Standard Bidding Document

Infrastructure Development Works of Sub Sector G14/1 (Works)

National

Single Stage-Two Envelope

October 01, 2026

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REQUEST FOR BIDS

PROCUREMENT OF CIVIL WORKS

1. The **Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA)** has reserved Funds for the procurement planned for FY **2026-27**. The **Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA)** intends to apply part of the proceeds of this Fund to cover eligible payments under the contract for the "**Infrastructure Development Works of Sub Sector G14/1**" with the reference of " **P141369**".

2. The **Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA)** invites sealed Bids from eligible Bidders for procurement of Works **(Infrastructure Development Works of Sub Sector G14/1)** described in the bidding documents on **EPADS v2.0**.

3. **Single Stage-Two Envelope** will be used by adopting **Least Cost Based Selection (LCBS)** Technique for the subject procurement, in line with the Public Procurement Rules, 2004 and any Regulations, Regulatory Guides, Procurement Guidelines or Instructions issued by the Authority from time to time.

4. All Bids must be accompanied by a Bid Security amount described in Bid Security Section in Bidding Document in the form of **Pay Order, Call at Deposit, Bank Guarantee**. Or all bids must be accompanied by bid securing declaration in the format specified in the Bidding documents

5. E-Bidding documents, containing detailed terms & conditions, specifications and requirements etc. are available on **e-Pak Acquisition and Disposal System (EPADS)** at **https://epads.gov.pk/opportunities/federal/procurements/141369** for all the interested bidders registered on **EPADS v2.0**. Bidders are required to get themselves registered on **EPADS v2.0** to participate in Bidding process.

6. The e-bids, prepared in accordance with the instructions in the e-Bidding documents, must be submitted through **EPADS v2.0** on or before **Monday, October 19, 2026 11:00 AM**. E-bids will be opened by using **EPADS v2.0** on the same day at **Monday, October 19, 2026 11:30 AM**. Manual submission of Bids shall not be entertained. Those vendor who have not yet registered on the new version of **EPADS v2.0**, may register themselves on **https://vendors.epads.gov.pk/**. A tutorial to explain the registeration process is available at **https://www.youtube.com/watch?v=MNW6T38v7tc.**

In terms of Rules 48 of Public Procurement Rules, 2004 Grievance Redressal Committee (GRC) is notified for the subject procurement and notification copy is available on the procuring agency's website and on Authority's website at (**www.ppra.org.pk**).

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Instructions to Bidders

A. INTRODUCTION

1. **Scope of Bid**

1.1. The Procuring agency/Employer (PA), as indicated in the Bid Data Sheet (BDS) invites Bids for the execution of Works as specified in the BDS and Section V- Works Requirements. The name, identification, and number of lots (contracts) of this National/ International Competitive Bidding process are specified in the BDS.

2. **Source of Funds**

2.1. Source of funds as referred in Clause 2 of Bid Data Sheet.

3. **Eligible Bidders**

3.1. A bidder may be natural person, company or firm or public or semi-public agency of Pakistan or any foreign country, or any combination of them with a formal existing agreement (on Judicial Papers) in the form of a joint venture or consortium. In the case of a joint venture or consortium, all members shall be jointly and severally liable for the execution of the Contract in accordance with the terms and conditions of the Contract. The joint venture or consortium shall nominate a Lead Member as nominated in the BDS, who shall have the authority to conduct all business for and on behalf of any and all the members of the joint venture or consortium during the Bidding process, and in case of award of contract, during the execution of contract. Verifiable copy of the agreement that forms a joint venture, consortium or association shall be required to be submitted as part of the Bid.

Any bid submitted by the joint venture, consortium or association shall indicate the part of proposed contract to be performed by each party and each party shall be evaluated (or post qualified if required) with respect to its contribution only, and the responsibilities of each party shall not be substantially altered without prior written approval of the Procuring Agency and in line with any instructions issued by the Authority.

(The limit on the number of members of JV or Consortium may be prescribed

in BDS, in accordance with the guidelines issued by the PPRA).

3.2. The invitation for bids is open to all prospective bidders subject to any provisions of incorporation or licensing by the respective national/ international incorporating agency or statutory body established for that particular trade or business. Procuring agencies shall specify the registration/licensing requirements for the foreign bidder keeping in view the requirement of that business.

3.3. A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidders may be considered to have a conflict of interest with one or more parties in this Bidding process, if they:

3.3.1. are associated or have been associated in the past, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring agency/Employer to provide consulting services for the preparation of design or technical specifications of the works that are the subject of the bid; or

3.3.2. have controlling shareholders in common; or

3.3.3. receive or have received any direct or indirect subsidy from any of them; or

3.3.4. have the same legal representative for purposes of this Bid; or

3.3.5. have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another bidder, or influence the decisions of the Procuring agency/Employer regarding this Bidding process; or

3.3.6. Submit more than one bid in this bidding process.

3.4. A Bidder may be ineligible if –

3.4.1. he is declared bankrupt or, in the case of company or firm, insolvent;

3.4.2. payments in favor of the bidder is suspended in accordance with the judgment of a court of law other than a judgment declaring bankruptcy and resulting (in accordance with the national laws) in the total or partial loss of the right to administer and dispose of its property;

3.4.3. the bidder is convicted, by a final judgment of a Court of Law or relevant Professional Statuary Body, of any offence involving professional conduct;

3.4.4. The bidder is debarred/ blacklisted by a national level Procuring agency/Employer and hence debarred due to involvement in corrupt and fraudulent practices, or performance failure or due to breach of bid securing declaration.

3.5. As and when required, bidders shall provide to the Procuring agency/Employer evidence of their eligibility, proof of compliance with the necessary legal requirements to carry out the contract effectively.

3.6. Bidders shall submit proposal relating to the nature, conditions and modalities of sub-contracting wherever the sub-contracting of any elements of the contract is envisaged.

4. **Eligible Material and Equipment**

4.1. All the material and equipment to be mobilized under the contract shall have their origin in eligible source countries, and all expenditures made under the contract will be limited to such materials and equipment. For this purpose, ineligible countries are stated in the section-IV titled as “Eligible Countries”.

B. BIDDING DOCUMENTS

5. **Contents of Bidding Documents**

5.1. The scope of Works, bidding procedures, and terms and conditions of the contract are prescribed in the bidding documents. In addition to the Invitation for Bids, the bidding documents which should be read in

conjunction with any addenda issued in accordance with ITB 7.1 include:

Section I -Invitation for Bids

Section II Instructions to Bidders (ITBs)

Section III Bid Data Sheet (BDS)

Section IV Eligible Countries

Section V Evaluation and Qualification Criteria

Section VI Works Requirements Technical Specifications & Schedule of Requirements

Section VII Standard Bidding Forms

Section VIII General Conditions of Contract (GCC)

Section IX Particular Conditions of Contract (PCC)

Section X Contract Forms

5.2. The bidder is expected to examine all instructions, forms, specifications, terms and conditions prescribed in the bidding documents. Failure to furnish all the information required in the bidding documents will be at the bidder’s risk and may result in the rejection of his bid.

6. **Clarification of Bidding Document, Pre-bid Meeting**

6.1. A prospective bidder requiring any clarification of the bidding document may notify the Procuring agency/Employer through EPADS.

6.2. The Procuring agency/Employer shall respond to the request for clarification in accordance with Rule 31 of the Public Procurement Rules 2004.

6.3. Should the Procuring Agency deem it necessary to amend the BIDDING document as a result of a clarification, it shall do so following the procedure under ITB 7.

6.4. If indicated in the BDS, the bidder’s designated representative is invited at the bidder’s cost to attend a pre-bid meeting at the place, date and time mentioned in the BDS. During this pre-bid meeting, prospective bidders may request clarification of the schedule of requirement, the evaluation criteria or any other aspects of the bidding documents.

6.5. Minutes of the pre-bid meeting, if applicable, including the text of the questions asked by bidders, including those during the meeting (without identifying the source) and the responses given, together with any responses prepared after the meeting will be uploaded on EPADS. Any modification to the bidding documents that may become necessary as a result of the pre-bid meeting shall be made by the Procuring agency/Employer exclusively through the use of an Addendum pursuant to ITB 7. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

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

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

7. **Amendment of Bidding Documents**

7.1. The procuring agency may issue notification of any change, addition, modification or deletion in accordance with Rule 23 of the Public Procurement Rules 2004 i.e. Bidding Documents.

7.2. To give prospective bidders reasonable time in which to take an addendum/corrigendum into account in preparing their bids, the Procuring agency/Employer may, at its discretion, extend the deadline for the submission of bids:

Provided that the Procuring agency/Employer shall extend the deadline for submission of bid in pursuance of Rule 27 of the Public Procurement Rules 2004, i.e. Extension of time for submission of bids, if such an addendum is

issued within last three (03) days of the bid submission deadline.

C. PREPARATION OF BIDS

8. **Language of Bid**

8.1. The bid prepared by the bidder, as well as all correspondence and documents relating to the bid exchanged by the bidder and the Procuring agency/Employer shall be written in the English language unless specified in the BDS. Supporting documents and printed literature furnished by the bidder may be in another language provided they are accompanied by an accurate translation of the relevant pages in the English language unless specified in the BDS, in which case, for purposes of interpretation of the bidder, the translation shall govern.

9. **Documents Constituting the Bids**

9.1. The Bids prepared by the Bidder shall constitute of all the documents required in the BDS.

10. **Documents Establishing Eligibility of Material, Equipment and Works, their Conformity to Bidding Documents**

10.1. The bid prepared by the bidder shall constitute the following components: -

10.1.1. Documentary evidence established in accordance with ITB 10 that the material and equipment to be utilized by the Bidder for the executions of works are eligible material and equipment and conform to the Bidding Documents;

10.1.2. Documentary evidence established in accordance with ITB 11 that the bidder has been authorized to carry out the Construction works;

10.1.3. Documentary evidence established in accordance with ITB 11 that the bidder is eligible and/or qualified for the subject bidding process;

10.1.4. Form of Bid and Bid Prices completed in accordance with ITB 12 and 13;

10.1.5. Completed schedules as required, including priced Bill of Quantities in accordance with ITB 13.

10.1.6. Technical Proposal completed in all aspects in accordance with ITB-15.

10.1.7. Bid security or Bid Securing Declaration furnished in accordance with ITB 17;

10.1.8. Any other document required in the BDS.

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

10.3. The bidder shall furnish, as part of its bid, all those documents establishing the eligibility in conformity to the terms and conditions specified in the bidding documents for all material, equipment and works which the bidder proposes to execute.

10.4. The documentary evidence of conformity of the material, equipment and works to the Bidding Documents may be in the form of literature, drawings, and data, and shall consist of:

10.4.1. a detailed description of the work methodology, approach, schedule and resources to be mobilized at site;

10.4.2. an item-by-item commentary on the Procuring agency/Employer’s Technical Specifications demonstrating substantial responsiveness of the material, equipment and works to those specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications;

10.4.3. any other procurement specific documentation requirement as stated in the BDS.

10.5. The required documents and other accompanying documents must be in English. In case any other language than English is used the pertinent translation into English shall be attached to the original version.

11. **Documents Establishing Eligibility and Qualification of the Bidder**

11.1. The bidder shall furnish, as part of its bid, all those documents establishing the bidder's eligibility to participate in the bidding process and/or its qualification to perform the contract if its bid is accepted.

11.2. The documentary evidence of the bidder's eligibility to bid shall establish to the satisfaction of the Procuring agency/Employer that the bidder, at the time of submission of its bid, is from an eligible country as defined in Section-IV titled as "Eligible Countries".

11.3. The documentary evidence of the bidder's qualification to perform the contract if its bid is accepted shall establish to the satisfaction of Procuring agency/Employer that:

11.3.1. The bidder has the financial and technical capability necessary to perform the Contract, meets the qualification criteria specified in Section-V, Evaluation and Qualification Criteria and BDS.

11.3.2. In the case of a bidder not doing business within Pakistan, the bidder is or will be (if awarded the contract) represented by a local bidder (Joint Venture) in accordance with the PEC works bylaws, and in case of award of works such foreign firm is required to participate in the execution of works to carry out its obligations as prescribed in the Conditions of Contract and /or Technical Specifications.

11.3.3. That the bidder meets the qualification criteria listed in Section-V, Evaluation and Qualification Criteria and BDS.

12. **Forms of Bid**

12.1. The Bidder shall fill the Form of Bids furnished in the bidding documents. The Bids Form must be completed without any alterations to its format and no substitute shall be accepted.

13. **Bid Prices**

13.1. The bid prices quoted by the bidder in the Standard bid Forms, Bill of Quantities and in the Price Schedules shall conform to the requirements specified below or exclusively mentioned hereafter in the bidding documents.

13.2. The bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. If a Price Schedule shows items listed but not priced, their prices shall be construed to be included in the prices of other items in the Bill of Quantities and will not be paid for separately by the Procuring agency/Employer.

13.3. Items not listed in the Price Schedule shall be assumed not to be included in the bid, and provided that the bid is still substantially responsive in their absence or due to their nominal nature, the corresponding average price of the respective item(s) of the remaining substantially responsive bidder(s) shall be construed to be the price of those missing item(s):
Provided that:

13.3.1. where there is only one (substantially) responsive bidder, or

13.3.2. where there is provision for alternate proposals and the respective items are not listed in the other bids,
The Procuring agency/Employer may fix the price of missing items in accordance with market survey, and the same shall be considered as final price.

13.4. The Bid price to be quoted in the Form of Bid in accordance with ITB 12 shall be the total price of the bid.

13.5. Unless otherwise specified in the BDS and the Contract, the rates and prices quoted by the bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the

Conditions of Contract.

13.6. If so specified in ITB 1.1, bids may be invited for individual lots (contracts) or for any combination of lots (packages).

13.7. Prices quoted by the Bidder shall be fixed during the bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable price will be treated as non-responsive and shall be rejected, pursuant to ITB 27, unless otherwise price adjustment is permissible under Conditions of the Contract.

13.8. All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date twenty-eight (28) days prior to the deadline for submission of bids, shall be included in the rates and prices and the total bid price submitted by the bidder.

14. **Currencies of Bid and Payment**

14.1. Prices shall be quoted in Pakistani Rupees unless otherwise specified in the BDS. Comparison of bids and tie of bid shall be treated in accordance with the Rule 30(2) of Public Procurement Rules, 2004.

15. **Documents Comprising the Technical Proposal**

15.1. The bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section VII – Standard Bid Forms, in sufficient detail to demonstrate the adequacy of the bidder's proposal to meet the work requirements and the completion time.

16. **Bid Validity Period**

16.1. Bids shall remain valid for the period specified in the BDS after the bid submission deadline prescribed by the Procuring agency/Employer. A bid valid for a shorter period shall be rejected by the Procuring agency/Employer as non-responsive. The period of bid validity will be determined from the complementary bid securing instrument i.e. the expiry period of bid security or bid securing declaration as the case may be.

16.2. Under exceptional circumstances, prior to the expiration of the initial Bids/Bid validity period, the Procuring Agency may request the Bidders' consent to an extension of the period of validity of their Bids/Bid. Such request for extension of the period of bid validity shall be carried out in accordance with Rule 26 of the Public Procurement Rules, 2004.

17. **Bid Security or Bid Securing Declaration**

17.1. Pursuant to ITB 11.1 unless otherwise specified in the BDS, the bidder shall furnish as part of its bid, a Bid Security in accordance with Rule 25 of the Public Procurement Rules, 2004 in the amount and currency specified in the BDS or Bid Securing Declaration as specified in the BDS in the format provided in Section VII (Standard Bidding Forms).

In case Procuring agency/Employer is inviting bids in lots / packages, the bidder shall be required to submit his bid security against the respective lot/ package for which he is submitting his bid.

Until the development of functionality of auto verification of financial instrument in EPADS, the scanned copy of bid security or bid securing declaration, as the case may be, shall be uploaded on E-PADS whereas the original instrument to be submitted to the procuring agency before closing of bid submission deadline,

17.2. The Bid Security shall be denominated in the local currency or in another freely convertible currency, and it shall be in the form specified in the **BDS** which shall be in any of the following:

17.2.1. A bank guarantee, an irrevocable letter of credit issued by a Scheduled bank in the form provided in the Bidding Documents or another form acceptable to the Procuring agency/Employer and valid for twenty-eight (28) days beyond the end of the validity of the Bid. This shall also apply if the period for Bid Validity is extended. In either case, the form must include the complete name of the bidder;

17.2.2. A cashier's or certified cheque; or

17.2.3. Another security as indicated in the **BDS**.

17.3. The Bid Security or Bid Securing Declaration shall be in accordance with the Form of the Bid Security or Bid Securing Declaration included in Section VII (Standard Bidding Forms) or another form approved by the Procuring agency/Employer prior to the bid submission.

17.4. The Bid Security shall be payable promptly upon written demand by the Procuring agency/Employer in case any of the conditions listed in ITB 17.9 are invoked.

17.5. Any bid not accompanied by a Bid Security or Bid Securing Declaration in accordance with ITB 17.1 or 17.3 shall be rejected by the Procuring agency/Employer and shall be declared as non-responsive bid, pursuant to ITB 27.

17.6. Unsuccessful bidders' Bid Security will be discharged or returned as promptly as possible, however in no case later than thirty (30) days after the expiration of the period of Bid Validity prescribed by the Procuring agency/Employer pursuant to ITB 16. The Procuring agency/Employer shall make no claim to the amount of the Bid Security, and shall promptly return the Bid Security document, after whichever of the following that occurs earliest:

17.6.1. The expiry of the Bid Security;

17.6.2. The entry into force of a procurement contract and the provision of a performance security (or guarantee), for the performance of the contract if such a security (or guarantee), is required by the Biding documents;

17.6.3. The rejection by the Procuring agency/Employer of all Bids;

17.6.4. The withdrawal of the bid prior to the deadline for the submission of bids, unless the biding documents stipulate that no such withdrawal is permitted.

17.7. The successful bidder's Bid Security will be discharged upon the bidder signing the contract pursuant to ITB 40, or furnishing the performance security (or guarantee), pursuant to ITB 41.

17.8. The Bid Security may be forfeited or the Bid Securing Declaration executed:

17.8.1. if a Bidder:

17.8.1.1. Withdraws its Bid during the period of Bid Validity as specified by the Procuring agency/Employer, and referred by the bidder on the Form of Bid except as provided for in ITB 16.2; or

17.8.2. In the case of a successful bidder, if the bidder fails:

17.8.2.1. to sign the contract in accordance with ITB 40; or

17.8.2.2. to furnish performance security (or guarantee) in accordance with ITB 41.

17.9. In case of Bid Security issued by the foreign bank is allowed by the Procuring agency/Employer, the same should be counter guaranteed by a corresponding bank in Pakistan. Furthermore, in case of joint venture, it should be in the name of Joint venture to ensure joint responsibility. In case the JV is not legally constituted at the time of bid submission, the bid security or bid securing declaration shall be in the names of all future members as named in the letter of bid.

18. **Withdrawal of Bids**

18.1. Before bid submission deadline, any bidder may withdraw, substitute, or modify its bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and the corresponding must accompany the respective written notice.

19. **Format and Signing of Bid**

19.1. The Bidder shall prepare and submit Bids through EPADS with due diligence after carefully reading all the terms and condition before bid submission deadline.

D. SUBMISSION OF BIDS

20. **Submission of Bids through EPADS v2.0**

20.1. All bids shall be submitted through EPADS v2.0.

21. **Deadline for Submission of Bids**

21.1. All bids shall be received through **EPADS v2.0** not later than bid submission deadline as specified in the **BDS**.

21.2. The Procuring agency/Employer may, under exceptional circumstances and at its discretion, extend the deadline for the submission of bids, pursuant to Rule 27 of the Public Procurement Rules, 2004. Extension of Time for submission of bid, by amending the Bidding Documents in accordance with ITB 7, in which case all rights and obligations of the Procuring agency/Employer and bidders previously subject to the deadline will thereafter be subject to the new deadline.

22. **Substitution and Modification of bids**

22.1. A bidder may substitute or modify his bid after it has been submitted, provided that written notice of the substitution or modification of the bid, is received by the Procuring agency/Employer prior to the deadline for submission of bids.

22.2. Revised bid may be submitted after the substitution or modification made in the original bid in accordance with the provisions referred in **ITB 18** .

E. OPENING AND EVALUATION OF BIDS

23. **Opening of Bids**

23.1. The Procuring Agency will open bids in accordance with Rule 28 of the Public Procurement Rules, 2004 and as specified in the BDS.

24. **Confidentiality**

24.1. Information relating to the examination, clarification, evaluation and comparison of bids and recommendation of contract award shall not be disclosed to bidders or any other persons not officially concerned with such process until the time of the announcement of the respective evaluation report.

25. **Clarification of Bids**

25.1. Clarification of Bidding Documents shall be carried out in accordance with Rule 31 of the Public Procurement Rules, 2004.

25.2. The alteration or modification in the bid which in any case affect the following parameters will be considered as a change in the substance of a bid:

25.2.1. evaluation & qualification criteria;

25.2.2. required scope of work;

25.2.3. contract price;

25.2.4. all securities requirements;

25.2.5. tax requirements;

25.2.6. terms and conditions of bidding documents.

25.2.7. change in the ranking of the bidder

26. **Preliminary Examination of Bids**

26.1. Prior to the detailed evaluation of bids, the Procuring agency/Employer will determine whether each bid:

26.1.1. meets the eligibility criteria defined in **ITB 3** and **ITB 4**;

26.1.2. has been prepared as per the format and contents defined by the Procuring agency/Employer in the bidding documents;

26.1.3. has been properly signed;

26.1.4. is accompanied by the required securities; and

26.1.5. is substantially responsive to the requirements of the bidding documents.

The Procuring agency/Employer's determination of a bid's substantial responsiveness will be based on the contents of the bid itself.

26.2. A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding Documents, without material deviation or reservation. A material deviation or reservation is one that: -

26.2.1. affects in any substantial way the scope, quality, or performance of the Works;

26.2.2. limits in any substantial way, inconsistent with the bidding documents, the Procuring agency/Employer's rights or the bidders' obligations under the Contract; or

26.2.3. if rectified, would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

26.3. The Procuring agency/Employer will confirm that the documents and information specified under ITB 9, 10 and 11 have been provided in the bid. If any of these documents or information is missing, or is not provided in accordance with the Instructions to Bidders, the bid shall be rejected.

26.4. The Procuring agency/Employer may waive-off any minor informality, nonconformity, or irregularity in a bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

Explanation: A minor informality, non-conformity or irregularity is one that is merely a matter of form and not of substance. It also pertains to some immaterial defect in a Bid or variation of a bid from the exact requirements of the invitation that can be corrected or waived without being prejudicial to other bidders. The defect or variation is immaterial when the effect on quantity, quality, or delivery is negligible when contrasted with the total cost or scope of the works. The Procuring agency/Employer either shall give the bidder an opportunity to cure any deficiency resulting from a minor

informality or irregularity in a bid or waive the deficiency, whichever is advantageous to the Procuring agency/Employer. Examples of minor informalities or irregularities include failure of a bidder to –

26.4.1. *Submit the number of copies of signed bids required by the invitation;*

26.4.2. *Furnish required information concerning the number of its employees;*

26.4.3. *the firm submitting a bid has formally adopted or authorized, before the date set for opening of bids, the execution of documents by typewritten, printed, or stamped signature and submits evidence of such authorization and the bid carries such a signature.*

26.5. Provided that a Technical Bid is substantially responsive, the Procuring agency/Employer may request the bidder to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Technical Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any such aspect of the technical Proposal linked with the ranking of the bidders. Failure of the bidder to comply with the request may result in the rejection of its bid.

26.6. Provided that a Technical Bid is substantially responsive, the Procuring agency/Employer shall rectify quantifiable nonmaterial nonconformities or omissions related to the Financial Proposal. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of the missing or nonconforming item or component.

26.7. If a bid is not substantially responsive, it will be rejected by the Procuring agency/Employer and may not subsequently be evaluated for complete technical responsiveness.

27. **Examination of Terms and Conditions; Technical Evaluation**

27.1. The Procuring agency/Employer shall examine the bid to confirm that all terms and conditions specified in the **GCC** and the **PCC** have been

accepted by the bidder without any material deviation or reservation.

For this purpose:

“Deviation” means departure from the requirements specified in the Bidding Document.

“Reservation” means setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document.

27.2. The Procuring agency/Employer shall evaluate the technical aspects of the bid submitted in accordance with ITB 30, to confirm that all requirements specified in Section VI – Works Requirement, Technical Specifications of the Bidding Documents have been met without material deviation or reservation.

27.3. If after the examination of the terms and conditions and the technical evaluation, the Procuring agency/Employer determines that the bid is not substantially responsive in accordance with ITB 27, it shall reject the bid.

28. **Correction of Arithmetic Errors**

28.1. Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows: -

28.1.1. if there is a discrepancy between unit prices and the sub-total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the sub-total price shall be corrected, unless in the opinion of the Procuring agency/Employer there is an obvious misplacement of the decimal point in the unit price, in which the total price as quoted shall govern and the unit price shall be corrected;

28.1.2. if there is an error in a total corresponding to the addition or subtraction of sub-totals, the sub-totals shall prevail, and the total shall be corrected; and

28.1.3. where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.

28.1.4. Where there is discrepancy between grand total of price schedule and amount mentioned on the Form of Bid, the amount referred in Price Schedule shall be treated as correct subject to elimination of other errors.

28.2. The amount stated in the Bid will, be rectified by the Procuring agency/Employer in accordance with the above procedure for the correction of errors and, with, the concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount, its bid shall be rejected after forfeiture of Bid Security or execution of the Bid Securing Declaration, as the case may be, in accordance with **ITB 41.3**.

29. **Conversion to Single Currency**

29.1. The unit rates and the prices shall be quoted by the bidder entirely in Pak rupees. A bidder expecting to incur expenditures in other currencies for inputs to the Works from outside the Procuring agency/Employer's country (referred to as the "Foreign Currency Requirements") shall indicate the same in the letter of bid-financial proposal. The proportion of the Bid Price (excluding Provisional Sums) needed by him for the payment of such Foreign Currency Requirements either (i) entirely in the currency of the Bidder's home country or, (ii) at the bidder's option, entirely in Pak rupees provided always that a bidder expecting to incur expenditures in a currency or currencies other than those stated in (i) and (ii) above for a portion of the foreign currency requirements, and wishing to be paid accordingly, shall indicate the respective portions in his bid. Comparison of bids quoted in different currencies and conversion of bids into a single currency shall be carried out in accordance with Rule 30(2) of the Public Procurement Rules, 2004**.**

30. **Evaluation of Bids**

30.1. The Procuring agency/Employer shall evaluate and compare only the bids determined to be substantially responsive, pursuant to **ITB 27**.

30.2. In evaluating the Technical Proposal of each Bid, the Procuring agency/Employer shall use the criteria and methodologies listed in the BDS

and in terms of works requirement. No other evaluation criteria or methodologies shall be permitted.

30.3. The Procuring agency/Employer's evaluation of a bid will take into account:

30.3.1. the bid price, excluding provisional sums and the provision, if any, for contingencies in the summary bill of quantities, but including day work items, where priced competitively;

30.3.2. converting the amount resulting from applying above, if relevant, to a single currency in accordance with ITB 29;

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

30.5. If these bidding documents allow bidders to quote separate prices for different lots, and the award to a single bidder of multiple lots, the methodology of evaluation to determine the lowest evaluated lot combinations in the Form of Bid, is specified in the **BDS**.

30.6. If the bid, which results in the Evaluated Bid Price (Successful Bid), is seriously unbalanced or front loaded in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

Explanation:

"Unbalanced" or "front-loaded" bids consist of deliberately submitting bids with artificially high prices or unit rates for the early stages of a construction project, offset by artificially low prices or unit rates for the later stages of the project, to improve the contractor's cash flow.

31. **Domestic Preference**

31.1. If the **BDS** so specifies, the Procuring agency/Employer will grant a margin of preference to the domestic contractor in line with the rules, regulations, regulatory guides or instructions issued by the Authority from time to time.

32. **Determination of Successful Bid**

32.1. The Procuring agency/Employer shall compare the evaluated bids in accordance with the predefined bidding procedure, of all substantially responsive bids to determine the Successful bidder.

33. **Qualification of Bidder**

33.1. The Procuring agency/Employer shall determine to its satisfaction whether the bidder is substantially responsive and whose bid is declared as Successful bid either continues to meet (if prequalification applies) or meets (if post-qualification applies) the qualifying criteria specified in Evaluation and Qualification Criteria.
Note: In case of international bidding, the parameters for incorporation or licensing within Pakistan may be fulfilled as part of post qualification.

33.2. The determination shall be based upon an examination of the documentary evidence of the bidder’s qualifications submitted by the bidder, pursuant to **ITB 11**.

33.3. Prior to contract award, the Procuring agency/Employer will verify that the successful bidder (including each member of a JV) is not blacklisted/debarred. The Procuring agency/Employer will conduct the same verification for each sub-contractor proposed by the successful bidder.

34. **Sub-Contractors**

34.1. The bidder shall provide details regarding any specialized sub-contractor to the Procuring agency/Employer. In case change of sub-contractors, the bidder shall promptly notify the Procuring agency/Employer and obtain approval for replacement of sub-contractors.

34.2. Bidders may propose sub-contracting up to the percentage of total value of contracts or the volume of works as specified in the **BDS**.

35. **Abnormally Low Financial Bid**

35.1. A procuring Agency may reject abnormally low bids. The decision of the Procuring agency/Employer to reject a bid and reasons for the decision shall be recorded in the procurement proceedings and promptly communicated to the bidder concerned. Moreover, the Procuring agency/Employer shall not incur any liability solely by rejecting abnormally bid

Guidance for Procuring agency/Employer:

An abnormally low bid means, in the light of the Procuring agency/Employer's estimate and of all the bids submitted, the bid appears to be abnormally low by not providing a margin for normal levels of profit. In order to identify the Abnormally Low Bid (ALB) following approaches can be considered to minimize the scope of subjectivity:

35.1.1. Comparing the bid price with the cost estimate;

35.1.2. Comparing the bid price with the bids offered by other bidders submitting substantially responsive bids; and

35.1.3. Comparing the bid price with prices paid in similar contracts in the recent past either government- or development partner-funded.

35.2. The Procuring agency/Employer will determine to its satisfaction whether the bidder that is selected as having submitted the successful bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in **ITB 11**

35.3. The determination will take into account the bidder's financial and technical capabilities. It will be based upon an examination of the documentary evidence of the bidder's qualifications submitted by the bidder, pursuant to **ITB 11**, as well as such other information as the Procuring agency/Employer deems necessary and appropriate. Factors not included in these bidding documents shall not be used in the evaluation of the bidders' qualifications.

35.4. Procuring agency/Employer may seek “Certificate for Independent Price Determination” from the bidder and the results of reference checks may be used in determining award of contract.

Explanation: The Certificate shall be furnished by the bidder. The bidder shall certify that the price is determined keeping in view of all the essential aspects such as raw material, its processing, value addition, optimization of resources due to economy of scale, transportation, insurance and margin of profit etc.

35.5. An affirmative determination will be a prerequisite for award of the contract to the bidder. A negative determination will result in rejection of the bidder’s bid, in which event the Procuring agency/Employer will proceed to the next ranked bidder to make a similar determination of that bidder’s capabilities to perform satisfactorily.

F. AWARD OF CONTRACT

36. **Criteria of Award**

36.1. Subject to **ITB 36 and 37**, the Procuring agency/Employer will award the Contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents and who has been declared as Successful Bidder, provided that such bidder has been determined to be:

36.1.1. eligible in accordance with the provisions of **ITB 3**;

36.1.2. is determined to be qualified to perform the Contract satisfactorily; and

36.1.3. Successful negotiations have been concluded, if any.

37. **Negotiations**

37.1. The Committee of the Procuring agency/Employer may negotiate with the Most Advantageous Bidder relating to the following areas:

37.1.1. a minor alteration to the technical (drawings, design technical specifications) details of the statement of works;

37.1.2. Methodology, work plan, staffing in view to streamline the work;

37.1.3. a minor amendment to the Particular conditions of Contract;

37.1.4. finalizing payment arrangements;

37.1.5. clarifying details that were not apparent or could not be finalized at the time of Bidding;

37.2. Where negotiation fails to result into an agreement, the Procuring agency/Employer may invite the next ranked bidder for negotiations. Where negotiations are commenced with the next ranked bidder, the Procuring agency/Employer shall not reopen earlier negotiations.

38. **Procuring agency's Right to reject All Bids**

38.1. The procuring agency has the right to reject all bids in accordance with Rule 33 of the Public Procurement Rules, 2004. However, the Authority (i.e. **PPRA**) may call from the Procuring agency/Employer the justification of those grounds.

39. **Notification of Award**

39.1. The procuring agency shall announce and publish the evaluation result in accordance with Rule 35 of the Public Procurement Rules, 2004.

39.2. Where no complaints have been lodged, the bidder whose bid has been accepted will be notified of the award by the Procuring agency/Employer prior to expiration of the bid validity period through EPADS. However, the Procuring agency/Employer shall not award any procurement contract at least for five (05) days after the announcement of final evaluation report. The notification letter (herein after and in the condition of the contract and contract form called “Letter of Acceptance” will specify the sum that the Procuring agency/Employer will pay the successful bidder in consideration for the execution and completion of the

works as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price).

39.3. The notification of award will constitute the formation of the Contract, subject to the bidder furnishing the Performance Security (or guarantee) in accordance with **ITB 41** and signing of the contract in accordance with **ITB 40**.

39.4. Upon the successful bidder's furnishing of the performance security (or guarantee) pursuant to **ITB 41**, the Procuring agency/Employer will promptly notify each unsuccessful bidder, the name of the successful bidder and the Contract amount and will discharge the Bid Security or Bid Securing Declaration of the bidder(s) pursuant to **ITB 17**.

40. **Signing of Contract**

40.1. Promptly after notification of award, Procuring agency/Employer shall send the successful bidder the draft agreement, incorporating all terms and conditions as agreed by the parties to the contract.

40.2. Immediately after the Redressal of grievance by the **GRC**, and after fulfillment of all conditions precedent of the Contract Form, the successful bidder and the Procuring agency/Employer shall sign the contract.

40.3. Where no formal signing of a contract is required, work order issued to the bidder shall be construed to be the contract.

41. **Performance Security (or Guarantee)**

41.1. After the receipt of the Letter of Acceptance, the successful bidder, within the specified time, shall deliver to the Procuring agency/Employer a Performance Guarantee in the amount and in the form stipulated in the BDS and PCC, denominated in the type and proportions of currencies in the Letter of Acceptance and in accordance with the Conditions of Contract.

41.2. If the Performance Guarantee is provided by the successful bidder and it shall be in the form specified in the BDS which shall be in any of the following:

41.2.1. certified cheque, cashier's or manager's cheque, or bank draft;

41.2.2. irrevocable letter of credit issued by a scheduled bank of Pakistan or in the case of an irrevocable letter of credit issued by a foreign bank, the letter shall be confirmed or authenticated by a scheduled bank of Pakistan;

41.2.3. bank guarantee confirmed by a reputable local bank or, in the case of a successful foreign bidder, bonded by a foreign bank; or

41.2.4. surety bond callable upon demand issued by any reputable surety or insurance company.
Any Performance Guarantee submitted shall be enforceable in Pakistan.

41.3. Failure of the Most Advantageous Bidder to comply with the requirement of **ITB 40** shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security or declare blacklisted (in case bid securing declaration is submitted) in which event the Procuring agency/Employer may make the award to the next most advantageous bidder or reinitiate the procurement process afresh (as a case may be).

42. **Advance Payment**

42.1. Advance payment will be provided to the bidder in percentage and in the manner as agreed by the both parties in terms of Conditions of the Contract.

42.2. The Procuring agency/Employer will provide an advance payment as stipulated in the Conditions of Contract, subject to a maximum amount, as stated and/or Conditions of the Contract. The advance payment request shall be accompanied by an advance payment security (guarantee) in the form provided in Section X. For the purpose of receiving the advance payment, the bidder shall make and estimate of, and include in its bid, the expenses that will relate to the purchase of equipment, machinery, materials, and on the engagement of labor during the first month beginning with the date of the Procuring agency/Employer's "**Notice to Commence**" as specified in the **PCC**.

43. **General Performance of the Bidders**

43.1. The Procuring agency/Employer reserves the right to obtain information regarding performance of the bidders on their previously awarded contracts / works. The Procuring agency/Employer may seek information / report from the previous employer for consideration. However, the Procuring agency/Employer shall incorporate such parameters in the evaluation criteria and accordingly decide the fate of the bid submitted.

44. **Corrupt & Fraudulent Practices**

44.1. Procuring agencies (including beneficiaries of Government funded projects and procurement) as well as Bidders/Suppliers/Contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts, and will avoid to engage in any corrupt and fraudulent practices.

G. GRIEVANCE REDRESSAL & COMPLAINT REVIEW MECHANISM

45. **Grievance Redressal**

45.1. Grievance Redressal shall be carried out in accordance with Rule 48 of the Public Procurement Rules, 2004 i.e. Redressal of grievances by the procuring agency and “Redressal of Grievances Regulations 2021”.

H. MECHANISM OF BLACKLISTING

46. **Mechanism of Blacklisting**

46.1. The Procuring agency/Employer shall proceed Blacklisting of Bidders/Contractors in accordance with Rule 19 of the Public Procurement Rules, 2004 i.e. Blacklisting and “Blacklisting and Debarment of Bidders or Contractors Regulations 2024.

Bid Data Sheet

Bids Data Sheet (BDS)

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

BDS Clause Number	ITB Number	Amendments of, and Supplements to, Clauses in the Instruction to Bidders
A. Introduction		
1	1.1	Name of Procuring Agency:**Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA)** The subject of procurement is:**Infrastructure Development Works of Sub Sector G14/1** Expected commencement date: **Tuesday, November 10, 2026**
2.	2.1	Financial year for the operations of the Procuring Agency:**2026-27** Name and identification number of the Contract: **P141369**
3.	3.1	JV/Consortium or AssociationAllowed: **No** Number of JV/Consortium Members: **Nil**
B. Bidding Documents		

4.	**6.2 & 6.4**	The Bidders may seek clarifications through **EPADS v2.0**: Clarification Date: Friday, October 16, 2026 Pre-Bid Meeting: Monday, October 12, 2026 11:00 AM Venue: Committee Room, 10-Mauve Area, Sector G-10/4, FGEHA, Islamabad.
5.	**7.2**	Any addendum, in case issued, shall be published on **Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA)** website and on **EPADS v2.0**.
C. Preparation of Bids		
6.	**8.1**	List of documents required along with the bid: No
7.	**9.1**	The qualification criteria to establish the supply / production capability of the bidder. *see Eligibility Criteria*
8.	**11.2**	**Works and Their relateddocuments:** *See section Required Scope of Work*
9.	**11.1**	Price schedule will be provided according to the format defined and acquired. *see section price schedule.*
10.	**11.4**	**Specifications:** *see section of specifications.*

11.	**11.5 & 13.5**	The price shall be **Fixed**. The bid price shall be adjusted in accordance with Appendix provided – Formula for Price Adjustment.
12.	**14.1**	Currency of the Bids shall be : **PKR**
13.	**16.1**	The Bids/Bid Validity period shall be: **120 Days**
14.	**17.1**	The amount of Bid Security shall be as defined in Bid Security Section for items and lots given in **BDS 6**
15.	**17.2**	The Bid Security shall be in the form of: **Pay Order, Call at Deposit, Bank Guarantee**
16.	**15.1**	Alternative Bids to the requirements of the bidding documents willnot be permitted.
D. Submission of Bids		
17.	**18.1 & 21.1**	Bid shall be submitted online on EPADS v2.0 whereas hard copy of the bid security should be submitted to the following; **10-Mauve Area, Sector G-10/4, Islamabad Capital Territory** Bids that are not submitted on EPADS v2.0 shall be disqualified. The deadline for Bids submission is: **Monday, October 19, 2026 11:00 AM**
E. Opening and Evaluation of Bids		

18.	**24.1**	The Bids opening shall take place on **EPADS v2.0**. Day *:* ***Monday*** Date:***October 19, 2026*** Time *:* ***11:30 AM***
19.	**30.2**	Selection technique adopted will be: **Least Cost Based Selection (LCBS)** *see Evaluation Criteria*
F. Award of Contract		
20.	**41.1 & 41.2**	The Performance guarantee shall: **10.00%**. The Performance Guarantee shall be acceptable in the form of:**Bank Guarantee**
21.	**45.1**	Arbitrator shall be appointed by mutual consent of the both parties.
G. Review of Procurement Decisions		
22.	**37**	Grievance against this procurement shall be submitted online on EPADS v2.0.

Eligibility Criteria

Bidder's Type	Required Registration
Any	NADRA CITIZENSHIP (CNIC/NICOP) FBR (NTN) FBR (GSTN) PEC

Eligibility Criteria	Document
Nationality - Nationality in accordance with ITB 4.3 of Volume I (Attached Annexure)Forms ELI 1 and 2, with attachments	Yes
Conflict of Interest - No conflicts of interest in accordance with ITB 3.7 of Volume I (Attached Annexure) (Letter of Bid – Technical Proposal)	Yes
State owned entity proof - Shall be a state-owned entity - State owned entity proof.	Yes
Valid registration with Pakistan Engineering Council - Category C-B and above Specialization Codes: CE-01, CE-09, CE-10, EE-04 and EE-11 - PEC Registration License	Yes
History of Non-Performing Contracts - Non-performance of a contract did not occur as a result of contractor default for last 15 years - Form CON-2	Yes
Pending Litigation - Bidder’s financial position and prospective long-term profitability sound according to criteria established in Financial Capabilities below and assuming that all pending litigation will be resolved against the Bidder - Form CON – 2	Yes

Litigation History - No consistent history of court/ arbitral award decisions against the Bidder since 1st January 2011 - Form CON – 2	Yes
No- Blacklisting - Bidder has never been blacklisted - Affidavit on Judicial Stamp Paper prepared within the current month of submission of bidding document that the firm has never been blacklisted.	Yes
Income Tax Registration Certificate - Bidder registration with the Federal Board of Revenue for Income Tax - Income Tax Registration Certificate	Yes
Active Tax Payer (Income Tax) - Bidder shall be on the active taxpayer’s list of the Federal Board of Revenue for Income Tax - Record of Active Taxpayer for Income Tax	Yes
Active Tax Payer (Sales Tax) - Bidder shall be on the active taxpayer’s list of the Federal Board of Revenue for Sales Tax - Record of Active Taxpayer for Sales Tax	Yes

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Evaluation Criteria

Least Cost Based Selection (LCBS)

Weightage

Technical Evaluation %
100

Technical Marks	100
Passing Marks	**50**
Experience	
Specific Infrastructure Works Experience – Completed Projects Experience as constructor in execution of Roads/Housing Infrastructure development Projects completed during last ten (10) years. Max. Marks = 24 • 12 marks will be awarded for each completed project having project cost ≥ Rs. 1,500M up to maximum of 24 marks. • 08 marks will be awarded for each completed project having project cost from Rs. 1000M to Rs. 1499.99 M up to maximum of 24 marks. • 06 marks will be awarded for each completed project having project cost from Rs. 750 M to 999.99M up to maximum of 24 marks. • No marks will be awarded for project having project cost < Rs. 750M. Form. EXP – 4.2 (a) i. The applicants must provide Letter of Award and Taking Over/ Completion Certificate of completed projects. No marks will be given to the projects for which above certificates are not provided. ii. Applicant shall provide complete information of the projects including scope, cost and covered area etc. iii. Proportionate marks on the basis of share in JV agreement will be awarded to each partner, for projects executed as Joint Venture (JV). (Qualitative)(Doc Required)	24

Specific Infrastructure Works Experience – In-Hand Projects Experience as Contractor in execution of Roads/Housing Infrastructure development projects currently in-hand. Max. Marks = 16 • 08 marks will be awarded for each in-hand project having project cost ≥ Rs. 200M up to maximum of 16 marks • 06 marks will be awarded for each in-hand project having project cost from Rs. 170M to Rs. 199.99M up to maximum of 16 marks. • 04 marks will be awarded for each in-hand project having project cost from Rs. 140M to Rs. 169.99M up to maximum of 16 marks. • No marks will be awarded for project having project cost < Rs. 140M. Form. EXP – 4.2 (b) i. The applicants must provide Award Letter of in-hand projects. No marks will be given to the projects for which above certificate is not provided. ii. Applicant shall provide complete information of the projects including scope, cost and covered area etc. iii. Proportionate marks on the basis of share in JV agreement will be awarded to each partner, for projects executed as Joint Venture (JV). (Qualitative)(Doc Required)	16
Personnel Capabilities	
1) Project Manager - 3 marks will be awarded for M.Sc. Civil Engineer having at least 12 years relevant experience or B.Sc. Civil Engineer having at least 15 years' experience in roads/infrastructure works - Max Marks = 3 2) Construction Manager - 2 marks will be awarded for B.Sc. Civil Engineer having at least 10 years in roads/infrastructure works - Max Marks = 2 3) Site Engineer - 2 marks will be awarded for B.Sc. Civil Engineer having at least 10 years in roads/infrastructure works - Max Marks = 2 4) Associate Engineer (Civil) - 1.5 mark will be awarded for each Site Inspector having B-Tech / DAE Civil and at least 08 years in roads/infrastructure works up to maximum of 3 marks - Max Marks = 3 5) Associate Engineer (Electrical) - 1.5 mark will be awarded for Site Inspector having B-Tech / DAE Electrical and at least 08 years in roads/infrastructure works - Max Marks = 1.5 6) Quantity Surveyor (Civil) - 1.5 mark will be awarded for Quantity Surveyor having B-Tech / DAE Civil and at least 08 years in roads/infrastructure works - Max Marks = 1.5 7) Surveyor - 1 mark will be awarded for each Surveyor having certificate and at least 08 years in roads/infrastructure works up to maximum of 02 mark - Max Marks = 2 Form PER-1 and PER-2 Provide the following for each personnel, failing which, no marks will be awarded: a. verifiable proof of employment with the bidder of the staff b. detailed CV c. valid PEC Registration for Engineers d. Diploma Certificates of DA (Qualitative)(Doc Required)	15
Equipment Capabilities	

Asphalt Plant - Min. Quantity = 01 No. - Marks = 1.5 Pneumatic Tyre Roller - Min. Quantity = 04 No. - Marks = 1.5 Bull Dozer (200HP) - Min. Quantity = 02 No. - Marks = 01 Asphalt Paver Machine - Min. Quantity = 01 No. - Marks = 01 Concrete Batching Plant - Min. Quantity = 01 No. - Marks = 01 Vibratory Road Roller (10 Ton) - Min. Quantity = 04 No. - Marks = 01 Sheep Foot Roller (10 Ton) - Min. Quantity = 04 No. - Marks = 01 Excavator - Min. Quantity = 04 No. - Marks = 01 Grader - Min. Quantity = 04 No. - Marks = 01 Dumper - Min. Quantity = 16 No. - Marks = 01 Loader - Min. Quantity = 02 No. - Marks = 01 Tractor Trolley - Min. Quantity = 06 No. - Marks = 0.5 Water Bowser - Min. Quantity = 06 No. - Marks = 0.5 Concrete mixer machine (single load) - Min. Quantity = 02 No. - Marks = 0.5 Steel Cutting / Bending Machine - Min. Quantity = 02 No. - Marks = 0.5 Generator Set (10KVA) - Min. Quantity = 03 No. - Marks = 0.5 Total Station - Min. Quantity = 03 No. - Marks = 0.5 Form EQU: (SECTION VI) Proportionate marks will be awarded if minimum number of corresponding equipment is less than minimum required. Provide an undertaking on stamp paper to the effect that the listed equipment is available with the firm and will be made available, as and when required, for the Project. (Qualitative) (Doc Required)	15
Financial Soundness	
Annual Turnover The minimum annual volume of construction work (Annual Turn-Over) during any of the last three years: Max Marks = 15 • 7.5 Marks will be awarded if the Turnover is in range of PKR. 2,000 million to PKR. 2,500 million FORM FIN - 3.1, FIN - 3.2 and FIN 3.3 The bidder shall submit Audited financial statements for the last three years duly certified by the Chartered Accounts Firms shall submit copies of Credit Line Facility. No marks shall be awarded, if the audited financial statements are not provided for all 3 years. • 15 Marks will be awarded if the Turnover is more than PKR. 2,500 million. (Qualitative)(Doc Required)	15

Working Capital The amount of Working Capital (Current Assets – Current Liabilities) & credit facilities (in specific name of the Project), net of other construction commitments of the construction, shall be as under: Max Marks = 15 • 7.5 Marks will be awarded if the Working Capital is in range of PKR. 700 million to PKR. 1,000 million • 15 Marks will be awarded if the Working Capital is more than PKR. 1,000 million. FORM FIN - 3.1, FIN - 3.2 and FIN 3.3 The bidder shall submit Audited financial statements for the last three years duly certified by the Chartered Accounts Firms shall submit copies of Credit Line Facility. No marks shall be awarded, if the audited financial statements are not provided for all 3 years. (Qualitative) (Doc Required)	15

Jobs/Lots

Lot Title : INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB SECTOR G-14/1, ISLAMABAD

Bid Security : 50226492 PKR

Job	Delivery Schedule	Quantity
Roads Walkways and Paved areas	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job
Storm Water Drainage works	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job
Sanitary Sewerage Works	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job
Potable Water Supply works	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job

Job	Delivery Schedule	Quantity
Road/ Street Lighting Works	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job
Elevated Water Tank (Civil Works + Plumbing Works + Electrical Works)	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job
Underground Water Tank (02 Nos.) (Civil Works + Plumbing Works + Electrical Works)	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job
Tubewells (02 Nos.) (Civil Works + Plumbing Works + Electrical Works)	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job
Cross Drainage Works	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job
Geo-Technical Investigations	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job
Channelization of Storm water Nallah	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job
Dismantling	**Address:** G-14/1, Islamabad **Schedule:** 728 Days **Quantity:** 1/job	1/job

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Related Services :

No

Work Specifications and Market Rates

Lot Title: INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB SECTOR G-14/1, ISLAMABAD

Specifications / Requirements:

Sr. No	Ref. No.	Description	Unit	Qty	Rate		Amount
1	1	Roads Walkways and Paved areas (Detail BOQ Attached As Annexure)	Job	1	785241676	(Rupees Seven hundred eighty-five million, two hundred forty-one thousand, six hundred seventy-six Only)	785241676
2	2	Storm Water Drainage works (Detail BOQ Attached As Annexure)	Job	1	168639445	(Rupees One hundred sixty-eight million, six hundred thirty-nine thousand, four hundred forty-five Only)	168639445
3	3	Sanitary Sewerage Works (Detail BOQ Attached As Annexure)	Job	1	235208083	(Rupees Two hundred thirty-five million, two hundred eight thousand, eighty-three Only)	235208083

Sr. No	Ref. No.	Description	Unit	Qty	Rate		Amount
4	4	Potable Water Supply works (Detail BOQ Attached As Annexure)	Job	1	524150118	(Rupees Five hundred twenty-four million, one hundred fifty thousand, one hundred eighteen Only)	524150118
5	5	Road/ Street Lighting Works (Detail BOQ Attached As Annexure)	Job	1	303981948	(Rupees Three hundred three million, nine hundred eighty-one thousand, nine hundred forty-eight Only)	303981948
6	6	Elevated Water Tank (Civil Works + Plumbing Works + Electrical Works) (Detail BOQ Attached As Annexure)	Job	1	61883083	(Rupees Sixty-one million, eight hundred eighty-three thousand, eighty-three Only)	61883083
7	7	Underground Water Tank (02 Nos.) (Civil Works + Plumbing Works + Electrical Works) (Detail BOQ Attached As Annexure)	Job	1	143688504	(Rupees One hundred forty-three million, six hundred eighty-eight thousand, five hundred four Only)	143688504
8	8	Tubewells (02 Nos.) (Civil Works + Plumbing Works + Electrical Works) (Detail BOQ Attached As Annexure)	Job	1	28145037	(Rupees Twenty-eight million, one hundred forty-five thousand, thirty-seven Only)	28145037

Sr. No	Ref. No.	Description	Unit	Qty	Rate		Amount
9	9	Cross Drainage Works (Detail BOQ Attached As Annexure)	Job	1	190578581	(Rupees One hundred ninety million, five hundred seventy-eight thousand, five hundred eighty-one Only)	190578581
10	10	Geo-Technical Investigations (Detail BOQ Attached As Annexure)	Job	1	1185550	(Rupees One million, one hundred eighty-five thousand, five hundred fifty Only)	1185550
11	11	Channelization of Storm water Nallah (Detail BOQ Attached As Annexure)	Job	1	84112791	(Rupees Eighty-four million, one hundred twelve thousand, seven hundred ninety-one Only)	84112791
12	12	Dismantling (Detail BOQ Attached As Annexure)	Job	1	144807075	(Rupees One hundred forty-four million, eight hundred seven thousand, seventy-five Only)	144807075
						GRAND TOTAL:	Rs2,671,621,891.00

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Scope of Work

The scope of works mainly comprises Civil, Electrical, Plumbing, Infrastructure Development and related Ancillary Works lying within the boundaries and limits as shown on the drawings and any such additional areas adjacent thereto as may be designated by the Engineer from time to time for the construction to be performed under the Contract, and all such areas and additional areas shall comprise the Site.

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Price Schedule

For Individual Jobs

#	Job Title	Quantity	Unit Price (PKR)	Total Price (PKR)	Delivery Location	Delivery Period / Year	Country of Origin
1							
2							

For Lots

#	Lot Title	Total Lot Price (PKR)	Country of Origin
1	[Lot 1 Title]		

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

PUBLIC PROCUREMENT REGULATORY AUTHORITY
(PPRA)
EPADS

General Conditions of Contract

A. General

1. **Definitions**

1.1. Unless the context otherwise requires, the following terms whenever used in this Contract shall have the same meaning and shall be interpreted as indicated

1.1.1. “Applicable Law” means the laws and any other instruments having the force of law in the Government’s Country, or in such other country as may be specified in the Special Conditions of the Contract (SC), as they may be issued and in force from time to time;

1.1.2. “The Contract” means an agreement enforceable by law;

1.1.3. “The Contract Price” means the price payable to the Contractor under the Contract for the full and proper performance of its contractual obligations;

1.1.4. “The Services” means the work to be performed by the Contractor pursuant to this Contract and as prescribed in the Specifications and Schedule of Activities included in the Contractor’s Bid;

1.1.5. “Ancillary Services” means those services ancillary to the provision of Services, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training, and other such obligations of the Contractor covered under the Contract;

1.1.6. “GCC” means the General Conditions of Contract contained in this section;

1.1.7. “SCC” means the Special Conditions of Contract by which the GCC may be amended or supplemented;

1.1.8. **“**Day” means calendar day unless indicated otherwise;

1.1.9. “Effective Date” means the date on which this Contract comes into force and effect;

1.1.10. “The Contractor” means the individual or corporate body whose Bids to provide the Services has been accepted by the Procuring Agency;

1.1.11. “The Project Site,” where applicable, means the place or places named in Bid Data Sheet and technical Specifications;

1.1.12. “Government” means the Government of Pakistan;

1.1.13. “Local Currency” means the currency of Pakistan;

1.1.14. “In Writing” means communicated in written form with proof of receipt;

1.1.15. “Completion Date” means the date of completion of the Services by the Contractor as certified by the Procuring Agency;

1.1.16. “Foreign Currency” means any currency other than the currency of the country of the Procuring Agency;

1.1.17. “Party” means the Procuring Agency or the Contractor, as the case may be, and “Parties” means both of them;

1.1.18. "Service" means any object of procurement other than goods or works;

1.1.19. “Subcontractor” means any entity to which the Bidder subcontracts any part of the Services.

2. **Applicable Law**

2.1. The contract shall be governed and interpreted in accordance with the laws of Pakistan, unless otherwise specified in SCC.

3. **Language**

3.1. The Contract as well as all correspondence and documents relating to the Contract exchanged between the Contractorand the Procuring Agency, shall be written in the **English language** unless otherwise stated in the **SCC** . Supporting documents and printed literature that are part of the Contract may be in another language provided these are accompanied by an accurate translation of the relevant passages in English, in which case, for purposes of interpretation of the Contract, this translation shall govern.

4. **Notices**

4.1. Any notice, request, or consent made pursuant to this Contract shall be in writing and shall be deemed to have been made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or when sent by registered mail, telex, telegram, or facsimile to such Party at the address specified in the **SCC**.

5. **Location**

5.1. The Services shall be performed at such locations as the Procuring Agency may approve and as specified in **SCC.**

5.2. A {DOCUMENTS}

6. **Authorized Representatives / Authority of Member in charge**

6.1. Any action required or permitted to be taken, and any document required or permitted to be executed, under this Contract by the Procuring Agency or the Contractor may be taken or executed by the officials specified in the **SCC**.

B. Commencement, Completion, Modification, and Termination of Contract

7. **Effectiveness of Contract**

7.1. This Contract shall come into effect on the date the Contract is signed by both parties and such other later date as may be stated in the **SCC.**

8. **Commencement of Services**

8.1. The Contractor shall confirm availability of Key Experts and begin carrying out the Services not later than the number of days after the Effective Date specified in the **SCC.**

9. **Program schedule**

9.1. Before commencement of the Services, the Contractor shall submit to the Procuring Agency for approval a Program showing the general methods, arrangements, order and timing for all activities. The Services shall be carried out in accordance with the approved Program as updated.

10. **Starting Date/Expiration Date**

10.1. The Contractor shall start carrying out the Services Five (05) days after the date the Contract becomes effective, or at such other date as may be specified in the **SCC.**

10.2. Unless terminated earlier pursuant to Clause **GCC 14** hereof, this Contract shall expire at the end of such time period after the Effective Date as specified in the **SCC.**

11. **Entire Agreement**

11.1. This Contract contains all covenants, stipulations and provisions agreed by the Parties. No agent or representative of either Party has authority to make, and the Parties shall not be bound by or be liable for, any statement, representation, promise or agreement not set forth herein.

12. **Modification**

12.1. Any modification or variation of the terms and conditions of this Contract, including any modification or variation of the scope of the Services, may only be made by written agreement between the Parties. However, each Party shall give due consideration to any modification(s) or variation(s) made by the other Party.

12.2. In cases of any modification(s) or variation(s), the prior written consent of the Procuring Agency is required.

13. **Force Majeure**

13.1. **Definition**
For the purposes of this Contract, “Force Majeure” means an event which is beyond the reasonable control of a Contractor and which makes a Contractor’s performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances.

13.2. **No Breach of Contract**
The failure of a Party to fulfill any of its obligations under the contract shall not be considered to be a breach of, or default under, this Contract in so far as such inability arises from an event of Force Majeure, provided that the Party affected by such an event (a) has taken all reasonable precautions, due care and reasonable alternative

measures in order to carry out the terms and conditions of this Contract, and (b) has informed the other Party as soon as possible about the occurrence of such an event.

13.3. **Extension of Time**
Any period within which a Contractor shall, pursuant to this Contract, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result of Force Majeure.

13.4. **Payments**
During the period of their inability to perform the Services as a result of an event of Force Majeure, the Contractor shall be entitled to continue to be paid under the terms of this Contract, as well as to be reimbursed for additional costs reasonably and necessarily incurred by them during such period for the purposes of the Services and in reactivating the Service after the end of such period.

14. **Termination**

14.1. **By the Procuring Agency**
The Procuring Agency may terminate this Contract in case of the occurrence of any of the events specified in paragraphs (a) through (e) of this Clause. In such an occurrence the Procuring Agency shall give at least thirty (30) calendar days' written notice of termination to the Contractor in case of the events referred to in (a) through (d); at least sixty (60) calendar days' written notice in case of the event referred to in (e);

14.1.1. If the Contractor fails to remedy a failure in the performance of its obligations hereunder, as specified in a notice of suspension;

14.1.2. If the Contractor becomes (or, if the Contractor consists of more than one entity, if any of its members becomes) insolvent or bankrupt or enter into any agreements with their creditors for relief of debt or take advantage of any law for the benefit of debtors or go into liquidation or receivership whether compulsory or voluntary;

14.1.3. If the Contractor fails to comply with any final decision reached as a result of arbitration proceedings;

14.1.4. If, as the result of Force Majeure, the Contractor is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days;

14.1.5. If the Procuring Agency, in its sole discretion and for any reason whatsoever, decides to terminate this Contract;

14.2. **By the Contractor**
The Contractor may terminate this Contract, by not less than thirty (30) calendar days' written notice to the Procuring Agency, in case of the occurrence of any of the events specified in paragraphs (a) through (d) of this Clause.

14.2.1. If the Procuring Agency fails to pay any money due to the Contractor pursuant to this Contract and not subject to dispute within forty-five (45) calendar days after receiving written notice from the Contractor that such payment is overdue;

14.2.2. If, as the result of Force Majeure, the Contractor is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days;

14.2.3. If the Procuring Agency fails to comply with any final decision reached as a result of arbitration;

14.2.4. If the Procuring Agency is in material breach of its obligations pursuant to this Contract and has not remedied the same within forty-five (45) days (or such longer period as the Bidder may have subsequently approved in writing) following the receipt by the Procuring Agency of the Contractor's notice specifying such breach.

C. Obligations of the Contractor

15. **General**

15.1. **Standard of Performance**

15.1.1. The Contractor shall perform the Services and carry out the Services with all due diligence, efficiency and economy, in accordance with generally accepted professional standards and practices, and shall observe sound management practices, and employ appropriate technology and safe and effective equipment, machinery, materials and methods. The Contractor shall always act, in respect of any matter relating to this Contract or to the Services, as a faithful adviser to the Procuring Agency, and shall at all times support and safeguard the Procuring Agency's legitimate interests in any dealings with the third parties;

15.1.2. The Contractor shall employ and provide such qualified and experienced Experts and Sub-Contractors as are required to carry out the Services.

15.2. **Law Applicable to Services**

The Contractor shall perform the Services in accordance with the Contract and in accordance with the Law of Pakistan and shall take all practicable steps to ensure that any of its Experts and Sub-Bidders, comply with the Applicable Law.

16. **Conflict of Interests**

16.1. **Contractor Not to Benefit from Commissions and Discounts**

The remuneration of the Contractor shall constitute the Contractor's sole remuneration in connection with this Contract or the Services, and the Contractor shall not accept for their own benefit any trade commission, discount, or similar payment in connection with activities pursuant to this Contract or to the Services or in the discharge of their obligations under the Contract, and the Contractor shall use their best efforts to ensure that the Personnel, any Subcontractors, and agents of either of them similarly shall not receive any such additional remuneration.

16.2. **Contractor and Affiliates Not to be Otherwise Interested in Project**

The Contractor agree that, during the term of this Contract and after its termination, the Contractor and its affiliates, as well as any Subcontractor and any of its affiliates, shall be disqualified from providing Services (other than the Services and any continuation thereof) for any project resulting from or closely related to the Services.

16.3. **Prohibition of Conflicting Activities**
Neither the Bidder nor its Subcontractors nor the Personnel shall engage, either directly or indirectly, in any of the following activities:

16.3.1. during the term of this Contract, any business or professional activities in the Government's country which would conflict with the activities assigned to them under this Contract;

16.3.2. during the term of this Contract, neither the Contractor nor their Subcontractors shall hire public employees in active duty or on any type of leave, to perform any activity under this Contract;

16.3.3. after the termination of this Contract, such other activities as may be specified in the **SCC.**

17. **Insurance to be Taken Out by the Contractor**

17.1. The Contractor(a) shall take out and maintain, and shall cause any Subcontractors to take out and maintain, at its (or the Sub-contractors', as the case may be) own cost but on terms and conditions approved by the Procuring Agency, insurance against the risks, and for the coverage, as shall be specified in the **SCC**; and (b) at the Procuring Agency's request, shall provide evidence to the Procuring Agency showing that such insurance has been taken out and maintained and that the current premiums have been paid.

18. **Contractor's Actions Requiring Procuring Agency's Prior Approval**

18.1. The Contractor shall obtain the Procuring Agency's prior approval in writing before taking any of the following actions:

18.1.1. appointing such members of the Personnel not provided by the Contractor;

18.1.2. changing the Program of activities; and

18.1.3. any other action that may be specified in the **SCC.**

19. **Reporting Obligations**

19.1. The Contractor shall submit to the Procuring Agency the reports and documents in the numbers, and within the periods as prescribed by the Procuring Agency.

20. **Liquidated Damages**

20.1. **Payments of Liquidated Damages**
The Contractor shall pay liquidated damages to the Procuring Agency at the rate per day stated in the **SCC** 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 **SCC**. The Procuring Agency may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.

20.2. **Correction for Over-payment**
If the Intended Completion Date is extended after liquidated damages have been paid, the Procuring Agency 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 **SCC.**

20.3. **Lack of performance penalty**
If the Contractor has not corrected a Defect within the time specified in the Procuring Agency's notice, a penalty for Lack of performance will be paid by the Contractor. The amount to be paid will be calculated as a percentage of the cost of having the Defect corrected, assessed as specified in the Contractor

21. **Performance Guarantee**

21.1. Within the time stipulated in the acceptance letter from the Procuring Agency, the successful Bidder shall furnish the Performance Guarantee in shape and amount **specified in SCC.**

21.2. The proceeds of the Performance Guarantee shall be payable to the Procuring agency as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

21.3. The Performance Guarantee shall be denominated in the currency of the Contract, or in a freely convertible currency acceptable to the Procuring agency and shall be in the acceptable form as specified in **SCC**.

21.4. The Performance Guarantee will be discharged by the Procuring agency and returned to the Supplier not later than thirty (30) days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless otherwise **specified in SCC.**

22. **Sustainable Procurement**

22.1. The Contractor shall conform to the sustainable procurement contractual provisions, if and as specified in the **SCC.**

D. Contractor's Personnel

23. **Description of Personnel**

23.1. The titles, agreed job descriptions, minimum qualifications, and estimated periods of engagement in the carrying out of the Services of the Contractor's Key Personnel. The Key Personnel listed by title as well as by name are hereby approved by the Procuring Agency.

24. **Removal and / or Replacement of Personnel**

24.1. Except as the Procuring Agency may otherwise agree, no changes shall be made in the Key Personnel. If, for any reason beyond the reasonable control of the Contractor, it becomes necessary to replace any of the Key Personnel, the Contractor shall provide as a replacement a person of equivalent or better qualifications.

24.2. If the Procuring Agency finds that any of the Personnel have (i) committed serious misconduct or have been charged with having committed a criminal action, or (ii) have reasonable cause to be dissatisfied with the performance of any of the Personnel, then the Contractor shall, at the Procuring Agency's written request specifying the grounds thereof, provide as a replacement a person with qualifications and experience acceptable to the Procuring Agency.

24.3. The Contractor shall have no claim for additional costs arising out of or incidental to any removal and/or replacement of Personnel.

E. Obligations of the Procuring Agency

25. **Change in the Applicable Law**

25.1. If, after the date of this Contract, there is any change in the Applicable Law with respect to taxes and duties which increases or decreases the cost of the Services rendered by the Contractor, then the remuneration and reimbursable expenses otherwise payable to the Contractor under this Contract shall be increased or decreased accordingly by agreement between the Parties, and corresponding adjustments shall be made to the amounts referred in the **SCC.**

26. **Services and Facilities**

26.1. The Procuring Agency shall make available to the Contractor and the Experts, for the purposes of the Services and free of any charge, the services, facilities and property described in the Terms of Reference, at the times and in the manner specified in the Terms of Reference.

26.2. In case that such services, facilities and property shall not be made available to the Contractor, the Parties shall agree on (i) any time extension that it may be appropriate to grant to the Contractor for the performance of the Services, (ii) the manner in which the Contractor shall procure any such services, facilities and property from other sources, and (iii) the additional payments, if any, to be made to the Contractor as a result thereof.

F. Payments to the Contractor

27. **Contract Price**

27.1. The price payable shall be in Pakistani Rupees unless otherwise specified in the **SCC**.

28. **Terms and Conditions of Payment**

28.1. Payments will be made to the Contractor according to the payment schedule stated in the **SCC** and as per actual invoice submitted by the Contractor.

28.2. Unless otherwise stated in the **SCC**, the advance payment shall be made against the provision by the Contractor of a bank guarantee for the same amount, and shall be valid for the period stated in the **SCC.** Any other payment shall be made after the conditions listed in the **SCC** for such payment have been met, and the Contractor have submitted an invoice to the Procuring Agency specifying the amount due.

29. **Quality Control Identifying Defects**

29.1. The principle and modalities of Inspection of the Services by the Procuring Agency shall be as indicated in the **SCC.** The Procuring Agency shall check the Contractor’s performance and notify him of any Defects that are

found. Such checking shall not affect the Contractor's responsibilities. The Procuring Agency may instruct the Contractor to search for a Defect and to uncover and test any service that the Procuring Agency considers may have a Defect. Defect Liability Period is as defined in the **SCC**.

29.2. A {INSPECTION}

30. **Correction of Defects, and Lack of Performance Penalty**

30.1. The Procuring Agency shall give notice to the contractor of any Defects before the end of the Contract. The Defects liability period shall be extended for as long as Defects remain to be corrected.

30.2. Every time notice a Defect is given; the contractor shall correct the notified Defect within the length of time specified by the Procuring Agency's notice.

30.3. If the contractor has not corrected a Defect within the time specified in the Procuring Agency's notice, the Procuring Agency will assess the cost of having the Defect corrected, the contractor will pay this amount, and a Penalty for Lack of Performance.

31. **Settlement of Disputes Amicable Settlement**

31.1. The Parties shall use their best efforts to settle amicably all disputes arising out of or in connection with this Contract or its interpretation.

32. **Dispute Settlement**

32.1. **Arbitration**

If any dispute of any kind whatsoever shall arise between the procuring agency and the contractor in connection with or arising out of the Contract, including without prejudice to the generality of the foregoing, any question regarding its existence, validity or termination, or the execution of the contract, the parties shall seek to resolve any such dispute or difference by mutual consultation. If the parties fail to resolve such a dispute or difference even after negotiations or mediation, then the dispute shall be referred within fourteen (14) days in writing by either party to the Arbitrator, with a copy to the other party.

Any dispute in respect of which a notice of intention to commence arbitration has been given, in accordance with **GCC sub-clause 32.1**, shall be finally settled by arbitration. Arbitration may be commenced prior to or after completion of the Contract. Arbitration proceedings shall be conducted in accordance with Arbitration Act 1940. Notwithstanding any reference to arbitration herein, the parties shall continue to perform their respective obligations under the Contract unless otherwise agreed. The Procuring Agency shall continue to pay the Contractor any undisputed amounts due under the Contract during the resolution of any dispute.

Special Conditions of Contract

SECTION VIII. SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the Conditions of Contract. The corresponding clause number of the GCC is indicated in parentheses.

Number of GC Clause

Amendments of, and Supplements to, Clauses in the General Conditions of Contract

Number of GC Clause 1

Definitions

The Procuring Agency is: Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA), Project Director 10-Mauve Area, Sector G-10/4, Islamabad Capital Territory

The Supplier is:

The title of the subject procurement is: Infrastructure Development Works of Sub Sector G14/1

Number of GC Clause 2

Applicable/Governing Law:

The Contract shall be interpreted in accordance with the laws of Islamic Republic of Pakistan

Number of GC Clause 3

Language:

The language of the Contract, all correspondence and communications to be given, and all other documentation to be prepared and supplied under the Contract shall be in **English.**

Number of GC Clause 4

Notices:

The addresses for the notices are:

Procuring Agency:

Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA), Project Director
10-Mauve Area, Sector G-10/4, Islamabad Capital Territory
+92-333-639-3669
dd-tech1@fgeha.gov.pk

Contractor/ Bidder:

[Name, address and telephone number]

The Contractor/ Bidder’s Representative(s)

[Name, address, telephone number and e-mail address]

Number of GC Clause 6.1

The Authorized Representatives are:

For the Procuring Agency:

Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA), Project Director
10-Mauve Area, Sector G-10/4, Islamabad Capital Territory
+92-333-639-3669
dd-tech1@fgeha.gov.pk

For the Bidder:

Name: ……

Designation: ……..

Address: ……..

Number of GC Clause 7

Effectiveness of the contract

The Contractor/Bidder shall be effective within ….. days from the date of signature of the Contract by both parties

Number of GC Clause 8

Commencement of Contract:

The Contractor/Bidder shall provide Non-Consultancy Services from the effective date of contract.

Number of GC Clause 10.2

Expiration of Contract:

The time period shall be ……

Number of GC Clause 14

Termination

In the event of termination of the contract due to any reason as already defined in the General Conditions of Contract, the Bidder shall be responsible for providing to the Authority the Goods till the time of alternate arrangements.

Number of GC Clause 16

Conflict of Interest:

The Procuring Agency reserves the right to determine on a case-by-case basis whether the Bidder should be disqualified from providing goods or services due to a conflict of a nature described in Clause GCC 17.

Number of GC Clause 20

Liquidated Damages

If the Bidder fails to provide services as required under the contract or in case of any data loss/data breach or any incident compromising the data security or other such failures related to any services, the Bidder shall pay to the Procuring Agency as Liquidated Damages at a rate of **0.11%** to **0.11%** of the Contract value, in accordance with the extent of performance failure & the cost of investigating such incidents as judged by the Authority.

Number of GC Clause 21

Performance Guarantee:

The amount of performance guarantee shall be **10.00%** of the contract price in acceptable form of **Bank Guarantee**

Number of GC Clause 27

Currency of Payment:

All the payment to be released to the contractor/Bidder shall be in Pakistani Rupees.

Number of GC Clause 28

Payment terms:

Payment will be made to the Bidder against the procured Goods and services according to the actual invoice or running bills submitted by the Bidder against the services provided within the time given in the conditions of the contract.

Number of GC Clause 29

Identifying Defects:

The Authority reserves the right at any time to inspect the premises of the provider to inspect the goods and monitor the goods being provided.

Number of GC Clause 31

Following is the guidance for Dispute Resolution

i. If any dispute of any kind whatsoever shall arise between the Authority and the Bidder in connection with or arising out of the Contract... (full clause unchanged)

ii. At future of negotiation the dispute shall be resolved through mediation...

iii. At failure of mediation, arbitration under Arbitration Act 1940...

iv. Cost sharing equally...

v. Proceedings may commence before/after completion...

Notwithstanding any reference to the arbitration herein, the parties shall continue to perform their respective obligations under the Contract.

Rules of procedure for arbitration proceedings:

Any dispute between the Authority and a Bidder shall be referred to arbitration under the laws of Pakistan including Arbitration Act 1940.

Place of Arbitration and Award:

The arbitration shall be conducted in English language and place shall be Islamabad. The award shall be final and binding.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Bid Securing Declaration

Form 9: Bid Securing Declaration

Date: *[insert date (as day, month and year)]*

Bid No.:***P141369***

To: **Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA), Project Director 10-Mauve Area, Sector G-10/4, Islamabad Capital Territory**

We, the undersigned, declare that:

We understand that, according to your conditions, Bids must be supported by a Bid Securing Declaration.

We accept that we will be blacklisted and henceforth cross debarred for participating in respective category of public procurement proceedings for a period of (not more than) six months, if fail to abide with a bid securing declaration, however without indulging in corrupt and fraudulent practices, if we are in breach of our obligation(s) under the Bid conditions, because we:

1. have withdrawn or modified our Bid during the period of Bid Validity specified in the Form of Bid;

2. Disagreement to arithmetical correction made to the Bid price; or

3. having been notified of the acceptance of our Bid by the Procuring Agency during the period of Bid Validity, (i) failure to sign the contract if required by Procuring Agency to do so or (ii) fail or refuse to furnish the Performance Security or to comply with any other condition precedent to signing the contract specified in the Bidding Documents.

We understand this Bid Securing Declaration shall expire if we are not the successful

Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight (28) days after the expiration of our Bid.

Contract Form

SECTION IX: CONTRACT FORMS

THIS AGREEMENT made the _____ day of _____ 20_____ between **Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA), Project Director 10-Mauve Area, Sector G-10/4, Islamabad Capital Territory**

(hereinafter called "the Procuring Agency") of the one part and *[name of Bidder]* of *[city and country of Bidder]* (hereinafter called "the Bidder") of the other part:

WHEREAS the Procuring Agency invited Bids for provision of goods, viz., **Infrastructure Development Works of Sub Sector G14/1 (*P141369*)** and has accepted a Bids by the Bidder for the provision of Goods in the sum of *[contract price in words and figures]* (hereinafter called "the Contract Price").

NOW THIS CONTRACT WITNESSETH AS FOLLOWS:

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

2. The following documents shall be deemed to form and be read and construed as part of this Contract, In the event of any ambiguity or conflict between the Contract Documents listed below, the order of precedence shall be the order in which the Contract Documents are listed below:-

1. This form of Contract;
2. the Form of Bids and the Price Schedule submitted by the Bidder;
3. the Schedule of Requirements;
4. the Technical Specifications;
5. the Special Conditions of Contract;
6. the General Conditions of the Contract;
7. the Procuring Agency's Letter of Acceptance; and
8. [*add here: any other documents*]

3. In consideration of the payments to be made by the Procuring Agency to the Bidder as hereinafter mentioned, the Bidder hereby covenants with the Procuring Agency to provide the Goods related services and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Procuring Agency hereby covenants to pay the Bidder in consideration of the provision of Goods and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the contract at the times and in the manner prescribed by the contract.

IN WITNESS whereof the parties hereto have caused this Contract to be executed in accordance with their respective laws the day and year first above written.

Signed, sealed, delivered by _____the _____ (for the Procuring Agency)

Witness to the signatures of the Procuring Agency:

……

Signed, sealed, delivered by _____the _____ (for the Procuring Agency)

Witness to the signatures of the Bidder: ……

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Integrity Pact

Integrity Pact

DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC. PAYABLE BYTHE SUPPLIERS OF GOODS, SERVICES & WORKS IN CONTRACTS WORTH RS.10.00 MILLION OR MORE

Contract Number: Contract Value: Contract Title:

Dated:

[Name of Supplier] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan or any administrative subdivision or agency thereof or any other entity owned or controlled by it (GoP) through any corrupt business practice.

Without limiting the generality of the foregoing [Name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fee etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultations fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

[Name of Supplier] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoP and has not taken any action or will not take any action to circumvent the above declaration, representative or warranty.

[Name of Supplier] accepts full responsibility and strict liability for making and false declaration, not making full disclosure, misrepresenting fact or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other right and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [Name of Supplier] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten time the sum of any commission, gratification, bribe, finder's fee or kickback given by [Name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

Performance Guarantee Form

Performance Guarantee Form

To: **Federal Government Employees Housing Authority (Federal Government Employees Housing Authority-FGEHA), Project Director 10-Mauve Area, Sector G-10/4, Islamabad Capital Territory**

WHEREAS *[name of Bidder]* (hereinafter called "the Bidder") has undertaken, in pursuance of Contract No. *[reference number of the contract]* dated *[insert date]* for provision of Goods*(*hereinafter called "the Contract").

AND WHEREAS it has been stipulated by you in the said Contract that the Bidder shall furnish you with a Bank Guarantee by a reputable bank for the sum specified therein as security for compliance with the Bidder's performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Bidders guarantee:

THEREFORE, WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Bidder, up to a total of *[amount of the guarantee in words and figures]*, and we undertake to pay you, upon your first written demand declaring the Bidder to be in default under the Contract and without cavil or argument, any sum or sums within the limits of *[amount of guarantee]* as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the: *[insert date]*

Signature and seal of the Guarantors

_____

[name of bank or financial institution]

_____

[address]

_____

[date}

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Annexure

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Bidding Document - Volume I - Technical Bid

Information (Read-Only)

See Form Under Additional Forms and Documents: **Bidding Document - Volume I - Technical Bid** (page number: 82)

Bidding Document - Volume II - Technical Specifications - Part 1

Information (Read-Only)

See Form Under Additional Forms and Documents: **Bidding Document - Volume II - Technical Specifications - Part 1** (page number: 226)

Bidding Document - Volume II - Technical Specifications - Part 2

Information (Read-Only)

See Form Under Additional Forms and Documents: **Bidding Document - Volume II - Technical Specifications - Part 2** (page number: 302)

Bidding Document - Volume III - Tender Drawings - Part 1

Information (Read-Only)

See Form Under Additional Forms and Documents: **Bidding Document - Volume III - Tender Drawings - Part 1** (page number: 376)

Bidding Document - Volume III - Tender Drawings - Part 2

Information (Read-Only)

See Form Under Additional Forms and Documents: **Bidding Document - Volume III - Tender Drawings - Part 2** (page number: 424)

Bidding Document - Volume III - Tender Drawings - Part 3

Information (Read-Only)

See Form Under Additional Forms and Documents: **Bidding Document - Volume III - Tender Drawings - Part 3** (page number: 472)

Bidding Document - Volume IV - Price Bid - Part 1

Information (Read-Only)

See Form Under Additional Forms and Documents: **Bidding Document - Volume IV - Price Bid - Part 1** (page number: 517)

Bidding Document - Volume IV - Price Bid - Part 2

Information (Read-Only)

See Form Under Additional Forms and Documents: **Bidding Document - Volume IV - Price Bid - Part 2** (page number: 553)

Bidding Document - Volume IV - Price Bid - Part 3

Information (Read-Only)

See Form Under Additional Forms and Documents: **Bidding Document - Volume IV - Price Bid - Part 3** (page number: 589)

Procurement Forms

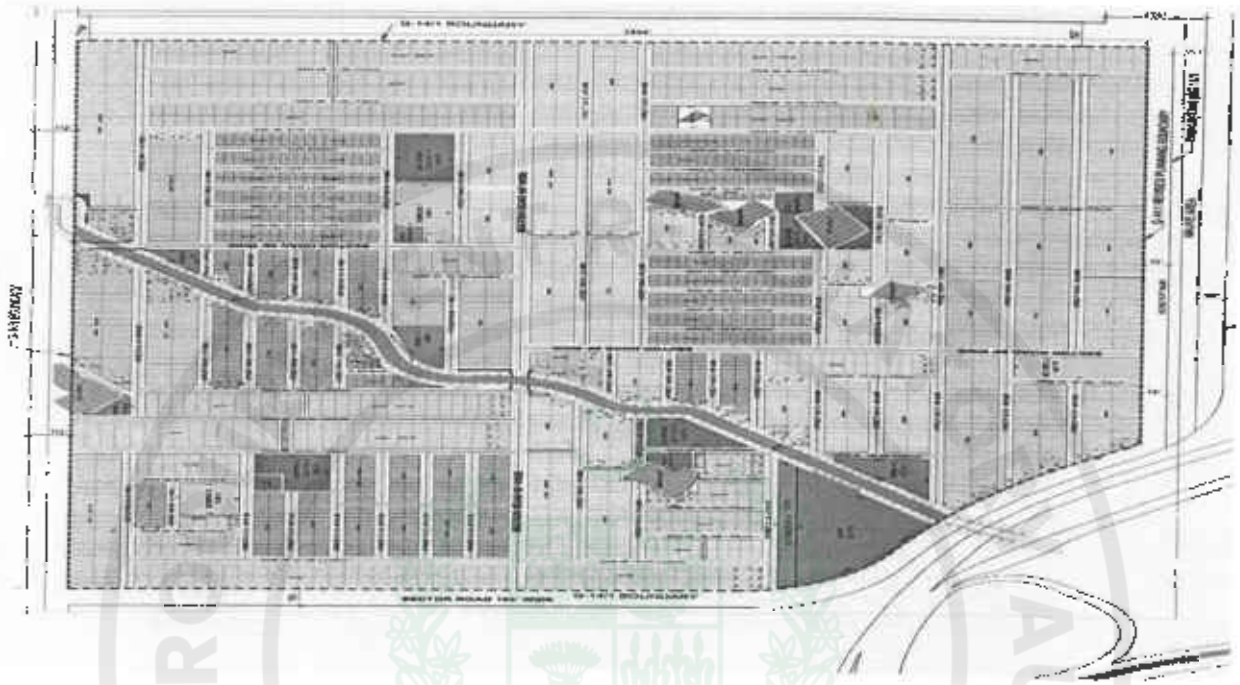
PUBLIC PROCUREMENT REGULATORY AUTHORITY
(PPRA)
EPADS

PUBLIC PROCUREMENT REGULATORY AUTHORITY
(PPRA)
EPADS

Additional Forms and Documents

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY, ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB SECTOR G-14/1, ISLAMABAD



TECHNICAL BID

BIDDING DOCUMENT VOLUME – I

INSTRUCTIONS TO BIDDERS
BIDDING DATA
FORM OF BID & APPENDICES TO BID
FORMS
CONDITIONS OF CONTRACT
SPECIAL PROVISIONS

SPETEMBER 2026

Clearance Code	:	4156/321/BD/056/(26)
Doc No	:	01
Rev No.	:	0

National Engineering Services Pakistan (Pvt.) Limited
NESPAK House Sector G-5/2, Islamabad, Pakistan
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Fax: +92-51-9221914
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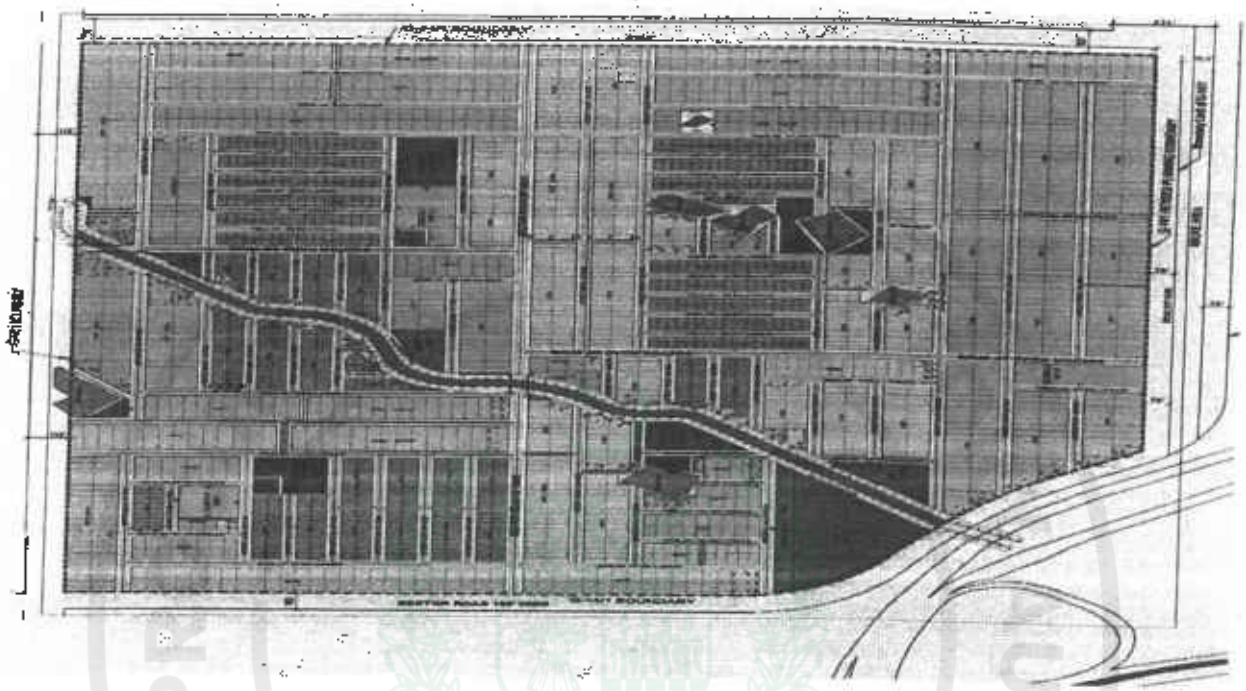
http://www.nespak.com.pk

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY, ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB SECTOR G-14/1, ISLAMABAD



TECHNICAL BID

BIDDING DOCUMENT VOLUME – I

INSTRUCTIONS TO BIDDERS
BIDDING DATA
FORM OF BID & APPENDICES TO BID
FORMS
CONDITIONS OF CONTRACT
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National Engineering Services Pakistan (Pvt.) Limited
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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY, ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB SECTOR G-14/1, ISLAMABAD

TECHNICAL BID

BIDDING DOCUMENT VOLUME – I

SEPTEMBER, 2026

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

National Engineering Services Pakistan (Pvt) Limited
NESPAK House Sector G-5/2, Islamabad, Pakistan
Phone: 192-51-9221910 - 13 Fax: +92-51-9221914
Email: Islamabad@nespak.com.pk
http://www.nespak.com.pk

Transmittal Code		Doc. No.		Rev. No.	

SECTION I: INVITATION FOR BIDS

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY, ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB SECTOR G-14/1, ISLAMABAD

Invitation For Bids

Date: .....

1. This Invitation for Bids follows the Procurement Notice (PN) or Procurement Advertisement (PA) No. ---------- for the subject Project/Procurement which appeared in [*insert media*] ---------- vide dated [*insert dates of issue of PN/PA*] ---------- and on EPADS.

2. The Procuring agency/Employer has reserved the funds for the procurement planned during the financial year 2026-27. It is intended that part of the proceeds of the funds will be used to cover eligible payment under the contract for the INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB-SECTOR G-14/1, ISLAMABAD.

3. Federal Government Employees Housing Authority (FGEHA), Islamabad now invites bids from eligible bidders i.e. state-owned entities under PPRA rules 42 (f) for the subject Contract.

4. The bidding shall be conducted in line with the procedure of the Rule 36(b) Single Stage–two envelop procedure prescribed under Public Procurement Rules 2004, e-Pak Procurement Regulations, 2023 and any Regulations, Regulatory Guides, Procurement Guidelines or Instructions issued by the Authority (from time to time), and is open to all potential bidders registered in the EPADS.

5. All bids must be accompanied by a Bid Security at the option of the bidder, in the form of Call Deposit Receipt (CDR)/ Pay Order or a Bank Guarantee issued by a Scheduled Bank in Pakistan or from a foreign bank duly counter guaranteed by a Scheduled Bank in Pakistan in favor of the Employer in the amount of **PKR. 50 million.**

6. The electronic bids prepared in accordance with the instructions prescribed in the electronic bidding documents must be submitted through EPADS on or before *[mention bid closing date and time]* ----------. Electronic bids will be opened by using EPADS on the same day at *[mention bid opening time at least 30 minutes after bid closing time]*.

7. A Pre-Bid meeting will be held in the office of _____ on _____ 2026 at 1100 hrs.

8. Federal Government Employees Housing Authority (FGEHA) reserves the right to reject all Bids as per Rule 33 of Public Procurement Rules, 2004.

Director Technical
Federal Government Employees
Housing Authority (FGEHA), Islamabad
10- Mauve Area, Sector G-10/4,
Islamabad.

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SECTION II: INSTRUCTION TO BIDDERS (ITBs)

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

A. INTRODUCTION

1. Scope of Bid	1.1	The Procuring agency/Employer (PA), as indicated in the **Bid Data Sheet** (BDS) invites Bids for the execution of Works as specified in the BDS and **Section V- Works Requirements.** The name, identification, and number of lots (contracts) of this National/ International Competitive Bidding process are specified in the BDS.
2. Source of Funds	2.1	Source of funds as referred in Bid Data Sheet.
3. Eligible Bidders	3.1	A bidder may be natural person, company or firm or public or semi-public agency of Pakistan or any foreign country, or any combination of them with a formal existing agreement (on Judicial Papers) in the form of a joint venture or consortium. In the case of a joint venture or consortium, all members shall be jointly and severally liable for the execution of the Contract in accordance with the terms and conditions of the Contract. The joint venture or consortium shall nominate a Lead Member as nominated in the BDS, who shall have the authority to conduct all business for and on behalf of any and all the members of the joint venture or consortium during the Bidding process, and in case of award of contract, during the execution of contract. *(The limit on the number of members of JV or Consortium may be prescribed in BDS, in accordance with the guidelines issued by the PPRA).*
	3.2	The appointment of Lead Member in the joint venture or consortium shall be confirmed by submission of a valid Power of Attorney to the Procuring agency/Employer
	3.3	Verifiable copy of the agreement that forms a joint venture or consortium shall be required to be submitted as part of the Bid.
	3.4	Any bid submitted by the joint venture or consortium shall indicate the part of proposed contract to be performed by each party and each party shall be evaluated (or post qualified if required) with respect to its contribution only, and the responsibilities of each party shall not be substantially altered without prior written approval of the Procuring agency/Employer and in line with any instructions issued by the Authority.
	3.5	The invitation for bids is open to all prospective bidders subject to any provisions of incorporation or licensing by the respective national/ international incorporating agency or statutory body established for that particular trade or business.
	3.6	Foreign Bidders must be locally registered with the appropriate national incorporating body or statutory body, before participating in the national/international competitive

		bidding with the exception of such procurements made by the foreign missions of Pakistan. For such purpose the bidder must have to initiate the registration process before the bid submission and the necessary evidence shall be submitted to the Procuring agency/Employer along with their bid, however, the final award will be subject to the complete registration process.
	3.7	A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidders may be considered to have a conflict of interest with one or more parties in this Bidding process, if they: a) are associated or have been associated in the past, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring agency/Employer to provide consulting services for the preparation of design or technical specifications of the works that are the subject of the bid; or b) any of its affiliates has been hired (or is proposed to be hired) by the Procuring agency/Employer as Engineer for the Contract implementation; or c) The works to be executed are resulting from or directly related to consulting services for the preparation or implementation of the project that the bidder provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm; d) have controlling shareholders in common; or e) receive or have received any direct or indirect subsidy from any of them; or f) have the same legal representative for purposes of this Bid; or g) have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another bidder, or influence the decisions of the Procuring agency/Employer regarding this Bidding process; or h) Submit more than one bid in this bidding process.
	3.8	A Bidder may be ineligible if – (a) he is declared bankrupt or, in the case of company or firm, insolvent; (b) payments in favor of the bidder is suspended in accordance with the judgment of a court of law other than a judgment declaring bankruptcy and resulting (in accordance with the national laws) in the total or partial loss of the right to administer and dispose of its property;

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		(c) legal proceedings are instituted against such bidder involving an order suspending payments and which may result, in accordance with the national laws, in a declaration of bankruptcy or in any other situation entailing the total or partial loss of the right to administer and dispose of the property; (d) the bidder is convicted, by a final judgment of a Court of Law or relevant Professional Statuary Body, of any offence involving professional conduct; (e) The bidder is debarred/ blacklisted by a national level Procuring agency/Employer and hence debarred due to involvement in corrupt and fraudulent practices, or performance failure or due to breach of bid securing declaration. (f) The bidder is blacklisted or debarred by a foreign country, international organization, or other foreign institutions for the period defined by them.
	3.9	Bidders shall provide to the Procuring agency/Employer evidence of their eligibility, proof of compliance with the necessary legal requirements to carry out the contract effectively.
	3.10	Bidders shall provide such evidence of their continued eligibility to the satisfaction of the Procuring agency/Employer, as the Procuring agency/Employer shall reasonably request.
	3.11	Bidders shall submit proposal relating to the nature, conditions and modalities of sub-contracting wherever the sub-contracting of any elements of the contract is envisaged.
4. Eligible Material and Equipment	4.1	All the material and equipment to be mobilized under the contract shall have their origin in eligible source countries, and all expenditures made under the contract will be limited to such materials and equipment. For this purpose, ineligible countries are stated in the section-IV titled as "Eligible Countries".
	4.2	For purposes of this Clause, "origin" means the place where the material, equipment is produced, manufactured, or processed, or through manufacture, procession, or assembly, another commercially recognized article results that differs substantially in its basic characteristics from its imported components or the place from where the services are/to be supplied.
	4.3	The nationality of the bidder shall not determine the origin of the material and equipment.
	4.4	To establish the eligibility of the material and equipment, Bidders shall fill the country-of-origin declarations included in the Form of Bid.

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5. One Bid per Bidder	5.1	A bidder shall submit only one bid, in the same bidding process, either individually as a bidder or as a member in a joint venture or any similar arrangement.
	5.2	No bidder can be a sub-contractor while submitting a bid individually or as a member of a joint venture in the same bidding process.
6. Cost of Bidding	6.1	The Bidder shall bear all costs associated with the preparation and submission of its bid, and the Procuring agency/Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

B. BIDDING DOCUMENTS

7. Contents of Bidding Documents	7.1	The scope of Works, bidding procedures, and terms and conditions of the contract are prescribed in the bidding documents. In addition to the Invitation for Bids, the bidding documents which should be read in conjunction with any addenda issued in accordance with **ITB 9.2** include: **Section I** -Invitation for Bids **Section II** Instructions to Bidders (ITBs) **Section III** Bid Data Sheet (BDS) **Section IV** Eligible Countries **Section V** Works Requirements Technical Specifications & Schedule of Requirements **Section VI** Standard Bidding Forms **Section VII** General Conditions of Contract (GCC) **Section VIII** Special Conditions of Contract (SCC) **Section IX** Contract Forms
	7.2	The number of copies to be completed and submitted with the Bid is specified in the **BDS**.
	7.3	The Procuring agency/Employer is not responsible for the completeness of the bidding documents and their addenda, if they were not obtained directly from the Procuring agency/Employer or the signed pdf version downloaded from the website of the Procuring agency/Employer or the Authority's website or e-Procurement System as the case may be. However, Procuring agency/Employer shall place both the pdf and editable version of the same on its website and Authority's website or e-Procurement System to facilitate the bidder for filling the standard bidding forms.
	7.4	The bidder is expected to examine all instructions, forms, specifications, terms and conditions prescribed in the bidding documents. Failure to furnish all the information required in the bidding documents will be at the bidder's risk and may result in the rejection of his bid.

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8. Clarification of Bidding Document, Pre-bid Meeting	8.1	A prospective bidder requiring any clarification of the bidding document may notify the Procuring agency/Employer in writing or in electronic form that provides record of the contents of communication at the Procuring agency/Employer's address indicated in the **BDS**.
	8.2	The Procuring agency/Employer will within three (3) working days after receiving the request for clarification, respond in writing or in electronic form to any request for clarification provided that such request is received not later than three (03) days prior to the deadline for the submission of Bids as prescribed in **ITB 24.1.** However, this clause shall not apply in case of alternate methods of procurement.
	8.3	Copies of the Procuring agency/Employer's response will be forwarded to all identified prospective bidders through an identified source of communication, including a description of the inquiry, but without specifying its source. In case of downloading of the bidding documents from the website of Procuring agency/Employer or e-Procurement System, the response of all such queries will also be available on the same platform available at the website.
	8.4	Should the Procuring agency/Employer deem it necessary to amend the bidding documents as a result of a clarification, it shall do so following the procedure as prescribed under **ITB 09.**
	8.5	If indicated in the **BDS**, the bidder's designated representative is invited at the bidder's cost to attend a pre-bid meeting at the place, date and time mentioned in the **BDS**. During this pre-bid meeting, prospective bidders may request clarification of the schedule of requirement, the evaluation criteria or any other aspects of the bidding documents.
	8.6	Minutes of the pre-bid meeting, if applicable, including the text of the questions asked by bidders, including those during the meeting (without identifying the source) and the responses given, together with any responses prepared after the meeting will be transmitted promptly to all prospective bidders who have obtained the bidding documents. Any modification to the bidding documents that may become necessary as a result of the pre-bid meeting shall be made by the Procuring agency/Employer exclusively through the use of an Addendum pursuant to **ITB 9.** Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.
	8.7	The bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for

NATIONAL ENGINEERING SERVICES PAKISTAN PVT. LTD. ISLAMABAD

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		preparing the bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the bidder's own expense.
	8.8	The bidder and any of its authorized personnel will be granted permission by the Procuring agency/Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the bidder and its personnel will release and indemnify the Procuring agency/Employer from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
9. Amendment of Bidding Documents	9.1	Before the deadline for submission of bids, the Procuring agency/Employer for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder or pre-bid meeting may modify the bidding documents by issuing addenda.
	9.2	Any addendum issued including the notice of any extension of the deadline shall be part of the bidding documents pursuant to **ITB 7.1** and shall be communicated in a timely manner and on equal opportunity basis. Where notification of such change, addition, modification or deletion becomes essential, such notification shall be made in a manner similar to the original advertisement. *Provided that the bidder who had either already submitted their bid or handed over the bid to the courier prior to the issuance of any such addendum shall have the right to withdraw his already filed bid and submit the revised bid prior to the original or extended bid submission deadline.*
	9.3	To give prospective bidders reasonable time in which to take an addendum/corrigendum into account in preparing their bids, the Procuring agency/Employer may, at its discretion, extend the deadline for the submission of bids: *Provided that the Procuring agency/Employer shall extend the deadline for submission of bid, if such an addendum is issued within last three (03) days of the bid submission deadline.*

C. PREPARATION OF BIDS

10. Language of Bid	10.1	The bid prepared by the bidder, as well as all correspondence and documents relating to the bid exchanged by the bidder and the Procuring agency/Employer shall be written in the English language unless specified in the **BDS.** Supporting documents and printed literature furnished by the bidder may be in another language provided they are accompanied by an accurate

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

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		translation of the relevant pages in the English language unless specified in the **BDS**, in which case, for purposes of interpretation of the bidder, the translation shall govern.
11. Documents Establishing Eligibility of Material, Equipment and Works, their Conformity to Bidding Documents	11.1	The bid prepared by the bidder shall constitute the following components: - a) Documentary evidence established in accordance with **ITB 11** that the material, equipment and services to be provided by the Bidder are eligible material, equipment and services, and conform to the Bidding Documents; b) Documentary evidence established in accordance with **ITB 12** that the bidder has been authorized to carry out the Construction works; c) Documentary evidence established in accordance with **ITB 12** that the bidder is eligible and/or qualified for the subject bidding process; d) Form of Bid and Bid Prices completed in accordance with **ITB 14 and 15;** e) Completed schedules as required, including priced Bill of Quantities in accordance with **ITB 13 & 15.** f) Technical Proposal completed in all aspects in accordance with **ITB-17.** g) Bid security or Bid Securing Declaration furnished in accordance with **ITB 19;** h) Alternative bids, if permisible, in accordance with **ITB 20;** i) Duly Notarized Power of Attorney authorizing the signatory of the Bidder to submit the bid; and j) Any other document required in the **BDS.**
	11.2	In addition to the requirements, bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all members and submitted with the bid, together with a copy of the proposed Agreement.
	11.3	The bidder shall furnish, as part of its bid, all those documents establishing the eligibility in conformity to the terms and conditions specified in the bidding documents for all material, equipment and works which the bidder proposes to execute.
	11.4	The documentary evidence of conformity of the material, equipment and works to the Bidding Documents may be in the form of literature, drawings, and data, and shall consist of: a) a detailed description of the work methodology, approach, schedule and resources to be mobilized at site;

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		b) an item-by-item commentary on the Procuring agency/Employer's Technical Specifications demonstrating substantial responsiveness of the material, equipment and works to those specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications; c) any other procurement specific documentation requirement as stated in the **BDS**.
	11.5	The required documents and other accompanying documents must be in English. In case any other language than English is used the pertinent translation into English shall be attached to the original version.
12. Documents Establishing Eligibility and Qualification of the Bidder	12.1	The bidder shall furnish, as part of its bid, all those documents establishing the bidder's eligibility to participate in the bidding process and/or its qualification to perform the contract if its bid is accepted.
	12.2	The documentary evidence of the bidder's eligibility to bid shall establish to the satisfaction of the Procuring agency/Employer that the bidder, at the time of submission of its bid, is from an eligible country as defined in Section-IV titled as "Eligible Countries".
	12.3	The documentary evidence of the bidder's qualification to perform the contract if its bid is accepted shall establish to the satisfaction of Procuring agency/Employer that: a) The bidder has the financial and technical capability necessary to perform the Contract, meets the qualification criteria specified in Section-V, Evaluation and Qualification Criteria and **BDS**. b) In the case of a bidder not doing business within Pakistan, the bidder is or will be (if awarded the contract) represented by a local bidder (Joint Venture) in accordance with the PEC works bylaws, and in case of award of works such foreign firm is required to participate in the execution of works to carry out its obligations as prescribed in the Conditions of Contract and /or Technical Specifications. c) That the bidder meets the qualification criteria listed in Section-V, Evaluation and Qualification Criteria and **BDS.**
13. Letter of Bid and Schedules	13.1	The Letter of Bid (Technical or Financial as the case may be) and Schedules, including the Bill of Quantities, shall be prepared using the relevant forms furnished in Standard Bid Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under **ITB 22.** All blank spaces shall be filled in with the information requested.

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14. Letter of Bid	14.1	The bidder shall fill the Letter of Bid (Technical or Financial as the case may be) furnished in the bidding documents. The Standard Bid Forms must be completed without any alterations to its format and no substitute shall be accepted.
15. Bid Prices	15.1	The bid prices quoted by the bidder in the Standard bid Forms, Bill of Quantities and in the Price Schedules shall conform to the requirements specified below or exclusively mentioned hereafter in the bidding documents.
	15.2	The bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. If a Price Schedule shows items listed but not priced, their prices shall be construed to be included in the prices of other items in the Bill of Quantities and will not be paid for separately by the Procuring agency/Employer.
	15.3	Items not listed in the Price Schedule shall be assumed not to be included in the bid, and provided that the bid is still substantially responsive in their absence or due to their nominal nature, the corresponding average price of the respective item(s) of the remaining substantially responsive bidder(s) shall be construed to be the price of those missing item(s): Provided that: a) where there is only one (substantially) responsive bidder, or b) where there is provision for alternate proposals and the respective items are not listed in the other bids, The Procuring agency/Employer may fix the price of missing items in accordance with market survey, and the same shall be considered as final price.
	15.4	The Bid price to be quoted in the Form of Bid in accordance with ITB 15.1 shall be the total price of the bid.
	15.5	Unless otherwise specified in the **BDS** and the Contract, the rates and prices quoted by the bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract.
	15.6	If so specified in **ITB 1.1**, bids may be invited for individual lots (contracts) or for any combination of lots (packages).
	15.7	Prices quoted by the Bidder shall be fixed during the bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable price will be treated as non-responsive and shall be rejected, pursuant to **ITB 30**, unless otherwise price adjustment is permissible under Conditions of the Contract.
	15.8	All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date

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		twenty-eight (28) days prior to the deadline for submission of bids, shall be included in the rates and prices and the total bid price submitted by the bidder.
16. Currencies of Bid and Payment	16.1	The currency(ies) of the bid and the currency(ies) of payments shall be as specified in the **BDS.**
	16.2	For the purposes of comparison of bids quoted in different currencies, the price shall be converted into a single currency specified in the bidding documents. The rate of exchange shall be the selling rate, prevailing on the date of opening of (financial part of) bids specified in the bidding documents, as notified by the State Bank of Pakistan on that day.
	16.3	Bidders shall indicate details of their expected foreign currency requirements in the Bid, if prescribed in the BDS.
	16.4	Bidders may be required by the Procuring agency/Employer to clarify their foreign currency requirements, if prescribed in the BDS and to substantiate that the amounts included in Lump Sum and in the **SCC** are reasonable and responsive to **ITB 16.1**.
17. Documents Comprising the Technical Proposal	17.1	The bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in **Section IV – Standard Bid Forms**, in sufficient detail to demonstrate the adequacy of the bidder's proposal to meet the work requirements and the completion time.
18. Bid Validity Period	18.1	Bids shall remain valid for the period specified in the **BDS** after the bid submission deadline prescribed by the Procuring agency/Employer. A bid valid for a shorter period shall be rejected by the Procuring agency/Employer as non-responsive. The period of bid validity will be determined from the complementary bid securing instrument i.e. the expiry period of bid security or bid securing declaration as the case may be.
	18.2	Under exceptional circumstances, prior to the expiration of the initial bid validity period, the Procuring agency/Employer may request the bidders' consent to an extension of the period of validity of their bids only once, for the period not more than the period of initial bid validity. The request and the bidders' responses shall be made in writing or in electronic forms that provide record of the content of communication. The Bid Security provided under **ITB 19** shall also be extended 28 days beyond the deadline of extended bid validity period. A bidder may refuse the request for the extension of his bid without forfeiting his bid security or causing to be executed his Bid Securing Declaration. A bidder agreeing to the request will not be required nor permitted to modify its bid, but will be required

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		to extend the validity of its Bid Security or Bid Securing Declaration for the period of the extension, and in compliance with **ITB 19** in all respects.
19. Bid Security or Bid Securing Declaration	19.1	Pursuant to **ITB 11.1** unless otherwise specified in the **BDS**, the bidder shall furnish as part of its bid, a Bid Security in form of fixed amount not exceeding five percent of the estimated value of procurement determined by the Procuring agency/Employer and in the amount and currency specified in the **BDS** or Bid Securing Declaration as specified in the **BDS** in the format provided in **Section VI (Standard Bidding Forms).** In case Procuring agency/Employer is inviting bids in lots / packages, the bidder shall be required to submit his bid security against the respective lot/ package for which he is submitting his bid, which shall not exceed five percent of the estimated value of that particular lot/ package.
	19.2	The Bid Security or Bid Securing Declaration is required to protect the Procuring agency/Employer against the risk of Bidder's conduct before award of the contract to the most advantageous bidder which would warrant the security's forfeiture, pursuant to **ITB 19.9.**
	19.3	The Bid Security shall be denominated in the local currency or in another freely convertible currency, and it shall be in the form specified in the **BDS** which shall be in any of the following: a) A bank guarantee, an irrevocable letter of credit issued by a Scheduled bank in the form provided in the Bidding Documents or another form acceptable to the Procuring agency/Employer and valid for twenty-eight (28) days beyond the end of the validity of the Bid. This shall also apply if the period for Bid Validity is extended. In either case, the form must include the complete name of the bidder; b) A cashier's or certified cheque; or c) Another security as indicated in the **BDS.**
	19.4	The Bid Security or Bid Securing Declaration shall be in accordance with the Form of the Bid Security or Bid Securing Declaration included in **Section VI (Standard Bidding Forms)** or another form approved by the Procuring agency/Employer prior to the bid submission.
	19.5	The Bid Security shall be payable promptly upon written demand by the Procuring agency/Employer in case any of the conditions listed in **ITB 19.9** are invoked.
	19.6	Any bid not accompanied by a Bid Security or Bid Securing Declaration in accordance with **ITB 19.1 or 19.3** shall be rejected by the Procuring agency/Employer and shall be

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		declared as non-responsive bid, pursuant to **ITB 30**.
	19.7	Unsuccessful bidders' Bid Security will be discharged or returned as promptly as possible, however in no case later than thirty (30) days after the expiration of the period of Bid Validity prescribed by the Procuring agency/Employer pursuant to **ITB 18**. The Procuring agency/Employer shall make no claim to the amount of the Bid Security, and shall promptly return the Bid Security document, after whichever of the following that occurs earliest: (a) The expiry of the Bid Security; (b) The entry into force of a procurement contract and the provision of a performance security (or guarantee), for the performance of the contract if such a security (or guarantee), is required by the Biding documents; (c) The rejection by the Procuring agency/Employer of all Bids; (d) The withdrawal of the bid prior to the deadline for the submission of bids, unless the biding documents stipulate that no such withdrawal is permitted.
	19.8	The successful bidder's Bid Security will be discharged upon the bidder signing the contract pursuant to **ITB 47,** or furnishing the performance security (or guarantee), pursuant to **ITB 48.**
	19.9	The Bid Security may be forfeited or the Bid Securing Declaration executed: a) If a Bidder: i) Withdraws its Bid during the period of Bid Validity as specified by the Procuring agency/Employer, and referred by the bidder on the Form of Bid except as provided for in **ITB 18.2**; or ii) Does not accept the correction of errors pursuant to **ITB 32**; or b) In the case of a successful bidder, if the bidder fails: i) to sign the contract in accordance with **ITB 47**; or ii) to furnish performance security (or guarantee) in accordance with **ITB 48.**
	19.10	In case of Bid Security issued by the foreign bank is allowed by the Procuring agency/Employer, the same should be counter guaranteed by a corresponding bank in Pakistan. Furthermore, in case of joint venture, it should be in the name of Joint venture to ensure joint responsibility.
20. Alternative Bids by Bidders	20.1	Bidders shall submit offers that comply with the requirements of the bidding documents, including the basic bidder's technical design as indicated in the specifications and Bill of Quantities. Alternatives will not be considered, unless specifically allowed for in the **BDS**. If so allowed,

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		ITB 20 shall prevail.
	20.2	When alternative schedule for execution of works is explicitly invited, a statement of that effect will be included in the **BDS** as will the method for evaluating different schedule for execution of works.
	20.3	If so allowed in the **BDS**, bidders wishing to offer technical alternatives to the requirements of the bidding documents must also submit a bid that complies with the requirements of the bidding documents, including the basic technical design as indicated in the specifications. In addition to submitting the basic bid, the bidder shall provide all information necessary for a complete evaluation of the alternative by the Procuring agency/Employer, including technical specifications, breakdown of prices, and other relevant details. Only the technical alternatives, if any, of the Most Advantageous Bidder conforming to the basic technical requirements (without altering the bid price) shall be considered by the Procuring agency/Employer.
21. Withdrawal of Bids	21.1	Before bid submission deadline, any bidder may withdraw, substitute, or modify its bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and the corresponding must accompany the respective written notice.
	21.2	Bids requested to be withdrawn in accordance with **ITB 21.1** shall be returned unopened to the bidders.
22. Format and Signing of Bid	22.1	The Bidder shall prepare an original and the number of copies of the bid as indicated in the **BDS**, clearly marking each **"ORIGINAL"** and **"COPY"** as appropriate. In the event of any discrepancy between them, the original shall prevail: *Provided that except in Single Stage One Envelope Procedure, the bid shall include only the copies of technical proposal.*
	22.2	The original and the copy (ies) of the bid shall be typed or written in indelible ink and shall be signed by the bidder or a person or persons duly authorized to sign on behalf of the bidder. This authorization shall consist of a written confirmation as specified in the **BDS** and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the bid, except for un-amended printed literature, shall be initialed by the person or persons signing the bid.

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	22.3	Any interlineations, erasures, or overwriting shall be valid only if they are signed by the person(s) authorized for signing the Bid.

D. SUBMISSION OF BIDS

23. Sealing and Marking of Bids	23.1	In case of Single Stage One Envelope Procedure, the bidder shall seal the original and each copy of the bid in separate envelopes, duly marking the envelopes as **"ORIGINAL"** and **"COPY"**. The envelopes shall then be sealed in an outer envelope securely sealed in such a manner that opening and resealing cannot be achieved undetected. **Note:** *The envelopes shall be sealed and marked in accordance with the bidding procedure adopted as referred in Rule-36 of Public Procurement Rules,2004.*
	23.2	The inner and outer envelopes shall: a) be addressed to the Procuring agency/Employer at the address given in the **BDS**; and b) bear the title of the subject procurement or project name, as the case may be as indicated in the **BDS**, the Invitation for Bids (ITB) title and number indicated in the **BDS**, and a statement: **"DO NOT OPEN BEFORE"**, to be completed with the time and the date specified in the **BDS**, pursuant to **ITB 24.1.**
	23.3	In case of Single Stage Two Envelope Procedure, The Bid shall comprise two envelopes submitted simultaneously, one called the Technical Proposal and the other Financial Proposal. Both envelopes to be enclosed together in an outer single envelope called the Bid. Each Bidder shall submit his bid as under: a) Bidder shall submit his **TECHNICAL PROPOSAL** and **FINANCIAL PROPOSAL** in separate inner envelopes and enclosed in a single outer envelope. b) **ORIGINAL** and each copy of the Bid shall be separately sealed and put in separate envelopes and marked as such. c) The envelopes containing the **ORIGINAL** and copies will be put in one sealed envelope and addressed / identified as given in **ITB 23.2.**
	23.4	The inner and outer envelopes shall: a) be addressed to the Procuring agency/Employer at the address provided in the **BDS**; b) bear the name and identification number of the contract as defined in the **BDS**; and provide a warning not to open before the time and date for bid opening, as specified in the **BDS** pursuant to **ITB 24.1.** c) In addition to the identification required in **ITB 23**

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		hereof, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared "late" pursuant to **ITB 25.**
	23.5	If all envelopes are not sealed and marked as required by **ITB 23.2**, **ITB 23.3** and **ITB 23.4** or incorrectly marked, the Procuring agency/Employer will assume no responsibility for the misplacement or premature opening of bid.
24. Deadline for Submission of Bids	24.1	Bids shall be received to the Procuring agency/Employer no later than the date and time specified in the **BDS.**
	24.2	The Procuring agency/Employer may, under exceptional circumstances and at its discretion, extend the deadline for the submission of bids by amending the Bidding Documents in accordance with **ITB 9**, in which case all rights and obligations of the Procuring agency/Employer and bidders previously subject to the deadline will thereafter be subject to the new deadline.
25. Late Bids	25.1	The Procuring agency/Employer shall not consider for evaluation of any bid that arrives after the deadline for submission of bids, in accordance with **ITB 24.**
	25.2	Any bid received by the Procuring agency/Employer after the deadline for submission of bids shall be declared late, recorded, rejected and returned unopened to the bidder.
26. Substitution and Modification of bids	26.1	A bidder may substitute or modify his bid after it has been submitted, provided that written notice of the substitution or modification of the bid, is received by the Procuring agency/Employer prior to the deadline for submission of bids.
	26.2	Revised bid may be submitted after the substitution or modification made in the original bid in accordance with the provisions referred in **ITB 22.**

E. OPENING AND EVALUATION OF BIDS

27. Opening of Bids	27.1	The Procuring agency/Employer will open all bids, in public, in the presence of bidders' or their representatives who choose to attend, and other parties with a legitimate interest in the bid proceedings at the place, on the date and at the time, specified in the **BDS**. The bidders' representatives present shall sign a attendance sheet as a proof of their attendance.
	27.2	First, envelopes marked **"WITHDRAWAL"** shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the bidder. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening.
	27.3	Second, outer envelopes marked **"SUBSTITUTION"** shall be opened. The inner envelopes containing the Substitution Bid

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		shall be exchanged for the corresponding Original Bid being substituted, which is to be returned to the bidder unopened. No envelope shall be substituted unless the corresponding Substitution Notice contains a valid authorization to request the substitution and is read out and recorded at bid opening.
	27.4	Next, outer envelopes marked **"MODIFICATION"** shall be opened. No Technical Proposal and/or Financial Proposal shall be modified unless the corresponding Modification Notice contains a valid authorization to request the modification and is read out and recorded at the opening of the bids. Any modification shall be read out along with the Original Bid except in case of Single Stage Two Envelope Procedure where only the Technical Proposal, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Financial Proposal, both Original and Modification, will remain unopened till the prescribed financial bid opening date.
	27.5	Other envelopes holding the bids shall be opened one at a time, in case of Single Stage One Envelope Procedure, the bidders' names, the bid prices, the total amount of each bid and of any alternative bid (if alternatives have been requested or permitted), the presence or absence of Bid Security, Bid Securing Declaration and such other details as the Procuring agency/Employer may consider appropriate, will be announced by the Procurement Evaluation Committee.
	27.6	In case of Single Stage Two Envelope Procedure, the Procuring agency/Employer will open the Technical Proposals in public at the address, date and time specified in the **BDS** in the presence of bidders' designated representatives who choose to attend and other parties with a legitimate interest in the bid proceedings. The Financial Proposals will remain unopened and will be held in custody of the Procuring agency/Employer until the specified time of their opening.
	27.7	The envelopes holding the Technical Proposals shall be opened one at a time, and the following read out and recorded: (a) the name of the bidder; (b) whether there is a modification or substitution; (c) the presence of a Bid Security or Bid Securing Declaration, if required; and (d) Any other details as the Procuring agency/Employer may consider appropriate.
	27.8	Bids not opened and not read out at the bid opening shall not be considered further for evaluation, irrespective of the circumstances.
	27.9	Bidders are advised to send in a representative with the knowledge of the content of the bid who shall verify the information read out from the submitted documents. Failure to send a representative or to point out any un-read information

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		by the sent bidder's representative shall indemnify the Procuring agency/Employer against any claim or failure to read out the correct information contained in the bidder's bid.
	27.10	No bid will be rejected at the time of bid opening except for late bids which will be returned unopened to the bidder, pursuant to **ITB 25.**
	27.11	The Procuring agency/Employer shall prepare minutes of the bid opening. The record of the bid opening shall include, as a minimum: the name of the bidder and whether or not there is a withdrawal, substitution or modification, the bid price if applicable and the presence or absence of a Bid Security or Bid Securing Declaration.
	27.12	The bidders' representatives who are present shall be requested to sign on the attendance sheet. The omission of a bidder's signature on the record shall not invalidate the contents and affect the record. A copy of the record shall be distributed to all the bidders.
	27.13	A copy of the minutes of the bid opening shall be furnished to individual bidders upon request.
	27.14	In case of Single Stage -Two Envelop Bidding Procedure, after the announcement of technical evaluation report, the Procuring agency/Employer, shall at a time within the bid validity period, publicly open the financial proposals of the technically responsive bidder only. The financial proposal of bidders found technically non-responsive shall be returned un-opened to the respective bidders after seven days of the announcement of technical evaluation report, except those aggrieved bidder(s) whose complaints are pending before the Grievance Redressal Committee.
28. Confidentiality	28.1	Information relating to the examination, clarification, evaluation and comparison of bids and recommendation of contract award shall not be disclosed to bidders or any other persons not officially concerned with such process until the time of the announcement of the respective evaluation report.
	28.2	Any effort by a bidder to influence the Procuring agency/Employer processing of bids or award decisions may result in the rejection of its bid.
	28.3	Notwithstanding **ITB 28.2** from the time of bid opening to the time of contract award, if any bidder wishes to contact the Procuring agency/Employer on any matter related to the bidding process, it should do so in writing or in electronic forms that provides record of the content of communication.
29. Clarification of Bids	29.1	To assist in the examination, evaluation and comparison of bids, the Procuring agency/Employer may, ask any bidder for a clarification of its bid including breakdown of prices invariably in writing. Any clarification submitted by a bidder that is not in response to a request by the Procuring

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		agency/Employer shall not be considered.
	29.2	The request for clarification and the response shall be in writing or in electronic forms that provide record of the content of communication. No change in the prices or substance of the bid shall be sought, offered, or permitted, except clarification for the correction of arithmetic errors discovered by the Procuring agency/Employer during the evaluation of bids which shall be sought in accordance with **ITB 32.**
	29.3	The alteration or modification in the bid which in any case affect the following parameters will be considered as a change in the substance of a bid: a) evaluation & qualification criteria; b) required scope of work; c) contract price; d) all securities requirements; e) tax requirements; f) terms and conditions of bidding documents. g) change in the ranking of the bidder
	29.4	From the time of bid opening to the time of Contract award if any bidder wishes to contact the Procuring agency/Employer on any matter related to the bid it should do so in writing or in electronic forms that provide record of the content of communication.
30. Preliminary Examination of Bids	30.1	Prior to the detailed evaluation of bids, the Procuring agency/Employer will determine whether each bid: a) meets the eligibility criteria defined in **ITB 3** and **ITB 4;** b) has been prepared as per the format and contents defined by the Procuring agency/Employer in the bidding documents; c) has been properly signed; d) is accompanied by the required securities; and e) is substantially responsive to the requirements of the bidding documents. The Procuring agency/Employer's determination of a bid's substantial responsiveness will be based on the contents of the bid itself.
	30.2	A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding Documents, without material deviation or reservation. A material deviation or reservation is one that: - a) affects in any substantial way the scope, quality, or performance of the Works; b) limits in any substantial way, inconsistent with the bidding documents, Procuring

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		agency/Employer's rights or the bidders' obligations under the Contract; or c) if rectified, would affect unfairly the competitive position of other bidders presenting substantially responsive bids.
	30.3	The Procuring agency/Employer will confirm that the documents and information specified under **ITB 11, 12** and **13** have been provided in the bid. If any of these documents or information is missing, or is not provided in accordance with the Instructions to Bidders, the bid shall be rejected.
	30.4	The Procuring agency/Employer may waive-off any minor informality, nonconformity, or irregularity in a bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder. ***Explanation:*** *A minor informality, non-conformity or irregularity is one that is merely a matter of form and not of substance. It also pertains to some immaterial defect in a Bid or variation of a bid from the exact requirements of the invitation that can be corrected or waived without being prejudicial to other bidders. The defect or variation is immaterial when the effect on quantity, quality, or delivery is negligible when contrasted with the total cost or scope of the works. The Procuring agency/Employer either shall give the bidder an opportunity to cure any deficiency resulting from a minor informality or irregularity in a bid or waive the deficiency, whichever is advantageous to the Procuring agency/Employer. Examples of minor informalities or irregularities include failure of a bidder to –* (a) *Submit the number of copies of signed bids required by the invitation;* (b) *Furnish required information concerning the number of its employees;* (c) *the firm submitting a bid has formally adopted or authorized, before the date set for opening of bids, the execution of documents by typewritten, printed, or stamped signature and submits evidence of such authorization and the bid carries such a signature.*
	30.5	Provided that a Technical Bid is substantially responsive, the Procuring agency/Employer may request the bidder to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Technical Bid related to documentation requirements. Requesting information or

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		documentation on such nonconformities shall not be related to any such aspect of the technical Proposal linked with the ranking of the bidders. Failure of the bidder to comply with the request may result in the rejection of its bid.
	30.6	Provided that a Technical Bid is substantially responsive, the Procuring agency/Employer shall rectify quantifiable nonmaterial nonconformities or omissions related to the Financial Proposal. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of the missing or nonconforming item or component.
	30.7	If a bid is not substantially responsive, it will be rejected by the Procuring agency/Employer and may not subsequently be evaluated for complete technical responsiveness.
31. Examination of Terms and Conditions; Technical Evaluation	31.1	The Procuring agency/Employer shall examine the bid to confirm that all terms and conditions specified in the **GCC** and the **SCC** have been accepted by the bidder without any material deviation or reservation. For this purpose: "Deviation" means departure from the requirements specified in the Bidding Document. "Reservation" means setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document.
	31.2	The Procuring agency/Employer shall evaluate the technical aspects of the bid submitted in accordance with **ITB 31**, to confirm that all requirements specified in **Section V – Works Requirement, Technical Specifications** of the Bidding Documents have been met without material deviation or reservation.
	31.3	If after the examination of the terms and conditions and the technical evaluation, the Procuring agency/Employer determines that the bid is not substantially responsive in accordance with **ITB 30**, it shall reject the bid.
32. Correction of Arithmetic Errors	32.1	Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows: - a) if there is a discrepancy between unit prices and the sub-total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the sub-total price shall be corrected, unless in the opinion of the Procuring agency/Employer there is an obvious misplacement of the decimal point in the unit price, in which the total price as quoted shall govern and the unit price shall be corrected; b) if there is an error in a total corresponding to the addition or subtraction of sub-totals, the sub-totals

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		shall prevail, and the total shall be corrected; and c) where there is a discrepancy between the amounts in figures and in words, the amount in words will govern. d) Where there is discrepancy between grand total of price schedule and amount mentioned on the Form of Bid, the amount referred in Price Schedule shall be treated as correct subject to elimination of other errors.
	32.2	The amount stated in the Bid will, be rectified by the Procuring agency/Employer in accordance with the above procedure for the correction of errors and, with, the concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount, its bid shall be rejected after forfeiture of Bid Security or execution of the Bid Securing Declaration, as the case may be, in accordance with **ITB 19.9.**
33. Conversion to Single Currency	33.1	The unit rates and the prices shall be quoted by the bidder entirely in Pak rupees. A bidder expecting to incur expenditures in other currencies for inputs to the Works from outside the Procuring agency/Employer's country (referred to as the "Foreign Currency Requirements") shall indicate the same in the letter of bid-financial proposal. The proportion of the Bid Price (excluding Provisional Sums) needed by him for the payment of such Foreign Currency Requirements either (i) entirely in the currency of the Bidder's home country or, (ii) at the bidder's option, entirely in Pak rupees provided always that a bidder expecting to incur expenditures in a currency or currencies other than those stated in (i) and (ii) above for a portion of the foreign currency requirements, and wishing to be paid accordingly, shall indicate the respective portions in his bid.
	33.2	To facilitate evaluation and comparison, the Procuring agency/Employer will convert all bid prices expressed in the amounts in various currencies in which the bid prices are payable. For the purposes of comparison of bids quoted in different currencies, the price shall be converted into a single currency specified in the bidding documents. The rate of exchange shall be the selling rate, prevailing on the date of opening of (financial part of) bids specified in the bidding documents, as notified by the State Bank of Pakistan on that day.
	33.3	The currency selected for converting bid prices to a common base for the purpose of evaluation, along with the source and date of the exchange rate, are specified in the **BDS.**
34. Evaluation of Bids	34.1	The Procuring agency/Employer shall evaluate and compare

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		only the bids determined to be substantially responsive, pursuant to **ITB 30**.
	34.2	In evaluating the Technical Proposal of each Bid, the Procuring agency/Employer shall use the criteria and methodologies listed in the **BDS** and in terms of works requirement. No other evaluation criteria or methodologies shall be permitted.
	34.3	The Procuring agency/Employer's evaluation of a bid will take into account: a) the bid price, excluding provisional sums and the provision, if any, for contingencies in the summary bill of quantities, but including day work items, where priced competitively; b) price adjustment for correction of arithmetic errors in accordance with **ITB 32.1**; c) converting the amount resulting from applying (a) and (b) above, if relevant, to a single currency in accordance with **ITB 33**;
	34.4	The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
	34.5	If these bidding documents allow bidders to quote separate prices for different lots, and the award to a single bidder of multiple lots, the methodology of evaluation to determine the lowest evaluated lot combinations in the Form of Bid, is specified in the **BDS.**
	34.6	If the bid, which results in the Evaluated Bid Price (Most Advantageous Bid), is seriously unbalanced or front loaded in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract. **Explanation:** *"Unbalanced" or "front-loaded" bids consist of deliberately submitting bids with artificially high prices or unit rates for the early stages of a construction project, offset by artificially low*

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		prices or unit rates for the later stages of the project, to improve the contractor's cash flow.
35. Domestic Preference	35.1	If the **BDS** so specifies, the Procuring agency/Employer will grant a margin of preference to the domestic contractor in line with the rules, regulations, regulatory guides or instructions issued by the Authority from time to time.
36. Determination of Most Advantageous Bid	36.1	The Procuring agency/Employer shall compare the evaluated bids in accordance with the predefined bidding procedure, of all substantially responsive bids to determine the Most Advantageous bidder.
37. Qualification of Bidder	37.1	The Procuring agency/Employer shall determine to its satisfaction whether the bidder is substantially responsive and whose bid is declared as most advantageous bid either continues to meet (if prequalification applies) or meets (if post-qualification applies) the qualifying criteria specified in Evaluation and Qualification Criteria. *Note: In case of International bidding, the parameters for incorporation or licensing within Pakistan may be fulfilled as part of post qualification.*
	37.2	The determination shall be based upon an examination of the documentary evidence of the bidder's qualifications submitted by the bidder, pursuant to **ITB 12**.
	37.3	Prior to contract award, the Procuring agency/Employer will verify that the successful bidder (including each member of a JV) is not blacklisted/debarred. The Procuring agency/Employer will conduct the same verification for each sub-contractor proposed by the successful bidder.
38. Sub-Contractors	38.1	The bidder shall provide details regarding any specialized sub-contractor to the Procuring agency/Employer. In case change of sub-contractors, the bidder shall promptly notify the Procuring agency/Employer and obtain approval for replacement of sub-contractors.
	38.2	Bidders may propose sub-contracting up to the percentage of total value of contracts or the volume of works as specified in the **BDS.**

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39. Abnormally Low Financial Bid	39.1	Where the bid price is considered to be abnormally low, the Procuring agency/Employer shall perform price analysis either during determination of Most Advantageous Bid or as a part of the post-qualification process. The following process shall apply: a) The Procuring agency/Employer may reject a bid if the Procuring agency/Employer has determined that the price in combination with other constituent elements of the bid is abnormally low in relation to the subject matter of the procurement (i.e. scope of the procurement or ancillary services) and raises concerns as to the capability and capacity of the respective Bidder to perform that contract; b) Before rejecting an abnormally low bid the Procuring agency/Employer shall request the bidder an explanation of the bid or of those sections which it considers contribute to the bid being abnormally low; take account of the evidence provided in response to a request in writing; and subsequently verify the bid or parts of the bid being abnormally low; c) The decision of the Procuring agency/Employer to reject a bid and reasons for the decision shall be recorded in the procurement proceedings and promptly communicated to the bidder concerned; d) The Procuring agency/Employer shall not incur any liability solely by rejecting abnormally bid; and e) An abnormally low bid means, in the light of the Procuring agency/Employer's estimate and of all the bids submitted, the bid appears to be abnormally low by not providing a margin for normal levels of profit. **Guidance for Procuring agency/Employer:** In order to identify the Abnormally Low Bid (ALB) following approaches can be considered to minimize the scope of subjectivity: (i). Comparing the bid price with the cost estimate; (ii) Comparing the bid price with the bids offered by other bidders submitting substantially responsive bids; and (iii) Comparing the bid price with prices paid in similar contracts in the recent past either government- or development partner-funded.
	39.2	The Procuring agency/Employer will determine to its satisfaction whether the bidder that is selected as having submitted the most advantageous bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in **ITB 12**

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	39.3	The determination will take into account the bidder's financial and technical capabilities. It will be based upon an examination of the documentary evidence of the bidder's qualifications submitted by the bidder, pursuant to **ITB 12**, as well as such other information as the Procuring agency/Employer deems necessary and appropriate. Factors not included in these bidding documents shall not be used in the evaluation of the bidders' qualifications.
	39.4	Procuring agency/Employer may seek "Certificate for Independent Price Determination" from the bidder and the results of reference checks may be used in determining award of contract. ***Explanation:*** *The Certificate shall be furnished by the bidder. The bidder shall certify that the price is determined keeping in view of all the essential aspects such as raw material, its processing, value addition, optimization of resources due to economy of scale, transportation, insurance and margin of profit etc.*
	39.5	An affirmative determination will be a prerequisite for award of the contract to the bidder. A negative determination will result in rejection of the bidder's bid, in which event the Procuring agency/Employer will proceed to the next ranked bidder to make a similar determination of that bidder's capabilities to perform satisfactorily.

F. AWARD OF CONTRACT

40. Criteria of Award	40.1	Subject to **ITB 36** and **37**, the Procuring agency/Employer will award the Contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents and who has been declared as Most Advantageous Bidder, provided that such bidder has been determined to be: a) eligible in accordance with the provisions of **ITB 3;** b) is determined to be qualified to perform the Contract satisfactorily; and c) Successful negotiations have been concluded, if any.
41. Negotiations	41.1	The Committee of the Procuring agency/Employer may negotiate with the Most Advantageous Bidder relating to the following areas: (a) a minor alteration to the technical (drawings, design technical specifications) details of the statement of works; (b) Methodology, work plan, staffing in view to streamline the work; (c) a minor amendment to the special conditions of Contract; (d) finalizing payment arrangements; (e) clarifying details that were not apparent or could not be finalized at the time of Bidding;

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	41.2	Where negotiation fails to result into an agreement, the Procuring agency/Employer may invite the next ranked bidder for negotiations. Where negotiations are commenced with the next ranked bidder, the Procuring agency/Employer shall not reopen earlier negotiations.
42. Procuring agency/Employer's Right to reject All Bids	42.1	Notwithstanding **ITB 37**, the Procuring agency/Employer reserves the right to reject all the bids, and to annul the bidding process at any time prior to acceptance of bid, without thereby incurring any liability to the affected bidder(s). However, the Authority (i.e. PPRA) may call from the Procuring agency/Employer the justification of those grounds.
	42.2	Notice of the rejection of all bids shall be given promptly to all bidders that have submitted bids.
	42.3	The Procuring agency/Employer shall upon request communicate to any bidder the grounds for its rejection of its bids, but is not required to justify those grounds.
43. Variations	43.1	The Engineer shall make any variation in the quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following: a) increase or decrease the quantity of any work included in the Contract, b) omit any such work (but not if the omitted work is to be carried out by the Employer or by another contractor), c) change the character or quality or kind of any such work, d) change the levels, lines, position and dimensions of any part of the Works, e) execute additional work of any kind necessary for the completion of the Works, or f) change any specified sequence or timing of construction of any part of the Works. No such variation shall in any way vitiate or invalidate the Contract, but the effect, if any, of all such variations shall be valued in accordance with **ITB 15**. Provided that where the issue of an instruction to vary the Works is necessitated by some default of or breach of contract by the Contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor.
44. Instructions for variations	44.1	The Contractor shall not make any such variation without an instruction of the Engineer. Provided that no instruction shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an instruction given under this Clause, but is the result of the

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		quantities exceeding or being less than those stated in the Bill of Quantities.
45. Valuation of Variations	45.1	All variations and any additions to the Contract Price which are required to be determined in accordance with **ITB 15** (for the purposes of this Clause referred to as "varied work"), shall be valued at the rates and prices set out in the Contract if, in the opinion of the Engineer, the same shall be applicable. If the Contract does not contain any rates or prices applicable to the varied work, the rates and prices in the Contract shall be used as the basis for valuation so far as may be reasonable, failing which, after due consultation by the Engineer with the Procuring agency/Employer and the Contractor, suitable rates or prices shall be agreed upon between the Engineer and the Contractor. In the event of disagreement, the Engineer shall fix such rates or prices as are, in his opinion, appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issued in accordance with **ITB 15.**
46. Notification of Award	46.1	Prior to the award of contract, the Procuring agency/Employer shall issue a Final Evaluation Report giving justification for acceptance or rejection of the bids.
	46.2	Where no complaints have been lodged, the bidder whose bid has been accepted will be notified of the award by the Procuring agency/Employer prior to expiration of the bid validity period in writing or through electronic means that provide record of the content of communication. However, the Procuring agency/Employer shall not award any procurement contract atleast for fifteen (15) days after the acceptance of bid. The notification letter (herein after and in the condition of the contract and contract form called "Letter of Acceptance" will specify the sum that the Procuring agency/Employer will pay the successful bidder in consideration for the execution and completion of the works as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price).
	46.3	The notification of award will constitute the formation of the Contract, subject to the bidder furnishing the Performance Security (or guarantee) in accordance with **ITB 48** and signing of the contract in accordance with **ITB 47.**
	46.4	Upon the successful bidder's furnishing of the performance security (or guarantee) pursuant to **ITB 48**, the Procuring agency/Employer will promptly notify each unsuccessful bidder, the name of the successful bidder and the Contract amount and will discharge the Bid Security or Bid Securing

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		Declaration of the bidder(s) pursuant to **ITB 19**.
47. Signing of Contract	47.1	Promptly after notification of award, Procuring agency/Employer shall send the successful bidder the draft agreement, incorporating all terms and conditions as agreed by the parties to the contract.
	47.2	Immediately after the Redressal of grievance by the GRC, and after fulfillment of all conditions precedent of the Contract Form, the successful bidder and the Procuring agency/Employer shall sign the contract.
	47.3	Where no formal signing of a contract is required, work order issued to the bidder shall be construed to be the contract.
48. Performance Security (or Guarantee)	48.1	After the receipt of the Letter of Acceptance, the successful bidder, within the specified time, shall deliver to the Procuring agency/Employer a Performance Guarantee in the amount and in the form stipulated in the **BDS and SCC**, denominated in the type and proportions of currencies in the Letter of Acceptance and in accordance with the Conditions of Contract.
	48.2	If the Performance Guarantee is provided by the successful bidder and it shall be in the form specified in the **BDS** which shall be in any of the following: (a) certified cheque, cashier's or manager's cheque, or bank draft; (b) irrevocable letter of credit issued by a scheduled bank of Pakistan or in the case of an irrevocable letter of credit issued by a foreign bank, the letter shall be confirmed or authenticated by a scheduled bank of Pakistan; (c) bank guarantee confirmed by a reputable local bank or, in the case of a successful foreign bidder, bonded by a foreign bank; or (d) surety bond callable upon demand issued by any reputable surety or insurance company. Any Performance Guarantee submitted shall be enforceable in Pakistan.
	48.3	Failure of the Most Advantageous Bidder to comply with the requirement of **ITB 47** shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security or declare blacklisted (in case bid securing declaration is submitted) in which event the Procuring agency/Employer may make the award to the next most advantageous bidder or reinitiate the procurement process afresh (as a case may be).
49. Advance Payment	49.1	Advance payment will be provided to the bidder in percentage and in the manner as agreed by the both parties in terms of Conditions of the Contract.
	49.2	The Procuring agency/Employer will provide an advance payment as stipulated in the Conditions of Contract, subject

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		to a maximum amount, as stated and/or Conditions of the Contract. The advance payment request shall be accompanied by an advance payment security (guarantee) in the form provided in Section X. For the purpose of receiving the advance payment, the bidder shall make and estimate of, and include in its bid, the expenses that will relate to the purchase of equipment, machinery, materials, and on the engagement of labor during the first month beginning with the date of the Procuring agency/Employer's "Notice to Commence" as specified in the **SCC.**
50. General Performance of the Bidders	50.1	The Procuring agency/Employer reserves the right to obtain information regarding performance of the bidders on their previously awarded contracts / works. The Procuring agency/Employer may seek information / report from the previous employer for consideration. However, the Procuring agency/Employer shall incorporate such parameters in the evaluation criteria and accordingly decide the fate of the bid submitted.
51. Corrupt & Fraudulent Practices	51.1	Procuring agencies (including beneficiaries of Government funded projects and procurement) as well as Bidders/Suppliers/Contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts, and will avoid to engage in any corrupt and fraudulent practices.

G. GRIEVANCE REDRESSAL & COMPLAINT REVIEW MECHANISM

52. Constitution of Grievance Redressal	52.1	Procuring agency/Employer shall constitute a Grievance Redressal Committee (GRC) comprising of odd number of persons with proper power and authorization to address the complaint. The GRC shall not have any of the members of Procurement Evaluation Committee. The committee must have one subject specialist depending the nature of the procurement.
53. GRC Procedure	53.1	Any party can file its written complaint against the eligibility parameters or any other terms and conditions prescribed in the prequalification or bidding documents found contrary to provision of Procurement Regulatory Framework, and the same shall be addressed by the GRC well before the bid submission deadline.
	53.2	Any bidder feeling aggrieved by any act of the Procuring agency/Employer after the submission of his bid may lodge a written complaint concerning his grievances not later than seven days of the announcement of technical evaluation report and five days after issuance of final evaluation report.
	53.3	In case, the complaint is filed against the technical evaluation report, the GRC shall suspend the procurement proceedings.

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	53.4	In case, the complaint is filed after the issuance of the final evaluation report, the complainant cannot raise any objection on technical evaluation of the report: Provided that the complainant may raise the objection on any part of the final evaluation report in case where single stage one envelope bidding procedure is adopted.
	53.5	The GRC, in both the cases shall investigate and decide upon the complaint within ten days of its receipt.
	53.6	Any bidder or the Procuring agency/Employer not satisfied with the decision of the GRC may file Appeal before the Appellate Committee of the Authority on prescribed format after depositing the Prescribed fee.
	53.7	The Committee, upon receipt of the Appeal against the decision of the GRC complete in all respect shall serve notices in writing upon all the parties to Appeal.
	53.8	The committee shall call the record from the concerned Procuring agency/Employer or the GRC as the case may be, and the same shall be provided within prescribed time.
	53.9	The committee may after examination of the relevant record and hearing all the concerned parties, shall decide the complaint within fifteen (15) days of receipt of the Appeal.
	53.10	The decision of the Committee shall be in writing and shall be signed by the Head and each Member of the Committee. The decision of the committee shall be final.

H. MECHANISM OF BLACKLISTING

54. Mechanism of Blacklisting	54.1	The Procuring agency/Employer shall bar for not more than the time prescribed in Rule-19 of the Public Procurement Rules, 2004, from participating in their respective procurement proceedings, bidder or contractor who either: Involved in corrupt and fraudulent practices as defined in Rule-2 of Public Procurement Rules; I) Fails to perform his contractual obligations; and ii) Fails to abide by the id securing declaration;
	54.2	The show cause notice shall contain: (a) precise allegation, against the bidder or contractor; (b) the maximum period for which the Procuring agency/Employer proposes to debar the bidder or contractor from participating in any public procurement of the Procuring agency/Employer; and (c) the statement, if needed, about the intention of the Procuring agency/Employer to make a request to the Authority for debarring the bidder or contractor from participating in public procurements of all the procuring agencies.

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	54.3	The Procuring agency/Employer shall give minimum of seven days to the bidder or contractor for submission of written reply of the show cause notice.
	54.4	In case, the bidder or contractor fails to submit written reply within the requisite time, the Procuring agency/Employer may issue notice for personal hearing to the bidder or contractor/ authorize representative of the bidder or contractor and the Procuring agency/Employer shall decide the matter on the basis of available record and personal hearing, if availed.
	54.5	In case the bidder or contractor submits written reply of the show cause notice, the Procuring agency/Employer may decide to file the matter or direct issuance of a notice to the bidder or contractor for personal hearing.
	54.6	The Procuring agency/Employer shall give minimum of seven days to the bidder or contractor for appearance before the designated officer of the Procuring agency/Employer for personal hearing. The designated officer shall decide the matter on the basis of the available record and personal hearing of the bidder or contractor, if availed.
	54.7	The Procuring agency/Employer shall decide the matter within fifteen (15) days from the date of personal hearing unless the personal hearing is adjourned to a next date and in such an eventuality, the period of personal hearing shall be reckoned from the last date of personal hearing.
	54.8	The Procuring agency/Employer shall communicate to the bidder or contractor the order of debarring the bidder or contractor from participating in any public procurement with a statement that the bidder or contractor may, within thirty (30) days, prefer a representation against the order before the Authority.
	54.9	Such blacklisting or barring action shall be communicated by the Procuring agency/Employer to the Authority and respective bidder or bidders in the form of decision containing the grounds for such action. The same shall be publicized by the Authority after examining the record whether the procedure defined in blacklisting and debarment mechanism has been adhered to by the Procuring agency/Employer.
	54.10	The bidder may file the review petition before the Review Petition Committee Authority within thirty (30) days of communication of such blacklisting or barring action after depositing the prescribed fee and in accordance with "Procedure of filing and disposal of review petition under Rule-19(3) Regulations, 2021". The Committee shall evaluate the case and decide within ninety (90) days of filing of review petition.

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	54.11	The committee shall serve a notice in writing upon all respondent of the review petition. The notices shall be accompanied by the copies of review petition and all attached documents of the review petition including the decision of the Procuring agency/Employer. The parties may file written statements along with essential documents in support of their contentions. The Committee may pass such order on the representation may deem fit.
	54.12	The Authority on the basis of decision made by the committee either may debar a bidder or contractor from participating in any public procurement process of all or some of the procuring agencies for such period as the deemed appropriate or acquit the bidder from the allegations. The decision of the Authority shall be final.

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SECTION III: BID DATA SHEET

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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Bid Data Sheet (BDS)

The following specific data for the procurement of works shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITBs). Whenever there is a conflict, the provisions herein shall prevail over those in ITBs.

BDS Clause Number	ITB Number	Amendments of, and Supplements to, Clauses in the Instruction to Bidders
		A. Introduction
1.	1.1	Name of Procuring agency/Employer: Director General Federal Government Employees Housing Authority, Islamabad The subject of procurement is: Infrastructure development Works for Sub Sector G-14/1, Islamabad Period for completion of the works: 728 days Commencement date execution of the works: 14 days after signing of Contract. Type of Procurement: National competitive bidding
2.	2.1	Financial year for the operations of the Procuring agency/Employer: 2026-27 & onwards Name of Project: Infrastructure development Works for Sub Sector G-14/1, Islamabad Name of financing institution: Employer's own Funds Name and identification number of the Contract: Not Applicable
3.	3.1	Delete the text of Sub-Clause 3.1 in its entirety and substitute with the following: This invitation for Bids is open to state owned entities under PPRA Rule 42 (f), "Direct Contracting with State Owned Entities", meeting the following requirements at the time of submission of Bids and thereafter: (a) Proof of State-Owned Entity (b) Duly licensed by the Pakistan Engineering Council (PEC) in the category relevant to the value of the Works in the relevant field of specialization. (c) All partners constituting the Bidder including proposed subcontractors do not appear in the list of debarred/ blacklisted firms and individuals on the websites of PEC and Federal & Provincial Procurement Regulatory Authorities and have not been declared debarred/ blacklisted by foreign country, international organizations or other foreign institutions

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BDS Clause Number	ITB Number	Amendments of, and Supplements to, Clauses in the Instruction to Bidders
4.	3.2	Not Applicable
5.	3.3	Not Applicable
6.	3.4	Not Applicable
7.	5.1	Each bidder shall submit only one bid. Joint venture of firms is not allowed. A bidder who participates in more than one bid (other than alternatives pursuant to Clause IB.20) will be disqualified.

B. Bidding Documents

8.	7.1	Delete the text of Sub-Clause 7.1 and substitute with the following: The Bidding Documents, in addition to Invitation for Bids, are those stated below, and should be read in conjunction with any Addenda issued in accordance with Clause IB.9. Technical Bid **7.1.1 Volume - I** • **Section I** - Invitation for Bids • **Section II** - Instruction to Bidders (ITBs); • **Section III** - Bidding Data Sheet (BDS); • **Section IV** - Eligible Countries; • **Section V** – Evaluation and Qualification Criteria; • **Section VI** – Works Requirements Technical Specifications & Schedule of Requirements; • **Section VII** – Standard Bidding Forms; • **Section VIII** – General Conditions of Contract (GCC) ; • **Section IX** – Special Conditions of Contract (SCC); - Part A – Contract Data; - Part B- Special Provisions; • **Section X** – Contract Forms **7.1.2 Volume – II** • Specifications: - Part A – Specific Provisions; - Part B – Technical Provisions. **7.1.3 Volume – III** • Bid Drawings.

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		Financial Bid **7.1.4 Volume – IV** • Letter of Financial Bid; • Preamble to Bill of Quantities; • Bill of Quantities.
9.	**7.2**	Complete Bid duly signed, stamped and scanned shall be submitted online on EPADS v2.0.
10.	**8.1**	The address for clarification of Bidding Documents is; **Director Technical** Federal Government Employees Housing Authority (FGEHA), Islamabad 10- Mauve Area, Sector G-10/4, Islamabad.
	8.5	Pre-bid meeting venue, time, and date will be as per Invitation for Bids.

C. Preparation of Bids

11.	**10.1**	The Language of all correspondences and documents related to the Bid is: English
12.	**11.1(j)**	In addition to the documents stated in **ITB 11,** the following documents must be included with the Bid: List of documents: Nil
13.	**11.5 (c)**	Other procurement specific documentation requirements are: Nil
14.	**15.2**	Delete the text of Sub-Clause 15.2 and substitute with the following: Bidder Shall Quote Premium in the Form of Percentage Above or Below the estimated price put to bid provided in the Summary of Estimate. Prices provided in the estimate against items are complete inclusive value of the finished work without any hidden technical and/ or financial reservations or implications. Bidders shall not modify, change, nor add any footnotes or any conditions to the Estimate.
15.	**15.5**	The bid price shall be adjusted in accordance with Appendix C – Formula for Price Adjustment.
16.	**15.6**	Name of the works: Infrastructure development Works for Sub Sector G-14/1, Islamabad The identification No.: Not applicable The No. and identification of lots (contracts) comprising this open competitive bid: Not Applicable
17.	**16.1**	The currency of the Bid shall be in Pak Rupees (PKR).

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		The No. and identification of lots (contracts) comprising this open competitive bid: Not Applicable
17.	16.1	The currency of the Bid shall be in Pak Rupees (PKR).
18.	18.1	The Bid Validity period shall be 120 days.
19.	19.1	The amount of Bid Security shall be PKR 50 million. The currency of the Bid Security shall be: PKR Original Bid Security shall be submitted at the following address: **Director Technical** Federal Government Employees Housing Authority (FGEHA), Islamabad 10- Mauve Area, Sector G-10/4, Islamabad.
20.	19.3	The Bid Security shall be in the form of: Call Deposit Receipt (CDR) / Pay Order or a Bank Guarantee issued by a Scheduled Bank in Pakistan or from a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan in favor of the Employer valid for a period of 120 days from the date of submission/opening of bids.
21.	19.3 (c)	Other forms of security are: Not applicable.
22.	20.1	Alternative Bids to the requirements of the Bidding Documents will not be permitted.
23.	20.2	Not applicable
24.	22.1	The Bid prepared in accordance with the instructions in the Bidding documents, must be submitted through **EPADS v2.0.**
25.	22.2	The written confirmation of authorization to sign on behalf of the Bidder shall consist of: Written power of Attorney

D. Submission of Bids

26.	23.1	Not Applicable.
27.	23.2	Not Applicable.
28.	23.4 (a)	Bid shall be submitted through EPADS v2.0.

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E. Opening and Evaluation of Bids

31.	**27.1**	Bids will be opened by using EPADS v2.0.
32.	**32.1**	Delete the text of Sub-Clause 32.1 and substitute with the following: Bids determined to be substantially responsive will be checked by Employer for any arithmetic errors. Errors will be corrected by the Empl as follows: where there is a discrepancy between the quoted amount provided by bidder in the summary of Estimates and in the Letter of Price Bid, amount stated in the Form of Bid shall govern; and (a) where there is a discrepancy between the Premium/amount in figures and in words mentioned in the summary of Estimates, the premium/amount in words shall govern; and (b) where there is a discrepancy between the percentage premium and the total amount quoted by the Bidder by multiplying the percentage premium with the price put to Bid, the value provided as premium shall govern and total amount shall be corrected.
33.	**33.2**	The currency that shall be used for Bid evaluation and comparison purposes to convert all Bid prices expressed in various currencies is: PKR The source of exchange rate shall be: Nil The date of exchange rate shall be: Nil
34.	**33.3**	The bids shall be quoted in PKR
35.	**34**	**Evaluation Techniques** Least Cost Based Selection (LCBS): After meeting the requirements of eligibility, qualification and substantial responsiveness, the bid in compliance with all the mandatory (drawings/ design/ technical specifications /requirements and/or requisite quality threshold (if any), and having lowest evaluated cost (or financial proposal) shall be considered highest ranked bid.
36.	**34.2**	Criteria for evaluating the bids to be used in the evaluation and their evaluation method or reference to the Technical Specifications as mentioned in Section-V Evaluation and Qualification Criteria.
37.	**34.5**	Not Applicable.

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38.	35	Not Applicable.
39.	38.1	Not Applicable.
40.	38.2	Sub-contracting: Not Applicable. Contractor under PPRA Rule 42(f) "Direct Contracting with State Owned Entities" shall accomplish the work exclusively through its own resources without involving private sector as a partner or in the form of a joint venture or as a sub-contractor.

F. Award of Contract

41.	48	The Performance Security (or guarantee) shall be 10% (ten percent) of the Contract Price.
42.	48	The Performance Security (or guarantee) shall be in the form of Bank Guarantee either from any Scheduled Bank in Pakistan or from a bank located outside Pakistan duly counter-guaranteed by a Scheduled Bank in Pakistan. The amount of Performance Security shall be reduced to 50% following issue of the Taking-Over Certificate for the whole of the Works under Clause 10 of Conditions of Contract. The cost of complying with requirements of this Sub-Clause shall be borne by the Contractor.

G. Review of Procurement Decisions

43.	52.1	In case of grievance, the address of Grievances Committee is: **Convener Grievance Committee,** Federal Government Employees Housing Authority 10- Mauve Area, Sector G-10/4, Islamabad [redacted]
44.	53.6	The Address of PPRA to submit a **copy** of appeal: Grievance Redressal Appellate Committee Public Procurement Regulatory Authority 1st Floor, G-5/2, Islamabad, Pakistan Tel: +92-51-9202254

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SECTION IV: ELIGIBLE COUNTRIES

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Section IV. Eligible Countries

All the bidders are allowed to participate in the subject procurement without regard to nationality, except bidders of some nationality, prohibited in accordance with policy of the Federal Government.

Following countries are ineligible to participate in the procurement process:

1. India
2. Israel

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SECTION V: EVALUATION AND QUALIFICATION CRITERIA

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Section V. Evaluation and Qualification Criteria

Qualification of Bidders will be based on the criteria given in succeeding para A regarding eligibility and mandatory requirements. Only those bidders who would meet the eligibility and mandatory requirements will be evaluated on the basis of criteria given in succeeding para B regarding the bidder's Experience, Personnel capabilities, Equipment capabilities and Financial soundness.

Sub-contractor's experience and resources shall not be taken into account in determining the applicant's compliance with the qualifying criteria.

The Employer reserves the right to waive minor deviations, if they do not materially affect the capability of the Bidder to perform the Contract.

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A. Eligibility and Mandatory Requirements

Eligibility and Mandatory Requirements			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements and Explanation Notes
				All Parties Combined	Each Member	One Member	
1. Eligibility							
1.1	Nationality	Nationality in accordance with ITB 4.3	Must meet requirement	N/A	N/A	N/A	Forms ELI 1 and 2, with attachments
1.2	Conflict of Interest	No conflicts of interest in accordance with ITB 3.7	Must meet requirement	N/A	N/A	N/A	Letter of Bid – Technical Proposal
2. Proof of State-Owned Entity							
2.1	State owned entity proof	Shall be a state-owned entity	Must meet requirement	N/A	N/A	N/A	State owned entity proof.
3. Valid registration with Pakistan Engineering Council (PEC)							
3.1	Valid registration with Pakistan Engineering Council	Category C-B and above Specialization Codes: CE-01, CE-09, CE-10, EE-04 and EE-11	Must meet requirement	N/A	N/A	N/A	PEC Registration License Specialization Codes: CE-01, CE-09, CE-10, EE-04 and EE-11
4. Historical Contract Non-Performance							
4.1	History of Non-Performing Contracts	Non-performance of a contract did not occur as a result of contractor default for last 15 years.	Must meet requirement	N/A	N/A	N/A	Form CON-2
4.2	Pending Litigation	Bidder's financial position and prospective long-term profitability sound according to criteria established in Financial Capabilities below and assuming that all pending litigation will be resolved against the Bidder	Must meet requirement	N/A	N/A	N/A	Form CON – 2

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Eligibility and Mandatory Requirements			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements and Explanation Notes
				All Parties Combined	Each Member	One Member	
		Bidder					
4.3	Litigation History	No consistent history of court/ arbitral award decisions against the Bidder since 1st January 2011.	Must meet requirement	N/A	N/A	N/A	Form CON – 2
5. No-Blacklisting							
5.1	No- Blacklisting	Bidder has never been blacklisted	Must meet requirement	N/A	N/A	N/A	Affidavit on Judicial Stamp Paper prepared within the current month of submission of bidding document that the firm has never been blacklisted
6. Registration with Federal Board of Revenue							
6.1	Income Tax Registration Certificate	Bidder registration with the Federal Board of Revenue for Income Tax	Must meet requirement	N/A	N/A	N/A	Income Tax Registration Certificate
6.2	Active Tax Payer (Income Tax)	Bidder shall be on the active taxpayer's list of the Federal Board of Revenue for Income Tax	Must meet requirement	N/A	N/A	N/A	Record of Active Taxpayer for Income Tax

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Eligibility and Mandatory Requirements			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements and Explanation Notes
				All Parties Combined	Each Member	One Member	
6.3	Active Tax Payer (Sales Tax)	Bidder shall be on the active taxpayer's list of the Federal Board of Revenue for Sales Tax	Must meet requirement	N/A	N/A	N/A	Record of Active Taxpayer for Sales Tax

B. Detailed Qualification Criteria

Only those bidders who successfully meet all the **Eligibility** and **Mandatory Requirements** shall qualify for detailed evaluation, in accordance with the given criteria. The detailed qualification shall be carried out on the basis of the criteria for the different categories and minimum passing marks prescribed hereunder:

S. No.	Category	Weightage / Marks	Passing Marks
B.1	Experience	40	20
B.2	Personnel Capabilities	15	7.5
B.3	Equipment Capabilities	15	7.5
B.4	Financial Soundness	30	15
	Total	100	50

Eligibility and Qualification Criteria			Compliance Requirements		Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)	Submission Requirements and Explanation Notes

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				All Parties Combined	Each Member	Lead Member	
B.1 Experience		**Max Marks = 40**	**50%**	**N/A**	**N/A**	**N/A**	
B1.1	**Specific Infrastructure Works Experience – Completed Projects**	Experience as constructor in execution of Roads/Housing Infrastructure development Projects completed during last ten (10) years. **Max. Marks = 24** • 12 marks will be awarded for each completed project having project cost ≥ Rs. 1,500M up to maximum of 24 marks. • 08 marks will be awarded for each completed project having project cost from Rs. 1000M to Rs. 1499.99 M up to maximum of 24 marks. • 06 marks will be awarded for each completed project having project cost from Rs. 750 M to 999.99M up to maximum of 24 marks. • No marks will be awarded for project having project cost < Rs. 750M.					Form. EXP – 4.2 (a) i. The applicants must provide Letter of Award and Taking Over/ Completion Certificate of completed projects. No marks will be given to the projects for which above certificates are not provided. ii. Applicant shall provide complete information of the projects including scope, cost and covered area etc. iii. Proportionate marks on the basis of share in JV agreement will be awarded to each partner, for projects executed as Joint Venture (JV).

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements and Explanation Notes
				All Parties Combined	Each Member	Lead Member	
B1.2	**Specific Infrastructure Works Experience – Completed Projects**	Experience as Contractor in execution of Roads/Housing Infrastructure development projects currently in-hand. **Max. Marks = 16** • 08 marks will be awarded for each in-hand project having project cost ≥ Rs. 200M up to maximum of 16 marks • 06 marks will be awarded for each in-hand project having project cost from Rs. 170M to Rs. 199.99M up to maximum of 16 marks. • 04 marks will be awarded for each in-hand project having project cost from Rs. 140M to Rs. 169.99M up to maximum of 16 marks. • No marks will be awarded for project having project cost < Rs. 140M.					Form. EXP – 4.2 (b) i. The applicants must provide Award Letter of in-hand projects. No marks will be given to the projects for which above certificate is not provided. ii. Applicant shall provide complete information of the projects including scope, cost and covered area etc. iii. Proportionate marks on the basis of share in JV agreement will be awarded to each partner, for projects executed as Joint Venture (JV).

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or Intended)			Submission Requirements and Explanation Notes
				All Parties' Combined	Each Member	Lead Member	
B.2 Personnel Capabilities		**Max Marks = 15**	**50%**	**N/A**	**N/A**	**N/A**	Form PER-1 and PER-2 Provide the following for each personnel, failing which, no marks will be awarded: a. verifiable proof of employment with the bidder of the proposed staff b. detailed CV c. valid PEC Registration for Engineers d. Diploma Certificates of DAE staff
B2.1	**Project Manager**	3 marks will be awarded for M.Sc. Civil Engineer having at least 12 years relevant experience or B.Sc. Civil Engineer having at least 15 years' experience in roads/infrastructure works. **Max Marks = 3**					
B2.2	**Construction Manager**	2 marks will be awarded for B.Sc. Civil Engineer having at least 10 years in roads/infrastructure works **Max Marks = 2**					
B2.3	**Site Engineer**	2 marks will be awarded for B.Sc. Civil Engineer having at least 10 years in roads/infrastructure works. **Max Marks = 2**					

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements and Explanation Notes
				All Parties Combined	Each Member	Lead Member	
B2.4	**Associate Engineer (Civil)**	1.5 mark will be awarded for each Site Inspector having B-Tech / DAE Civil and at least 08 years in roads/infrastructure works up to maximum of 3 marks **Max Marks = 3**					
B2.5	**Associate Engineer (Electrical)**	1.5 mark will be awarded for Site Inspector having B-Tech / DAE Electrical and at least 08 years in roads/infrastructure works. **Max Marks = 1.5**					
B2.6	**Quantity Surveyor (Civil)**	1.5 mark will be awarded for Quantity Surveyor having B-Tech / DAE Civil and at least 08 years in roads/infrastructure works. **Max Marks = 1.5**					
B2.7	**Surveyor**	1 mark will be awarded for each Surveyor having certificate and at least 08 years in roads/infrastructure works up to maximum of 02 mark. **Max Marks = 2**					

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements and Explanation Notes
				All Parties Combined	Each Member	Lead Member	
B.3 Equipment Capabilities		**Max Marks = 15**	**50%**	**N/A**	**N/A**	**N/A**	Form EQU: (SECTION VI) Proportionate marks will be awarded if minimum number of corresponding equipment is less than minimum required. Provide an undertaking on stamp paper to the effect that the listed equipment is available with the firm and will be made available, as and when required, for the Project.
B3.1	**Asphalt Plant**	Min. Quantity = 01 No. Marks = 1.5					
B3.2	**Pneumatic Tyre Roller**	Min. Quantity = 04 No. Marks = 1.5					
B3.3	**Bull Dozer (200HP)**	Min. Quantity = 02 No. Marks = 01					
B3.4	**Asphalt Paver Machine**	Min. Quantity = 01 No. Marks = 01					
B3.5	**Concrete Batching Plant**	Min. Quantity = 01 No. Marks = 01					
B3.6	**Vibratory Road Roller (10 Ton)**	Min. Quantity = 04 No. Marks = 01					
B3.7	**Sheep Foot Roller (10 Ton)**	Min. Quantity = 04 No. Marks = 01					
B3.8	**Excavator**	Min. Quantity = 04 No. Marks = 01					
B3.9	**Grader**	Min. Quantity = 04 No. Marks = 01					

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements and Explanation Notes
				All Parties Combined	Each Member	Lead Member	
B3.10	Dumper	Min. Quantity = 16 No. Marks = 01					
B3.11	Loader	Min. Quantity = 02 No. Marks = 01					
B3.12	Tractor Trolley	Min. Quantity = 08 No. Marks = 0.5					
B3.13	Water Bowser	Min. Quantity = 06 No. Marks = 0.5					
B3.14	Concrete mixer machine (single load)	Min. Quantity = 02 No. Marks = 0.5					
B3.15	Steel Cutting / Bending Machine	Min. Quantity = 02 No. Marks = 0.5					
B3.16	Generator Set (10KVA)	Min. Quantity = 03 No. Marks = 0.5					
B3.17	Total Station	Min. Quantity = 03 No. Marks = 0.5					
B.4 Financial Soundness		**Max Marks = 30**	**50%**	**NA**	**NA**	**NA**	FORM FIN - 3.1, FIN - 3.2 and FIN 3.3 The bidder shall submit Audited financial statements for the last three years duly certified by the Chartered Accounts Firms shall submit copies of Credit Line Facility. No marks shall be awarded, if the audited financial statements are not provided for all 3 years.

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements and Explanation Notes
				All Parties Combined	Each Member	Lead Member	
B4.1	**Annual Turnover**	The minimum annual volume of construction work (Annual Turn-Over) during any of the last three years: **Max Marks = 15** • 7.5 Marks will be awarded if the Turnover is in range of PKR. 2,000 million to PKR. 2,500 million • 15 Marks will be awarded if the Turnover is more than PKR. 2,500 million.					
B4.2	**Working Capital**	The amount of Working Capital (Current Assets – Current Liabilities) & credit facilities (in specific name of the Project), net of other construction commitments of the construction, shall be as under: **Max Marks = 15** • 7.5 Marks will be awarded if the Working Capital is in range of PKR. 700 million to PKR. 1,000 million • 15 Marks will be awarded if the Working Capital is more than PKR. 1,000 million.					

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SECTION VI: WORKS REQUIREMENT, TECHNICAL SPECIFICATIONS, DRAWINGS, SUPPLEMENTARY INFORMATION AND BILL OF QUANTITIES

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Scope of Works

The scope of works mainly comprises Civil, Electrical, Plumbing, Infrastructure Development and related Ancillary Works lying within the boundaries and limits as shown on the drawings and any such additional areas adjacent thereto as may be designated by the Engineer from time to time for the construction to be performed under the Contract, and all such areas and additional areas shall comprise the Site.

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Technical Specifications

Volume-II covering Technical Specifications

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Drawings

Volume-III covering Drawings

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Supplementary Information

NOT APPLICABLE

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Bill of Quantities

Volume-IV covering Bill of Quantities

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Technical Proposal

- Site Organization
- Method Statement
- Mobilization Schedule
- Construction Schedule
- List of Major Equipment
- Bidder's Equipment Data

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Site Organization

The Bidder is required to submit an organization proposed for the Works, together with their names, qualifications, experience, positions held and their nationalities.

Designation	Name	Summary of Qualifications Experience, Present, Position and Nationality

- **Head Office:**

- **Site Office:**
  Contractor's Representative
  Site Superintendent
  Supervising Engineer
  Plant Erectors
  Construction Supervisors
  Other Key Staff

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Method Statement

The Bidder is required to submit a narrative outlining the method of performing the Work. The narrative should indicate in detail and include but not be limited to:

1. Organization Chart indicating head office and field office personnel involved in management and supervision, engineering, equipment maintenance and purchasing.

2. Mobilization, in Pakistan, the type of facilities including personnel accommodation, office accommodation, provision for maintenance and for storage, communications, security and other services to be used.

3. The method of executing the Works, the procedures for installation of equipment and machinery and transportation of equipment and materials to the site and providing all services including but not limited to supply of power, water, maintenance of facilities, safety and security and all what is required for completion of works in accordance with the Contract.

4. Quality control / Quality assurance measures to be adopted including procedures to be followed for carrying out all tests required under specifications.

5. **The Bidder while preparing his methodology for performing and executing the works shall also consider the following:**

   a) The timely completion of the Project as per the time provided in Contract Data.

   b) The Contractor while filling out the list of major equipment required at site, shall ensure that the equipment requirement is in consonance with the construction requirement.

   c) The Contractor is not restricted to carry out the work in single shift. The Contractor should note that if he plans to execute the work in more than single shift than all costs related to the additional superintendence to be provided by the Engineer will be borne by the Contractor. Procedure for such additional costs will be worked out and finalized between the Contractor and Engineer with the consent of the Employer.

   d) The portions of the Site shall be made available to the Contractor in coordination with other Contractors working at site. The Contractor shall prepare the work programme accordingly.

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Mobilization Schedule

The Bidder is required to submit a narrative outlining the method for mobilization of works and arrangement of preliminaries.

In accordance with the Particular Conditions, Sub-Clause 4.1, the Contractor shall not carry out mobilization to Site unless the Engineer gives consent.

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Construction Schedule

Pursuant to Sub-Clause 8.3 of the General Conditions, the whole of the Works, and each Section (if any), shall be completed within the Time for Completion for the Works or Section (as the case may be) stated as hereunder and mentioned in Contract Data:

Description	Time for Completion (Days)
Whole Works	728 days

The Bidder shall provide, the Construction Schedule in the bar chart (CPM, PERT or any other to be specified herein) showing the sequence of work items and the period of time during which he proposes to complete each work item in such a manner that his proposed programme for completion of the whole of the Works and Sections of the Works may meet Employer's completion targets in days noted above and counted from the Commencement Date.

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LIST OF MAJOR EQUIPMENT

The Bidder will provide a list of all major equipment and related items, under separate heading for items owned, to be purchased or to be arranged on lease by him to carry out the Works. The information shall include make, type, capacity, and anticipated period of utilization for all equipment.

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed.

Sr. No.	Description of Equipment	Total No. of Equipment to be brought/installed/erected at site during execution of Works	Minimum Mandatory Equipment to be brought / installed / erected at site prior to release of 2nd Part of Mobilization Advance
1.	Pneumatic Tyre Roller	04 Nos	02 Nos
2.	Bull Dozer (200HP)	02 Nos	01 No.
3.	Asphalt Paver Machine	01 No.	01 No.
4.	Asphalt Plant	01 No.	01 No
5.	Concrete Batching Plant	01 No.	01 No
6.	Vibratory Road Roller (10 Ton)	02 Nos.	01 No.
7.	Sheep Foot Roller (10 Ton)	02 Nos.	01 No.
8.	Excavator	04 Nos.	02 Nos.
9.	Grader	02 Nos.	01 Nos.
10.	Dumper	16 Nos.	02 Nos.
11.	Loader	02 Nos.	01 No.
12.	Tractor Trolley	06 Nos.	02 Nos.
13.	Water Bowser	06 Nos.	02 Nos.
14.	Concrete mixer machine (single load)	02 Nos.	01 No.
15.	Steel Cutting / Bending Machine	02 Nos.	01 No.
16.	Generator Set (10KVA)	02 Nos.	01 No.
17.	Leveling Equipment	03 Nos.	02 Nos.
18.	Total Station	03 Nos.	02 Nos.
19.	Lab. Equipment	As per Instructions of Engineer	

Note:

The bidder while preparing his methodology for performing and executing the works and listing out Major Equipment (required to complete the Works in the specified Time Schedule) in this Appendix shall consider the above mentioned minimum requirement of Construction Equipment to be brought/installed/erected at site.

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ORGANIZATIONAL CHART
FOR THE
SUPERVISORY STAFF AND LABOUR

MINIMUM MANDATORY STAFF REQUIREMENT:

The Contractor shall arrange the following staff at site immediately upon commencement of works:

Designation	Nos.	Minimum Qualification	Min. Relevant Working Experience
Project Manager	01	M.Sc. Civil / B.Sc. Civil Engineer with valid Pakistan Engineering Council Registration	12 years for M.Sc. Civil or 15 years for B.Sc. Civil Engineer in Road /Infrastructure works.
Construction Manager	01	B.Sc. Civil Engineer with valid Pakistan Engineering Council Registration	10 years in Road /Infrastructure works
Site Engineer	01	B.Sc. Civil Engineer with valid Pakistan Engineering Council Registration	10 years in Road /Infrastructure works
Associate Engineer / Site Inspector	02	DAE (Civil)	08 years in Road /Infrastructure works
Associate Engineer / Site Inspector	01	DAE (Electrical)	08 years in Road /Infrastructure works
Quantity Surveyor	01	DAE (Civil)	08 years in Road /Infrastructure works
Surveyor	02	Survey Certificate	08 years in Road /Infrastructure works

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Form EQU: Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section V, Evaluation and Qualification Criteria. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

Item of equipment		
Equipment information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current status	Current location	
	Details of current commitments	
Source	Indicate source of the equipment ☐ Owned ☐ Rented ☐ Leased ☐ Specially manufactured	

Omit the following information for equipment owned by the Bidder.

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

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List of Recomendad Manufacturers

Equipment and materials specified with brand names have been provided in order to establish a standard of performance and do not necessarily indicate a preference for a particular manufacturer or material.

The names of manufacturers given below are to indicate the level of quality and performance anticipated by the Engineer/ Employer. Other makes may be accepted provided that the quality and performance of such equipment, in the opinion of the Engineer and subject to approval of the Employer, are at least equal to or better than the equipment/ product offered by the recommended manufacturer.

The acceptance of equipment/ materials offered by these manufacturers will be subject to compliance of offered models /materials with the specifications, capacity and/or performance requirements.

Onus lies with the Contractor for establishing the genuineness of any material/product for its make and origin.

S.No.	Equipment & Materials	Recommended Manufacturers & Suppliers	Country (Origin, Manufacturing, Assembling, Testing & Supply)
1	Water Proofing	Importent Chemicals	
		Sika Chemicals	
		Pagel Construction Chemicals	
2	Concrete Pavers & Paving Blocks	Envicerte Ltd.	
3	HDPE Pipes	Dadex Pipes Ltd	
		Beta Pipes Ltd	
		International Industries Ltd.	
4	G.I. Pipes	International Industries Ltd.	
		Bashir Pipe Industries Pvt. Ltd.	
		Jamal Pipe Industries Pvt. Ltd.	
5	G.I.Pipe Fittings	M/S HE	China
		M/S TG	China
6	MS Pipe & Fittings	Bashir Pipe Industries Pvt. Ltd.	
		Jamal Pipe Industries Pvt. Ltd.	
7	PVC Pipe	Dadex Pipes	
		Adamjee pipes	
		Newtech pipes Ltd	
8	Bronze/Brass/CI Valves	Kitz	Japan
		Scon	
		Jaws Technical Experts	
		Tozen	
9	C.I Manhole/Grating Covers	Alpine	
		Sandan Engg. Pvt. Ltd (Teepu)	
		Jaws Technical Experts	
		Atif Global Trade	
10	Hangers & Supports	M/S Fischer.	
		M/S Hilti.	
11	Pumping Machinery	M/S KSB	

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S.No.	Equipment & Materials	Recommended Manufacturers & Suppliers	Country (Origin, Manufacturing, Assembling, Testing & Supply)
		M/S Grundfos	
12	Fiberglass pipes	M/S Bin Tariq	
13	Distribution Boards	Powertech	
		Tecmen	
		Bilal engineering	
14	Cables & Wires	Pakistan cables	
		Newage cables	
		Fast cables	
15	MCCBs and MCBs ELCBs	Schneider	
		Terasaki	
		ABB	
16	Lighting Poles	Jamal pipes	
		Bashir pipes	
		Munir pipes	
17	PVC Conduits, Pipes, Accessories	Dadex	
		Durabuilt	
		Adamjee pipes Ltd	
		NewTech Pipes Ltd	
18	Lighting Protection & Earthing	DEHN	
		Furse	UK
		Thermo Weld	
19	Lightings	Phillips	
		Osram	
20	Light Fixture	Philips	
		Bega	
		Indalux	
		Vlux	
		Schreder	
21	Distribution	Elmatech	
		Siemens	
		Electromech	
		ABB	
		Legrand	
22	Cables and Wires	Pakistan Cables	
		Pioneer Cables	
		Newage Cables	
23	PVC Conduit & Accessories	Beta	
		Dadex	
		Tesco	
24	Steel Conduit & Accessories	Hilal Industries	
		IIL	
		Jamail	
		Poineer	
		Bashir	
25	Switches, Sockets etc.	Buch	
		Milano	
		Legrand	

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S.No.	Equipment & Materials	Recommended Manufacturers & Suppliers	Country (Origin, Manufacturing, Assembling, Testing & Supply)
		ABB	
26	Back Boxes, Pull Boxes, etc.	Buch	
		Milano	
		Legrand	
		ABB	
27	Telephone Cables Dish antenna Cables	Siemens Germany	
		Pakistan Cables Limited	
		Pioneer Cables	
		Newage Cables	
		Comscope USA & 3M	
28	Telephone Junctrion Boxes	IES Switch gear	
		S.A. Electric	
		N.R. Industries	
		MISTO Industries	
29	Fans	Pak	
		Millat	
		Climax	
		or as approved by the Engineer	
30	MCCBs and MCBs	Marlin Gerlin (MG)	
		Legrand	
		Siemens	
		ABB	
31	ACBs	ABB	
		Siemens	
32	G.I. PIPE	M/S International Industries Limited (lil)	
		M/S Jamal Pipe Industries (Pvt) Limited	
		M/S Bashir Pipe Industries (Pvt.) Limited	
33	G.I. Pipe Fitting	M/S. HE	China
		M/S. TG	China
34	C.I. Gate Valves, Washouts & Air-Relief Valves	M/s. Ghulam Mohi-Ud-Din & Sons(GMD)	
35	Bronze Gate Valves	Kitz	Japan
		M/S M. Hanif & Sons (MHS)	
36	C.I Pipes & Fittings	M/S Alpine Steel (Pvt.) Ltd.	
		M/S B.K.M (Pvt.) Ltd.	
37	C.I. Covers With Frame	M/S Alpine Steel (Pvt.) Limited	
		M/S B.K.M. (Pvt) Ltd.	
		M/S Sandal Engineering (Pvt.) Ltd.	
38	Fire Hydrants	M/S Haseen Habib (Pvt.) Ltd.	
39	uPVC Pipes And Fittings (Pressre & Non-Pressure)	M/S Dadex Enternit Ltd.	
		M/S Shafisons Engineering (Pvt.) Ltd. (Beta Pipes).	
		M/S Snow	

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S.No.	Equipment & Materials	Recommended Manufacturers & Suppliers	Country (Origin, Manufacturing, Assembling, Testing & Supply)
40	Concrete Pavers & Tiles	M/S Tuff Tiles M/S Izhar Limited	

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Authorized Signature and official Seal: _____

Name: _____

Date: _____

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SECTION VII: STANDARD BIDDING FORMS

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SECTION VII: STANDARD BIDDING FORMS

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Letter of Bid – Technical Proposal

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

Place this Letter of Bid in the first envelope "TECHNICAL PROPOSAL".

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

Note: All italicized text in black font is to help Bidders in preparing this form and Bidders shall delete it from the final document.

Date of this Bid submission: [*insert date (as day, month and year) of Bid submission*]
RFB No.: Not Applicable.
Alternative No.: Not Applicable.

To:

Director Technical
Federal Government Employees
Housing Authority (FGEHA), Islamabad
10- Mauve Area, Sector G-10/4,
Islamabad.

We, the undersigned Bidder, hereby submit the first part of our Bid, the Technical Proposal

In submitting our Bid we make the following declarations:

(a) **No reservations:** We have examined and have no reservations to the bidding document, including addenda issued in accordance with Instructions to Bidders (**ITB 9**);

(b) **Eligibility**: We meet the eligibility requirements and have no conflict of interest in accordance with ITB 3;

(c) **Bid/Proposal-Securing Declaration**: We have not been suspended nor declared ineligible by the Procuring agency/Employer based on execution of a Bid Securing Declaration or Bid Securing Declaration in the Procuring agency/Employer's country in accordance with **ITB 3;**

(d) **Conformity:** We offer to execute works in conformity with the bidding document and in accordance with the works requirements: [*insert a brief description of the WORKS*];

(e) **Bid Validity Period**: Our Bid shall be valid for the period specified in **BDS 18.1** (as amended, if applicable) from the date fixed for the Bid submission deadline specified in **BDS 24.1** (as amended, if applicable), and it shall remain binding upon us, and may be accepted at any time before the expiration of that period;

(f) **Performance Security**: If our Bid is accepted, we commit to obtain a performance security in accordance with the bidding document;

(g) **One Bid per Bidder**: We are not submitting any other Bid(s) as an individual Bidder, and we are not participating in any other bid(s) as a Joint Venture member or as a subcontractor, and meet the requirements, other than Alternative Bids submitted in accordance with **ITB 20;**

(h) **Suspension and Debarment:** We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Procuring agency/Employer. Further, we are not ineligible under Pakistan laws;

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(i) **State-owned enterprise or institution:** [*select the appropriate option and delete the other*] [*We are not a state-owned enterprise or institution*] / [*We are a state-owned enterprise or institution*];

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

(k) **Not Bound to Accept:** We understand that you are not bound to accept the Most Advantageous Bid or any other Bid that you may receive; and

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

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

Country of Origin of the Bidder: *[insert country of origin, in case of JV country of origin of lead member]*

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

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

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

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

*: In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder.

**: Person signing the Bid shall have the power of attorney given by the Bidder. The power of attorney shall be attached with the Bid Schedules.

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Form ELI 1 - Bidder Information Form

[The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted.]

Date: *[insert date (as day, month and year) of Bid submission]*
RFB No.: *Aviation Complex-01*

Page _____ of_ _____ pages

1. Bidder's Name *[insert Bidder's legal name]*
2. In case of JV, legal name of each member : *[insert legal name of each member in JV]*
3. Bidder's actual or intended country of registration: *[insert actual or intended country of registration]*
4. Bidder's year of registration: *[insert Bidder's year of registration]*
5. Bidder's Address in country of registration: *[insert Bidder's legal address in country of registration]*
6. Bidder's Authorized Representative Information Name: *[insert Authorized Representative's name]* Address: *[insert Authorized Representative's Address]* Telephone/Fax numbers: *[insert Authorized Representative's telephone/fax numbers]* Email Address: *[insert Authorized Representative's email address]*
7. Attached are copies of original documents of *[check the box(es) of the attached original documents]* ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above. ☐ In case of JV, JV agreement, in accordance with ITB 3.3. ☐ Establishing that the Bidder is not under the supervision of the Procuring agency/Employer[in case of subsidiaries] 8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

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Form ELI 2 - Bidder's JV Members Information Form

[The Bidder shall fill in this Form in accordance with the instructions indicated below. The following table shall be filled in for the Bidder and for each member of a Joint Venture]].
Date: *[insert date (as day, month and year) of Bid submission]*
RFB No.: *Aviation Complex-01*

Page _____ of_ _____ pages

1. Bidder's Name: *[insert Bidder's legal name]*
2. Bidder's JV Member's name: *[insert JV's Member legal name]*
3. Bidder's JV Me... *country of registration]*
4. Bidder's JV Memb... *istration]*
5. Bidder's JV Member's legal address in country of registration: *[insert JV's Member legal address in country of registration]*
6. Bidder's JV Member's authorized representative information Name: *[insert name of JV's Member authorized representative]* Address: *[insert address of JV's Member authorized representative]* Telephone/Fax numbers: *[insert telephone/fax numbers of JV's Member authorized representative]* Email Address: *[insert email address of JV's Member authorized representative]*
7. Attached are copies of original documents of *[check the box(es) of the attached original documents]* ☐ Articles of incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above. 8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

NOT APPLICABLE

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PERSONNEL

Form PER 1 – Contractor's Representative and Key Personnel Schedule

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

Contractor' Representative and Key Personnel

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

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

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Form PER-2: Resume and Declaration

Contractor's Representative and Key Personnel

Name of Bidder	

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

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

Project	Role	Duration of involvement	Relevant experience
[main project details]	*[role and responsibilities on the project]*	*[time in role]*	*[describe the experience relevant to this position]*

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Declaration

I, the undersigned *[insert either "Contractor's Representative" or "Key Personnel" as applicable]* , certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

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

Commitment	Details
Commitment to duration of contract:	*[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]*
Time commitment:	*[insert period (start and end dates) for which this Contractor's Representative or Key Personnel is available to work on this contract]*

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

(a) be taken into consideration during Bid evaluation;

(b) result in my disqualification from participating in the Bid;

(c) result in my dismissal from the contract.

Name of Contractor's Representative or **Key Personnel: [*Insert name*]**

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Bidder:

Signature: _____

Date: (day month year): _____

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

Bidder's Name: _____
Date: _____
JV Member Name_____
ICB/NCB No. and title: _____
Page _____of _____pages

Non-Performed Contracts in accordance with Qualification Criteria			
☐ Contract non-performance did not occur January *[insert year]* ☐ Contract(s) not performed since *[insert year]*			
Year	**Non-performed portion of contract**	**Contract Identification**	**Total Contract Amount (current value, currency, exchange rate and PKR equivalent)**
		Contract Identification: Name of Procuring agency/Employer(PA): Address of PA: Reason(s) for nonperformance:	
Pending Litigation, in accordance with Qualification Criteria			
☐ No pending litigation ☐ Pending litigation			

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Year of dispute	Amount in dispute (currency)	Contract Identification	Total Contract Amount
		Contract Identification: _____ Name of PA: _____ Address of PA: _____ Matter in dispute: _____ Party who initiated the dispute: _____ Status of dispute: _____	

Litigation History in accordance with Section III, Evaluation and Qualification Criteria of the Prequalification document

☐ No Litigation History
☐ Litigation History

Year of award	Outcome as percentage of Net Worth	Contract Identification	Total Contract Amount (currency), PKR Equivalent (exchange rate)
[insert year]	*[insert percentage]*	Contract Identification: *[indicate complete contract name, number, and any other identification]* Name of PA: *[insert full name]* Address of PA: *[insert street/city/country]* Matter in dispute: *[indicate main issues in dispute]* Party who initiated the dispute: *[indicate "Procuring agency/Employer" or "Contractor"]* Reason(s) for Litigation and award decision *[indicate main reason(s)]*	*[insert amount]*

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FINANCIAL SITUATION

Form FIN – 3.1: Financial Situation and Performance

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

1. Financial data

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

*Refer to ITB 16 for the exchange rate

2. Sources of Finance

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

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No.	Source of finance	Amount (PKR)
1		
2		
3		

3. Financial documents

The Bidder and its parties shall provide copies of audited balance sheets for last 05 years pursuant to Evaluation and Qualifications Criteria, Sub-factor B.4. The financial statements shall:

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

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

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

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

☐ Attached are copies of Audited Balance Sheets for the 03 years required above; and complying with the requirements

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Form FIN – 3.2: Average Annual Turnover

Bidder's Name: _____
Date: _____
JV Member's Name_____
ICB/NCB No. and title: _____
Page _____of _____pages

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

* See Section V, Evaluation and Qualification Criteria.

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Form FIN – 3.3: Financial Resources

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

Financial Resources		
No.	**Source of financing**	**Amount (PKR.)**
1		
2		
3		

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Form FIN – 3.4: Current Contract Commitments / Works in Progress

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

Current Contract Commitments					
No.	**Name of Contract**	**Procuring agency/Employer's Contact Address, Tel, Fax**	**Value of Outstanding Work [PKR Equivalent]**	**Estimated Completion Date**	**Average Monthly Invoicing Over Last Six Months [PKR/month)]**
1					
2					
3					
4					
5					

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Form FIN - 5: Self-Assessment Tool for Bidder's Compliance to Financial Resources (Criterion 2.1 of Section 3)

This form requires the same information submitted in Forms FIN – 3.3 and FIN -3.4. All conditions of "Available Financial Resources Net of CCC ≥ Requirement for the Subject Contract" must be satisfied to qualify.

Form FIN - 5A: For Single Entities

For Single Entities: (A)	Total Available Financial Resources from FIN – 3.3 (B)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN – 3.4 (C)	Available Financial Resources Net of CCC D = (B - C)	Requirement for the Subject Contract (E)	Results: Yes or No [*D must be greater than or equal to E*] (F)
_____ (Name of Bidder)				.....	

Form FIN - 5B: For Joint Ventures

For Joint Ventures: (A)	Total Available Financial Resources from FIN – 3.3 (B)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN – 3.4 (C)	Available Financial Resources Net of CCC D = (B - C)	Requirement for the Subject Contract (E)	Results: Yes or No [*D must be greater than or equal to E*] (F)
One Partner:					
_____ (Name of Partner)	NOT USED			.....	
Each Partner:					
_____ (Name of Partner 1)				.....	
_____ (Name of Partner 2)				.....	

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_____ (Name of Partner 3)				.....	
All partners combined	$\sum D$ = Sum of available financial resources net of current contract commitments for all partners		$\sum D =$ _____	.....	

- Note -

Form FIN – 5 is made available for use by the bidder as a self-assessment tool, and by the employer as an evaluation work sheet, to determine compliance with the financial resources requirement as stated in 2.3.3. Failure to submit Form FIN - 5 by the Bidder shall not lead to bid rejection.

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EXPERIENCE

Form EXP - 4.1: General Construction Experience

Bidder's Name: _____
Date: _____
JV Member's Name_____
ICB/NCB No. and title: _____
Page _____of _____pages

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

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

Bidder's Name: _____
Date: _____
JV Member's Name_____
ICB/NCB No. and title: _____
Page _____of _____pages

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

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

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

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

Bidder's Name: _____
Date: _____
Bidder's JV Member Name: _____
Sub-contractor's Name[1] (as per ITB 34.2 and 34.3): _____
ICB/NCB No. and title: _____

Page _____ of _____ pages

All Sub-contractors for key activities must complete the information in this form as per ITB 38 and Qualification Criteria and Requirements, Sub-Factor 4.2.

1. Key Activity No One: _____

	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor ☐	Member in JV ☐	Management Contractor ☐	Sub-contractor ☐
Total Contract Amount			PKR equivalent	
Quantity (Volume, number or rate of production, as applicable) performed under the contract per year or part of the year	Total quantity in the contract (i)	Percentage participation (ii)		Actual Quantity Performed (i) x (ii)
Year 1				
Year 2				
Year 3				
Year 4				
PA's Name:				
Address: Telephone/fax number				

[1] If applicable

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	Information
E-mail:	

2. Activity No. Two

3. .....

	Information
Description of the key activities in accordance with Section III:	

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

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

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

NOT USED

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

Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor ☐	Member in JV ☐	Management Contractor ☐	Subcontractor ☐
Total Contract Amount			PKR	
Details of relevant experience				

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

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Appendix-A
Form of Bid Security

(Bank Guarantee)

[The bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated.]

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *[Purchaser to insert its name and address]*

No.: *[Purchaser to insert reference number for the Request for Bids]*

Alternative No.: *[Insert identification No if this is a Bid for an alternative]*

Date: *[Insert date of issue]*

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

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

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

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

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

(a) has withdrawn its Bid during the period of Bid validity set forth in the Applicant's Letter of Bid ("the Bid Validity Period"), or any extension thereto provided by the Applicant; or

(b) having been notified of the acceptance of its Bid by the Beneficiary during the Bid Validity Period or any extension thereto provided by the Applicant, (i) has failed to sign the contract agreement, or (ii) has failed to furnish the performance security, in accordance with the Instructions to Bidders ("ITB") of the Beneficiary's bidding document.

This guarantee will expire: (a) if the Applicant is the successful Bidder, upon our receipt of copies of the Contract agreement signed by the Applicant and the performance security issued to the Beneficiary in relation to such Contract agreement; or (b) if the Applicant is not the successful Bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary's notification to the Applicant of the results of the Bidding process; or (ii) twenty-eight days after the end of the Bid Validity Period.

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

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[Signature(s)]

Note: All italicized text is for use in preparing this form and shall be deleted from the final product.

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Appendix-B
Form of Bid-Securing Declaration

[The Bidder shall fill in this Form in accordance with the instructions indicated.]

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

To: *[complete name of Procuring agency/Employer]*

We, the undersigned, declare that:

We understand that, according to your conditions, Bids must be supported by a Bid-Securing Declaration.

We accept that we will be blacklisted and henceforth cross debarred for participating in respective category of public procurement proceedings for a period of (not more than) six months, if fail to abide with a bid securing declaration, however without indulging in corrupt and fraudulent practices, if we are in breach of our obligation(s) under the Bid conditions, because we:

NOT APPLICABLE

(a) have withdrawn our Bid during the period of Bid validity specified by us in the Letter of Bid; or

(b) having been notified of the acceptance of our Bid by the Procuring agency/Employer during the period of Bid validity, (i) fail or refuse to sign the Contract; or (ii) fail or refuse to furnish the Performance Security (or guarantee), if required, in accordance with the ITB.

We understand this Bid Securing Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight days after the expiration of our Bid.

Name of the Bidder*_____

Name of the person duly authorized to sign the Bid on behalf of the Bidder**_____

Title of the person signing the Bid_____

Signature of the person named above_____

Date signed _____ day of _____,

*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder

**: Person signing the Bid shall have the power of attorney given by the Bidder attached to the Bid

[Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all members to the Joint Venture that submits the Bid.]

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Appendix C
Formula for Price Adjustment

[*The formulae for price adjustment shall be of the following general type:*]

Pn= a + b Ln / Lo + c En/ Eo + d Mn/Mo + ...

where:

"Pn" is the adjustment multiplier to be applied to the estimated Contract value in the relevant currency of the work carried out in period "n", this period being a month;

"a" is a fixed coefficient, stated in the relevant table of adjustment data, representing the non- adjustable portion in contractual payments;

"b", "c", "d", ... are coefficients representing the estimated proportion of each cost element related to the execution of the Works as stated in the relevant table of adjustment data; such tabulated cost elements may be indicative of resources such as labour, equipment and materials;

"Ln", "En", "Mn", are the current cost indices or reference prices for period "n", expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the date 28 days prior to the last day of the period (to which the particular Payment Certificate relates); and

"Lo", "Eo", "Mo", are the base cost indices or reference prices, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the Base Date i.e. prices prevalent 28 days prior to the latest day for submission of Bids.

The weightings (coefficients) for each of the factors of cost stated in the following table(s) of adjustment data shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variation(s).

The source of prices and the weightages for use in the adjustment formula shall be as follows:

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SCHEDULE OF ADJUSTMENT DATA

Table I. Local Currency (LC) For Bill Nos_____.

Cost Element	Description	Weightages	Applicable Price
(i)	(II)	(III)	(IV)
a	Fixed Portion	0.470	
b	Labour *(Labourer (un-skilled) per day, shall be taken as representative of all types of Labour (skilled/unskilled) deployed at site)*	0.150	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.
c	Cement *(OPC cement per bag shall be taken as representative of all types of cement used at the site)*	0.050	- do -
d	Reinforcing Steel *(½" Ø round M.S. Bars per tonne shall be taken as representative of all types and diameters of Steel Reinforcement)*	0.050	- do -
e	Crush / Bajri(rata) (per truck) (100 CFT) [Bajri(rata) shall be taken as representative of all types of coarse aggregates, base course and sub base course.	0.050	- do -
f	High Speed Diesel (HSD) *(HSD shall be taken as representative of all kind of fuels used in connection with the Contract)*	0.320	- do -
g	Bitumen, M. Ton	0.030	Attock Oil Refinery Limited
	Total	1.000	

Notes:

1) Prices for "(b)" to "(f)" shall be taken from the Government of Pakistan, Federal Bureau of Statistics. Monthly Statistical Bulletin. The base prices shall be those prevalent 28 days prior to the latest day for submission of Bids. Current date price of any element shall be those prevalent 28 days prior to the last day of the period to which the particular Payment Certificate relates.

2) If the Statistical Bulletin of the aforesaid month is not available at the time of Bid opening, then the Basic Prices of Specified Materials will be submitted by the Contractor at the time of their availability and shall be recommended by the Engineer and will be fixed as Basic Prices for Specified Materials for Price Adjustment.

3) The prices for the cost elements of (b) to (f) shall be used for Islamabad City.

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4) Any fluctuation in the prices of materials other than those given above shall not be subject to adjustment of the Contract Price and shall be deemed to be included in the rates and prices quoted by the Bidders.

5) The prices of materials provided in this Appendix are for the purpose of price adjustment only. The Contractor shall base his rates entered in the Bill of Quantities on current market prices.

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SECTION VIII. GENERAL CONDITIONS (GC)

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NATIONAL ENGINEERING SERVICES PAKISTAN PVT LTD. ISLAMABAD

Section VIII. General Conditions (GC)

Red Book:

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The Conditions of Contract are the "General Conditions" which form part of the "Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer ("Red book") Second edition 2017, Reprinted 2022 with amendments" published by the Federation Internationale Des Ingenieurs – Conseils (FIDIC) and the following "Particular Conditions" which shall complement the General Conditions of the Contract.

The Contractor shall arrange and provide three (3) originals of the above FIDIC publication directly from FIDIC and shall also submit the original purchase receipts as documentary evidence to the Engineer.

International Federation of Consulting Engineers (FIDIC)

FIDIC Bookshop – Box- 311 – CH – 1215 Geneva 15 Switzerland

Fax: +41 22 799 49 054

Telephone: +41 22 799 49 01

E-mail: fidic@fidic.org

www.fidic.org

FIDIC code: ISBN13: 978-2-88432-084-9

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SECTION IX. SPECIAL CONDITIONS OF THE CONTRACT

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Special Conditions of the Contract

The Special Conditions of Contract (SCC) complement the General Conditions of Contract (GCC) to specify data and contractual requirements of the Procuring agency/ Employer/ Employer, the engineer, the sector, the overall project, and the works. In the event of a conflict, the provisions herein shall prevail over those in the GCC.

Part A – Contract Data

Contract data of the SCC, includes data to complement the GCC in a manner similar to the way in which the Bid Data Sheet complements the Instructions to Bidders.

SCC Clause Number	GCC Clause Number	Amendments of, and Supplements to, Clauses in the GCC
		General Provision (GCC 1)
1.	1.1.27	365 days
2.	1.1.31	Employer's name and address: Director General Federal Government Employees Housing Authority, Islamabad Name of Employer's representative: **Director Technical** Federal Government Employees Housing Authority (FGEHA), Islamabad 10- Mauve Area, Sector G-10/4, Islamabad.
3.	1.1.35	_____ *[insert Engineer's name and address at the time of appointment of the Engineer]*
4.	1.1.84	728 days for whole of the Works
5.	1.3	**For notices** Procuring agency/Employer Authorized representatives name and address: **Director Technical** Federal Government Employees Housing Authority (FGEHA), Islamabad 10- Mauve Area, Sector G-10/4, Islamabad. Engineer's Authorized representatives name and address: _____ *[insert Engineer's authorized representative name and address at the time of appointment of the Engineer]*

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		Contractors Authorized representatives name and address: --- *[insert Contractor's name and address at the time of signing of the Contract]*
6.	1.4	**Governing Law;** The Applicable Law shall be: Laws of the Islamic Republic of Pakistan
7.	1.4	**Communication Language:** The Communication Language shall be: English
The Employer/ Procuring agency/Employer (GCC Clause 2)		
8.	2.1	Time for access to the Site: Within 14 days of Signing of Contract Agreement.
9.	2.4	The Employer has sufficient funds to cover the Cost of the entire Project.
The Engineer (GCC Clause 3)		
10.	3.2	Engineer's Duties and Authority: Variations resulting in an increase of the Accepted Contract Amount in excess of 1% subject to accumulative Variations not exceeding five percent (5%) of the Accepted Contract Amount.
The Contractor (GCC Clause 4)		
11.	4.2	Performance guarantee/ security will be in the form of an un-conditional and irrevocable bank guarantee from a scheduled bank in Pakistan in the amount of 10% as a percentage of the Accepted Contract Price.
12.	4.7.2(a)	**Clause 4.7 Setting out** Period for notification of errors in the items of reference: *28 (twenty-eight) days*
13.	4.20	Number of additional paper copies of progress reports: 03
Sub-Contracting (GCC Clause 5)		
14.	5.1(a)	Maximum allowable accumulated value of work subcontracted (as a percentage of the Accepted Contract Amount): Not Applicable. Contractor under PPRA Rule 42(f) "Direct Contracting with State Owned Entities" shall accomplish the work exclusively through its own resources without involving private sector as a partner or in the form of a joint venture or as a sub-contractor

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15.	5.1 (b)	Works for which sub-contracting is not permitted: Whole
Staff and Labour (GCC Clause 6)		
16.	6.5	Normal working hours 08 *(eight) hours*.
Plant, Material and Workmanship (GCC Clause 7)		
17.	7.2	Samples as required by the Engineer.
Commencement, Delays and Suspension (GCC Clause 8)		
18.	8.3	Number of additional paper copies of program: 03 copies
19.	8.8	Delay damages shall be payable for each day of delay shall be 0.11% of the Accepted Contract Amount per day, in the currency and proportions in which the Contract Price is payable. Maximum amount of delay damages is 10% of the Accepted Contract Amount.
20.	8.14	Clause 8.14 Applicability of Incentives for Early Completion: Not Applicable.
Measurement and Valuation (GCC Clause 12)		
21.	12.2	Method of measurement shall be in accordance with the reference Technical Specifications, Bill of Quantities and/ or other applicable Schedule(s) for relevant BOQ Item of work.
22.	12.3	Percentage of overheads, profit and taxes: 25%
Variations and Adjustments (GCC Clause 13)		
23.	13.4 (b)(ii)	Percentage rate to be applied to Provisional Sums for overhead charges, profit and taxes is: Twenty five percent (25%)
24.	13.7	Adjustments for Changes in Cost: The Accepted Contract Amount shall be adjustable during Contract Execution as per Appendix-C.
Contract Price and Payment (GCC Clause 14)		
25.	14.2	Total advance payment shall be ten percent (10%) of the Accepted Contract Amount excluding Provisional Sums payable in the currency and proportion of Contract.
26.	14.2.3	Repayment of Advance payment: Deduction shall be made at the amortization rate of 15% of the value of the Works executed in each IPC as provided in paragraph (i) of Sub-Clause GCC 14.3, starting from 1st IPC against work done

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		provided that the advance payment shall be completely repaid prior to the time when 90% of the Accepted Contract Amount less Provisional Sums has been certified for payment. It may be more than 15% in the last instalment to ensure full repayment.
27.	14.3	Period of payment: one month
28.	14.3(b)	Number of additional paper copies of statements: four (04)
29.	14.3(iii)	Percentage of retention: 7% (seven percent) Limit of Retention Money: 5% (five percent)
30.	14.5(b)(i)	Plant and Materials for payment when shipped: Not Applicable
31.	14.5(c)(i)	Plant and Non-Perishable Materials under Bill of "Imported Plant and Materials" shall be paid as: Not Applicable
32.	14.6.2	Withholding (amount in) an IPC: 5% of the Accepted Contract Amount.
33.	14.7(a)	Period of payment of Advance Payment to the Contractor: 14 days
34.	14.7 b(i)	Period for the Procuring agency/Employer to make interim payments to the Contractor under Sub-Clause 14.6 (interim Payment): 14 days
35.	14.7 b(ii)	Period for the Procuring agency/Employer to make interim payments to the Contractor under Sub-Clause 14.13 (Final Payment): 28 days
36.	14.7(c)	Period for the Procuring agency/Employer to make final payment to the Contractor: 56 days
37.	14.8	financing charges for delayed payment: Nil
38.	14.11.1(b)	Number of additional paper copies of draft Final Statement: four (4)
39.	14.15	**Currencies of Payment** The Contract Price shall be paid in Pakistani Rupees (PKR).
40.	14.15 (a)(i)	Local Currency: 100% Foreign Currency: 0%
41.	14.15 (c)	Local Currency: 100% Foreign Currency: 0%

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42.	14.15 (f)	Rate of exchange: Nil
43.	17.2 (d)	**Liability for Care of the Works** Nil
Insurance (GCC Clause 19)		
44.	19.1	Permitted deductible limits insurance required for the Works: 10% of the loss amount on each and every loss. insurance required for Goods: Nil insurance required for liability for breach of professional duty: Nil insurance required against liability for fitness for purpose (if any is required): Nil insurance required for injury to persons and damage to property: Pak Rupees one hundred thousand (PKR. 100,000) per occurrence with number of occurrences unlimited insurance required for injury to employees: Pak Rupees one hundred thousand (Rs. 100,000) per occurrence with number of occurrences unlimited other insurances required by Laws and by local practice: Nil
45.	19.1	Periods for submission of insurance: a) evidence of insurance: Not later than the Commencement Date b) relevant policies: Within twenty-eight (28) days from the Commencement Date
46.	19.2.1(b)	Additional amount to be insured: 15% of Accepted Contract Amount
47.	19.2.1(iv)	List of Exceptional Risks which shall not be excluded from the insurance cover for the Works: Nil
48.	19.2.2	Extent of insurance required for Goods: from Ex-Works to delivery at the Site Amount of insurance required for Goods: Full Replacement Value
49.	19.2.3(a)	amount of insurance required for liability for breach of professional duty: full replacement value of the Works to be designed by the Contractor
50.	19.2.3(b)	Insurance required against liability for fitness for purpose: Yes
51.	19.2.3	Period of insurance required for liability for breach of professional duty: Until the date of issuance of Performance Certificate
52.	19.2.4	Amount of insurance required for injury to persons and damage to property:

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		Injury to person and Fata case: in accordance with Workmen Compensation Act Damage to Property: PKR 1 million without limit to the number of incidents
53.	19.2.6	**Insurance** Other insurances required by Laws and by local practice: All insurances as applicable to the extent of execution of the project, under Federal and Provincial laws of Islamic Republic of Pakistan.
Dispute Avoidance/ Adjudication Board (GCC Clause 21)		
54.	21.1	As and when required (Ad-hoc DAB)
55.	21.1	The DAB shall comprise: *sole member*
56.	21.1	List of proposed members of DAB [to be inserted at the time of signing of the Contract] - Proposed by Employer/ Procuring agency/Employer: One sole member to be appointed with mutual consent of both parties. - Proposed by Contractor: One sole member to be appointed with mutual consent of both parties.
57.	21.2	Appointing entity (official) for DAB members: Chairman Pakistan Engineering Council (PEC) from the list of PEC approved arbitrators published at its website.
58.	21.6	PEC Rules of Conciliation and Arbitration or Pakistan Arbitration Act of 1940, if the former is inactive. The place of Arbitration shall be in the Employer's country: Islamabad, Pakistan

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Part-B Special Provisions

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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PARTICULAR CONDITIONS
Part B - Special Provisions

1.1 Definitions

1.1.22 "DAAB or Dispute Avoidance / Adjudication Board"

Delete the text of 1.1.22 and replace with the following:

"Dispute Adjudication Board" or **"DAB"** means the person so named in the Contract, or appointed under Clause 21"

1.1.23 "DAAB Agreement"

Delete the text of 1.1.23 and replace with the following:

"DAB Agreement" means the Agreement signed or deemed to have been signed by both parties and the sole member of the DAB in accordance with Sub-Clause 21.1. [*Constitution of DAB*] or Sub-Clause 21.2 [*Failure to Appoint DAB Member(s)*], incorporating by reference the General Conditions of DAB Agreement contained in the Appendix of these General Conditions with such amendments as are agreed.

1.1.76 "Specification"

Following is added at the end:

"and consists of two parts i.e.,

i) "Part A - Specific Provisions"; and

ii) "Part B - Specifications

- Technical Provisions"."

1.2 Interpretation

"and" is deleted from the end of sub-paragraph (i) and added at the end of sub-paragraph (j).

Sub-paragraph (k) is added:

"(k) The word "tender" is synonymous with "bid" the word tenderer with "bidder", the words "tender documents" with "bidding documents" and "Schedule of Prices" with "Bill of Quantities", as applicable."

1.5 Priority of Documents

The documents listed at (a) through (k) of this Sub-Clause are deleted and substituted with the following:

(a) the Contract Agreement;

(b) the Letter of Acceptance;

(c) The completed Letters of Technical & Price Bid;

(d) the Particular Conditions Part A - Contract Data;

(e) the Particular Conditions Part B - Special Provisions;

(f) the General Conditions;

(g) the Specification Part A - Specific Provisions;

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(h) the Technical Proposal
(i) Bill of Quantities (Schedule - B to Bid)
(j) Drawings
(k) The Specification Part B - Technical Provisions
(l) any other documents forming part of the Contract.

The addenda/ corrigenda, if any, shall be deemed to have been incorporated at the appropriate places in the documents forming the Contract.

1.6 Contract Agreement

Delete the text and substitute with the following:

The Parties shall sign a Contract Agreement within 28 days after the Contractor receives the Letter of Acceptance. 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 Contractor. The Contractor shall prepare six (6) copies of the Contract Document (including all the volumes / documents listed in the Contract Agreement) along-with copies of all the bonds/Guarantees/Sureties, at his cost and shall submit the same to the Employer".

3.1 The Engineer

In sub-paragraph (a) the text "as defined in the Pakistan Engineering Council Act, 1975 (Act No. V of 1976)" are added after the words "professional engineer"

3.2 Engineer's Duties and Authority

The Engineer shall obtain the consent in writing of the Employer before taking action under the following Sub-Clauses of these Conditions:

(a) Consenting to the subcontracting of any part of the Works under Sub-Clause 5.1 [*Subcontractors*]

(b) Any action under Sub-Clauses 8.9 [*Employer's Suspension*] and 8.12 [*Prolonged Suspension*]

(c) Issuance of "Taking Over Certificate" under Sub-Clause 10.1 [*Taking Over the Works and Sections*].

(d) Issuing the "Performance Certificate" under Sub-Clause 11.9 [*Performance Certificate*].

(e) Sub-Clause 13.1 [*Right to Vary*]: Instructing a Variation, except:

(i) in an emergency situation as determined by the Engineer, or

(ii) if such a Variation would increase the Accepted Contract Amount by less than the percentage specified in the Contract Data.

(f) Sub-Clause 13.3 [*Variation Procedure*]: approving a proposal for Variation submitted by the Contractor in accordance with Sub-Clause 13.3.2 [Variation by Request for Proposal] or 13.2 [*Value Engineering*].

(g) Certifying release of second half of the Retention Money under Sub-Clause 14.9 [*Release of Retention Money*].

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(h) Issuing Final Payment Certificate under Sub-Clause 14.13 [*Issue of FPC*].

(i) Any Change in the payment thereof under Clause 13.6 [*Adjustment for Changes in Law*].

(j) Extra payment as a result of Contractor's claims under Clause 20 [*Employer's and Contractor's Claim*].

Any such requirement shall not be applied to any action by the Engineer under Sub-Clause 3.7 [*Agreement or Determination*], as stated in Sub-Clause 3.2 [*Engineer's Duties and Authority*] of the General Conditions.

Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 and shall notify the Contractor accordingly, with a copy to the Employer.

Following is added after the words "the Employer's consent is required" in 4th paragraph:

"stating that the Employer's consent has been obtained for that specified authority".

4.2 Performance Security

4.2.1 Contractor's Obligations

The entity issuing the Performance Security and its form shall be as under:

The Performance Security shall be, at the option of the Contractor, issued in the prescribed form included in the Bidding Documents, by (a) a Scheduled Bank in Pakistan or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan.

Following paragraph is added at the end of this Sub-Clause:

"The amount of Performance Security shall be reduced to 50% following issue of the Taking-Over Certificate for the whole of the Works under Clause 10 of Conditions of Contract."

The cost of complying with requirements of this Sub-Clause shall be borne by the Contractor.

4.3 Contractor's Representative

In second paragraph the text "professional engineer as defined in the Pakistan Engineering Council Act, 1975 (Act No. V of 1976) (having temporary licence in case of foreign engineer under Section 12 of the Pakistan Engineering Council Act, 1975 (Act No. V of 1976)" are added after the

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words "qualified, experienced".

In the 3rd paragraph the words "28 days" are substituted by "14 days". In 2nd line of 4th paragraph the text "or appoint a replacement" is substituted by "except appointment of a suitable temporary replacement is deployed at the Site"

4.4 Contractor's Documents

4.4.2 As-Built Records

First paragraph is deleted and the text in the last paragraph is substituted with the following:

"The Contractor shall furnish to the Engineer 6 copies, one reproducible and one electronic copy (provided the Engineer has made available to the Contractor editable form of the Drawings) of all Drawings amended to conform to the Works as built. In case the Engineer does not make available to the Contractor editable form of the Drawings, the Contractor shall furnish to the Engineer as-built data for incorporation in the Drawings. Upon receipt of PDF versions of the as-built drawings prepared by the Engineer, the Contractor shall furnish to the Engineer 6 copies and one reproducible of these Drawings.

The price of such Drawings shall be deemed to be included in the Contract Price."

Following Sub-Clause is added:

4.4.4 Shop Drawings

The Contractor shall submit to the Engineer for review 3 copies of all shop and erection drawings applicable to this Contract as per provision of relevant Sub-Clause of the Contract.

Review and approval by the Engineer shall not exceed 21 days and be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory and the Engineer's review or approval shall not relieve the Contractor of any of his responsibilities under the Contract.

4.8 Health and Safety Obligations

The following text is added at the end of this Sub-Clause:

In the event of work being carried out outside the normal working hours and in the event of work being carried out at night, the Contractor shall at his own cost, provide and maintain such good and sufficient light as will enable the work to proceed satisfactorily and without danger. The approaches to the Site and the Works where the night work is being carried out shall be sufficiently lighted. All arrangement adopted for such lighting shall be to the satisfaction of the Engineer.

4.20 Progress Reports

At the end of sub-paragraph (g) the word "and" is deleted and at the end of sub-paragraph (h) the full stop (.) is replaced with ";", and the following new sub-paragraphs are added as:

i) planned programme for the execution of the Works for next 56 days to enable the Engineer to determine its programme of inspection and testing;

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j) monthly summary of daily job record indicating weather conditions, deployment of Contractor's Equipment, labour employment, local material procurement and material import, if any; and

k) salient contractual and project information

5.1 Subcontractors

The Sub-Clause 5.2 is deleted in its entirety.

5.2 Nominated Subcontractors

5.2.2 Objection to Nomination

In sub-paragraph (c), "and" is deleted from the end of (i) and at the end of (ii) is replaced with: ", and".

The following is then added as (iii):

"(iii) be paid only if and when the Contractor has received from the Employer payments for sums due under the Subcontract referred to under Sub-Clause 5.2.3 [*Payment to nominated Subcontractors*]."

6.1 Engagement of Staff and Labour

The following paragraph is added at the end of the Sub-Clause:

"The Contractor shall, to the extent practicable and reasonable, employ staff (not less than 50%) and labour (not less than 85%) with appropriate qualifications and experience from sources within the Islamic Republic of Pakistan."

6.7 Health and Safety of Personnel

The existing text is substituted with the following:

"In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Engineer may authorize or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Engineer may determine to be reasonably necessary for such purpose. The Contractor shall also provide all other medical services and appoint a health and safety officer at Site if stated in the Specifications. In case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer immediately by the quickest available means."

6.8 Contractor's Superintendence

Insert at the end of sub-paragraph (a) of this Sub-Clause:

"or, if not, the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their superintendence duties"

The following text is added at the end of this Sub-Clause:

"The Contractor's authorized representative and his other engineers working at site shall possess valid registration with the Pakistan Engineering Council.

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The Contractor's authorized representative at Site shall be authorized to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract."

6.12 Key Personnel

The following is inserted at the end of the last paragraph:

"If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer."

The following Sub-Clauses 6.13 to 6.26 are added at the end of Sub-Clause 6.12:

6.13 Foreign Personnel

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

The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.

6.14 Supply of Foodstuffs

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

6.15 Supply of Water

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

6.16 Measures against Insect and Pest Nuisance

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

6.17 Alcoholic Liquor or Drugs

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

6.18 Arms and

The Contractor shall not give, barter, or otherwise dispose

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	Ammunition	of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.
6.19	**Festivals and Religious Customs**	The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.
6.20	**Funeral Arrangements**	The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.
6.21	**Forced Labour**	The Contractor, including its Subcontractors, shall not employ or engage forced labour which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.
6.22	**Child Labour**	The Contractor, including its Subcontractors, shall not employ or engage child labour in accordance with relevant law(s) in force in Islamic Republic of Pakistan.
6.23	**Employment Records of Workers**	The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Engineer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [*Contractor's Records*].
6.24	**Workers' Organizations**	The Contractor shall comply with the relevant labour laws of Pakistan which recognize workers' rights to form and to join workers' organizations/Trade Union of their choosing and to bargain collectively without interference.
6.25	**Non-Discrimination and Equal Opportunity**	The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices. Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure non discrimination and equal opportunity, including for specific groups such as women, persons with disabilities, migrant workers and children (of working age in accordance with Sub-Clause

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6.22)

6.26 Epidemics

In the event of any out-break of illness of epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities for the purpose of overcoming the same.

7.7 Ownership of Plant and Materials

The following is added before the first paragraph: "Except as otherwise provided in the Contract,"

The following is added at the end of the Sub-Clause:

"No Plant and/or Materials that is the property of the Employer shall be removed from the Site. If it becomes necessary to:

(i) remove any item of such Plant from the Site for the purposes of repair, the Contractor shall give a Notice, with reasons, to the Engineer requesting consent to remove the defective or damaged item off the Site. This Notice shall clearly identify the item of defective or damaged Plant, and shall give details of: the defect or damage to be repaired; the place to which defective or damaged item of Plant is to be taken for repair; the transportation to be used (and insurance cover for such transportation); the proposed inspections and testing off the Site; and the planned duration required before the repaired item of Plant shall be returned to the Site. The Contractor shall also provide any further details that the Employer may reasonably require; or

(ii) replace any item(s) of such Plant and/or Materials, the Contractor shall give a Notice, with reasons, to the Engineer clearly identifying the item(s) of Plant and/or Materials to be replaced, and giving details of the due date of delivery to the Site of the replacement item(s).

Where any item of Plant and/or Materials has become the property of the Employer under this Sub-Clause before it has been delivered to the Site, the Contractor shall ensure that such an item is not moved except for its delivery to the Site.

The Contractor shall indemnify and hold the Employer harmless against and from the consequences of any defect in title or encumbrance or charge (except any reasonable restriction arising from the intellectual property rights of the manufacturer or producer) on any item of Plant and/or Materials that has become the property of the Employer under this Sub-Clause."

The following Sub-Clause 7.9 is added after Sub Clause 7.8:

7.9 Use of Pakistani Materials and Services

The Contractor shall, so far as may be consistent with the Contract, make the maximum use of materials, supplies, plant and equipment indigenous to or produced or fabricated in Pakistan and services available in Pakistan provided such materials, supplies, plant, equipment and services shall be of required standard.

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8.1	**Commencement of Works**	The following is added before the first paragraph: "within 14 days, after signing of the Contract Agreement by both Parties," and thereafter the word "The" is replaced with the word "the".
8.5	**Extension of Time for Completion**	The following is added after paragraph (c): "for last five years".

The following Sub-Clause 11.12 is added after Sub-Clause 11.11:

11.12	**Supervisory Assistance During DNP**	If provided under the Schedule of Prices, the Contractor shall provide supervisory assistance to the Employer during the DNP for the Works. Such supervisory assistance shall be as described in the Specification for the purpose of supporting the Employer's operation and maintenance of the Plant for the period specified in the Schedule of Prices after the Date of Completion.
12.2	**Method of Measurement**	The following paragraph is added at the end of the Sub-Clause: "Summary of measured quantity for payment shall be delineated item-wise under four heads namely; "Schedule of Prices Quantity", "Quantity Executed To-date", "Quantity Certified Previously" and "Net Quantity Executed under this Certificate".
12.3	**Valuation of the Works**	After sub-paragraph (c) delete the text of 5th paragraph "Each new rate..... .....relevant matters" and substitute with the following: "the valuation will be carried out on the basis similar items covered in the Bill of Quantities of applicable item rates of Pak. PWD Schedule of Rates 2022 with the application of awarded premium / rebate. Failing above, the valuation will be carried out by the Engineer on the basis of item rates of Pak. PWD Schedule of Rates 2022 with the application of awarded premium / rebate., insofar as such rates or prices apply and where such rates or prices do not directly apply, the value shall be based on the rates or prices deduced therefrom so far as it is practicable to do so. If the same is not provided in the Bill of Quantities, then the valuation will be carried out on the basis of actual with the application of current market rates for labour, material etc. No Price Adjustment on account of material, labour, POL etc. shall be allowed on such items if the valuation is carried out on the basis of current market rates and the percentage of overheads, taxes & profit, etc. to be allowed in such cases shall be twenty-five percent (25%)."
13.4	**Provisional Sums**	The following paragraph is inserted as the penultimate paragraph:

"The Provisional Sum shall be used to cover the Employer's share of the DAB members' fees and expenses, in accordance with Clause 21. No prior instruction of the Engineer shall be required with respect to the work of the DAB. The Contractor shall submit the DAB members' invoices and the satisfactory evidence of having paid 100% of such invoices as part of the substantiation of those Statements submitted under Sub-Clause 14.3."

13.6 Adjustments for Changes in Laws

The following paragraphs are added at the end of the Sub- Clause:

"Notwithstanding the foregoing, the Contractor shall not be entitled to an extension of time if the relevant delay has already been taken into account in the determination of a previous extension of time and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the Table of Adjustment Data in accordance with the provisions of Sub-Clause 13.7 [*Adjustments for Changes in Cost*]."

14.2 Advance Payment

14.2.1 Advance Payment Guarantee

The entity issuing the Advance Payment Guarantee and its form shall be as under:

The Advance Payment Guarantee shall be in the form of Guarantee issued by (a) a Scheduled Bank in Pakistan or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan.

14.2.2 Advance Payment Certificate

Add the following at the end:

"The Engineer shall issue an Advance Payment Certificate for the advance payment in following two equal parts:

(i) first part within 14 days after signing of the Agreement or the date of receipt of Engineer's Notice to Commence, whichever is earlier; and

(ii) second part within 42 days from the date of payment of the first part, subject to the satisfaction of the Engineer as to the state of mobilization of the Contractor, bringing/installing/erecting of essential equipment and mobilization of minimum mandatory staff to complete the requirement for the entire work, having fulfilled his obligation under the Contract agreement for provision of facilities for the Engineer such as Site office, transport etc. and his own facilities such as contractor's camp, storage yards, etc. and having completed at least 2% of the permanent works (to be assessed by the Engineer during this time period."

14.6 Issue of IPC

14.6.1 The IPC

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In the first line of the 1st paragraph the words "28 days" are substituted by "14 days".

14.7	Payment	Delete '.' At the end of last paragraph and add the words "or through crossed cheque in favour of the Contractor."
14.8	Delayed Payment	In the first paragraph, third line, the words "compounded monthly" are deleted. The text of 2nd paragraph is deleted and substituted with the following: "The Employer shall pay to the Contractor compensation at the rate stated in the Contract Data."
15.2	Termination for Contractor' Default	15.2.1 Notice Following text is added at the end of sub-paragraph (h) of this Sub-Clause: "For the purposes of this Contract, corrupt and fraudulent practices have been defined in Public Procurement Rules 2004." 15.2.3 After Termination The word "and" at the end of sub-paragraph (ii) of paragraph (b) is deleted. The following paragraph is added after sub-paragraph (iii): "(iv) all Employer-Supplied Materials and/or Employer's Equipment made available to the Contractor in accordance with Sub-Clause 2.6 *[Employer-Supplied Materials and Employer's Equipment]*, and"
15.4	Payment after Termination for Contractor's Default	The following text is added at the end of this Sub-Clause: "The Employer shall be entitled to sell any of the Contractor's Equipment, Temporary Works and unused materials and apply the proceeds of sale towards payment of any debt due from the Contractor to the Employer under this Clause including any outstanding payments to the Subcontractors."
16.2	Termination by Contractor	16.2.1 Notice The sub-paragraph (j) is deleted in its entirety. At the end of sub-paragraph (i) "; or" is replaced with "." and at the end of sub-paragraph (h) ";" is replaced with "; or". In sub-paragraph (f) "84 days" are replaced with "180 days" and text "for reasons not attributable to the Contractor" is added at the end.
16.3	Contractor's Obligations After Termination	Sub-paragraph (c) is deleted and replaced with: "(c) deliver to the Engineer all Employer-Supplied Materials and/or Employer's Equipment made available to the Contractor in accordance with Sub-Clause 2.6 *[Employer-Supplied Materials and Employer's Equipment]*; and (d) remove all other Goods from the Site, except as necessary for safety, and leave the Site."

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17.1	**Responsibility for Care of the Works**	After the two instances of "Goods" in the last paragraph, the words "Employer-Supplied Materials and/or Employer's Equipment" are added.

The following Sub-Clause 17.7 is added after Sub-Clause 17.6:

17.7	**Use of Employer's Accommodation/ Facilities**	The Contractor shall take full responsibility for the care of the items of the Employer's facilities and/or accommodation, if any, as detailed in the Specification, from the date of use and/or occupation by the Contractor until the date on which such use and/or occupation is re-vested in the Employer. If any loss or damage happens to any of the above items during a time while the Contractor is responsible for its care, arising from any cause other than a cause for which the Employer is responsible or liable, the Contractor shall promptly rectify the loss or damage at the Contractor's risk and cost.
18.1	**Exceptional Events**	The words "or disorder" are replaced with "disorder or sabotage" in sub-paragraph (c) of the Clause.
18.4	**Consequences of an Exceptional Event**	The following is added at the end of sub-paragraph (b) after deleting the ".": ", including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Exceptional Events, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 19.2 [*Insurance to be provided by the Contractor*]."
18.5	**Optional Termination**	In sub-paragraph (c), the words "and necessarily" are added after the words "was reasonably".
19.1	**General Requirements**	Following text is added at the end of first paragraph: "The Contractor shall immediately after the date of the Letter of Acceptance submit the draft of insurance policies for the Employer's consent." Following text is added at the end of third paragraph: "The Contractor shall, within the respective periods stated in the Contract Data submit to the Engineer and the Employer a) evidence that the insurances described in this Clause have been effected, and b) copies of policies of the insurances described in Sub-Clauses 19.2.1, 19.2.4 and 19.2.5."
19.2	**Insurance to be provided by the Contractor**	19.2.5 Injury to employees The words "sickness, disease" are deleted in the third line of first paragraph. The following Sub-Clause is added after Sub-Clause 19.2.6: 19.2.7 Insurance Company "The Contractor shall be obliged to place all insurances described in this Clause with insurers listed in the Contract Data with min. rating of AA by PACRA/VIS.

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21.1	**Constitution of the DAAB**	Delete the text of Sub-Clause 21.1 in its entirety and replace with the following: Disputes shall be adjudicated by a DAB in accordance with Sub-Clause 21.4 [*Obtaining DAAB's Decision*]. The Parties shall jointly appoint a DAB by the date 28 days after a Party gives notice to the other Party of its intention to refer a dispute to a DAB in accordance with Sub-Clause 21.4. The DAB shall comprise, as stated in the Contract Data, of one suitably qualified person ("the member"). The members shall be selected from those on the list on PEC Website, other than anyone who is unable or unwilling to accept appointment to the DAB. The agreement between the Parties and the sole member ("adjudicator") shall incorporate by reference the General Conditions of Dispute Adjudication Agreement contained in the Appendix to FIDIC Conditions of Contract for Plant Design-Build, First Edition 1999, with such amendments as are agreed between them. The terms of the remuneration of the sole member shall be mutually agreed upon by the Parties when agreeing the terms of appointment. Each Party shall be responsible for paying one-half of this remuneration. If at any time the Parties so agree, they may appoint a suitably qualified person to replace the member of the DAB. Unless the Parties agree otherwise, the appointment will come into effect if the member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment. The replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Sub-Clause. The appointment of the member may be terminated by mutual agreement of both Parties, but not by the Employer or the Contractor acting alone. Unless otherwise agreed by both Parties, the appointment of the DAB (including the member) shall expire when the DAB has given its decision on the dispute referred to it under Sub- Clause 21.4 [*Obtaining DAAB's Decision*], unless other disputes have been referred to the DAB by that time under Sub-Clause 21.4, in which event the relevant date shall be when the DAB has also given decisions on those disputes.
21.3	**Avoidance of Disputes**	Delete the Sub-Clause 21.3 in its entirety.
21.4	**Obtaining DAAB's Decision**	In the 1st paragraph of Sub-Clause 21.4 after the words "if a dispute arises between the parties then, "add the following: "after a DAB has been appointed"; Delete the words " (whether or not any informal discussions have been held under Sub-Clause 21.3 [*Avoidance of Disputes]*); 21.4.1 " Reference of a Dispute to the DAAB" Delete Sub-Paragraph (a) of Sub-Clause 21.4.1.

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21.6	**Arbitration**	The word "international" is deleted in the sixth line of first paragraph. The text of sub-paragraph (a) is substituted with the following: "the Dispute shall be finally settled under the Rules of Arbitration, specified in the Contract Data;"

The following Clauses are added after Clause 21

22	**Custom Duty**	The Contractor shall be liable to pay custom duty arising out of the Contract. The rates and prices as stated in the contract shall be deemed to cover all such duties.
23	**Taxes**	The Contractor, Subcontractors and their employees shall be liable to pay income tax, withholding tax, super tax and other taxes on income arising out of the Contract. The rates and prices as stated in the contract shall be deemed to cover all such taxes.
24	**Integrity Part**	If it is found and established at any stage that the Contractor or any of his Subcontractors, agents or servants have violated or involved in violation of the Integrity Pact signed by the Contractor then the Employer shall be entitled to : a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by the Contractor or any of his Subcontractors, agent or servants; b) terminate the Contract; and c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other corrupt business practices of the Contractor or any of his Subcontractors, agent or servants. The termination under sub-paragraph (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clause 15.1 to 15.4 and the payment under Sub-Clause 15.4 shall be made after having deducted the amounts due to the Employer under sub- paragraph (a) and (c) of this Sub-Clause

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SECTION X: CONTRACT FORMS

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Notification of Award

(On Procuring agency/Employer's letterhead)

Letter of Acceptance

[Date]. . . . .

To: . . . .[Name and address of the contractor]

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

This is to notify you that your Bid dated . . . . .[date]. . . . . for execution of the . . . .[name of the contract and identification number, as given in the Bid Data Sheet] . . . . . for the Accepted Contract Amount of the equivalent of . . . . . [amount in words and figures and name of currency]. . . . ., as corrected and modified in accordance with the Instructions to Bidders, is hereby accepted by our Agency.

You are requested to furnish 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: .....

Name and Title of Signatory: .....

Name of Agency: .....

Attachment: Contract Agreement

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Form of Contract

THIS AGREEMENT made the _____ day of _____ 20_____ between *[name and address of Procuring agency/Employer]* of Pakistan (hereinafter called "the Procuring agency/Employer") of the one part and *[name of Contractor]* of *[city and country of Contractor]* (hereinafter called "the ") of Contractor other part:

WHEREAS the Procuring agency/Employer desired that the works *[brief description of works]* should be executed by the contractor, and has accepted a Bid by the contractor for the execution and completion of these works and remedying of any defects therein, in the sum of *[contract price in words and figures]* (hereinafter called "the Contract Price").

NOW THIS CONTRACT WITNESSETH AS FOLLOWS:

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

2. The following documents shall be deemed to form and be read and construed as part of this Contract, In the event of any ambiguity or conflict between the Contract Documents listed below, the order of precedence shall be the order in which the Contract Documents are listed below:-

   (a) This form of Contract;
   (b) Letter of Acceptance;
   (c) the Form of Bid and the Price Schedule submitted by the Bidder;
   (d) the Works Requirements;
   (e) the Technical Specifications;
   (f) the Drawings;
   (g) the General Conditions of the Contract
   (h) the Special Conditions of Contract,
   (i) the completed schedule including Bill of Quantities; and
   (j) *[add here: any other documents]*

3. In consideration of the payments to be made by the Procuring agency/Employer to the contractor as mentioned in this contract, the contractor hereby covenants with Procuring agency/Employer to execute the works to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Procuring agency/Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Contract to be executed in accordance with their respective laws the day and year first above written.

Signed, sealed, delivered by _____the _____ (for the Procuring agency/Employer)	Signed, sealed, delivered by _____the _____ (for the Contractor)

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Witness to the signatures of the Procuring agency/Employer	Witness to the signatures of the Contractor .....

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

NATIONAL ENGINEERING SERVICES PAKISTAN PVT LTD. NESPAK ISLAMABAD

Performance Guarantee Form

To: *[name of Procuring agency/Employer]*

WHEREAS *[name of Contractor]* (hereinafter called "the contractor") has undertaken, in pursuance of Contract No. *[reference number of the contract]* dated *[insert date]* for the execution of *[insert name of the works and its brief description]* (hereinafter called "the Contract").

AND WHEREAS it has been stipulated by you in the said Contract that the contractor shall furnish you with a Bank Guarantee by a reputable bank for the sum specified therein as security for compliance with the Contractor's performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractor a guarantee:

THEREFORE, WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Contractor, up to a total of *[amount of the guarantee in words and figures]*, and we undertake to pay you, upon your first written demand declaring the Contractor to be in default under the Contract and without cavil or argument, any sum or sums within the limits of *[amount of guarantee]* as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the: *[insert date]*

Signature and seal of the Guarantors

[name of bank or financial institution]

[address]

[date]

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Advance Payment Security

Demand Guarantee

Beneficiary: _____

Date: _____

ADVANCE PAYMENT GUARANTEE No.: _____

Guarantor: _____

We have been informed that [inset name of the Contractor] (hereinafter called "the Contractor") has entered into Contract No. _____ dated _____ with the [insert name of the Procuring agency/Employer] (hereinafter called "the Procuring agency/Employer") for the execution of _____ (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum _____ (_____) is to be made against an advance payment guarantee.

At the request of the Contractor, we as Guarantor, hereby irrevocably undertake to pay the Procuring agency/Employer any sum or sums not exceeding in total an amount of _____ upon receipt by us of the Procuring agency/Employer's complying demand supported by the Procuring agency/Employer's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:

(a) has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or

(b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Contractor has failed to repay.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Procuring agency/Employer's bank stating that the advance payment referred to above has been credited to the Contractor on its account number _____ at _____**

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as specified in copies of interim statements or payment certificates which shall be presented to us.

The Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against payments from Interim Payment Certificates of the Contractor provided that the Guarantor agrees that the aforesaid period of validity shall be deemed to be extended if on the above mentioned date the advance payment is not fully adjusted.

_____

[signature(s)]

Note: All italicized text is for use in preparing this form and shall be deleted from the final product.

Retention Money Security
Demand Guarantee

_____ *[Guarantor letterhead or SWIFT identifier code]*

Beneficiary: _____ *[Insert name and Address of Procuring agency/Employer]*

Date: _____ *[Insert date of issue]*

RETENTION MONEY GUARANTEE No.: *[Insert guarantee reference number]*

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

We have been informed that _____ *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Contractor") has entered into Contract No. _____ *[insert reference number of the contract]* dated _____ with the Procuring agency/Employer, for the execution of _____ *[insert name of contract and brief description of Works]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, the Procuring agency/Employer retains moneys up to the limit set forth in the Contract ("the Retention Money"), and that when the Taking-Over Certificate has been issued under the Contract and the first half of the Retention Money has been certified for payment, payment of *[*insert the second half of the Retention Money *or if the amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money,* the difference between half of the Retention Money and the amount guaranteed under the Performance Security and, if required, the ES Performance Security*]* is to be made against a Retention Money guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ *[insert amount in figures]* (_____) *[amount in words]* upon receipt by us of the Procuring agency/Employer's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without your needing to prove or show grounds for your demand or the sum specified therein.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Procuring agency/Employer's bank stating that the second half of the Retention Money as referred to above has been credited to the contractor on its account number _____ at _____ *[insert name and address of Contractor's bank].*

This guarantee shall expire no later than the …. day of ……, 2…, and any demand for payment under it must be received by us at the office indicated above on or before that date.

_____

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

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Integrity Pact

DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC. PAYABLE BY THE SUPPLIERS OF GOODS, SERVICES & WORKS IN CONTRACTS WORTH RS.10.00 MILLION OR MORE

Contract Number: _____ Dated: _____
Contract Value: _____
Contract Title: _____

[Name of Contractor] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan or any administrative subdivision or agency thereof or any other entity owned or controlled by it (GoP) through any corrupt business practice.

Without limiting the generality of the foregoing [Name of Contractor] represents and warrants that it has fully declared the brokerage, commission, fee etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultations fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

[Name of Contractor] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoP and has not taken any action or will not take any action to circumvent the above declaration, representative or warranty.

[Name of Contractor] accepts full responsibility and strict liability for making and false declaration, not making full disclosure, misrepresenting fact or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other right and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [Name of Contractor] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten time the sum of any commission, gratification, bribe, finder's fee or kickback given by [Name of Contractor] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

_____ _____
[Procuring agency/Employer] [Contractor]

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Declaration of Ultimate Beneficial Owners Information for Public Procurement Contracts.

1. Name
2. Father's Name/Spouse's Name
3. CNIC/NICOP/Passport No.
4. Nationality
5. Residential address
6. Email address
7. Date on which shareholding, control or interest acquired in the business.
8. In case of indirect shareholding, control or interest being exercised through intermediary companies, entries or other legal persons or legal arrangements in the chain of ownership or control, following additional particulars to be provided:

1	2	3	4	5	6	7	8	9	10
Name	Legal form (company/limited Liability Partnership/ Association of Persons/Single Member Company/Partnership Firm/individual/other individual, body corporate (to be specified)	Date of Incorporation/registration	Name of Director(s)	Business Address	Country	Email address	Percentage of shareholding, control or interest of BO in the legal person or legal arrangement	Percentage of shareholding , control or interest of legal person or legal arrangement in the Company	Identity of natural person who ultimately owns or controls the legal person or arrangement

9. **Information about the Board of Directors (details shall be provided regarding number of shares in the capital of the company as set opposite respective names).**

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1	2	3	4	5	6	7	8
Name and surname (in Block Letters)	CNIC No. (in case of foreigner, Passport No.)	Father's/Husband's Name in full	Current Nationality	Any other Nationality (ies)	Occupation	Residential address in full or the registered office address for a subscriber other than natural person	Number of shares taken by each subscriber (in figures and words)
			Total numbers of shares taken (in figures and words)				

10. Any other information incidental to or relevant to Beneficial Owner(s).

Name and signature
(Person authorized to issue notice on behalf of the company)

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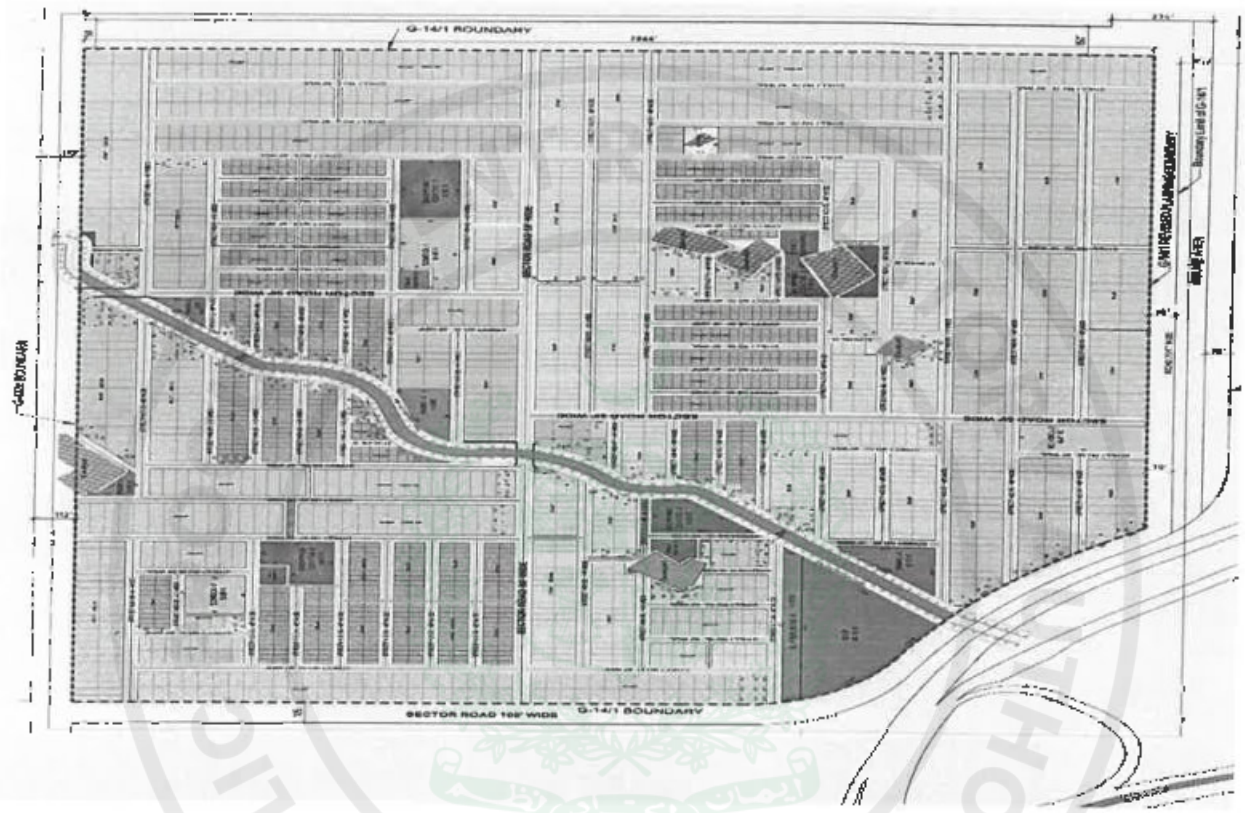
FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY, ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB-SECTOR G-14/1, ISLAMABAD



SPECIFIC PROVISIONS
TECHNICAL SPECIFICATIONS

BIDDING DOCUMENT
VOLUME – II

SEPTEMBER 2026

Clearance Code	:	4156/321/BD/056(26)
Doc No	:	02
Rev No.	:	0

National Engineering Services Pakistan (Pvt.) Limited
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http://www.nespak.com.pk

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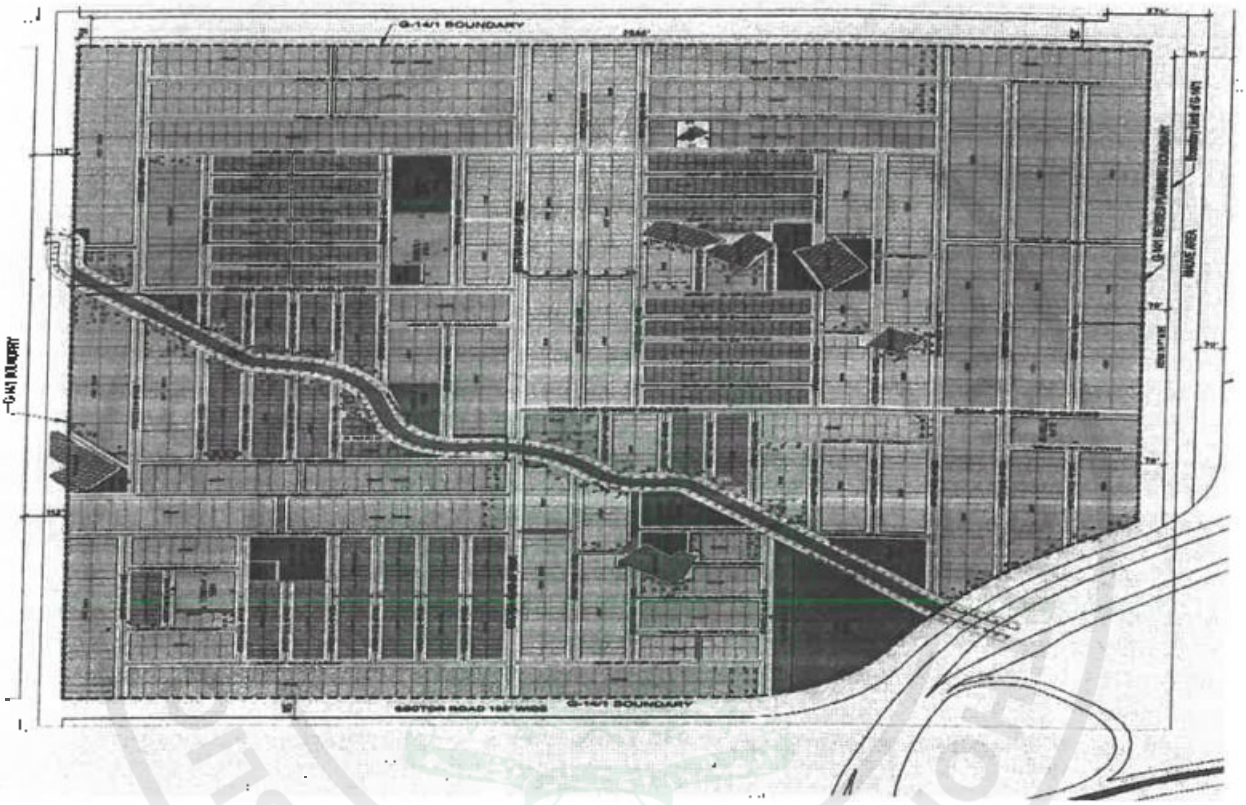
FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY, ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB-SECTOR G-14/1, ISLAMABAD



SPECIFIC PROVISIONS TECHNICAL SPECIFICATIONS

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Clearance Code	:	4156/321/BD/056(26)
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National Engineering Services Pakistan (Pvt.) Limited
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http://www.nespak.com.pk

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY

ISLAMABAD INFRASTRCUTURE DEVELOPMENT OF SUB SECTOR G-14/1, ISLAMABAD

PART – I SPECIFIC PROVISIONS

PART – II TECHNICAL SPECIFICATIONS

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

PART-I
SPECIFIC PROVISIONS

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SPECIFICATIONS – SPECIFIC PROVISIONS

1. GENERAL

1.1 Specifications – Special Provisions shall form an integral part of Bid and the Contract documents.

1.2 The Contractor shall notify all sub-contractors of the provisions of these Special Provisions.

2. DESCRIPTION OF PROJECT, WORKS INVOLVED AND SITE

Federal Government Employees Housing Authority (FGEHA) intends to carry out Infrastructure Development Works for Sub-Sector G-14/1, Islamabad and ancillary works as per approved design and drawings.

The scope of works mainly comprises construction of roads, cross drainage structures, Nullah channelization, storm water drainage, water supply, sewerage, street lighting, underground and elevated water tank, tubewells and Landscaping etc. lying within the boundaries and limits shown on the Drawings and any such additional areas adjacent thereto as may be designated by the Engineer from time to time for the construction to be performed under the Contract, and all such areas and additional areas shall comprise the Site.

3. CODES, STANDARDS AND CERTIFICATES

A. Applicable Standards

Except as otherwise provided by these Specifications or the Drawings, all materials, equipment and fabrication and testing thereof shall conform to the latest applicable standards and codes referred in the Specifications by use of the abbreviations explained below:

ASCE		American Society of Civil Engineers
ASA		American Standard Association
ACI	-	American Concrete Institute (USA)
AISI	-	American Iron and Steel Institute (USA)
AISC	-	American Institute of Steel Construction (USA)
ANSI	-	American National Standard Institute (USA)
ASTM	-	American Society for Testing and Materials (USA)
AASHTO	-	American Association of State Highway & Transportation Officials.
AWS	-	American Welding Society (USA)
BS	-	British Standards (UK)
CP	-	Codes of Practice (UK)
ICAO		International Civil Aviation Organization
BSICP		British Standard Institute Code of Practice
PS	-	Pakistan Standards (Pak)
PCA		Portland Cement Association
PSI		Pakistan Standard Institute
SSPC	-	Steel Structures Painting Council (USA)
UBC	-	Uniform Building Code (USA)
USBR	-	United States Bureau of Reclamation (USA)

If the Contractor, at any time and for any reason, wishes to deviate from the above standards or desires to use material or equipment not covered by the above standards, he shall state the exact nature of the changes, the reason for making the change and shall submit complete specifications of the materials and equipment to the Engineer for approval.

B. Standards other than those Specified

Where requirements for materials or equipment are specified by reference to a standard which has its origin in one country, it is not the intention to restrict the requirements solely to that standard and that country. Other standards, including

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standards of other countries, will be accepted provided the requirements thereof, in the sole opinion of the Engineer, are at least equal to the requirements of the standard specified. The Contractor may propose to the Engineer an equivalent standard other than that specified, in which case he shall submit the proposed standard and all other information required and shall submit written proof that his proposed standard is equivalent in all significant respects to the standard specified. All submissions must be made in the English language.

C. **Codes and Standards at Site**

The Contractor shall supply and have at his site office:-

a) Copies of all latest editions of codes and standards referred to in these Specifications or equivalent codes and standards as approved by the Engineer.

b) Catalogues and published recommendations from manufacturers supplying products and materials for the project.

c) The Contractor shall provide manufacturer's or supplier's materials which must meet the requirements of a specific code or standard as stated in these Specifications.

4. MANUFACTURER'S RECOMMENDATIONS

Installation of manufactured items shall be in accordance with procedures recommended by the manufacturer or as approved by the Engineer.

5. UNITS OF MEASUREMENTS

The MKS System of Units shall be used throughout the Project.

6. EXISTING CONDITION AT SITE

Drawings and information pertaining to existing project conditions are furnished for reference. Neither the Employer nor the Engineer warrants the adequacy or correctness of these. The Contractor's are encouraged to visit the project site to assess the existing site conditions.

7. PROTECTION AND PRECAUTIONS

The Contractor and his sub-contractors shall afford all necessary protection to existing structures and will be required to make good at his own expense any damage done to such structures through his own or his representatives or subcontractors' fault and negligence.

The Contractor and his sub-contractors shall afford all necessary protection to existing roads in the area . He will clear and make good at his own expense any damage to or debris on these roads through his own fault and negligence. He must at all time ensure the free and normal flow of traffic and shall not cause obstruction to the traffic system. The Contractor and his sub-contractors shall provide and maintain necessary protection an precautionary measures such as warning signs, warning lamps and barricades etc. to prevent accidents.

The Contractor shall promptly correct all such damage to original condition at no additional expense to the Employer.

The Contractor shall cooperate with trades performing work under other contracts as necessary for completion.

8. SEQUENCE OF CONSTRUCTION

The Contractor shall submit his proposal for approval of the Engineer the sequence of Construction, prior to starting the works. The works shall be executed as per approved sequence of construction

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9. LINES AND LEVELS

Survey control points will be established by the Engineer. The Contractor shall be responsible for verifying these and shall be responsible for all requirements necessary for the execution of any work to the locations, lines, and levels specified or shown on the drawings, subject to such modifications as the Engineer may require as work progresses.

10. PLANT, EQUIPMENT AND TOOLS

The Contractor shall provide at his cost modern plant, equipment and tools, adequate and befitting to the nature, magnitude and size of this Contract, in strict compliance with the requirements of the General Conditions of Contract, Conditions of Particular Applications and Technical Specifications.

11. PARTIAL POSSESSION

Whenever, as determined by the Employer any portion of work performed by the Contractor is in a condition suitable for use, the Employer may take possession of or use such portion.

Such use by the Employer shall in no instance be construed as constituting final acceptance, and shall neither relieve the Contractor of any of his responsibilities under the Contract, nor acts a waiver by the Employer of any of the conditions thereof, provided that the Contractor shall not be liable for the cost of repairs, re-work, or renewals which may be required due to ordinary wear and tear resulting from such use. However, if such use increase the cost or delays to the completion of remaining portions of work, the Contractor will be entitled to an equitable adjustment.

If, as a result of the Contractor's failure to comply with the provision of the Contract, such use proves to be unsatisfactory, the Employer will have the right to continue such use until such portion of the work can, without injury to the Employer, be taken out of service for correction of defects, errors, omissions, or replacement of unsatisfactory materials or equipment, as necessary for such work to comply with the Contract; provided that the period of such operation or use pending completion of appropriate remedial action shall not exceed twelve months unless otherwise mutually agreed upon in writing between the parties.

12. EXISTING SERVICES

The Contractor shall search for, find, locate and protect any wiring, cable, duct, pipework, etc., within or immediately adjoining the site area.

The Contractor shall take full responsibly for safety of existing service lines, utilities and utility structures uncovered or encountered during excavation and construction operations.

The Contractor shall take full responsibility for damaging any such service lines, utility/utility structure and any cost and/or expense that arises or issues from any such damage shall be borne directly by himself. Should any damage to any such service occur the Contractor shall forthwith take remedial action, initiate safety precautions, install temporary services and carryout repair all at his own cost and expense and inform the Engineer and notify all relevant authorities.

Existing utilities which are to remain in service for or after the works are to be determined by the Contractor. If any existing service lines, utilities and utility structures which are to remain in service are uncovered or encountered during these operations, they shall be safeguarded, protected from damage, and supported. The Contractor shall preserve, maintain and keep in perfect working conditions, any existing facilities required to [illegible] by the Employer/the Engineer.

13. CONSTRUCTION AREA AND ACCESS

The Employer will provide the Contractor possible space within or nearby the area of site of works for the storage of plant, equipment and materials and for Contractor's temporary office,

during the currency of the Contract. In case the adjacent area as required by the Contractor is not available within the Project boundary for storage of plant, equipment and machines then the Contractor shall arrange at his own expense possible space for storage of plant, equipment and machines at his own cost and expense. On no account shall such temporary installations conflict/interfere with any of the permanent installations, services and any operational function of Employer. The handling and storage of all plants, equipment and materials at site shall be the sole responsibility of the Contractor and at no risk and cost to the Employer.

The Contractor shall protect all material against corrosion, mechanical damage or deterioration during storage and erection on site. The protection methods shall be to the approval of the Engineer

14. CONSTRUCTION & CHECKING AT SITE

The Contractor shall submit to the Engineer in due time for approval and discussion, his proposals and plans as to the method and procedure to be adopted for the temporary and permanent works involved.

The submitting to these suggestions and arrangements, and the approval thereof by the Engineer shall not relieve the Contractor of his responsibilities and duties under the Contract.

The carrying out of all work included in the Contract is to be supervised by a sufficient number of qualified representatives of the Contractor and full facilities and assistance are to be afforded by the Contractor for the Engineer or his Representative to check & examine the execution of the work.

The Engineer reserves the right to inspect all parts of the works but may at his discretion waive inspection on certain items. This shall in no way absolve the Contractor from his responsibilities. This particularly applies to the checking of materials, the accurate setting out of foundations, and to the levelling, setting and aligning of the various parts, and to the proper fitting and adjustment of manufactured and finished materials and fixtures in position.

If the Engineer or his Representative find that the work progress is slow in such a way that the works or parts thereof will not be completed in the time specified, then he shall order the Contractor to work overtime or in shifts and the Contractor shall comply. These arrangements will be free of all financial encumbrances and at no additional costs to the Employer.

In the event of night work, the Contractor shall provide sufficient and adequate lighting to the satisfaction of the Engineer or his Representative and shall supply the necessary manpower for satisfactory continuation of the work after normal hours.

15. STORAGE & HANDLING FACILITIES

The Contractor shall make his own arrangements for providing the necessary space for the storage of plant, equipment and materials and for Contractor's temporary office, in and around the site of works, during the currency of the Contract.

16. PRODUCT DATA

Manufacture's standard schematic drawings shall be modified or deleted to indicate only information which is applicable to the project. Such standard information shall be supplemented to provide all additional applicable information.

Manufacturer's catalogue sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive literature shall be clearly marked to identify pertinent materials products or models. Dimensions and required clearances shall be indicated. Shop performance characteristics and capacities shall be noted.

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17. PRODUCT QUALITY AND HANDLING

Suppliers of local and foreign products and installations specified shall have been regularly engaged in the business of manufacturing, fabricating, installing and / or servicing work required for a period not less than 5 years. In addition, the Engineer may request as appropriate a:

- list of similiar installations that describes project, scope and date of completion.
- complete literature, performance data, and technical data.
- list of services record within Pakistan.
- location of service office from which this installation could be maintained.

For the actual fabrication, installation and testingof the specified work use only thoroughly trained and experienced workmen completely familiar with the items required and with the manufacturers recommended methods of installation. In acceptance or rejection, no allowance will be made for the lack of skill on the part of workmen.

Use all means necessary to protect materials before, during and after installation and to protect the installed work and materials of all other trades. In the event of damage, immediately make all repairs and replacement necessary for approval and at no additional cost to the Employer.

18. INSPECTION & TESTS REPORTS

All equipment and materials furnished under these specifications and all work performed in connection therewith will be subject to rigid inspection by the Engineer or the Engineer's Representative. Acceptance of equipment and material or the waiving off inspection thereof shall in no way relieve the Contractor of his responsibility for meeting the requirements of the Contract.

The Contractor shall furnish the Engineer with certified true copies of test reports of all materials used in the manufacture and fabrication of all equipment and material including metal work, steel pipes, fire bricks etc. The result of these test shall be in such form as to show compliance with the applicable Specifications, standards and codes for the material used.

19. FIELD LABORATORY AND TESTING

19.1 General

The Contractor shall provide and maintain a field laboratory equipped with approved equipment to perform all the tests required by the Engineer. The quality control testing shall be performed by the Contractor's competent personnel in accordance with a site testing and quality control programme to be established by the Contractor and approved by the Engineer. The Engineer may however, require certain tests to be performed in any other laboratory designated by him.

The Contractor shall provide laboratory helpers to the Engineer for testing. The laboratory shall be run by a qualified material Engineer and Laboratory Technician to be employed by the Contractor.

The Field Laboratory, including all equipment and staff shall be placed at the disposal and direction of the Engineer during the Contract.

The Contractor shall keep a complete record of all quality tests performed on site.

All quality control and tests shall be carried out in accordance with applicable standards and codes. In addition to routine field testing, the contractor shall undertake soil studies for water storage structures etc as directed by the engineer, and furnish a report for evaluation of structural designs of hydraulic and retaining structures where applicable with no additional payment to contractor.

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19.2. Field Laboratory Equipment Requirements

The Laboratory shall be equipped with new unused and latest Equipment to perform tests as per Technical Specifications and General Conditions of Contract. Additional equipment/materials shall be supplied by the Contractor as and when required by the Engineer to perform any specified test, at no additional cost to the Employer. Necessary soil testing shall be undertaken by the contractor at onset for verification of soil strata, soil classification for preparation of soil study report and evaluation of structural design of water storage structures with no additional cost.

The laboratory shall also be equipped with new unused furniture, fittings and fixtures. If any equipment, furniture, fitting or fixture becomes unserviceable for any reason what so ever, the Contractor shall promptly replace the same as and when directed by the Engineer.

19.3. Testing Laboratory Certificates

The Engineer may accept a certificate from a commercial testing laboratory, satisfactory to him, certifying that the product has been tested within a period acceptable to the Engineer and that it conforms to the requirements of these specifications.

19.4. Method of Payment

The cost of providing running and maintenance of the laboratory, equipment, materials and staff, testing charges for materials supplied by the Employer and all other tests to be performed in any other laboratory designated by the Engineer shall be deemed to be included in the price quoted by the Contractor and no separate claim for payment on this account shall be entertained by the Engineer. Furthermore, the cost of any additional laboratory, field and shop tests required through the resubmission of samples because of failure of compliance with Specifications shall be borne by the Contractor.

In case the Contractor does not provide the specified equipment and testing facility, cost of testing plus 100 percent overheads shall be recovered from his bills.

20. SURVEYING INSTRUMENTS

20.1 General

The minimum quantity of survey equipment is stated below which shall be available with the Contractor at site of Works along with qualified Surveyors and Survey Helpers. The equipment shall be maintained throughout the Contract Period and replaced by the Contractor in case of damage or loss. The survey equipment shall be made available to the Engineer when requested. All surveying equipment shall be in good working condition.

20.2 Surveying Equipment Required

The Contractor shall provide and maintain the following surveying equipment at site.

a) Total Station with staff : 02 No.
b) Automatic Levels with tripods & staff : 02 No.
c) All other miscellaneous tools, equipment and materials required for surveying.

21. APPROVAL OF MATERIALS AND PLANT

21.1 Quality of Materials

All materials, fixtures, fittings, supplies and plant furnished under the Contract shall be new and unused, standard first grade quality and of the best workmanship and design. No inferior or low-grade materials, supplies or articles will be either approved or accepted, and all work of assembly and construction shall be done in a first-class

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and workmanlike manner. In asking for prices for materials intended for delivery to the Site and incorporation in the Works under any portion of these Specifications, the Contractor shall provide the manufacturer or supplier with complete information as may be necessary to secure compliance to this Clause and, in every case, he shall quote this Clause in full to each such manufacturer or supplier.

21.2 Submission of Samples and Data

21.2.1 The Contractor shall furnish for approval of the Engineer with reasonable promptness all samples as directed by the Engineer or specifically called for in the Specifications and in accordance with the time schedule provided in the schedule of submittals. The Engineer shall check and approve such samples with reasonable promptness only for conformance with the design concept of the Works and for compliance with the information given in the Contract Documents. All work shall be in accordance with approved samples.

21.2.2 Samples shall be furnished so as not to delay fabrication, allowing the Engineer reasonable time for consideration of the sample submitted.

21.2.3 Each sample shall be properly labeled with the name and quality of the material, manufacturer's name, name of the project, the Contractor's name and the date of submission, and the Specifications Article number to which the sample refers.

21.2.4 The manufacturer's installation directions shall be provided with each sample. The Contractor shall pay all transportation costs and deliver samples to the Engineer's office, Site or testing laboratory as directed by the Engineer.

21.2.5 Samples shall be of adequate size to permit proper evaluation of the material by the Engineer. Where variations in colour, texture, dimensions or other characteristics are to be expected, the Contractor shall submit samples showing the maximum range of variation. Materials exceeding the range of variation of the approved samples shall not be used on the Work.

21.2.6 In order to permit coordinated selection of colours and finishes, the Contractor shall deliver samples of all related items to the Engineer at one time. Samples of such materials will not be approved until all related samples have been submitted.

21.2.7 If both Shop Drawings and samples are required for the same item, the Engineer may require both to be submitted before approving either.

21.2.8 The Contractor shall erect Mock-up samples of finished items where specifically called for in the documents or as directed by the Engineer.

The Mock-up samples shall be preserved/protected by the Contractor till the end of the project or as directed by the Engineer.

21.2.9 No acceptance or approval of any Shop Drawings or sample, or any indication or request by the Engineer on any Shop Drawings shall constitute an authorization for any increase in the Contract Sum.

21.3 Inspection

All material and Plant furnished and all work performed under this Contract will be subject to inspection by the Engineer at all times and in all states of completion both off-Site and on-Site. The Contractor shall furnish promptly without additional charge, all facilities, labour and materials reasonably needed for performing such inspection and testing as may be required by the Engineer.

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21.4 Approved Sample at Site

The Contractor shall, at all times, keep on the Site approved samples. All such samples shall be made available to the Engineer as and when required.

22. BAR BENDING SCHEDULE

Bar bending (reinforcement bars) schedule of all structural drawings shall be prepared by the Contractor and submitted in triplicate to the Engineer for approval.

23. DRAWINGS

23.1 Bid Drawings

Bid Drawings issued with the Bid Documents, called the Bid Drawings, show scope of the work to be performed by the Contractor. The Drawings are generally in sufficient detail so as to be used as a basis for construction, fabrication and for placing orders for materials subject to corrections based on the future issue of supplementary Drawings as provided under Sub-Clause 12.2 hereof.

23.2 Construction Drawings, Supplementary Drawings

Upon commencement of the works and furnishing by the Contractor stake out survey plan& natural ground levels, the Engineer shall issue Construction Drawings to the Contractor. The Construction drawings may be issued in stages, where necessary.

The Engineer shall have authority to issue to the Contractor, from time to time, such supplementary Drawings and instructions as shall be necessary for the purpose of the proper and adequate execution and completion of the Works and the remedying of any defects therein. The Contractor shall follow these drawings.

When additional information regarding the geological formations or other conditions becomes available, the Engineer may find it desirable to change dimensions or design of one or more of the features of the Works to conform to the newly disclosed conditions. The Engineer reserves the right to make such reasonable changes, and the Contractor's operations shall be conducted so as to accommodate any such reasonable changes in the Works.

23.3 Definition of Term Drawings

The term Drawings as used in the Specifications means the Drawings referred in Clauses 12.1 and 12.2 above.

23.4 Checking of Drawings

The Contractor shall check all Drawings carefully as soon as practicable after receipt thereof, and shall promptly notify the Engineer of any errors discovered.

23.5 Copies of Drawings

Drawings will be issued to the Contractor as described below:

23.5.1 Construction Drawings

Two (2) sets of the Construction Drawings will be issued to the Contractor as stated above, free of charge. Additional sets will be provided at cost of reproduction upon written request of the Contractor.

23.5.2 Supplementary Drawings

Two (2) prints of each supplementary Drawing will be issued to the Contractor free of charge. Additional sets will be provided at cost of reproduction upon written request of the Contractor.

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23.6 Drawings to Be Furnished by the Contractor

The Contractor shall submit to the Engineer for review, such drawings as are required under the Contract, sufficiently in advance of the work intended to be executed.

23.6.1 Reinforcement Drawings

Reinforcement placement drawings and bar bending schedules (to be provided by the Contractor as per clause 11 above) of all RCC work shall be prepared by the Contractor and submitted in triplicate to the Engineer for approval, sufficiently in advance of the works in which they are intended to be used.

23.6.2 Shop Drawings

(a) The Contractor shall submit to the Engineer for review three (3) copies of all drawings to be issued for setting out, fabrication, supply order and construction; based on data, requirements, dimensions, details, codes, standards and design provided in the drawings issued by the Engineer. Such drawings shall be submitted at least twenty-eight (28) days before they are required for use. If within a period of fourteen (14) days after submission, the Engineer notifies the Contractor that a drawing fails to comply with the relevant requirement of the Contract, it shall be rectified and resubmitted for approval at the Contractor's cost. Fabrication or construction shall not commence on any part of the Works until the shop drawings or construction drawings for that part of the Works have been approved by the Engineer.

The Works shall be executed in accordance with the drawings as approved by the Engineer. If the Contractor wishes to modify any approved drawings, he shall immediately notify the Engineer and submit revised drawings for approval. If the Engineer instructs that further drawings are necessary for executing the Works, the Contractor shall prepare such drawings and submit them for approval.

The Contractor at his cost shall rectify errors, omission, ambiguities, inadequacies and other defects.

Approval by the Engineer, in accordance with this paragraph, shall not relieve the Contractor of any of his responsibilities under the Contract.

(b) The shop drawings shall be properly identified indicating the part of the Works, the name of the contractor / supplier etc., the date of preparation and the dates of all revisions. The Shop Drawings shall be complete and shall show the design dimensions, proposed materials to be used, finishes, type of shop paint and all other details in connection thereto.

(c) Where adjoining work requires shop drawings, the Contractor shall prepare and submit composite shop drawings, which shall show and define the work under all affected trades. If the Contractor executes work before coordinating with other trades so as to cause interference with work of those trades, he shall make changes necessary to correct the conditions without extra cost to the Employer.

(d) No changes shall be made by the Contractor in the resubmitted shop drawings in excess of the corrections spelled out by the Engineer and in a separate note on the shop drawings.

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(e) No work in the shop shall be started and no material or plant ordered until the Engineer has approved the shop drawings. It shall be the responsibility of the Contractor to submit the shop drawings on a schedule that allows reasonable time for checking and approval and subsequent fabrication. Failure to submit shop drawings in ample time for checking, correcting, and rechecking will not justify extension of time for completion of the Works.

(f) The Contractor shall also check and verify all site measurements whenever requested by other Specialist Contractors or by other Sub-Contractors to enable them to prepare their own shop drawings and pass on the information with sufficient promptness, so as not to delay the work in any way. A copy of all such information passed on shall be given to the Engineer.

23.6.3 As-Built Drawings

The Contractor shall, at all times, keep on Site a separate set of prints of all drawings on which all significant changes between the work shown on the Drawings and that which is actually constructed, shall be noted neatly, accurately and promptly as the work progresses. The Subcontractor(s) for plumbing, mechanical and electrical shall, at all times, keep on Site, a separate set of prints of the drawings (showing their parts of the Works) on which all significant changes between the work shown on the Drawings and that which is actually constructed, shall be noted neatly, accurately and promptly as the work progresses. Such drawings shall show the exact physical location and configuration of the works as actually installed.

The Contractor shall, within fourteen (14) days of issuance of Taking-Over Certificate for whole of the Works, furnish to the Engineer for his approval two (2) copies of such marked up drawings. One (1) copy of each of the marked up drawings approved by the Engineer shall be returned to the Contractor by the Engineer and these shall be used for the preparation of the As - Built Drawings.

The Contractor shall furnish to the Engineer six (6) complete sets and one reproducible copy of all As -Built Drawings within twenty eight (28) days of receipt of drawings stated above, from the Engineer.

24. PROTECTION OF THE WORKS

The Contractor shall whenever necessary cover up and protect the works from weather and damage by his own or other workmen performing subsequent operation. The Contractor shall provide all necessary dustsheets, barriers and guard rails and clear away the same at completion.

25. RESTORATION AND CLEANING

Upon completion of the works the Contractor shall restore all items covered by the Contract to the satisfaction of the Engineer.

The Contractor shall do regular cleaning and clear away all rubbish and excess materials that may accumulate from time to time on completion and before handing over. Upon completion of the works he shall obliterate all signs of temporary construction facilities such as work areas, structures, foundations of temporary structures, stock piles of excess or waste materials, or any other vestiges of construction, as directed by the Engineer. All buildings shall be cleaned; floors and paving scrubbed and the works and site shall be left in a clean and satisfactory state for immediate use and occupation. Care shall be taken not to use any cleaning materials which may cause damage to the surface to be cleaned.

The Contractor shall also take all necessary precautions to keep the works and site free from vermin during construction and he shall leave the works vermin free on completion. Application of pest control agents shall not commence until the specific product, name, method and extent of application have been submitted to and approved of by the Engineer.

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26. SITE OFFICE AND TEMPORARY FACILITIES TO BE PROVIDED BY THE CONTRACTOR

26.1 Contractor's Office, Facilities Etc.

The Contractor shall establish and maintain a Site office. The Contractor shall provide all facilities in connection with the execution, completion, of the Works, remedying defects therein and maintenance of the utilities services. The facilities shall not be limited to the Contractor's Site Office, labour camps, work yard and storage areas, temporary water supply, waste water disposal, temporary electricity, medical unit, temporary roads, fire protection and firefighting equipment etc. The Contractor shall be solely responsible for arranging all utilities and the Contractor shall setup, maintain and operate an architectural and engineering facility at site with adequate number of technical and support staff as well as equipment required for particular nature of job covered under the Contract to prepare drawings/shop drawings for approval of the Engineer.

The Contractor shall arrange his labour camp, work yard, storage area and site office.

26.2 Temporary Roads

The Contractor shall prepare and maintain such temporary roads as may be necessary, from the site to the nearest road and also within the plot. Such roads shall be positioned strictly in accordance with the Engineer's instructions and the Contractor shall reduce or control any dust nuisance by regularly spraying water and compaction as directed.

26.3 Temporary Services

26.3.1 Temporary Water Supply

The Contractor shall supply in sufficient quantity all necessary potable and other water for construction purposes for all trades at points within a reasonable distance of any building being constructed. The Contractor shall make arrangements and pay charges for water service installation, maintenance and removal thereof, and pay the costs of water for all trades.

At completion of the work, the temporary water services equipment and piping shall be removed by the Contractor at his own expense.

26.3.2 Temporary Electricity

The Contractor shall make all the necessary arrangements for a temporary electricity service, pay all expense in connection with the installation, operation and removal thereof and pay the costs of electricity consumed by all trades. The Contractor shall arrange and furnish an Electric Power Generating set at site and maintain the generating set in perfect working condition through-out the duration of Contract. The generating power of the set shall be sufficient to operate all plant and equipment as well as the camps and offices of the Contractor and the offices of the Engineer/Employer, during construction at site. Should the set fail to meet the required demand at site or fail to function or operate, the Contractor shall immediately replace the same with other generating set/sets to the satisfaction of the Employer as well as the Engineer.

A temporary lighting system shall be furnished, installed and maintained by the Contractor as required to satisfy the minimum requirements for safety and security and to the satisfaction of the Engineer.

When the permanent electrical power and lighting systems are in an operating condition, they may be used for temporary power and lighting for construction purposes provided that the Contractor obtains the written approval of the Engineer and the Employer and assumes full responsibility for the entire power

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and lighting system and pays all costs for operation and maintenance of the system.

At completion of construction work, or at such time as the Contractor makes use of permanent electrical equipment and devices, temporary electricity services shall be removed by the Contractor at his own expense.

26.3.3 Waste Disposal

The Contractor shall make such temporary provisions as may be required in order to dispose of any chemicals, fuels, oils, grease, bituminous materials, waste and soil waste and the like without causing pollution to either the site or the environment. Disposal of any materials, wastes, effluent, garbage, oil, grease, chemicals and the like shall be in areas specified by the concerned local authority proposed by the Contractor and subject to the approval of the Engineer. If any waste material is dumped in unauthorized areas the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated ground shall be excavated, disposed off as directed by the Engineer and replaced with suitable fill material compacted and finished with topsoil all at the expense of the Contractor.

26.3.4 Fire Protection

The Contractor shall provide and maintain adequate fire protection in the form of barrels of water with buckets, fire bucket tanks, fire extinguisher, or other effective means ready for instant use, distributed around the project and in and about temporary inflammable structures during construction of the works.

Gasoline and other flammable liquids shall be stored in and dispensed from safety containers approved by the Engineer and storage shall not be within building.

Torch-cutting and welding operations performed by the Contractor shall have the approval of the Engineer before such work is started and a chemical extinguisher is to be available at the location where such work is in progress.

The Contractor shall follow the instructions and specifications of the Civil Defense Department or any other local department concerned with such activities.

27 CONSTRUCTION SCHEDULE

A Construction schedule shall be maintained in accordance with the provisions of the General Conditions of Contract.

The schedule shall be accompanied with sufficient data and information including all necessary particulars of constructional plant, equipment machinery, temporary Works, arrival of plant, equipment at site and their installation, method of operation, work forces employed, etc., for an activities of the Works.

Should the Engineer consider any alteration or addition in the programme and time schedule, the Contractor shall conform thereto without any cost to the Employer.

Whenever necessary and wherever the progress of the actual work shows departure, the programme and time schedule shall be undated and submitted to the Engineer for his approval.

28 SUBMISSION REQUIREMENTS

28.1 Schedule submission at least sixty days before the dates when reviewed submittals will be needed.

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28.2 Submit Shop Drawings as per provision given in Sub-Clause 19.5 (a) and number of copies of Product Data which the Contractor requires for distribution plus four copies which will be retained by the Engineer.

28.3 Submit three samples unless otherwise specified.

28.4 Accompany submittals with transmittal letter, in duplicate, containing:

- Date
- Project title and number
- Contractor's name and address
- The number of each Shop Drawing, Product Data and the Sample submitted.
- Notification of deviations from Contract Documents.
- Other pertinent data.

29 RESUBMISSION REQUIREMENTS

Shop Drawings:

- Revise initial drawings as required and resubmit as specified for initial submittal.
- Indicate on drawings any changes which have been made by the Engineer.
- Product Data and Samples: Submit new data and samples as required for initial submittal.

30 MONTHLY PROGRESS REPORT AND PHTOGRAPHS

30.1 During the continuance of the Contract, the Contractor shall submit monthly progress on forms as approved by the Engineer.
Such monthly reports shall show the actual progress completed as of date of the report plotted against the schedule as given by the Contractor at the start of work and shall be broken down so as to indicate status of all activities associated with mobilization design, material procurement, manufacture, surveys works, tests with regard to the agreed contract programme.

30.2 The Employer and the Engineer reserve the right to coordinate the schedules of this Contractor and other Contractors working at the Site, and to adjust and/or change any and all such schedules as required during the course of construction in order to achieve a coordinated project in harmony with the Employer's completion date.

30.3 Commencing after the first month of construction, and continuing every month until completion, the Contractor shall take and submit photographs to the Engineer's Representative, to show progress of his work and completion of each structure or major feature.

31 CONTRACTOR TO NOTIFY DELAYS ETC.

Any delay which will affect the completion of Works shall be notified to the Contractor who shall state the action he is taking for effective completion of the Contract programme.

The Contractor shall submit a report in respect of the various sections of the Works, the equipment in use or held in readiness, a return of labour and supervisory staff, and details of any matters arising which may generally affect the progress of the work.

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The Contractor shall give a summary of the detailed progress report giving the position with regard to the agreed Contract programme.

The progress reports shall be set out in a format to the approval of the Engineer, and forwarded promptly so that on receipt the information contained therein is not more than 21 days out of date.

If during execution of the Contract, the Employer considers the progress position of any section of the work to be unsatisfactory, or for any other reason relating to the Contract, he will be at liberty to convene a meeting and the Contractor's Representatives are to attend such meeting.

The Contractor's Site Office shall prepare and submit 6 copies of a weekly progress report to the Employer and Engineer's Site Office. This report shall summarize site activities and record and details where difficulties in maintaining the agreed programme are being experienced or are likely to cause subsequent delay.

The Contractor's Site Office shall also prepare and submit to the Engineer's Site Office 2 copies of Daily Activity Report summarizing the main activities to be undertaken each day, noting special activities such a tests, alignment checks, etc. The Contractor shall be responsible for expediting the delivery of all material and equipment to be provided by him and his subcontractors.

32 PHOTOGRAPHS

As soon as work commences on Site, the Contractor shall provide at least 10 to 12 photographs (along with soft copy) of the works from positions to be selected by the Engineer. Each photographic print shall not be less than 297mm x 210mm and shall bear a printed description, a serial number and the date when taken.

The negatives/soft copy of all photographs shall be held at the Contractor's Site Office, numbered and handed over to the Employer at the completion of the Contract.

33 SIGN BOARD

The Contractor shall erect and maintain at the Site in a location to be approved by the Engineer two (2) Sign Boards of dimensions approved by the Engineer. The Sign Boards shall be made of metal. It shall be mounted on steel posts securely anchored and braced. The Contractor shall paint on the Sign Boards, the name of the Works, and the names of the Employer, Engineer and the Contractor both in English and Urdu Language.

34 SITE OFFICE FOR EMPLOYER, ENGINEER/ENGINEER'S STAFF

The Contractor shall construct, provide, furnish and maintain for Employer/Engineer, following site offices as per design provided in these documents along with stabilized access road:

Employer office:
One separate room for Project Director with attach bath facility
One separate room for Project Engineer with attach bath facility
One room for Employer's staff with attach bath facility
Conference Room
Kitchen

The Contractor shall provide office furniture including chairs, tables, sofas, air-conditioners, refrigerator, UPS and stabilizers and any other necessary feels appropriate to Contractor.

The Contractor shall provide 02 laptops for "The Employer" at site, having specifications, HP OmniBook Ultra Flip 14 FH0033 Core Ultra 9 Series 2 288V 32GB RAM 2TB SSD X360 Touch Windows 11, Internet devices (02 Nos.) Printers (01 Nos.), 01 Photocopy machine (RICON AFICIO MP 2852), one scanner, 02 no latest I-Phone Mobile Brand latest model for capturing site activity and all stationery items.

Engineer's office:
Two rooms with attach baths for the Engineer and Engineer's staff
Kitchen

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Display room for equipment / samples etc.

The Contractor shall provide office furniture including chairs, tables, sofas, air-conditioners, refrigerator, UPS and stablizers and any other necessary services deemed appropriate for site office.

The Contractor shall provide for The Engineer representative a Loptop of Z-Book series with latest specifications, a Desktop Computer (01 Nos.), Internet Devices (01 No.), Printers A3 & A4 (01 each), 02 no latest Samsung Mobile Brand New latest model for capturing site activity, one scanner and all stationery items etc.

Internet Services for Employer and Engineer office each.

Executive lunch for Employer/ Engineers Staff –Approximately 15 persons

The site offices shall be connected to the electrical system, potable water supply system and sewage disposal system.

The Contractor shall provide replacement of the equipment(s), if any of the above mentioned equipment(s) is temporarily or permanently rendered unserviceable for any reason(s) or declared to be beyond repair by the Employer / Engineer/Engineer's staff at no additional cost to the Employer.

The said offices shall be provided by the Contractor within twenty eight (28) days of the receipt by the Contractor of Engineer's Notice to Commence or twenty one (21) days of the payment of the first half of the Mobilization Advance, whichever earlier.

The site offices shall be maintained by the Contractor up to a period of three hundred sixty four (364) days after the Issuance of Taking Over Certificate (DLP Period) by the Engineer.

The site offices along with all fittings, fixtures and gadgets shall become property of the Employer after the completion of the project and shall be handed over to the Employer along with list of all items given for the use of Engineer. The site office shall be removed /dismantled if directed by the Engineer/Employer. In such case, the area shall be developed in accordance with the drawings or to its natural state and as per the instructions of the Engineer.

No payment shall be made to the Contractor for the works involved under this Sub-Clause.

35 TRANSPORT FOR THE EMPLOYER / ENGINEER

The Contractor shall provide, operate and maintain 01No 1300CC brand new Toyota Yaris automatic vehicle along with driver and fuel card of 350 liter per month for project Director staff, 01 No. (1000 CC) brand new latest model air-conditioned Suzuki Cultus automatic along with driver and fuel card of 250 liters each per month for Project Engineers/AD and 02 Nos. brand new Motor Cycle 125CC for site Staff along with fuel card of 75 liters each per month to meet the transportation needs in connection with the project.

The Contractor shall provide, operate and maintain 01No 1300CC brand new Toyota Yaris automatic vehicle along with driver and fuel card of 350 liter per month for "Engineer Representative", 01 No. (1000 CC) brand new latest model air-conditioned Suzuki Cultus manual/auto along with driver and fuel card of 250 liters each per month for "Resident Engineer and staff", and also 01 No. brand new Motor Cycle 125CC for site Staff along with fuel card of 75 liters each per month to meet the transportation needs in connection with the project.

The Contractor shall furnish supply and provide, as may be necessary without specific direction of the Engineer / Engineer's staff, all fuels, lubricants, tyres and other supplies, all maintenance, repairs, comprehensive insurance cover and running costs and suitability qualified driver at all times and will provide a substitute vehicle in case of any break down.

The Contractor shall provide replacement vehicle(s), if the vehicle is temporarily or permanently rendered unserviceable for any reason(s) or declared to be beyond repair by the Employer/ Employer's representative at no additional cost to the Employer.

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The Contractor shall maintain the vehicles till issuance of Defects Liability Certificate by The Engineer.

No separate payment shall be made to the Contractor for the facilities involved under this clause. The cost thereof shall be deemed to have been included in the price quoted by the Contractor for the works. The vehicles provided by the contractor shall become property of the Client immediately after issuance to concerned staff.

An amount of Rs. 200,000/- per car and Rs. 30,000/- per motor cycle per month will be deducted if the cars or motorcycle are not delivered right after the commencement of works.

36 COORDINATION OF WORK AT SITE

The Contractor shall take cognizance that during the execution of the project, other Contractor will be working concurrently on this site.

All works of his responsibility shall be coordinated by the Contractor so as to give the necessary facilities to other Contractor or their workman or any other employ, who execute or supervise any work on the site.

The Contractor shall ensure that the necessary safety precaution will be observed and interferences shall be avoided specially for the works executed side by side by different Contractors.

Due consideration must be given to permit access to sections of the work as required by other Contractors for the extension of their works. With a view to coordinate the works, the Engineer may from time to time direct the order of the works to be carried out.

No payment shall be made to the Contractor for the works involved under this sub clause.

37 SITE FACILITIES TO BE PROVIDED BY THE CONTRACTOR

37.6.1 General

Without prejudice to the generality of the various clauses of the Contract, particular attention is drawn to the obligation of the Contractor to make his own arrangement at his own expense for the following.

37.6.2 Labour Camps and Staff Residences

The Contractor shall provide, operate and maintain labour camps and staff residences and are required for the proper and efficient progress of the work to house his own employees. For the purposes of operation and maintenance of the Camps and Residences, the Contractor shall comply with the rules of Pakistan Labour Camp Rules 1960 and all other applicable provisions of the Pakistan Labour Laws.

37.6.3 Administrative and Field Office

The Contractor shall provide, operate and maintain administrative and field offices required for his staff and would be responsible for Operation and Maintenance, furniture, equipment, appliances, janitor services and security of the same.

37.6.4 Work yards and Storage Areas

The Contractor shall provide, operate and maintain all sheds, fencing, foundations and all above ground structures required to store material or equipment brought on to the site by him. The Contractor shall be responsible for the security of his entire camps, residence, site and field offices work yard and storage area.

37.6.5 Water Supply, Sewerage System and Electricity

The Contractor shall make his own arrangement, at his own expense for provision, operation and maintenance of electric supply, reasonable supplies of [illegible] potable water and sewerage system at the site of works and his labour camps, staff

residences and offices. The Contractor shall pay all fees, and charges (including bills) of whatsoever nature to the concerned departments (if any) in order to procure connections of the above facilities and thereafter using these facilities.

37.6.6 Medical Care

The Contractor shall arrange provision of adequate medical facilities for his employees.

Adequately equipped and properly staffed first aid stations or dispensaries shall be provided by the Contractor at camps and other strategic locations, to administer first aid treatment at all times free of charge to all persons on the Site, including personnel of the Engineer and the Employer. The nature, number and location of facilities furnished and the Contractor's staff for administering first-aid treatment shall meet the requirements of the Health Services of the Government of Pakistan and of Section III of the Manual "Safety Requirements for Construction by Contract", published by the Employer, and shall be subject to approval by the Engineer.

37.6.7 Other Facilities

The Contractor shall also be responsible for providing at his own cost other facilities for his own staff and labour such as educational, recreational, transport, telephone and catering if required.

38. CONSTRUCTION PROCEDURES

The Contractor shall advise the Engineer of proposed construction procedures in accordance with the General Conditions of Contract.

If the Engineer shall see that the work progress is slow in such a way that the work will not be completed in the time specified, then he shall order the Contractor to work overtime or in more shifts and the Contractor shall obey these orders without any additional payments and without any objections or request for compensation.

39. NOTIFICATION TO ENGINEER

The Engineer shall be notified daily in writing of the nature and location of the Works the Contractor intends to perform the next day so as to enable necessary inspection and measurement to be carried out. The Engineer may, if necessary, direct that longer notice be given of certain operations.

40. NIGHT WORK

When work is done at night the Contractor shall maintain from sunset to sunrise such lights on or about his work and plant as the Engineer may deem necessary for the proper observations of the work and the efficient execution thereof.

41. WEATHER

No work is to be undertaken when, in the opinion of the Engineer, the weather is so unsuitable that proper protection of the work cannot be ensured.

42. CO-ORDINATION WITH OTHER CONTRACTORS

It shall be the responsibility of the Contractor to keep-up good relations with other Contractors employed on site by the Employer. The Contractor shall cooperate and coordinate his work with that of the other Contractors working at the Site, to whatever extent may be necessary to complete the Project in accordance with the approved programme of the Works and in accordance with the Engineer's Instructions. Should a disagreement or dispute arise between the Contractor and other contractors, the same shall be referred without delay to the Engineer for his decision. Upon such decision, the Contractor shall proceed with the work in accordance therewith. In case the access to the works of other contractors is through the Site area of the Contractor, the Contractor shall coordinate with and permit all reasonable access to other Contractors.

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43. ACCIDENT PREVENTION, SAFETY MEASURES AND PROTECTIVE EQUIPMENT

The Contractor shall comply and enforce compliance by all his sub- contractors with the highest standards of safety and accident prevention in accordance with international standards and in compliance with all applicable laws, ordinances and statutory provisions.

All requisite barriers, fences, warning signs, lights and other safety precautions as required for the protection of persons and property on or adjacent to the site shall be provided at the Contractor's cost.

All false work, scaffolding and handrails shall be well constructed and secured at all times. Where overhead work is being carried out, warning signs shall be installed at ground level clearly warning of the overhead work.

All warning signs shall be in two languages, English and Urdu, and shall at all times be maintained in a clean and legible condition, to the satisfaction of the Engineer.

Trash shall be removed at frequent intervals to the satisfaction of the Engineer.

Netting shall be provided at all levels where work is in progress, all around the building.

44. SETTING OUT OF WORK AND SURVEY

44.1 Reference Points, Lines

The Contractor shall establish benchmarks and / or reference line at the Site in accordance with the instructions of the Engineer. The Contractor shall set out its work from these benchmarks and lines. The Contractor shall supply plant, equipment, materials and labour for checking if required of the survey control by the Engineer. Slope stakes will be set by the Contractor before commencement of excavation and will be re-established as required during progress of work using established bench-marks and reference points.

44.2 Verification

The Engineer may make checks as the work progress to verify lines and grades established by the Contractor and to determine the conformance of the work as it progresses with the requirements of the Drawings and Specifications. Such checking by the Engineer shall not relieve the Contractor of his responsibility to perform all work in accordance with the Drawings and Specifications and the lines and grades given therein.

Based upon the basic control, the Contractor shall provide his own primary control points, as needed for the Works, and shall preserve and maintain them until otherwise authorized.

The Contractor shall be responsible for maintaining all survey markers/monuments, and property corners. If any markers/monuments are destroyed by the Contractor, the Contractor shall arrange, at his own cost, to retrace and replace them to the entire satisfaction of the Engineer. If a monument cannot be replaced in its original position, the Contractor shall install a witness corner. The Contractor shall complete and file monument reference cards on all monuments as per instructions of the Engineer.

The Contractor shall provide experienced construction surveyors with adequate experience in the construction surveys similar in nature as required by this contract.

Based upon established basic control monuments the Contractor shall establish all lines and grades necessary to control the Works, and shall be responsible for all measurements that may be required for execution of the Works to the tolerance prescribed below.

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The Contractor shall perform such surveys and computations as are necessary to determine quantities of work performed or placed during each progress payment period, and shall also perform all surveys necessary for the Engineer to determine final quantities of work in place. The Engineer will determine final quantities based on original ground levels determined by the Contractor and agreed by the Engineer.

The Contractor shall notify the Engineer at least 24 hours before performing a quantity survey and, unless specifically waived, quantity surveys shall be performed in the presence of an authorized representative of the Engineer.

Degree of accuracy for the survey works shall satisfy the following specified tolerances:

(a) Structure points shall be set within 0.01 foot accuracy from point to point, except where tighter tolerances are required.

(b) Cross-section points shall be located within 0.10 foot, horizontally and 0.01 foot vertically.

(c) Permissible closing error for a levelling line meant for establishing Temporary Bench Mark (TBMs) shall not exceed $0.045 \times \sqrt{M}$ foot, where M is in miles. The permissible closing error shall be duly adjusted.

The Contractor shall provide all materials, equipment and labour required for surveying work, including, but not limited to, instruments, stakes, spikes, steel pins, templates, platforms, and tools, and except as required to be incorporated in the work or left in place, all such materials and equipment, shall remain the property of the Contractor. Surveying instruments shall be in perfect working condition and shall be subject to rigid inspection for proper operation at least after every two weeks of use. Defective instruments shall be promptly replaced or repaired and adjusted to the satisfaction of the Engineer.

Survey data shall be recorded in accordance with recognized professional surveying standards. Original field notes, computations, and other surveying data shall be recorded in the Contractor furnished field books. Notes or data not in accordance with standard formats will be rejected. Illegible notes or data, or use of erasures on any page of a field book will be considered sufficient cause for rejection of part or the entire field book. Copied notes or data will not be permitted; therefore, rejection of part or all of a field book may necessitate re-surveying. Corrections by ruling or lining out errors will be satisfactory.

45. ENVIRONMENTAL PROTECTION

The Contractor shall exercise care to protect the natural landscape and shall conduct his construction operations so as to prevent any unnecessary destruction, scarring or defacing of the natural surroundings in the vicinity of works. Except where clearing is required for the Permanent works, approved construction roads and the Temporary Works, and for excavation operations, all trees and native vegetation shall be preserved and shall be protected from damage which may be caused by the Contractor's construction operations and equipment. On completion of the works, all work areas shall be smoothed and graded in a manner to confirm to the natural appearance of the landscape. Where unnecessary destruction, scarring, damage or defacing may occur as a result of the Contractor's operations, it shall be repaired, replanted, or otherwise corrected as directed by the Engineer at no additional cost to the Employer.

46. PAYMENT OF WORK

No payment shall be made for the works involved within the scope of this section of specification unless otherwise specifically stated in the Bills of Quantities or herein.

The cost thereof shall be deemed to have been included in the total price quoted by the Contractor.

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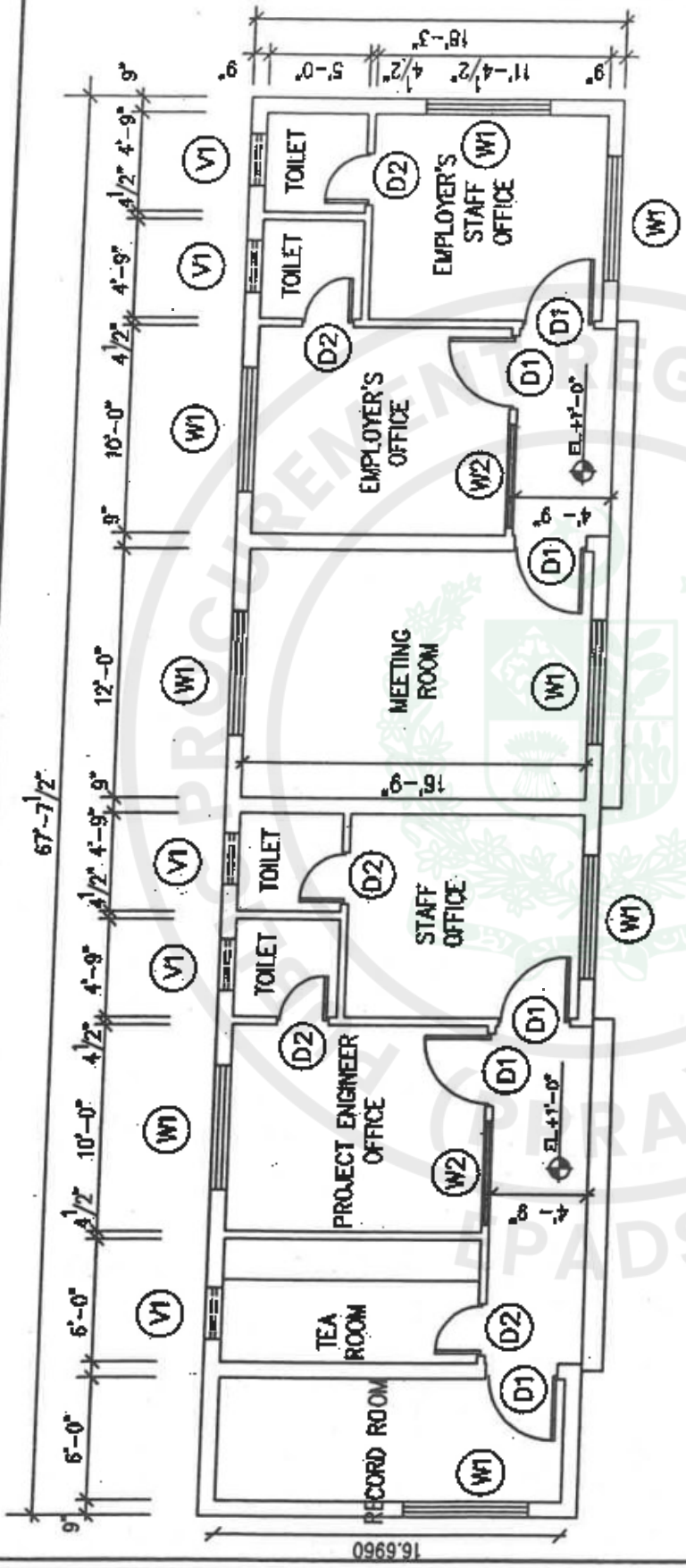
SITE OFFICE FOR EMPLOYER/ENGINEER/ENGINEER'S STAFF

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

ARCHITECTURAL DETAILS



SCHEDULE OF DOORS & WINDOWS

D1	3'-6"x 7'-0"	DEODAR WOOD FRAME & FLUSH SHUTTERS WITH COMMERCIAL PLY (PAINTED).
D2	2'-6"x 7'-0"	
W1	6'-0"x 4'-0"	STEEL Z SECTION WINDOWS & VENTILATORS WITH FIXED FLY PROOFING (PAINTED) & 5mm THICK PLAIN OR FROSTED (IN TOILET AREAS)
W2	5'-0"x 4'-0"	
V1	2'-6"x 2'-0"	

EMPLOYER'S SITE OFFICE

NOTES

1. ROOF SYSTEM SHALL BE OF PRE CAST CONCRETE ROOFING SYSTEM SLOPING TO ONE SIDE WITH A MINIMUM HEIGHT OF 11'-0" WITH THERMOPORE FALSE CEILING
2. BOTH INTERNAL & EXTERNAL SIDES OF THE WALLS SHALL BE PLASTERED WITH 1:4 C.S. MORTAR.
3. INTERNAL WALLS SHALL BE PAINTED WITH SPD WITH LIME WASH ON THE EXTERIOR.
4. CEMENT CONCRETE FLOORING SHALL BE PROVIDED IN ALL ROOMS.
5. CERAMIC TILE FLOORING WITH CERAMIC TILE DADO UPTO 5'-0" SHALL BE PROVIDED IN ALL TOILETS & TEA ROOM.
6. THE SITE OFFICE SHALL HAVE ITS 2 INDIPENDENT O/H WATER TANK OF AT LEAST 500 GALLON CAPACITY EACH.

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

FGEHA	INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1 ISLAMABAD	TITLE	SITE OFFICE
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD		SCALE N.T.S	NO.
		DATE August 2025	REV. 0

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ARCHITECTURAL DETAILS

SCHEDULE OF DOORS & WINDOWS

D1	3'-6"x 7'-0"	DEODAR WOOD FRAME & FLUSH SHUTTERS WITH COMMERCIAL PLY (PAINTED).
D2	2'-6"x 7'-0"	
W1	6'-0"x 4'-0"	STEEL Z SECTION WINDOWS & VENTILATORS WITH FIXED FLY PROOFING (PAINTED) & 5mm THICK PLAIN OR FROSTED (IN TOILET AREAS) GLASS.
W2	5'-0"x 4'-0"	
V1	2'-6"x 2'-0"	

ENGINEER'S SITE OFFICE

NOTES

1. ROOF SYSTEM SHALL BE OF PRE CAST CONCRETE ROOFING SYSTEM SLOPING TO ONE SIDE WITH A MINIMUM HEIGHT OF 11'-0" WITH THERMOPORE FALSE CEILING
2. BOTH INTERNAL & EXTERNAL SIDES OF THE WALLS SHALL BE PLASTERED WITH 1:4 C.S. MORTAR.
3. INTERNAL WALLS SHALL BE PAINTED WITH SPD WITH LIME WASH ON THE EXTERIOR.
4. CEMENT CONCRETE FLOORING SHALL BE PROVIDED IN ALL ROOMS.
5. CERAMIC TILE FLOORING WITH CERAMIC TILE DADO UPTO 5'-0" SHALL BE PROVIDED IN ALL TOILETS & TEA ROOM.
6. THE SITE OFFICE SHALL HAVE ITS 2 INDIPENDENT O/H WATER TANK OF AT LEAST 500 GALLON CAPACITY EACH.

FGEHA	INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1 ISLAMABAD	TITLE	SITE OFFICE
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD		SCALE N.T.S	NO.
		DATE August 2025	REV. 0

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY

ISLAMABAD INFRASTRCUTURE DEVELOPMENT OF SUB SECTOR G-14/1, ISLAMABAD

PART-II
TECHNICAL SPECIFICATIONS

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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

SECTION - 2100

FORMWORK

1. SCOPE
2. GENERAL
3. MATERIALS
4. DELIVERY AND STORAGE
5. WORKMANSHIP
6. MEASUREMENT & PAYMENT

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NATIONAL ENGINEERING SERVICES (PVT) LTD. ISLAMABAD

SECTION - 2100

FORMWORK

1.0 SCOPE

The work under this section of the Specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with the supply and installation of formwork for the purpose of containing concrete during placement and consolidation in the required shape and form.

2.0 GENERAL

It shall be the responsibility of the Contractor to perform the work by engaging well trained and experienced staff.

3.0 MATERIALS

The Contractor shall use the following materials for different purposes as stated below:

3.1 Timber

Form framing, sheathing and shoring.

3.2 Plywood

Form sheathing and panels.

3.3 Steel

- Heavy forms and false work
- Column and joint forms
- Permanent forms
- Welding of permanent forms

3.4 Form Ties Anchors and Hangers

For securing formwork against placing loads and pressures.

3.5 Coatings

Facilitate form removal.

3.6 Steel Joints

For formwork support.

3.7 Steel frame shoring

For formwork support.

4.0 DELIVERY AND STORAGE

4.1 Delivery

The delivery of formwork components shall be made in a manner so as not to cause damage.

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4.2 Storage

Form work should be stored, after cleaning and preparing for re-use, if used before in such a manner that access to all different component is available.

Form work component which can be affected by weathering shall be stored in appropriate building or under covers and shade.

5.0 WORKMANSHIP

5.1 Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall have sufficient rigidity to maintain specified tolerances.

Where required details and locations of special forms to be used are set out on the drawings. The Engineer shall reject any formwork in any part of the work which has been constructed with a non- approved formwork. Approval of form work by the Engineer shall be one of these conditions to be fulfilled before concreting. The Engineer shall reject any concreting which may not conform to the approved model.

5.2 Earth cuts shall not be used as forms for vertical surfaces of reinforced concrete work unless required as such or permitted by the Engineer.

5.3 Formwork shall be of timber, steel, plywood, proprietary building boards and such special materials, as may be approved by the Engineer, which give the required finish and shape to the surface of concrete. Wooden formwork shall be free from loose knots and shall be well seasoned.

5.4 The formwork shall conform to the shape, lines and dimensions as shown on the plans, and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete, and shall be sufficiently tight to prevent loss of liquid from the concrete.

The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor. Where necessary, to maintain the specified tolerances, the formwork shall be cambered to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads.

The Contractor shall establish and maintain in an undisturbed condition and until final completion and acceptance of the project, sufficient control points and bench marks to be used as references for checking upon tolerances.

5.5 Requirements for 'facing materials' are given in the Section relevant to 'Finishing of Formed Surfaces.'

5.6 Where natural plywood-form-finish, grout-cleaned-finish, smooth-rubbed-finish, scrubbed-finish, or sand-floated-finish is required, forms shall be smooth (faced with plywood, liner sheets, or prefabricated panels) and true to line, in order that the surfaces produced will require little dressing to arrive at true surfaces. Where any as-cast finish is required, no dressing shall be permitted in the finishing operation.

5.7 Where as-cast surfaces, including natural plywood- form-finish are specified, the panels of material against which concrete is cast shall be orderly in arrangement, with joints between panels planned in approved relation to openings, building corners, and other architectural features.

5.8 Where panels for as-cast surfaces are separated by recessed or otherwise emphasized joints, the structural design of the forms shall provide for locating form ties where possible, within the joints so that patches of tie holes will not fall within the panel areas.

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5.9 Forms shall not be re-used if there is any evidence of surface wear and tear or defect which would impair the quality of the surface finish. Forms shall be thoroughly cleaned and properly coated before re-use.

5.10 Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Unless otherwise specified in the Contract documents chamfer strips shall be placed in the corners of forms to produce beveled edges on permanently exposed surfaces. Interior corners on such surfaces and the edges of formed joints will not require bevelling unless required by the Contract documents.

5.11 Positive means such as wedges or jacks for accurate adjustment and for proper removal of shores and struts shall be provided and all settlement shall be monitored during concrete placing operation. Forms shall be securely braced against lateral deflections.

5.12 Where concreting of thin members is required to be carried out within formwork of considerable depth, temporary openings in the sides of the formwork shall be provided where necessary to facilitate the placing and consolidation of concrete. Small temporary openings shall also be provided at the bottom of the formwork for columns, walls and deep beams to permit the cleaning out of debris and observation immediately before concrete is deposited.

5.13 Form ties shall be constructed so that the ends or end fasteners can be removed without causing appreciable spalling at the faces of the concrete. After the ends or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than twice the diameter or twice the minimum dimension of the tie from the formed faces of concrete to be permanently exposed to view and in no case shall this distance be less than 19mm (3/4 in.) when the formed face of the concrete is not to be permanently exposed to view from ties may be cut off flush with the formed surfaces.

Through bolts may be permitted provided that they are greased to allow for easy withdrawal and the holes subsequently made good. Through bolts are not to be used on water-retaining structures.

5.14 At construction joints contact surface of the form sheathing for flush surfaces exposed to view shall overlap the hardened concrete in the previous placement by no less than 25mm (1 in.). The forms shall be held against the hardened concrete to prevent offsets or loss of mortar at the construction joint so as to maintain a true surface.

5.15 Wood forms for wall opening shall be constructed to facilitate loosening, if necessary, to counteract swelling of the forms.

5.16 Wedges used for final adjustment of the forms prior to concrete placement shall be fastened in position after the final check.

5.17 Formwork shall be so anchored to shores or to other supporting surfaces or members that upward or lateral movement of any part of the formwork system during concrete placement will not occur.

5.18 Runways or planks for moving labour and equipment shall be provided with struts or legs and shall be supported directly on the formwork or upon the structural member without resting on the reinforcing steel.

5.19 All surfaces of forms and embedded materials shall be cleaned of any accumulated mortar or grout from previous concreting and of all other foreign material before placing fresh concrete.

5.20 Forms shall be sufficiently tight to prevent leakage of grout or cement paste. Board forms having joints opened by shrinkage of the wood shall be removed and replaced. Plywood and other wood surfaces not subject to shrinkage shall be sealed against

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absorption of moisture from the concrete by either (1) a field applied, approved form oil or sealer, or (2) a factory applied non-absorptive liner. When forms are coated to prevent bond with concrete, it shall be done prior to placing of the reinforcing steel. Excess coating material shall not be allowed to stand in puddles in the forms nor allowed to come in contact with the concrete against which fresh concrete will be placed. Care shall be taken that such approved composition is kept out of contact with the reinforcement. Where as-cast finishes are required, materials, which will impart a stain to the concrete, shall not be applied to the form surfaces. Where the finished surface is required to be painted, the material applied to form surfaces shall be compatible with the type of paint to be used.

5.21 For reinforced concrete, in no circumstances shall forms be struck until the concrete attains a strength of at least twice the stress to which the concrete may be exposed at the time of striking.

The strength referred to shall be that of concrete using the same cement and aggregates, with the same proportions, and cured under conditions of temperature and moisture similar to those obtaining in the work. Where possible, the formwork should be left for longer time as it would assist the curing.

In normal circumstances (generally where temperature are above 20° C and where ordinary cement is used) forms may be struck after expiry of the following periods:

- Walls, columns and vertical 48 hours or as may sides of beams decided by the Engineer.

- Side of slab (shores of 6 days props left under)

- Beams soffits (shores or 12 days props left under)

- Removal of shores or props to slabs:

  1. Spanning upto 4 metre (13 ft.) 10 days.
  2. Spanning over 4 metre (13 ft.) 16 days.

- Removal of shores or props to beams:

  1. Spanning upto 6 metre (20 ft.) 18 days.
  2. Spanning over 6 metre (20 ft.) 25 days.

For rapid hardening cement 3/7 of the above period will be sufficient in all cases except verlical sides of slabs, beams and columns which should be retained for a minimum of 24 hours.

The number of shores or props, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slab and beams, as the case may be.

Proper allowance shall be made for the decrease in rate of hardening of concrete in cold weather and the above minimum duration must be increased when the mean daily temperature is below 20° C.

5.22 When repair of surface defects or finishing is required at an early age, forms shall be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations.

5.23 Top forms on sloping surfaces of concrete shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such slopping surfaces shall be performed at once and be followed by the specified curing.

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5.24 Wood forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete.

5.25 All formwork shall be removed without such shock or vibration as would damage the reinforced concrete. Before the top plank and struts are removed, the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened. Proper precautions shall be taken to allow for the decrease in the rate of hardening that occurs with all cement in the cold weather.

5.26 When reshoring or repropping is permitted or required, the operations shall be planned in advance and shall be subject to approval. While reshoring is underway no live loads shall be permitted on the new construction.

In no case during reshoring shall concrete in beams, slab, columns or any other structural member be subjected to combined dead and construction loads in excess of the load permitted by the Engineer for the developed concrete strength at the time of reshoring.

Reshores shall be placed as soon as practicable after stripping operations are complete but in no case later than the end of working day on which stripping occurs.

Reshores shall be tightened to carry their required loads without overstressing the construction. Reshores shall remain in place at least until tests representative of the concrete being supported have reached the strength specified in sub-clause 5.23 hereof.

5.27 Floors supporting props or shores under newly placed concrete shall have their orginal supporting props or shores left in place or shall be reshored. The reshoring system shall have a capacity sufficient to resist the anticipated loads and in all cases shall have a capacity equal to at least one half the capacity of the shoring system above. The reshores shall be located directly under a shore position above unless other locations are permitted.

The reshoring or re-propping shall extend over a sufficient number of storeys to distribute the weight of newly placed concrete, forms, and construction live loads in such a manner that the design superimposed loads of the floors supporting shores or props are not exceeded.

5.28 It is generally desirable to give forms for reinforced concrete an upward camber to ensure that the beams or slabs (specially cantilever slabs) do not have a sag when they have taken up their deflection, but this should not be done unless permitted by the Engineer.

5.29 No loads, other than man and light plant required in connection with the actual work in hand, shall be allowed on suspended floors until 28 days after concreting where ordinary Portland Cement is used and 14 days when rapid hardening Portland Cement is used.

5.30 Prior to placing concrete, all forms shall be inspected and all debris and extraneous matter removed. The form oil or release agent shall not react with concrete to affect the strength nor shall it give any colour. It shall be applied in such a manner as not to contaminate the reinforcement and other fixtures to be embedded in concrete.

5.31 Formwork for concrete pavement shall be made of steel of an approved section, with a base width of at least 200 millimeters (8 in.) and the depth shall be equal to the thickness of the pavement at the edge as shown on the plans. The forms shall be staked with steel stakes, and stakes shall be of a length approved by the Engineer. Each section of forms shall have a stake pocket at each end and at intervals of not more than 1.5 meters (5 ft.) between ends. The stake pockets shall have approved devices for locking the form to the steel stakes. Each section of forms shall be straight and free from bends and warps at all times. No section shall show a variation greater than 3millimeter in 3 meters.

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10 ft.) from a true plane surface on the top of the form, and the inside face shall not vary more than 6 millimeters (1/4 in.) from a plane surface.

Before placing forms, the underlying base shall be to the required grade, and shall be firm and compact. The forms shall have full bearing upon the foundation throughout their length and shall be placed with exactness to the required grade and alignment of the edge of the finished pavement. They shall be so supported during the entire operation of placing, tamping and finishing the pavement that they will not deviate vertically at any time more than 3 millimeters (1/8 in.) from the proper elevation.

Forms shall not be removed for at least twelve (12) hours after the concrete has been placed. Forms shall be carefully removed in a manner to avoid damage to the pavement. Under no circumstances will the use of pry bars between the forms and the pavement be permitted. Pavement, which in the opinion of the Engineer, is damaged due to the careless removal of forms shall be repaired by the Contractor, as directed by the Engineer, at the Contractor's own expense. Forms shall be thoroughly cleaned and oiled each time they are used.

When pavement is placed adjoining existing concrete pavement upon which the finishing machine will travel, any irregularities in the old pavement shall be ground down to a true, uniform surface, of sufficient width to accommodate the wheels of the finishing equipment, if necessary to obtain proper smoothness of the pavement.

6.0 MEASUREMENT AND PAYMENT

Except otherwise specified in the Bill of Quantities no payment will be made for the works involved within the scope of this section of the specifications.

The cost thereof shall be deemed to have been included in the quoted unit rate of relevant concrete items of the Bills of Quantities.

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SECTION - 2200

REINFORCEMENT

1. SCOPE
2. APPLICABLE STANDARDS
3. MATERIALS
4. COMPLIANCE WITH SPECIFICATIONS
5. DELIVERY & STORAGE
6. BAR BENDING SCHEDULES
7. FABRICATING, BENDING AND PLACING
8. MEASUREMENT & PAYMENT

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SECTION - 2200

REINFORCEMENT

1.0 SCOPE

The work under this section of specification consists of furnishing all plant, labour, equipment, appliances and materials and performing all operations in connection with the supply, transporting, cutting, bending and placing steel reinforcement, welded wire, fabric, dowels, tie-bars and assemblies in concrete structures, pavement or elsewhere, at any floor and at any height as shown in the drawings, as specified herein and as required by the site conditions or as directed by the Engineer.

2.0 APPLICABLE STANDARDS

Latest editions of the following Pakistan, British and ASTM Standards are relevant to these specifications wherever applicable.

Pakistan Standard

P.S 241	Tensile Testing of Steel.
P.S 244	Bend test for Steel
P.S 580	Rolled deformed Steel bars (intermediate grade) for concrete reinforcement.
P.S 605	Rolled deformed steel bars (hard grade) for concrete reinforcement.
P.S 606	Rolled deformed Steel bars (structural grade) for concrete reinforcement.
P.S 607	General technical delivery requirement for steel.

British Standard

B.S 4449	Carbon steel bars for reinforcement of concrete
B.S 4466	Specifications for Bending dimensions and scheduling of bars for the reinforcement of concrete.

ASTM Standard

A 185	Standard specification for welded steel wire fabric for concrete reinforcement.
A 305	Minimum requirement for the deformations of deformed steel bars for concrete reinforcement.
A 615	Standard specification for deformed and plain billet steel bars for concrete reinforcement.

ACI Codes

ACI 315	Details and Detailing of Concrete Reinforcement (ACI Publication SP-66)
ACI 318	Building Code Requirements for Reinforced Concrete.

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In addition to the above, the latest editions of other Pakistan Standards, British standards, American Concrete Institute Standards, American Society for Testing and Materials Standards and other standard as may be specified by the Engineer for Special Material and construction are also relevant.

3.0 MATERIALS

3.1 Reinforcement

3.1.1 General

Reinforcement shall be obtained only from manufacturers approved by the Engineer. Each consignment of reinforcement steel shall be accompanied by the manufacturer's certificate or shall refer to a previous certificate, if the consignment is from the same batch, showing that the reinforcement steel complies with the specified requirement. If such certificate is not made available, the Engineer may direct testing of different consignments of reinforcing steel at the Contractor's cost. Should the result of such tests show that the sample does not meet with the specifications the whole consignment shall be rejected and removed from the site at the Contractor's cost.

Reinforcement shall be free from all loose or flaky rust and mill scale or coating, and any other substance that would reduce or destroy the bond. Reduced section steel reinforcement shall not be used.

3.1.2 Reinforcing Steel

Unless otherwise specified, all plain reinforcing bars shall comply with the requirements of B.S 4449 for plain mild steel bars and shall have a minimum characteristic strength of 36,000 psi (250 MPa).

Unless otherwise specified, all deformed reinforcing bars shall comply with the requirements of ASTM A-615 for deformed hot rolled new stock billet steel bars and shall have a minimum characteristic strength of 40,000 psi (276 Mpa) and 60,000 psi (414 MPa), as shown on drawings.

3.1.3 Spacers and Supports

Spacers and supports shall be approved standard products of types best suited for the purpose.

3.1.4 Welding

The bars shall not be welded, unless prior approval of the Engineer is obtained in writing. If permitted, welding shall be done in accordance with relevant codes and standards taking all necessary precautions and safeguards. Where welding is unavoidable the Engineer may require substitution of the high strength deformed bars by plain round steel bars of lower grade, conforming to BS 4449, of equivalent strength.

4.0 COMPLIANCE WITH SPECIFICATIONS

The Contractor shall submit certificates of compliance from the manufacturer stating that the supplied reinforcement conforms to the Specifications. In addition, wherever and as directed by the Engineer, conformance of the supplied reinforcing bars with the specifications shall be demonstrated by the Contractor through laboratory tests, in accordance with the relevant standards.

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5.0 DELIVERY & STORAGE

5.1 Delivery

Steel reinforcement bars shall be kept in bundles firmly secured and tagged. Each bar or bundle of bars shall be identified by marks as per relevant BS standard.

5.2 Storage

The method of storage shall be approved by the Engineer. Reinforcing bars shall be stored in racks or platforms above the surface of ground and shall be protected free from scaling, rusting, oiling, coatings, damage, contamination and structural defects prior to placement in works. Bars of different diameters and grades of steel reinforcement shall be kept separately.

6.0 BAR BENDING SCHEDULES

The Contractor shall prepare bar bending schedules of all the reinforcing steel bars and shall obtain approval of the Engineer before proceeding with the work.

The Engineer's approval, however, will not relieve the Contractor of his responsibility in this regard.

7.0 FABRICATING, BENDING & PLACING

7.1 Reinforcement shall be accurately placed as shown in drawings and secured against displacement by using 16 gauge steel wire ties or suitable clips at intersections and supported from the formwork by using concrete, metal or plastic chains, spacers or hangers of an approved pattern. Where concrete blocks are used for ensuring the cover, they shall be made of mortar not leaner than one part of cement to two parts of sand.

Where the concrete surface will be exposed to the weather in the finished structure, the portions of all accessories in contact with the form work shall be galvanized or shall be made of plastic.

7.2 Bars used for concrete reinforcement shall be fabricated in accordance with the dimensions shown in the bar bending schedule approved by the Engineer.

7.3 The cutting tolerance for all reinforcing bars shall be 19 mm (3/4 in.).

7.4 Fabricating tolerance shall be as per ACI - 315.

7.5 Placing tolerances shall be as per ACI-318 & 317.

7.6 Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter or enough to exceed the above tolerances, the resulting arrangement of bars shall be subject to approval of Engineer.

7.7 Vertical bars in columns shall be offset at least one bar diameter at lapped splices. To ensure proper placement, templates shall be furnished for all columns dowels.

7.8 Reinforcement shall not be bent or straightened in a manner that will injure the material.

No bars shall be bent twice in the same place, nor shall they be straightened after bending.

Unless permitted, by Engineer, reinforcement shall not be bent after being partially embedded in hardened concrete.

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7.9 No splice of reinforcement shall be made except as approved by the Engineer.

7.10 Welding of reinforcement shall not be done unless permitted and approved by the Engineer.

7.11 Exposed reinforcement intended for bonding with future extensions is to be effectively protected from corrosion. Protection is also to be provided to reinforcement partly built into concrete where the exposed part is to be built into later concrete.

7.12 No concreting is to be carried out until the reinforcement has been checked and approved by the Engineer.

7.13 All detailing shall be done as per ACI standards ACI-315, ACI-318 & ACI-350R, as and where required.

7.14 Standard or actual unit weight whichever is lesser shall be used for calculation of weights.

8.0 MEASUREMENT & PAYMENT

8.1 General

Except otherwise specified herein or elsewhere in the Contract Documents no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bills of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bills of Quantities.

8.1.1 Providing and installing chairs, supports, hooks, spacers, binding wires, corrosion protection sleeves, wire cage or basket for tie bars and dowels and laps not shown on drawings including wastage and rolling margin.

8.1.2 Testing of mild steel, deformed steel, welded wire fabric, dowels, tie bars and assemblies.

8.2 Reinforcing Bars.

8.2.1 Measurement

Measurement for acceptably completed works of reinforcement shall be made by weight in metric ton according to bar bending schedules approved by the Engineer.

8.2.2 Payment

Payment will be made for acceptable measured quantity of reinforcement provided and placed in position on the basis of unit rate per metric ton quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

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SECTION - 2300

PLAIN AND REINFORCED CONCRETE

1. SCOPE
2. APPLICABLE CODES AND STANDARDS
3. SUBMITTALS
4. MATERIALS
5. MATERIAL TESTING
6. EXECUTION
7. FINISHING OF FORMED SURFACES
8. REPAIR OF DEFECTS
9. CONCRETE CONSTRUCTION TOLERANCES
10. ACCEPTANCE OF STRUCTURE
11. MEASUREMENT & PAYMENT

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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SECTION - 2300

PLAIN AND REINFORCED CONCRETE

1.0 SCOPE

The work under this section of the specification consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with the supply, manufacture, transporting, placing, consolidating, finishing and curing of plain and reinforced concrete for pavements and other structures as shown in the drawings, as specified herein and as required by the site conditions or as directed by the Engineer, for a complete job. Reinforcement does not form part of this section.

2.0 APPLICABLE CODES AND STANDARDS

The latest edition of following ACI, ASTM, Pakistan & British Standard are relevant to these specification wherever applicable:

2.1 ACI (American Concrete Institute)

- 117 Standard Specification for tolerances for concrete construction and materials.
- 201.2 Guide to durable concrete
- 211.1 Recommended Practice for Selecting Proportions for Normal and Heavy Weight Concrete.
- 214 Recommended Practice for Evaluation of Strength Test Results of Concrete.
- 301 Specifications for Structural Concrete for Buildings
- 304 Recommended Practice for Measuring, Mixing, Trans-porting, and Placing Concrete
- 305 Hot Weather Concreting
- 308 Recommended Practice for Curing Concrete
- 309 Recommended Practice for Consolidation of Concrete
- 315 Manual of Standard Practice for Detailing Reinforced Concrete Structures
- 318 Building Code Requirements for Reinforced Concrete
- 347 Recommended Practice for Concrete Formwork
- 350R Concrete Sanitary Engineering Structures
- 544.1R State-of-the-Art Report on Fiber Reinforced Concrete
- 544.2R Measurement of Properties of Fiber Reinforced Concrete
- SP-2 Manual of Concrete Inspection

SP-142 Fiber Reinforced Concrete Developments and Innovation

SP-155 Testing of Fiber Reinforced Concrete

SP-182 Structural Applications of Fiber Reinforced Concrete

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UBC Uniform Building Code

COE CRD 48-92 Method of Test for Water Permeability of Concrete; U.S Army Corps of Engineers

NACE National Association of Corrosion Engineering

- A199.1 Construction and Industrial Plywood

2.2 ASTM (American Society for Testing and Materials)

- A 185 Standard Specification for Welded Steel Wire, Fabric for Concrete Reinforcement
- A 305 Minimum Requirements for the Deformations of Deformed Steel bars for Concrete Reinforcement
- A 499 Hot-Rolled Rail Carbon Steel Bars and Shapes
- A 615 Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- A 616 Standard Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
- A 617 Standard Specification for Axle Steel Deformed and Plain Bars for Concrete Reinforcement
- A 675 Steel Bars and Bar Size Shapes, Carbon, Hot-Rolled, Special Quality, Subject to Mechanical Property Requirements
- A 615 Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- A706 Low-Alloy Steel Deformed and Pain Bars for Concrete Reinforcement
- A767 Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
- A775 Epoxy-Coated Reinforcing Steel Bars
- C 31 Making and Curing Concrete Test Specimens in the Field
- C 33 Concrete Aggregates
- C 39 Compressive Strength of Cylindrical Concrete Specimens
- C 40 Organic Impurities in sand for concrete.
- C 42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- C 78 Flexural Strength of Concrete (Using Simple Beam with Third Point Loading)
- C 87 Effect of organic impurities in fine aggregates on strength of mortar.
- C 88 Soundness of Aggregates
- C 94 Ready-Mixed Concrete
- C 109 Compressive Strength of Hydraulic Cement Mortars
- C 117 Materials Finer than No.200 Sieve in Mineral Aggregates by washing.
- C 123 Light weight pieces in aggregates

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- C 125Concrete and Concrete Aggregates
- C 127Test method for Specific Gravity and Absorption of Coarse Aggregate
- C 128Test method for Specific Gravity and Absorption of Fine Aggregate
- C 131Resistance to Degradation of small size Aggregate by Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine
- C 136Sieve or Screen Analysis of Fine and Coarse Aggregates
- C 138Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
- C 142Clay Lumps and Friable Particles in Aggregates
- C 143 Slump of Portland Cement Concrete
- C 144 Aggregate for Masonry Mortar
- C 150Portland Cement
- C 156Test Method for Water Retention of Concrete Curing Materials
- C 157Length Change of Hardened Hydraulic Cement Mortar or Concrete
- C 171Sheet Materials for Curing Concrete
- C 172Method of Sampling Fresh Mixed Concrete
- C 173Air Content of Freshly Mixed Concrete by the Volumetric Method
- C 185Air Content of Hydraulic Cement Mortar
- C 186 Heat of Hydration of Hydraulic Cement
- C 188 Density of Hydraulic Cement
- C 191Time of Setting of Hydraulic Cement by Vicat Needle
- C 217Weather resistance of Natural State
- C 227Potential Alkali Reactivity of cement - Aggregate Combination.
- C 231Air Content of Freshly Mixed Concrete by the Pressure Method
- C 260Air-Entraining Admixtures for Concrete
- C 289Potential reactivity of Aggregate
- C 293 Standard test method for Flexural Strength of Concrete (using simple beam with center Point Loading)
- C 309Liquid Membrane-Forming Compounds for Curing Concrete
- C 321Standard Test method for Bond Strength of Chemical Resistant material
- C 330Light Aggregates for Structural Concrete
- C 332Light weight aggregates for insulating concrete.
- C 348Standard Test method for Flexural strength of Hydraulic Cement Mortars

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- C 400 Requirements for water use in mixing and curing concrete

- C 494 Chemical Admixtures for Concrete

- C 535 Resistance to Abrasion of Large Size Coarse Aggregates

- C 595 Specification for Blended Hydraulic Cements

- C 596 Standard Test method for Drying, shrinkage of Mortar Containing Hydraulic Cement

- C 685 Concrete Made by Volumetric Batching and Continuous Mixing

- C 881 Epoxy-Resin-Base Bonding Systems for Concrete

- C 989 Ground Granulated Blast – Furnace Slag for use in Concrete

- C 995 Standard Test Method for Time of Flow of Fiber Reinforced Concrete Through Inverted Slump Cone

- C 1018 Standard Test Method for Flexural Toughness and First- Crack Strength of Fiber-Reinforced Concrete (Using Beam with Third-Point Loading)

- C1116 Standard specification for Fiber-Reinforced Concrete and Shotcrete)

- C 1399 Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete

- D 75 Sampling Aggregates

- D 512 Chloride Ion in Water and Waste Water

- D 516 Sulphate Ion in Water and Waste Water

- D 596 Reporting Results of Analysis of Water

- D 1190 Concrete Joint Sealer, Hot-Poured Elastic Type

- D 1411 Water-Soluble Chlorides Present as Admixes in Graded Aggregate Road Mixes

- D 1751 Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

- D 1752 Preformed sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Concrete

- D 1850 Concrete joint sealer (cold application type)

- E 11 Wire-Cloth Sieves for Testing Purposes

- E 96 Water Vapour Transmission of Materials in Sheet Form

- E 154 Materials for Use as Vapour Barriers under Concrete Slab

- E 337 Relative Humidity by Wet and Dry Bulk Psychrometer

- CALIF 217 Method of Test for Sand Equivalent

- CALIF 227 Method of Test for Evaluating Cleanness of Coarse Aggregate

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- CE CRD C 119 Method of Test for Flat and Elongated Particles in Coarse Aggregate

-CE CRD C400 Requirements for Water for Use in Mixing and Curing Concrete

- CE CRD C 513 Rubber Waterstops

- CE CRD C 572 Polyvinyl Chloride Waterstops

- CE CRD C 588 Expansive Grout

- FF MM G 650 Epoxy-Resin Grout

2.3 B.S (British Standard)

- 12 Portland cement (Ordinary & Rapid Hardening)

- 146 Portland Blast Furnace Slag Cement

- 410 Test Sieves

- 693 General Requirements for Oxy-acetylene Weld-ing

- 812 Methods for the sampling and testing of mineral aggregates, san fillers.

- 882 Coarse and fine aggregates from natural souroes.

- 1305 Batch Mixer.

- 1881 Methods of Testing Concrete

- 3148 Tests for water for making concrete.

- 4027 Sulphate Resisting Portland Cement

- 4449 Carbon Steel Bars for the Reinforcement

- 4483 Steel fabric for the reinforcement of concrete

- 8110 Structural use of concrete.

In addition, the latest editions of other Pakistan Standard, ACI, ASTM & British Standard and other Standards as may be specified by the Engineer for Special Materials and construction are also relevant.

3.0 SUBMITTALS

All submittals shall be in accordance with the schedule of submittals prepared by the Contractor and approved by the Engineer.

3.1 Proposed Mix Designs

Submit proposed designs for trial design batches for each grade of concrete along with samples of proposed material.

Submit proposed final mix designs for each grade of concrete at least 7 calendar days before the date planned for the start of concrete placement, along with samples of proposed materials which differ from those submitted previously, and reports of successful 3, 7 and 28 calendar day strength tests, for Engineer's approval.

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3.2 **Construction Procedure**

Submit to the Engineer procedures for the following:

a) Both hot and cold weather concreting procedures shall be submitted to the Engineer by Contractor regardless of the need for the immediate implementation of such not less than two weeks before beginning the work. Procedures shall include requirements for insulation, enclosures and the like. Finishing procedures and timing and duration of curing shall be described.

b) Contractor's construction procedures shall be computer word processed procedure and shall include charts and diagrams as applicable and necessary, to fully explain the subject procedures, methods and equipment operation in order to allow effective review by the Engineer, assist the Testing Agency's evaluation of the work, and to allow Contractor's personnel to perform work in full conformance to the Tender & Contract Document.

c) Protection of concrete against injury due to mechanical contact and construction operation.

d) Protection of work by other trades.

3.3 **Placement Schedule**

Submit a placement schedule for approval prior to start of concrete placement operations. Daily concrete pour schedules shall be submitted 24 hours in advance of planned pours.

3.4 **Formwork**

Submit for approval copies of manufacturer's data and installation instructions for proprietary materials including form coatings, manufactured form systems, ties and accessories.

3.5 **Certificates of Compliance**

Submit certificates of compliance covering cement types, reinforcement, grout materials, additives, epoxy-resin materials etc. The certificates of compliance shall include the material or product manufacturer's statements that supplied items conform to Specifications.

3.6 **Testing Programme**

Submit test programme for all specified requirements alongwith the testing schedule for approval of the Engineer.

3.7 **Test Reports**

Submit test reports showing the result of required tests and compliance with specified standards and codes, for approval. Test reports shall be certified by the Contractor and the Testing Agency.

3.8 **Samples**

Submit to the Engineer for acceptance prior to purchase, fabrication or delivery, samples of materials for his approval.

Substitute products materials or fixtures proposed by the Contractor shall be submitted as samples for approval. The samples shall be accompanied by detailed information about materials.

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3.9 **Shop Drawings**

a) Shop drawings shall be submitted to the Engineer for approval in accordance with the requirements of the Contract Documents and as specified herein under:

b) Shop drawings furnished for this section shall conform to the best standards of the construction industry. Shop drawings shall be prepared under the supervision of compelent engineering personnel. Prior to submittal, the Contractor shall check each shop drawing for compliance with the requirements of the Contract Documents. As evidence of conformance with this requirement, each shop drawing shall bear the seal and the self-written signature of Contractor's registered Professional Engineer.

c) Shop drawings shall include plans, elevations, sections and complete details to describe clearly, at an ample scale for all works to be provided. Drawings shall be accurately dimensioned, where applicable, and shall be noted clearly.

d) Work of Other Trades: Show in the shop drawings, and dimension thereon, holes required for passage of work of other sections through Cast-In-Place Concrete Work. Prepare and submit to the Engineer field work drawings for holes not shown in shop drawings.

e) Submit shop drawings for curved and radial concrete formwork and identify the formwork materials proposed for use.

f) Construction Joint, Expansion Joint and contraction Joint Drawings: Show all joints given in the drawings, specified herein, and required by Contractor to provide for the sequence of pourings. Submit in sufficient time to allow the orderly detailing of reinforcing steel. Reinforcement shop drawings shall be prepared in conformance with the accepted Construction Joint, Expansion Joint and contraction Joint Drawings. Measures to control cracks e.g. shrinkage strips, admixture as per relevant ACI codes shall be shown on the drawings.

g) Reinforcing Steel, including welded wire fabric (WWF), shall be detailed in strict accordance with the methods and procedures provided in "ACI Detailing Manual". Reinforcing steel drawings shall be submitted simultaneously with related shop drawings.

Prepare shop drawings which provide for reinforcement, including dowels, properly positioned in all concrete work, so that material can be properly cut, bent and placed. Form not be removed for at least twelve (12) hours after the concrete has been placed. Forms shall be carefully given in shop drawings. Reinforcing steel drawings shall show, to scale, all concrete work including pits, kerbs, trenches, pads, equipment bases, steps, slopes, radii, curves, openings, holes, blockouts and the like. Provide schedules and details showing placing sequences, bending, lengths and locations of all reinforcement.

h) Detailing: All reinforcing steel shall be detailed in strict compliance with ACI 318 and ACI 315.

3.10 **Coordination Drawings**

Submit coordinated drawings of the following:

All sleeve locations, whether round or of other shape, penetrating exterior and interior walls, pits, slabs, beams, other structural systems and pavements.

The position of all embedded items required to receive the work of other trade, including details needed to assure correct placement of both the embedded items and the reinforcing steel.

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The Contractor shall coordinate and crosscheck for accuracy, completeness and correct relationship to the work of other sections, each shop drawing prepared for the work of this section, including each shop drawing prepared by nominated subcontractors. Contractor's check shall include a verification of strict compliance with the Contract Documents and shall be performed prior to submission of each shop drawing for review by the Engineer. The Contractor shall certify the co-ordination, accuracy, and Contract compliance of each shop drawing by a written statement placed in each drawing and attested by the responsible person in charge of the work for Contractor. The personally inscribed initials of the person(s) preparing each drawing as well as the detailing agency's supervisor and chief checker shall be included in the title block or similar prominent location.

3.11 **Mill Test**

Furnish the Engineer with certified mill test report for cement and for steel reinforcement, including bars, welded wire fabric, dowels, anchors and splices for approval.

3.12 **Name of Manufacturers/Suppliers**

Submit for acceptance by the Engineer:

- Aggregates
- Ready mix concrete
- Reinforcing bars
- Welded steel wire fabric
- Concrete accessories
- Cement
- Admixture
- Joint filler
- Joint sealants
- Water stops
- Membrane curing, sealing, hardening compound
- Bonding compound
- Form oil
- Anchors

4.0 MATERIALS

4.1 Cement

4.1.1 The cement shall be fresh and of approved origin and manufacturer. It shall be one of the following as may be specified by the Engineer.

- Sulphate Resistant Portland Cement (low alkali) complying with the requirements of BS-4027 or ASTM C-150 Type V.
- Ordinary Portland Cement Type II (low alkali) complying with the requirements of BS-12 or ASTM C-150.
- Portland Blast–Furnace Slag Cement shall conform to BS-146 or to ASTM C-595. Slag shall consist of finely ground granulated iron blast–furnace slag and shall conform to ASTM C-989 Grade 80, 100, or 120.
- The proportioning of OPC and Portland Blast Furnace Slag material shall be in the ratio of 60 OPC to 40 Slag or as approved by the Engineer."

4.1.2 Unless otherwise specified, ordinary Portland Cement complying with the requirements of BS12 shall be used.

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4.1.3 The Contractor shall supply to the Engineer at fortnightly intervals, reports of tests for conformance with the relevant specified standard in respect of the samples of cement from the work-site. These tests shall be carried out in a laboratory approved by the Engineer.

4.1.4 Only one brand of each type of cement shall be used for concrete in any individual member of the structure. Cement shall be used in the sequence of receipt of shipment, unless otherwise directed.

4.1.5 There shall be sufficient cement at site to ensure that each section of work is completed without interruption.

4.1.6 Cement reclaimed from cleaning of bags or from leaky containers shall not be used.

4.1.7 The Contractor shall provide and erect (at his cost) in a suitable plain, dry, well ventilated, weather-proof and water proof shed of sufficient capacity to store the cement.

4.1.8 The cement shall be used as soon as possible after delivery and cement which the Engineer consider has become stale or unsuitable through absorption of moisture from the atmosphere or otherwise shall be rejected and removed immediately from the site at the Contractor's expense. Any cement in containers damaged so as to allow the contents to spill or permitting access of the atmosphere prior to opening of the container at the time of concrete mixing shall be rejected and removed immediately from the site at the Contractor's expense.

4.1.9 Mixing together of different types of cement shall not be permitted.

4.2 Aggregates

The sources of supply of all fine and coarse aggregates shall be subject to the approval of the Engineer.

Aggregates shall conform with ASTM C33 (including applicable ASTM Documents referenced therein) and as specified. Coarse aggregates shall be well graded from fine to coarse within the prescribed limits of this specification. Fine aggregate shall consist of natural sand, manufactured sand or combination of the two and shall be composed of clean, hard, and durable spherical or cubical particles. Coarse aggregate shall consist of crushed or uncrushed gravel, crushed stone, or a combination thereof and shall be clean, hard, uncoated particles of maximum nominal size as specified for each grade of concrete.

All fine and coarse aggregates shall be clean and free from clay, loam, silt and other deleterious matter. If required, the Engineer reserves the right to have them washed by the Contractor at no additional expense. Coarse and fine aggregates shall be delivered and stored separately at site. Aggregates shall not be stored on muddy ground or where they are likely to become dirty or contaminated. The materials shall be stock piled for a period before use for at least a day so as to drain nearly to constant moisture content. The grading of the coarse and fine aggregates shall be tested at least once for every 100tons supplied, to ensure that grading is uniform and same as that of the samples used in preliminary tests.

The sulphate content of aggregates shall not exceed 0.40 percent by weight for each individual source of coarse and fine aggregate. The chloride content of aggregates shall not exceed 0.05 percent by weight for each source of coarse and fine aggregate. The total sulphate content of concrete shall not exceed 4.0 percent by weight of the cement. The total chloride content of concrete shall not exceed 0.40 percent by weight of the cement.

Aggregates, when tested in accordance with CRD C119 shall contain not more than 8 percent by weight of thin, flat and elongated particles.

Petrographic analysis of aggregate shall be carried out initially for each source and periodically whenever directed by the Engineer.

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The specific gravities and absorption of aggregates shall be identified in accordance with ASTM C 127 and ASTM C 128.

Prior to the initial use of each source of aggregates, certified tests shall be performed on aggregates to verify compliance with these specifications and submitted for Engineer's review and approval.

Gradation of coarse aggregates for concrete shall conform to the gradations given in Table-I.

The gradation of combined coarse and fine aggregates shall be within the grading limit specified in Table-II.

The Fineness Modulus of fine aggregate (sand) shall be not less than 2.3 nor more than 3.1. In at least four out of five successive test samples, the modulus shall vary by not more than 0.20 from the moving average for the last five tests. The gradation of the coarse aggregate will be suitable if the results of four out of the last five consecutive tests comply with the gradation requirements.

Furnish certified test reports for aggregate tests listed in Table-III, Quality Tests.

4.3 **Water**

Only clean water from the sources approved by the Engineer shall be used. The Contractor shall supply sufficient water for all purposes, including mixing the concrete, curing and cleaning plant and tools. Water analysis shall be performed in accordance with ASTMD596.

4.4 **Concrete Patching Compound**

Use an approved epoxy-resin compound applied according to manufacturer's instructions. Compound shall be paintable material which produces no evidence of bleeding and which, after final set, shall not be affected by high humidity and moisture. Epoxy-resin compound shall comply with FSMM-G-650, Type 1, Grade C.

4.5 **Fibre Reinforced Concrete**

Duracrete Polypropylene Fiber or equivalent concrete reinforcing: Concrete shall be treated with Duracrete polypropylene synthetic reinforcing fibers or equivalent when indicated on the drawings or as otherwise specified by the Architect/Consultant in accordance with the fiber manufacturer's recommendations.

a. Synthetic reinforcing fibers shall be manufactured from virgin polypropylene.
b. The dosage rate shall be1.8 kg/cu.m (3.0 Lb/ Cu yd) of concrete.
c. Fiber supplier shall provide technical assistance, if required.
d. All fibers must meet or exceed the standards and specifications set forth in ACI 544, Fiber Reinforced Concrete.
e. Listed below are the minimum properties of the polypropylene fibers for use. All fibers must meet or exceed the characteristics described in ACI-544, IR, table 1.1, Fiber Reinforced Concrete.

1. Tensile Strength: 4.4 grams/denier
2. Elongation at break: 12%
3. Fiber: 100% Fibrillated / Monofilament Polypropylene (as per site requirement)
4. Lengths: 19 mm
5. Absorption: Nil
6. Specific gravity: 0.9
7. Ignition point: 593 °C
8. Melting point: 160-170 °C

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9. Heat & UV stabilization: Long term
10. Thermal conductivity: Low
11. Electrical conductivity: Low
12. Salt resistance: High
13. Acid resistance: High
14. Alkali resistance: 100% (alkali proof)

4.6 Additives

All additives shall be from a manufacturer approved by the Engineer.

Air Entraining Admixtures shall conform to ASTM C 260. Other admixtures shall conform to ASTM C 494.

Liquid Crystalline Water Proofing Bitocrete C-16 for Schomberg Germeny or equivalent.

4.7 Vapor Barrier

Polyethylene sheeting conforming with ASTM E154 and 0.2mm thick as a minimum. Other similar material having a vapour permeance rating not exceeding 0.5per meter as determined by ASTME96, will be considered unless noted otherwise.

4.8 Grout

a) Damp Pack Bedding Grout: Mix of one part portland cement and 2« parts of fine aggregate proportioned by weight and not more than 4« gal. (17 liters) of water per bag of cement.

b) Pre-mixed, Non-Shrink, Non-Metallic Grout: "Masterflow 713" manufactured by Master Builders, "Euco-N.S." manufactured by the Euclid Chemical Company or other approved equal.

c) Pre-mixed, Non-Shrink, Metallic Grout: "Embeco 636" manufactured by Master Builders, "Firmix" manufactured by the Euclid Chemical Co., or other approved product.

d) Expansive Grout: CE CRD-C588, Type A or M, as required.

4.9 Cover Material for Curing

Curing material shall conform to the following:

a) Impervious Sheeting: ASTM C171, type optional, except that polyethylene sheeting shall be 0.1mm minimum thickness, white opaque. Where the work is exposed to high winds the impervious sheeting shall not be used.

b) Burlap: Cloth made of jute or kenaf shall conform with AASHTO M182 and shall weigh a minimum 0.3kg/my.

c) Liquid Membrane Forming Compound: ASTM C309, Type 2.

4.10 Joint Fillers

ASTM D 1751, preformed, resilient bituminous type or ASTM D1752, preformed sponge rubber.

4.11 Joint Sealants

ASTM D 1190, ASTM D 3569, ASTM D 3406, hot-pour type.

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4.12 Waterstops

Provide flat, dumbbell type or center bulb type water stops at construction joints where shown. Web thickness not less than 6mm (1/4 in.) for units up to 125mm (5 in.) wide, and not less than 10mm (3/8 in.) for widths over 125mm (5 in.). Provide polyvinyl chloride (PVC) waterstops of approved manufacturer.

4.13 Epoxy Resin

ASTM C 881, type, Grade 3, Class C.

4.14 Formwork

a) Formwork for Concrete Pavement

Forms shall be made of steel of an approved section, with a base width of at least 200 millimeters (8 in.) and the depth shall be equal to the thickness of the pavement at the edge as shown on the plans. The forms shall be staked with steel stakes, and stakes shall be of a length approved by the Engineer. Each section of forms shall have a stake pocket at each end and at intervals of not more than 1.5 metres (5 ft.) between ends. The stake pockets shall have approved devices for locking the form to the steel stakes. Each section of forms shall be straight and free from bends and warps at all times. No section shall show a variation greater than 3 millimeter in 3 metres (1/8 inch in 10 ft.) from a true plane surface on the top of the form, and the inside face shall not vary more than 6 millimeters (1/4 in.) from a plane surface.

Before placing forms, the underlying base shall be to the required grade, and shall be firm and compact. The forms shall have full bearing upon the foundation throughout their length and shall be placed with exactness to the required grade and alignment of the edge of the finished pavement. They shall be so supported during the entire operation of placing, tamping and finishing the pavement that they will not deviate vertically at any time more than 3 millimeters (1/8 in.) from the proper elevation.

Forms shall not be removed for at least twelve (12) hours after the concrete has been placed. Forms shall be carefully removed in a manner to avoid damage to the pavement. Under no circumstances will the use of pry bars between the forms and the pavement be permitted. Pavement, which in the opinion of the Engineer, is damaged due to the careless removal of forms shall be repaired by the Contractor, as directed by the Engineer, at the Contractor's own expense.

Forms shall be thoroughly cleaned and oiled each time they are used.

When pavement is placed adjoining existing concrete pavement upon which the finishing machine will travel, any irregularities in the old pavement shall be ground down to a true, uniform surface, of sufficient width to accommodate the wheels of the finishing equipment, if necessary to obtain proper smoothness of the pavement.

b) Formwork for Structures

Material, workmanship etc. of formwork for structures, refer specification Section 2100.

4.15 Reinforcement

Materials for reinforcing steel, welded wire fabric, dowels and tie bars, refer specification Section 2200.

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5.0 MATERIAL TESTING

A. Samples and Testing

Samples from stock on the site or suppliers materials shall be taken by the Contractor in presence of the Engineer. Furnish tests and certificates as specified.

B. Cement

Sampled cement shall be tested by a testing laboratory. Certified copies of laboratory test reports shall be furnished for each lot of cement and shall include all test data, results and certification that the sampling and testing procedures are in conformance with the Specifications for approval. No cement shall be used until test results are satisfactory. Cement that has been stored for more than four months after being tested shall be re-tested before use. Cement found unsatisfactory under test shall be immediately removed from the construction site or supplier stock.

C. Aggregates

Aggregate sampling shall conform to ASTM D 75. Aggregates shall be sampled and tested by a testing laboratory. No aggregate shall be used until test results are satisfactory to the Engineer.

D. Water

Water analysis shall be performed in accordance with ASTM D 696, and the report shall be submitted for Engineer's approval.

E. Admixtures

Sampling and testing of all admixtures used in concrete mix shall be in accordance with the standard procedure recommended by an approved testing laboratory. No admixture shall be used until test results are satisfactory and approval.

F. Concrete

a) Compressive Strength: The Contractor shall provide and test three sets of specimens taken under the supervision of the Engineer from each 125 cubic metres (4,500 Cft.) or not less than once a day each grade of concrete placed. Samples shall be secured in accordance with ASTM C 172. Test specimens shall be made and cured in accordance with ASTM C 31. Specimens shall be tested in accordance with ASTMC39 or ACI 214. Test specimens shall be evaluated for each grade of concrete specified in conformance with ACI318, chapter "Concrete Quality". The standard age of concrete for tests shall be 3, 7 and 28 calendar days.

b) Slump and Entrained Air: Slump test and entrained air tests shall be performed in the field under the supervision of the Engineer. Slump test shall conform to ASTM C 143 and entrained air content shall be determined in accordance with ASTM C 231 or C 173 as applicable.

c) Concrete removed for the Structure : When the results of the strength test of the specimen indicate deficiency in specified requirements or where there is other evidence that the quality of concrete is below specified requirements, core boring tests shall be made in conformance with ASTM C-42. If a deficiency is discovered, the Contractor may be allowed to make load test, at his expense, and results shall be evaluated in conformance with ACI 318, Chapter 20.

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5.1 Frequency of Testing

a) The following tests shall be performed initially for approval and as per required frequency thereafter:

-	Aggregates	ASTM C 33	----------
-	Soundness	ASTM C 88	bi-weekly
-	Specific Gravity	ASTM C 127	weekly
-	Absorption	ASTM C 128	weekly
-	Abrasion	ASTM C 131	weekly
-	Gradation	ASTM C 136	daily
-	Sand Equivalent	ASTM C 217	weekly
-	Cleanliness	ASTM C 227	weekly
-	Elongation	CRD C 119	bi-weekly
-	Chloride Ion	ASTM D 512	bi-weekly
-	Water Analysis	ASTM D 596	bi-weekly

b) The following tests shall be performed initially for approval and thereafter as specified:

- Concrete Compressive Strength: ASTM C39. Three sets of specimens for each 75 cu.m (2,625 Cft.) of each grade of concrete placed or at least three sets for each grade per work shift.

- Concrete Sulphate (S03), Chloride Content and pH value:
One test per month for each grade of concrete. Broken laboratory specimens from strength tests shall be used for hardened concrete Sulphate, Chloride content and pH Value tests."

6.0 EXECUTION

6.1 Nominal Concrete Mixes

6.1.1 The cement, fine aggregate and the coarse aggregate shall be weighed separately. The proportions of cement to fine aggregate and coarse aggregate shall be adjusted as per ACI 211 & ACI 318 so as to provide the concrete of the required crushing strength when tested as set out in Table1.

6.1.2 The Contractor shall regulate and arrange mixing of the ingredients for the designed mix of the concrete by weight batching.

6.1.3 Water/Cement Ratio

The quantity of water used shall be just sufficient to produce a dense concrete of the specified strength. For all exterior exposed work and foundations the water/cement ratio shall not exceed 0.45, allowance being made for any water in the fine and coarse aggregates.

6.1.4 Workability

Admixtures may be used where necessary to achieve required workability, with the Engineer's approval. For concrete pavements, the mix determined shall be workable concrete having a slump between 13mm (1/2 in.) and 50mm (2 in.), as determined by ASTMC143. For other structures the concrete shall be proportioned and produced to have a slump of 75mm (3 in.) or less if consolidation is to be by vibration, and 125mm (5 in.) or less if consolidation is to be by methods other than vibration.

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6.2 **Strength and Durability Requirements for Concrete**

Strength and Durability Requirements for Concrete are given below:

Class of Concrete	Specified Cylinder Compressive Strength at 28 days MPa / psi
A1	35.0 / 5,000
A	28.0 / 4,000
B	21.0 / 3,000
C	17.0 / 2,465
D	8.0 / 1,160
E	5.0 / 725

6.2.1 The Contractor shall adopt all necessary measures as per ACI201.2, like proper grading of aggregates, control of water cement ratio and cement content, proper compaction and curing, to achieve dense and durable concrete.

6.2.2 The Contractor shall submit mix design by weight for each grade of concrete at least 45 calendar days before any placement of concrete, alongwith samples of the proposed materials. Manufacture 12nos. test cylinders 12" (305mm)x6"(152mm) in accordance with ASTMC-31, and in accordance with the mix design batching by weight and test 3 cylinders each at 3, and 28 days in the presence of Engineer's Representative, in accordance with ASTMC-39 and submit all relevant data and results of tests for approval of the Engineer. The Contractor shall obtain approval from the Engineer in writing for each mix design before producing the actual concrete for the works.

6.3 **Batching, Mixing and Delivery**

a) Batching: The Contractor shall submit to the Engineer for review the plans and capacity of the concrete batching plant and delivery equipment, which shall comply with ASTM C-94.

The Contractor shall furnish test certificates for the scales and metering devices before producing concrete and at least every six weeks thereafter.

b) Accuracy of Plant Batching: Cement measured by weight in individual batchers shall be within ñ1.0 percent of the desired intermediate and final weights in cumulative batchers. The minimum batching accuracy shall be ñ0.3 percent of scale capacity for small loads below 30 percent of scale capacity.

Aggregate measured by weight in individual batchers shall be within ñ2.0 percent of the desired weight, or within ñ1.0 percent of the desired intermediate and final weights in cumulative batchers; but in either case, the minimum batching accuracy shall be ñ0.3 percent of scale capacity for small loads below 15 percent and 30 percent of scale capacity, respectively.

Water measured by volume or by weight shall be within ñ1.0 percent of the desired amount.

Liquid admixtures measured by volume or by weight shall be within ñ1.0 percent of the desired amount.

Compensation for changes of moisture content in fine and coarse aggregate shall be made by devices which shall correct the batch water and the weight of the effected aggregate simultaneously without changing the batch setting.

c) Mixing and Delivery: Concrete shall be mixed completely in the batching plant. Records shall be kept of water added in normal batching.

Concrete shall be transported to the point of discharge in agitator-mixer trucks, or by other approved means.

Trip tickets shall be provided for each delivery. The tickets shall show the designation of the materials in each batch, measured weight or volume of materials, methods of cooling concrete, class of concrete, batch number, mixer number, batch volume, date and time water was added to the mix, time of discharge from the mixer, and delivery truck number.

When it is necessary to add water to the agitator-mixer, it shall be done in accordance with ASTM C 94 and recorded.

6.5 **Embedded Items**

6.5.1 Suitable templates or instructions or both shall be provided for setting out items not placed in the forms. Embedded items and other materials for electrical, mechanical or other operations shall have been completed, inspected tested and approved before concrete is placed.

Joints at intersections and at ends of pieces shall be made in the manner most appropriate to the material being used. Joints shall develop effective water-tightness fully equal to that of the continuous waterstop material, shall permanently develop mechanical strength not less than that of the parent section, and shall permanently retain their flexibility.

6.5.2 Electric conduits and other pipes which are planned to be embedded shall not, with their fittings, displace more than four percent of the area of the cross section of a column on which stress is calculated or which is required for fire protection. Sleeves, conduits, or other pipes passing through floors, walls, or beams shall be of such size or in such location as not to impair unduly the strength of the construction; such sleeves, conduits, or pipes may be considered as replacing structurally in compression the displaced concrete, provided that they are not exposed to rusting or other deterioration, are of uncoated or galvanized iron or steel not thinner than standard steel pipe, have a nominal inside diameter not over 50mm (2 in.) and are spaced not less than three diameters on centres. Except when plans of conduits and pipes are approved by the Engineer, embedded pipes and conduits other than those merely passing through, shall not be larger in outside diameter than one third the thickness of the slab, wall, or beams in which they are embedded nor so located as to impair unduly the strength of the construction. Sleeve pipes, or conduits of any material not harmful to concrete and within the limitations of this section may be embedded in concrete with the approval of the Engineer provided they are not considered to replace the displaced concrete.

6.5.3 All sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting.

All Contractors whose work is related to the concrete or must be supported by it shall be given ample notice and opportunity to introduce and/or furnish embedded items before the concrete is placed.

6.5.4 Expansion joint material, waterstops and other embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with approved readily removable material to prevent the entry of concrete into the voids.

6.5.5 Non Shrink Grout

Grout of placement under base and bearing plates of steel machinery and equipment, for grouting anchor bars and dowels and for similar uses shall be as specified. The grout shall be used in accordance with the following and as per manufacturer's recommendations, and as directed by the Engineer.

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Concrete surfaces to receive non-shrink grout shall be roughened, cleaned and dampened. Form shall be provided to retain the grout until sufficiently hard to support itself. Grout shall be poured in place and thoroughly rodded or strapped to prevent air entrapment and formation of voids. After non-shrink grout has received its initial set, it shall be kept damp for at least 24 hours.

TABLE I : Gradation of Concrete Aggregates

	Percentage by Weight Passing				
	Coarse			Fine	
Particle Size Square Openings (Equivalent U.S. Sieve Designation)	19 mm to 5 mm	25 mm to 5 mm	37.5 mm to 19 mm	50 m. to 25 mm	(Sand)
	¾"-No.4	1"-No.4	1½ "-3/4"	2"-1"	
63.0 mm (2 1/2 in.)	-	-	-	100	-
50.0 mm (2 in.)	-	-	100	95 – 100	-
37.5 mm (1 1/2 in.)	-	100	90 - 100	35 – 70	-
25.0 mm (1 in.)	100	94 - 100	20 - 55	0 - 15	-
09.0 mm (3/4 in.)	090 –100	-	0 - 15	-	-
12.5 mm (1/2 in.)	-	25 - 60	-	0 - 5	-
09.5 mm (3/8 in.)	20 - 55	-	0 - 5	-	100
05.0 mm (No.4)	0 - 10	0 - 10	-	-	95 - 100
02.36 mm (No. 8)	0 - 5	0 - 5	-	-	-
1.18 mm (No. 16)	- - - -	45 - 80			
0.60 mm (No. 30)	- - - -	25 - 55			
0.30 mm (No. 50)	- - - -	10 - 30			
0.15 mm (No. 100)	- - - -	02 - 10			

TABLE II : Gradation of Combined Coarse and Fine Aggregates for Concrete

Particle Size Square Openings (Equivalent U.S. Sieve Designation)	Percentage by Weight Passing Sieves Maximum Aggregate Size				
	50mm	37.5mm	25mm	19mm	9.5mm
63.00 mm (2 1/2 in.)	100	-	-	-	-
50.00 mm (2 in.)	90 - 100	100	-	-	-
37.05 mm (1 1/2 in.)	70 – 90	90-100	100	-	-
25.00 mm (1 in.)	50 - 75	50 - 86	90 - 100	100	-

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Particle Size Square Openings (Equivalent U.S. Sieve Designation)	Percentage by Weight Passing Sieves Maximum Aggregate Size 50mm	37.5mm	25mm	19mm	9.5mm
19.00 mm (3/4 in.)	45 - 70	45 - 75	55 - 100	90 -100	-
12.05 mm (1/2 in.)	-	-	-	-	100
09.05 mm (3/8 in.)	38 - 55	38 - 55	45 - 75	60 - 80	90 - 100
05.00 mm (No. 4)	30 - 45	30 - 45	35 - 60	40 - 60	50 - 85
02.36 mm (No. 8)	22 - 35	23 - 38	27 - 45	30 - 45	37 - 52
01.18 mm (No. 16)	15 - 27	17 - 33	20 - 35	20 - 35	25 - 40
00.60 mm (No. 30)	10 - 18	10 - 22	12 - 25	13 - 23	15 - 25
00.30 mm (No. 50)	4 - 10	4 - 10	5 - 15	5 – 15	5 - 15
00.15 mm (No. 100)	1 - 3	1 - 3	1 - 5	1 - 5	1 - 5
0.075 mm (No. 200)	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2

TABLE III : Quality Tests For Aggregates

Material	Test	Requirement	Test Designation
Coarse	Abrasion	Loss 40% max.	ASTM C 131
Coarse	Absorption	2.0% max.	ASTM C 127
Coarse	Clay Lumps	1.0% max.	ASTM C 142
Coarse	Surface Coating	0.5% max.	ASTM C 117
Coarse and Fine	Soundness	Loss 10% max.	ASTM C 88
Coarse and Fine	Sieve	As specified	ASTM C 136
Fine	Absorption	4.0% max.	ASTM C 128
Coarse	Cleanness	75% min.	CALIF 227
Fine	Sand equivalent	70% min.	CALIF 217

6.5 Concrete for Structures

6.5.1 Placing

6.5.1.1 Before placing of concrete, formwork shall have been completed; water shall have been removed; reinforcement shall have been secured in place; expansion joint material, anchors and other embedded items shall have been kept in position; and the entire preparation shall have been approved.

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No concrete shall be placed into the foundation pits and trenches until the ground to receive the same has been examined and approved by the Engineer for this purpose.

6.5.1.2 Concrete shall be deposited continuously, or in layer of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located as shown in the Contract Documents or as approved by the Engineer. Placing shall be carried out at such a rate that the concrete, which is being integrated with fresh concrete, is still plastic. Concrete, which has partially hardened, shall not be deposited. Temporary spreaders in forms shall be removed when the concrete placing has reached an elevation rendering their services unnecessary. They may remain embedded in the concrete only if made of metal or concrete and if prior approval has been obtained.

6.5.1.3 The actual sequence of construction proposed by the Contractor shall be subject to the Engineer's approval before construction starts on any part of the structure, and this sequence shall not be varied without the Engineer's approval.

6.5.1.4 The concrete shall be placed as soon after it has been mixed as is practicable. Once the concrete has left the mixer, no more water shall be added, although the concrete may be mixed or agitated to help maintain workability. The concrete shall not be used if, through any cause, the workability of the mix at the time of placing is too low for it to be compacted fully and to an acceptable finish by whatever means available.

The time between mixing and placing should be reduced if the mix is richer or the initial workability of the mix is lower than normal, if a rapid hardening cement or an accelerator is used, or if the work is carried out at a high temperature or exposed to a drying atmosphere.

The Contractor shall ensure that the delay between mixing and placing does not exceed 45 minules under any circumstances. Any concrete, which does not satisfy this requirement shall be discarded.

6.5.1.5 Concrete shall be deposited as nearly as possible in its final position to avoid re-handling. In no circumstances may concrete be rated or made to flow along the forms by the use of vibrators. Concreting shall be carried on as a continuous operation using methods, which shall prevent segregation or loss of ingredients.

6.5.1.6 The free fall of concrete shall not be allowed to exceed two metre and where it is necessary for the concrete to be placed more than this depth, it shall not be dropped into its final position, but shall be placed through pipes fed by a hopper. When a pipe is used for placing concrete the lower end shall be kept inside, or close to the freshly deposited concrete. The diameter of the pipe shall be not less than 225 mm (9 in.).

6.5.1.7 Workmen carrying concrete to the site, and all other workmen, shall move only along runways or planks placed for the purpose and no person shall be allowed to walk on the reinforcement.

6.5.2 Consolidation

6.5.2.1 All concrete shall be consolidated by vibration, spading, rodding or forking so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Only competent workmen shall operate vibrators. Use of vibrators to transport within forms shall not be allowed.

Vibrators shall be inserted and withdrawn at points approximately 450 mm (18 in.) apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not excessive so as to cause segregation, generally from 5 to 15 sec. A spare Vibrator shall be kept on the job site during all concrete placing operations. Where the concrete is to have an as-cast finish, a full surface of mortar shall be brought against the form by the vibration process, supplemented, if necessary, by spading to work the coarse aggregate back from the formed surface.

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6.5.2.2 If there is any tendency for the mix to segregate during consolidation, particularly if this produces excessive laitance, the mix proportions shall be modified to effect an improvement in the quality of the concrete to the satisfaction of the Engineer and in conformity with the provisions of Clause 5.

6.5.2.3 Vibrator shall not be allowed to contact the formwork for exposed concrete surfaces.

6.5.2.4 Mechanical vibrators shall be of a type approved by the Engineer to suit particular conditions.

6.5.3.5 Over-vibration or vibration of very wet mixes shall be avoided.

6.5.3 Curing and Protection

6.5.3.1 Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures and mechanical injury, and shall be maintained with minimum moisture loss at a relative constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be subject to approval of the Engineer.

6.5.3.2 For concrete surfaces not in contact with forms, one of the following procedures shall be applied immediately after completion of placement and finishing, as approved by the Engineer.

- Ponding or continuous sprinkling.
- Application of absorptive mats or fabric kept continuously wet.
- Application of waterproof sheet materials approved by the Engineer.
- Application of other moisture-retaining covering as approved.
- Application of a curing compound conforming to ASTM C309.

The compound shall be applied in accordance with the recommendations of the manufacturer immediately after any water sheet, which may develop after finishing has disappeared from the concrete surface. It shall not be used on any surface against which additional concrete or other material is to be bonded unless it is proved that the curing compound will not prevent bond, or unless positive measures are taken to remove it completely from areas to receive bonded applications.

6.5.3.3 Moisture loss from surface placed against wooden forms or metal forms, and exposed to heating by the sun, shall be minimized by keeping the forms wet until they can be safely removed. After form removal, the concrete shall be cured until the end of the time prescribed as follows by one of the methods specified above.

6.5.3.4 Curing in accordance with sub-clauses above shall be continued for at least 10 days in the case of all concrete except concrete with rapid-hardening Portland Cement, for which the period shall be at least 3 days. Alternatively, if tests are made of cubes kept adjacent to the structure and cured by the same methods and to the same intensity, moisture retention measures may be terminated when the average compressive strength has reached 70 percent of the minimum specified works cube strength. If one of the first four curing procedures specified above is used initially, it may be replaced by one of the other specified procedures any time after the concrete is one day old provided the concrete is not permitted to become surface dry during the transition.

6.5.4.5 When the mean daily outdoor temperature is less than 5°C (41°F), temperature of the concrete shall be maintained between 10 and 20 degrees C (50°F-68°F) for the required curing period specified above.

When necessary, arrangements for heating, covering insulation or housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required

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temperature with measures to avoid concentration of heat. Combustion heaters shall not be used during the first 24 hours, unless precautions are taken to prevent exposure of the concrete to exhaust gasses, which contain carbon dioxide.

6.5.4.6 When necessary, provision for wind-breaks, shading, spraying, sprinkling, ponding or wet covering with a light coloured material shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operation will allow.

6.5.4.7 Changes in temperature of the air immediately adjacent to the concrete during and immediately following the curing period shall be kept as uniform as possible and shall not exceed 3°C (5.4°F) in any one hour or 10°C (18°F) in any 24 hour period.

6.5.4.8 Concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock and excessive vibrations, during the curing period. All finished concrete surfaces shall be protected from damage by construction equipment, materials or methods by application of curing procedures, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete.

6.5.5 **Works in Extreme Weather**

6.5.5.1 Unless adequate protection is provided, and approval is obtained, concrete shall not be placed during rain.

Rain water shall not be allowed to increase the mixing water nor to damage the surface finish.

6.5.5.2 When the temperature of the surrounding air is expected to be below 5°C during placing or within 24 hours thereafter, the temperature of the plastic concrete, as placed, shall be no lower than 13°C for sections less than 300 mm (12 in.) in any dimensions nor 10°C for any other sections.

When necessary, concrete material should be heated before mixing and carefully protected after placing. In general, heating of mixing water alone to about 60°C may be sufficient for this purpose. Dependence should not be placed on slat or other chemicals. Calcium chloride up to a maximum of 1-1/2 percent of the weight of cement may be used to accelerate the rate of hardening only with prior written permission of the Engineer. Use of calcium chloride in excess of 1-1/2 percent is harmful. No frozen material or concrete damaged by frost shall be removed. It is recommended that concrete exposed to the action of freezing weather should have entrained air and the water content of the mix should not exceed 25 litres per bag of cement.

If water of aggregate is heated above 38°C, the water shall be combined with the aggregate in the mixer before cement is added. Cement shall not be mixed with water or with mixtures of water and aggregate having a temperature greater than 38°C.

6.5.5.3 During hot weather, the temperature of the concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set, or cold joints and should not exceed 32°C. For mass concreting, this temperature should not exceed 21°C. When the temperature of the concrete exceeds 32°C, precautionary measures approved by the Engineer shall be put into effect. When the temperature of the steel is greater than 50°C, steel forms and reinforcement shall be sprayed with water just prior to placing the concrete. The ingredients shall be cooled before mixing, or ice flakes, or well crushed ice may be substituted for all part of the mixing water if, due to high temperature, low slump, flash set or cold joints are encountered.

Other precautions recommended by ACI Standard 305 shall also be adopted.

6.5.6 **Construction Joints**

6.5.6.1 Concreting shall be carried out continuously up to construction joints, the position and arrangement of which shall be approved by the Engineer.

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6.5.6.2 Joints not shown on the drawings shall be so made and located as to least impair the strength of the structures and shall need prior approval of the Engineer. In general, they shall be located near the middle of the spans of slabs and beams unless a secondary beam intersects a main beam at this point, in which case the joint in the main beam shall be offset a distance equal to twice the width of the secondary beam. Joints in walls and columns shall be at the underside of floor slabs or beams, and at the top of footings or floor slabs. Beams, brackets, column, capitals, haunches and drop panels shall be placed at the same time as slabs. Joints shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

6.5.6.3 Reinforcing steel shall continue across the joints. Key and inclined dowels shall be provided as, and where directed by Engineer. Longitudinal keys at least 40 mm (1-5/8 in.) deep shall be provided in all joints in walls and between walls and slabs or footings.

6.5.6.4 When the work has to be resumed on a surface which has hardened, such surface shall be roughened in an approved manner which will expose the aggregate uniformly and will not leave laitance, loosened particles of aggregate or damaged concrete at the surface.

6.5.6,5 The hardened concrete of construction joints and of joints between footings and walls or columns, between walls or columns and beams or floors they support, joints in un-exposed walls and all others not mentioned herein shall be dampened (but not saturated) immediately prior to placing of fresh concrete.

6.5.6.6 The hardened concrete of joints in exposed work, joints in the middle of beams, and slabs; and joints in work designed to contain liquids shall be dampened (but not saturated) and then thoroughly covered with a coat of cement grout similar in proportions to the mortar in the concrete. The grout shall be as thick as possible on vertical surfaces and at least 13 mm (1/2 in.) thick on horizontal surfaces. The fresh concrete shall be placed before the grout has attained initial set.

6.5.6.7 When the concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle, and brushed, care being taken to avoid dislodgement of particles of aggregate, The surface shall then be coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 150 mm (6 in.) in thickness, and shall be well rammed against old work, particular attention being paid to corners and closed spots.

6.5.6.8 Stop ends for movement joints or construction joints shall be made by splitting them along the lines of reinforcement passing through them, so that each portion can be positioned and removed separately without disturbance or shock to the reinforcement or the concrete. Stop ends made of expanded metal or similar material may only be left permanently in the concrete with prior written approval of the Engineer. Where such stop ends are used, no metal may be left permanently in the concrete closer to the surface of the concrete than the specified cover to the reinforcement. Wood strips inserted for architectural treatment shall be kerfed to permit swelling without pressure on the concrete.

6.5.7 Expansion Joints

Expansion joints shall be provided wherever indicated on the Drawings or as directed by the Engineer. In no case shall the reinforcement, or other embedded items be run continuous or through an expansion joint. All expansion joints shall be carefully placed so as not to be displaced during concreting. The method of placing the expansion joints shall be strictly in accordance with the Drawings and/or as directed by the Engineer. All materials for use in the expansion joints shall have, prior approval of the Engineer before placing order for supply.

6.5.8 Embedded Items

6.5.8.1 Sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting.

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All Contractors whose work is related to the concrete or must be supported by it shall be given ample notice and opportunity to introduce and/or furnish embedded items before the concrete is placed.

6.5.8.2 All embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with approved readily removable material to prevent the entry of concrete into the voids.

7.0 FINISHING OF FORMED SURFACES

7.1 General

7.1.1 After removal of forms, the surfaces of concrete shall be given one or more of the finishes specified below in locations designated by the Contract Documents.

7.1.2 When finishing is required to match a small sample furnished to the Contractor, the sample finish shall be reproduced on an area at least 10 square metres (108 Sft.) in an inconspicuous location Designated by the Engineer before proceeding with the finish in the specified location.

7.1.3 Allowable deviations from plumb or level and from the alignment, profile grades, and dimensions are specified in Clause 9. Tolerances for concrete construction defined as 'tolerances', are to be distinguished from irregularities in finish as described herein. The finish requirements for concrete surfaces shall be as generally specified in this clause and as indicated on the Drawings. Finishing of concrete surfaces shall be performed only by workmen who are skilled in concrete finishes. The Contractor shall keep the Engineer informed as to when finishing of concrete will be performed. Unless inspection is waived in each specific case, finishing of concrete shall be performed only in the presence of the Engineer. Concrete surfaces will be tested by the Engineer where necessary to determine whether surface irregularities are within the limits herein after specified.

Surface irregularities are classified as abrupt or gradual. Offsets caused by displaced or misplaced form sheathing or lining or sections, or otherwise defective form lumber will be considered as abrupt irregularities, and will be tested by direct measurements. All other irregularities will be considered as gradual irregularities, and will be tested by use of a template, consisting of a straight edge or the equivalent thereof for curved surfaces. The length of the template will be 2 metres (6.5 ft.) for testing of formed surfaces and 3 metres (10 ft.) for testing of unformed surfaces.

7.2 As-cast Finishes

Unless otherwise specified or indicated on the Drawings the classes of finish shall apply as follows:

7.2.1 Rough form finish:

No selected form facing materials shall be specified for rough form finish surfaces. The holes and defects shall be patched. Fins exceeding 6 mm (1/4 in.) in height shall be chipped off or rubbed off. Otherwise, surfaces shall be left with the texture imparted by the forms.

7.2.2 Fair face finish:

Fair face finish applies to concrete formed surfaces, the appearance of which is considered by the Engineer to be of special importance, such as surfaces of structures prominently exposed to public view. Location of surfaces of concrete structures requiring fair face finish are shown in the Drawings. Surface irregularities, measured as described in sub-clause 7.2.1, 'Rough form finish', all not exceed 6 mm (1/4 in.) for gradual irregularities and 3 mm (1/8 in.) for abrupt irregularities, except that abrupt irregularities will not be permitted at construction joints. Abrupt irregularities at construction joints and elsewhere in excess of 3 mm (1/8 in.) and gradual irregularities in excess of 6 mm (1/4 in.) shall be reduced by grinding so as to conform to the

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specified limits. Abrupt irregularities at construction joints shall be ground on 1 to 20 ratio of height to length.

Unless otherwise approved, repair of imperfections in formed concrete shall be completed within 24 hours after removal of forms. The form facing material shall produce a smooth, hard, uniform texture on the concrete. It may be plywood, hardboard, metal, plastic paper, or other approved material capable of producing the desired fair face finish. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to the practical minimum. It shall be supported by studs or other backing capable of preventing excessive deflection. Material with raised grain, torn surfaces, worn edge, patches, dents, or other defects, which will impair the texture of the concrete surface shall not be used. The holes and defects shall be patched. All fins shall be completely removed.

8.0 REPAIR OF DEFECTS

8.1 General

8.1.1 Any concrete failing to meet the specified strength or not formed as shown on drawings, concrete out of alignment, concrete with surfaces beyond required tolerances or with defective surfaces which cannot be properly repaired or patched in the opinion of the Engineer shall be removed at Contractor's cost.

The Engineer may reject any defective concrete and order it to be cut out in part or in whole and replace at the Contractor's expense.

8.1.2 All ties, bolt holes, and all repairable defective areas shall be patched immediately after form removal.

8.2 Repair of Defective Areas

8.2.1 Defective and honeycombed concrete shall be removed down to sound concrete. The area to be patched and an area at least 150 mm (6 in.) wide surrounding it shall be dampened to prevent absorption of water from the patching mortar. A bonding grout shall be prepared using a mix of approximately 1 part cement to 1 part fine sand passing No.25 BS Sieve and shall then be well brushed into the surface.

8.2.2 The patching mixture shall be made of the same material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not less than 1 part cement to 2-1/2 parts sand by weight. White Portland cement shall be substituted for a part of the gray Portland cement on exposed concrete in order to produce a colour matching the color of the surrounding concrete, as determined by a trial patch.

8.2.3 The quantity of mixing water shall be no more than necessary for handling and placing. The patching mortar shall be mixed in advance and allowed to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.

8.2.4 After surface water has evaporated from the area to be patched, the bond coat shall be well brushed into the surface. When the bond coat begins to loose the water sheen, the premixed patching mortar shall be applied. The mortar shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding surface to permit initial shrinkage; it shall be left undisturbed for at least 1 hour before being finally finished. The patched area shall be kept damp for at least 7days. Metal tools shall not be used in finishing a patch in a formed wall, which will be exposed.

8.2.5 Where as-cast finishes are specified, the quantity of patched area shall be strictly limited. The combined total of patched areast in as-cast surfaces shall not exceed 0.2 square metre (2 square foot) in each 100 square metres (1076 square foot) of as-cast surface. This is in addition to form tie patches, if the project design permits ties to fall within as-cast areas.

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8.2.6 Any patches in as-cast architectural concrete shall be indistinguishable from surrounding surfaces. The mix formula for patching mortar shall be determined by trail to obtain a good colour match with the concrete when both patch and concrete are cured and dry. After initial set, surfaces of patches shall be dressed manually to obtain the same texture as surrounding surfaces.

8.2.7 Patches in architectural concrete surfaces shall be cured for at least 7 days. Patches shall be protected from premature drying to the same extent as the body of the concrete.

8.3 **Tie and Bolt Holes**

After being cleaned and thoroughly dampened, the tie and bolt holes shall be filled solid with patching mortar. If architectural appearance requires, these holes may be filled partially creating the desired round clear holes pattern on surfaces exposed to view.

8.4 **Proprietary Materials**

If permitted or required by the Engineer, proprietary compounds for adhesion or as patching ingredients may be used in lieu of or in addition to the foregoing patching procedures. Such compounds shall be used in accordance with the manufacturer's recommendations with prior approval of the Engineer.

9.0 CONCRETE CONSTRUCTION TOLERANCES

All tolerances shall be as per ACI 317.

Where tolerances are not stated in the specifications or drawings for any individual structure or feature thereof, maximum permissible deviations from established lines, grades, and dimensions shall conform to the following. The Contractor is expected to set and maintain concrete forms so as to ensure complete work within tolerance limits. These allowable tolerances shall not relieve the Contractor of his responsibility for correct fitting of indicated materials and components. These tolerances are not cumulative.

9.1 Variation from the plumb (or the specified batter for inclined walls). (allowable variation)

9.1.1 In the lines and surfaces of columns and walls, and in arises

In any 3 metres (10 ft.) of length or height	6 mm (1/4 in.)
Maximum for the entire length or height	25 mm (1 in.)

9.1.2 For exposed corner columns, control joint grooves and other conspicuous lines

In any bay or 6 metres (20 ft.) maximum	6 mm (1/4 in.)
Maximum for the entire length or height	13 mm (1/2 in.)

9.2 Variation from the level or from the grades indicated on the drawings.

9.2.1 In beam soffits, and in arises measured before removal of supporting shores.

In any 3 metres (10 ft.) of length	6 mm (1/4 in.)
In any bay or in any 6 metres (20 ft.) maximum	10 mm (3/8 in.)
Maximum for the entire length	19 mm (3/4 in.)

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9.3 Variation of the linear structure lines from established position in plan and related position of columns and walls.

In any bay or 6 metres	± 13 mm (± 1/2 in)
Maximum for the entire length	± 25 mm (± 1 in.)

9.4 Variation in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls.

Up to 12" (300mm)	- 6 mm (- ¼ in.) +10 mm (+ 3/8 in.)
More than 12" (300mm)	- 10 mm (- 3/8 in.) +13 mm (+ ½ in.)

9.5 **Footings**

9.5.1 Variation in dimensions in plan

Minus	13mm (1/2 in.)
Plus (plus variation applied to concrete only, not to the reinforcing bars or dowels). (formed)	50mm (2 in.)

9.5.2 Misplacement or eccentricity

2 percent of the footing width in the direction of misplacement but not more than (applies to concrete only, not to reinforcing bars or dowels).	+ 50mm (+ 2 in.)

9.5.3 Reduction in thickness

Minus 5 percent of specified thickness

10.0 ACCEPTANCE OF STRUCTURE

10.1 General

10.1.1 Completed concrete work, which meets all applicable requirements will be accepted subject to the other terms of the Contract Documents.

10.1.2 Completed concrete work, which fails to meet one or more of the requirements and which has been repaired to bring it into compliance will be accepted subject to the other terms of the Contract Documents.

10.1.3 Completed concrete work, which fails to meet one or more of the requirements and which cannot be brought into compliance may be accepted or rejected as provided in these Specifications or in the Contract Documents. In this event, modifications may be required to assure that remaining work complies with the requirements.

10.2 Dimensional Tolerances

10.2.1 Formed surfaces resulting in concrete outlines smaller than permitted by the tolerances of clause 9 shall be considered potentially deficient in strength and subject to the provisions of sub clause 10.4.

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10.2.2 Formed surfaces resulting in concrete outlines larger than permitted by the tolerances of clause 9 may be rejected and the excess material shall be subject to removal. If removal of the excess material is permitted, it shall be accomplished in such a manner as to maintain the strength of the section and to meet all other applicable requirements of function and appearance. Permission is required if excess material is to be removed in accordance with this clause.

10.2.3 Concrete members cast in the wrong location may be rejected if the strength, appearance or function of the structure is adversely affected as decided by the Engineer or if misplaced items interfere with other construction.

10.2.4 Inaccurately formed concrete surfaces exceeding the limits of Clause 9 or of Clause 6.5 of Section 'Formwork' shall be removed and replaced, and those that are exposed to view, may be rejected, or shall be repaired, or removed and replaced, as directed by the Engineer.

10.3 Appearance

10.3.1 Architectural concrete with surface defects exceeding the limitations described in relevant Clauses of this section shall be removed and replaced.

10.3.2 Other concrete exposed to view with defects which adversely affect the appearance of the specified finish may be repaired only by approved methods.

10.3.3 Concrete not exposed to view is not subject to rejection for reason of defective appearance.

10.4 Strength of Structure

10.4.1 Strength of the structure in place will be considered potentially deficient if it fails to comply with any requirement which is relevant to the strength of the structure, including but not necessarily limited to the following conditions:

- Concrete strength requirements not considered to be satisfied in accordance with Clause 6 hereof.
- Reinforcing steel size, quantity, strength, position or arrangement at variance with the requirements as specified under section 'Reinforcement' or in the Contract Documents.
- Concrete, which differs from the required dimensions or location in such a manner as to reduce the strength.
- Curing less than that specified.
- Inadequate protection of concrete from extremes of temperature during early stages of hardening and strength development.
- Mechanical injury, construction fires, premature removal of formwork, likely to result in deficient strength.
- Poor workmanship likely to result in deficient strength.

10.4.2 Structural computations and/or additional testing may be required when the strength of the structure is considered potentially deficient.

10.4.3 Core tests may be required when the strength of the concrete in place is considered deficient.

10.4.4 If core tests are inconclusive or impractical to obtain or if structural computations do not confirm the safety of the structure, load tests may be required and their results evaluated, in accordance with ACI Standard 318.

10.4.5 Concrete work judged inadequate by structural computations or by results of a load test shall be reinforced with additional construction, if so directed by the Engineer or shall be replaced, at the Contractor's expense.

10.4.6 The Contractor shall bear all costs incurred in providing the additional testing and/or computations required by this section.

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11.0 MEASUREMENT AND PAYMENT

11.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

11.1.1 All types of formwork including shoring/bracing/scaffolding etc.

11.1.2 All types of expansion, construction and contraction joints

11.1.3 All sampling, mixing and testing as specified.

11.1.4 Concrete mix design.

11.1.5 Vapour barrier.

11.1.6 Impervious sheeting, burlap covering, liquid membranes compound, additives, non-shrink grout and epoxy resins.

11.1.7 Anchor bolts and other embedded parts.

11.1.8 All submittals including shop drawings, co-ordination drawings etc.

11.1.9 Repair and replacement of defective work.

11.1.10 Surface texture, skid resistant surfaces & surface test.

11.1.11 Curing

11.1.12 Installation / fixing in position of all precast / prefabricated concrete elements, as shown on drawings.

11.1.13 Tie bars, dowel bars, dowel bar sleeves and welded wire mesh.

11.1.14 Concrete Admixtures / Super plasticizers

11.2 Plain and Reinforced Concrete

11.2.1 Measurement

Measurement of acceptably completed works of plain and reinforced concrete will be made on the basis of number of cubic metre / cubic foot of concrete actually provided, placed, consolidated, finished, cured in position, complete as shown on drawings or as directed.

All Pile Works shall be measured in accordance with BOQ, Drawings and its National & International Standards wherever applicable.

11.2.2 Payment

Payment will be made for the acceptable measured quantity of plain and reinforced concrete on the basis of unit rate per cubic metre / cubic foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

All Pile Works shall be paid in accordance with BOQ, Drawings and its National & International Standards wherever applicable.

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11.3 Water Stopper

11.3.1 Measurement

Measurement of acceptably completed works of water stopper will be made on the basis of running metre / running foot of water stopper actually provided, placed in position, complete as shown on drawings or as directed.

11.3.2 Payment

Payment will be made for the acceptable measured quantity of water stopper on the basis of unit rate per running metre / running foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

11.4 C.C Jali

11.4.1 Measurement

Measurement of acceptably completed works of c.c jali will be made on the basis of square metre / square foot of cement concrete jail actually provided, placed in position, complete as shown on drawings or as directed.

11.4.2 Payment

Payment will be made for the acceptable measured quantity of c.c jali on the basis of unit rate per square metre / square foot quoted in the respective items of Bill of Quantities and shall constitute full compensation for all the works related to the item.

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SECTION – 5216

WATER SUPPLY PIPES, PIPE LAYING AND APPURTENANCES

1.0 SCOPE

2.0 MATERIALS

3.0 APPROVAL OF MATERIAL AND EQUIPMENT

4.0 INSTALLATION

5.0 FLUSHING

6.0 LEAKAGE TEST

7.0 RETESTING AFTER BACKFILL

8.0 PIPE LINE DISINFECTION

9.0 FINAL FLUSHING

10.0 SAMPLING AND TESTING

11.0 CLEAN UP

12.0 WASHOUTS

13.0 AIR VALVES

14.0 MEASUREMENT AND PAYMENT

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1.0 SCOPE

The work covered by this Section of the specification consists in furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with water supply lines and appurtenances in strict accordance with this section of the specifications and the applicable Drawings.

2.0 MATERIALS

Material shall conform to the respective specifications and other requirements specified hereinafter and shall be new and unused.

2.1 Galvanized Iron Pipes and Fittings (BS standards)

These galvanized iron pipes shall strictly conform to B.S. 1387 Specifications for "Steel Tubes and Tubulars suitable for screwing to B.S. 21 pipe threads" and shall be of medium grade. All screwed pipes and sockets shall conform B.S. 1740. A complete and uniform adherent coating of zinc white will be provided for galvanized iron pipes and fittings.

2.2 MS/Galvanized Iron Pipes and Fittings (ASTM standards)

These pipes shall conform to ASTM designation A53, ERW, Grade-B, "Standard Specification for pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless".

Short pieces shall be flanged at both ends. The flanges shall conform to B.S. 4504, part 3 (PN 16). M.S. pipe pieces shall be externally protected by applying two coats of red oxides (of approved quality) and bituminous coating (grade 10/20) at the rate of 0.4 lb/Sq.ft.

2.3 Polyethylene (HDPE) Pipes

Polyethylene Pipes and fittings shall conform to ISO 4427:1996, DIN 8074/8075, PE-100 of specified pressure rating (PN-10, PN-12.5, PN-16).Material, diameters, wall thickness shall be as indicated in identified standards. Tests to be performed in factory for pipes shall be Heat revision, Short term hydrostatic pressure test and Tensile strength. Fusion welding shall be performed as per ISO 4427 and DVS 2207-1 by specified firms.

Warning tape shall be provided for laying over PE pipes. It should be single fold, 0.02 inch thick and 2 inch wide, with warning for digging continuously printed in approved language. The tape shall be placed one foot above the PE pipe.

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2.4 Sluice (Gate) Valve

Valves shall be wedge gate valves conforming to British Standard Specification 5163. Ends of valves shall be suitable for the type of pipe to which the valves will be connected.

2.5 Check Valves

Check valve shall comply with the requirements of BS 5153 latest revision for pressure rating of 16 bar. The valve shall be of swing type and shall be of quick acting single door type.

2.6 Fire Hydrants

The metal of the fire hydrant shall conform to B.S. 750 and shall be of screw down streamline pattern. The body shall be best quality, closed grain, grey cast iron with spindle of manganese bronze having tensile strength of not less than 11.0 tons per square inch machined from solid rolled bars, the seating valves and other parts shall be of best quality gun metal with Brinell Hardness No. 80. The direction of closing shall be by clockwise rotation and outlet shall have screwed joint for accommodation 2 1/2" dia hose connection. Inlet flanges of hydrant shall be suitable for jointing with flanges of hydrant bends and tees. All fire hydrants shall be coated with three coats of solution from an approved manufacturer to give a uniform protective coating on cast iron.

3.0 APPROVAL OF MATERIALS AND EQUIPMENT

As soon as practicable but within 30 days after receipt of notice to proceed and before any materials or equipment are purchased, the Contractor shall submit for approval by the Engineer a complete schedule, in triplicate, of materials and equipment to be incorporated in the work, together with the names and addresses of the manufacturers and their catalogue cuts, diagrams, drawings, and such other descriptive data as may be required by the Engineer. No consideration will be given to partial lists submitted from time to time. Approval of materials and equipment under deviations from the specifications shall not be granted unless the attention of the Engineer has been directed to the specific deviations. Laboratory results and certifications, specified or otherwise required, shall be submitted prior to delivery of the material and equipment to site.

4.0 INSTALLATION

4.1 Handling

Pipe and accessories shall be handled in such a manner as to ensure their delivery to the trench in sound, un-damaged condition. If any pipe or fitting is damaged, the repair or replacement shall be made by the

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Contractor at his expenses in a satisfactory manner. No other pipe or material of any kind shall be placed inside of a pipe or fittings. Pipe shall be carried into position and not dragged. The interior of pipe and accessories shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations by plugging or other approved method. Before installation, the pipe shall be inspected for defects. Material found to be defective before or after laying shall be replaced with sound material without additional expense to the Employer. Rubber gaskets that are not to be installed immediately shall be stored in a cool dark place and protected against the direct rays of the sun.

4.2 **Cutting of Pipe**

This shall be done in a neat and workman-like manner without damage to the pipe. Unless otherwise authorized by the Engineer or recommended by the manufacturer, cutting shall be done with a mechanical cutter of approved type. Wheel cutters shall be used wherever practicable.

4.3 **Location**

Where the location of the water pipe is not clearly defined by dimensions on the Drawings, the water pipe shall be located as directed by the Engineer.

4.4 **Deflection**

Maximum allowable deflections from a straight line or grade, as required by vertical curves, horizontal curves, or offsets will be 2^{0} degrees for Asbestos Cement Pipe unless other- wise recommended by the manufacturer. If the alignment requires deflections in excess of the specified limitations, special bends or a sufficient number of shorter lengths of pipe shall be furnished to provide angular deflections within the limit setforth, as approved.

4.5 **Placing and Laying**

Pipe and accessories shall be carefully lowered into the trench by means of derrick ropes, belt slings, or other suitable equipment. Under no circumstances shall any of the water line materials be dropped or dumped into the trench. Care shall be taken to avoid abrasion of the pipe coating. Poles used as levers shall be of wood and shall have broad flat faces to prevent damage to the pipe. Except where necessary in making connections with other lines or authorized by the Engineer pipe shall be laid with the bells facing in the direction of laying. The full length of each section of pipe shall rest solidly upon the pipe bed, with recesses excavated to accommodate bell coupling and joints. Pipe that has the

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grade or the joint disturbed after laying shall be taken out and re-laid. Pipe shall not be laid in water shall be kept out of the trench until the materials in the joints have hardened or until chaulking or jaunting is completed. When work is not in progress, open ends of pipe, fittings, and valves shall be securely closed so that no trench water, earth, or other substances will enter the pipes or fittings. Where any part of a coating or lining is damaged, the repair shall be made by the Contractor at his expense in a satisfactory manner. Pipes shall be installed in accordance with recommendations of the pipe manufacturer. Pipe ends left for future connections shall be valved, plugged or capped, and anchored, as shown or as directed, where connections shall be made by using specials and fittings to suit the actual conditions.

4.6 Jointing

The joints shall be in accordance with the recommendations of the manufacturer or as approved by the Engineer.

Connections between different types of pipes and accessories shall be made with transition fittings where recommended by the pipe manufacturer.

Service connections shall be made as indicated and in accordance with the recommendations of the pipe manufacturer.

4.7 Setting of Fire Hydrants, Valves and Surface Boxes

Fire hydrants shall be located and installed, as shown. Hydrants shall be set plumb and in accordance with the manufacturer's instructions.

Valves and surface boxes shall be installed as shown or directed, and shall be set plumb. Surface shall be centered on the stems or operators. Concrete, concrete pipe, brick, brick ballast used in chambers shall conform to the relevant clause of the Specification. Where feasible, valves or operators shall be located outside the area of roads and streets. Earth fill shall be carefully tamped around each valve box to the satisfaction of Engineer on all sides of the box, or to the undisturbed trench face if less than 4 ft.

Hydrants and valves shall have the interiors cleaned of all foreign matter before installation. Surface boxes shall be lighted and the hydrant or valve shall be inspected in open and closed positions to ensure that all parts are in working condition.

4.8 Thrust Blocks

Plugs, caps, tees, bends and fire hydrants shall be provided with concrete thrust blocks. Backing shall be placed between solid ground and

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the hydrant or fitting to be anchored. The area of bearing shall be as shown on the Drawing. The backing shall be so placed that fitting joints shall be accessible for repair. The concrete shall be class C plain cement concrete.

4.9 **Pipe Bedding**

Fine sand as pipe bedding material shall be used for A.C. pipe and C.I. fittings. The sand shall be free from clay, silt, salts, organic impurities and debris. Approval of pipe bedding materials shall be obtained by the site Engineer prior to placing.

4.10 **Pavement Restoration**

The Contractor shall restore paved surface which have been cut under this contract, as part of the work under the excavation items and at no extra cost to the owner/employer.

5.0 FLUSHING

The Contractor shall provide facilities for flushing the line. Water for flushing the line shall be arranged by the Contractor. Flushing of line shall be done section by section. For each valved section of pipeline the Contractor shall make a temporary hose connection between the water pipeline and the pipeline under test. Water shall be pumped into the section flushed. Other arrangements for storing and pumping of water shall be subject to the approval of Engineer. Due precautions shall be taken by the Contractor for the disposal of water. The pipeline shall be flushed by keeping all the branching pipes open. Flushing shall be continued until clean water starts flowing through the other end. Section by section, the entire pipeline shall be flushed at a minimum flushing velocity of 2.5 ft/sec.

6.0 LEAKAGE TEST

Flushing of the pipeline shall be followed by a leakage test. The Contractor shall provide facilities for performing the leakage test. Water and pumping facilities shall be provided by the Contractor. Before the testing of pipeline, the Contractor shall ensure that concrete backing blocks have been provided where necessary. The test shall be performed only after all concrete work in contact with pipe to be tested has set for a minimum of 24 hours. All joints shall be left exposed. Leakage test shall be performed by keeping the end of the pipeline closed by proper plugs blocked to resist 150 per cent of the working pressure. While filling the line all valves and openings shall be kept open and water shall be filled in slowly. When the pipeline is completely filled with water and all air expelled, water shall be pumped into the pipeline to a minimum pressure of 150 percent of actual working pressure and the test pressure shall be maintained for at least 1 hour. Each and every joint shall be inspected for leaks and for all visible leakage

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and displacement leakage test shall be performed by the Contractor, for the newly laid pipeline. A measured quantity of water shall be pumped into the pipeline. No piping installation will be accepted until the leakage is equal or less than the number of imperial gallons per hour as determined by the formula:

$$L = 0.00054\ ND\sqrt{P}$$

L = Leakage in Imperial Gallons

N = Number of joints

D = Nominal diameter of pipe in inches

P = Average test pressure (psi) during test

In the event of the pipeline failing the leakage test, the Contractor shall locate and repair the defective pipe, fitting or joint at his expenses. For dewatering the line for repairs the Contractor shall follow the instructions given by the Engineer for disposal of water. After repairs of the line, the Contractor shall retest the line. The line will not be accepted until it passes the leakage test.

7.0 RETESTING AFTER BACKFILL

After the pipe trench has been backfilled, the entire length shall be subjected to a leakage test as a whole unit. The Contractor shall repair the line if it fails to pass the leakage test requirements specified hereinbefore. The test shall be repeated and repairs affected until the pipeline passes the leakage test.

8.0 PIPELINE DISINFECTION

8.1 General

The Contractor shall furnish all equipment, labour and material for the proper disinfection of the pipeline. Disinfection shall be accomplished by chlorination after the lines have been tested for leakage but before they have been connected to the main system. Disinfections of the pipelines shall be done in the presence of the Engineer's representative with equipment approved by him.

8.2 Chlorination

A chlorine and water mixture shall be supplied by means of a solution feed chlorination device. The chlorine solution shall be applied at one end of the pipeline through a trap, in such a manner that as the pipeline is filled with water, the dosage applied to the water entering the pipe shall be at least (25 p.p.m) or enough to meet the requirements given hereinafter.

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8.3 **Retention Period**

Chlorination water shall be retained in the pipeline for a period of at least 24 hours. After the chlorine treated water has been retained for the required time, the chlorine residual at the pipe extremities and at such other representative points shall be at least 10 parts per million. This procedure shall be repeated until the required residual chlorine concentration is obtained.

8.4 **Chlorination of Valves**

During the process of chlorination the pipeline, all valves or other appurtenances shall be operated while the pipeline is filled with the heavily chlorinated water.

9.0 FINAL FLUSHING

Following complete disinfection of the pipeline, all treated water shall be thoroughly flushed from the pipeline at its extremities. Treated water and water used for flushing the pipelines shall be disposed of in a manner instructed by the Engineer. Fresh treated water shall be filled in the line and water tested from presence of coliform. the test result should indicate negative coliform presence. If the test indicates any positive coliform, the entire process of disinfection shall be repeated or improved upon until coliform free samples are obtained.

10.0 SAMPLING AND TESTING

Disinfection of the pipeline and appurtenances shall be the responsibility of the Contractor. The first set of samples will be collected for analysis by the Engineer. Should the samples reveal presence of colifform the Contractor shall again disinfect the pipeline and appurtenances at no extra cost to the Employer for sampling and testing for subsequent retests until coliform free samples are obtained. The charges for resampling and retesting shall be recovered from the Contractor.

11.0 CLEAN-UP

Upon completion of the installation of the water supply lines, distribution system and appurtenances, all debris and surplus materials resulting from the work will be removed and disposed off in a manner satisfactory to the Engineer

12.0 WASHOUTS

The design and locations of washouts shall be illustrated on the Drawings to be approved by the Engineer. Exact positioning shall be determined with regard to topography and to the approval of the Engineer. At least 10 ft. of the washout pipe work, inclusive of the isolating valve, measured from the centre line of the

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pipeline, shall be laid at the same time as the pipeline and suitably capped to prevent ingress of foreign material. The minimum gradient for the washout pipe work shall be 1 in 100.

13.0 AIR VALVES

a) Double orifice Air Valves

These shall be designed to meet the following conditions:

- expulsion of air during charging of the pipeline
- admit air during emptying of the pipeline to avoid the occurrence of negative pressure
- expulsion of air accumulated at summit points along the pipeline under normal operating conditions

First two conditions shall be met by the employment of a large orifice capable of handling large volumes of air at high flow rate, and the third condition by a small orifice capable of discharging small quantities of air as they accumulate.

The large orifice shall be sealed by a buoyant rigid ball and the chamber housing shall be designed to avoid premature closing of the valve by the air whilst being discharged. The small orifice shall be sealed by a buoyant ball at all pressures above atmospheric except when air accumulates in the valve chamber.

b) Single Orifice Air Valves

These shall be designed to carry out the function described above. Each valve shall be provided with only a small orifice which shall operate in the same manner as that in a double acting air valve.

Valves with air intake or exhaust facilities shall have approved screening arrangements to prevent the ingress of air borne sand.

The nominal pressure shall range between NP 16 and 25.

Body ends shall be flanged with raised faces and drilled according to BS 4504 for the nominal pressure specified or indicated in the Drawings.

The materials for the valves shall be as follows:

Cast iron body cover and cowl: for small orifice, cast iron with gunmetal seat with rubber covered ball or other approved; for large orifice, cast iron with rubber seat and vulcanite covered ball or other approved.

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14.0 MEASUREMENT AND PAYMENT

Measurement and payment of pipe work, fittings, specials and appurtenances will be made in accordance with the provisions of this clause specified hereinafter.

14.1 Pipe work

a) **Method of Measurement**

Measurement will be made for the number of running feet of pipes including fittings, accessories and flanges acceptably installed complete in all respects as per relevant Drawings or as directed by the Engineer or manufacturer.

b) **Basis of Payment:**

Payment will be made for the running feet of pipework as measured above at the Contract Unit price and shall constitute full compensation to provide, handle, lay and joint pipes including fittings, flushing, leakage testing before & after backfilling, final flushing and all other work related to the item.

14.2 Service Connection

I) **G.I. Pipe and Fittings**

a) **Method of Measurement:**

Measurement will be made for the number of linear feet of galvanized iron pipe including fittings acceptably installed complete in all respects as per relevant Drawings or as directed by the Engineer.

b) **Basis of Payment:**

Payment will be made for the number of linear feet of galvanized iron pipe work as measured above at the Contract Unit Price of each unit and shall constitute full compensation to provide, handle, lay, joint and test galvanized iron pipe, fittings, including sleeves, nuts, sockets, plugs, bitumen coating with Polyethylene tape and all other work related to the item.

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ii) Ferrule Assembly

a) Method of Measurement:

Measurement shall be made for the number of ferrules acceptably installed complete in all respects as per relevant Drawings or specifications.

b) Basis of Payments:

Payment shall be made for the number of ferrules measured as above at the contract unit price for each unit and shall constitute full compensation for providing, tapping, drilling, fixing including M.S. straps, Saddles, and all other work related to the item to make complete house connection.

14.3 Sluice (Gate) Valves

a) Method of Measurement:

Measurement will be made for the number of sluice (gate) valves acceptably installed complete in all respects as per relevant Drawings.

b) Basis of Payment:

Payment will be made for the number of sluice (gate) valves measured as above at the Contract Unit Price for each unit and shall constitute full compensation for providing, handling, fixing and jointing and all other work related to the item including construction of chamber as shown on drawings.

14.5 Fire Hydrants

a) Method of Measurement:

Measurement shall be made for the number of fire hydrants acceptably installed complete in all respects as per relevant Drawings.

b) Basis of Payment:

Payment will be made for the number of fire hydrants measured as above at the Contract Unit Price for each unit and shall constitute full compensation for providing, handling, fixing and jointing and all other work related to the item including construction of chamber.

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14.6 **Washouts**

a) **Method of Measurement:**

Measurement will be made for the number of washouts acceptably installed including construction chamber completes in all respects and as approved by the Engineer.

b) **Basis of Payment:**

Payment will be made for the number of washouts measured as above at the contract unit price for each unit and shall constitute full compensation for providing handling, fixing and all other work related to the item including construction of chamber.

14.7 **Air Valves**

a) **Method of Measurement:**

Measurement will be made for the number of air valves acceptably installed complete in all respects and as approved by the Engineer.

b) **Basis of Payment:**

Payment will be made for the number of air valves measured as above at the contract unit price for each unit and shall constitute full compensation for providing handling, fixing and jointing related to the item including construction of chamber.

14.8 **Sand Cushion**

a) **Method of Measurement:**

Measurement will be made for the number of cubic foot of sand acceptably placed complete in all respects and as approved by the Engineer.

b) **Basis of Payment:**

Payment shall be made for the number of cu.ft of sand measured as provided above at the contract unit price per cu.ft and shall constitute full compensation for all work related to the item.

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14.9 **Thrust Blocks**

a) **Method of Measurement:**

Measurement will be made for the number of cubic foot of class 'C' concrete acceptably placed complete in all respects and as approved by the Engineer.

b) **Basis of Payment:**

Payment shall be made for the number of cu.ft of class 'C' concrete measured as provided above at the contract unit price per cu.ft and shall constitute full compensation for all work related to the item.

14.10 **Concrete Encasement**

a) **Method of Measurement:**

Measurement will be made for the number of cubic foot of class C concrete acceptably placed complete in all respects and as approved by the Engineer.

b) **Basis of Payment:**

Payment shall be made for the number of cu.ft of class C concrete measured as provided above at the contract unit price per cu.ft and shall constitute full compensation for all work related to the item.

*** End of Section 5216 ***

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SECTION 5220

VALVES AND APPURTENANCES

1.0 SCOPE

2.0 APPLICABLE STANDARDS

3.0 SUBMITTALS

4.0 MATERIAL AND EQUIPMENT

5.0 DELIVERY, STORAGE AND HANDLING

6.0 MEASUREMENT AND PAYMENT

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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1.0 SCOPE

The work under this section of the specification consists of furnishing all plant, labour, equipment, appliances, materials and performing all operations required as specified herein, as shown on the drawings, or as directed by the Engineer, in connection with installation of valves.

2.0 APPLICABLE STANDARDS

Cast iron gate valves	BS-5163
Cast iron check valves	BS- 5153
Bronze gate valves	BS- 5154
Bronze check valves	BS- 5152
Flexible rubber joint	BS- 5155
Float valves	BS- 1212

3.0 SUBMITTALS

The contractor shall submit technical brochures and samples of all the items mentioned in the Specifications from approved manufactures or as directed by the Engineer

4.0 MATERIAL & EQUIPMENT

4.1 DESCRIPTION

All valves shall be of renowned manufacturer as specified. Valve material shall be suitable for installation on potable water lines, sewage line or sludge piping. Service rating of the valves shall be at least 7 bars to 16 bars. The interior of all valves shall be cleaned of all foreign material before installation.

Valves shall be installed at the position indicated in the Contract Documents or as directed by the Engineer. Valves shall be adequately supported. Installed valves shall be subjected to pressure and leakage tests and no leakage shall be observed under these tests. End joints, flanges, etc., shall be of the appropriate class and material.

Valves shall be installed either in chambers or above grade on line as shown in the Contract documents and/or as specified herein. Valves shall be securely anchored.

Open and closed position indicator shall be provided for all valves. If installed in valve chambers, the indicator shall not extend above ground and shall not interfere with opening or closing of the valve. The indicator design shall be approved by the Engineer before installation.

4.2 CAST IRON GATE VALVES

Cast iron gate valves shall have flanged ends and wheel handle and shall conform to B.S.5163 "Specifications for Double Flanged Cast Iron Wedge Gate Valves for Waterworks purposes". Flanges shall be drilled to B.S. 4504 Part 1. Valves shall be rated for a working/service pressure of 16 bars for water supply system and 25 bars for firefighting system. Valves shall close in clockwise direction.

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The valve parts shall be of the following materials.

- Valve body shall be of cast iron.
- Flanges shall be of cast iron.
- Shaft shall be of stainless steel.
- Disc shall be of stainless steel with bronze trim.
- Seat shall be of cast iron with bronze trim.

4.3 CAST IRON CHECK VALVES

Cast iron check valves shall be of non-slam, swing type with flanged ends and shall conform to B.S. 5153, "Specifications for Cast Iron Check Valves for General Purposes". Flanges shall be drilled to B.S. 4504 Part 1. Valves shall be rated for a working/service pressure of 16 bars. The direction of flow shall be permanently marked on the body of the valve.

The valve parts shall be of the following materials.

- Valve body shall be of cast iron.
- Flanges shall be of cast iron.
- Shaft and spring shall be of stainless steel.
- Disc and seat shall be of stainless steel with bronze trim.
- Disc and shaft seal shall be of rubber (O-ring type).
- Wheel handle shall be of cast iron.

Valve parts in contact with water shall be of corrosion resistant material, free from toxic substances and shall not foster microbiological growth or impart taste, odor, turbidity or color to the water.

Inside surfaces of valves shall be enameled and outside surfaces shall be epoxy coated.

4.4 BRONZE GATE VALVE

Bronze gate valves shall conform to B.S. 5154, "Specifications for Copper Alloy, Globe, Globe Stop, Check and Gate Valves for General Purposes". Valves shall be rated for a working/service pressure of 16 bars. Valve ends shall be screwed or flanged as shown on the drawings. Threads shall be to B.S. 21 and flanges shall be drilled to B.S. 4504 Part 1. Valves shall close in clockwise direction. Open and shut indicators shall be marked on the wheel handle.

4.5 BRONZE CHECK VALVES

Check valves shall conform to B.S. 5152 "Specifications for bronze check valves for general purposes". The service rating shall be 16 bars. The direction of flow shall be permanently marked on the body of the valve. Body of valve shall be tested to 1-1/2 times the service rating and seat shall be tested to service rating. No leakage shall be permitted under the above tests check valves shall be of swing type.

End of the valves shall be flanged to joint with the standard fittings. Flanges shall be of appropriate class and material. Valves shall be installed at positions shown on the drawings the interior shall be cleaned

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of all foreign matter before installation. They shall be inspected to ensure that all components are sound and in working condition.

4.6 AUTOMATIC AIR VENT VALVE

Automatic Air Vent valve shall be of PN-16 Brass or bronze body (made in Italy), of specified size for automatic discharge of air and for automatic breaking of vacuum in a pressure main. The material used shall be corrosion resisting, growth. Each valve shall be installed with an isolating gate valve, stand pipe, clamp and connection with the line.

4.7 FLEXIBLE RUBBER JOINT

Flexible rubber joint shall be threaded union type of PN-16 conforming to BS 5155, of specified size for installation in water supply line crossing building expansion joint or at the locations as marked on drawings or as directed by the Engineer. The material used shall be corrosion resisting.

4.8 FLOAT VALVE

Float valve shall be of copper alloy, piston type and shall conform to B.S. 1212. Float shall be of copper and shall conform to B.S. 1968.

4.9 SINGLE ACTING AIR VALVE

Air release valves shall be single acting (air cum vacuum release) type suitable for the liquid for which it is used. Valves body and cover shall be of malleable iron. Float and valve seat shall be of stainless steel. Valve head shall be of Viton (Synthetic Rubber). Valve ends shall be screwed or flanged as shown on the drawings. Threads shall be to B.S. 21 and flanges shall be drilled to B.S. 4504 Part 1.

Air release valve shall be provided at all high points to ensure adequate venting of the piping system.

4.10 WATER METER

Water meter shall be of turbine/ vane type .the body shall be of fine grained cast iron with black enamel coating. Ends shall be flange shall be rated for 16 bars working pressure. The normal flow rate shall range from 50 cu.m/hr. to 300 cu.m/hr.

4.11 INSTALLATION OF VALVES, TESTING & COMMISSIONING

Valves shall be installed either in chambers or above grade on line as shown on the drawings and as directed by the Engineer. Before installation, the interior surfaces of valves shall be cleaned of all foreign matters, inspected to ensure that all components are sound and in working condition and tested to 1-1/2 times the working pressure or the service pressure whichever is greater. After installation, valves shall be securely anchored; tested, retouched where paints have been damaged and labeled.

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5.0 DELIVERY, STORAGE & HANDLING

Valves should be handled and stored properly to avoid any damage and slippage of threads especially during installation.

6.0 MEASUREMENT AND PAYMENT

6.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost therefore shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

a. Jointing arrangement of pipe on both ends of valves, including gaskets, nuts, bolts etc.
b. Valves and appurtenances supports and anchors
c. Keys for operation of valves
d. Steel embedded parts and lal el plates
e. Manufacturer's literature and operation manual for valves and appurtenances
f. Painting of valves, water meter and appurtenances
g. Stand pipe and coupling for underground fire hydrants

6.2 Measurement:

Measurement of acceptable completed works of all types of valves, water meter and above ground fire hydrants will be made on the basis of actual number of valves and above ground fire hydrants provided and installed in position as shown on the drawings, and as directed by the Engineer.

6.3 Payment:

Payment for the acceptable measured quantity of all types of valves, water meter and above ground fire hydrants will be made on the basis of unit rate per number quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 5220***

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SECTION - 5240

PUMPING MACHINERY

1.0 SCOPE

2.0 MATERIALS AND PRODUCTS

3.0 SPECIAL REQUIREMENTS OF PUMPS

4.0 FIREFIGHTING PUMPING UNIT

5.0 POTABLE WATER PUMP

6.0 POTABLE WATER BOOSTER PUMP

7.0 SUBMERSIBLE DEEP WELL POTABLE WATER PUMP

8.0 SUBMERSIBLE DRAINAGE PUMP

9.0 SUBMERSIBLE GRINDER TYPE SEWAGE DISPOSAL PUMP

10.0 MAINTENANCE MANUALS AND TOOLS

11.0 MEASUREMENT AND PAYMENT

PUBLIC PROCUREMENT REGULATORY AUTHORITY PPRA EPADS

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1.0 SCOPE

The work to be done under this section of the specifications includes furnishing all plant, labour, equipment, appliances and materials and in performing all operations required in connection with the installation of pumping machinery including all accessories as specified herein or shown on the Drawings or as directed by the Engineer.

2.0 MATERIALS AND PRODUCTS

Materials and machinery shall conform to the latest referenced specifications and other provisions specified herein and shall be new and unused. In case where manufacturers are specified, materials and equipment will be of the same manufacturers. In all other cases the Contractor shall submit the names and addresses of the Manufacturers and trade names of the materials and equipment that he intends to buy. Other information such as diagram, drawing and descriptive data will be supplied if so desired by the Engineer. Approval of materials and all the machinery under this provision shall not be construed as authorising any deviations from the specifications. The approval of machinery of manufacturer other than that specified will be purely on the discretion of the Engineer. The Engineer will fully ascertain the facts and satisfy himself as to the performance of the machinery offered by the Contractor.

3.0 SPECIAL REQUIREMENTS OF PUMPS

The Contractor shall furnish with each pump properly identified characteristic curves prepared and certified by the manufacturer showing capacity, head, efficiency and brake horsepower throughout the entire range of the pump.

The pumps shall have stable throttling curves and be suitable for unrestricted parallel operation.

All pumps shall be electric driven.

The pumps and their drives shall not overload or trip when operating against zero pressure.

The design, construction and materials shall be such that damage as a result of cavitation is completely eliminated.

Pumps shall have bearings and be suitable for continuous as well as intermittent operation without external sealing or cooling water. The pumps shall be such that they shall come into operation at once after a prolonged shutdown period without having to take special measures. Pumps shall be capable of delivering specified quantity of water at the specified pressure.

Pumps shall be tested at site before their final acceptance.

Pumps shall be installed at positions shown on the Drawings and/or as directed by the Engineer.

Pumps and their drives shall be in perfect alignment when installed in position.

Pump set shall be provided with reducer/enlarger if necessary on pump discharge pipe and suction pipe.

4.0 FIRE FIGHTING PUMPMING UNIT

The pump set shall be NFPA compliance Skid mounted Fire Fighting pumping unit complete ready to be connected with suction and delivery pipe lines and electric

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connection, including Horizontal Centrifugal Pumps with class IE3 electric motor of specified capacity or diesel engine drive, head and duty, pressure tank, pressure switches, sluice & check valves, strainers, suction and discharge headers, pressure gauges, control unit, manual tools, spare parts, testing and commissioning etc., complete in all respect ready to be connected with fire water supply line.

Pump materials shall be as under:

Pump Housing, head & Base	:	Fine grained grey cast iron
Intermediate chamber	:	Stainless Steel
Impeller	:	Stainless Steel
Shaft	:	Stainless steel
Shaft Sleeve	:	stainless steel
Power Transmission	:	Cast Iron split coupling

Pumps shall have mechanical seal. The suction and discharge flanges shall be rated for a working pressure of 25bars for fire pumps. The flanges shall be drilled to BS 10 (Table 'D' or 'E') or BS 4504.
Motors shall be of efficiency class IE3 and run on 3-phase, 400 volts + 10% 50 c/s A/C power motors.

5.0 POTABLE WATER PUMP

The pump shall be close coupled, horizontal, centrifugal pump of specified capacity, head and duty, totally enclosed, fan cooled, squirrel cage induction motors of specified power.

Pump material shall be as under:

Body	:	Fine grained grey cast iron
Impeller	:	Bronze
Shaft	:	Bronze or stainless steel

Pumps shall have mechanical seal. The suction and discharge flanges shall be rated for a working pressure of 10 kg/cm2 for potable water pumps. The flanges shall be drilled to BS 10 (Table 'D' or 'E') or BS 4504.

Motors shall run on 3-phase, 400 volts + 10%, 50 c/s A/C power motors shall be protected from low voltage, overload, overheating and phase failure.

Potable water pumps and motors shall be installed on concrete foundation with anchor bolts.

Potable water pumps will be automatically operated at pre-set levels in overhead tanks with help of level switches installed in respective overhead water tanks. In case a pump fails to start automatically, an alarm will be automatically sounded at preset minimum water level in overhead water tank.

OPERATION OF PUMPS:

- Both pumps are duty pumps.
- Duty of pumps shall be interchangeable.
- Pumps shall start and stop at predetermined low and high water level respectively, through level switches installed in overhead water tank.
- A duty cycle relay shall be installed for alternate operation.
- Alarm shall sound at highest water level in overhead water tank to describe that pumps has not stopped.
- Dry running relay in UGWT should also be installed.

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6.0 POTABLE WATER BOOSTER PUMP

Skid mounted potable water booster pump set shall comprise centrifugal pump and a pressure tank provided with the following accessories:

One number PVC/polypropylene/rubber/epoxy lined steel hydro-pneumatic pressure tank of specified capacity with neoprene rubber diaphragm between the water and air sections. The tank shall be complete skid mounted boosting system with automatic motor control unit for dry run protection and auto operation system shall be provided with stainless steel piping. The unit shall be furnished ready for installation L/C flexible pipe gate valve, non return valve, pressure switch & pressure gauge and shall be ready for operation when connected to the piping & electricity supply. The tank shall be rated for a working pressure of 16 kg/cm2 and test pressure of 25kg/cm2 and shall comply with all the relevant clauses of "ASME Code for Pressure Vessel".

Pump sleeve, intermediate chamber/guide vanes, impeller, suction inter-connector spline shaft cover plates etc. shall be of stainless steel with mechanical seal of approved material. Base plate shall be painted steel.

Pressure gauge, pressure switch gate and check valve shall be on pump discharge pipe. Pressure switch will be adjustable between specified maximum and minimum pressure levels and shall be wired to motor control panel.

- Gate valve and check valve on pump discharge pipe.
- Gate valve, on pump suction pipe.
- Minimum run timer adjustable from 0-6 minutes.
- Low water level cut-off switch.
- Reducer/enlarger, if necessary on pump discharge and suction pipe.
- Alternator with manual over-ride.
- Alarm shall sound at low water level.

Duty of the pump shall automatically alternate between the two pumps (if available) with manual override. In failure of any of the duty pump the standby pump will automatically come into operations within 30 second.

7.0 SUBMERSIBLE DEEP WELL POTABLE WATER PUMP

Pump shall be submersible centrifugal type. The pump housing shall be stainless steel or cast iron. The stainless steel pump sleeve shall be in one piece and equipped with an insulated carrying handle. The suction strainer shall be clipped on the pump housing so that it could easily be removed for maintenance. The pump housing shall be fitted with an internal riser pipe ensuring that has a number of holes which enable efficient cooling of the motor during operation. The cable entry shall be of the socket and plug connection type.

The shaft shall be stainless steel which shall rotate in maintenance-free heavy duty pre-lubricated ball bearings.

The impeller shall be of stainless steel or bronze material. The impeller shall be semi-open type with L-shaped blades. The blades shall be curved backwards.

The unit shall be equipped standard water-proof power cable. Pump shall be vertical, single entry, multi stage. Pumps capacity and head shall be as specified in schedule of pumps. Pumps shall be installed as shown on drawings.

Pumps shall be supplied and installed complete with Electric motor, starter, control panel, level switches, etc. Motors shall be of efficiency class IE3 and run on 3-phase, 400 volts + 10% 50 c/s A/C power motors.

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8.0 SUBMERSIBLE DRAINAGE PUMP

The pump shall consist of submersible drainage pump and motor with duckfoot bend/auto coupling, guide rails and chain etc of the specified capacity and head and shall be integral sealed unit with strainer.

Pump material shall be as under:

Casting:	Cast Iron
Impeller / Bowl:	Cast Iron
Shaft:	Stainless steel
Bearing:	Pre-lubricated bearing
Motor:	Air filled water tight

The pumps shall be installed inside the pit as shown on drawing. The discharge flange shall be threaded to BS 21 and shall be rated for working pressure of 10 kg/cm².

8.1 INSTALLATION

The submersible drainage pumps shall be installed in the sump pits at the locations shown on the drawings.

8.2 PUMP ACCESSORIES

Pumps shall be provided inclusive of the following accessories:

i. Duck foot Bend, Guide rails and pulling chain etc.
ii. Pressure gauge, level switches, flow switches etc.
iii. Reducer/enlarger is necessary if the pump discharge size is different from discharge piping.

8.3 MOTOR PROTECTION

Motors of 3kw or less power shall be started direct on line. Larger motors shall be started by star-delta starter.

Motor shall be protected against under voltage, over voltage, overload, over-heating and phase failure.

Motor shall be rated for normal operation against a voltage fluctuation of + 10% and frequency fluctuation of + 2Hz.

8.4 CONTROL

Operation of pumps shall be controlled by level switches installed inside the sump pit.

i. One pump shall be duty and one shall be standby.
ii. Pumps shall start and stop at the designated water levels inside the sump.
iii. If duty pump fail to start, the standby pump shall automatically come into operation.
iv. If standby pump fails to start, an alarm shall be sounded at high water level.

8.5 LEVEL SWITCH

Level switches shall be electric actuating device, which will close/open the circuit at preset lower/higher pressures. The device shall be housed in diecast

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aluminium casing with enamel finish. The switch shall be adjustable. The pressure switch shall be rated for a working pressure of 16 Bar. The switch shall be wired to control panel.

8.6 WATER LEVEL INDICATOR

The water level indicator for high and low water level cut off shall operate on 230 Volt AC, 50 Hz and supplied complete with float, float chains, counter-weights, chain clamps, steel mounting brackets, chain guide roller and any other equipment and material necessary for installation and satisfactory operation.

The level indicator shall have at least 5 switch contacts or as required for sensing the required water levels within the specified range. The level indicator shall be suitable to match with the specific gravity of the fluid in which it is intended to be installed. All operational, constructional and installation details shall be furnished by Contractor for approval.

The Contractor may quote for non-mechanical type of water level indicator to give equivalent performance. Technical literature and data of the indicator is to be furnished along with the bid documents.

9 SUBMERSIBLE GRINDER TYPE SEWAGE DISPOSAL PUMP

The pump with cutting/grinding device/impeller shall consist of submersible sewage pump and motor with duck foot bend/auto coupling, guide rails and chain etc of the specified capacity and head and shall be integral sealed unit with strainer.

Pump material shall be as under:

Casting:	Cast Iron
Impeller / Bowl:	Cast Iron
Shaft:	Stainless steel
Bearing:	Pre-lubricated bearing
Motor:	Air filled water tight

The pumps shall be installed inside the pit as shown on drawing. The discharge flange shall be threaded to BS 21 and shall be rated for working pressure of 10 kg/cm^2.

9.1 INSTALLATION

The submersible dsewage pumps shall be installed in the sump pits at the locations shown on the drawings.

9.2 PUMP ACCESSORIES

Pumps shall be provided inclusive of the following accessories:

(i) Duckfoot Bend, Guide rails and pulling chain etc.

(ii) Pressure gauge, level switches, flow switches etc.

(iii) Reducer/enlarger is necessary if the pump discharge size is different from discharge piping.

9.3 MOTOR PROTECTION

Motors of 3kw or less power shall be started direct on line. Larger motors shall be started by star-delta starter.

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Motor shall be protected against under voltage over voltage, overload, over-heating and phase failure.

Motor shall be rated for normal operation against a voltage fluctuation of + 10% and frequency fluctuation of + 2Hz.

9.4 CONTROL

Operation of pumps shall be controlled by level switches installed inside the sump pit.

(i) One pump shall be duty and one shall be standby.
(ii) Pumps shall start and stop at the designated water levels inside the sump.
(iii) If duty pump fail to start, the standby pump shall automatically come into operation.
(iv) If standby pump fails to start, an alarm shall be sounded at high water level.
(v) An automatically operated change over switch shall also be installed to change over duty of pumps after each cycle.

9.5 LEVEL SWITCH

Level switches shall be electric actuating device, which will close/open the circuit at preset lower/higher pressures. The device shall be housed in diecast aluminium casing with enamel finish. The switch shall be adjustable. The pressure switch shall be rated for a working pressure of 16 Bar. The switch shall be wired to control panel.

9.6 WATER LEVEL INDICATOR

The water level indicator for high and low water level cut off shall operate on 230 Volt AC, 50 Hz and supplied complete with float, float chains, counter-weights, chain clamps, steel mounting brackets, chain guide roller and any other equipment and material necessary for installation and satisfactory operation.

The level indicator shall have at least 6 switch-contacts or as required for sensing the required water levels within the specified range. The level indicator shall be suitable to match with the specific gravity of the fluid in which it is intended to be installed. All operational, constructional and installation details shall be furnished by Contractor for approval.

The Tenderer may quote for non-mechanical type of water level indicator to give equivalent performance. Technical literature and data of the indicator is to be furnished along with the bid documents.

10 MAINTENANCE MANUALS AND TOOLS

10.1 A book or books containing the complete information in connection with the assembly, operation, lubrication, adjustment and repair of the pumping equipment, electric motor, together with detailed parts list with drawings or photographs shall be furnished in duplicate.

10.2 For the pump room, special tools necessary for maintenance and repair of the pumps and electric motors including tools kits, grease guns etc. with accessories shall be furnished.

10.3 The manufacturer's recommended list of spare parts to be stocked by the CLIENT shall be submitted by the Contractor to the Engineer for approval. Such spare parts will also be furnished by the Contractor.

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10.4 All the maintenance manuals, tools, spare parts etc., shall be supplied by the Contractor at no cost of the CLIENT and all cost shall be deemed to be included by the Contractor in his bid against item of pumping set.

11 MEASUREMENT AND PAYMENT

11.1 Pumping Machinery

11.1.1 Measurement

Measurement for payment of pumping machinery pressure gauge, brass strainer, pressure switch and water level indicator shall be the actual number acceptably provided and installed in position; the Contractor's bid against these item shall include cost of providing and installing the pumping machinery including the pumps, electric motors, all accessories, manuals, tools, spare parts, etc., as shown on the Drawings, as specified herein or as directed by the Engineer.

11.1.2 Payment

Payment will be made for acceptable measured quantity of pumping machinery pressure gauge, brass strainer, pressure switch and water level indicator on the basis of unit rate per number quoted in the Bill of Quantities. The amount bid shall be full payment for the work specified.

*** End of Section 5240 ***

PUBLIC PROCUREMENT AUTHORITY (PPRA) EPADS

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SECTION - 5600

DEVELOPMENT OF TUBE-WELL

1. LOCATION OF TUBE WELL
2. ORDER OF WORK
3. MACHINERY & EQUIPMENT
4. DRILLING AND SUPERVISORY STAFF
5. MOBILIZATION AND DEMOBILIZATION
6. DRILLING OF BORE HOLES
7. DATA AND RECORDS
8. ELECTRICAL LOGS
9. CONSTRUCTION OF TUBE WELLS, DEVELOPMENT AND TESTING
10. DEVELOPMENT AND TESTING
11. MEASUREMENTS AND PAYMENT

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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1. LOCATION OF TUBE WELL

The tube well will be installed at location selected after performing Electrical Resistivity Survey.

2. ORDER OF WORK

a) The order in which the tube well sites are to be completed will be determined by the Engineer.

b) The work at each site will be accomplished in the following sequence: -

- Drilling with 4" to 8" dia bit to carry out pump out test with air compressor, to determine the tentative expected discharge of the well and to collect water samples for laboratory testing.
- Collection of samples at 5 ft. interval of depth or at change of lithology which ever is earlier.
- Sieve analysis of the representative lithologic samples.
- Electrical logging of the borehole.
- Improvement in the tentative design to be made based upon the actual sub-surface lithologic conditions encountered for approval by the Engineer at site.
- Installation of tube well assembly.
- Gravel packing to the annular space around the tube well assembly.
- Development and testing (D&T) of the tube well; and.
- Capping and sealing the tube well top.

3. MACHINERY & EQUIPMENT

The Contractor shall be solely responsible for furnishing all the plants, equipment, instruments, appliances, accessories, materials, labour, technicians etc, required to complete all the works specified in the tender document to the satisfaction of the Engineer.

4. DRILLING AND SUPERVISORY STAFF

The Contractor shall have at site, at all time, only qualified, experienced and thoroughly competent persons for the execution and supervision of the drilling and other related works.

5. MOBILIZATION AND DEMOBILIZATION

5.1 Mobilization

Mobilization shall consist of the delivery at site of all equipment, materials and supplies to be furnished by the Contractor, the complete assembly in satisfactory working order of all such equipment on the job and satisfactory storage at site of all such materials and supplies. The Contractor shall mobilize the necessary equipment and supplies in order

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to perform the work in satisfactory manner under the existing condition. This will also include the shifting of equipment from one location to another.

5.2 Demobilization

Demobilization shall consist of the removal from the site of all equipment and extra material from the site after completion of the work and leave the site clear, clean and tidy to the satisfaction of the Engineer.

6. DRILLING OF BORE HOLES

6.1 Scope of Work

Drilling of one exploratory holes to depths specified by the engineer but not more than 350 ft. shall consist of all work required in connection with drilling the bore holes at each site that would be shown on the map or directed by the Engineer including, but not limited to locating the site on the ground, moving in, setting up, preparing the site, drilling the bore, collecting data and keeping records, collecting preserving lithological and water samples and their analysis for gradation and water quality, installing and removing temporary casing, dismantling, moving out and cleaning up the site.

6.2 Location of Exploratory Holes

The Engineer as a result of Electric Resistivity survey carried out by the Contractor shall establish location of exploratory site in the field. Fixing the borehole locations on the ground shall be the responsibility of the Contractor.

6.3 Method of Drilling

6.3.1 The Contractor shall drill exploratory hole at the location established by the Engineer. The Contractor shall prepare the site for installing drilling rig and drilling the exploratory hole.

6.3.2 The bore hole shall be initially drilled a pilot 8" diameter with straight rotary rig up to desired depth depending up the reasonable extent of aquifer up to 350 ft. depth or to the depth less than this as directed by the Engineer at site.

6.3.3 After the desired depth is achieved the Contractor will carry out pump out test to determine tentative expected discharge of tube well and to collect water samples for laboratory test specified by the Engineer.

6.3.4 The water sampling will be carried out by installing temporary well of 2" diameter in the borehole with 10 ft. of screen at the bottom. The water samples will be collected by pumping with air compressor and lowering a suitable airline. Each water sample will be collected after 6 hours of pumping or more till the water is clear and the electrical conductivity and temperature of the water pumped should be constant for at least three hours. The contractor will supply all the instruments necessary for the above testing.

6.3.5 After achieving desired results through pump out test by air compressor. The same borehole will ream to 12" diameter. Each bore hole shall be drilled up to 350ft. depth or to the depth less than this as directed by the Engineer at the site. The bore holes shall be drilled straight and plumb so that the required pump and tube well casing may be installed concentric with the hole and within the

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tolerance specified for plumbness of the casing Waste materials from the drilling operation shall be disposed off in a manner approved by the Engineer.

6.3.6 Lithological Sampling

The lithological samples are to be collected at every 5 ft. depth or change of lithology whichever less is. After each sampling the hole shall be flushed out for removing the cuttings out of the hole. The samples shall be kept in a sample box of the type suggested by T.P. Ahrens or as directed by the Engineer. Representative samples shall be kept in polythene and cloth bags with proper mark on the bag i.e. borehole No., Samples No., Depth, Formation, data etc.

7. DATA AND RECORDS

The Contractor shall keep accurate record of drilling history indicating drilling fluid losses, circulation losses, time log, lithologic log of each bore hole including description of all materials encountered and their location in the bore hole. The fact that the Engineer or his representative may be present and keeping a separate record shall not relieve the Contractor from this responsibility. In the case of defective or incomplete records the Contractor shall complete the records at his own expense. All records and data shall be kept by the Contractor on forms approved by the Engineer. The Contractor shall deliver to the Engineer the original of all records and all such records shall become the property of the Employer.

8. ELECTRICAL LOGS

Contractor shall perform electric logging in each borehole. The resistivity and self-potential methods may be employed in electric logging. Each log shall be conducted from surface up to 3 ft. above the drilling depth. Contractor shall supply three copies of each log in which interpretation in term of lithology may be made.

9. CONSTRUCTION OF TUBE WELLS, DEVELOPMENT AND TESTING

9.1 Scope of Work

Construction of tube well will include, but not be limited, furnishing and installation of pipes, screens, fixtures to the required depth, furnishing and placing of gravel shrouding up to the specified depth in the annular space between the tube well and casing and to provide all the staff, technicians, drillers and furnishing of plants, machinery equipment, appliances, etc. required of drilling, installation and development and testing of tube well shall be the sole responsibility of the Contractor. After completing all the works mentioned herein, the Contractor shall remove all his machinery, equipment, plants and waste materials and clear the site as per specification and the instructions of Engineer.

9.2 Construction of Tube well

9.2.1 Contractor shall drill holes up to the depth as specified by the Engineer at site. The borehole is sufficiently straight and plumb so that the tube well casings and pump may be installed satisfactorily.

9.2.2 It shall be the Contractor's responsibility to protect the hole against caving and sloughing; and stabilizing the unstable materials in the manner approved by the Engineer.

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9.2.3 If, in the opinion of the Engineer it is necessary to discontinue the work in any bore hole because it is out of line more than the amount specified or on account of jammed tools, caving ground or because of negligence on part of the Contractor, the Contractor shall drill another bore hole at an alternative location designated by the Engineer. The Contractor will not be entitled to payment for any work done or materials furnished for bore holes abandoned as a result of his operations or negligence.

9.2.4 The depth of the pump-housing casing will be established by the Engineer. Lengths of the specified diameter of steel casing shall be provided to extend the pump housing casing from the elevation of the top of the pump housing casing to the depth established by the Engineer.

9.2.5 Adjoining sections of pump housing casing shall be assembled by field welding. All field welding shall be performed by the electric arc method, using heavily coated welding rods suitable for all position welding. All the pipe ends shall be beveled before welding. After being deposited, welds shall be cleaned of slag and shall show uniform sections, smoothness of weld metal, featheredges without overlap and free from porosity and clinkers.

9.2.6 The length and size of the casing as specified by the Engineer shall extend from the bottom of the housing pipe to the depth determined by the Engineer. The bottom of the tube well casing shall be provided with a ball plug. The tube well casing shall consist of slotted sections (brass screen) for installation against water yielding formations and blank pipe sections opposite non- water yield formations as directed by the Engineer. It is envisaged that the diameter of Housing pipe and screen will be 10" and/or 8" respectively.

9.2.7 The Contractor shall install the entire pump housing and tube well casing assembly straight plumb, and concentric in the reamed hole to permit the installation of the pump in such a manner that it will operate satisfactorily and without damage. The methods employed by the Contractor in the installation of the casing or in obtaining or correcting the verticality and straightness of the pump-housing casing shall be subjected to the approval of the Engineer.

9.2.8 Centralizers, placers or other suitable devices shall be attached to the tube well casing at about 30 ft. interval so that it will be centered in the bore hole throughout its entire length and held in such a position while gravel shrouding is being placed. Centralizers shall be attached to the pipe or coupling in a manner that ensures that the pipe is accurately centered in the borehole. The detail design of the Centralizers and method of attachment to the pipe and coupling shall be subject to the approval of the Engineer.

9.2.9 The Contractor shall install pump housing casing so that the deviation of its axis from the vertical shall not exceed one and half inch at the bottom of the pump housing casing. Measurements for determination of verticality and straightness of the pump housing casing shall be made by the Contractor in the presence of the Engineer upon completion of the gravel shrouding.

9.2.10 Measurements for determining the deviation of the pump housing casing from the vertical shall be made by the use of a circular plumb having a minimum outside diameter of ½" less than the inside diameter of the pump housing casing. The plumb shall hang vertically and shall be suspended in the center of the pump housing casing from a point 10 ft. above the top of the casing. When the plumb is lowered to the bottom of the pump-housing casing at the top by more than that corresponding to a deviation of the plumb of one and a half inch

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at the bottom of the pump-housing casing. All deviations shall refer to a vertical line passing through the center of the pump housing casing at the to the pump housing casing.

9.2.11 Straightness shall be determined by lowering a section of pipe 20 ft. long or a dummy of the same length to the bottom of the pump housing casing. The minimum outside diameter of the pipe or dummy shall be ½" less than the inside diameter of the pump housing casing. If a dummy is used, it shall consist of rigid spindle with three cylindrical rings, each ring having a height of at least 12". The rings shall be true cylinders and shall be located at each end and in the center of dummy shall be rigid so that it will maintain the alignment of the axis of the cylindrical rings. The pump housing casing shall be sufficiently straight so the pipe or dummy can be passed freely throughout the entire length of the pump housing casing. Plumbs, pipes and dummies used in these tests shall be approved by the Engineer.

9.2.12 If the tube well, failing to meet the specified requirements for straightness, vertically and concentricity shall be abandoned, the contractor shall construct a new well at his own expense at an alternative site designated by the Engineer.

9.2.13 The Contractor may obtain gravel from any source/location subject to the approval of the Engineer provided that gravel meets the requirements of the specifications. The Employer will not be responsible for amount of work involved or the amount of materials it will be necessary to waste in order to obtain the required amount of gravel of proper gradation.

9.2.14 The gravel shrouding shall be clean, washed, water worn, carbonate free, generally hard well rounded and without thin or flat particles. The gravel supplied shall be subject to inspection and screening in the field to ensure proper gradation suitable to the formation. Approximate limits of gradation of gravel shall be designed on the basis of gradation analysis of lithological samples. The limit of gradation shall be provided to the Contractor within a day or two after receiving the results of gradation of all the samples collected from the exploratory well which is to be converted to the tube well. The gravel shall be reasonably graded and shall conform to the approximate limits of design.

9.2.15 Gravel shall be placed at constant rate using Tremie pipe Hoppers of other similar devices to provide continuous and uniform gravel flow so as to minimize segregation of particle sizes. When Tremie pipe or Hopper is used, gravel shall be introduced in, the annular space between the pump housing and the edge of the hole at two points located 180 degree apart. The Tremie pipe when used shall be of suitable size and lowered to the bottom of the well on two opposite sides of the bore hole and calculated quantity of gravel shall be poured in the pipe through a funnel and the pipe shall be raised by 5 ft. intervals. In all the cases water shall be circulated steadily during gravel placement by inserting the drilling rod into pump housing and operating the circulation pump on the drilling rig. The water level in the annular space outside the pump housing shall be maintained at or above natural ground surface level by return flow from the cutting pit.

Temporary casing, if used, shall be carefully withdrawn in 5 ft to 10 ft interval during placement of gravel shrouding and the gravel shall be introduced so that each stage of the hole above bottom of the casing is completely filled before the casing is withdrawn to next stage.

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10. DEVELOPMENT AND TESTING

10.1 The tube well shall be developed with air compressor initially. The depth of the airline will be varied to clean all the sections of the screen. Any sediment collected at the bottom shall be lifted out by pumping or the bailer if necessary. The initial development will be considered as completed when the water is clear and sand free and the discharge is constant to the satisfaction of the Engineer.

10.2 The development procedures and methods used for the development of the tube wells shall be established by the Contractor subject to approval by the Engineer. Development and testing shall include, but not be limited to Block Surging, back washing and pumping the tube well at higher than the rated capacity strictly following the instructions and under the supervision of Engineer. The Engineer shall witness the development operations from their initiation to their completion. The Contractor shall maintain complete records of the development operations and shall make regular periodic measurements of discharge rates and water level measurement.

10.3 The final development of the tube well shall be performed with turbine/submersible pump for a minimum of six hours by step pumping, back washing and surging the tube well with a pump. The Contractor may notify the Engineer at any time following the completion of the six hours pumping period that the tube well is ready for testing.

10.4 The Contractor shall test each tube well under the Engineer's direction as described herein. Upon completion of the development operations the tube well shall be permitted to recover for minimum period of one hour. During this recovery period, the tube well shall be sounded. If the comparison of the depth by sounding and the length of the casing string indicating there is more than 5 ft of material in the tube well, it shall be cleaned to within 2 ft of the bottom of the casing.

10.5 Following the recovery period, the tube well shall be pumped at 150 percent of rated capacity for a period of one hour. The water pumped shall at all time be cleared and free from turbidity.

10.6 Upon satisfactory completion of above one-hour pumping period the tube well shall be permitted to recover for a period of one hour. Upon the completion of this recovery period, a four hour multiple step pump test shall be performed by pumping the tube well for one hour at each approximately four equal increments. The last increment shall be at 150 percent of rated capacity. Following this last increment of the step test, the tube well shall be pumped at a rate of 150 percent of design capacity for a period of two hours.

10.7 The following is a short summary of the development and testing procedure:

Development

Development time 6 hours (minimum)

Recovery 1 hour (minimum)

Testing

Pumping period 1 hour

Recovery 1 hour (minimum)

Step pumping 4 hour

Pumping period 2 hours.

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10.8 The Contractor shall furnish all necessary equipment for testing the tube well, including a water lubricated or oil lubricated test pump capable of delivering at least 150 percent of the tube well rated capacity at all stages of the tests, a valve for fine adjustment of the discharge, an electric measuring device to determine the draw down during each stage of the test and Imhoff cones to measure sand content. If oil lubricated test pumps are used, the Contractor shall exercise all reasonable precautions to keep the leakage of lubricating oil into the tube well at a minimum and shall promptly remove all oil which collect on the water surface in the tube well by the addition of detergents or other suitable chemicals and pumping the emulsified oil from the tube well. In the event the Contractor fails to keep the leakage of oil into the tube well within acceptable limits or to promptly remove oil accumulations from the tube well, the Engineer will order the use of oil lubricated test pumps discontinued, and the Contractor will be restricted to the use of water lubricated pumps for testing of the tube wells. The tube well specialist will determine the actual depth of setting for the test pump after the tube well has been developed. Piping gauges, orifices, meters, weir boxes or other measuring devices shall be furnished, installed and removed by the Contractor and shall remain his property. All measuring devices and testing equipment will be subject to approval by the Engineer.

10.9 The Contractor shall take draw down and discharge measurements and other pertinent data during each test at intervals as specified by the Engineer. All such data shall be recorded on forms approved by the Engineer and the original of such forms shall be delivered to the Engineer at the completion of the development and testing operations.

11. MEASUREMENTs AND PAYMENT

11.1 Measurement of Exploratory Holes

11.1.1 Measurement for drilling of exploratory holes will be made of the actual depth of each bore hole drilled, measured from the original ground surface, from the depth of bore hole specified by the Engineer. No measurement will be made of over-drilling required because of sloughing or caving for boreholes abandoned due to caving negligence on the part of the Contractor.

11.1.2 Payments will be made of depth of bore hole and samples on basis of bidding rates in the bill of quantities. The Contractor shall be paid for the actual depth requested. Any over drilling done by the Contractor for the safety of the pipes and screens or other purposes shall not be paid.

11.1.3 If desirable results are achieved by pump out tests. The same test bore will be reamed by rotary drill. No extra payment for test bore will be paid.

11.1.4 If desirable results are not achieved from pump out test with compressor. New test bore will be drilled at new location designated by the Engineer and the payment for bore hole abandoned due to non availability desired quality/quantity of water will be made to the Contractor.

11.2 Measurement for Tube Well

11.2.1 Measurement for drilling of tube wells will be made of the actual depth of each borehole drilled, measured from the original ground surface, for the depth of bore hole specified by the Engineer. No measurement will be made of over-drilling required because of sloughing, caving ground or for the Contractor's use in setting casing, for tube wells abandoned due to jammed tools, caving ground, or negligence on the part of the Contractor or for tube wells not constructed in accordance with all the requirements of these specifications.

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11.2.2 Payment will be made for the depth of bore hole per linear feet bid in the Bill of Quantities.

11.2.3 No payment will be made of drilling the test bore hole except the pump out test with compressor, if the desired quantity/quality of water is obtained. The same trial bore will be further developed for main bore hole.

11.2.4 If desired results are not obtained from the bore and the bore is abandoned the measurement and payment will be made as defined in 11.2.1 and 11.2.2.

11.2.5 Measurement for furnishing and installation of causing will be made of the total length of each size, wall thickness and type of pump housing and tube well casing actually installed in the tube well including length of concentric reducers. The measurement of length will be taken from the elevation of the top of the pump-housing casing to the bottom of the tube well casing. For measurement of length, concentric reducers will be considered as casing of the larger size to which the reducers are directly connected. No measurement will be made of centrallzers, bail plugs or other accessories required for the complete installation. Unless otherwise quoted as separate items in the bid.

11.2.6 Payment will be made for the actual cased depth at the unit price per linear feet bid in the Bill of Quantities.

11.2.7 Measurement for payment will be made of the length of annular space between casings and walls of the bore bole actually shrouded from top of the gravel shroud to the bottom of the hole as specified by the Engineer, or on lump sum basis if quoted by the Contractor as such.

11.2.8 Payment will be made for the actual length of gravel shrouding at the unit price per linear feet bid in the bill of quantities, or lump sum as per bid by the Contractor.

11.2.9 Payment for pump out test with compressor development and performing aquifer test shall be made as per rate quoted in the bill of quantities.

*** End of Section 5600 ***

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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SECTION – 9000

GEOTECHNICAL INVESTIGATIONS

1. GENERAL
2. DEFINITIONS
3. METHODS OF WORKING
4. DRILLING
5. SAMPLING
6. FIELD TESTING
7. LABORATORY TESTING
8. REPORTS AND RECORD
9. MEASUREMENT AND PAYMENTS

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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1. GENERAL

1.1 Scope of the contract

The purpose of the work specified herein is to determine the type, nature, thickness, structure and texture of the various subsurface strata and the conditions and the engineering characteristics of the subsurface materials as they exist to the depth and at the locations specified. This is to be accomplished by means of straight rotary drilling or heavy percussion boring, in situ testing and collection of disturbed/undisturbed samples from the project site. The selected samples of soil, rock and water shall be tested in the approved laboratory for their physical, chemical and engineering properties. The locations of boreholes will be finalized by the Engineer in the field.

1.2 Qualification of Geotechnical Contractor

Geotechnical Investigation Works shall be undertaken through specialized Geotechnical Contractor subject to fulfillment of following criteria.

Qualification will be based on the criteria given in the following paras regarding Geotechnical Contractor experience, personnel and equipment capabilities and litigation history. The Engineer reserves the right to waive minor deviations, if these do not materially affect the capability of the Geotechnical Contractor to perform the Works.

a) Experience of the Firm

The Geotechnical Contractor shall meet the following minimum criteria:

1) Successful experience as contractor in the execution of at least five (5) projects involving bulk of geotechnical investigations within the last three (03) years. This experience should specifically be of geotechnical investigations of similar nature.

b) Personnel Capabilities

The Geotechnical Contractor must have in his employment, suitably qualified and experience personnel to fulfil the positions tabulated below.

Sr. No.	Position	Qualification*	No.	Minimum Experience (Years)
1	Technical Manager	B.Sc. Civil Engg.	1	5
2	Site Geologist/ Supervisor / Engineer	M. Sc. Geology/ B.Sc. Civil Engg. / B.Sc. Geological Engg.	1	2
3	HSE Supervisor	HSE Certification course	1	1
4	Driller	Literate	1	3
5	Skilled Labor	-	As Required	-

c) Equipment Capabilities

The Geotechnical Contractor should own, or have assured access to the following key items of equipment in full working order, and must demonstrate that, based on known commitments, these will be available for deployment on the proposed works.

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Sr. No.	Equipment Type & Characteristics	Minimum Number Required
1	Straight Rotary Drilling rig complete in all respects including drilling rods, bits, mud pumps etc. along with at least one stand-by rig. The equipment shall be capable to obtain core recovery more than 80 percent and to complete the investigations within the time schedule.	1
2	Percussion Boring Set (>250 mm diameter), complete in all respects including tripod, chisel / bit etc.	1
3	Casing set having various diameters for all types of boring at least 25 m in length with casing bits.	1
4	Standard penetration test equipment complete in all respects including all rods, split spoon sampler, hammer and containers etc.	1
5	Core barrels (double tube) including coring and casing bits.	As required
6	Shelby/Denison/Pitcher samplers	1
7	UDS tubes & Split Spoon Samplers	As Required
8	Hydraulic jacks with all accessories for the extraction of casings	1
9	Electrically operated sounder for groundwater level measurement	1
10	Test pit excavation equipment/hand tools complete in all respect	As required
11	Field density test apparatus (with 6 and 12 inches dia. cone) complete in all respect 1 each	1
12	Wooden box for the preservation of undisturbed soil/rock samples	As required
13	Transport for mobilization of equipment	As required

d) Litigation History

The Contractor should provide accurate information on any litigation or arbitration resulting from Contracts completed or under execution over the last three (03) years of his Geotechnical Contractor. A consistent/ overwhelming history of litigation against the Geotechnical Contractor may result in rejection of the application. In case the Geotechnical Contractor claims Nil litigation, he shall submit the same statement on the letter head of his company.

e) Application of Health, Safety and Environmental Standards

The Contractor should provide the HSE Policies and supporting documentary evidence of his Geotechnical tractor for the following:

i) First Aid Box
ii) Personnel Protective Equipments (PPEs)
iii) Standard Operating Procedures (SOPs)
iv) Health, Safety and Environmental (HSE) Policies
v) HSE staff

1.3 Work under Instructions of Engineer

The Geotechnical Contractor shall carry out the specified works under the supervision of the Engineer, his Representative or the Representative's assistants.

1.4 Mobilization

The Geotechnical Contractor shall mobilize to site for the execution of work as per agreed schedule. Mobilization shall consist of the delivery at the site of all plant, equipment, accessories, spares, materials, and supplies to be furnished by the Geotechnical Contractor; the complete assembly of all such plant and equipment in a satisfactory working order and satisfactory storage at the Site of all materials and supplies. The equipment mobilized shall include but not limited to the items listed in Clause 1.5.

1.5 List of equipment which must be included but not limited to in items mobilized by the Contractor.

Description	Minimum Quantity
1) Rotary/Percussion drilling rig capable of drilling down to maximum required depth with water or bentonite mud, complete with all necessary casing, tools, rods and drilling equipment e.t.c.	As mentioned in bill of quantities
2) Casing of different diameters capable of boring/drilling upto maximum required depth in overburden. Minimum diameter of hole shall not be less than 6 inch at the bottom of the hole.	As per project requirement
3) Core barrels (double tube) including coring and casing bits.	As per project requirement
4) Hydraulic jacks with all accessories and spares for the extraction of casings after completion of holes.	As per project requirement
5) Denison sampler	As per project requirement
6) Pitcher sampler	As per project requirement
7) Soil sampling tubes for Denison & Pitcher samplers	As per project requirement
8) Open drive sampler tubes, shelby tubes	As per project requirement
9) Standard penetration test equipment including AW, B rods and split spoon samplers and containers for sample preservation	As per project requirement
10) Hand digging tools	As per project requirement
11) Field Density Test Apparatus	As per project requirement
10) Electrically operated sounder for groundwater level measurements	As per project requirement

1.6 Permission to start the works

The Geotechnical Contractor shall not be allowed to commence the works until he has

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mobilized all the equipment required to complete works as per BOQ and any delay caused thereby shall not be allowed as a basis of a claim for additional expenditure or an extension of the time for completion of the Works.

1.7 Demobilization

Demobilization shall consist of the removal from the site of all plant and equipment after completion of the work and leaving the site clear, clean and tidy to the satisfaction of the Engineer. Engineer's permission shall be sorted before demobilization from the site.

1.8 Plant and equipment

The Geotechnical Contractor shall keep on the site sufficient plant to meet the requirements of the work. The plant and equipment shall be in good operating condition and capable of efficiently performing the work as set forth.

1.9 Drillers and supervisory staff

The Geotechnical Contractor shall have on site, at all times, qualified, experienced, orderly and thoroughly competent persons including geotechnical engineers or engineering geologist who shall conduct and supervise drilling, boring operations, sampling, logging and in situ testing. The Geotechnical Contractor shall remove from the site any of his employees that in the opinion of the Engineer do not meet these requirements.

1.10 Setting up at each borehole

The Geotechnical Contractor shall make all the necessary arrangements for setting up at the location of each hole, everything necessary for carrying out the work specified at that hole, and for the preperation and reinstatement of the work areas, improvement to access routes and all other temporary works.

1.11 Housing and storage

The Geotechnical Contractor shall make his own arrangements for housing of his personnel and storage of the equipment and supplies at the site.

1.12 Health, Safety and Environmental (HSE) Measures

a) The Geotechnical Contractor shall ensure that all necessary measures are undertaken to maintain good health of its staff and hygienic conditions at the job site.

b) The Geotechnical Contractor shall ensure the safety of all the personnel engaged in the Works including the Employer and Engineer supervising staff, and shall take necessary precautions and preventive measures to that end including the use of personal protective equipment (PPE) and safe working procedures.

c) The Geotechnical Contractor shall take effective steps to assure that during the Work no air, water or soil pollution is generated.

1.13 Interference with others

It is possible that the Engineer may engage some other agency for the executions of other investigations at the Project site, which will start within the period of this Contract. The Geotechnical Contractor shall ensure that neither he nor his staff cause any interference with as well as delays to any other agency working on or near the site and that his plant and equipment or supplies shall not prevent or hinder the movement of personnel or of plant, equipment or supplies belonging to others who are lawfully in the area. If the Geotechnical Contractor receives any complaint either verbally or in writing that his operations have caused

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or causing delays or hindrance to others, he shall inform the Engineer immediately and pass on the original or a copy of any written complaint received. Likewise the Engineer shall inform the Geotechnical Contractor of such complaint which he has received concerning the Geotechnical Contractor operations.

1.14 Measurement of quantities

The quantities shown in Bill of Quantities are only approximate. The payment shall be made on the basis of actual work performed in accordance with the specifications.

1.15 Submission of Field Data

The Geotechnical Contractor shall supply complete field investigation data to the Engineer within two (02) days after the completion of field work. This data shall include copies of all approved logs and test records prepared during the course of the works including any alterations or amendments required by the Engineer. No separate payment shall be made for this work.

1.16 Order of work

The order of the execution of the work will be specified by the Engineer.

1.17 Coordination and Ground Elevation

Establishment of coordinates and ground elevations of all the boreholes are included in the scope of work. The coordinates should be provided with reference to a permanent local bench mark.

2 DEFINITIONS

2.1 Holes

Any borehole or drill hole is referred to generally as a hole.

2.2 Boring

Boring shall mean advancing a hole using machine-driven bailer, chisel or clay-cutter. The rig used shall be called a boring rig and the hole formed shall be called a borehole.

2.3 Drilling

Drilling shall mean the use of a machine-driven rig for advancing a hole in rock or soil required with a rotary cutting tool. The hole formed shall be called a drill hole and the rig used shall be called a drilling rig, which term shall include a boring rig with auxiliary equipment for drilling.

2.4 Sample tube

A 'Sample tube' shall mean the container into which undisturbed soil is forced during sampling and in which the soil is extracted from the ground and stored, after sealing, against loss of moisture.

2.5 Sampler

A 'sampler' shall mean the sample tube and all the accessories that are required to obtain the disturbed or undisturbed sample of soil.

3. METHODS OF WORKING

3.1 Areas to be investigated

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The limits of the project site and the approximate locations of the boreholes shall be indicated on Drawing, but the Engineer may change the locations within the limits of the area to be investigated during the progress of the work. The Engineer will specify from time to time during the Contract period the exact location and reference number of all boreholes, but locating the boreholes accurately in the field shall be the Geotechnical Contractor responsibility.

3.2 Boring

The Engineer will indicate the type and maximum depth likely for each hole before it is started, and the Geotechnical Contractor shall use the equipment necessary for continuing the hole to that depth.

3.3 Casing

A hole shall be cased in any stratum which is not sufficiently strong to stand unsupported, or when directed by the Engineer's Representative.

The Geotechnical Contractor shall ensure that casings are of a suitable size and are inserted in such a manner so as to render them recoverable. The Contract Rates for boring and drilling shall be deemed to include the supply, insertion and recovery of casing and any damage, loss or delay caused by difficulty or failure in recovery of casing.

3.4 Removal of casing

Casing shall not be removed from any hole nor any filling introduced into a hole until permission is given by the Engineer. This permission will normally be given as soon as work in the hole is completed and the groundwater level has been measured in accordance with Clause 3.8 of Technical Specifications.

3.5 Display of material removed

The material removed from all holes, except for disturbed samples in their containers and undisturbed samples in their samplers shall be laid out in sequence on a clean dry board for examination by the Engineer. The material shall be displayed in such a manner that, when required by the Engineer, further small, disturbed samples can be taken unmixed with other material. No material shall be removed from the board until authorized by the Engineer. All the material displayed shall be protected from adverse effects of the weather including hot sun and rain.

3.6 Supplementary holes

Holes that are abandoned shall be supplemented by other holes adjacent to the original location. In addition, holes from which unsatisfactory samples have been obtained and/or in which unsatisfactory field tests have been performed due to the negligence of the Geotechnical Contractor shall be supplemented by other holes adjacent to the original location. The exact location of such supplementary holes shall be specified by the Engineer in the field.

Penetration to the depth where the unacceptable holes were abandoned or to the depths where unsatisfactory samples were obtained or unsatisfactory field testing was performed may be made by any method selected by the Geotechnical Contractor that in the opinion of the Engineer will permit satisfactory field testing and sampling below those depths. The deepening of the supplementary hole below the depth at which original hole was abandoned shall be carried out using only the specified method of advancing the hole.

No payment will be made for that portion of the supplementary hole above the depth paid for in the unacceptable hole.

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3.7 Daily field records

Each day during the work on the Site, the Geotechnical Contractor shall hand over to the Engineer the original and a legible copy of the records of the previous day's work containing the following information in respect of each hole where work in progress.

a) Name of Contract.

b) Number, type and size of the hole.

c) Date and hours worked on the Site.

d) Brief description of the weather.

e) Total depth of hole at the beginning and end of each shift.

f) Make and type of machine in use.

g) The groundwater levels in accordance with Clause 3.8 and the depths at which water inflows were encountered.

h) The approximate quantity of water poured into a hole and the time when it was done.

i) Diameter of the hole and depths of any reduction in diameter.

j) The length of hole for which casing was used and the diameter of such casing.

k) A full geotechnical description of each stratum encountered.

l) Depth below ground of each change of stratum.

m) Reference number, depths and other details of all small and large disturbed samples, field moisture content samples and undisturbed samples (giving serial number and type of the sampler, length of sample recovered and number of blows used if driven).

n) Commencing and terminating depths of each drilling run, details of type of bit used and length of samples recovered.

o) Data obtained during in situ tests, together with the water level in the hole during the test on specified proformas.

p) Details of any instrumentation installed.

q) Details of backfilling and grouting including the quantity of material used.

r) Details of delays and breakdowns.

s) Any other relevant information and details of any other operation for which the Geotechnical Contractor may require additional payments.

3.8 Ground Water level

Readings of groundwater levels in all holes and that the depth of the hole in progress shall be taken with an electrically operated sounder and by other means recorded in the daily field records and logs at the following times:-

a) Before work commences in the morning.

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b) After work has finished in the evening, both before and after water (if any) is added to stabilize the hole.

c) When a hole has been completed.

d) Immediately prior to backfilling a hole at least after 48 hours.

e) At the time of undisturbed sampling and standard penetration and other in situ tests.

f) At the completion of the field work.

An electrically operated sounder in proper working order shall be maintained at each hole where work is in progress whether or not water has previously been observed in that hole.

The level of the bottom of the hole and the bottom of the casing, if any, shall be measured and recorded at the same time as each water level reading.

The times when water levels are measured shall also be recorded.

If, at any time, the level of the water in a hole fluctuates, a record shall be kept of the fluctuation. If the hole 'makes or 'loses' water the Engineer shall be informed immediately.

Any addition of water to assist the advance of a hole shall be recorded and any extraordinary smell or color of the water and any other unusual circumstances shall be reported. Water shall not be added or removed from a hole when in the opinion of the Engineer such action might adversely affect undisturbed sampling and the results of in situ tests.

3.9 No additional payment for water level observations

The Contract Rates for drilling and boring shall be deemed to include the cost of taking and recording all water levels as specified in Clause 3.8.

3.10 Backfilling of holes

Boreholes shall be backfilled with grout as explained below or as directed by the Engineer.

Grouting for backfilling holes shall consist of a mud formed by mixing one part by weight of bentonite with 10 parts of water, to which shall be added two parts by weight of cement after the bentonite and water have been thoroughly mixed. Alternatively, holes may be backfilled with purpose- made pellets of bentonite or bentonite/cement, provided they are of a size which, in the opinion of the Engineer is compatible with the size of hole. If there is no standing water in the hole, grout may be poured in from the top. If there is standing water in the hole, the grout shall be fed into the bottom of the hole by a tremie pipe, the end of which shall always be below the groundwater junction while grouting is being carried out.

Grout backfill shall be taken up to 30 cm below the original ground level. Any apparent loss of grout due to leakage or consolidation within one week shall be made-up with fresh grout and then the remaining depth of the hole shall be filled with concrete. No separate payment shall be made for this work and the contract rates for drilling shall be deemed to include cost of backfilling of boreholes.

3.11 Logs

Logs of boreholes/ drill holes/ shall be provided on forms specified by the Engineer. They shall include descriptions of all strata including details of the soil macrofabric (such as frequency, orientation and nature of discontinuities) and details of samples taken, and an account of all observations and field tests. Logs of drill holes and boreholes shall include notes on the nature, quantity and color of the drilling fluid returns. All logs shall be subject to the approval of the Engineer and one draft copy shall be submitted to the Engineer, not more than two days

after the hole is backfilled. Soil descriptions shall conform to ASTM designation D 2488-84 and classified according to ASTM designation D 2487-85. All depths and thicknesses of topsoil and strata shall be recorded in meters and all reduced levels shall be recorded in meters with respect to mean sea level.

3.12 Contractor's responsibility for records

The presence of the Engineer or any of his staff and their keeping separate drilling records shall not relieve the Geotechnical Contractor of any of his responsibilities for keeping records.

4. DRILLING

4.1 Depth of drilling

Drilling will be done to a maximum required depth at a minimum nominal hole size of 6 inches or as approved by the Engineer; boreholes shall be continued as drill holes when directed by the Engineer.

4.2 Accuracy of alignment of drill holes

Drill holes shall be within 1 degree of the required angle

4.3 Drilling plant

Drilling rigs shall be of the hydraulic feed type capable of using a rotary cutting tool, tipped with diamonds or other hard material and casing shall conform to B.S. 4019; Part I; 1974 or ASTM-2113-84 or an approved equivalent.

4.4 Drilling/ Boring procedure

The method of drilling may be any approved standard and accepted method of straight rotary drilling/wash boring or the combination of two methods by means of which a hole of specified diameter is extended to the desired depth. Percussion boring will be allowed only in case of presence of excessive gravels/cobbles/boulders in the substrata. Rotary cum wash boring method of drilling shall be used in soils or overburden for the purpose of advancing the hole by washing the interval between designated depths at which sampling and testing is to be undertaken.

During drilling the Geotechnical Contractor shall regulate the drilling at such speeds and control, the drilling fluid at such pressures which will ensure the minimum disturbance in the underlying material in which the in situ testing and sampling is to be carried out.

4.5 Drilling Procedure, Core Recovery (Boulders / Rocky Strata)

Drilling in rock/ hard strata shall be for the purpose of recovering cores. Drilling shall be carried out in such a manner and using such sizes of bits, that the maximum of core is recovered. This requires close surveillance of flushing media, drilling pressures, lengths and runs and all other factors relevant to the nature of the material drilled. The drill bit shall be withdrawn and the core removed as often as may be necessary to secure the maximum possible amount of core. In soft or friable formations dry drilling techniques may be required using single tube core barrels with tungsten carbide bits as directed by the Engineer. Length of Coring Runs (Boulders / Rocky Strata)

4.6 Coring Runs

Coring runs shall be limited to a maximum depth as mentioned in Bill of Quantities or as directed by the Engineer. When less than 80 percent of the core is recovered from a run the length of the following run shall be reduced to 50 per cent of the previous length unless otherwise directed by the Engineer.

4.7 Casing Advance

In all boreholes, casing shall be advanced in sequence with each run.

4.8 Removal of Cores on Blocking (Boulders / Rocky Strata)

The core shall be removed from the drill hole immediately if blocking of the bit or grinding of the core is apparent, regardless of the length of run which has been made.

4.9 Flushing Media

Clean water shall be the flushing medium in the drill holes unless the Engineer's Representative directs that bentonite mud shall be used.

4.10 Unusual Coring Experiences (Boulders/Rocky Strata)

As the function of drilling includes determination of width, orientation, extent and spacing of fissures, fractures or voids, the Contractor shall exercise particular care in recording water losses, artesian pressures, rod jerks or any other unusual coring experiences which will supplement the core record and further document the nature and extent of fracturing or voids.

4.11 Drilling through Gravels in Rock (Boulders / Rocky Strata)

Where gravels are encountered within the bedrock the Geotechnical Contractor may cross the full depth of the gravel bed by using core drilling. Accurate record of these strata should be kept.

4.12 Stabilizing holes in loose soil

Drilling mud of suitable consistency shall be used to stabilize the walls of bore holes and to prevent caving and disturbance of the materials to be sampled. The drilling mud shall be a mixture of bentonite and water with approved chemical additives if required, to assist in modifying its density and viscosity.

Where drilling mud is not effective, casing of appropriate size and strength may be used subject to the approval of the Engineer. It will be the responsibility of the Geotechnical Contractor to use appropriate means to stabilize the walls of the boreholes. The level of drilling mud shall at all time be maintained at the top of the borehole.

It shall be ensured that there is no jetting action of the drilling fluid. The minimum amount of drilling fluid necessary to carry away the cuttings shall be used. During drilling the Geotechnical Contractor shall regulate the pressure of the drilling fluid to ensure minimum disturbance in the underlying material in which the in situ testing and sampling is to be carried out.

5. SAMPLING

5.1 General

The Geotechnical Contractor shall take samples from any hole when ordered to do so by the Engineer. This shall include the provision of all necessary sampling equipment, tubes and containers crates and boxes, as well as handling and transportation to the approved laboratory or store.

5.2 Approval of equipment

No equipment or containers shall be used unless approved by the Engineer.

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5.3 Care of samples

The Geotechnical Contractor shall be responsible for the safe keeping of samples of all kinds until they have been handed over to the Engineer or disposed off on the Engineer's instructions as the case may be. Any sample damaged or showing signs of deterioration while in the Geotechnical Contractor's care shall be replaced by the Geotechnical Contractor at no expense to the Engineer as specified by the Engineer. All samples shall be prepared and packed as quickly as possible after removal from the ground to preserve the natural condition of the soil.

5.4 Numbering of samples

The Geotechnical Contractor shall assign a reference number to each soil and water sample taken from holes. The number shall be unique for that hole and shall be in order of depth below ground level.

5.5 Labelling samples

All disturbed and undisturbed soil, rock and water samples taken from holes shall be clearly labeled. Each label shall include the following information:-

a) Name of Contract

b) Reference number of the hole

c) Reference number of the sample

d) Date of sampling

e) Brief description of the sample (e.g. stiff blue silty clay)

f) Depth of the top and bottom of the sample below ground level.

g) Number of the sampler tube.

Tubes and crates for undisturbed samples shall be labeled 'Do not jar or vibrate' and 'Haul and transport in a horizontal position'. All samples must be stored and transported as per ASTM Standards. The area ratio and clearance ratio of the thin walled tube, should be in strict compliance with relevant ASTM Standards.

5.6 Small disturbed soil samples

In all the holes, small, disturbed samples shall be taken at the top of each stratum, and at intervals as directed by the Engineer. Material from the cutting shoes of open drive undisturbed samples, and from the split spoon sampler used for Standard penetration tests shall also be taken as disturbed samples.

Disturbed samples shall be truly representative of the composition of the in situ soil. When the samples have been taken from the hole, they shall be placed without delay in airtight container of not less than 1 kg capacity. The container shall be labeled in accordance with Clause 5.5

5.7 Field moisture content samples

Field moisture content samples shall be taken with (and separate from) each small disturbed sample or as otherwise directed by the Engineer. The samples shall be placed in airtight containers immediately after sampling. One sample shall be enough to fill the container.

They shall be kept wrapped in damp cloths in boxes and delivered to the laboratory within twenty four hours of sampling or as directed by the Engineer.

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5.8 Open drive undisturbed sampling in holes

Geotechnical Contractor shall clean the hole to the prescribed sampling elevation by means of rotary drilling or washing ensuring that the material to be sampled is not disturbed by the drilling and clean out operation. To minimize the compacting effect of casing driving the bottom of the casing shall be kept as high above the soil zone to be sampled as the conditions permit. Above the water table samples shall be obtained from a dry hole above the water table. Water shall be maintained within the hole at or above groundwater level below the water table.

Sampling with the open drive sampler (Shelby tube) will consist of lowering the sampler to the bottom of the hole and forcing the thin walled cylindrical tube into the soil in one continuous push, without rotation, using the hydraulic feed and weight of the drill rig. The sampling tube shall not be hammered into the material being sampled. The length of the undisturbed sample thus shall not be less than 30 cm.

5.9 Withdrawing the sampler

Before withdrawal of an open drive sampler the sampler shall (if practicable) be rotated through one complete revolution to shear the soil horizontally at the bottom of the sampler. The sampler shall then be withdrawn smoothly so as to cause the minimum disturbance to the sample. The total length of the sample shall be measured and recorded and, if any of the soil has fallen out of the bottom of the tube, this fact shall also be recorded.

5.10 Unsuccessful open drive sampling

There shall be no payment for a failure to obtain an open drive undisturbed sample and will be paid if the sample recovered is not less than 5 inch long, or the Engineer is satisfied that the failure was in no way caused by negligence of the Geotechnical Contractor.

5.11 Undisturbed sampling with Pitcher/Denison sampler

When directed by the Engineer, the Geotechnical Contractor shall core in drill holes with Pitcher/Denison sampler. The Pitcher/Denison sampler shall be capable of recovering cores with minimum diameter of NX size and a minimum length of 60 cms. Sampling with Pitcher sampler will consist of lowering it to the bottom of the hole and rotation coring in the normal manner. After completion of the drive, the sampler shall be withdrawn from the hole, extreme care being taken to avoid disturbance. The liners containing the core shall be separated from the barrel without jarring the core. The maximum possible length of core shall be obtained through each sampling operation. The core sample shall not be removed from the liner. The soil in the liner at the ends shall be trimmed to a depth of about 2 inches to a smooth flat surface, which shall be painted with warm liquid wax. A wooden filler block previously waxed shall be placed inside the liner tube at each end and covered with melted wax. The soil retained in the inner shoe and that removed from the top of the core shall be used for field identification and moisture content determination when directed by the Engineer.

The samples shall be labeled in accordance with Clause 5.5 and will be stored in the manner prescribed for undisturbed samples herein.

5.12 Sealing, labelling and storing undisturbed samples

After removing the cutting shoe and the adaptor head with the disturbed material which they contain, the visible ends of the sample shall each be trimmed of any wet disturbed soil and then immediately coated with not less than four layers of just molten microcrystalline wax or other similar material approved by the Engineer. A metal foil disc 0.6 inch greater diameter than the tube shall then be added and followed by more molten wax to give a total thickness of not less than 1 inch. Any space remaining in the ends of the sample tube shall be filled with damp sawdust or other material approved by the Engineer and the ends of the sample tube shall be covered with tight fitting plastic caps.

The sample tube shall immediately be labeled in accordance with Clause 5.5. A second label giving the same information shall be placed inside the sample tube at the top end.

The sample tubes shall be protected from adverse effects of the weather and must be stored as per ASTM standard.

5.13 Core Boxes

The Geotechnical Contractor shall provide wooden boxes for preserving cores. The cores boxes with two (2) cm thick partition shall be of sound construction made of two (2) cm thick good quality timber free of rot, knots and other defects. The timber shall be treated with termite resistant chemicals such as Shelldrite or equivalent. The bottoms shall be screwed on and covers shall be hinged and provided with screw plates and screws to keep the cover closed. Partitions shall be arranged for convenient marking and interpretation of cores. Partitions may be placed in the field to accommodate the size of cores being taken so that continuous core may be available for each drill hole in any one box even if the core size is changed. The core boxes shall become the property of the Engineer/ Employer when the core has been permanently placed therein.

5.14 Cores

The cores obtained from drill holes shall be carefully removed from the core barrel by means of a hydraulic or pneumatic core extruder and placed on plastic sheeting in core boxes. The plastic sheeting shall then be wrapped over the top of the core and sealed with adhesive tape so as to preserve its moisture. Field moisture samples shall be taken as directed by the Engineer's Representative.

Core shall be placed in the boxes in the correct sequence, with increasing depth from left to right in the box and from the hinged side to the hasp side of the box.

Fractured material which can be reassembled to form clearly defined core shall be reassembled and packed securely. Material which does not conform to the definition of core shall be spread throughout its length and packed securely. Core losses shall be shown by wooden blocks of a square cross section of approximately the same area and of a length equal to that of the core lost; these should be inserted immediately after the core is placed in the core box.

Each core run shall be segregated by labelled wooden blocks 2.5 cm thick and the depth of the bottom of each run shall be marked on the partitions in the core box with paint.

No box shall contain more than three (3) meters of core.

5.15 Marking of Core Boxes

The core boxes shall be marked prominently on the top sides and ends or as directed by the Engineer's Representative using waterproof jet black paint. The markings shall include the name of the Works, the working area, the drill hole number, box number and the total number of boxes for the drill hole. The same markings shall be painted inside the lid so as to be read when the lid is open, by someone standing at the hasp side of the box.

5.16 Storing and Disposal of Core Boxes

Before the completion of a drill hole the cores from that hole shall be stored neatly at the drill hole locations in such a manner that inspection of the cores can be made easily. The boxes containing the cores shall be stored under cover and protected from the weather, to the satisfaction of the Engineer's Representative. The Drilling Contractor shall transport all boxes containing cores from the site to an approved agency when directed by the Engineer's Representative.

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5.17 Core Samples

Lengths of core not less than 25 cm and not more than 50 cm long shall be taken for use as samples for laboratory testing when directed by the Engineer's Representative. Such samples shall be cut from the core as it is extruded from the core barrel and a spacer bearing the sample number shall be placed in the core box.

5.18 Waxing Core Samples

Immediately they are taken core samples shall be cleared of any loose sludge and coated with microcrystalline wax and cheese cloth or other similar material approved by the Engineer's Representative. The coating shall be built up in layers of both wax and cloth to a total thickness of not less than 25mm in order to seal the samples against loss of moisture by evaporation. The samples shall then be packed with straw or sawdust in wooden boxes and transported the same day to the laboratory. The wooden boxes shall become the property of the Engineer. The samples shall be stored in the manner prescribed herein for undisturbed samples.

5.19 Labelling Core Samples

The top of the core sample shall be clearly marked before it is waxed and on the outside of the wax. Labels in accordance with Clause 5.5 shall be placed inside the wax, outside the wax and on the wooden box.

5.20 Photography of Cores

The Contractor shall take colour photographs (with Digital Camera Device) of the core boxes containing the cores from vertically above so that the markings on the inside of the lid and on the partitions and blocks are legible in the photographs. The plastic wrapping shall be folded back out of sight, and shall be replaced and sealed again with adhesive tape after the photographs have been taken. A Gray Step wedge from the Kodak Colour Separation Guide shall be displayed with the cores and shall be included in each photograph.

The photography shall be taken from a close distance in order to show the core details. If the core has dried out it shall be sprayed lightly or wetted with a damp cloth to accentuate the colour of the core.

The Drilling Contractor shall furnish the electronic files of all pictures taken on core boxes during the field work.

5.21 Water samples

The Contractor shall take water samples from holes when directed by the Engineer, before the addition of water to the hole unless this is impossible. If necessary the hole shall be bailed out before taking the sample to ensure that any potential contaminant is removed. No fuel or other potential contaminant shall be allowed to enter the hole. The method of sampling shall be to the approval of the Engineer. Samples shall only be stored in approved airtight and scrupulously clean containers, and shall not be less than 1.0 liter in volume. Water samples shall be transported to the approved laboratory.

5.22 Transport of samples

All samples shall be transported to the store at the site the day the sample is collected. Samples in tubes shall be transported with the tubes in a horizontal position. Selected samples shall be transported by the Contractor to the laboratory approved by the Engineer.

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Every precaution shall be taken to avoid damage to the undisturbed samples during transportation. Samples including tube samples shall be transported in wooden boxes made from 5/8 inch or heavier timber, and with a capacity of holding six (6) samples. The samples shall be well packed in suitable material to protect the samples against vibration. The Geotechnical Contractor shall not expose sealed and coated samples to direct sunlight or extreme temperatures.

6. FIELD TESTING

6.1 Standard Penetration Test (SPT)

When directed by the Engineer, the Geotechnical Contractor shall carry out Standard Penetration Test (SPT) in any type of material. The penetration resistance 'N' shall be expressed as the number of blows of a 140 lbs hammer dropping freely from height of 30 inches to force the standard split barrel sampler 18 inches into the soil. The penetration resistance 'N' shall be expressed as the number of blows of the hammer required to force the sampler the last 12 inches into the soil.

Equipment to be furnished by the Geotechnical Contractor for carrying out SPT shall include split tube sampler, drive shoe with core catcher, 'A' or 'AW' rods (OD 1.718 inches, ID 1.344 inches) for depth less than 50 ft and 'N' or 'NW' rods for greater depth, 140 lbs weight donut type hammer, manila rope and free running pulley, guide pipe and driving head supplies, all casing, pumps, power tools for sampling and containers for preserving tools for sampling and containers for preserving samples. The anvil in all respects shall conform to ASTM Designation D 1586-99.

The beveled edge of the drive shoe shall be maintained in good condition and if excessively worn, shall be resharpened to the satisfaction of the Engineer. Damaged or bent drive shoe of the sampler shall not be used; it shall be replaced if damaged in such a manner as to cause projections within the interior surface of the shoe. A core catcher consisting of thin flexible flaps which fold back flush with the inner surface of the sampler during driving shall be fitted above the drive shoe or within the shoe.

Standard penetration tests shall be carried out in the holes as and when directed by the Engineer during the progress of work. If the Engineer or Geotechnical Contractor has reason to believe that the hole has entered a layer which consists predominantly of sand or finer soil, boring shall be stopped after cleaning the bottom of the hole taking utmost care to bail out all the loosened material which could have remained in the hole from the zone above the test level. Then rotary rig shall be installed for drilling 4 inches to 6 inches diameter holes, and smaller diameter casing (4 inch – 6 inch) fitted with a casing bit at the bottom shall be lowered to the bottom of the hole, the hole should then be drilled using mud and tricone bit or any other bit with upward discharging device 8 inch below the bottom of the hole. The smaller dia casing shall then be advanced to this depth by rotating with wrench. If unable to do so with wrench, rotary rig may be utilized to advance the casing. In no case will the casing be driven by hammering. Sounding of the hole shall then be made and further drilling, if required, shall be performed with tricone bit using mud for flushing to ensure the hole is open to the base of the casing but no deeper. Casing shall remain filled with mud slurry all the time to the top. During the process of boring, washing or cleaning the hole, utmost care shall be exercised to ensure that the material to be tested and sampled has not been disturbed by these operations. The casing shall not be in advance of the bottom of the hole where the test is to be conducted.

The split barrel sampler attached to drill rod shall then be lowered to the bottom of the hole. The drive weight shall then be allowed to fall on the anvil freely until the sampler has penetrated 6 inches into the soil (the seating drive). The penetration test shall then be started and the number of blows for each 3 inches penetration shall be recorded until 18 inches penetration is achieved.

In case, the driving of the shoe cannot be achieved even by performing one of the following efforts:

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- A total of 50 blows have been applied during any one of the three 6 inches increments.
- A total of 100 blows have been applied (including the seating drive) or
- There is no observed advance of the sampler during the application of 10 successive blows of the hammer.

Then, the test shall be considered as presenting Refusal to Penetration and shall be terminated even if the required Penetration of the sampler has not been obtained. In such cases the number of blows and the penetration attained shall be recorded. Immediately after each test, the sampler shall be carefully disassembled and any soil sample collected classified. The most representative portion of the soil sample from the bottom of the 12 inches drive shall be placed in an airtight container. This soil sample shall be made for the collection and preservation of such disturbed samples. The cost of such sampling shall be deemed to be included in the unit rate for performance of standard penetration test. After performing the first test in this way the hole shall be drilled with tricone bit using mud, and sounding shall be taken to ensure that the hole is clean to the bottom of the previous test. Then a second SPT shall be performed in the same manner as described above or undisturbed samples shall be collected as directed by the Engineer.

During the performance of SPT, including the seating drive, extreme care must be exercised in obtaining an accurate 30 inches free fall of the hammer. The rod above the hole collar should be held in vertical position to prevent energy loss due to rod whip or buckling uniformity must be obtained in all SPTs to be done. The rate of application of hammer blows should be between 10 and 20 blows/minute.

In case of gravelly soil the SPT shoe should be replaced by the solid cone with apex at 60º in accordance with BS 5930. (1981)

The test data obtained shall be recorded in the field and shall include the following:

i. Test number and depth
ii. Description of soil
iii. Thickness of layer
iv. Depth of water level; time at which test was made.
v. Number of blows for each 3 inch penetration and total length of penetration.
vi. Penetration resistance 'N' value.

One copy of the field data for each test shall be supplied to the Engineer within 24 hours of completing the test.

7. LABORATORY TESTING

7.1 Approved Laboratory

The soil / rock / water samples shall be tested at a local approved laboratory. The Engineer shall have access to the laboratories to supervise and check the laboratory testing of the samples. The testing shall be carried out in accordance with ASTM, BS or AASHTO Standards or as directed by the Engineer.

7.2 Testing Program

The Geotechnical Contractor shall arrange to carry out the laboratory tests on the specified samples of the subsoil materials and water. The Engineer shall issue particular instructions for any tests, if required. The samples to be tested and the tests to be carried out for each sample shall be specified by the Engineer.

7.3 Type of Tests

The testing in the laboratory shall comprise, but not limited to, the following tests:

1. Grain size Analysis

2. Hydrometer Analysis
3. Atterberg Limits (LL, PL)
4. Unconfined Compression test on soil and rock samples
5. Point load test on rock samples
6. Direct shear test on soil
7. Natural Moisture Content and Bulk Density
8. Consolidation with swell potential determination
9. Sulphate content of soil/water
10. Chloride content of soil/water
11. pH value of water
12. Organic matter content of soil
13. Total Dissolved Salts in water

LIST OF APPROVED LABORATORIES

Employer's approved laboratories have been listed hereunder:

1. SOILCON Geotechnical Testing Laboratories, 18- Km, Multan Road Lahore.
(Tel # 042-7510942, Fax # 042-7510944)

2. Central Materials Testing Laboratories (CMTL) WAPDA, Near Muhammad Pura Village P.O Thokar Niaz Baig, Lahore.
(Tel # 042-5300922, Fax # 042-5302921)

3. Soil Mechanics Laboratory Civil Engineering Department, UET, Lahore.
(Tel # 042-9029273, Fax # 042-9029202)

4. Decon, 159-P, Model Town Extension, Lahore.
(Tel # 042-8428699, Fax # 042-5840662)

5. Berkeley Associate, 316-D, OPF Housing Colony, Raiwind Road, Lahore.
(Tel # 042-8452273, Fax # 042-5323316)

6. National University of Science and Technology, Islamabad.
NUST Institute of Civil Engineering (NICE), NUST H-12 Sector, Islamabad
(Tel # 051-90854629 / 051-90854583)

If the Geotechnical Contractor intends to acquire the services of any testing laboratory other than the laboratories mentioned above, he shall obtain approval of the Engineer and will be responsible for arranging to provide all relevant data required by the Engineer for its approval of the Engineer.

8. REPORTS AND RECORDS

8.1. Introduction

The Geotechnical Contractor shall prepare and submit to the Engineer, one copy of a report/data on all work at site and such other details as required by the Engineer appropriate to the work performed.

8.2. Daily Report

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The Geotechnical Contractor shall prepare a Daily Report signed by the Geotechnical Contractor agent or representative on site for each exploratory borehole, which shall be submitted to the Engineer within 24 hours of the completion of the exploration to which they refer and contain the following information where relevant.

i General

(a) Job name, location and coordinates.
(b) Rig foreman's name.
(c) Exploratory hole reference number and level.
(d) Visitors to rig site (including Contractor's head office staff).
(e) Name of Supervisory Staff.

ii Rotary Borings

(a) Rate of penetration
(b) Diameters and depths of all casings used
(c) Any addition of water to the boring
(d) Method of penetration and flushing system
(e) Type of bit used

8.3. Submission of complete field and laboratory data

The results of each borehole and field tests carried out shall be communicated to the Engineer as follows:

i) Oral reports as the work proceeds.
ii) One set of complete data of the work in the form of a bound document, which shall contain but not limited to;

(a) A site plan showing the position of the boreholes giving their map reference.
(b) The borehole logs.
(c) Complete results of field tests.
(d) Complete results of Laboratory tests.
(e) Comments on any point, which the Engineer has put to the contractor for inquiry and investigation during the works.

8.4 Payment for reports

No separate payment will be made for the reports the cost of which shall be deemed to be included in the other items of work.

9. MEASUREMENT AND PAYMENT

BOQ Item - Mobilization and demobilization

a) Measurement

No quantity measurement will be made of the work under this item and payment shall be based on the completion of work as specified herein.

b) Payment

The payment shall constitute full compensation for all costs for mobilization and demobilization. The contract rates shall be deemed to include all costs for providing,

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transporting, operating and maintaining all the equipment and plant necessary for site investigation work along with providing water, power, providing all insurance covers, providing any other expense not covered in the item rates of the BOQ and shifting and setting up at each borehole location.

BOQ Item - Drilling of bore hole in Soil and Rock:

a) Measurement

The actual quantity shall consist of the full depth of acceptable vertical drill hole in soil/rock as measured along the line of the hole.

b) Payment

All the necessary operations done to accomplish drilling as specified shall be deemed to be part of this item. The casing of the drill holes or boreholes, taking and recording of water levels in holes, supply of daily field record and drill / borehole logs and all associated costs shall be deemed to be included in the contract rate. No separate payment shall be made for backfilling of holes and drilling of angle holes.

BOQ Item – Excavation of Test pits:

a) Measurement

The actual quantity shall consist of the full depth of acceptable test pit in soil as measured along the line of the test pit.

b) Payment

All the necessary operations done to accomplish excavation as specified shall be deemed to be part of this item. Taking and recording of water levels in pits, supply of daily field record and drill / test pit logs and all associated costs shall be deemed to be included in the contract rate. No separate payment shall be made for backfilling of pits.

BOQ Item - Carrying out standard penetration tests (SPT) in drill / boreholes

a) Measurement

The measurement for standard penetration tests shall be made as number of standard penetration tests actually performed on the instructions of the Engineer in a drill hole or a bore hole.

b) Payment

Payment shall be made as a unit for each test. The contract rate shall be deemed to include all labour and equipment required to perform the tests including standing time of labour and plant while the test is being set up and dismantled or in progress and the preparation and supply to the Engineer of any preliminary copies of test data and results as well as all the costs for providing jars, labeling, preservation and transportation of samples to the laboratory.

BOQ Item - Collection of undisturbed Soil samples from boreholes using Shelby tube/Pitcher/Denison sampler etc.

a) Measurement

Measurement shall be made as number of acceptable undisturbed open drive tube samples Pitcher/Denison samples separately and actually recovered on the instructions of the

Engineer.

b) Payment

Payment shall be made as a unit for each undisturbed sample successfully recovered. The contract rate for these items shall be deemed to include the cost of any incidental delay of standing time of labour and plant, for the cost of taking, sealing, labeling, transporting samples and the cost of supply of all approved tubes, containers, crates and boxes which shall become the property of the Engineer after delivery to the approved laboratory.

BOQ Item - Collection of composite Soil samples from test

a) **Measurement**

Measurement shall be made as number of acceptable composite soil samples collected as per instructions of the Engineer.

b) **Payment**

Payment shall be made as a unit for each composite soil sample successfully recovered. The contract rate for these items shall be deemed to include the cost of any incidental delay of standing time of labour and plant, for the cost of taking, sealing, labeling, transporting samples and the cost of supply of all approved tubes, containers, crates and boxes which shall become the property of the Engineer after delivery to the approved laboratory.

BOQ Item - Collection and preservation of groundwater samples from boreholes

a) **Measurement**

Measurement shall be made as number of water samples actually taken on the instructions of the Engineer.

b) **Payment**

Payment shall be made as a unit for each water sample. All costs incurred for providing equipment, material, labour and bailing out of the hole, if necessary and taking sealing, labeling, transporting the water samples as well as the cost of the containers shall be deemed to be included in the contract rate for water sampling.

BOQ Item - Laboratory testing

a) **Measurement**

Measurement under the item "Laboratory Testing" shall be made as per actual number of laboratory tests performed according to ASTM, AASHTO or the equivalent British Standards, or as directed by the Engineer.

b) **Payment**

Payment shall be made for number of laboratory test actually performed in the laboratories approved by the Engineer according to the price bid by the Contractor in the Bill of Quantities as a lump sum for each test. The lump sum shall be deemed to include complete laboratory testing for the specified test according to ASTM, AASHTO or British Standards and presentation of reports in standard form as directed by the Engineer.

ISLAMABAD

SECTION - 8133

LT DISTRIBUTION BOARDS

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS

6.0 MEASUREMENT AND PAYMENT

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, testing, and commissioning of all material and services of the complete Low Tension (LT) Distribution Boards as specified herein and/or shown on the Bidding Drawings and stated in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at site with other services for exact location and position of the each L.T. Distribution Board.

The Low Tension Distribution Board with accessories shall also comply with the General Specifications for Electrical Works, Section - 8001 and with other relevant provisions of the Bidding Document.

2.0 GENERAL

The Low Tension Distribution Board (DB) shall be sheet steel fabricated suitable for surface/recessed mounting on wall or floor standing totally enclosed, dust tight and vermin proof. It shall be complete in all respect with material and accessories, factory assembled, type-tested and finished according to the Specifications and to the normal requirements. The LT Distribution Board shall have protection class IP-42 for indoor installation, class IP-54 for indoor damp areas and class IP-65 for outdoor area.
The minimum form of construction to be followed for type tested DBs is as follows:

	Equipment Type	Min IP Rating	Min Form of Construction
1	Main LT Panel (MLTP)	IP 54	Form 4b, Type 6
2	Distribution Boards below 250A	IP 41	Form 2b, Type 2
3	Sub Main Distribution Boards above 250A	IP 41	Form 3b, Type 2
4	Final Circuit Distribution Boards	IP 41	
5	Life Safety/Emergency Distribution Equipment	IP 54	Form 4b, Type 6

The Low Tension Distribution Board shall be front operation type and shall:

- have a rated service short circuit breaking capacity (Ics), conforming to IEC 60947-2 and as shown on the drawings.
- be provided with adequate clearance from live parts so that the flashovers can not be caused by switching, vermin, pests etc.
- be suitable for 400 Volts, 3 phase 4 wire, 50 Hz system.
- be designed for flush mounting of all instruments on the front side.

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- have incoming and outgoing cable termination arrangement, terminal block/line up terminals.
- be provided with stainless steel name plate on the front side of door.
- have all incoming and outgoing connections from top or bottom as per requirement of site conditions.
- have door grounded by flexible copper strip/cable.
- have wiring diagram in the pocket inside the door of Distribution Board

3.0 APPLICABLE STANDARDS/CODES

The latest editions of the following standards and codes shall be applicable for the materials specified within the scope for this section:

IEC 60051	-	Direct setting electrical measuring instruments
IEC 60073	-	Colours for indicator lights and push buttons
IEC 60947-2	-	Low voltage switchgear and control gear
IEC 60439	-	Low Voltage Switchgear and Control gear Assemblies.
BS 4752	-	Circuit Breaker
BS 3871	-	Miniature & Moulded Case Circuit Breakers
BS 88	-	HRC fuses
BS 89/90	-	Ammeters and Voltmeters
BS 3938	-	Low voltage current transformers
BS 1432	-	Bus Bars

4.0 MATERIAL

4.1 Sheet Metal Work

The Low Tension Distribution Board (DB) shall be fabricated with 16 SWG/14SWG sheet steel recess / surface mounting as approved by the Engineer. All the components shall be installed on a common component mounting plate inside the enclosure and protected from the front with screwed sheet steel front plate. The enclosure shall be

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provided with rubber gasketting and a lockable hinged door with cam fastener.

The distribution board shall be supplied complete with all installation materials as recommended by the manufacturer. The incoming and outgoing cable connections shall be according to the wiring requirements. If required, an adapter box for accommodating the cables and conduits may be provided. The box shall be of the same material and finish as the DB. All holes, cutout etc. shall be tool and free from burrs and rough edges.

The cabling inside the DB shall be suitably harnessed by means of straps or cords. Colour sleeves shall be provided on each cable lugs connected to the bus bars, circuit breakers or terminals for phase identification. An earth bar shall be provided for connection of incoming and outgoing earth conductors. The earth bar shall be permanently connected to the body of DB at two points. Flexible copper strip shall be provided for earthing of the door of DB.

Circuit numbers/ designation on all circuits shall be conspicuously marked to facilitate connection and maintenance.

All metal work of the DB shall be cleaned down to bare shining metal phosphated and the surfaces chemically prepared for powder coating. Then these shall be coated with powder of colour RAL 7032 and then baked in oven. The thickness of powder coating shall not be less than 120 microns.

4.2 Components

The Low Tension Distribution Boards (DB) shall be provided with components as specified, as shown on the Bidding Drawings and required for the satisfactory operation of the distribution board and of the electrical system.

Typical component specifications are given below:

4.2.1 Bus Bars

The Bus bars shall be made of 99.99% pure high conductivity electrolytic tinned copper and shall be completely isolated and mechanically braced for the specified fault level. The identification of bus bars shall be by providing colours sleeves on bus bar ends and these shall be red, yellow and blue for phases and black for neutral. The earth bus bar shall be green.

The bus bars shall be for three phase, neutral and earth and shall be of appropriate size to meet the electrical and mechanical

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requirements of the system. The temperature rise shall not exceed 30°C at rated current.

4.2.2 Moulded Case Circuit Breaker (MCCB)

The MCCBs shall be moulded case triple pole 440 Volts or single/double pole 250 Volts of current ratings as shown on the drawings. These shall have fixed magnetic short circuit and adjustable/fixed thermal overload protection.

Under voltage and shunt trip etc. shall also be provided when so required for safe operation and interlock.

The MCCBs shall be installed such that their switching levers are accessible through the front plate for operation.

The single and triple pole MCCBs shall have short circuit rupturing capacity suitable for the distribution system as approved by the Engineer or as shown on the drawings. The MCCBs shall be suitable for working on lighting and power circuits.

4.2.3 Ammeters and Voltmeters

All meters shall be flush mounting, moving iron, spring controlled. The front dimensions shall be 96 x 96 mm for meters.

The meters shall be of accuracy class 1.5 according to BS-89 and 90. The ammeter shall be suitable for connection to 5 Amps secondary of current transformers or directly through shunt as shown on drawings. The ammeters and voltmeters shall have measuring range as indicated on the drawings.

4.2.4 Current Transformers

Air cooled, ring type current transformers shall be provided having transformation ratio as indicated on the drawings. The current transformers shall be of suitable burden having accuracy class 1.0 according to BS 3938. The current transformers shall have 5 amps secondary.

4.2.5 Selector Switches

The ammeter and voltmeter selector switches shall be complete with front plate, grip handle, R-Y-B and OFF position for ammeters, and RY-YB-BR-RN-YN-BN and OFF position for voltmeters shall be marked on the respective selector switches.

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4.2.6 Air Break Contactors

The contactors shall be air break, triple pole 400 VAC type and suitable for the type of duty (at least utilization Category AC3) to be performed. The main contacts shall be silver tipped, butt type with double break per pole. Each contactor shall be provided with single phase 230 VAC operating coil and minimum one spare normally open and one normally closed auxiliary contact. The number of working auxiliary contacts shall be provided according to the system requirements.

4.2.7 Push Buttons

The push buttons shall be illuminated, momentary make/break contact type or latch type (push-on/push-off) as required and approved by the Engineer and suitable for flush mounting. The push button for ON and OFF switching shall be red and green respectively. They shall be provided as shown on the drawing.

4.2.8 Indicating Lamps

Indicating lamps shall be LED type suitable for flush mounting, complete with base. They shall be suitable for operation on 230 V AC and it shall have rosettes of suitable colours as approved by the Engineer. These shall be provided for R, Y, B phases on each distribution board.

4.2.9 Impulse Relay

Impulse Relay shall be 1 or 2 pole, 250 V rated and be provided with latching mechanism.

4.2.10 Line up Terminals

Line up terminals wherever provided for control or power circuits shall be suitable for voltage and size of conductors as indicated on drawing.

The line-up terminals for controls shall be suitable for channel mounting. All necessary accessories such as end plates, fixing clips, transparent label holder caps and label sheets with marking shall be provided.

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5.0 INSTALLATION

The location of low tension distribution boards (DB) are shown diagramatically on the drawings. The actual location shall be determined at site, keeping in view the site conditions and in co-ordination with other equipment, as approved by the Engineer.

Low tension distribution board for recessed mounting in wall shall be installed such that the door shall finish flush with the surface of wall. The recess mounted distribution board shall be installed before the plastering of walls. The DB shall be protected to avoid any damage due to the civil work. Any cuttings, dismantling of the existing wall required for fixing the DB shall be coordinated at site with the approval of Engineer. Any damage done to civil structure shall be made good by the Contractor.

All loose parts dispatched separately with the DB shall be installed as per manufacturer instructions and all adjustments or setting shall be made as required. All screws, nuts and bolts used for fixing the distribution board shall be galvanized.

The distribution boards installation shall include connecting all incoming and outgoing cables. The cable entry in the boards shall be provided from top or bottom as required and/or as approved by the Engineer.

The distribution boards shall be tested as per instructions contained in article "Testing" of General Specifications for Electrical Works, Section-8001 of these Specifications.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each item of Bill of Quantities as given below shall include design, fabrication, supply, installation, testing, commissioning and completion for all works specified herein and/or as shown on the Bidding Drawings related to the item.

6.2 LT Distribution Boards (DBs)

6.2.1 Measurement:

Measurement shall be made for the number of each LT Distribution Board acceptably supplied and installed by the Contractor as a complete job.

6.2.2 Payment:

Payment shall be made for the number of jobs measured, as

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provided above, at the Contract unit price each and shall constitute full compensation for design, fabricating, supplying, installing, connecting, testing and commissioning of the LT Distribution Boards; including fixing arrangement, adapter box and other components/accessories for complete installation.

*** End of Section 8133 ***

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

SECTION - 8150

LIGHT FIXTURES

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS

6.0 MEASUREMENT AND PAYMENT

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, testing and commissioning of all material and accessories of the complete Light fixtures as specified herein and/or shown on the Tender drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at Site with other services for exact locations and positions of the light fixtures.

The lighting fixtures with accessories shall also comply with the General Specifications for Electrical Works, Section-8001 and with other relevant provisions of the Tender Document.

2.0 GENERAL

The description of light fixtures is given in the bill of quantities, and stated on the drawings, and all relevant material is described in this Section. The determination of quality is based on certified photo-metric data covering the coefficient of utilisation, light distribution curves, construction material, shape, finish, operation, etc.

The Contractor shall submit at least two samples of each and every light fixture specified and obtain approval of the Engineer before purchasing. The quality and finishes of the local make light fixtures (if mentioned in BOQ) shall be same as that of standard manufacturer. The accessories such as ballast, LED drivers, lamps, ignitors, etc., for all type of light fixtures shall be of make as stated in list of approved manufacturers. Approved equivalent against those specified will be accepted if the specified one is/will not be available. For any substitution the Engineer's approval is necessary.

All fixtures shall be finished in standard colour schemes as mentioned in the manufacturer's catalogue for respective fixtures, unless specifically stated in the Specifications, Drawings or Bill of Quantities or directed by the Engineer.

3.0 APPLICABLE STANDARDS/CODES

The latest editions of the following standards/codes shall be applicable to the material specified within the scope of this section:

IEC 60598-2-1	-	Particular requirement- Fixed general purpose luminaire
IEC 60598-2-2	-	Electrical Insulation Class I
IEC 62471	-	Photo biological Safety of lamps and lamps system
IEC 62031	-	LED modules for general lighting – Safety specifications

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IESNA LM80	-	Testing report for LED Chips with TM21 extrapolation graph
IEC61347-1	-	General and safety requirements.
IEC61347-2-13	-	Particular requirements for DC or AC supplied electronic control gear for LED modules.
IEC62384	-	DC or AC supplied electronic control gear for LED modules.
ISO 7010	-	Signs for the purposes of accident prevention, Fire protection, health hazard information and Emergency evacuation.

4.0 MATERIAL

4.1 LED Street Light Fixtures

The road light fixture shall be an attractive modern appearance, high performance 120W LED lamp as given in the BOQ/drawing.

Light fixture shall be provided with solid die cast aluminium housing, heat resistant silicon rubber gasket in optical LED compartment, DME type optic, tampered glass cover and shall be coated with powder of colour RAL 7040 ensuring no discoloration when exposed to UV light.

The light fixture shall be designed to receive power either from the battery or from the AC source. The light fixture shall have the following characteristics:

Voltage	=	100-270 VAC
Surge Protector	=	10 kV
Power Factor	>	0.95 (nominal power)

The light fixture shall have IP 66 protection to ensure long reliable performance and minimize maintenance requirement and an impact resistance of IK 08 with insulation Class I. Use of chemical glue shall NOT be allowed to avoid probable breakdown of water-proof and dust-proof seal.

The light fixture should have a minimum color rendering index (Ra) of 70 + 5 and a color temperature of 4000K for maximum efficacy with an average output of at least 15,000 lumens. The LED should have a color consistency within 5 SDCM (Standard Deviation of Color Matching). The color temperature variation of the LEDs should be restricted as per ANSI C78.377A with CCT variation limiting within 500K for nominal CCT of 4000K.

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The LED light fixture should be designed for lumen maintenance of L70 or 70% at the end of useful life at ambient temperature of 45 °C and shall be capable to operate efficiently within the temperature limit of -40 °C to 55 °C. The complete light fixture should have useful life of 50,000 burning hours.

The light fixture shall be fully compatible with future LED upgrades when they become available. It shall have a modular design to upgrade / replace with new LED modules or LED drivers at site conveniently with minimum effort. All electronic components/drivers shall be mounted on a separate removable gear tray. Light fixture housing shall have a tool less access by opening the cover.

The proposed LED road lighting light fixture shall be provided with in-built surge protection system to protect the electronic driver and LED system. Minimum surge protection rating is 10kV.

The housing shell, under the circuit board, shall be specially designed to ensure perfect contact between the circuit board and the light fixture housing for efficient heat dissipation. Only Metal Core PCBs shall be used to maximize heat transfer process and to offer reinforced electrical insulation via di-electric layer. The Metal Core PCB should be mounted on the housing using a highly efficient thermal interface material.

The optical LED compartment shall have a thermally hardened glass cover and high quality silicon gasket. The Glass cover will be tightly secured with the housing. The light fixture should have flexible optical system to achieve lighting parameters for required class of roads. The light fixture should offer a composite system efficiency of at least 130 lumen/Watt.

Specially designed lens system with unique inner and outer profile for high efficiency LED shall be provided to ensure maximum spacing between the poles and cover higher road widths. Multi layer optics design to ensure adequate luminance and luminance uniformity in the unlikely event of individual LED failure. The light fixture should offer choice of narrow, medium and wide beam light distribution.

The lamp position shall be adjustable to at least three positions to facilitate the changing of photometric distributions.. The photometric data of the lantern shall be authenticated by an Internationally Accredited Lighting Organisation.

Luminance level calculation with average luminance of the road surface, overall uniformity of road luminance, threshold increment, longitudinal uniformity of road surface luminance and surround ratio achieved shall be submitted by the Contractor / manufacturer for verifying conformance to International lighting standards and approval of the Engineer.

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4.13 LED Chips and Driver

The LED chip shall be from Cree / Nichia / Lumileds make or approved equivalent. The LED driver shall be designed to operate large array of high power LED's through current controlled output. The driver shall be suitable for operate up to 250VAC 50/60Hz mains supply. The LED driver shall have an efficiency of at least 95%. Fixed Output LED Driver (PSU) shall be integrated within each LED luminaire. The Driver compartment cavity and gear tray shall be designed with tool-less access for maintenance and replacement.

The light fixtures including the driver will include a warranty of at least 3 years against manufacturing defects. The cost of such provision will deemed to have been respective BOQ item of light fixture and no separate payment shall be admissible in this regard.

The LED driver shall fully conform to following specifications:-

1) BS-EN 61347-1 - General and safety requirements.
2) BS-EN 61347-2-13 - Particular requirements for DC or AC supplied electronic control gear for LED modules.
3) BS EN 55015: 2013 – Emission – Electrical lighting and similar equipment
4) BS EN 61547: 2009 – Immunity – Equipment for general lighting purpose
5) BS EN 61000-3-2: 2009 – Limits for harmonic currents emissions.
6) BS EN 61000-3-3: 2008 – Limits for voltage fluctuation and flicker.
7) BS EN 62493 – Assessment of lighting equipment related to human exposure to electromagnetic fields

5.0 INSTALLATION

5.1 General

The mounting heights of light fixtures are indicated on the drawings, and positions of fixtures are according to the mentioned scale.

The Contractor must ensure that the light fixtures are installed uniformly with respect to the dimensions of the area. Any modifications due to site conditions may be made with the approval of Engineer. All fixtures shall be carefully aligned before fixing in position.

The wiring between terminal box and the fixture shall be carried out with 3-core 1.5 sq.mm flexible copper conductor PVC/PVC cable respectively (separate for each light) for circuits protected by 10 amps and 15/20 amps MCBs. The wiring inside light fixture body shall be done with heat resistant cables or PVC insulated cable in heat resistant sleeves as

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approved by the Engineer.

Glasses, shades, reflectors, diffusers, etc., must be in a clear condition after installation. All light fixtures shall be earthed by an earth wire connected to the earth terminal in the fixture.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or shown on the Bidding Drawings related to the item.

6.2 LED Street Light Fixture

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or shown on the Bidding Drawings related to the item.

6.2.1 Measurement

Measurement shall be made for each type of light fixture including all accessories acceptably supplied and installed by the Contractor as complete unit.

6.2.2 Payment

Payment shall be made for the number of units measured as provided above at the contract unit price each and constitute full compensation for supplying, installing, connecting, testing and completion of LED Battens / LED Smart Panel / LED Downlight / LED Exit Sign / compact fluorescent Bulkhead including all accessories such as capacitors , LED drivers, LED Chips, LED optics, connecting cables & connectors, suspension rods and pendent arrangement, GI pipe bracket, ceiling supports, internal wiring, nuts, bolts, screws, etc., as required and complete in all respects.

6.3 LED Street Light Fixture

The Contractor's bid amount against each Bill of Quantities item as given below shall include supply, installation, testing, commissioning and completion for all work specified herein and/or shown on the Bidding Drawings related to the item.

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6.3.1 Measurement

Measurement shall be made for each type of light fixture including all accessories acceptably supplied and installed by the Contractor as complete unit.

6.3.2 Payment

Payment shall be made for the number of units measured as provided above at the contract unit price each and constitute full compensation for supplying, installing, connecting, testing and completion of High Pressure Sodium Flood Light / LED Flood Light Fixtures/ LED Street lights including all accessories such as ballasts, capacitors, igniters, LED drivers, nuts, bolts, screws, etc., including PVC pipe, foundation etc., as required and complete in all respects.

*** End of Section 8150***

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SECTION - 8240

EARTHING

1.0 SCOPE OF WORK

2.0 GENERAL

3.0 APPLICABLE STANDARDS/CODES

4.0 MATERIAL

5.0 INSTALLATIONS

6.0 MEASUREMENT AND PAYMENT

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

1.0 SCOPE OF WORK

The work under this section consists of supplying, installing, testing and commissioning of all material and services of the complete Earthing system as specified herein, as shown on the Tender Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at Site with other services for exact route, location and position of the earth electrode and ECC etc.

The Earthing system shall also comply with the General Specifications for Electrical Works Section - 8001 and with other relevant provisions of the Tender Documents.

2.0 GENERAL

The earthing system consists of earth electrodes, earthing leads, earth connecting points, earth continuity conductors and all accessories necessary for the satisfactory operation of the associated electrical system.

3.0 APPLICABLE STANDARDS/CODES

The latest editions of following standards / codes shall be applicable for the materials specified within the scope of this section:

BS 951	-	Earthing clamps
BS 7430	-	Earthing
BS 2874	-	Nuts, bolts, washers, screws and rivets fixing for use on copper
BS 6346	-	PVC insulated cables

4.0 MATERIAL

4.1 Earth Electrode

4.1.1 Copper Clad Steel Rod Type

This type of earth electrode shall comprise a 1.5 meter/3 meter long, 20 mm dia. copper clad steel rod having flat head at drive end and pointed conical tip at the driven end. The tip shall be hardened to facilitate driving. At the top of the rod, a brass clamp for bolted connections shall be provided suitable for connection to

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the down conductor or earthing lead as required. The thickness of Cu coating on the Galvanized Steel Rod should be 250 micron.

The inspection chamber with C.I. cover shall be provided as instructed by the Engineer.

4.2 Earthing Lead

The earthing lead shall connect the earth electrode to earth connecting point or equipment in the building. It shall be of stranded bare electrolytic copper of size shown on the drawings. The cost of earthing leads deemed to have been included in the price of earth electrode and no separate payment shall be made for it.

4.3 Earth Continuity Conductor

Earth continuity conductor (ECC) shall be stranded bare copper wire or single core PVC insulated copper conductor cable of sizes indicated on the drawings. All thimbles, lugs, sockets, nuts, washers & other accessories necessary for the complete installation of ECC shall be provided by the Contractor without any extra cost.

The specifications for single core PVC insulated cables used as ECC shall be same as those given in section "LT Cables" of the technical specifications. PVC insulated cables when used as ECC shall be green or green/yellow.

4.4 Earth Connecting Point

Earth connecting points shall comprise tinned copper bar, rectangular in shape, having dimensions of 300 x 50 x 6 mm. At least six terminals for connection shall be arranged on the bar, which can be increased or decreased as required by the Engineer.

The terminals shall have brass or tinned copper bolts, nuts and washers for protection against corrosion. Two holes shall be provided off centre of the copper bar for fixing to the wall by means of 10 mm dia. nut and bolt and shall be insulated by means of rubber gaskets/washers.

5.0 INSTALLATION

5.1 General

Complete earthing systems as shown on the drawing shall be installed by the Contractor. The earthing system shall give earth resistance, including the resistance of soil, earth leads and ECC equal to or less than one ohm.

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At all connections of earth continuity conductor to Generator, Transformer, LT Switch Board, LT Distribution Board, or any other metallic body, proper size copper or brass sockets, thimbles or lugs shall be used to which the copper wire shall be connected by copper brazing. The soldering of copper wire at joints or terminations shall not be allowed. All tee-off connections shall be by copper brazing using suitable socket and clamps. After brazing, the jointed surface shall be protected by oxide inhibiting compound of low electrical resistance. For connections to metallic body, the surface shall be thoroughly cleaned before bolting the lug or socket.

The earth continuity conductor shall in general run in cable trench or in conduits/pipes as shown on the drawings. For under floor runs, these shall be installed in pipe/conduit of appropriate sizes. Where laid along underground cables, these shall be laid directly underground in unpaved areas and in pipes under paved areas.

The earthing system shall be tested after complete installation of earth electrodes.

5.2 Earth Electrode

5.2.1 Copper Clad Steel Rod Type

In case the soil conditions at site permit and approved by the Engineer this type of earth electrode may be installed by hammering the electrode in soil, until the top of the rod is about 300 mm below the proposed finished ground level. If hammering down of rod is not possible due to site conditions, a pit shall be first excavated in bare ground upto the required depth and electrode shall be installed upright in the pit. The excavated pit shall be backfilled in layers of 500 mm, each layer tamped and compacted.

5.3 Earth Continuity Conductor

The earth continuity conductor of sizes shown on the drawing shall be installed all along the cable runs and connected to the earthing bar/terminals provided in equipment. The body of generator, transformer and all switchboards shall also be connected to earth by specified size of ECC. All other metal work shall also be connected to earth by specified size of ECC.

At any joint or terminations, the ECC shall be connected using proper accessories. No connection shall be made by twisting of earth conductors.

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5.4 Earth Connecting Point

The earth connecting point shall be installed at locations shown on the drawings. It shall be fixed on wall surface by means of brass screws with nuts, washers and other insulating material as instructed by the Engineer.

6.0 MEASUREMENT AND PAYMENT

6.1 General

The Contractor's bid amount against each Bill of Quantities item as given below shall include supplying, installation, testing, and commissioning of all work specified herein, as shown on the Tender drawing related to the item.

6.2 Earth Electrode

6.2.1 Measurement:

Measurement shall be made for the total no. of each type of earth electrode acceptably supplied and installed by the Contractor as a complete unit.

6.2.2 Payment:

Payment shall be made for the number of units measured, as provided above, at the Contract unit price each, and shall constitute full compensation for supplying, installing, testing, commissioning and completion of earth electrodes including copper plate or copper clad steel rod, earthing leads, excavation, backfilling, lime and charcoal, inspection chamber with cover, GI pipes for earthing leads/watering, nuts, bolts, washers, lugs, brazing and all related civil works.

6.3 Earth Continuity Conductor (ECC)

6.3.1 Measurement:

Measurement shall be made for the total running feet of each size and type of earth continuity conductor (ECC) acceptably supplied and installed by the Contractor.

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6.3.2 Payment:

Payment shall be made for the total running feet of each size and type of ECC measured, as provided above, at the Contract unit price and shall constitute full compensation for supplying, installing, connecting, testing and completing of ECC including all accessories such as sockets, thimbles, lugs, bolts, nuts, washers, brazing, etc.

6.4 Earth Connecting Point

6.4.1 Measurement:

Measurement shall be made for the total no. of earth connecting points acceptably supplied and installed by the Contractor as a complete unit.

6.4.2 Payment:

Payment shall be made for the total number of units measured, as provided above, at the Contract unit price each and shall constitute full compensation for supplying, installing and completion of earth connecting point and all other associated accessories such as nuts, bolts, washers, lugs, etc.

*** End of Section 8240 ***

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

SECTION - 8262

POLES FOR STREET LIGHTING

1.0 SCOPE OF WORK

The work under this section consists of manufacturing, supplying, installation testing and commissioning of the street lighting poles and accessories as specified herein, or as shown on the Bid Drawings and given in the Schedule of Prices.

The Contractor shall discuss the electrical layout with the Engineer and coordinate at site with other services for exact location and position of the electrical poles.

The poles with accessories shall also comply with the requirements of Special Provisions and with other relevant provisions of the Bid Documents.

2.0 APPLICABLE STANDARDS/CODES

The latest editions of the following standards/codes shall be applicable to the material specified within the scope of this Section:

- BS 5649 - Specification for lighting columns
- NV 65 - Specification for lighting columns
- CM 66 - Specification for lighting columns
- XP P 97 406-1 - Specification for lighting columns

3.0 CONSTRUCTION OF STREET LIGHTING POLES

The galvanized steel poles shall be of mild steel as shown on drawing from base plate to lantern connection, well proportioned and neatly finished. The height of the pole from the centre line of the spigot for lantern connection to the ground line and out-reach of each arm from the vertical centre line of the pole to the tip of the spigot for lantern attachment shall be as shown on Drawing. Approval of the Engineer shall be obtained before ordering the poles for manufacturing.

The pole (vertical portion) along with base plate shall preferably be in one piece. But if manufacturing in one length is not possible, it can be in two or three pieces with force fit lap joint.

The steel poles after fabrication shall be galvanized by hot dip process both in and outside as per BS-729 'Hot Dip Galvanized Coatings on Iron and Steel Articles'. The poles shall be prepared before galvanizing by removing grease, burs and slag etc. so that zinc coating is adherent, dense, smooth, continuous and uniform. The Contractor shall ensure before placing of order that the firm has adequate facility for hot dip galvanizing process as per standard practice. The steel used in the manufacture of poles shall be made by open hearth or electric furnace process.

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The steel for poles shall have the following requirements:

Tensile Strength

- Minimum = 39.9 kg/mm²
- Maximum Yield Point = 56.3 kg/mm²

Yield Point

- Minimum Elongation = 24.7 kg/mm²

Elongation

- for a 200mm sample = 20% min.

The straight portion of the pole shall be truly vertical and no deviation more than 100 mm in the entire length shall be accepted.

Other tolerances shall be as follows:

- Outside diameter = +/- 1%
- Wall thickness = +/- 10%
- Overall length of pole = +/- 0.5%
- Weight = - 0.3% + not limited.

The pole and the bracket shall be so designed that when subjected to wind at a velocity of 160 km/hour on the full projected area of pole, bracket and the lantern a factor of safety of 3 on minimum tensile strength of the material shall be obtained. In addition, the temporary horizontal deflections at the lantern position shall not exceed 1/40 of the length of the pole above ground at aforementioned wind velocity.

The poles shall have a base compartment, designed to accommodate a loop-in services cutout for 1 core PVC/SWA/PVC cables of given sizes. A 8 mm stainless steel stud complete with nut and washers shall be provided in the base compartment of the pole for earthing purpose.

The edges of the door opening on the pole shall be reinforced with a 10 mm thick M.S. square bar to reinstate the strength of pole at this location. The opening cover shall consist of weather proof, hinged door. The door shall be provided with a heavy duty non-rusting lock.

Flag brackets shall be fitted to poles if shown on the drawing and shall be as approved by the Engineer.

4.0 INSTALLATION

Lighting poles shall be handled / transported and erected in such a way so as to avoid any damages. Any damage to pole or galvanizing shall be made good to the satisfaction of the Engineer.

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The lighting poles shall be stored clear of soil, ground water or other rust producing materials. The fixing of poles shall be carried out in accordance with manufacturer's instructions and good engineering practice.

The poles shall be erected in a true vertical position. The contractor shall be responsible until completion of the maintenance period for correcting the alignment of any pole/bracket from its original position except where it is due to vehicle impact.

Where lighting poles are to be installed in the vicinity of overhead power lines, the Contractor shall inform the Engineer and act as directed. He shall maintain clearances as per WAPDA requirements from the power lines.

The Contractor shall number all the poles with high quality paint using stencil for 50 mm high lettering. The numbering shall be at 1200 mm from the bottom of pole towards the road. The numbering shall be in a manner as directed by the Engineer.

Earth backfill around pole foundation shall be done in 150 mm thick layers and shall be well rammed and compacted to provide full lateral support.

4.1 Data to be submitted

Before manufacturing, the Contractor shall submit for approval of the Engineer, the shop drawing of the pole anchor bolts, base plate and pole bracket together with details of the base compartment, cover and the means adopted for making it waterproof and tamperproof. Design calculation sheets for the poles from manufacturer shall also be submitted by the contractor to show that poles/foundations are safe for all specified stresses.

5.0 TESTS

5.1 General

The poles shall be tested and the results recorded for each test by the manufacturer in the presence of an authorized representative of the Owner or Engineer as stated below.

5.2 Inspection

The material, weight and dimensions of poles as specified shall be certified by the manufacturer. The poles shall be inspected and in case being found below the limits of tolerance as aforementioned, shall be rejected.

5.3 Loading Test

The pole shall be cantilevered horizontally, rigidly supported at base plate and loads applied at right angle to the axis of the pole at the required point i.e. at some distance from top. The test items shall be as follows:

- Deflection test.
- Permanent set test
- Breaking load test.

Sample comprising four poles shall be selected at random out of each lot of 1000 and subjected to deflection test. One pole per thousand shall be tested for permanent set test and breaking load test. When the poles in Contact are limited in

number, the manufacturer may avoid these tests and supply results of tests already done for prototype testing on such poles of supply calculation based results.

5.4 Galvanizing

Weight, uniformity of coating and other requirements shall be strictly inspected in accordance with BS-729 or other relevant international standards.

5.5 Service Cutouts

Each pole shall be provided with a waterproof and dust tight loop-in-service cutout accommodated in the base compartment of the pole.

The junction box shall comprise two (2) 10A MCBs for double arm poles and one (1) 10A MCB for single arm poles, a solid neutral link and an earthing terminal. It shall incorporate arrangements for looping "IN" and "OUT" for 1 core up to 95 mm^2 PVC/ /PVC cable having Aluminum conductor. The earth terminals, nuts and washers shall be adequately sized to take the earth continuity conductors with tight connections.

Dimensional drawings and details of the junction cutout box of pole shall be submitted for approval to the Engineer.

6.0 MEASUREMENT AND PAYMNET

6.1 Measurement

Measurement shall be made for the number of poles including all accessories and foundation block acceptably supplied and installed by the Contractor as shown on the drawing.

6.2 Payment

Payment shall be made for the number of units measured, as provided above, at the contract unit price each, and shall constitute full compensation for supplying, installing, connecting, testing and commissioning of each pole including junction cutout box.

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(TENDER DRAWINGS)
VOLUME-III

JANUARY, 2026

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04.	4156/324/BD/03C04	MASTER PLAN (SHEET 3 OF 6)	0
05.	4156/324/BD/03C05	MASTER PLAN (SHEET 4 OF 6)	0
06.	4156/324/BD/03C06	MASTER PLAN (SHEET 5 OF 6)	0
07.	4156/324/BD/03C07	MASTER PLAN (SHEET 6 OF 6)	0
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09.	4156/324/BD/03C09	MASTER PLAN SUPERIMPOSED ON SURVEY (SHEET 1 OF 6)	0
10.	4156/324/BD/03C10	MASTER PLAN SUPERIMPOSED ON SURVEY (SHEET 2 OF 6)	0
11.	4156/324/BD/03C11	MASTER PLAN SUPERIMPOSED ON SURVEY (SHEET 3 OF 6)	0
12.	4156/324/BD/03C12	MASTER PLAN SUPERIMPOSED ON SURVEY (SHEET 4 OF 6)	0
13.	4156/324/BD/03C13	MASTER PLAN SUPERIMPOSED ON SURVEY (SHEET 5 OF 6)	0
14.	4156/324/BD/03C14	MASTER PLAN SUPERIMPOSED ON SURVEY (SHEET 6 OF 6)	0
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19	4156/324/BD/03C19	SETTING OUT PLAN (SHEET 4 OF 6)	0
20.	4156/324/BD/03C20	SETTING OUT PLAN (SHEET 5 OF 6)	0
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45.	4156/324/BD/03C45	PLAN & PROFILE OF STREET-05 (SHEET 01 OF 01)	0
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50	4156/324/BD/03C50	PLAN & PROFILE OF STREET-10 (SHEET 01 OF 01)	0
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91	4156/324/BD/03C91	PLAN & PROFILE OF STREET-68 (SHEET 01 OF 01)	0
92	4156/324/BD/03C92	PLAN & PROFILE OF STREET-69 (SHEET 01 OF 01)	0
93	4156/324/BD/03C93	PLAN & PROFILE OF STREET-70 (SHEET 01 OF 01)	0
94	4156/324/BD/03C94	PLAN & PROFILE OF STREET-71 (SHEET 01 OF 01)	0
95	4156/324/BD/03C95	PLAN & PROFILE OF STREET-72 (SHEET 01 OF 01)	0
96	4156/324/BD/03C96	PLAN & PROFILE OF STREET-73 (SHEET 01 OF 01)	0
97	4156/324/BD/03C97	PLAN & PROFILE OF STREET-74 (SHEET 01 OF 01)	0
98	4156/324/BD/03C98	PLAN & PROFILE OF STREET-75 (SHEET 01 OF 01)	0
99	4156/324/BD/03C99	PLAN & PROFILE OF STREET-76 (SHEET 01 OF 01)	0
100	4156/324/BD/03C100	PLAN & PROFILE OF STREET-77 (SHEET 01 OF 01)	0
101	4156/324/BD/03C101	PLAN & PROFILE OF STREET-78 (SHEET 01 OF 01)	0
102	4156/324/BD/03C102	PLAN & PROFILE OF STREET-79 (SHEET 01 OF 01)	0
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106	4156/324/BD/03C106	PLAN & PROFILE OF STREET-81 (SHEET 01 OF 02)	0
107	4156/324/BD/03C107	PLAN & PROFILE OF STREET-81 (SHEET 02 OF 02)	0
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59.	4156/323/BD/03G07	ELEVATED WATER TANK (SHEET 01 OF 05)	0
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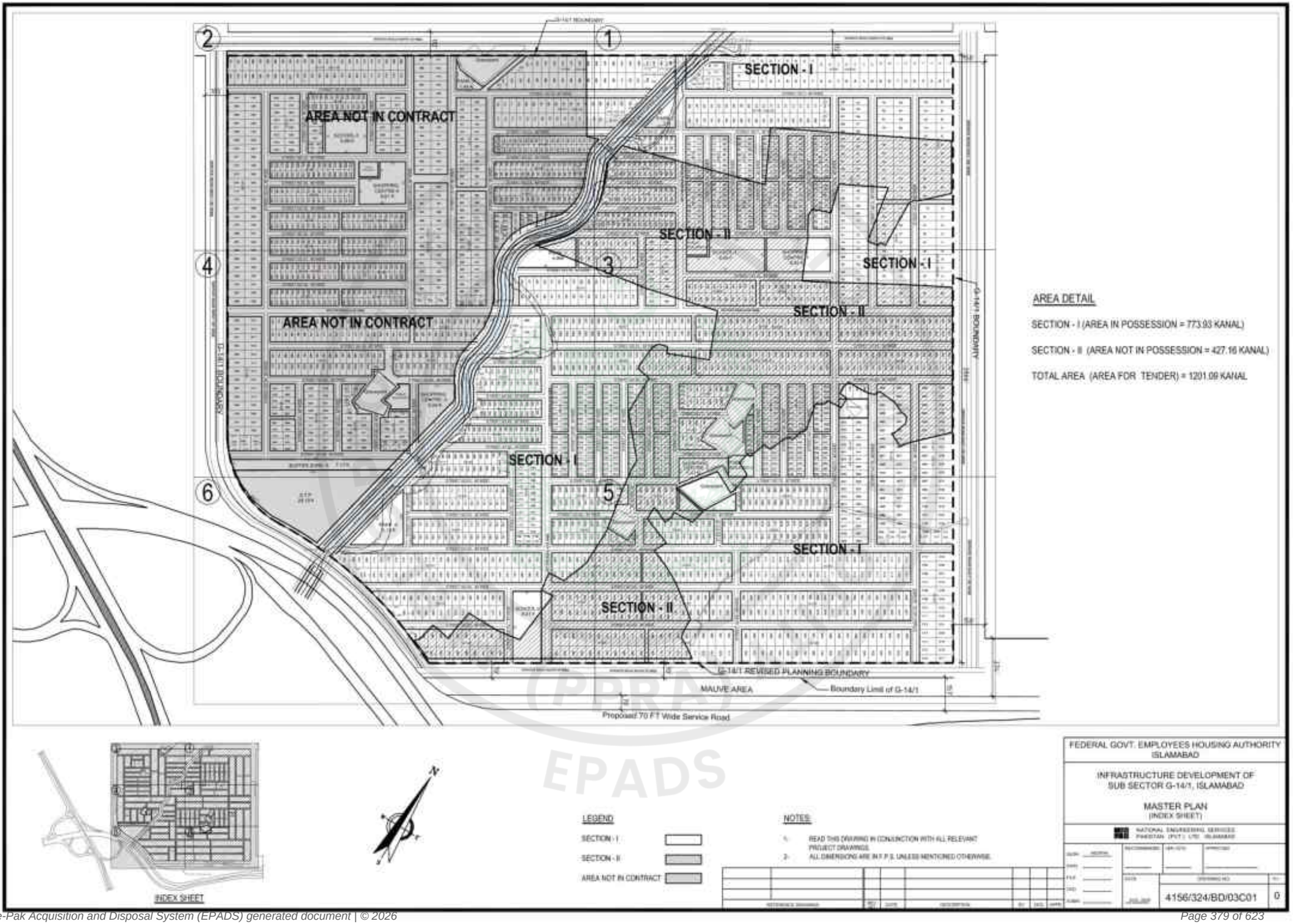

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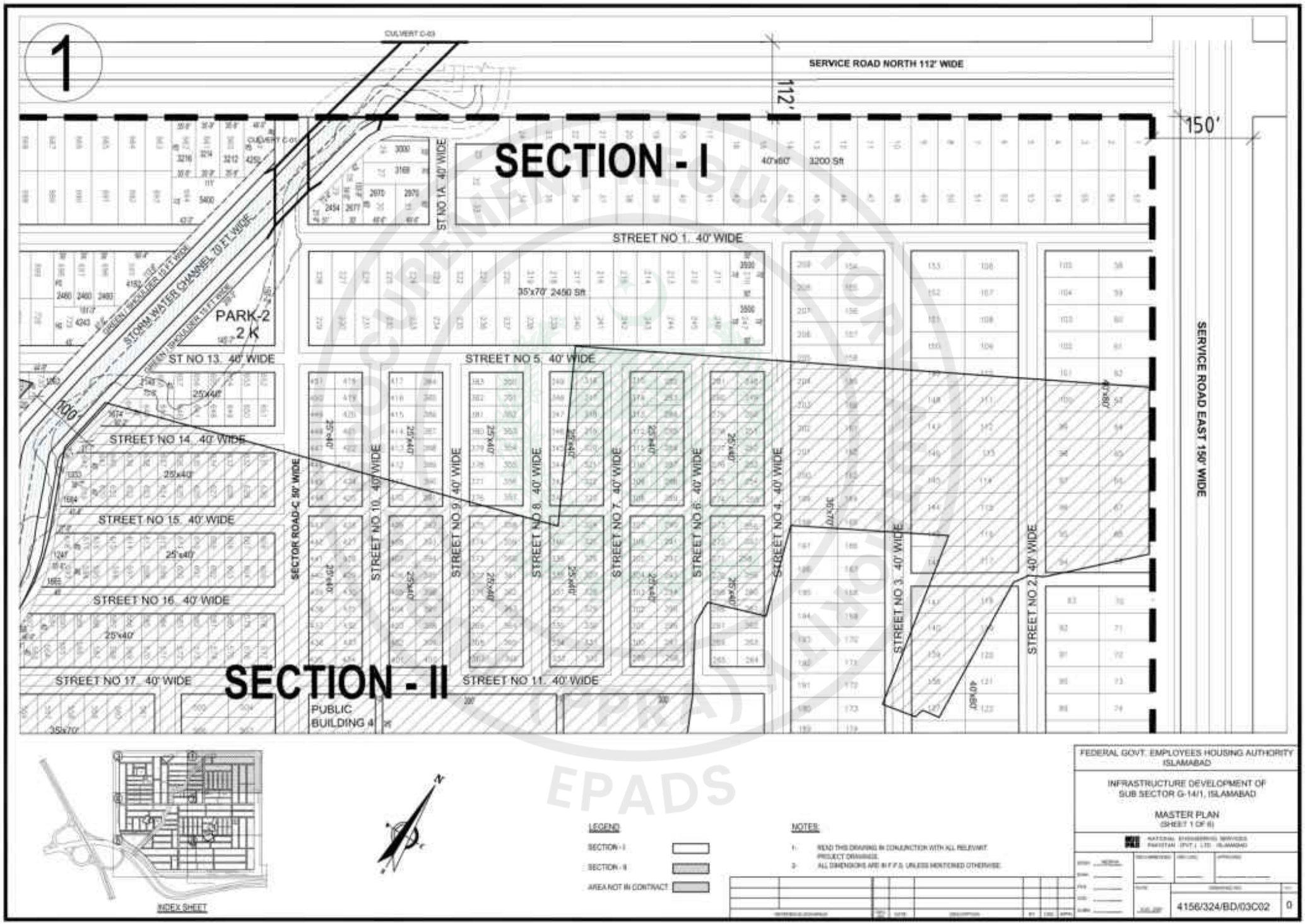

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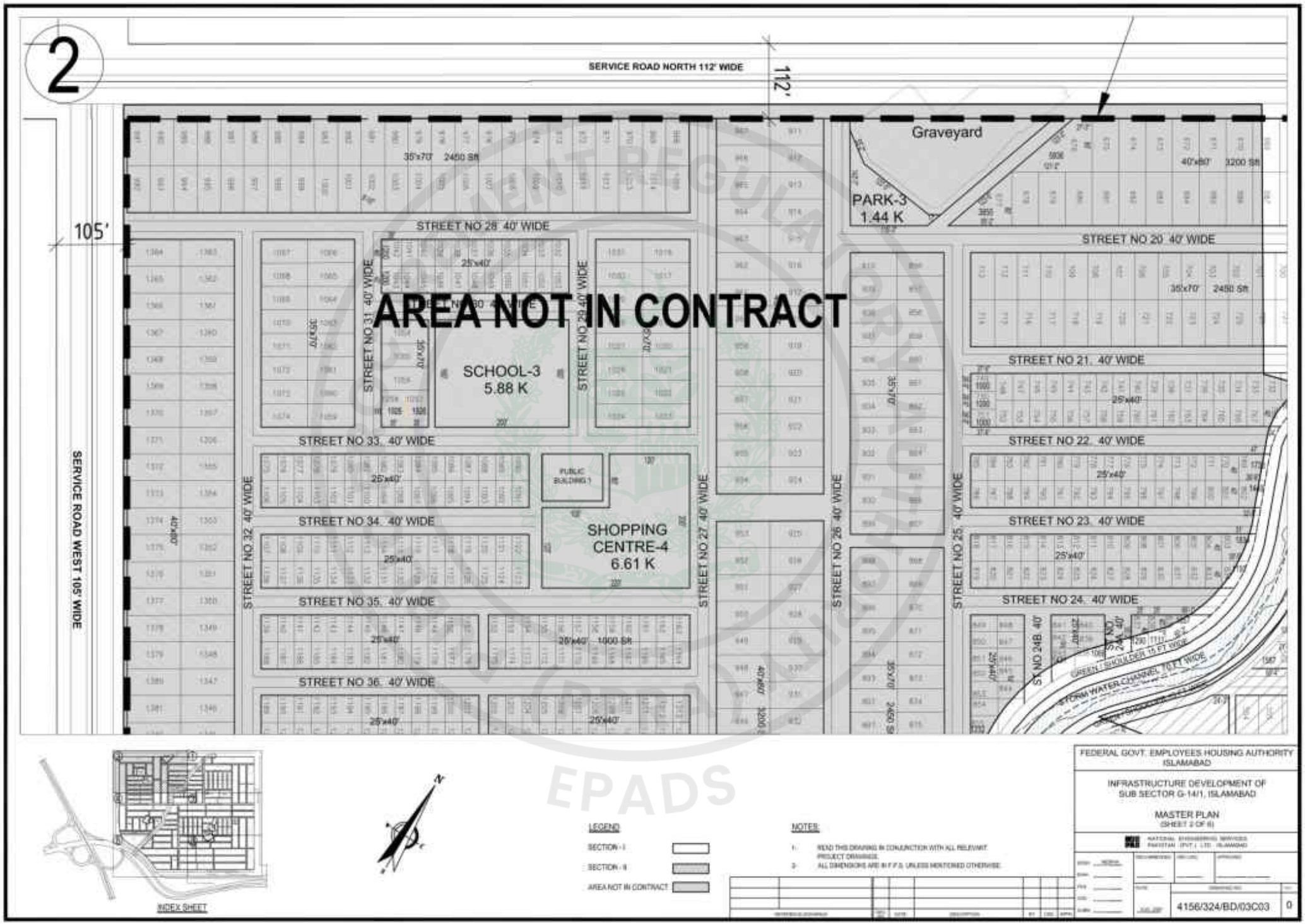

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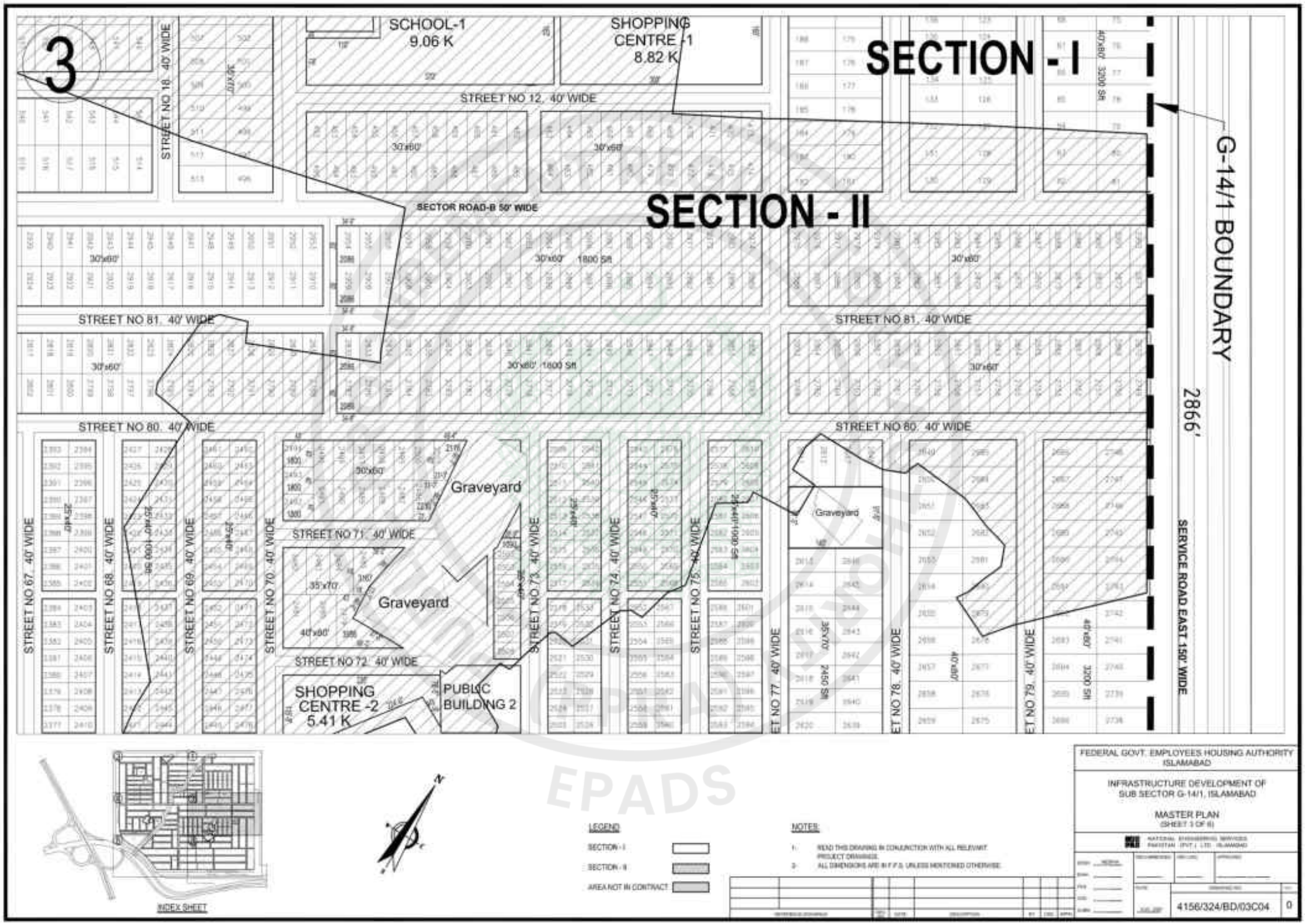

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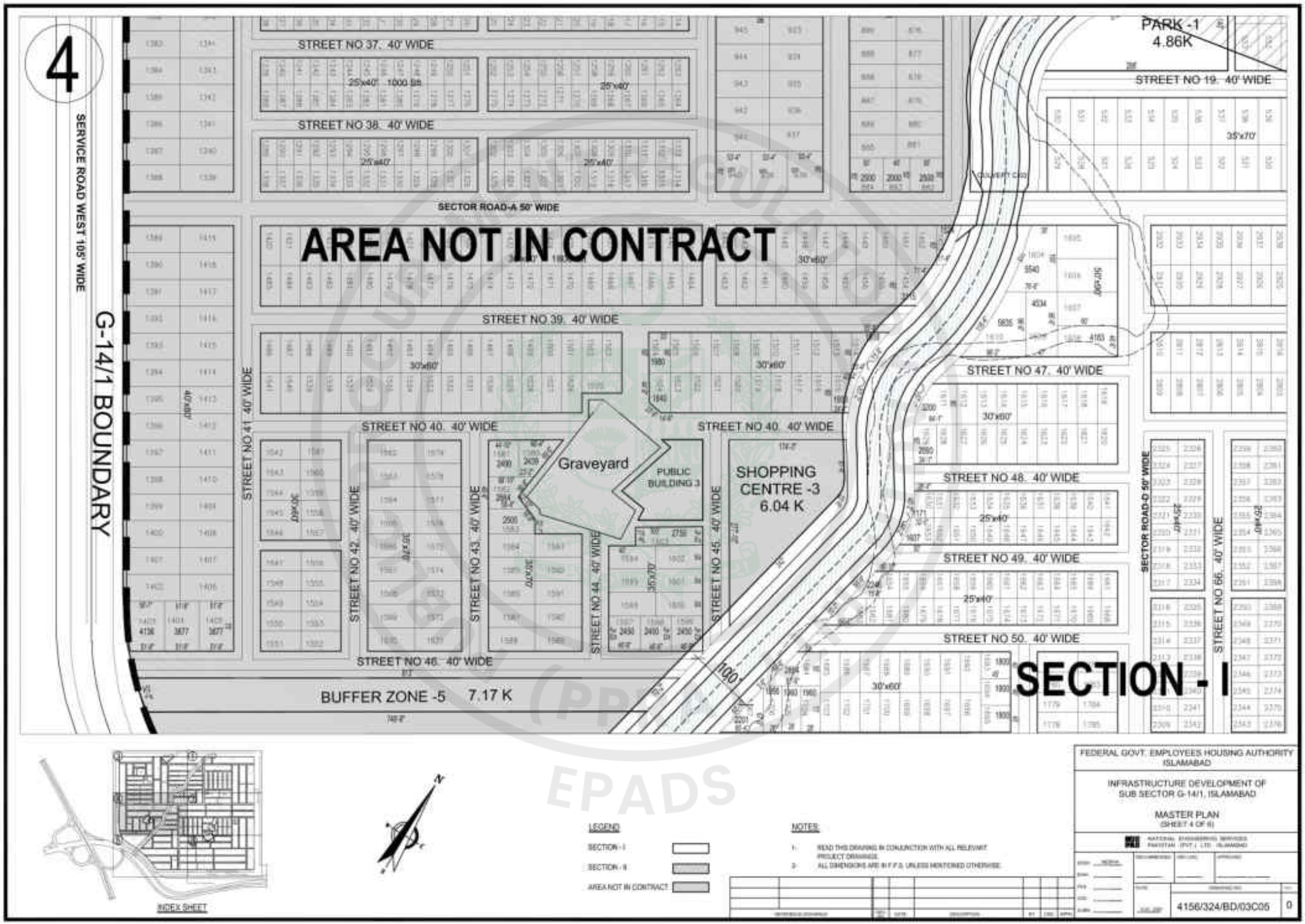

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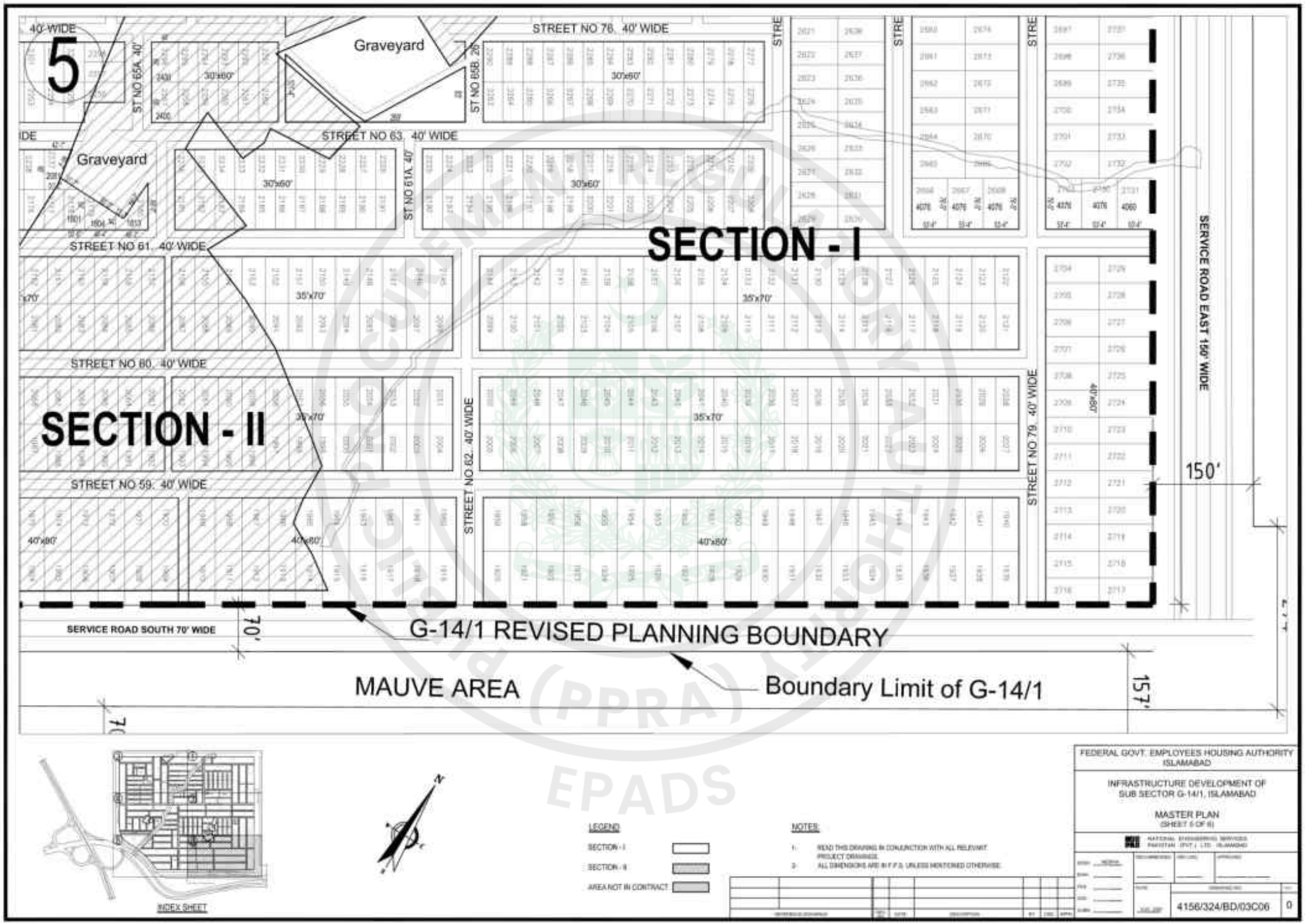

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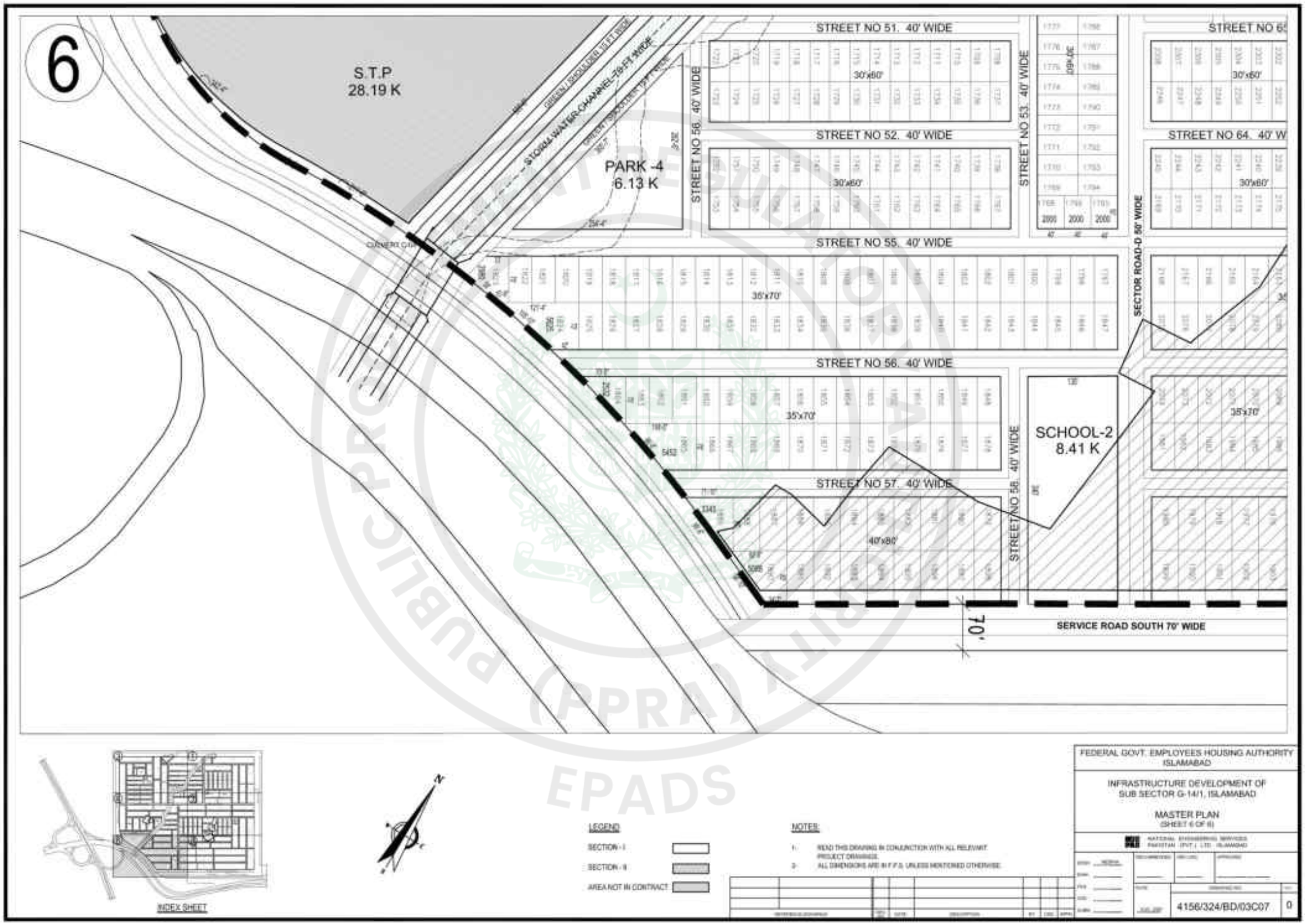

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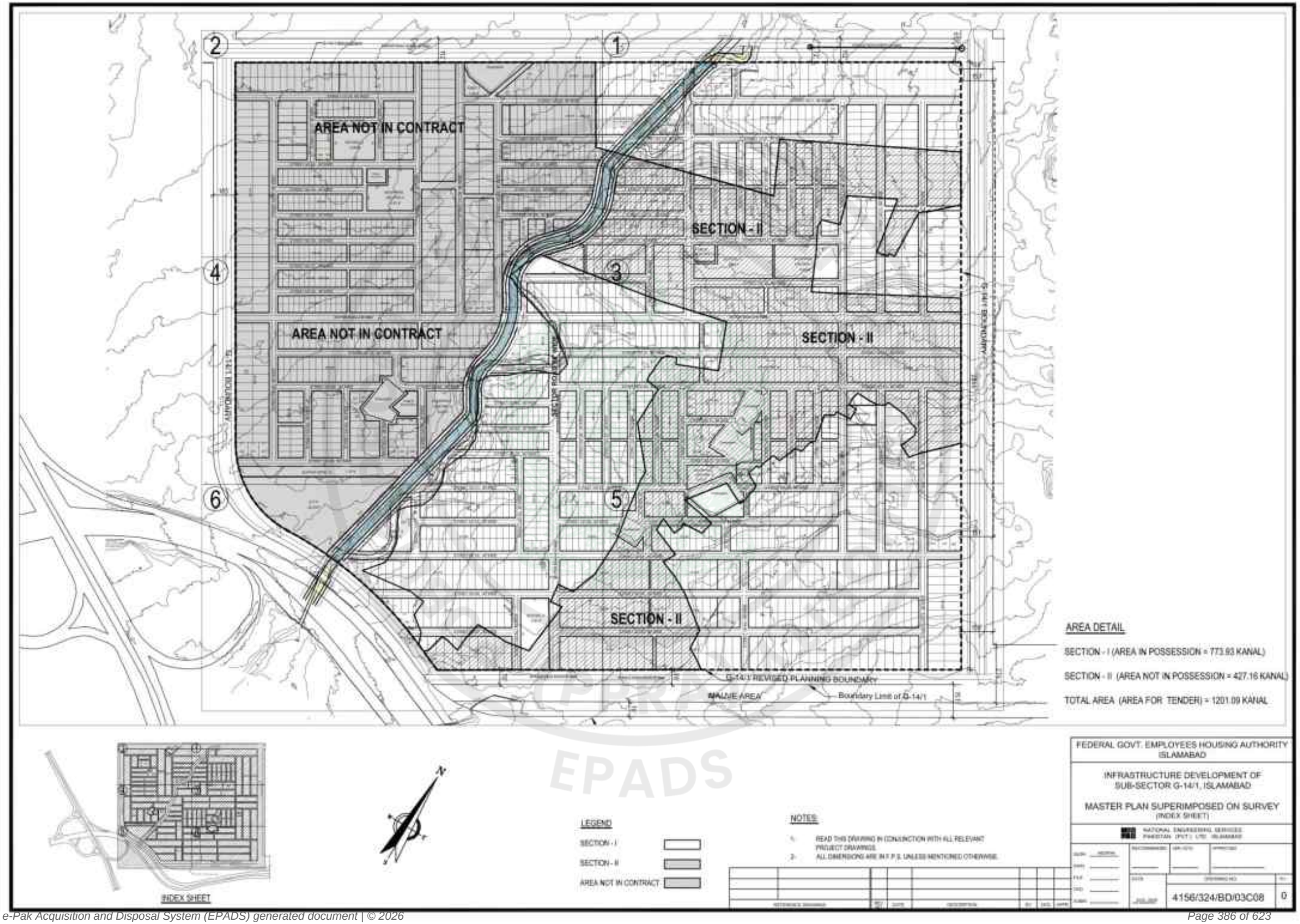

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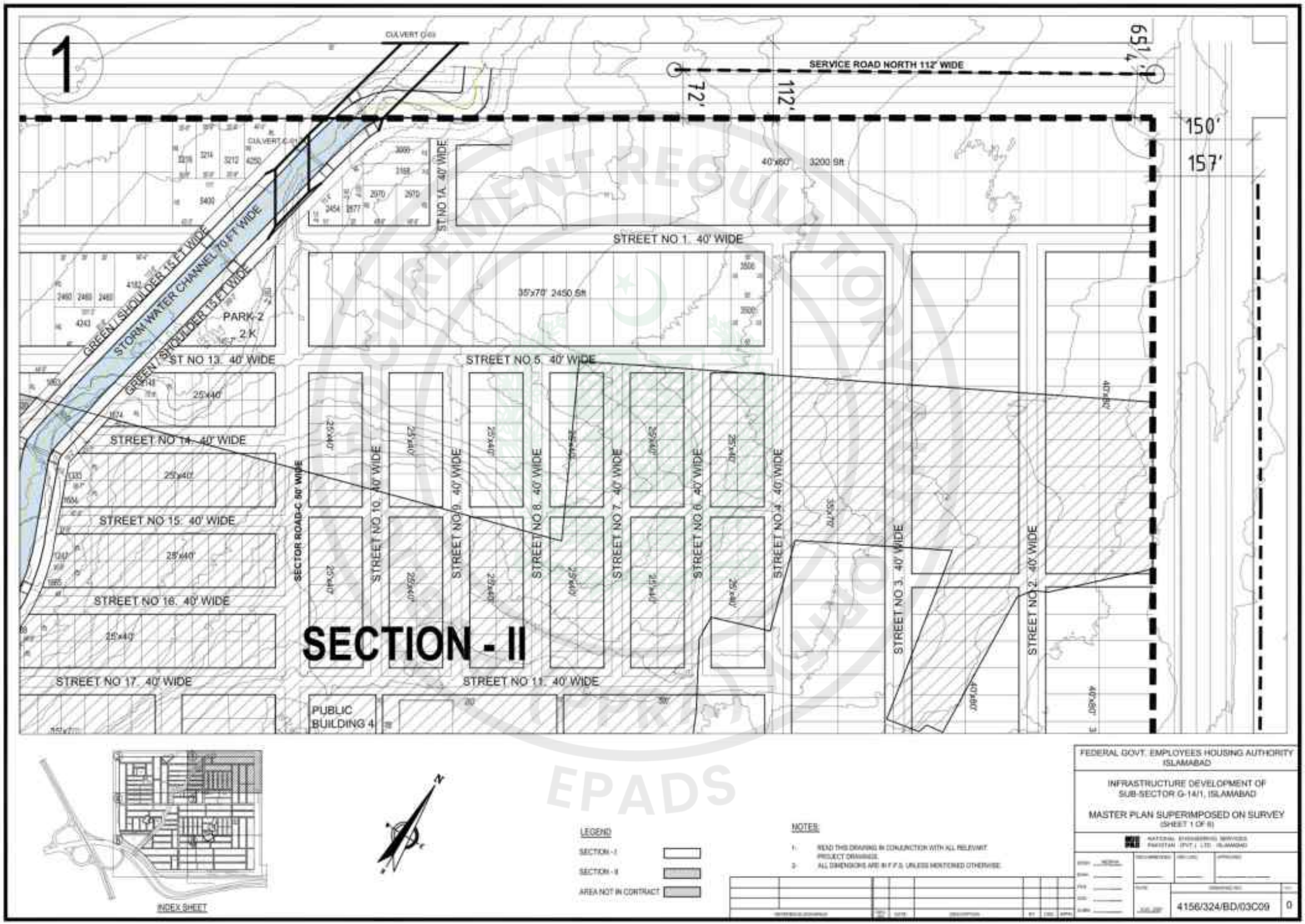

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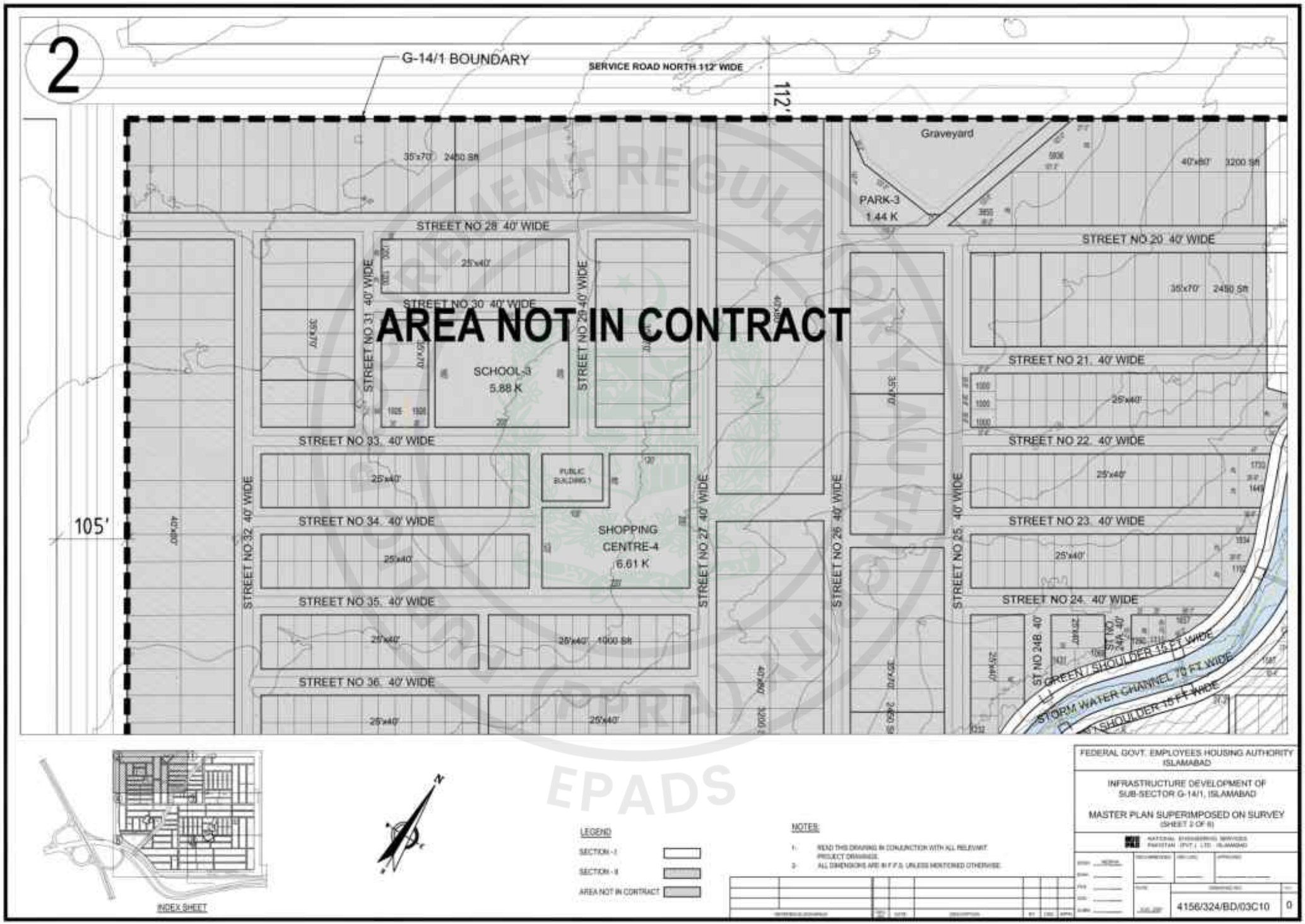

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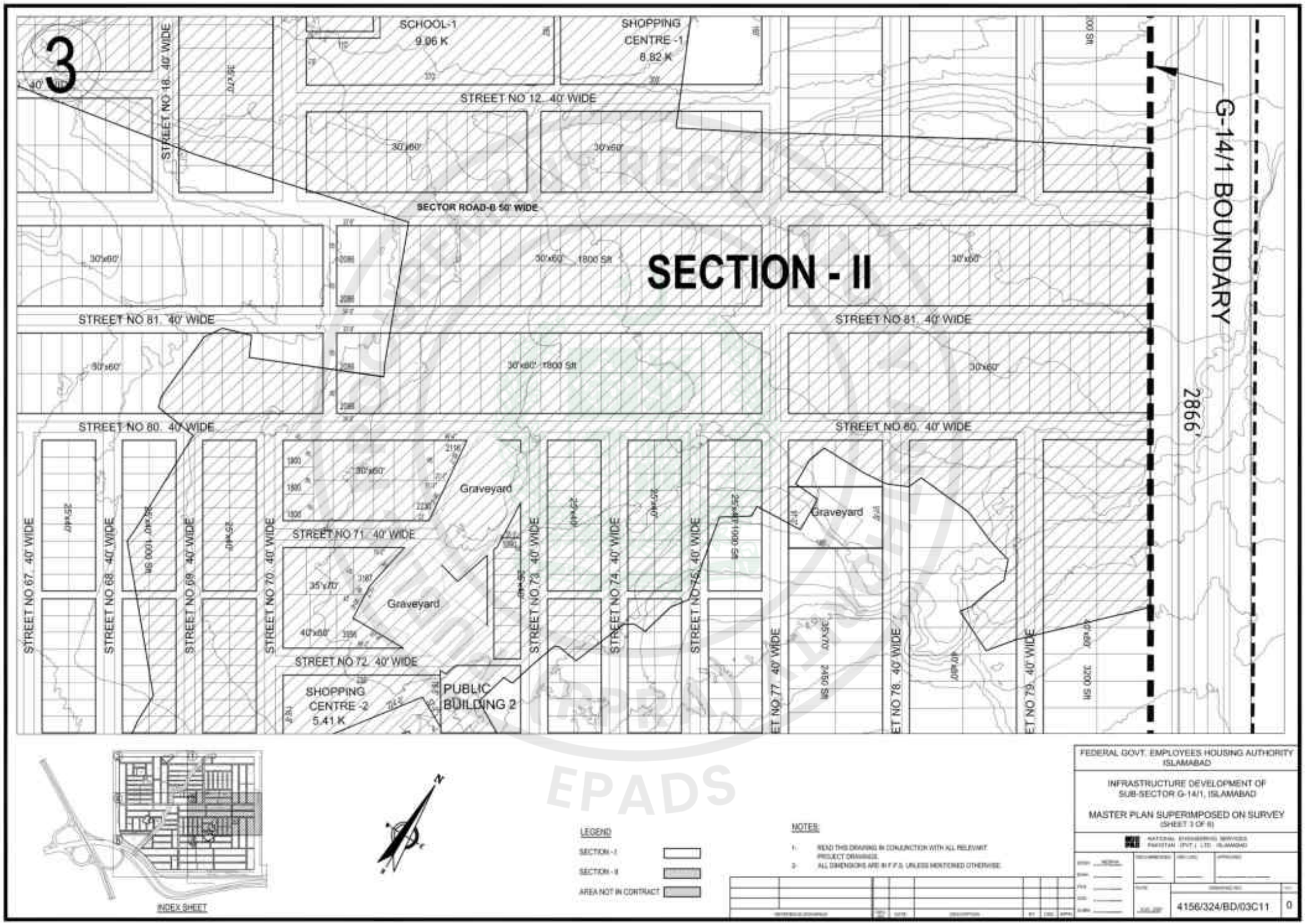

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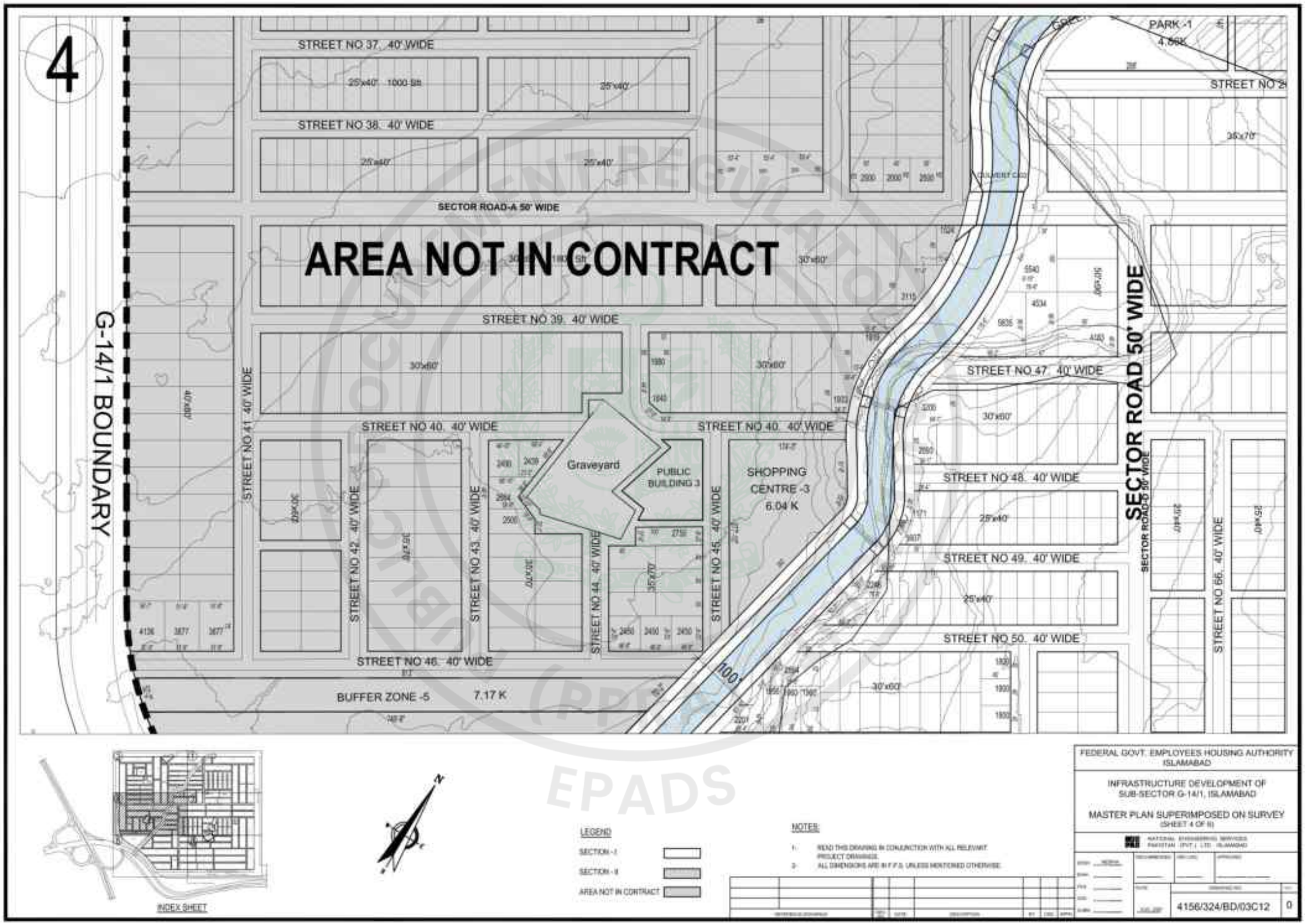

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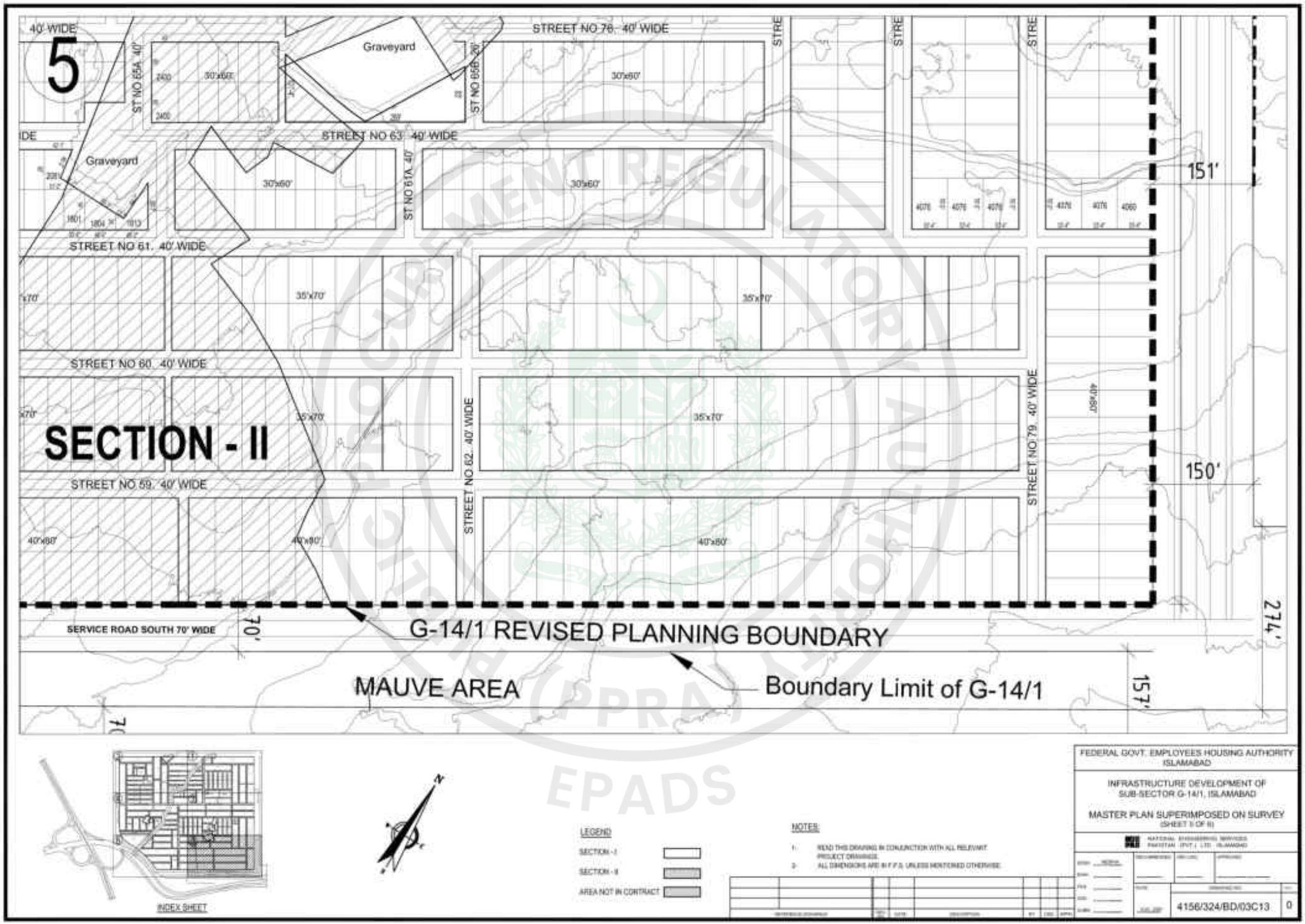

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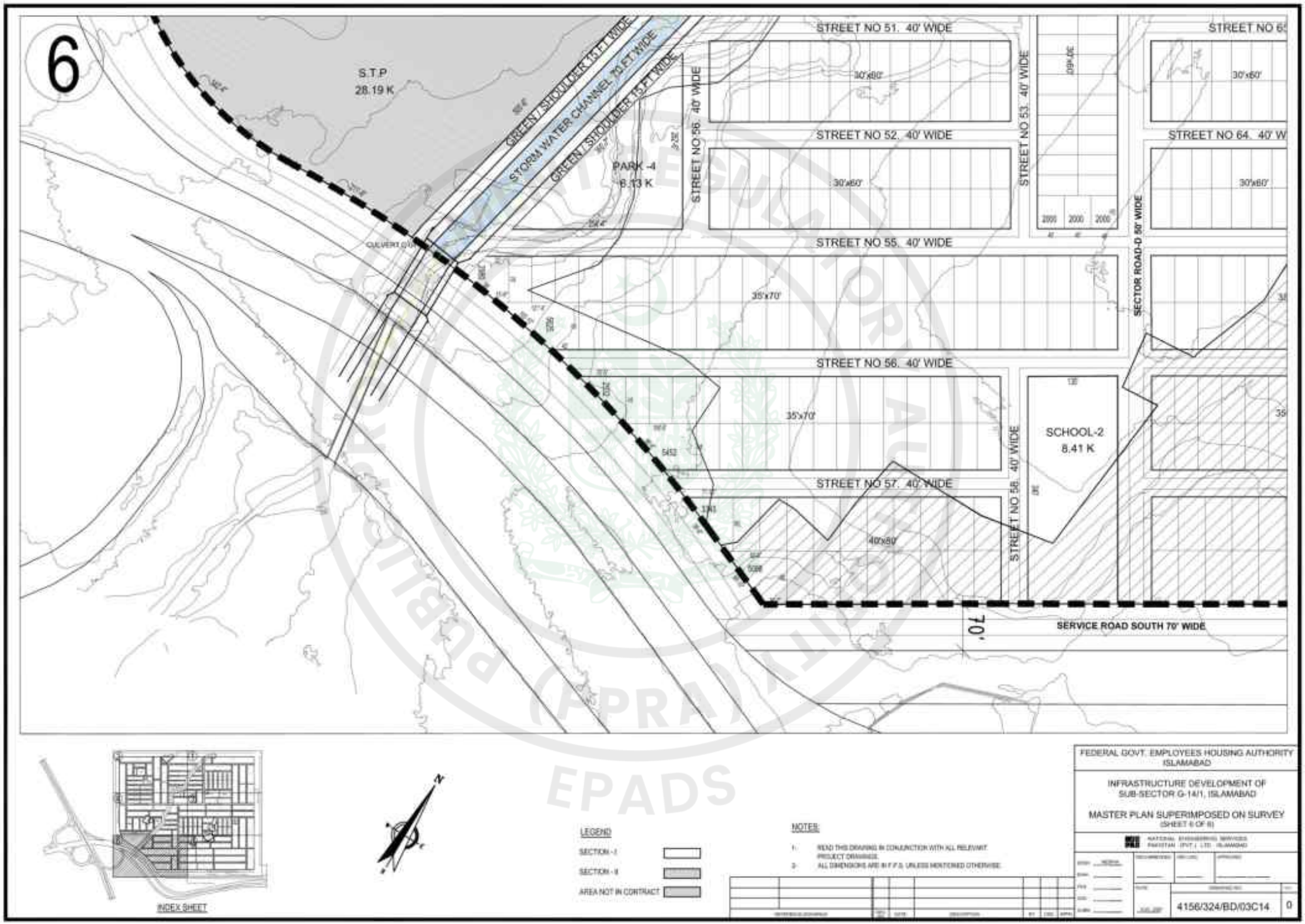

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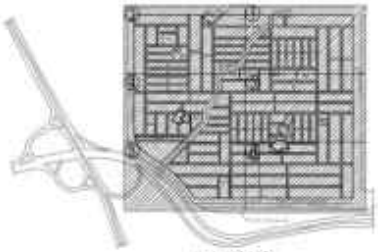
AREA DETAIL

SECTION - I (AREA IN POSSESSION = 773.93 KANAL)

SECTION - II (AREA NOT IN POSSESSION = 427.16 KANAL)

TOTAL AREA (AREA FOR TENDER) = 1201.09 KANAL



INDEX SHEET

LEGEND

SECTION - I

SECTION - II

AREA NOT IN CONTRACT

NOTES

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FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

SETTING OUT PLAN
(INDEX SHEET)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DRAWING NO.	REV.
4156/324/BD/03C15	0

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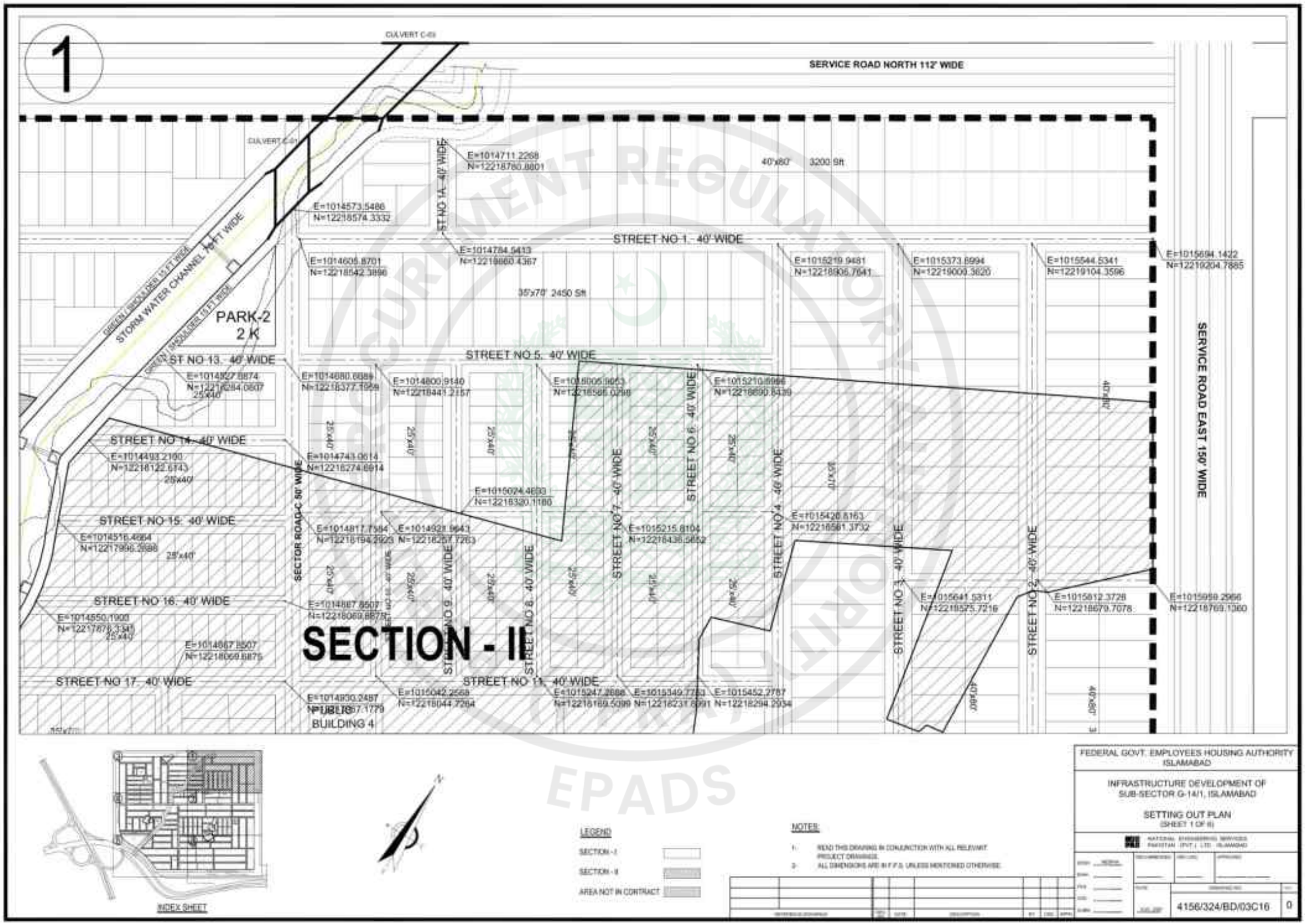

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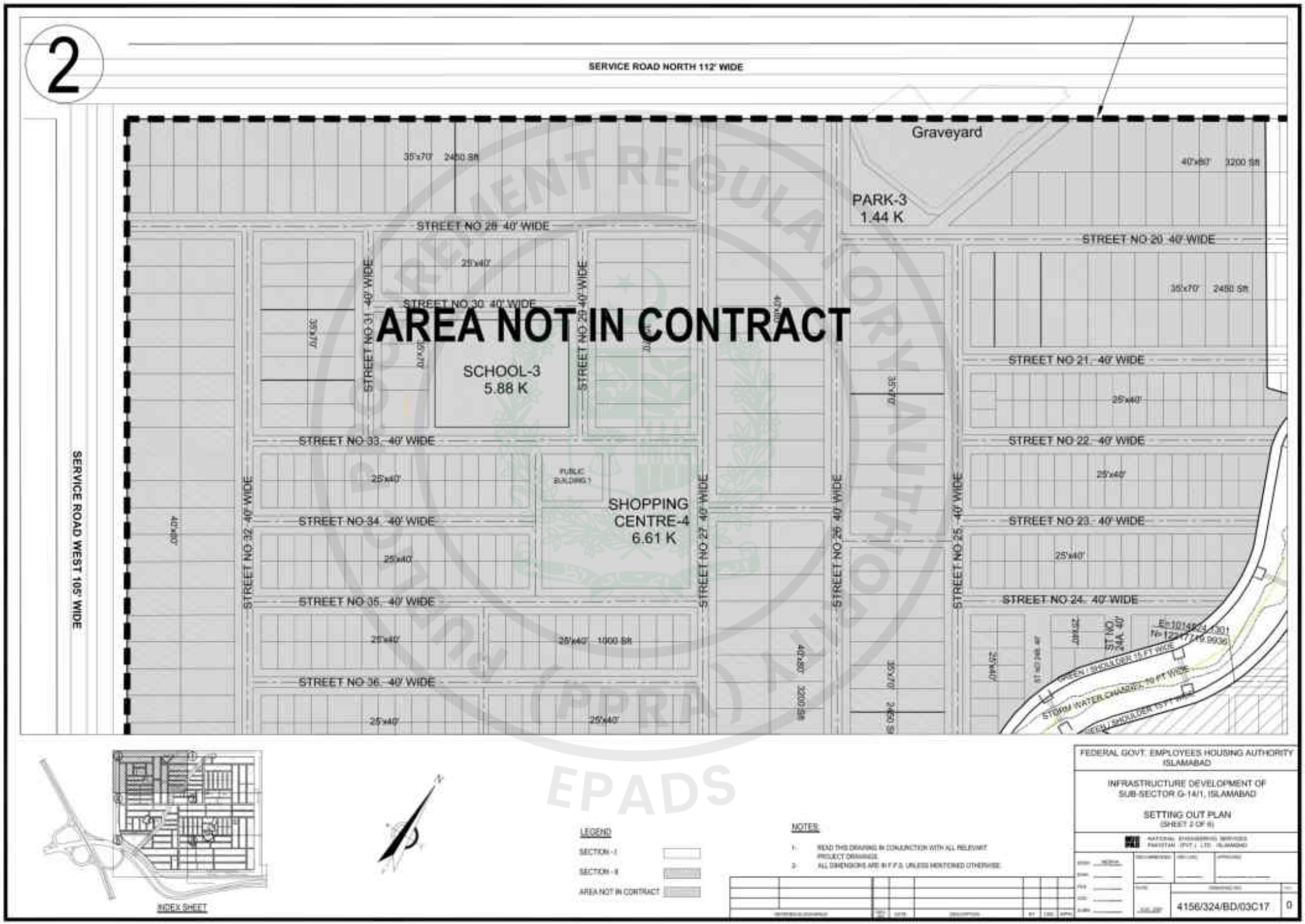

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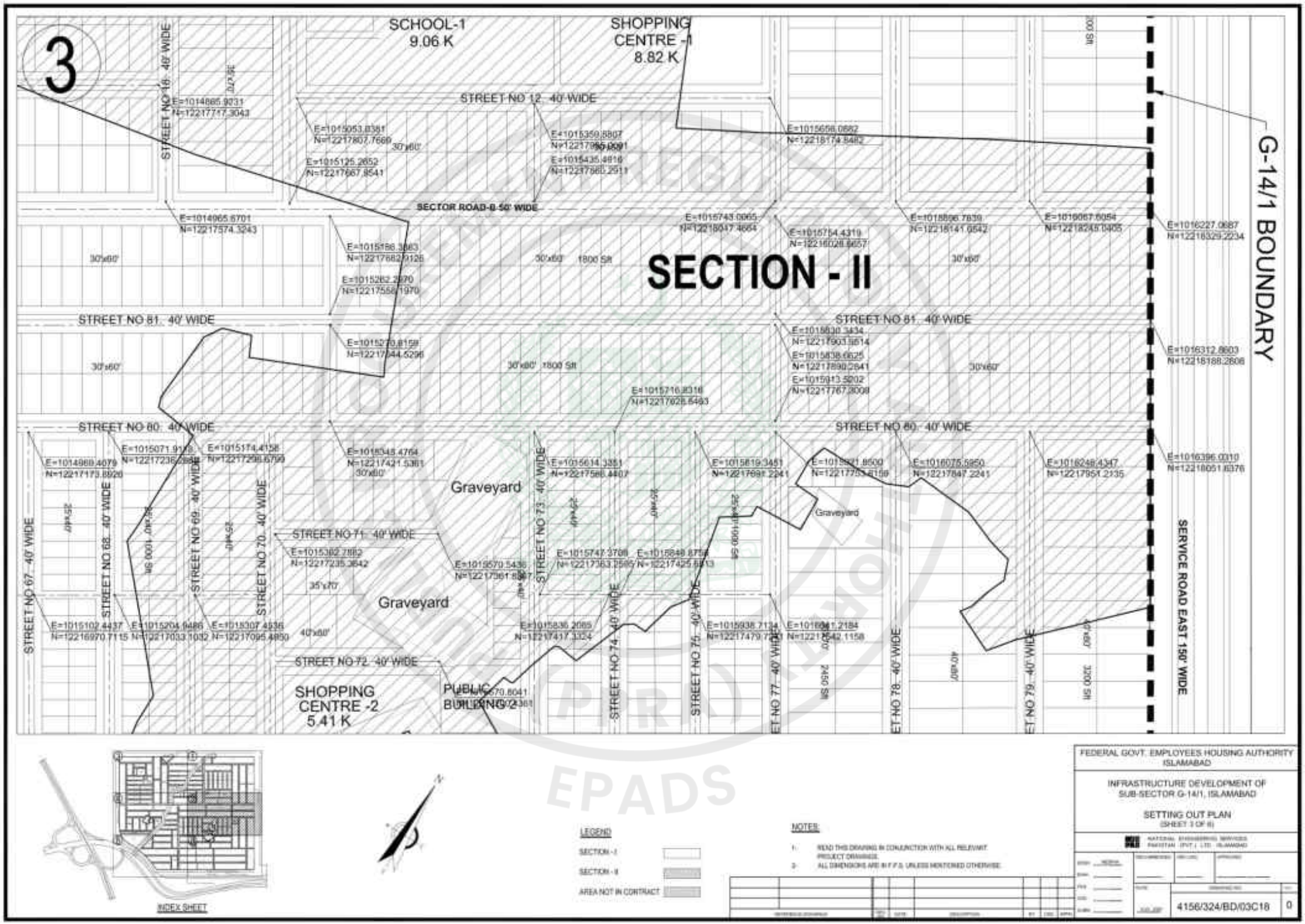

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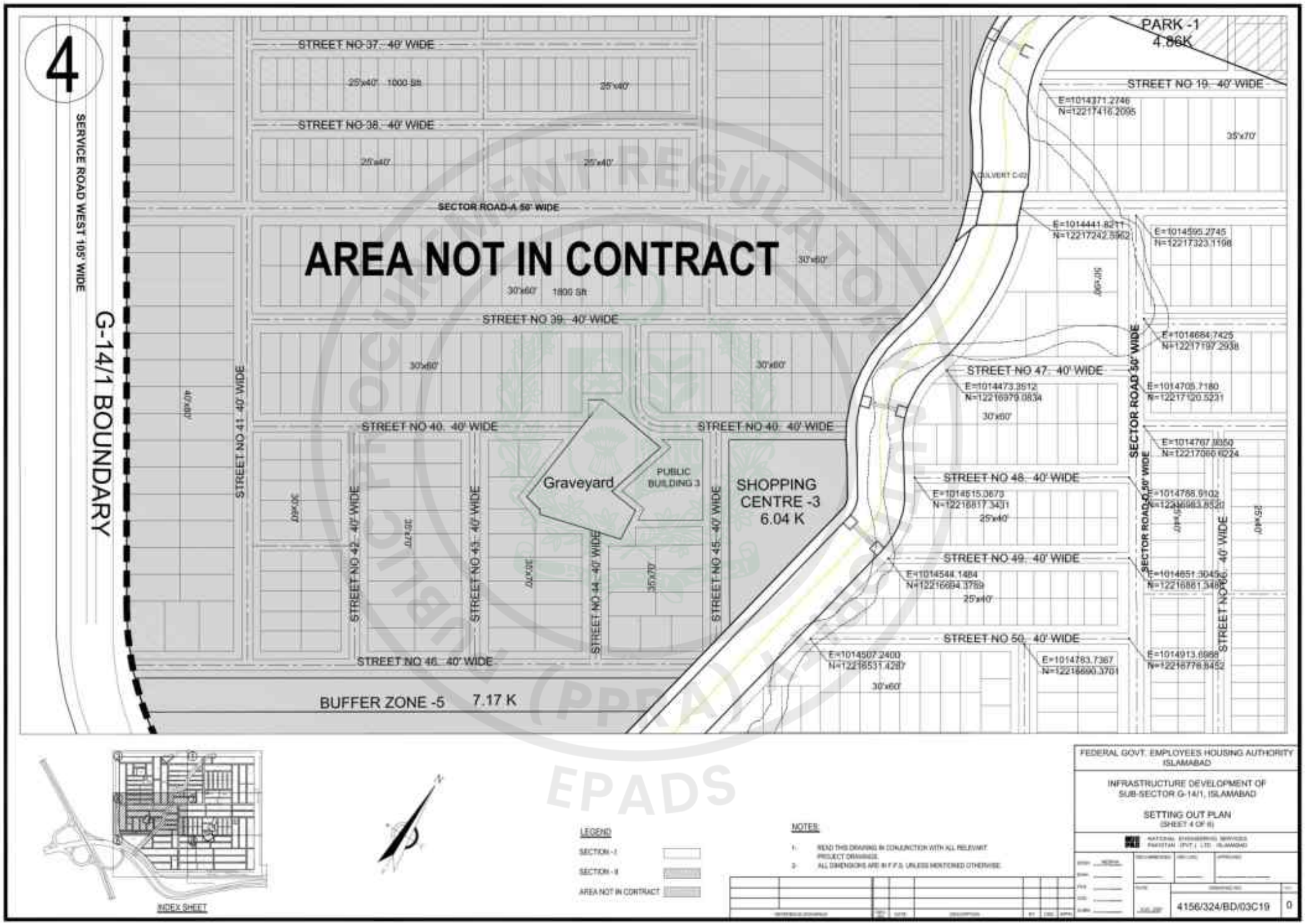

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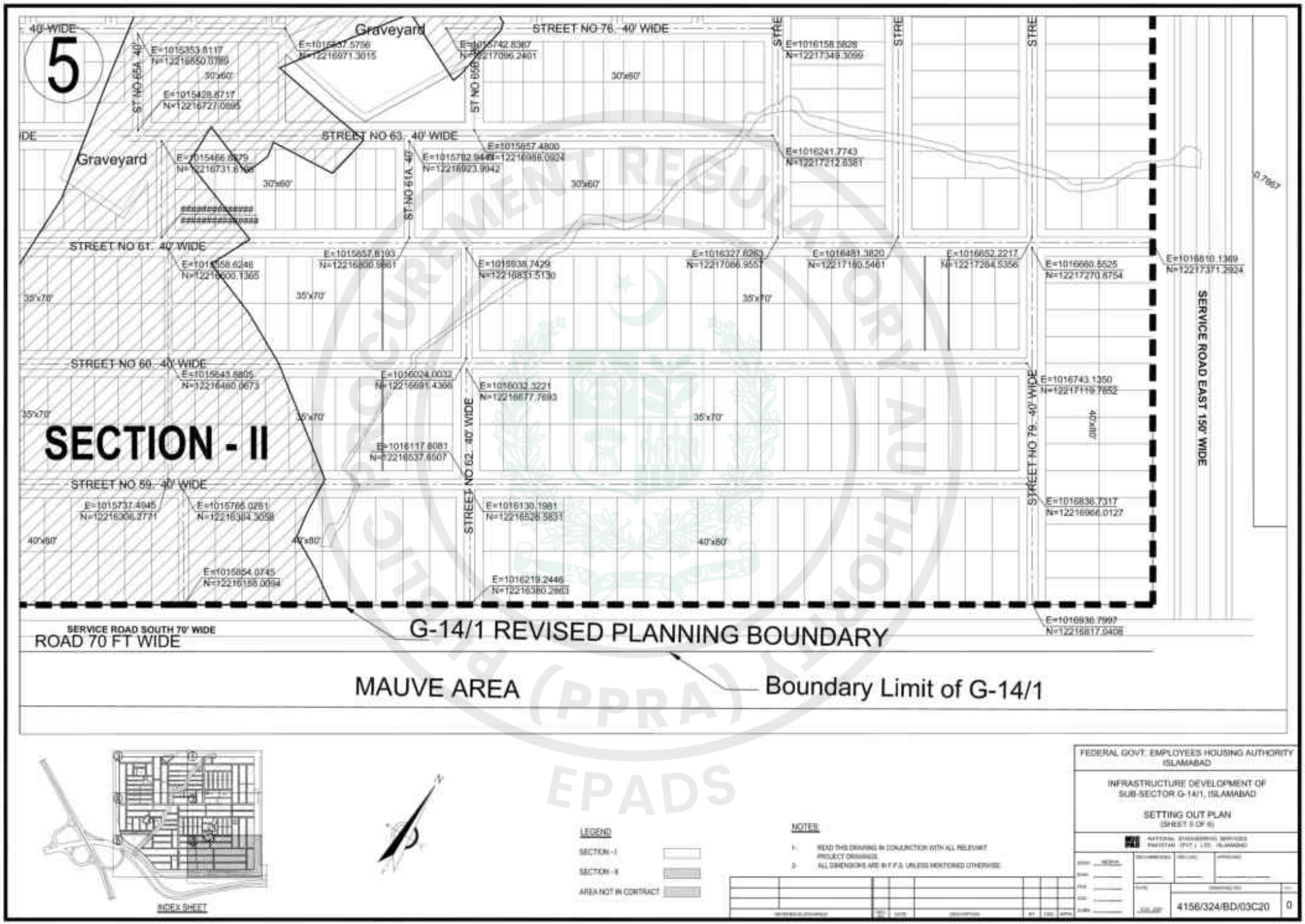

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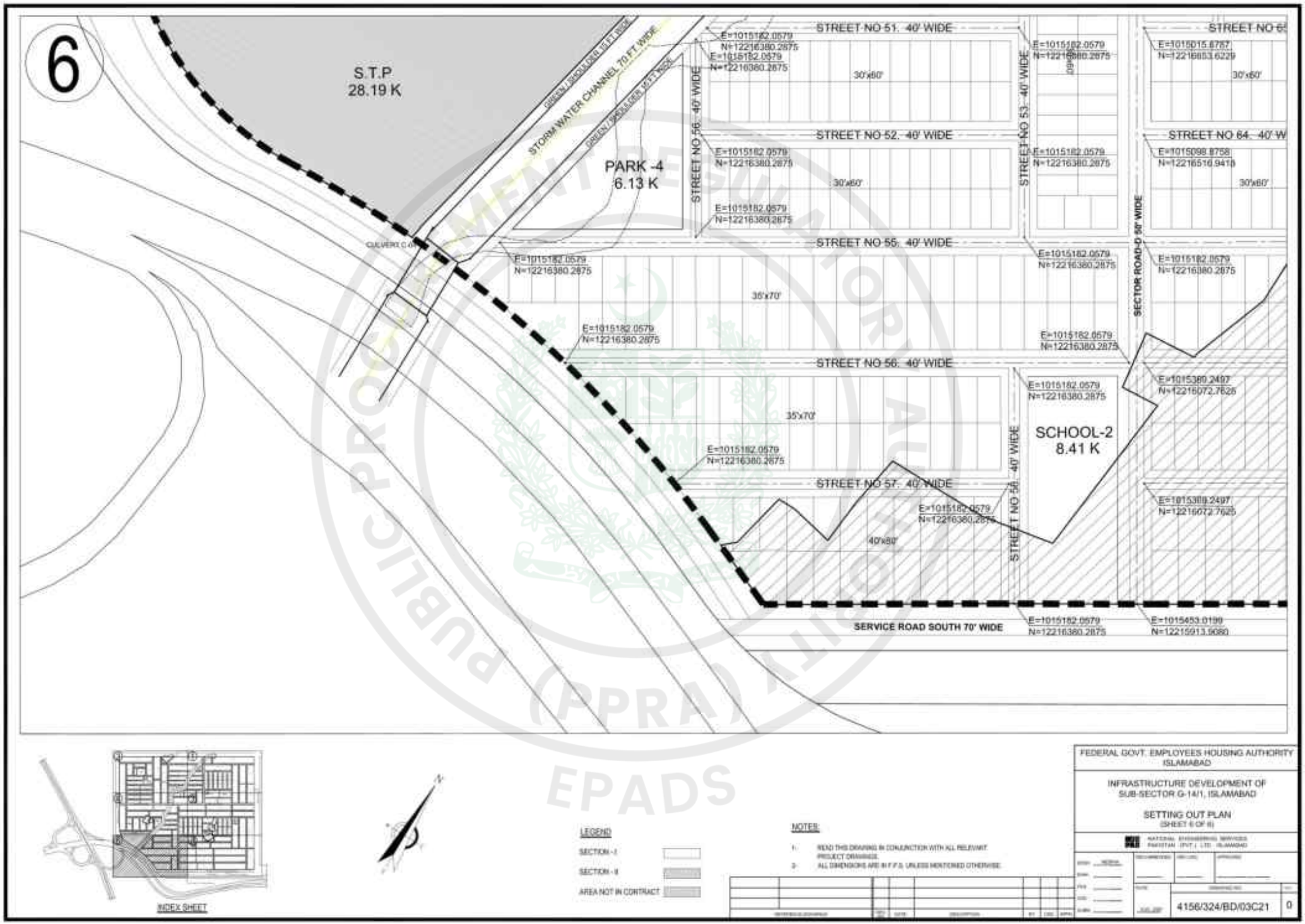

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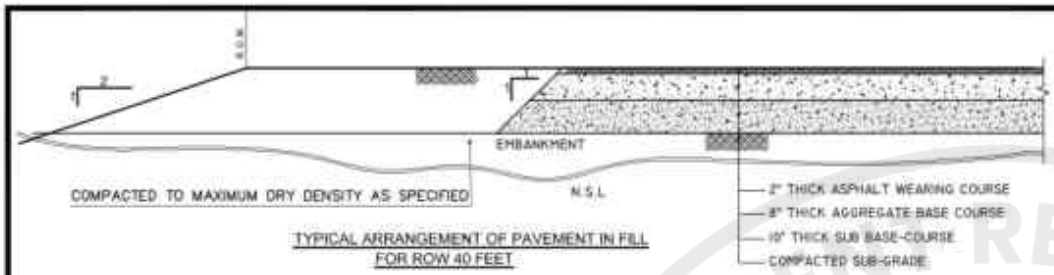
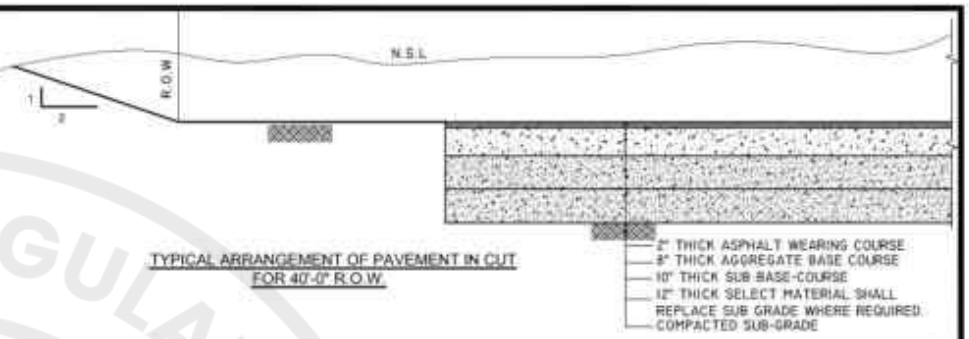
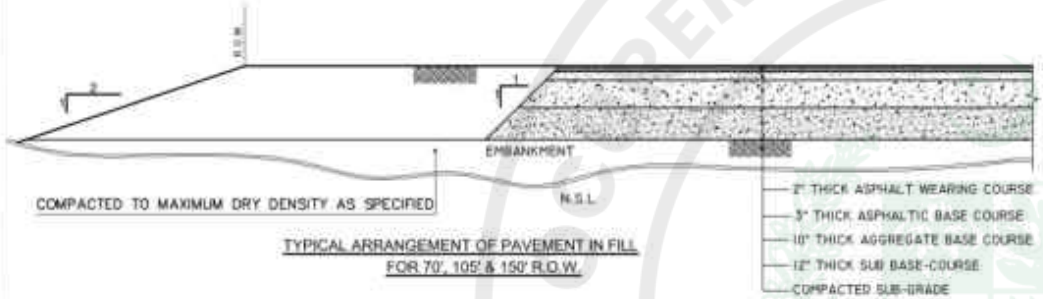


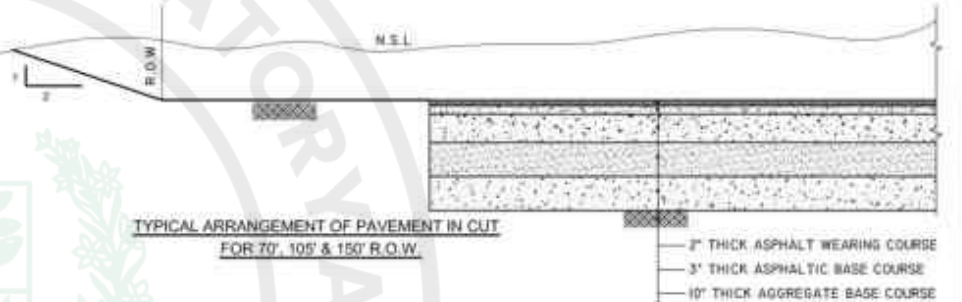
TYPICAL ARRANGEMENT OF PAVEMENT IN FILL
FOR ROW 40 FEET



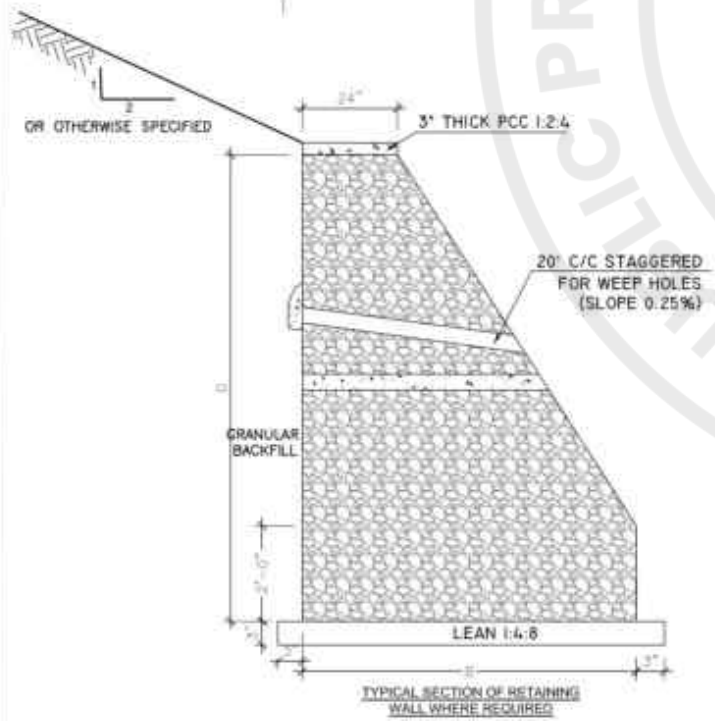
TYPICAL ARRANGEMENT OF PAVEMENT IN CUT
FOR 40'-0" R.O.W.



TYPICAL ARRANGEMENT OF PAVEMENT IN FILL
FOR 70', 105' & 150' R.O.W.



TYPICAL ARRANGEMENT OF PAVEMENT IN CUT
FOR 70', 105' & 150' R.O.W.



TYPICAL SECTION OF RETAINING
WALL WHERE REQUIRED

TYPICAL DETAIL OF FOOT PATH
(DETAIL-A)

SCHEDULE OF TOE WALLS

S.No.	D	B
1	6'-0"	4'-0"
2	8'-0"	4'-6"
3	10'-0"	6'-0"
4	14'-0"	10'-6"
5	18'-0"	13'-0"
6	25'-0"	17'-3"

LEGEND

1. W WATER LINE
2. S SANITARY SEWER
3. D DRAIN
4. G SUI GAS
5. T TELEPHONE
6. HT HIGH TENSION ELECTRIC
7. LT LOW TENSION ELECTRIC
8. FP FOOT PATH
9. OFC OPTICAL FIBRE CABLE
10. SCC SAFE CITY CABLE

NOTES:

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FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

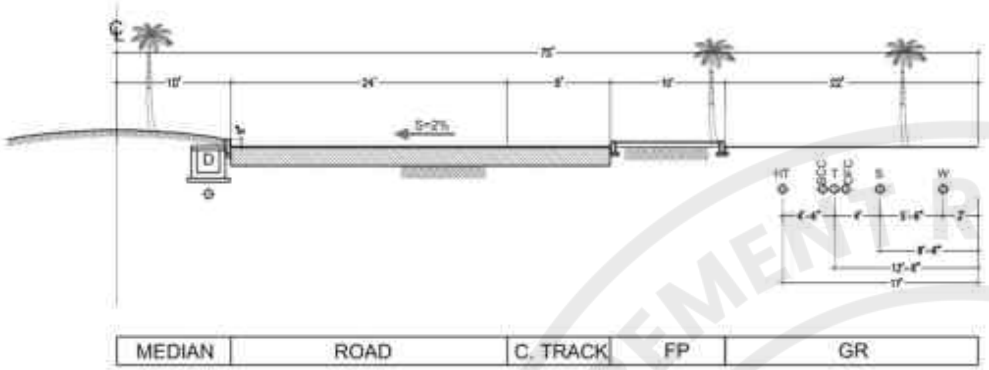
INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

TYPICAL ROAD DETAILS
(SHEET 1 OF 2)

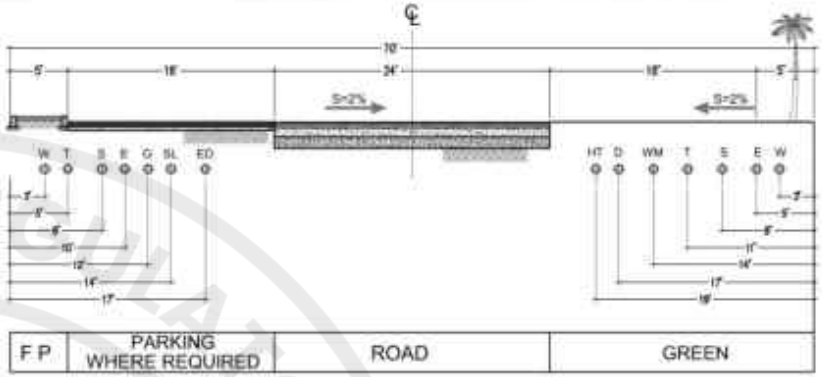
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESIGN	RECOMMENDED	CHECKED	APPROVED
DRAWN			
TRACED			
CHECKED			
DATE	DRAWING NO.		REV.
	4156/324/BD/03C22		0

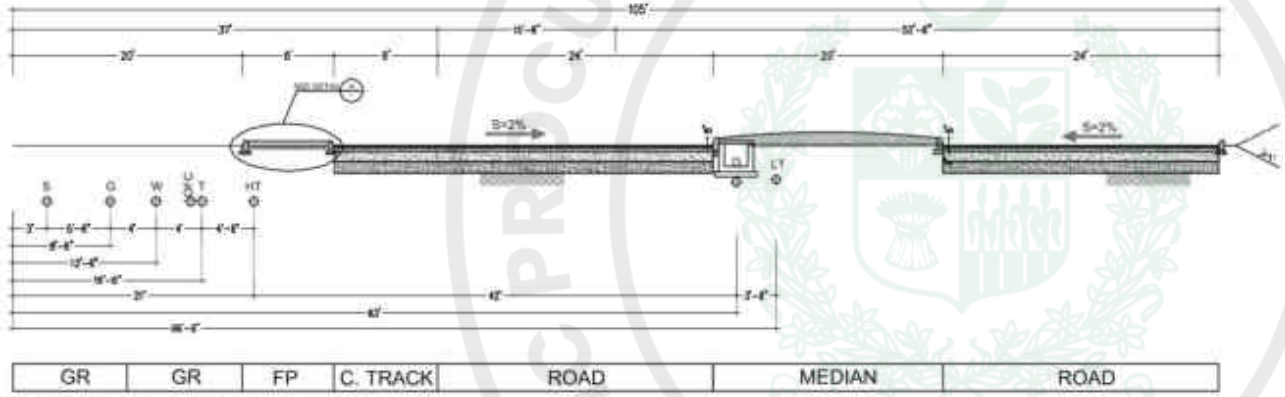
PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS



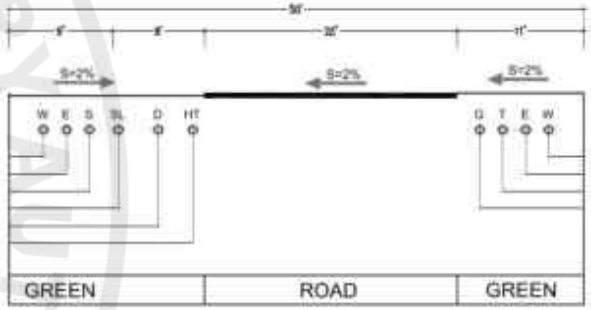
X-SECTION OF MARKAZ ROAD 150'-0" R.O.W (HALF PORTION)



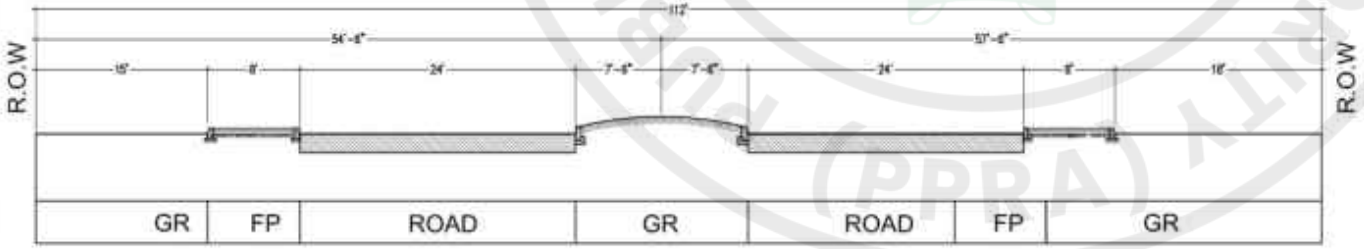
X-SECTION OF 70'-0" WIDE ROAD



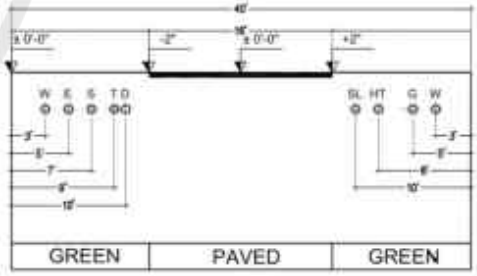
X-SECTION OF 105'-0" WIDE ROAD



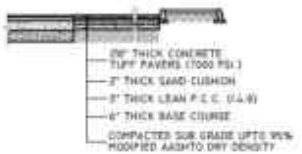
X-SECTION OF 50'-0" WIDE ROAD



X-SECTION OF MAIN ROAD-01 (112'-0" R.O.W)



40'-0" WIDE ROAD
SCALE = 1" = 8'-0"



TYPICAL PARKING DETAIL

LEGEND

1. W WATER LINE
2. S SANITARY SEWER
3. D DRAIN
4. G SUI GAS
5. T TELEPHONE
6. HT HIGH TENSION ELECTRIC
7. LT LOW TENSION ELECTRIC
8. FP FOOT PATH
9. OFC OPTICAL FIBRE CABLE
10. SCC SAFE CITY CABLE

NOTE

1. THE DRAINAGE MATERIAL (WOOD/WHAN) SHALL BE USED FOR PREPARATION OF SUBGRADE IN CASE OF LOW CBR (BELOW 7%) A-4 SOIL ENCOUNTERED BASED AFTER NECESSARY SOIL TEST PERFORMED UNDER SUPERVISION OF MATERIAL ENGINEER AT SITE.
2. THE SUBGRADE SOIL SHALL BE REPLACED WITH GRANULAR / SELECTED MATERIAL IN CASE OF OVER MOISTURED OR SOIL MIXED WITH ORGANIC MATERIAL AS DIRECTED BY RE ENGINEER REPRESENTATIVE BASED ON NECESSARY SOIL TEST CONDUCTED AT SITE UNDER SUPERVISION OF MATERIAL ENGINEER.
3. THE S-SECTION CAN BE MIRRORED AS PER SITE CONDITION UNDER INTIMATION TO INFRASTRUCTURE SECTION.

FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY ISLAMABAD

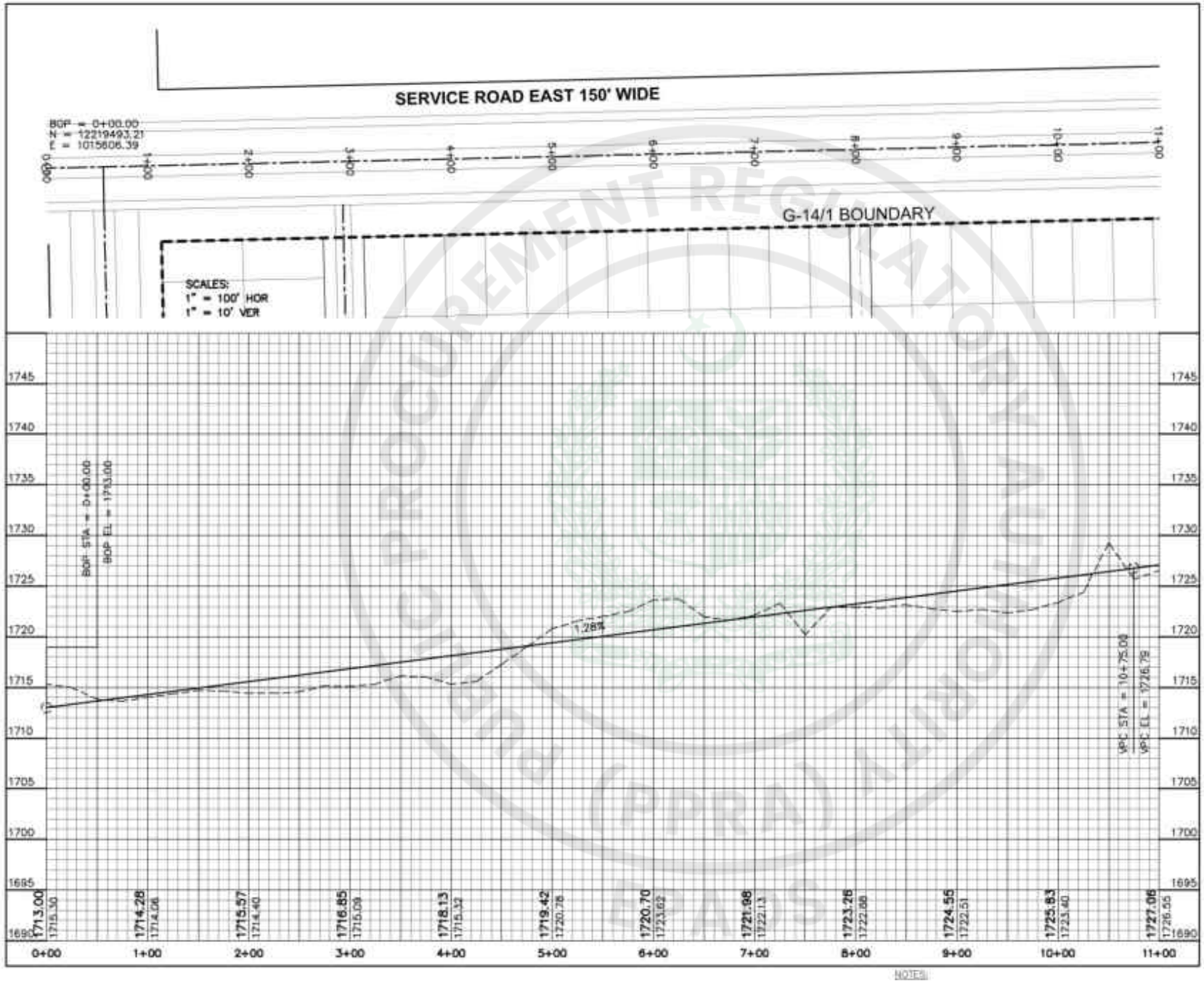
INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1, ISLAMABAD

TYPICAL ROAD DETAILS
(SHEET 2 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

4156/324/BD/03C23 | 0

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS



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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SERVICE ROAD EAST
(SHEET 1 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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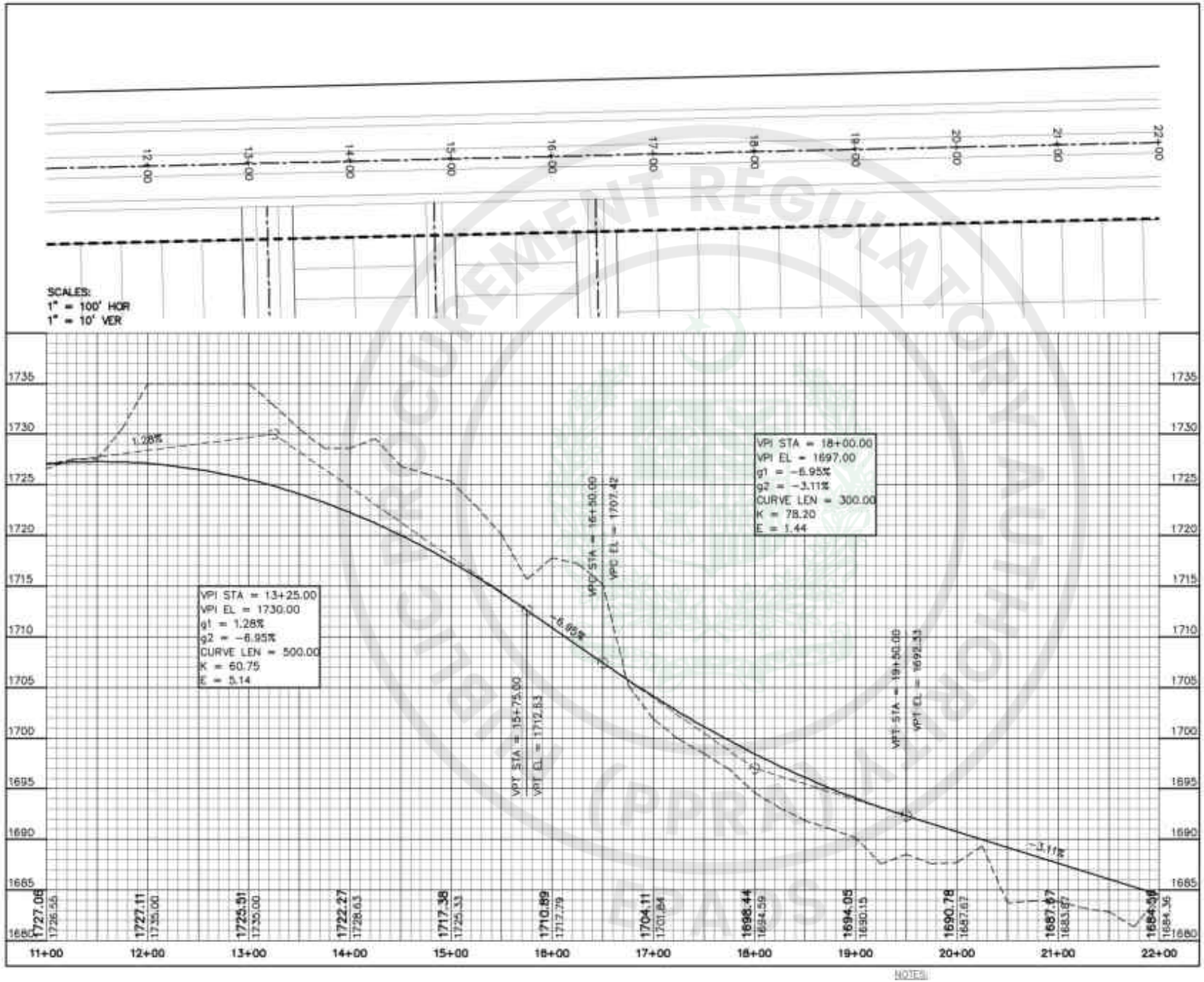

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SERVICE ROAD EAST
(SHEET 2 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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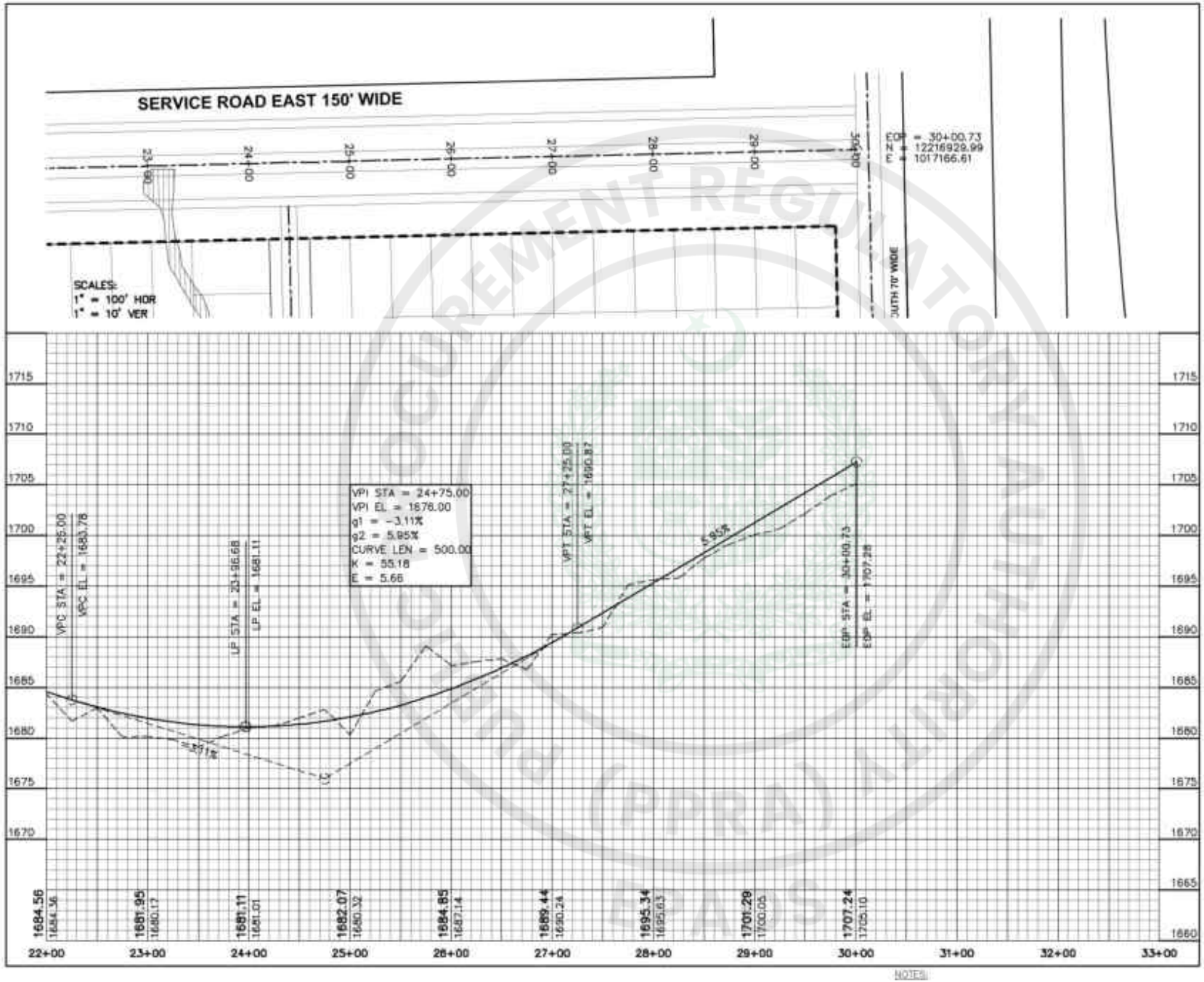

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SERVICE ROAD EAST
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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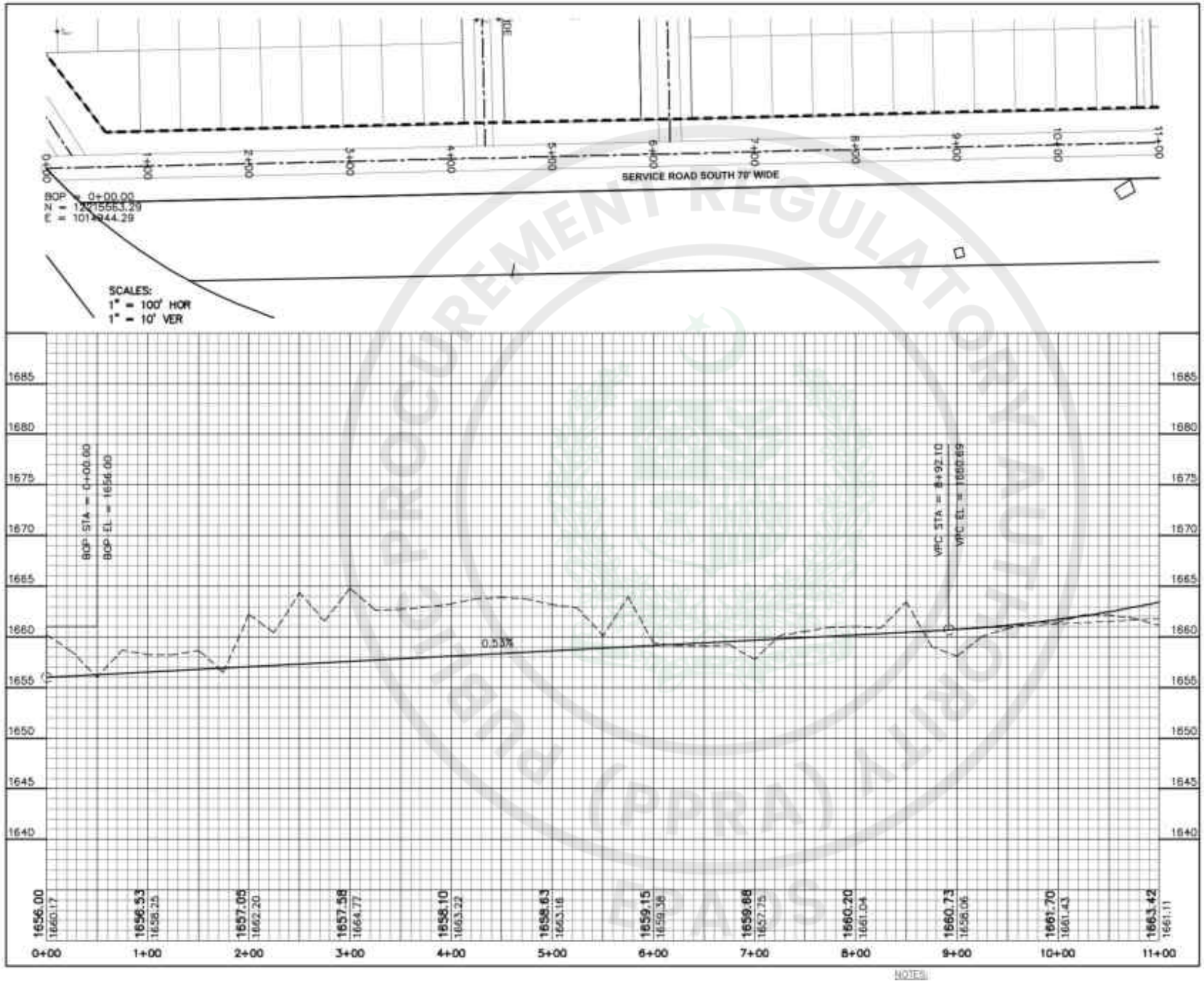

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SERVICE ROAD SOUTH
(SHEET 1 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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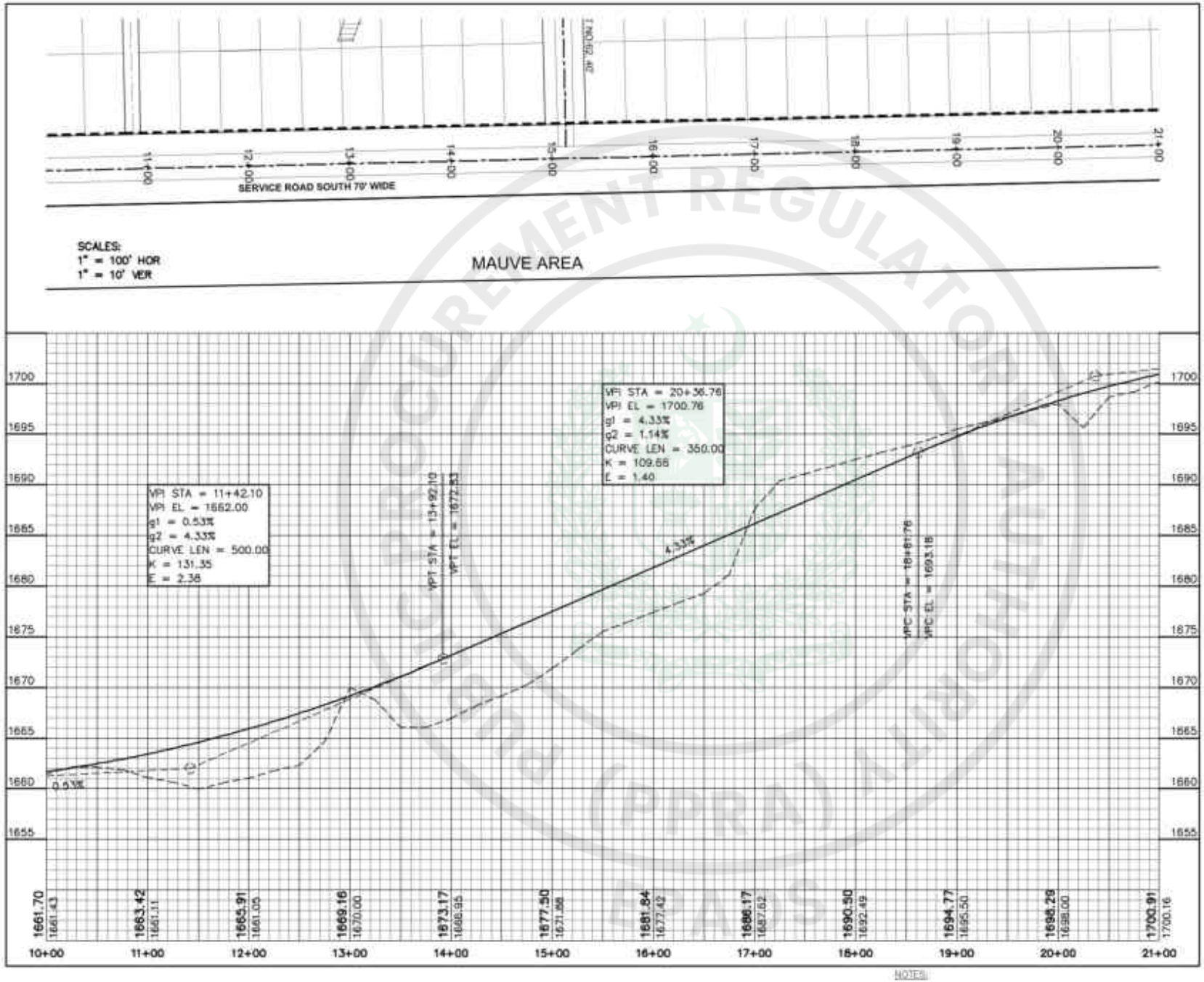

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SERVICE ROAD SOUTH
(SHEET 2 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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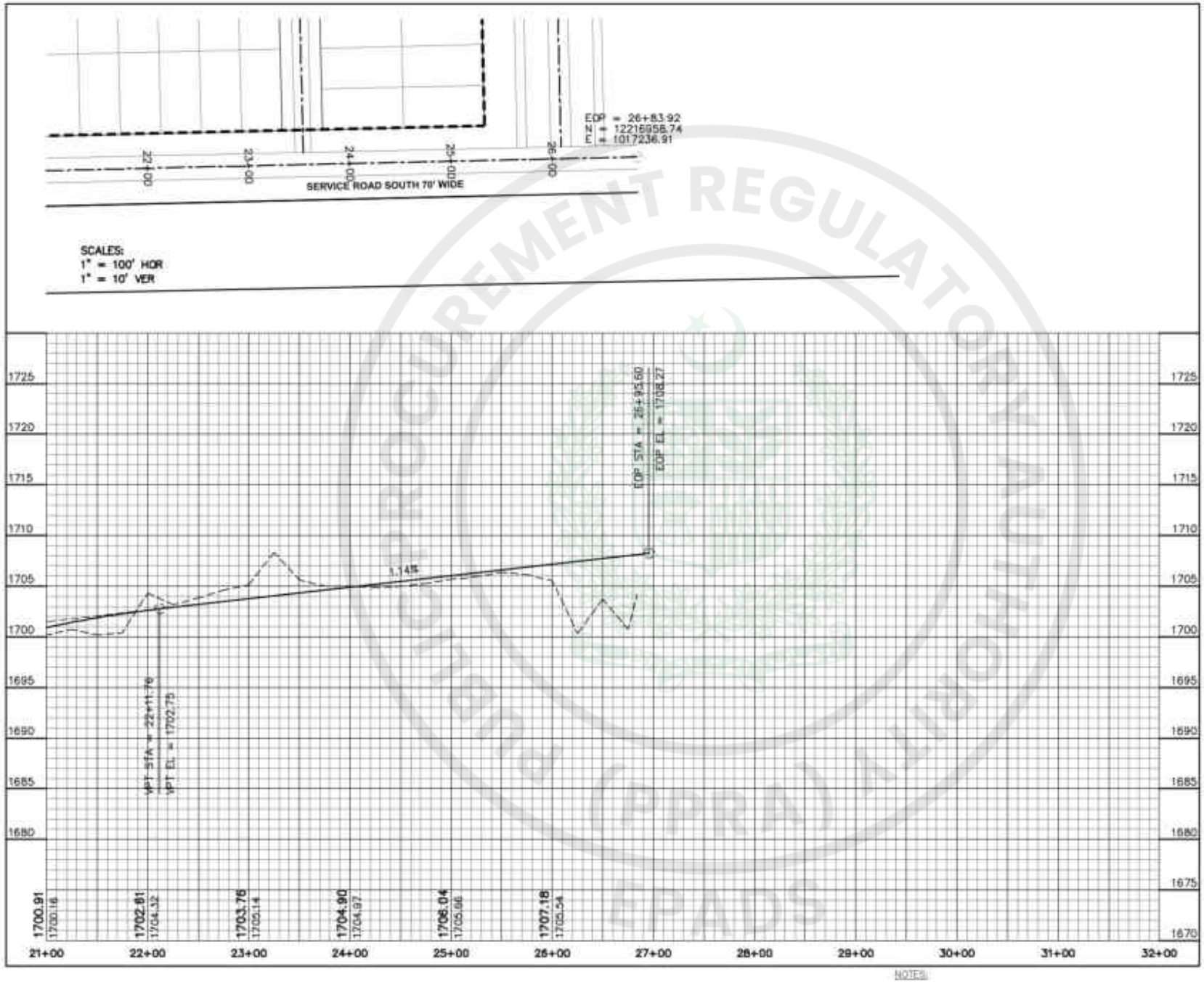

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PROFILE OF SERVICE ROAD SOUTH
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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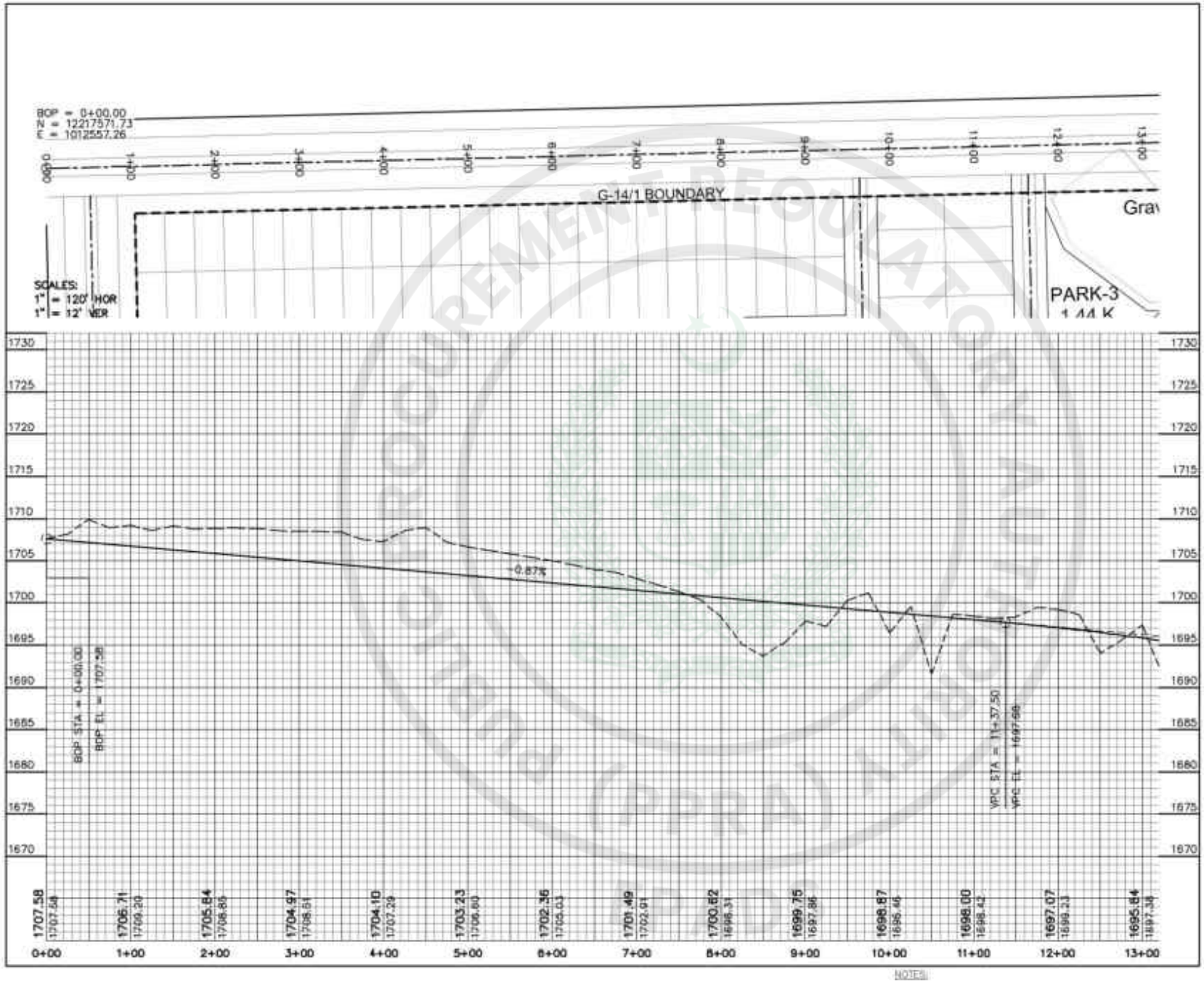

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SERVICE ROAD NORTH
(SHEET 1 OF 2)

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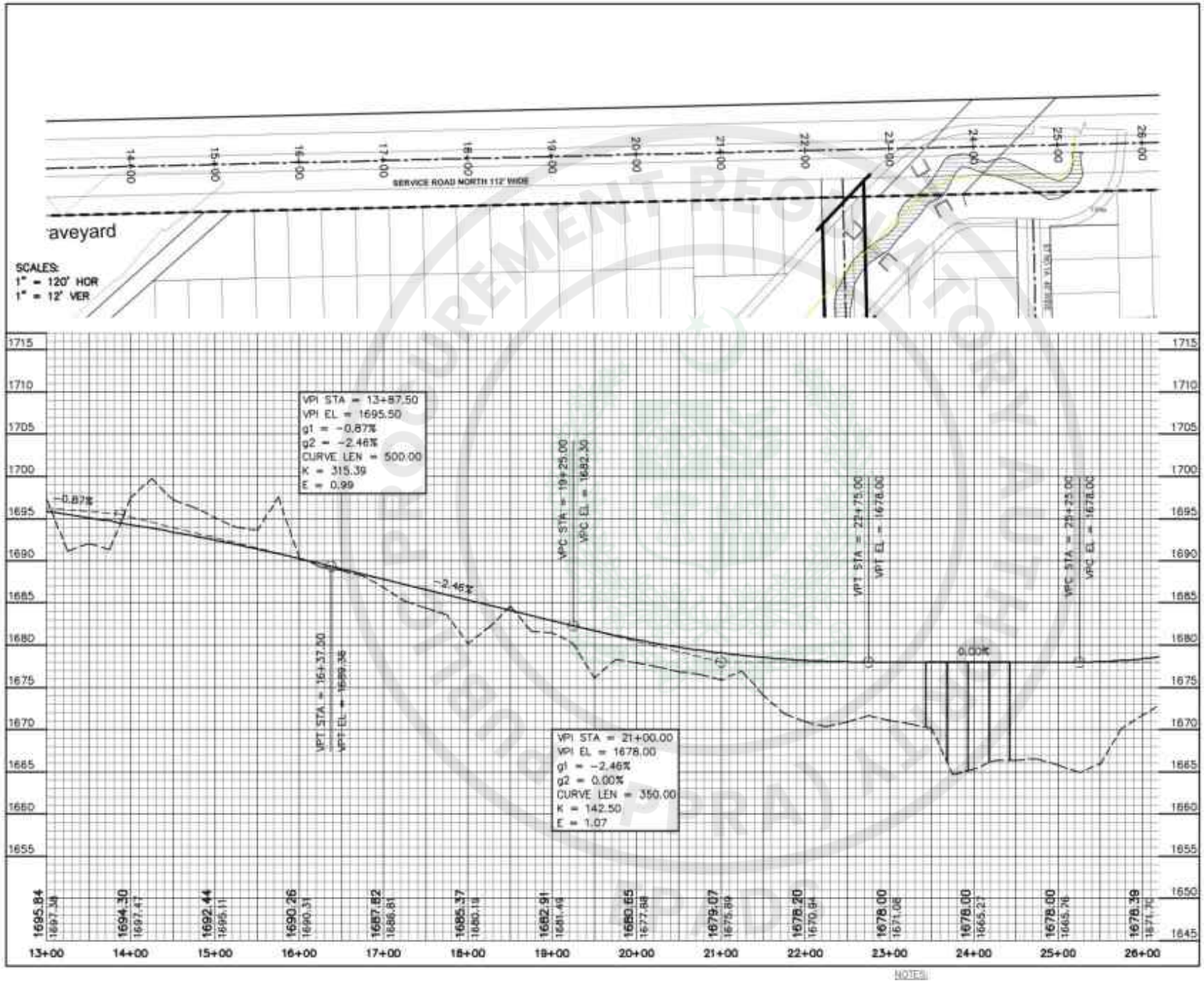

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SERVICE ROAD NORTH
(SHEET 2 OF 3)

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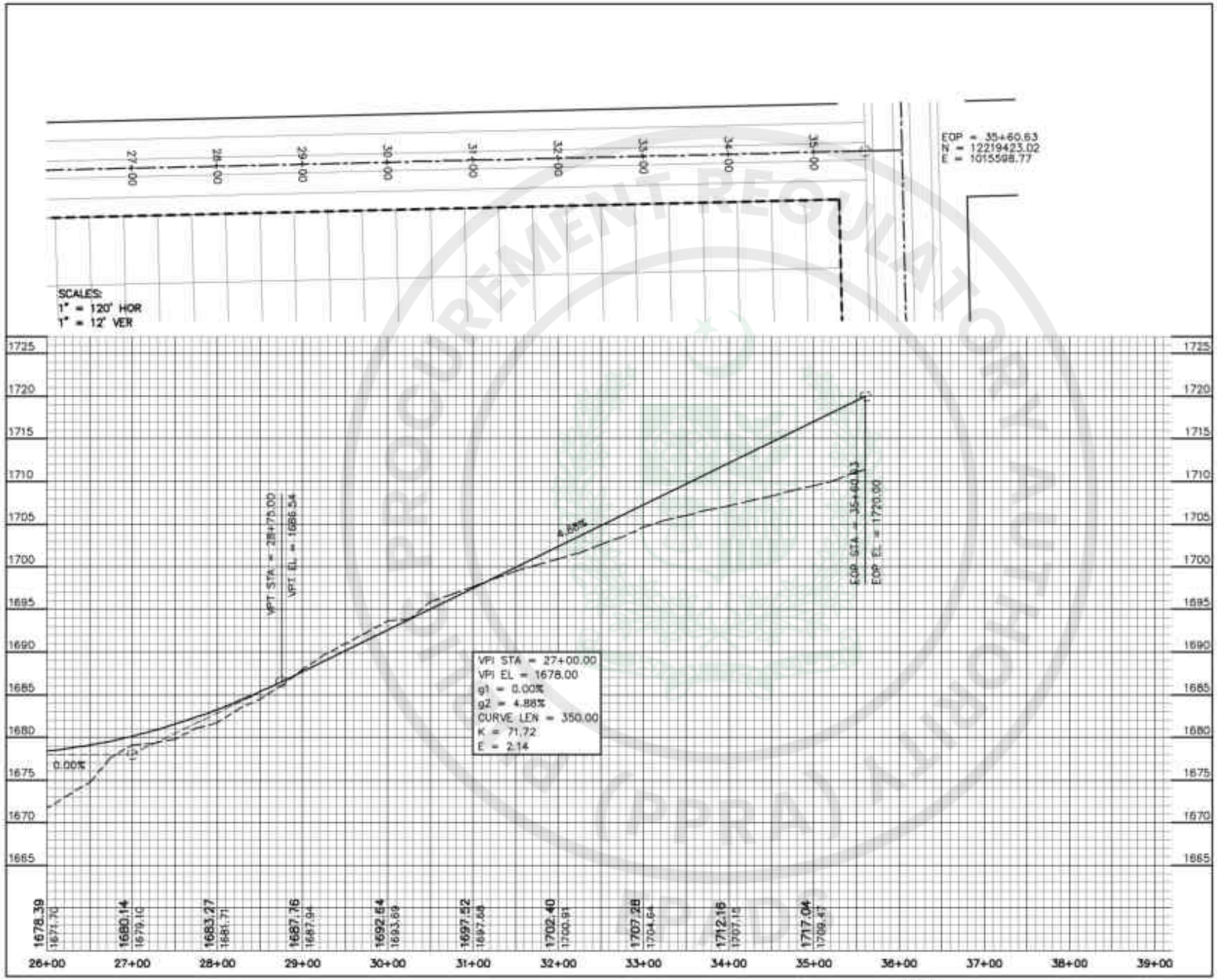

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SERVICE ROAD NORTH
(SHEET 3 OF 3)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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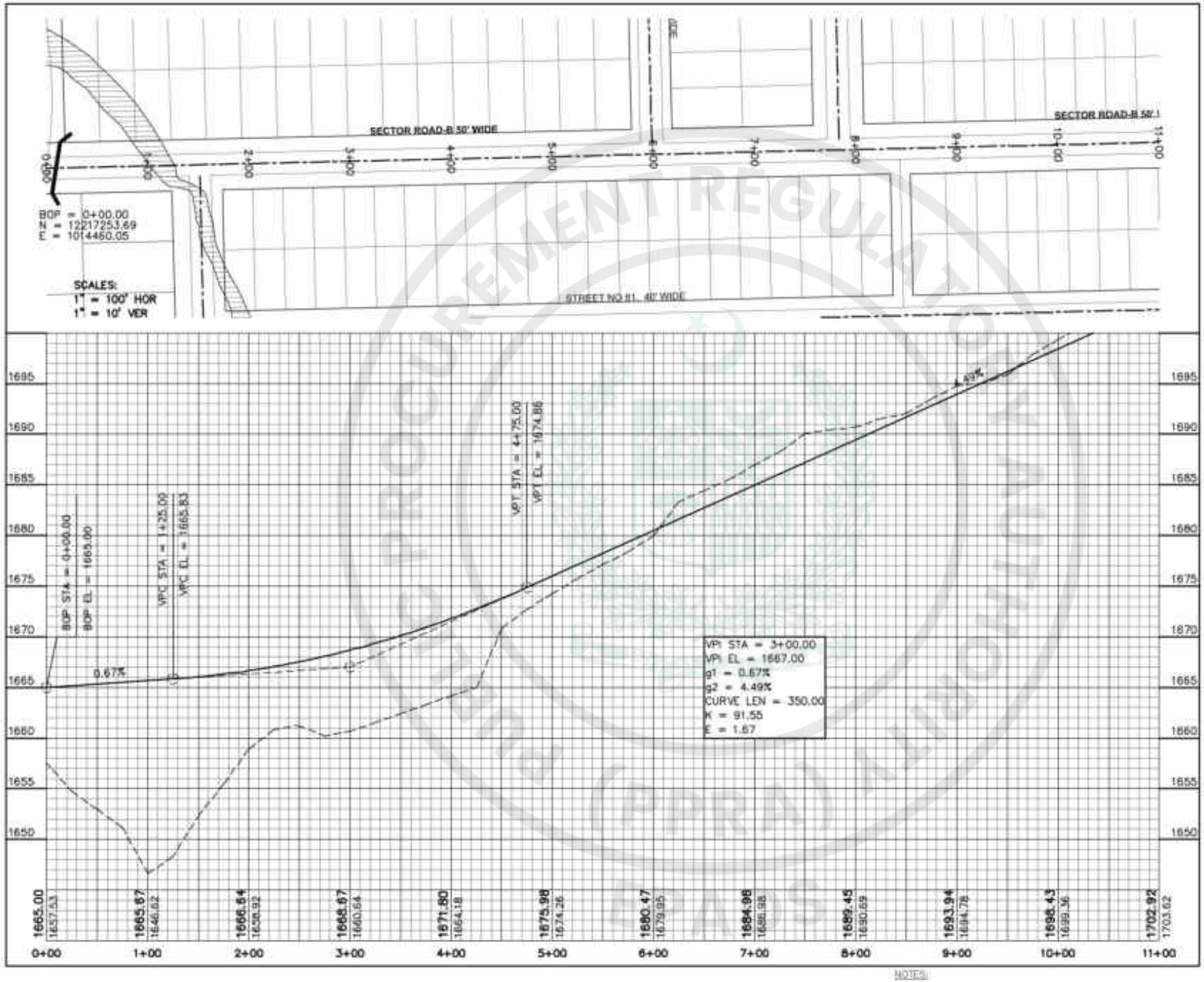

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SECTOR ROAD-B 50ft WIDE
(SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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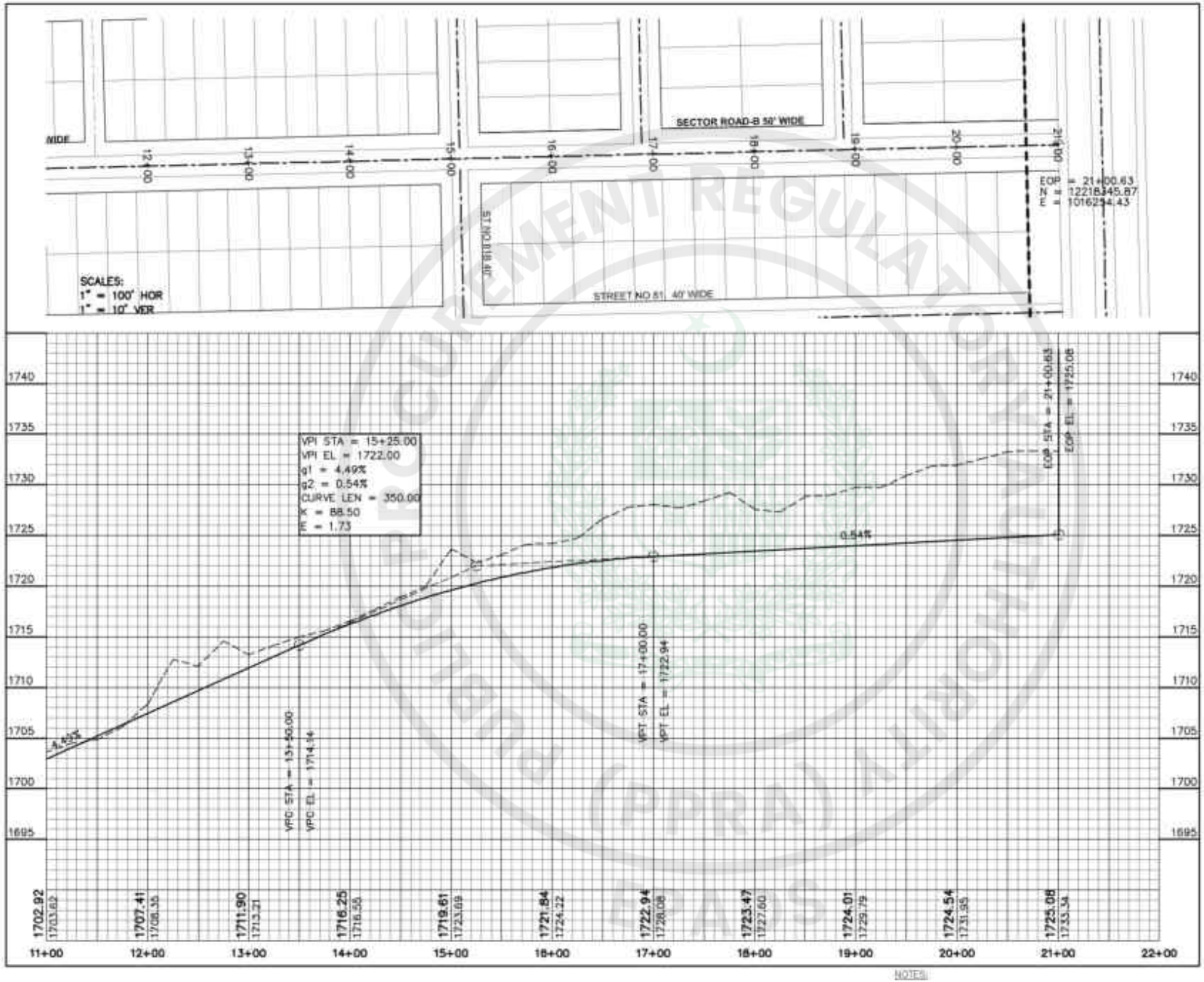

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SECTOR ROAD-B 50ft WIDE
(SHEET 2 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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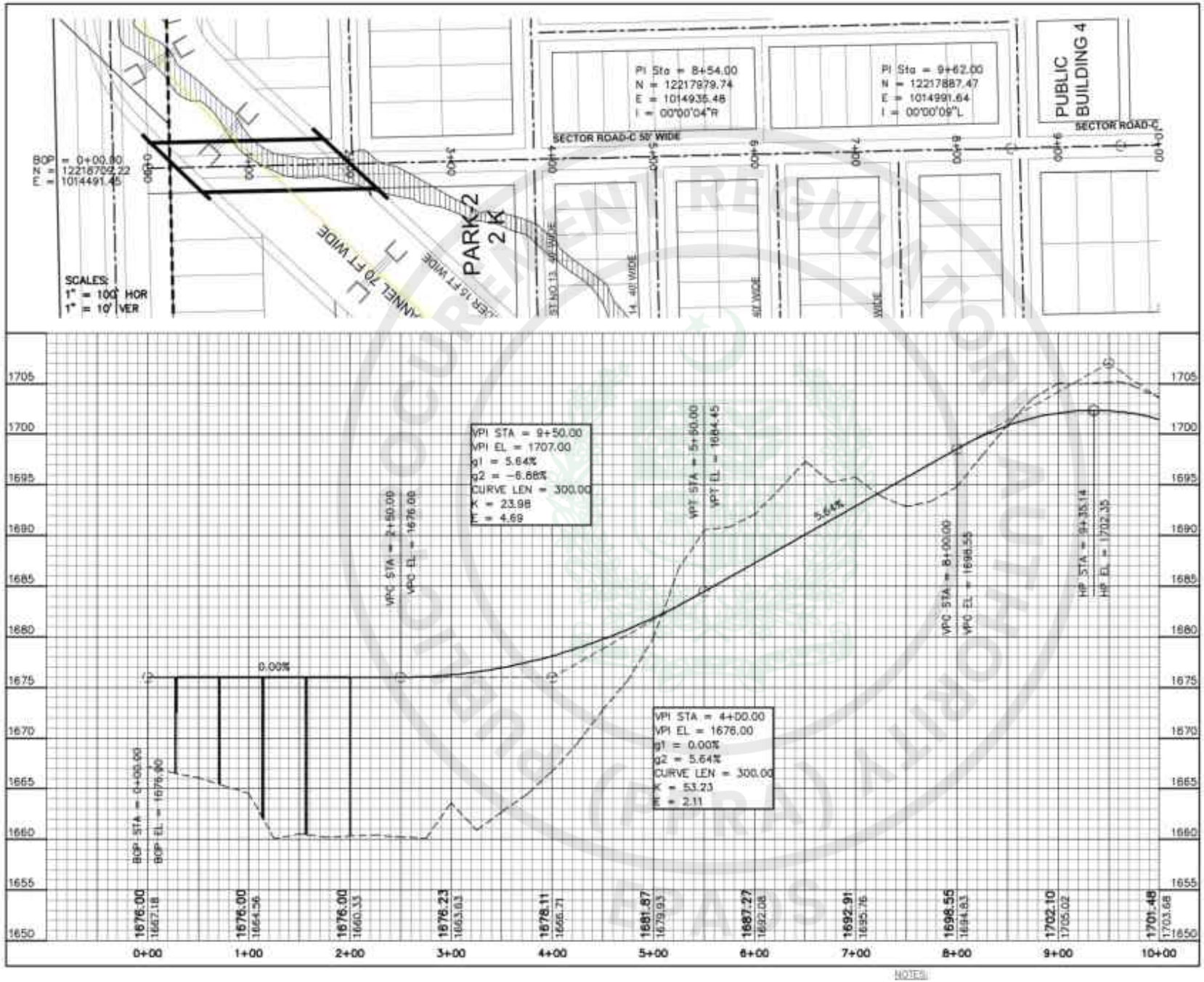

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SECTOR ROAD-C 50ft WIDE
(SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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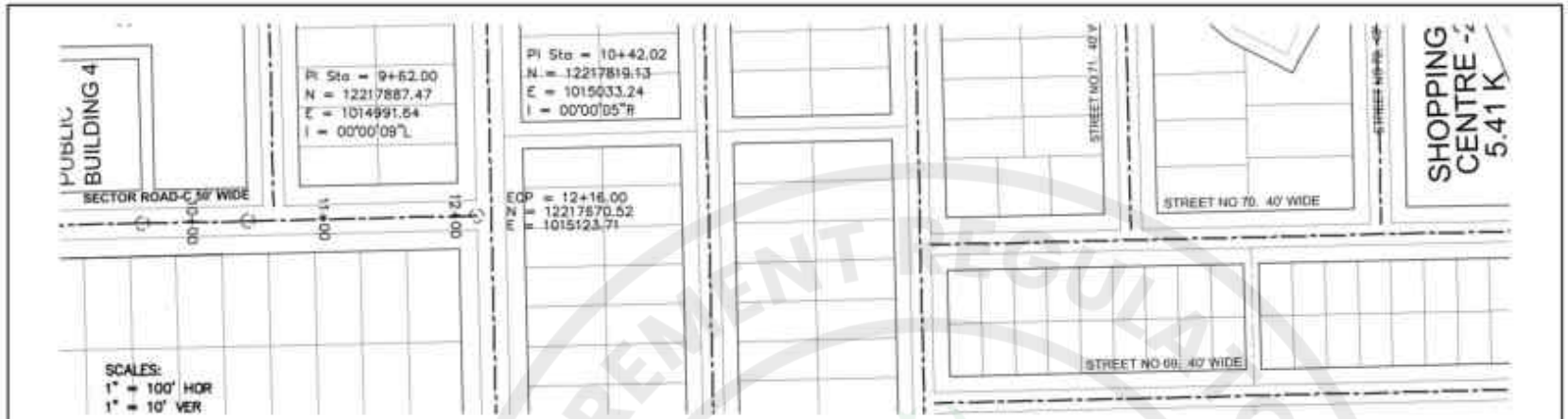

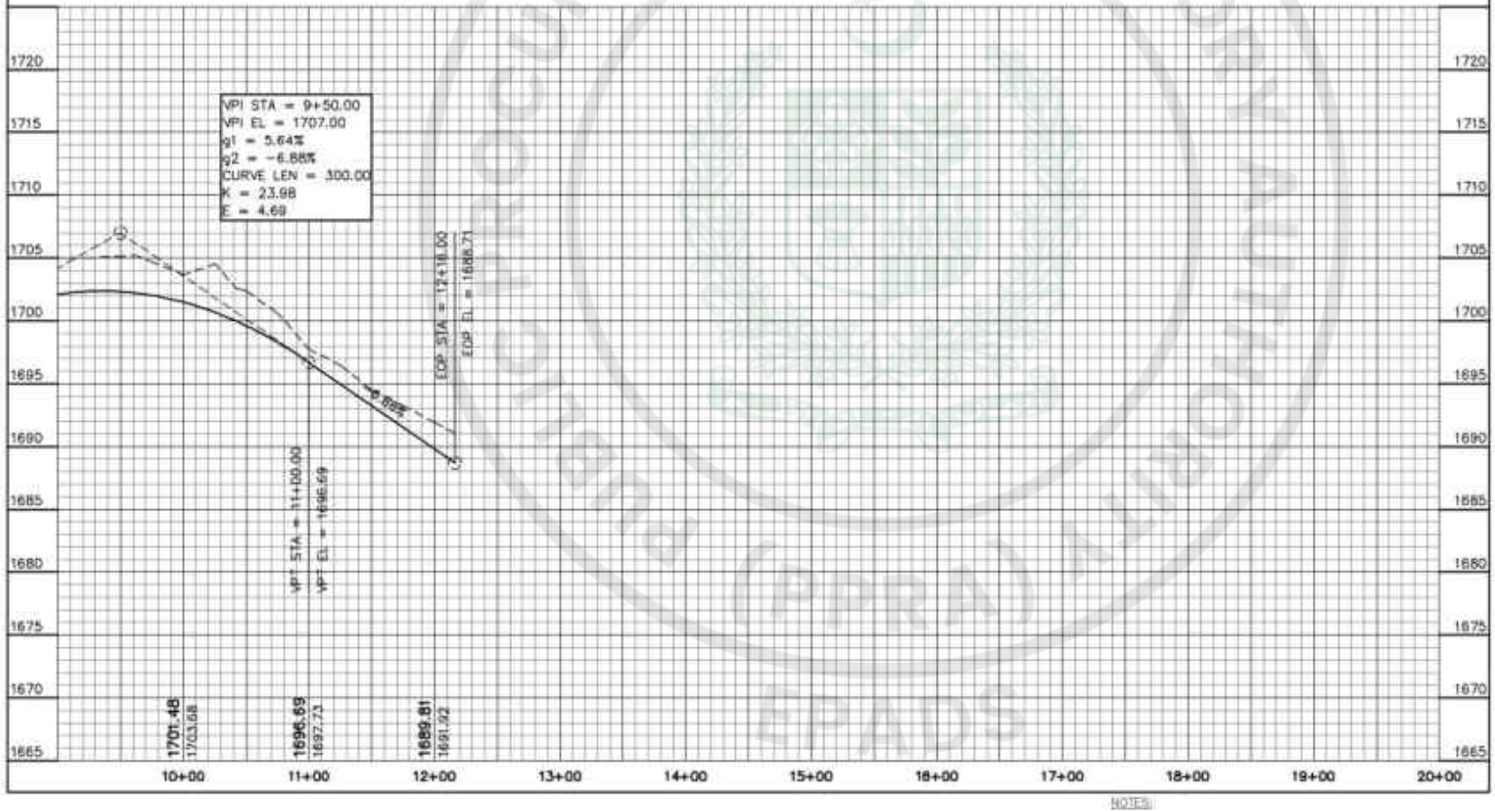

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SECTOR ROAD-C 50ft WIDE
(SHEET 2 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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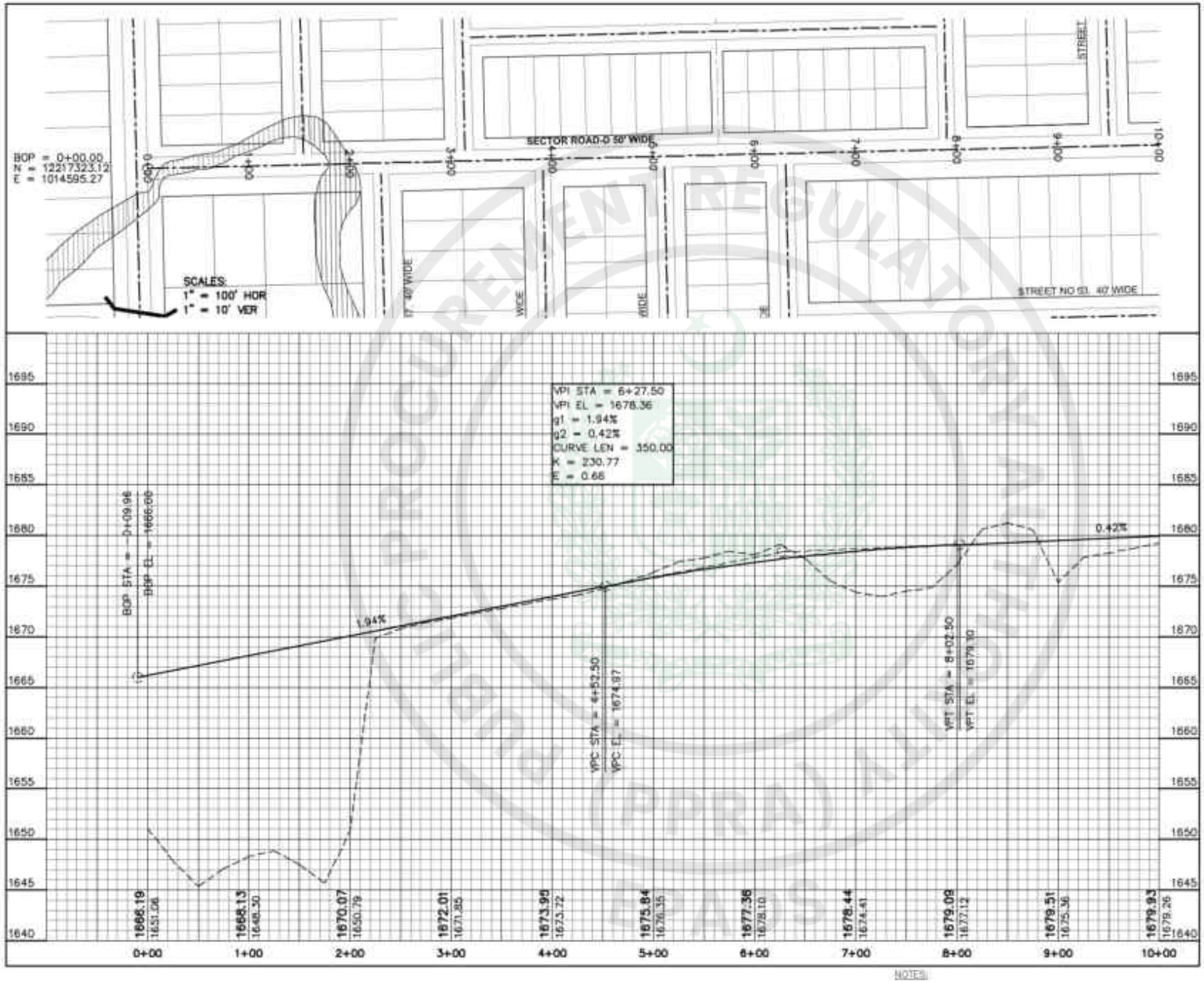

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SECTOR ROAD-D 50ft WIDE
(SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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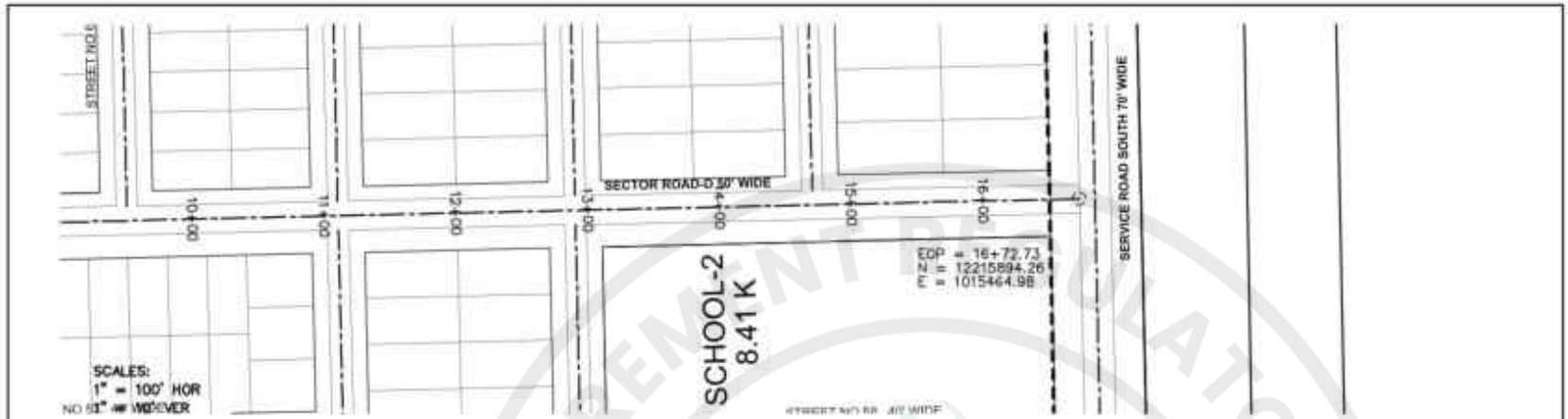

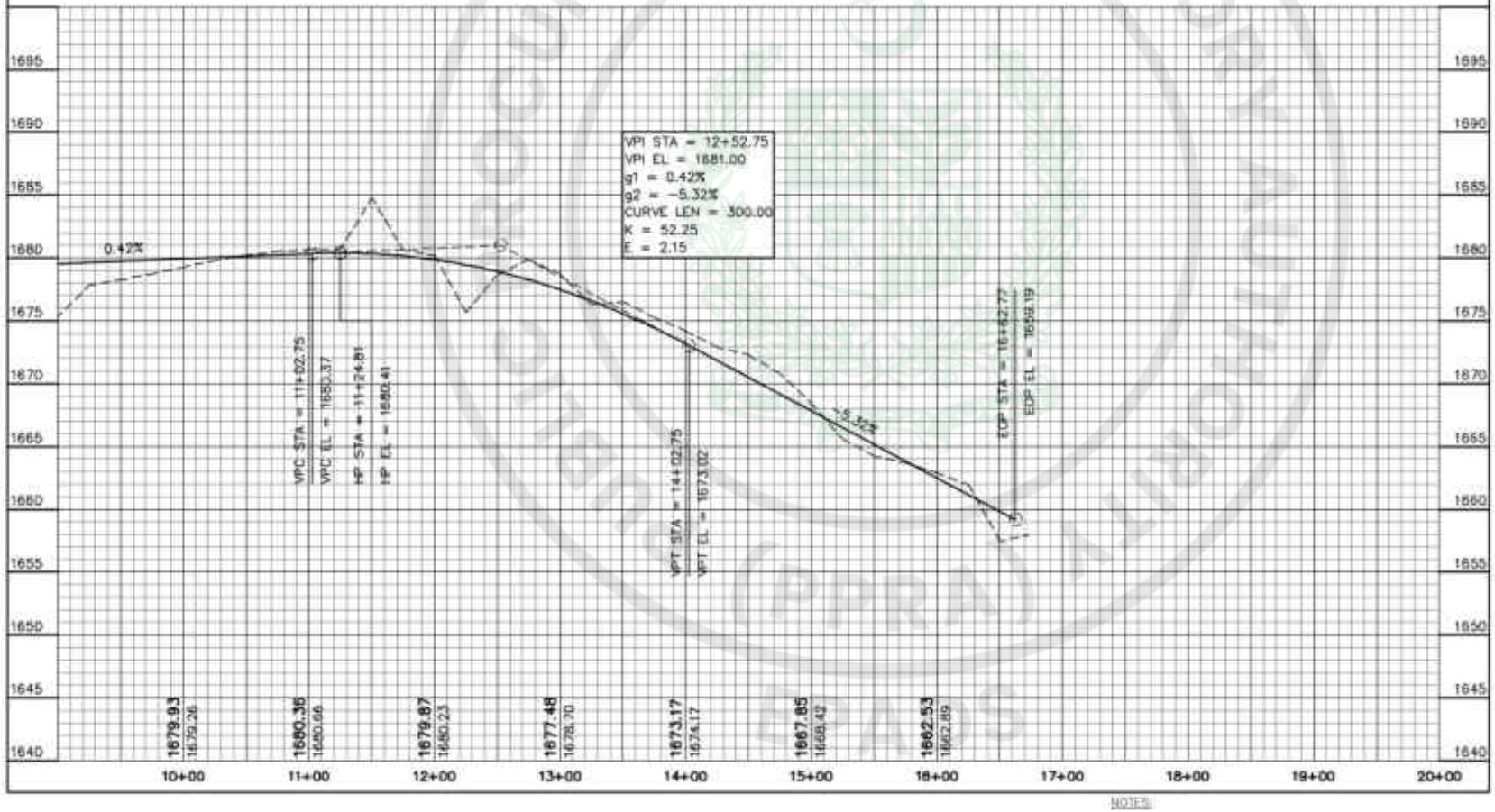

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF SECTOR ROAD-D 50ft WIDE
(SHEET 2 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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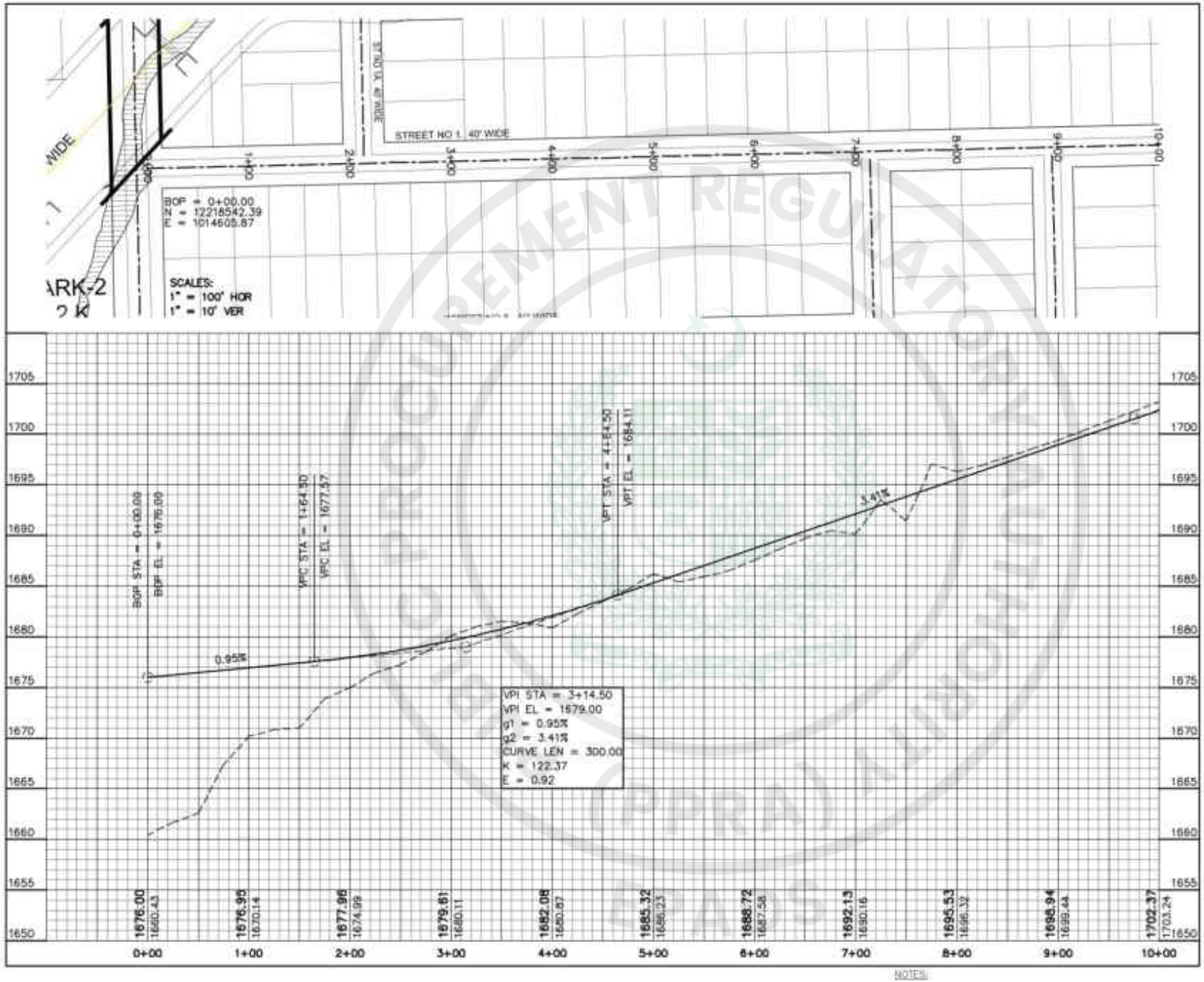

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 01 (40ft WIDE)
(SHEET 1 OF 2)

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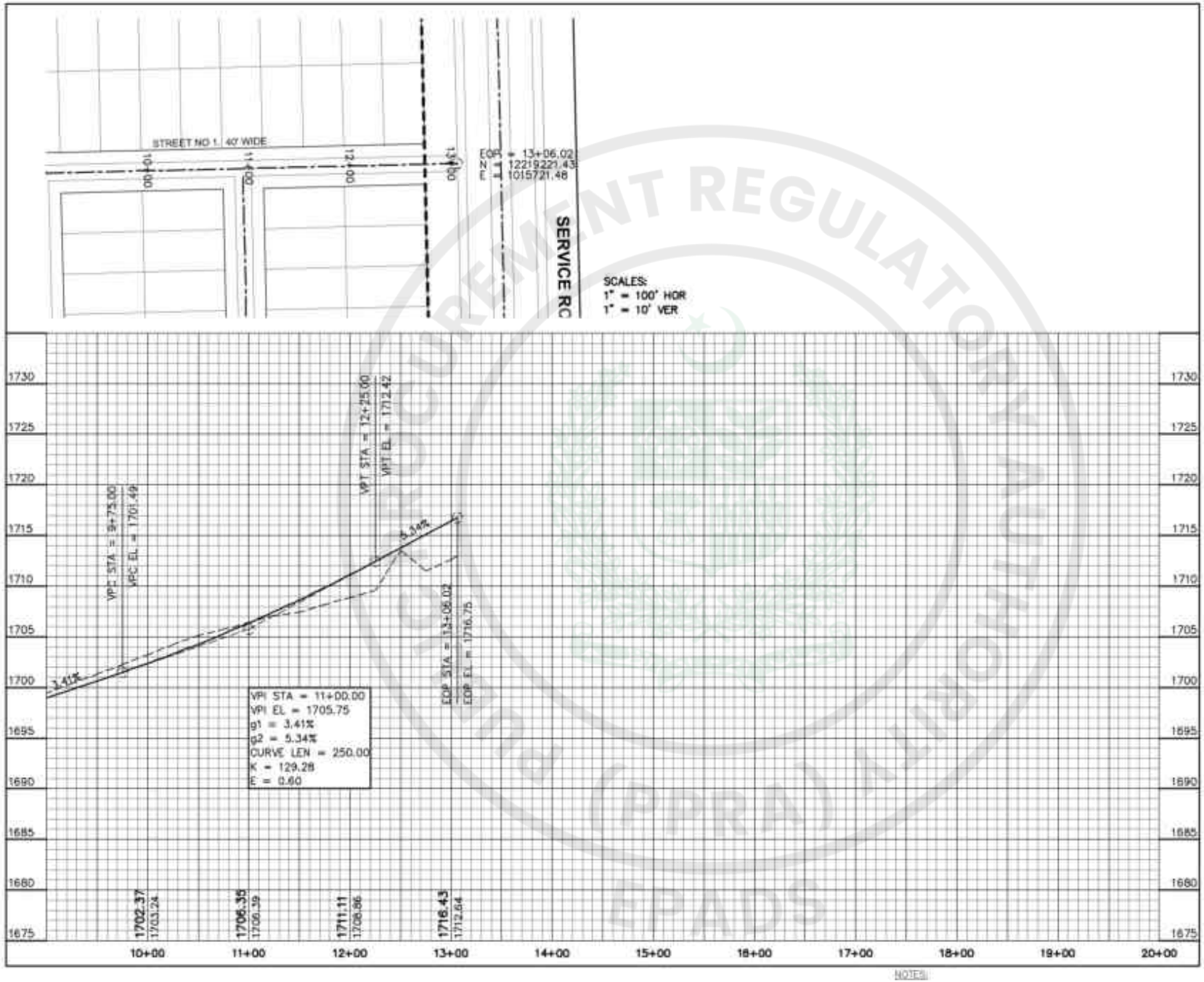

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 01 (40ft WIDE)
(SHEET 2 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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DRAWN			
FILE			
CADD	DATE	DRAWING NO.	REV.
SCALE		4156/324/BD/03C40	0

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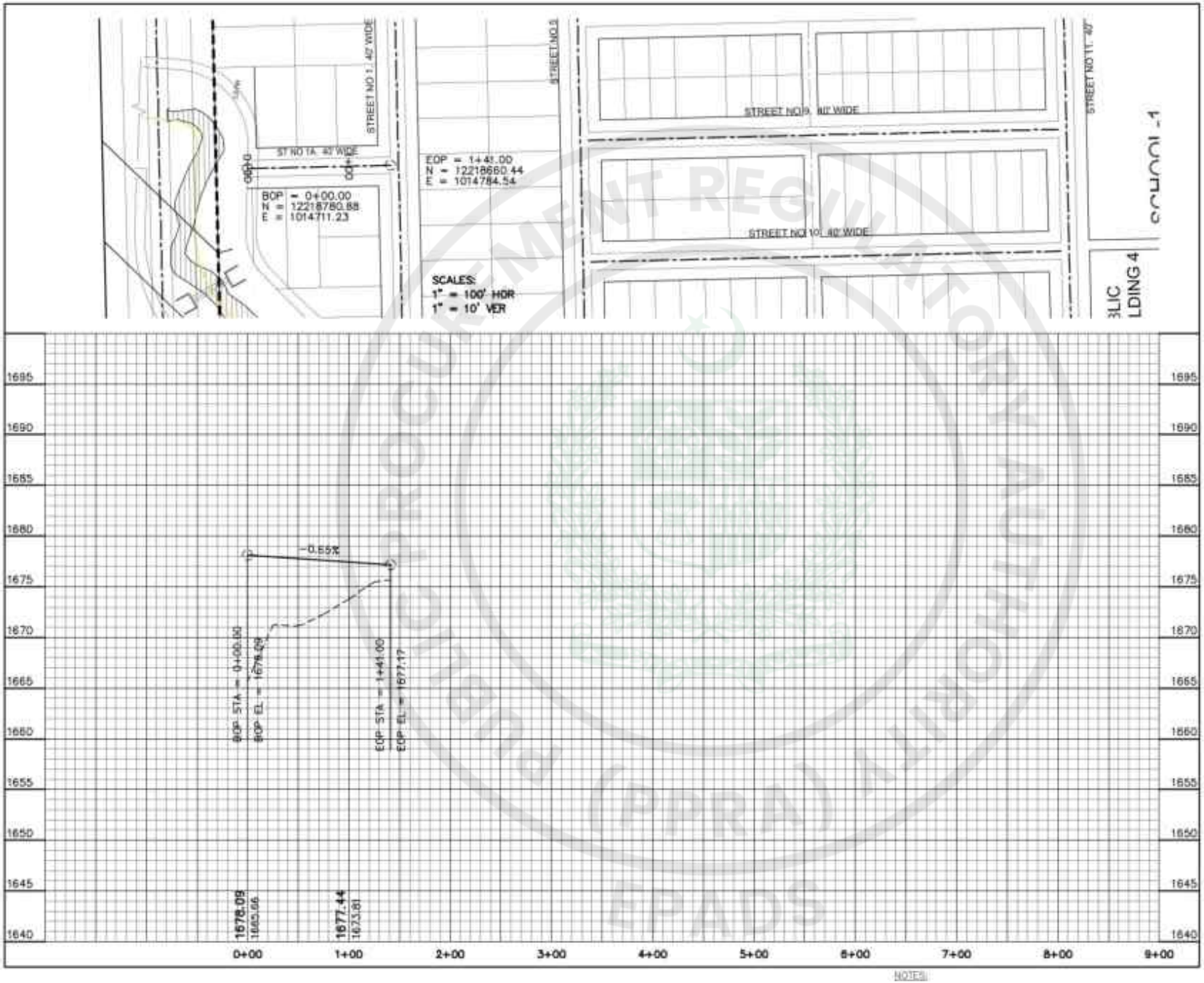

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 01A (40ft WIDE)
(SHEET 1 OF 1)

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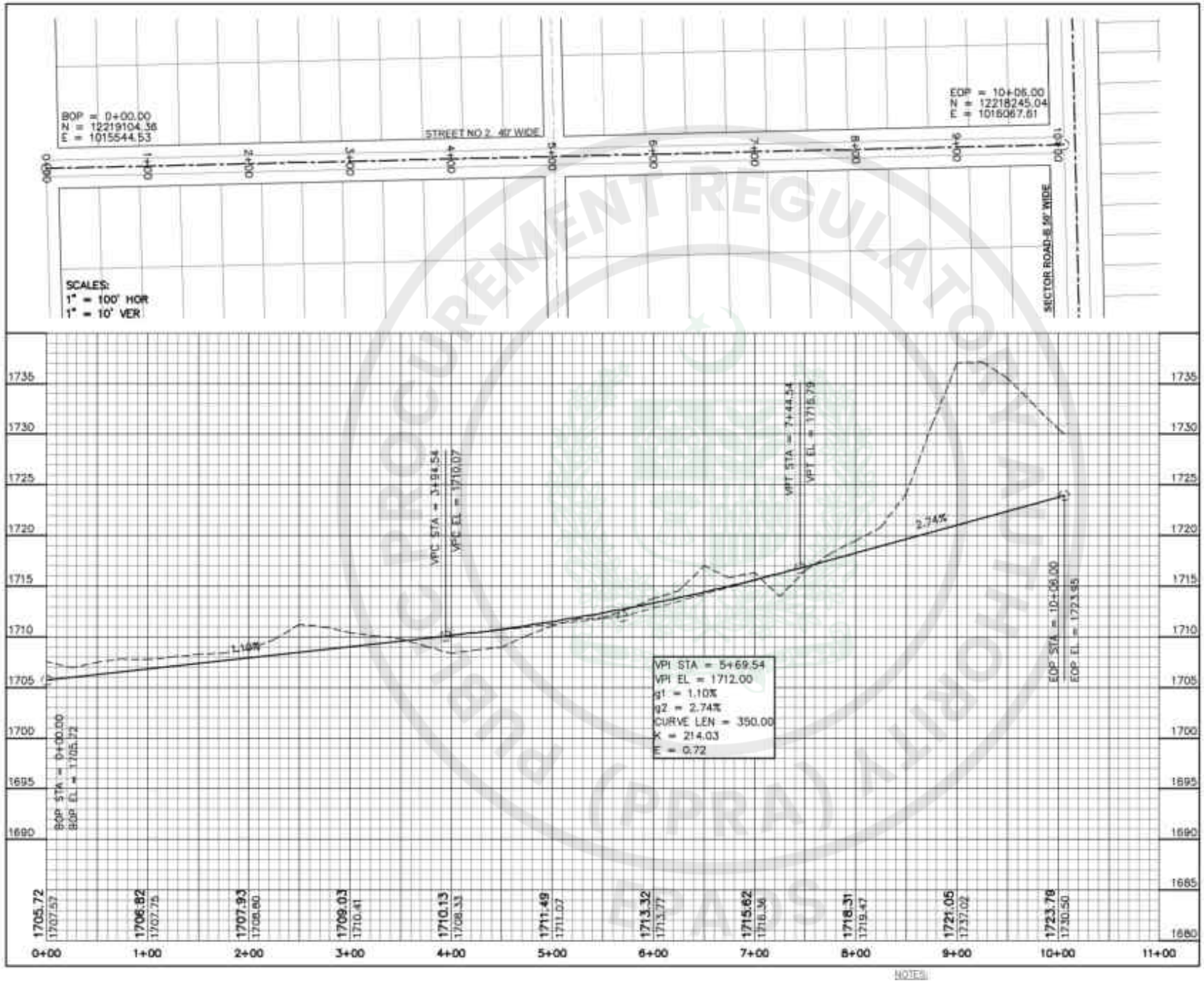

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 02 (40ft WIDE)
(SHEET 1 OF 1)

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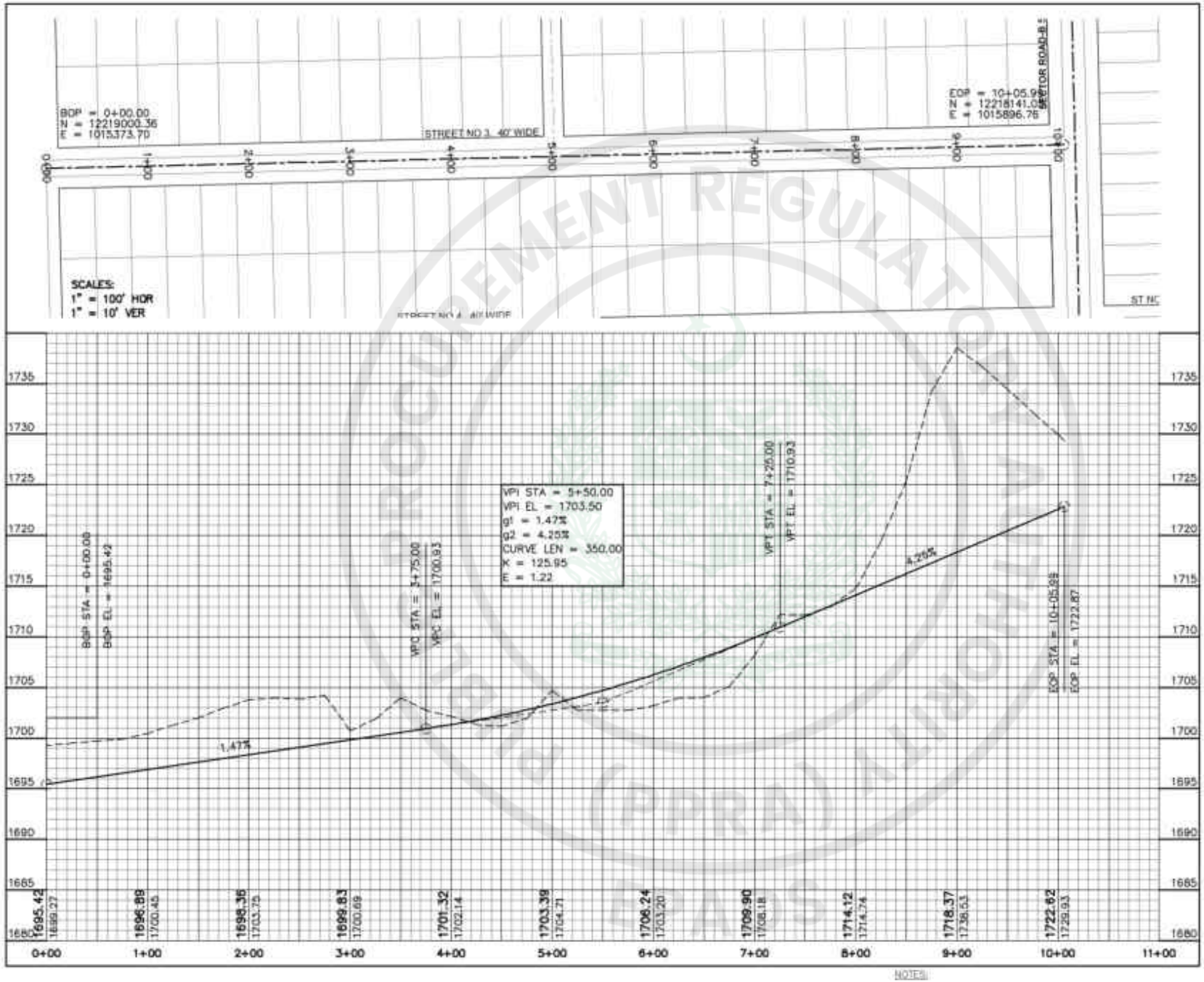

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 03 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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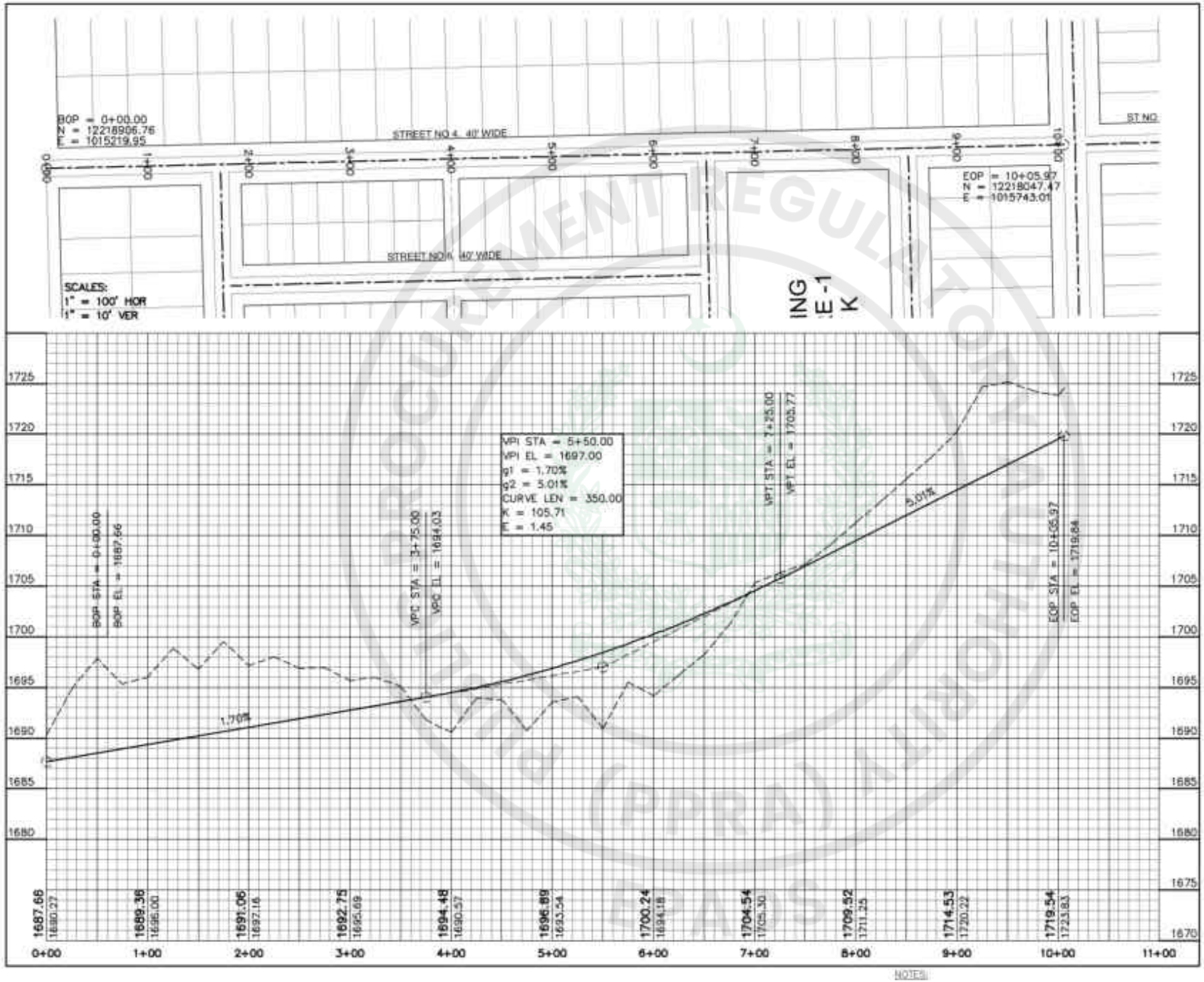

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 04 (40ft WIDE)
(SHEET 1 OF 1)

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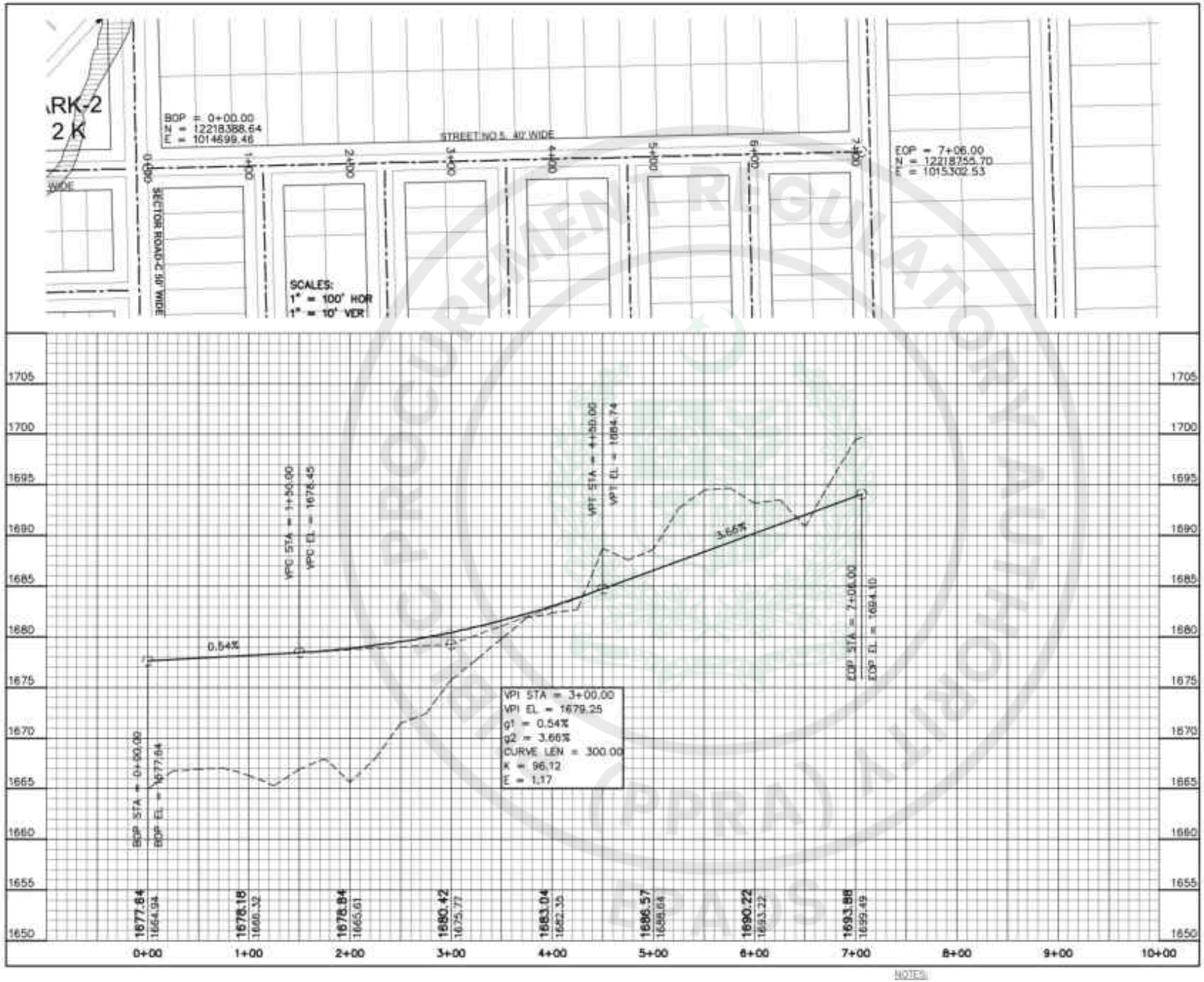

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 05 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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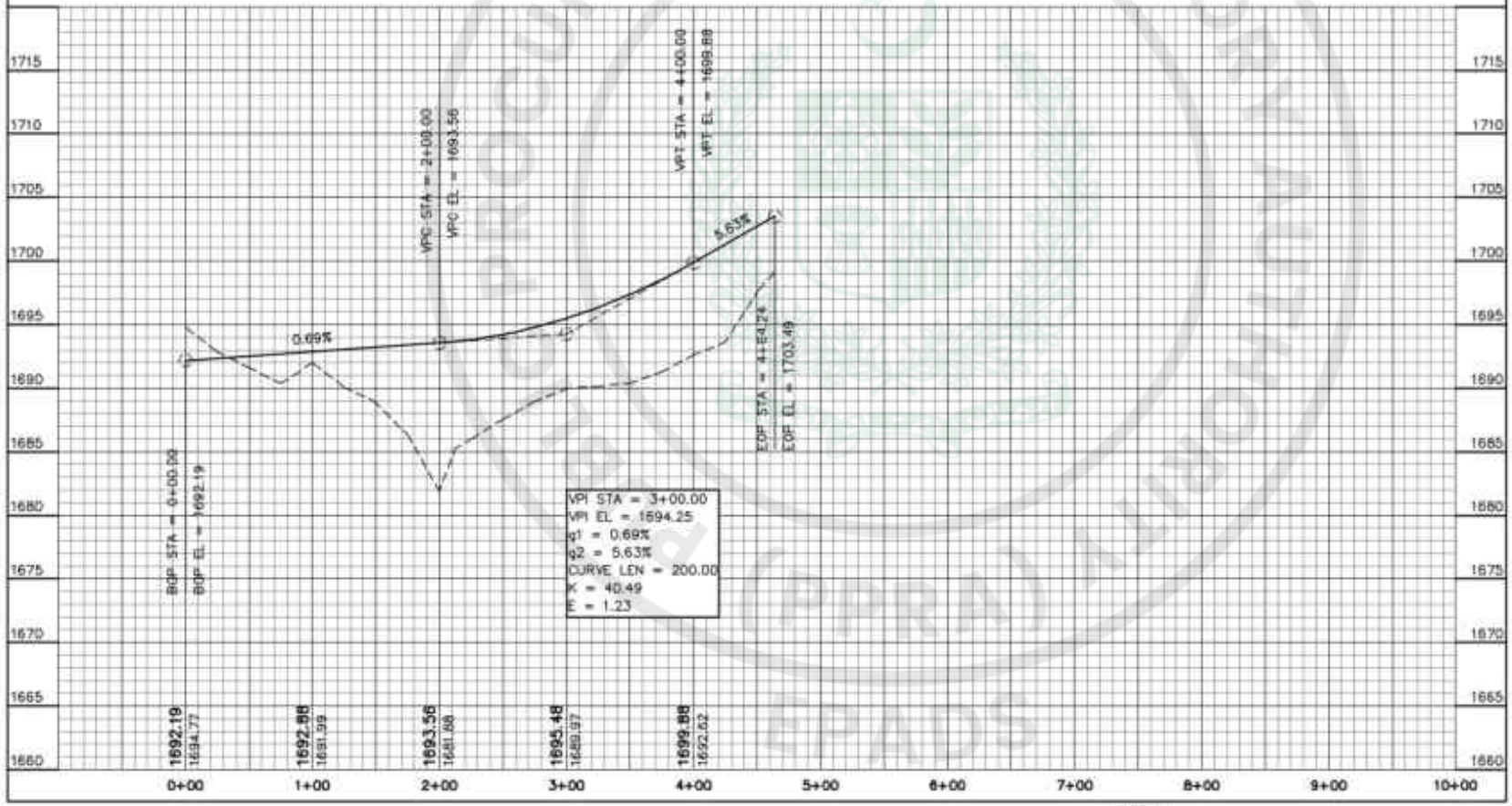

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 06 (40ft WIDE)
(SHEET 1 OF 1)

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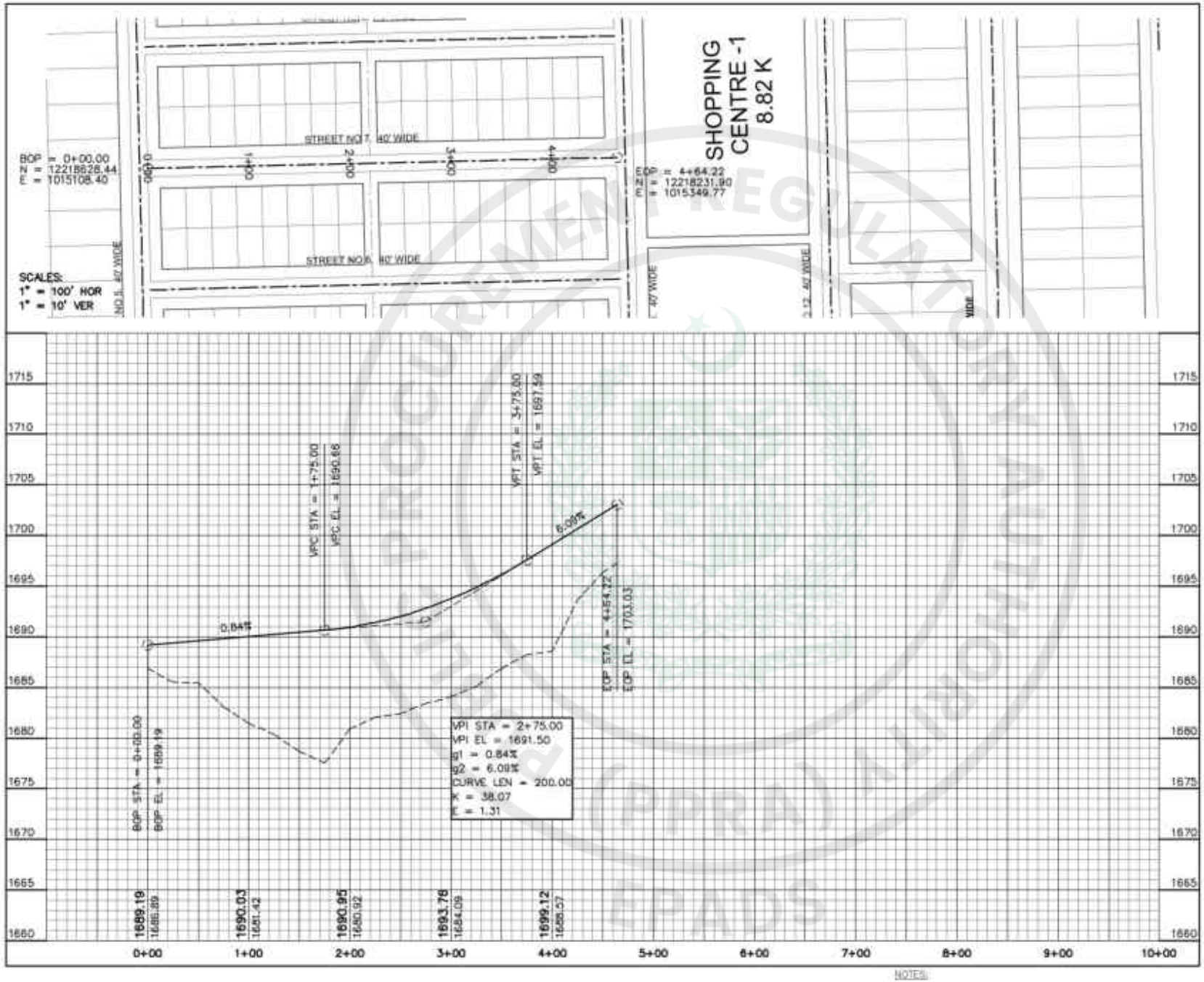

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 07 (40ft WIDE)
(SHEET 1 OF 1)

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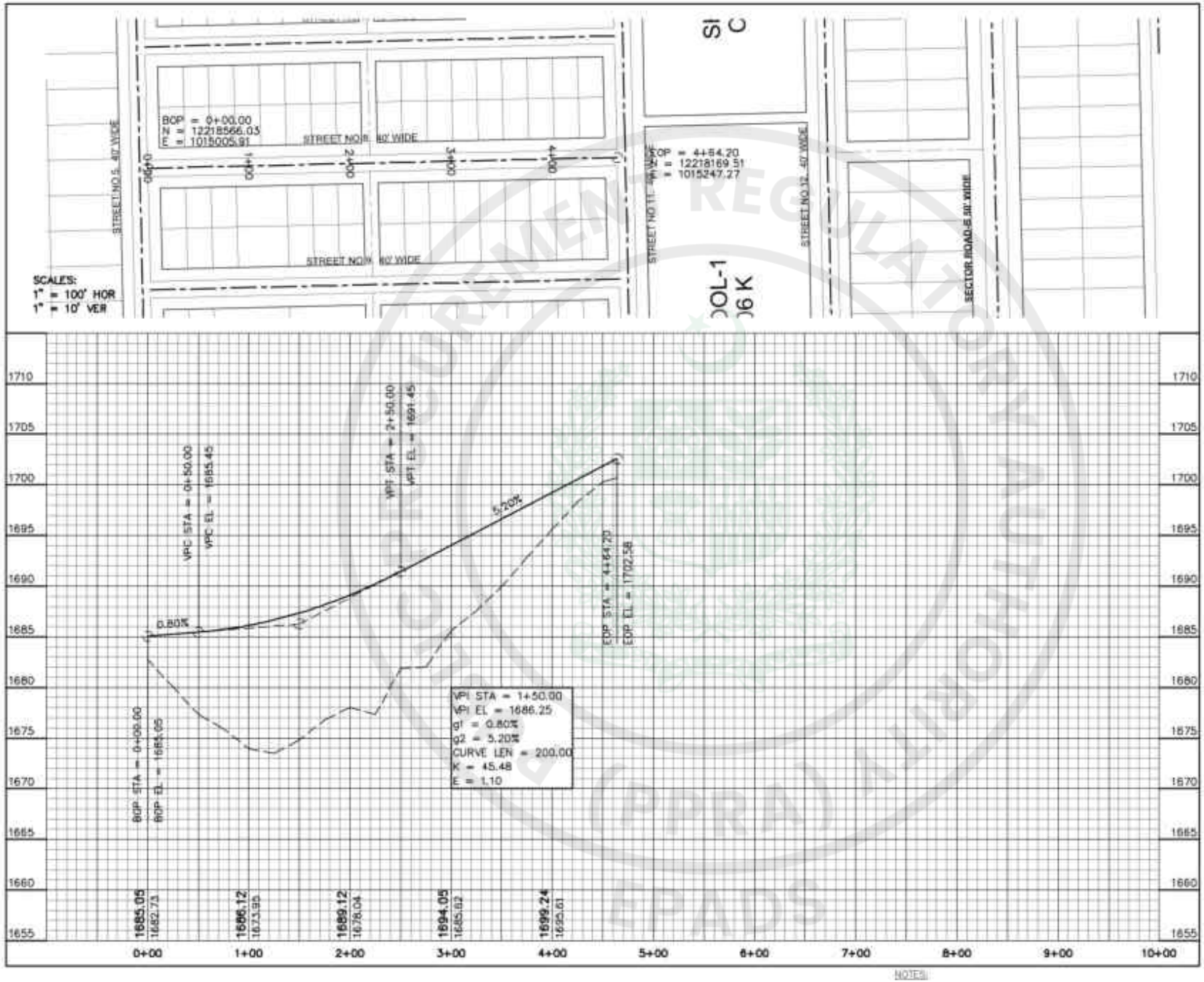

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 08 (40ft WIDE)
(SHEET 1 OF 1)

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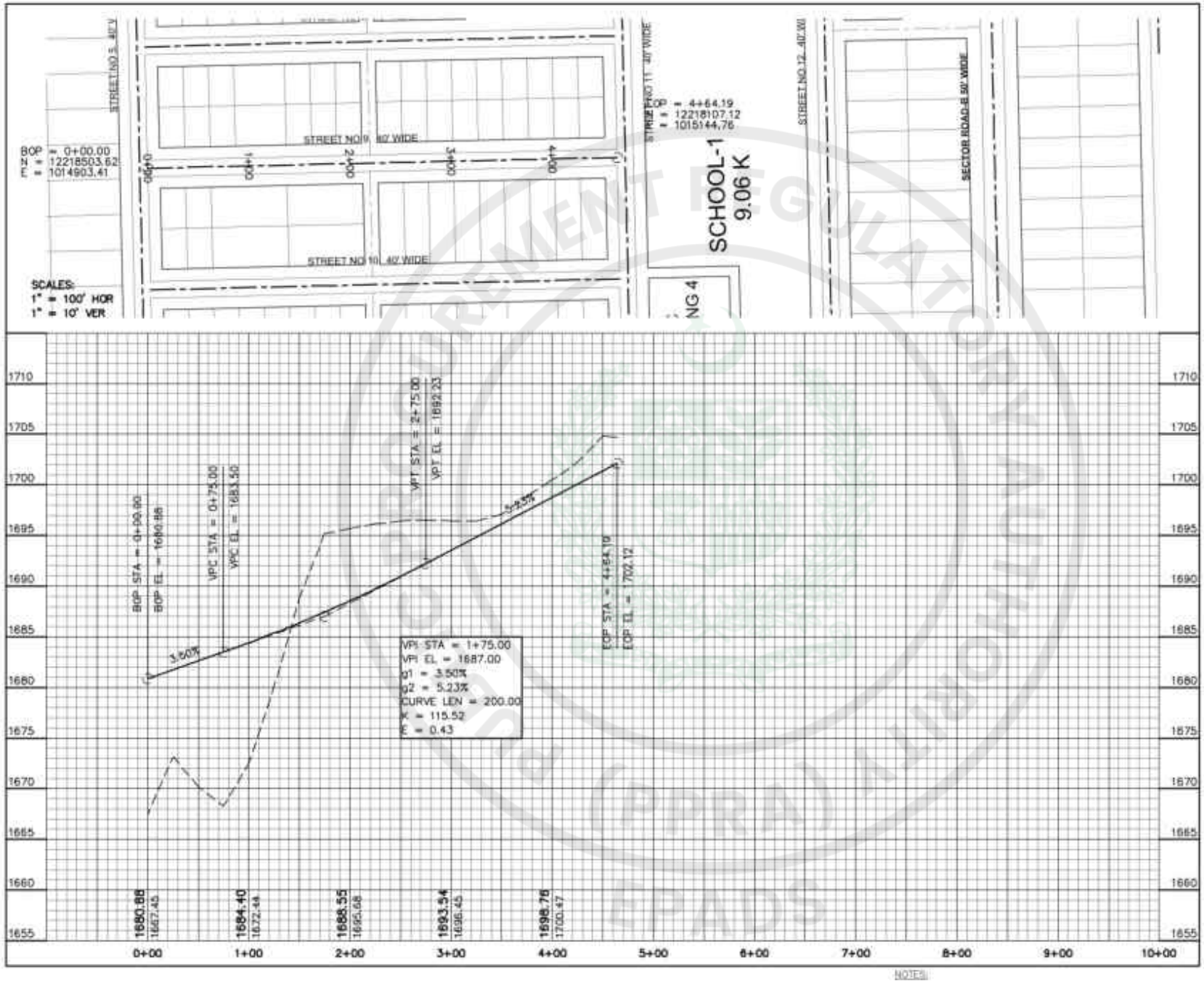

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 09 (40ft WIDE)
(SHEET 1 OF 1)

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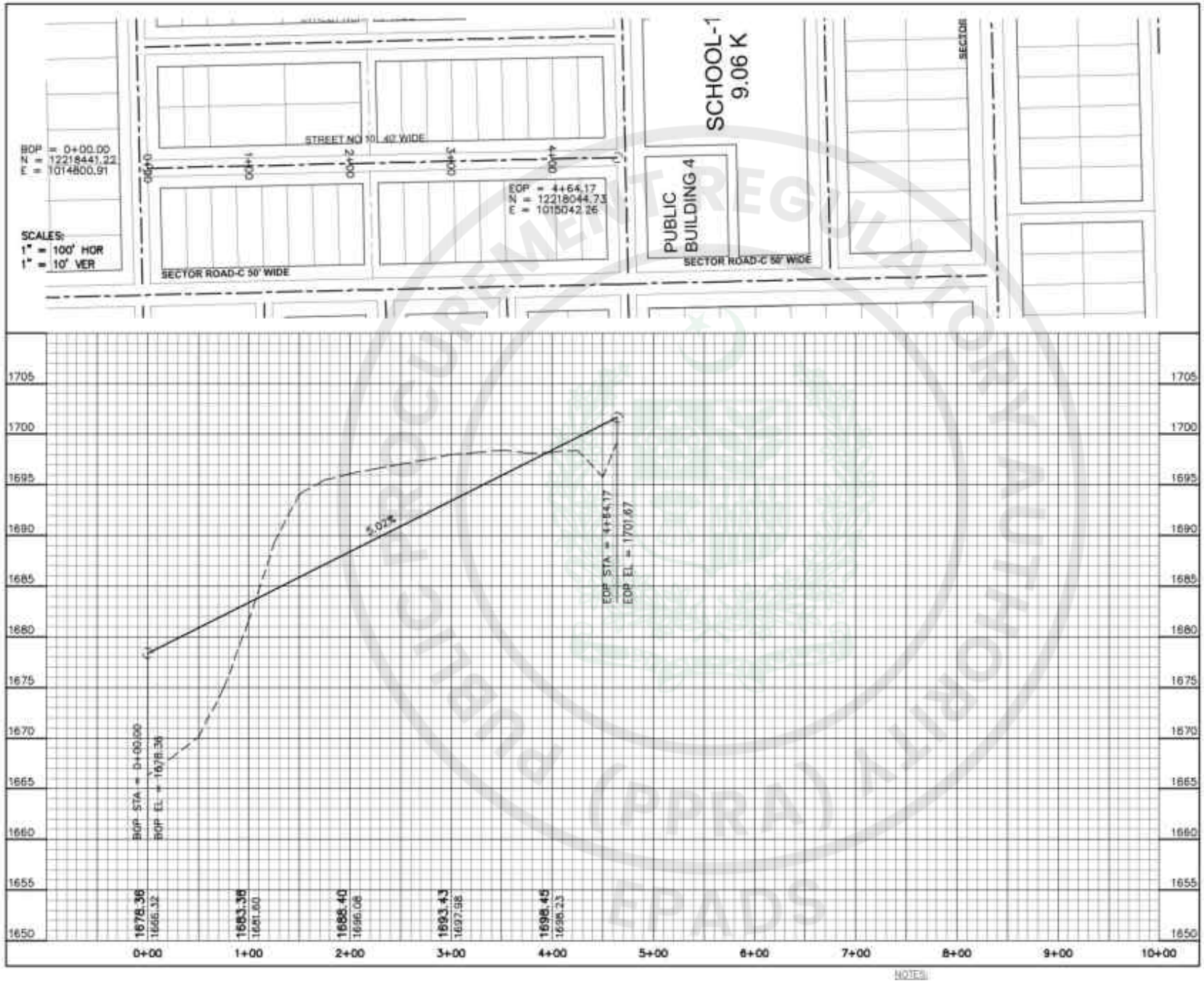

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 10 (40ft WIDE)
(SHEET 1 OF 1)

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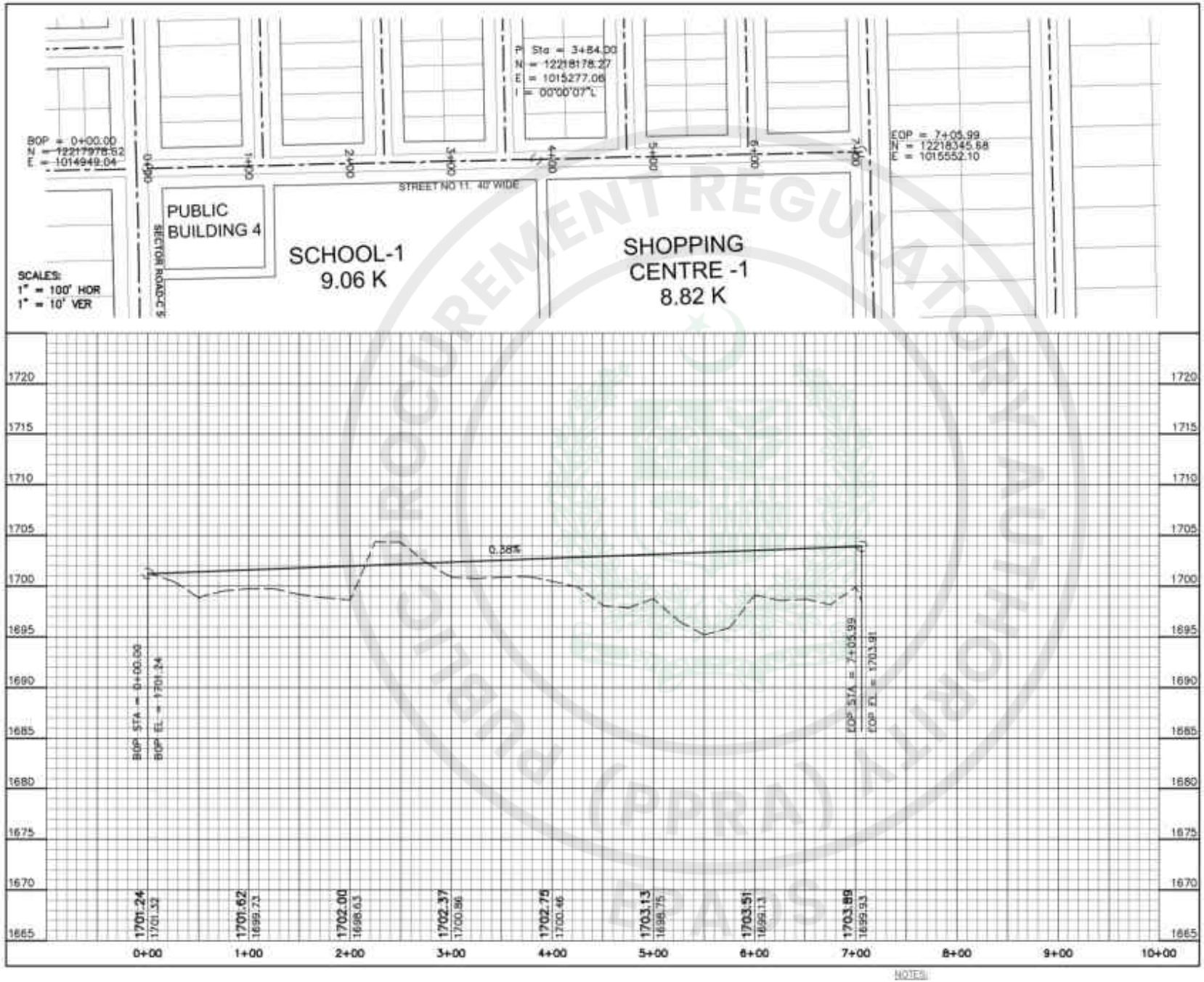

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 11 (40ft WIDE)
(SHEET 1 OF 1)

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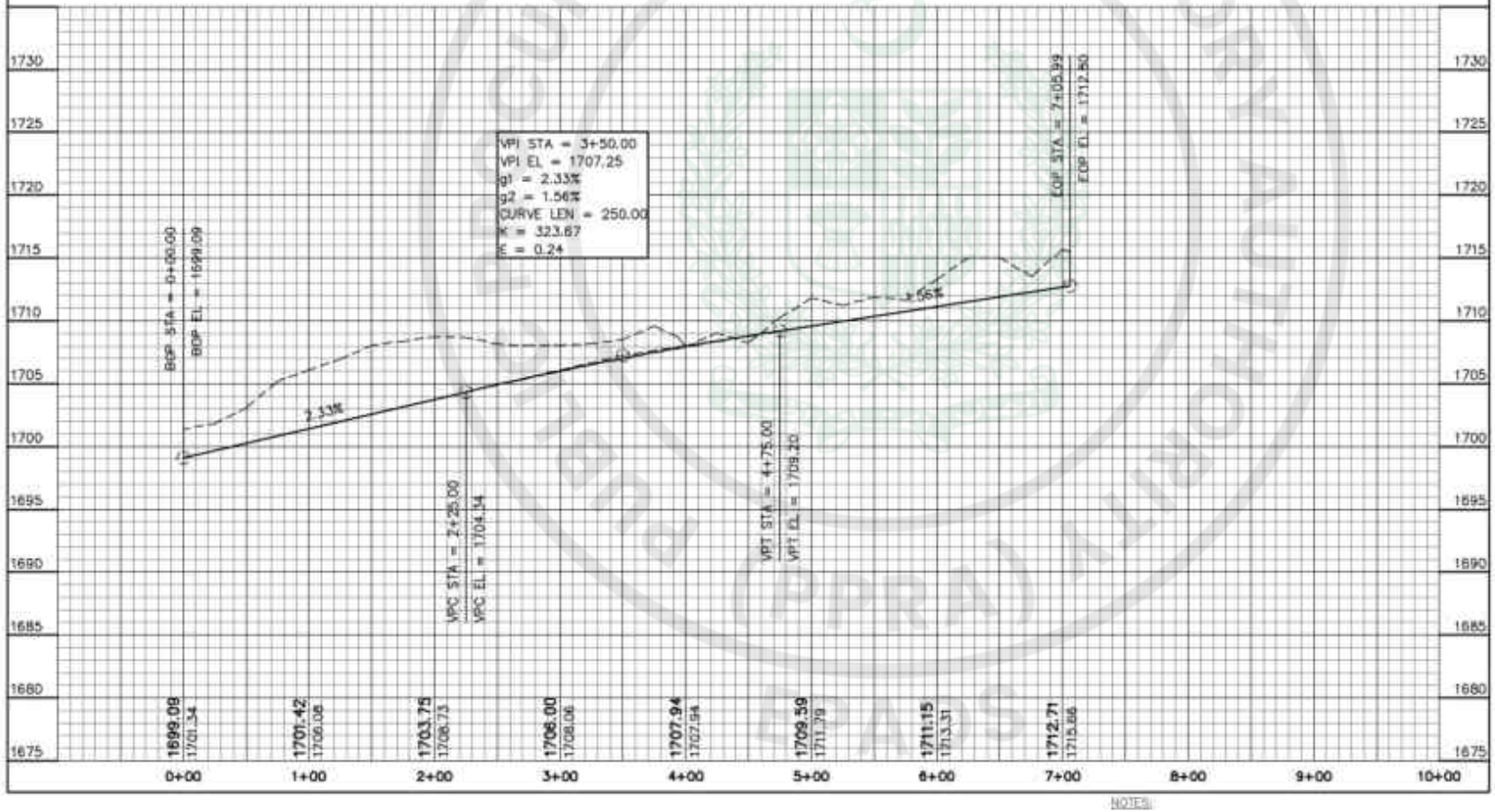

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 12 (40ft WIDE)
(SHEET 1 OF 1)

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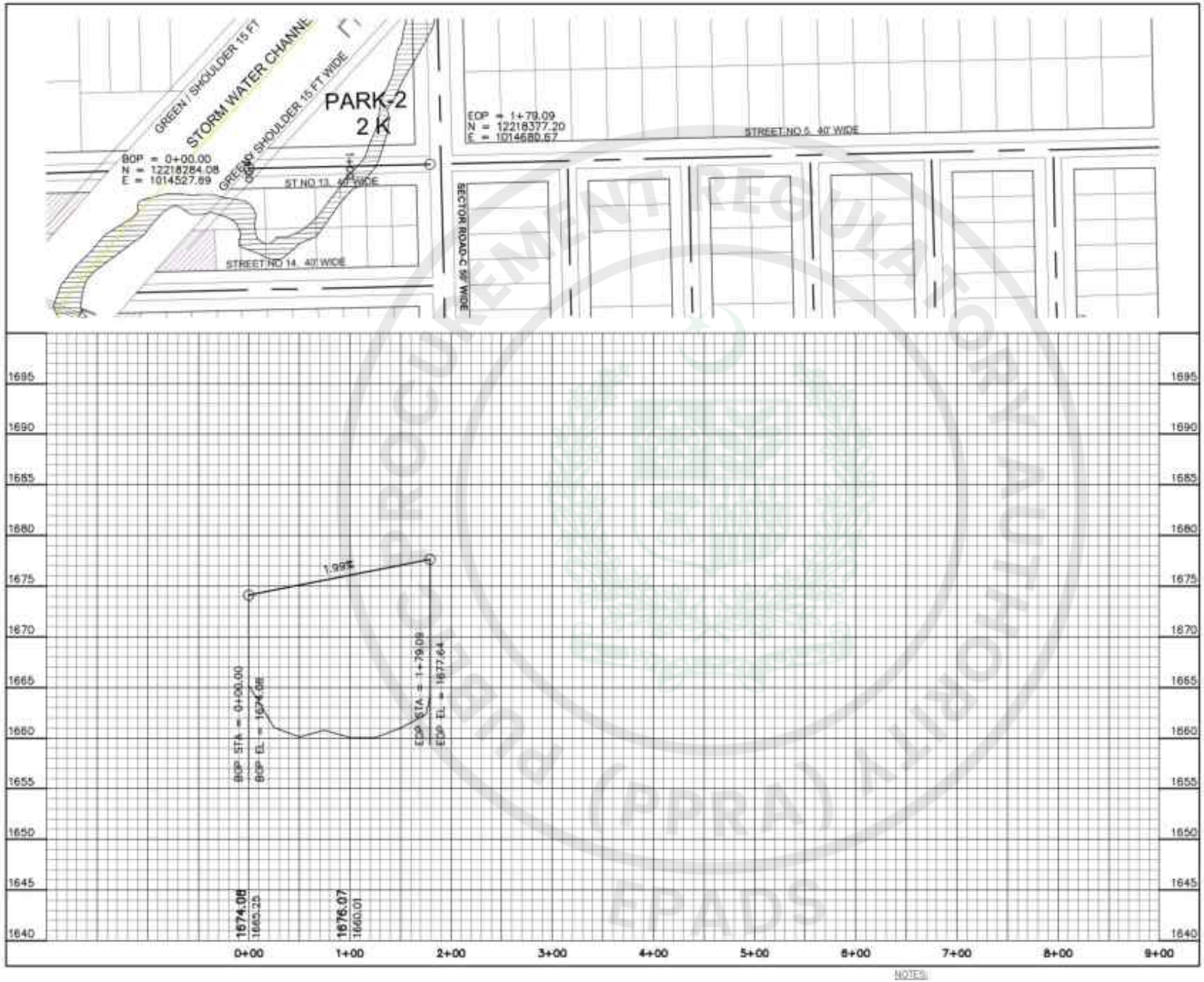

SCALES:
1" = 100' HOR
1" = 10' VER

NOTES:

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FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 13 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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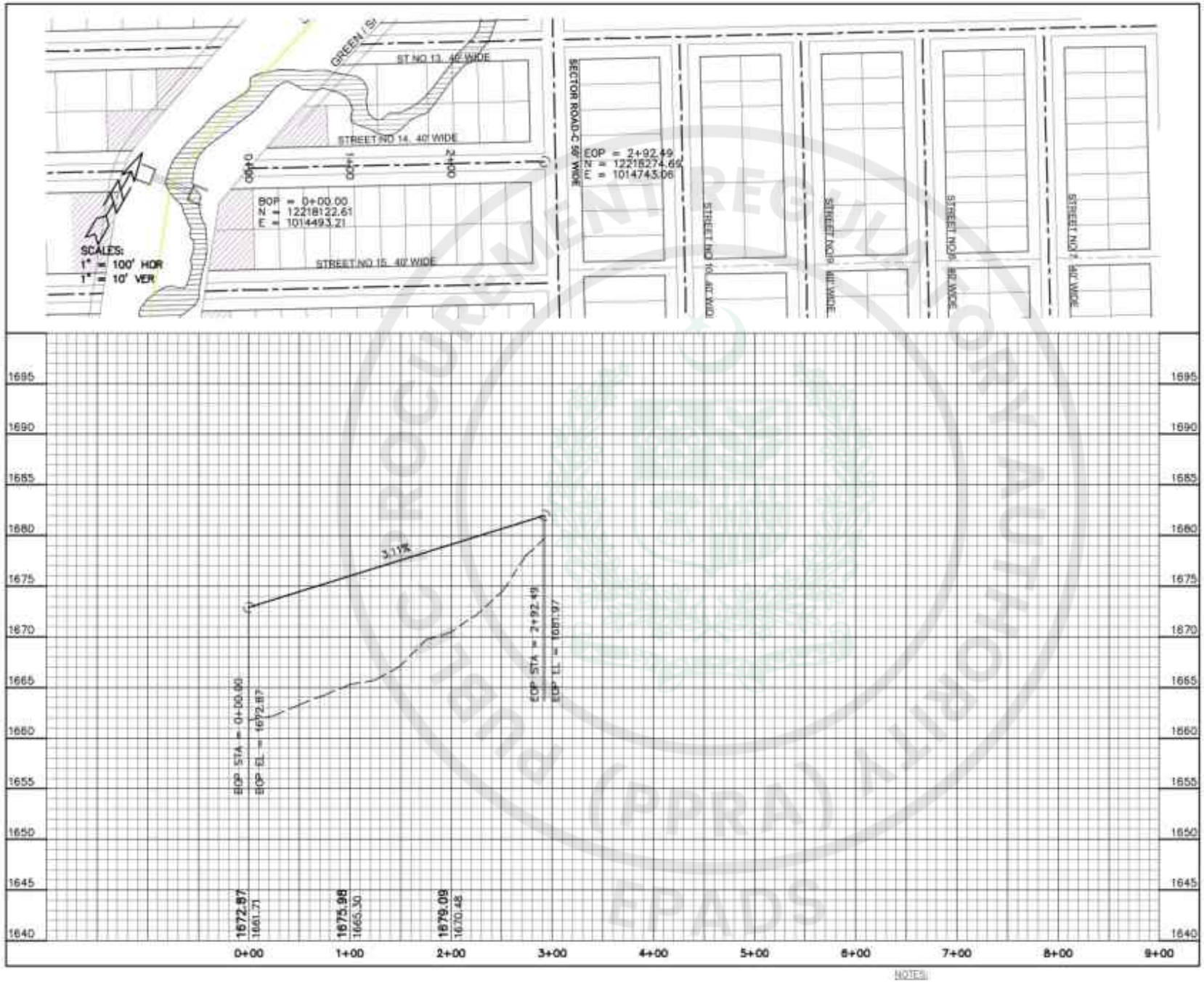

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 14 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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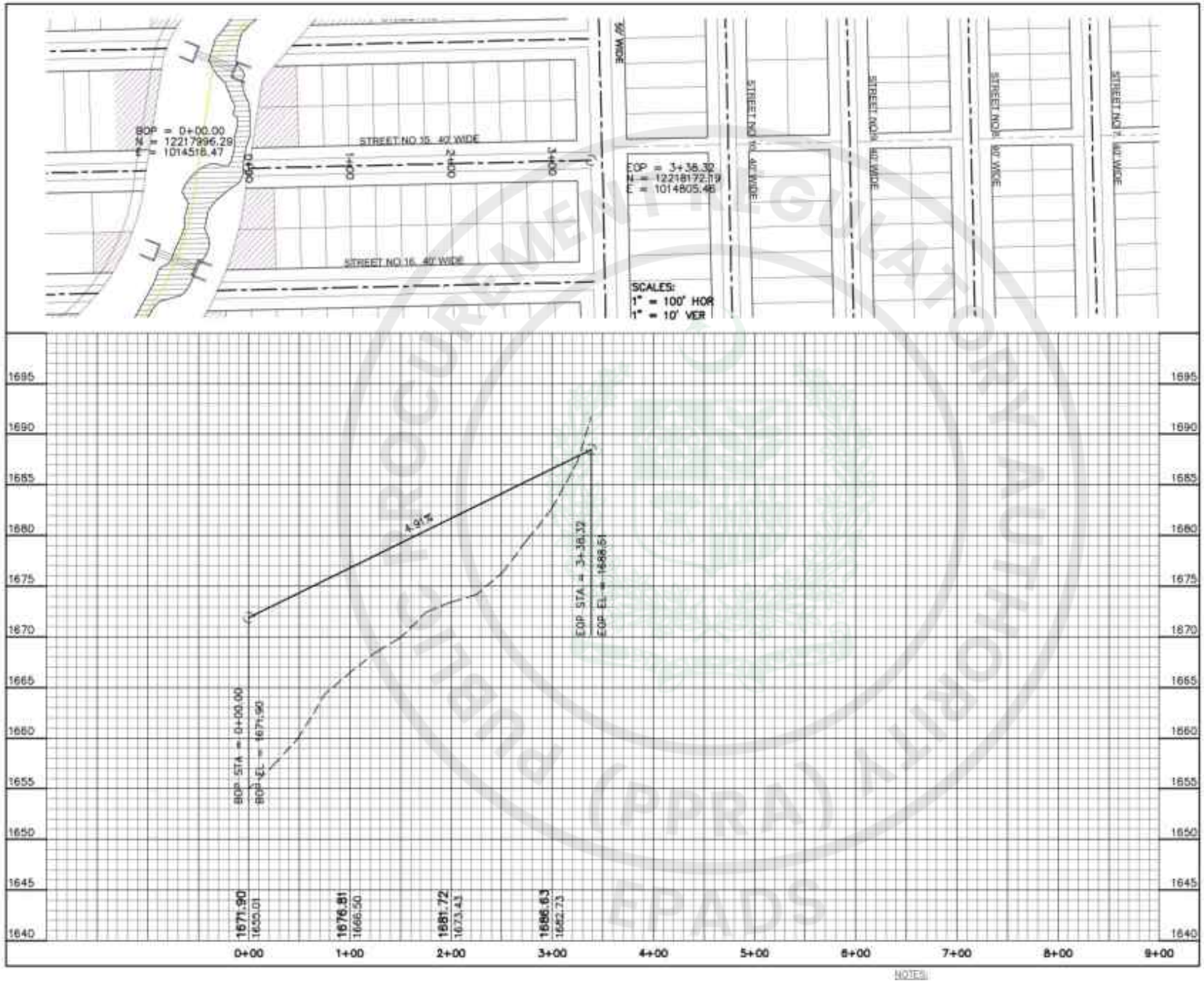

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 15 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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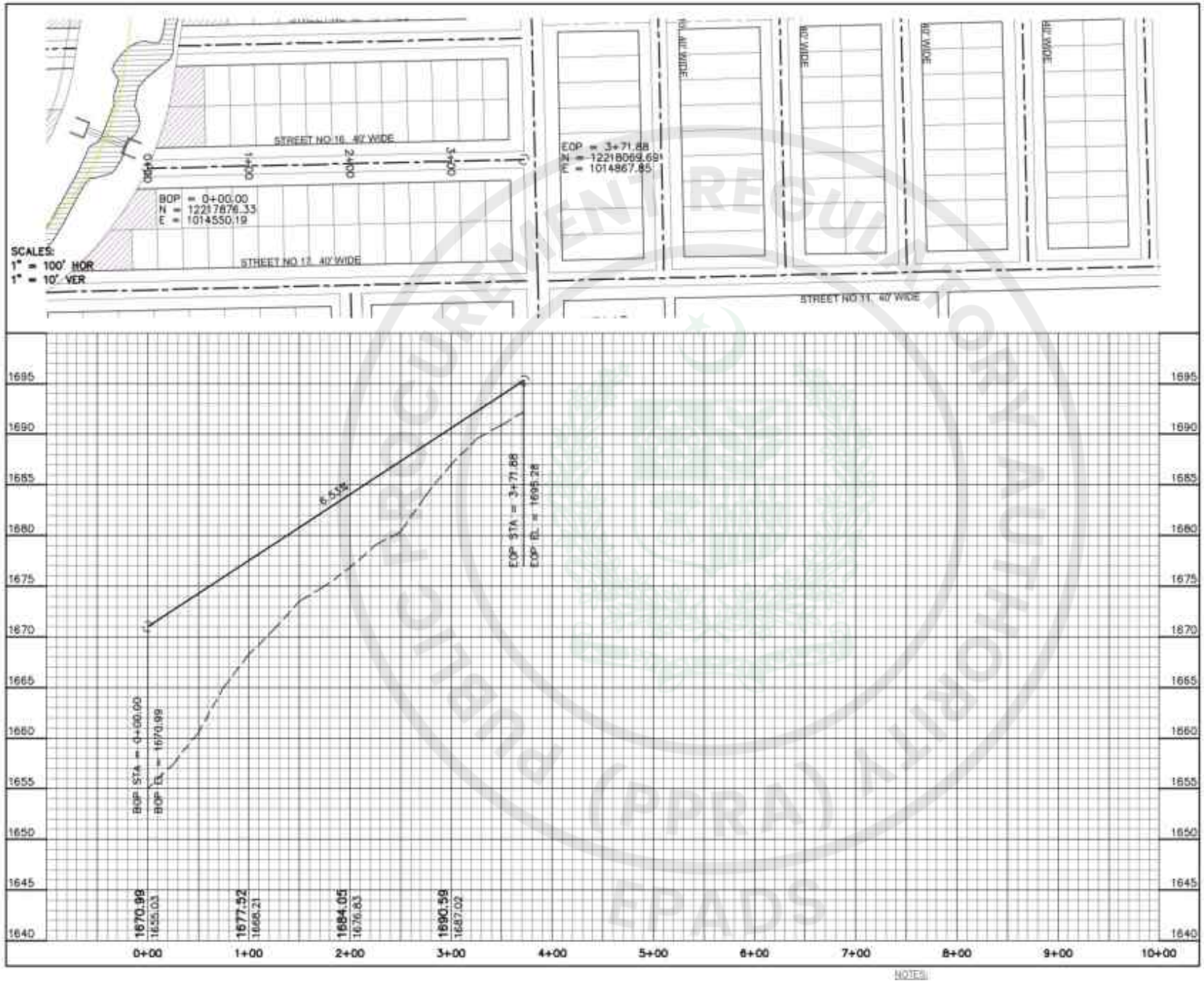

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 16 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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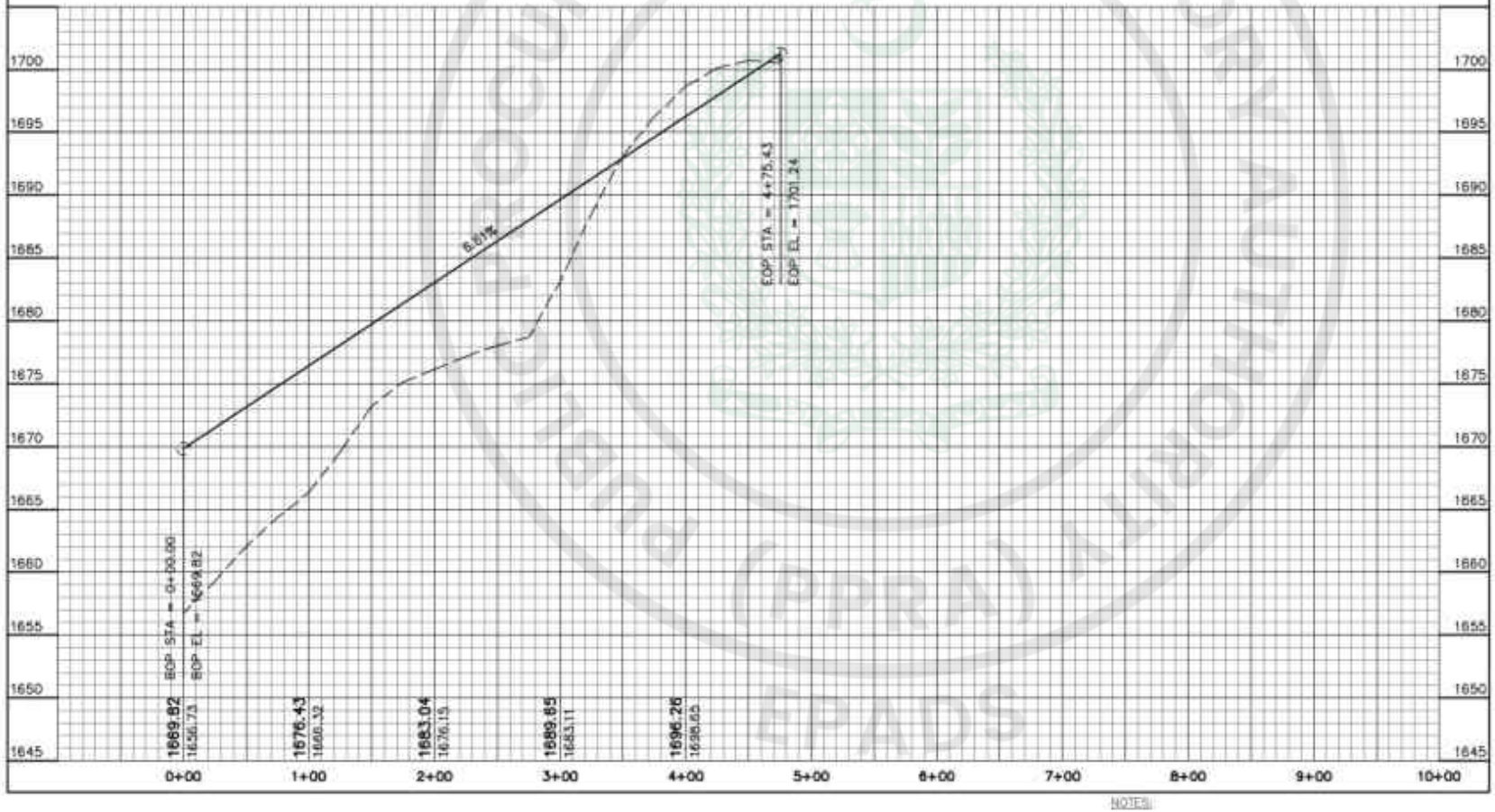

NOTES:

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 17 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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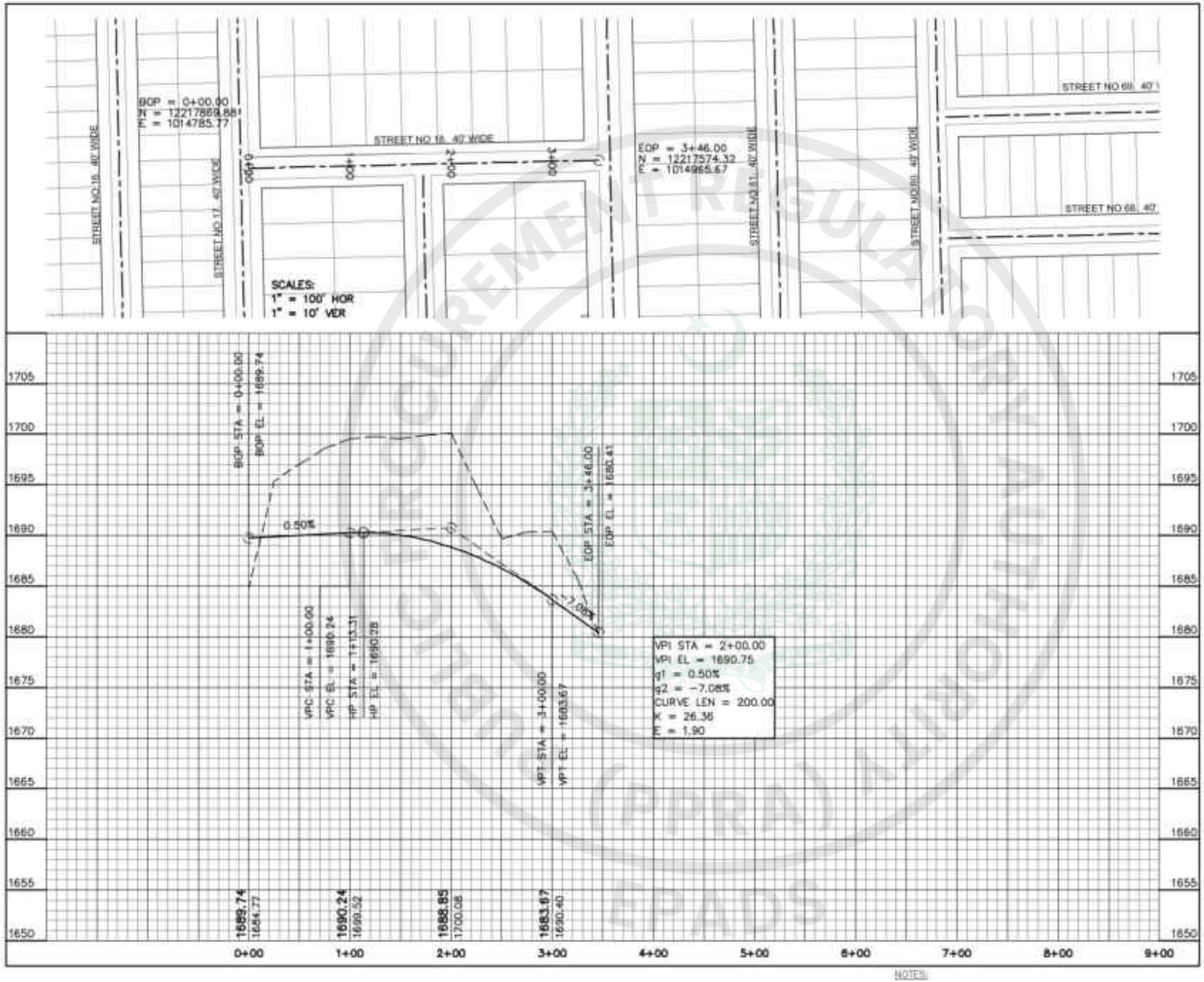

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 18 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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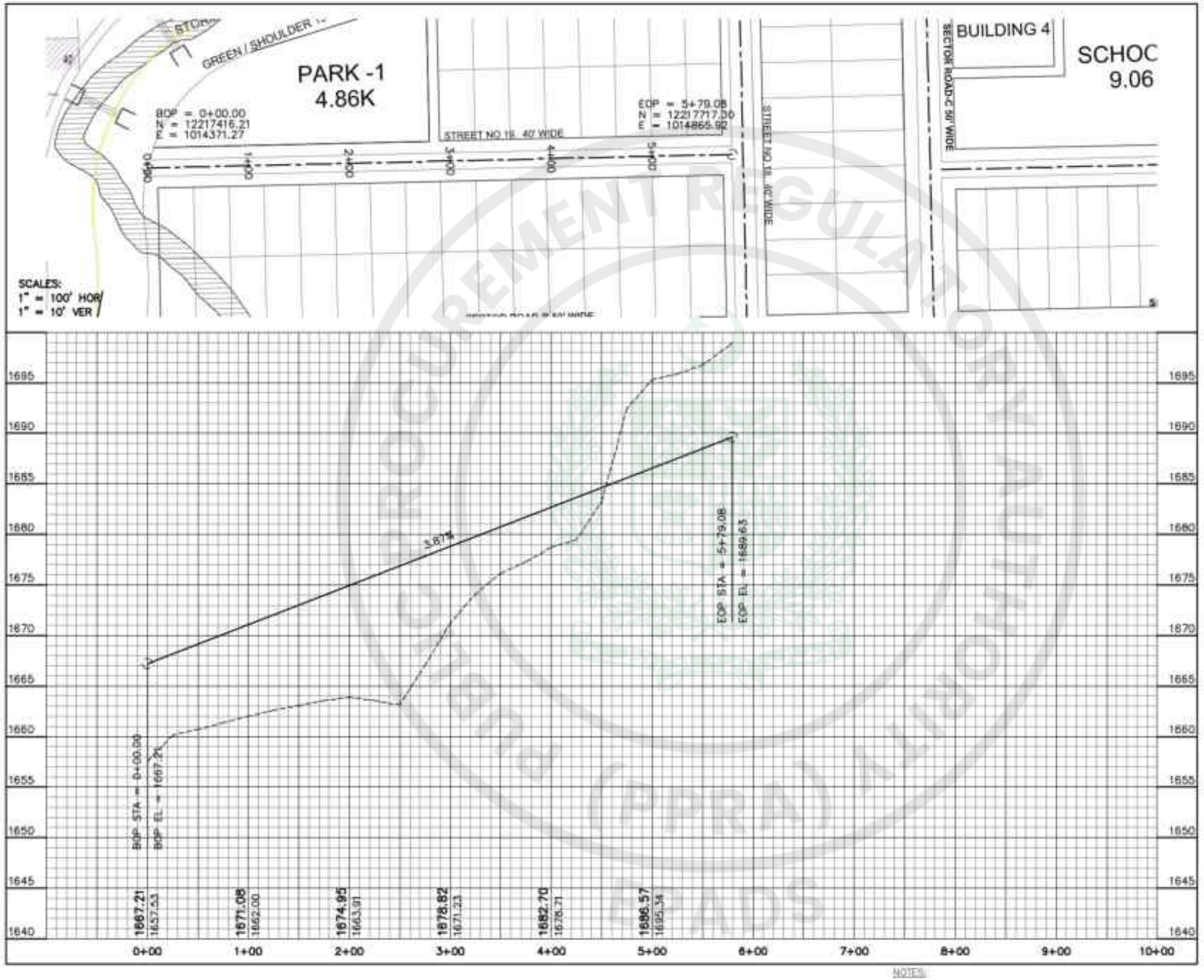

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 19 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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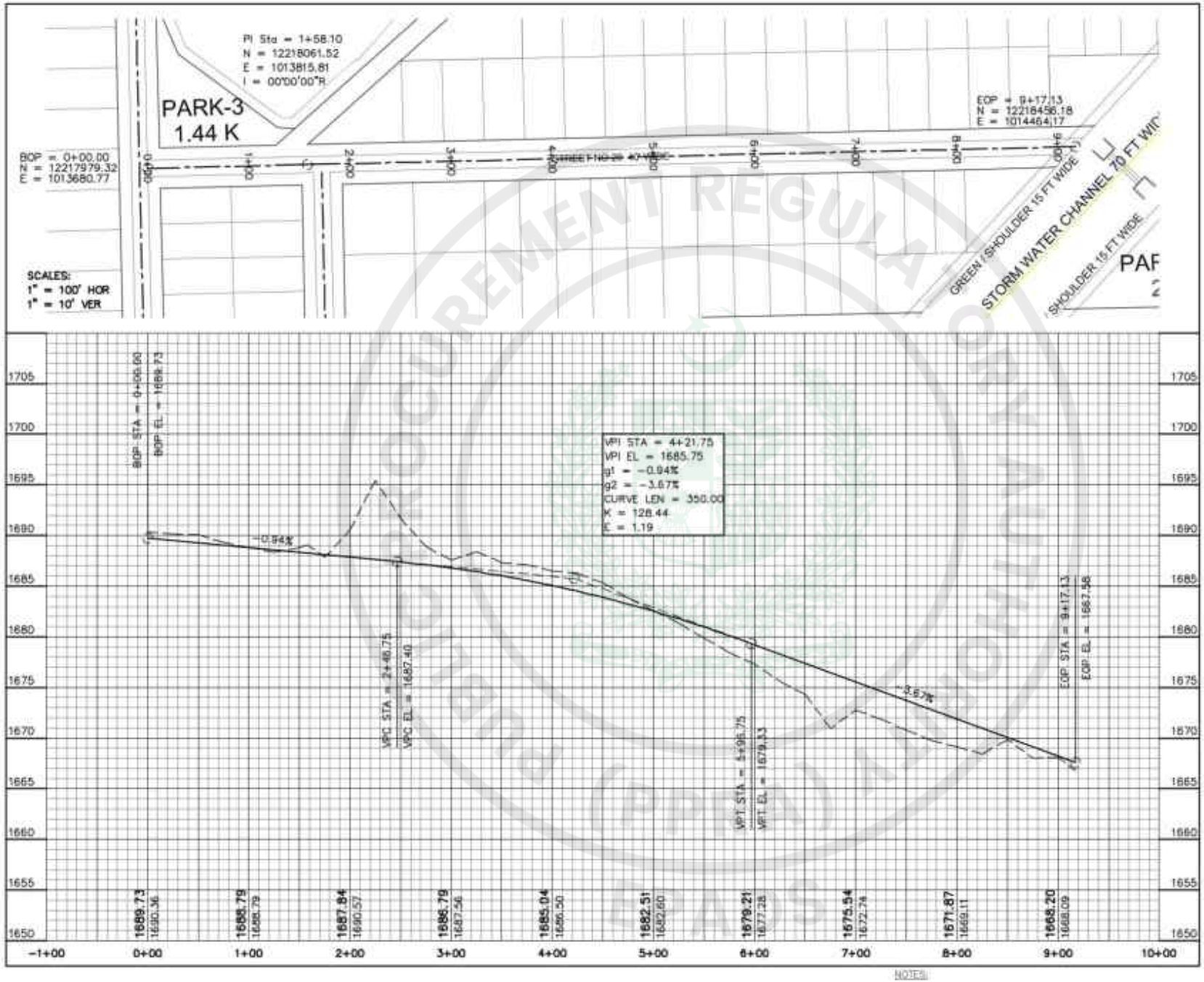

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 20 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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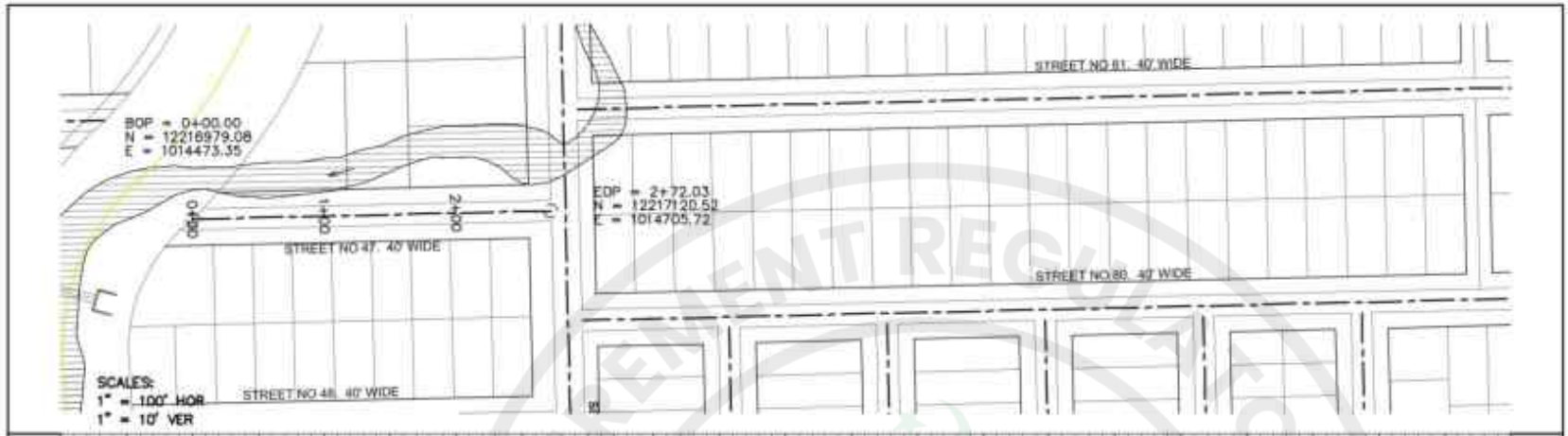

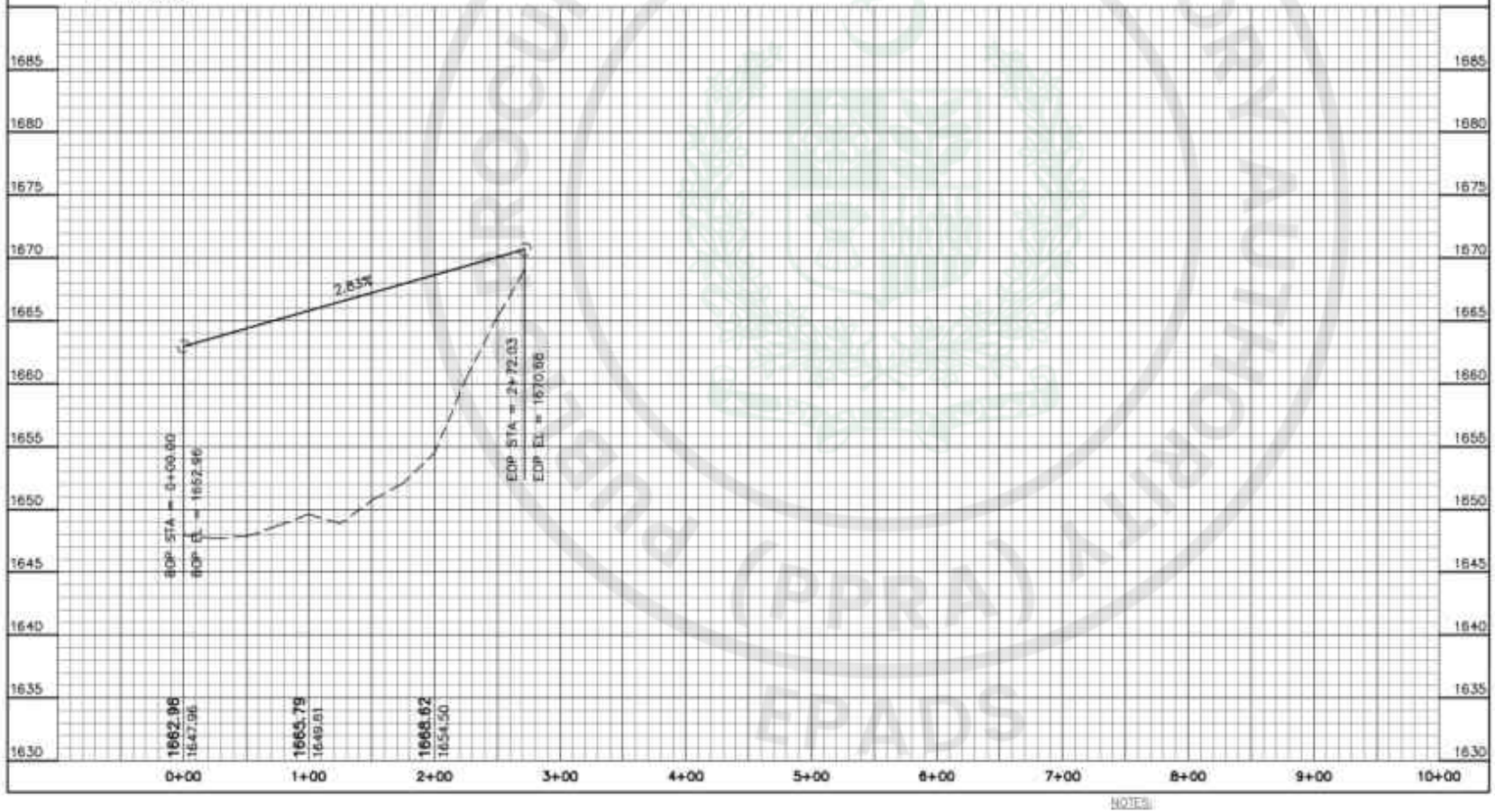

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 47 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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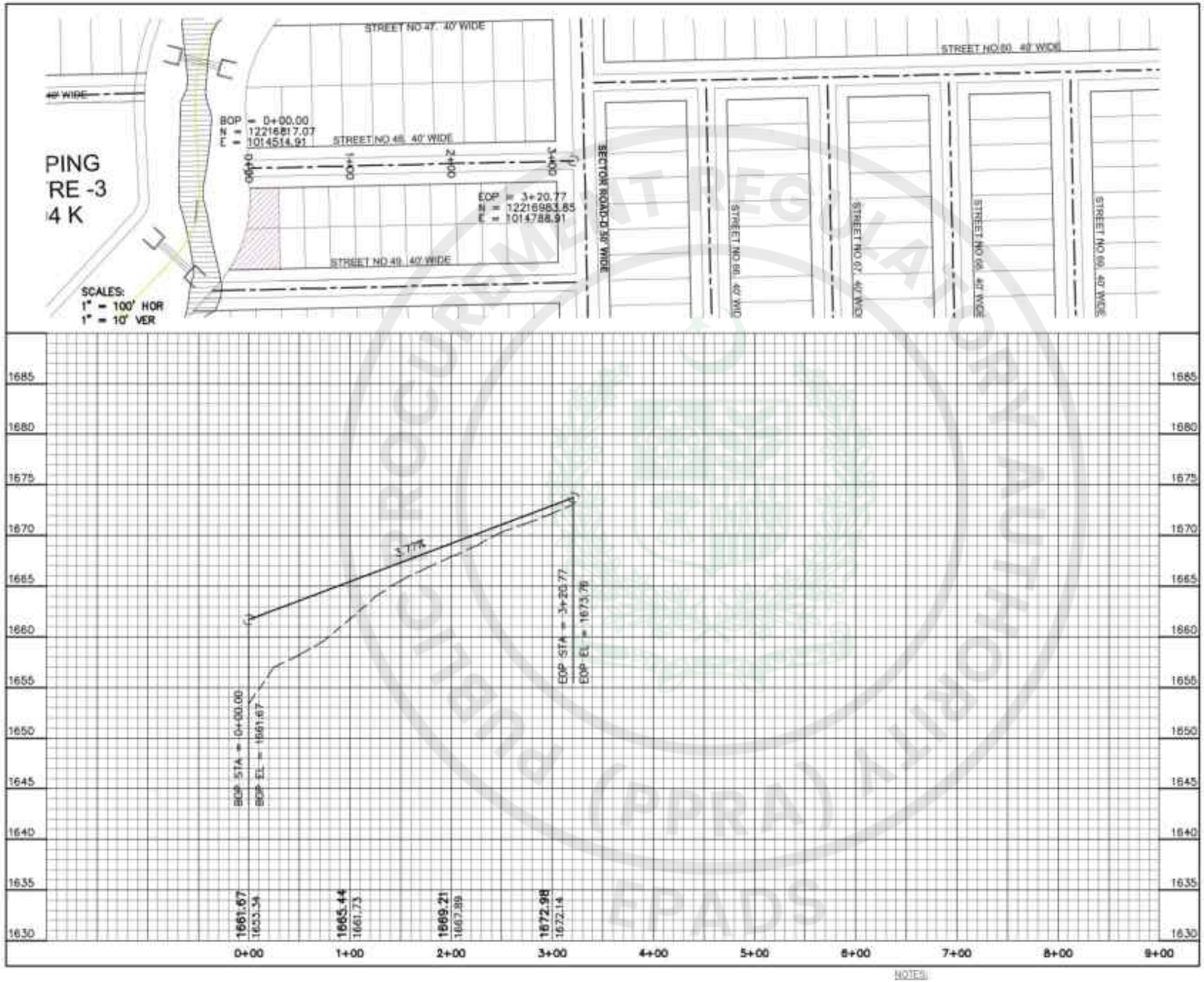

NOTES:

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 48 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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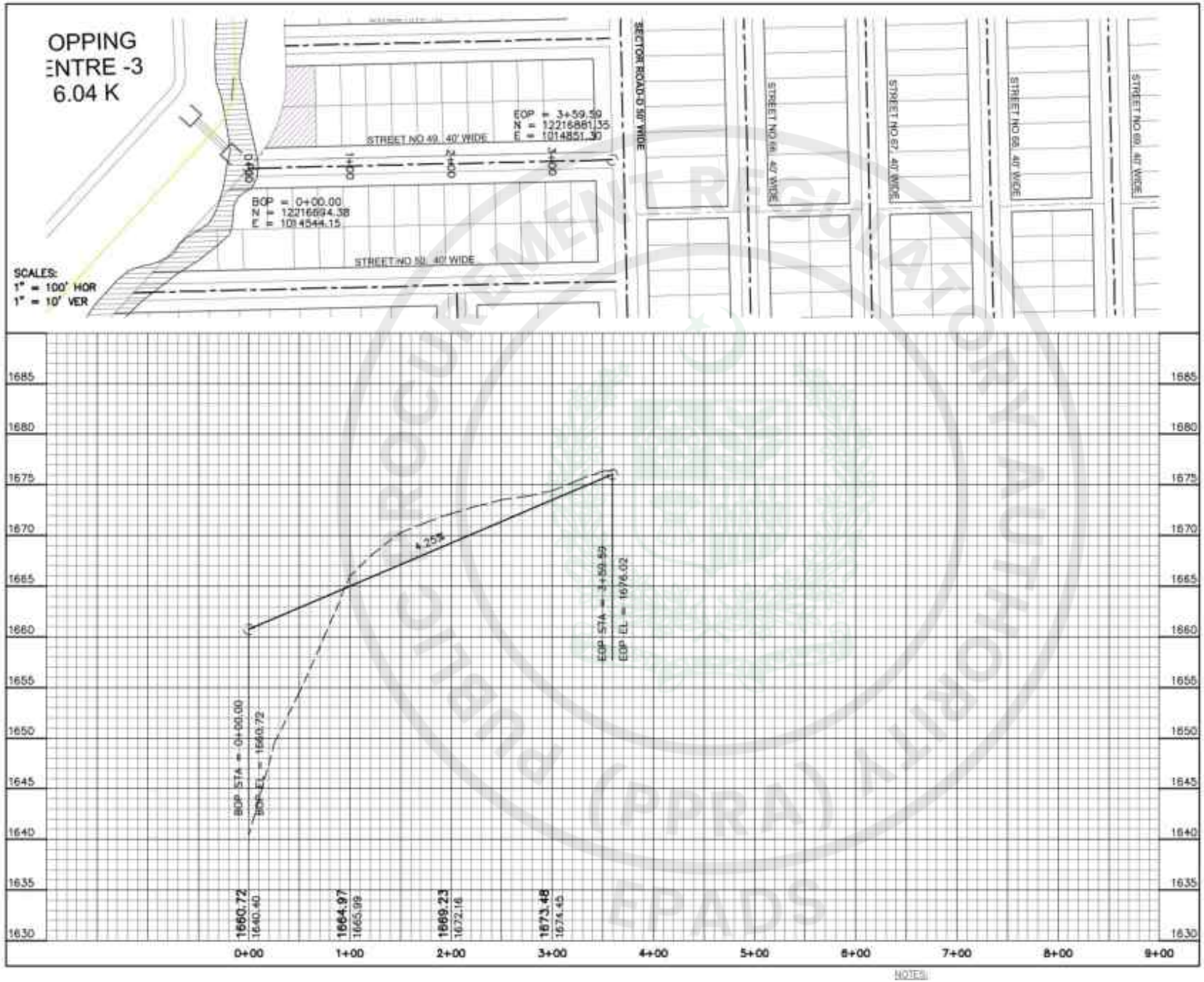

NOTES:

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 49 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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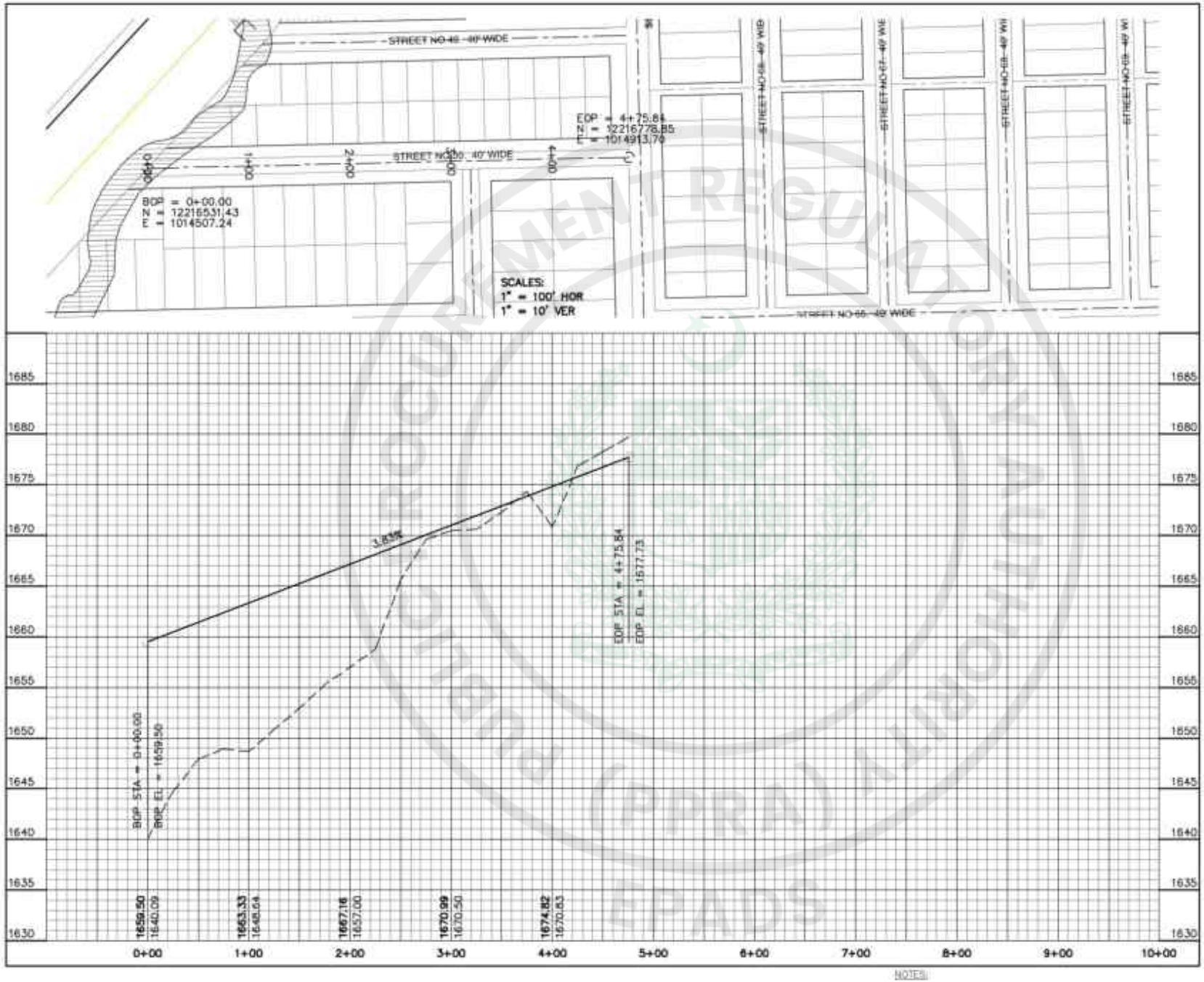

NOTES:

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 50 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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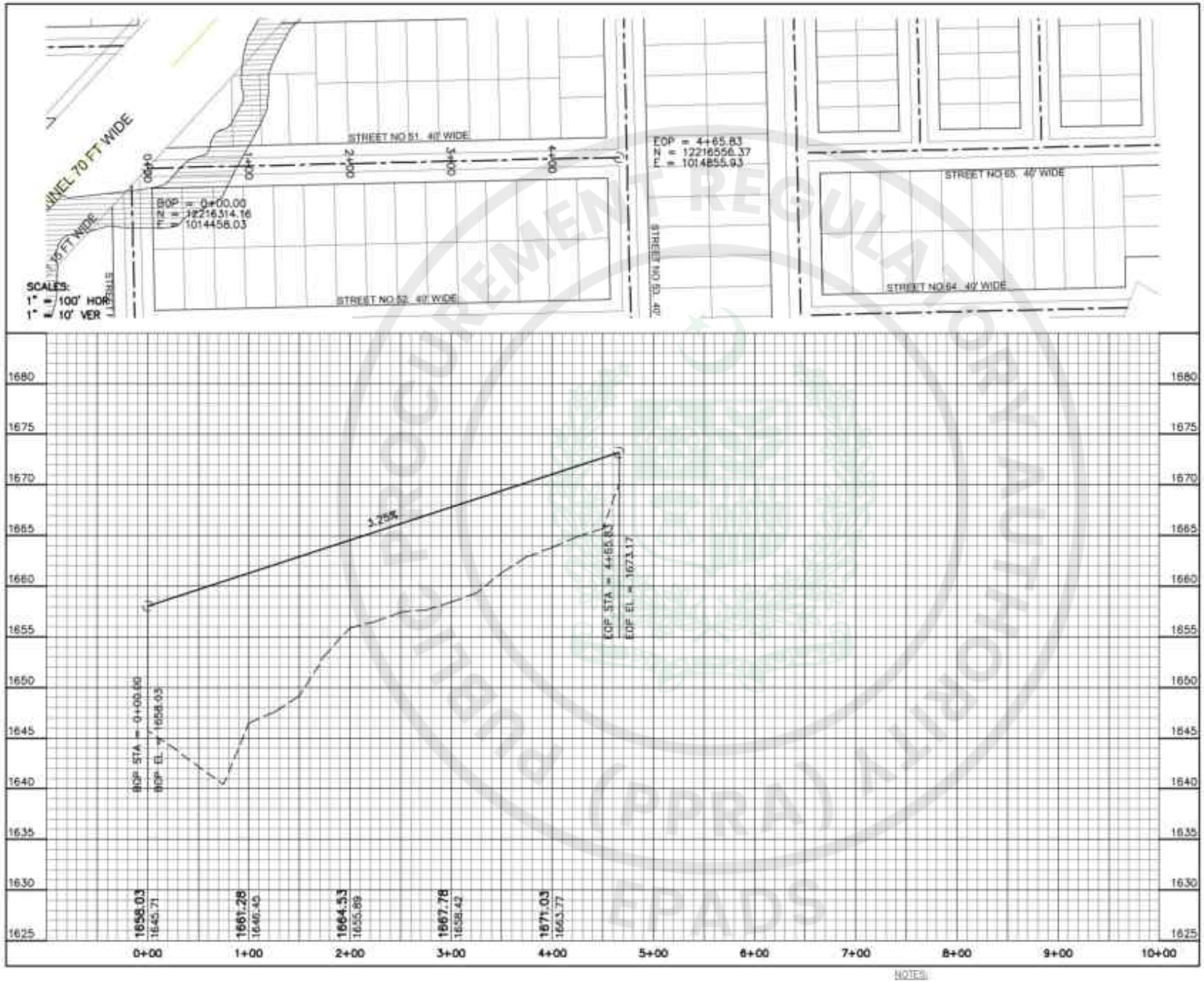

NOTES:

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 51 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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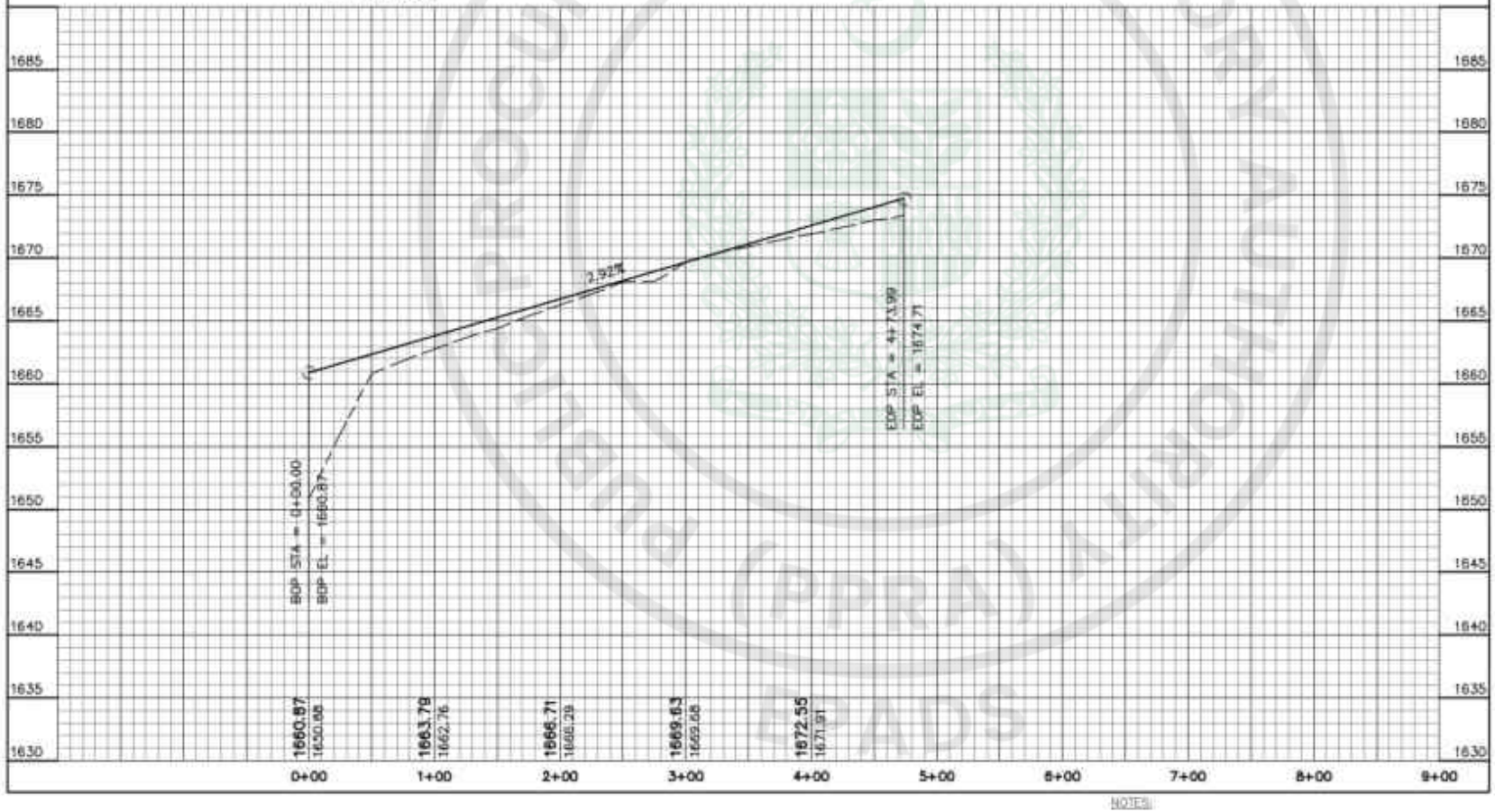

NOTES:

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 52 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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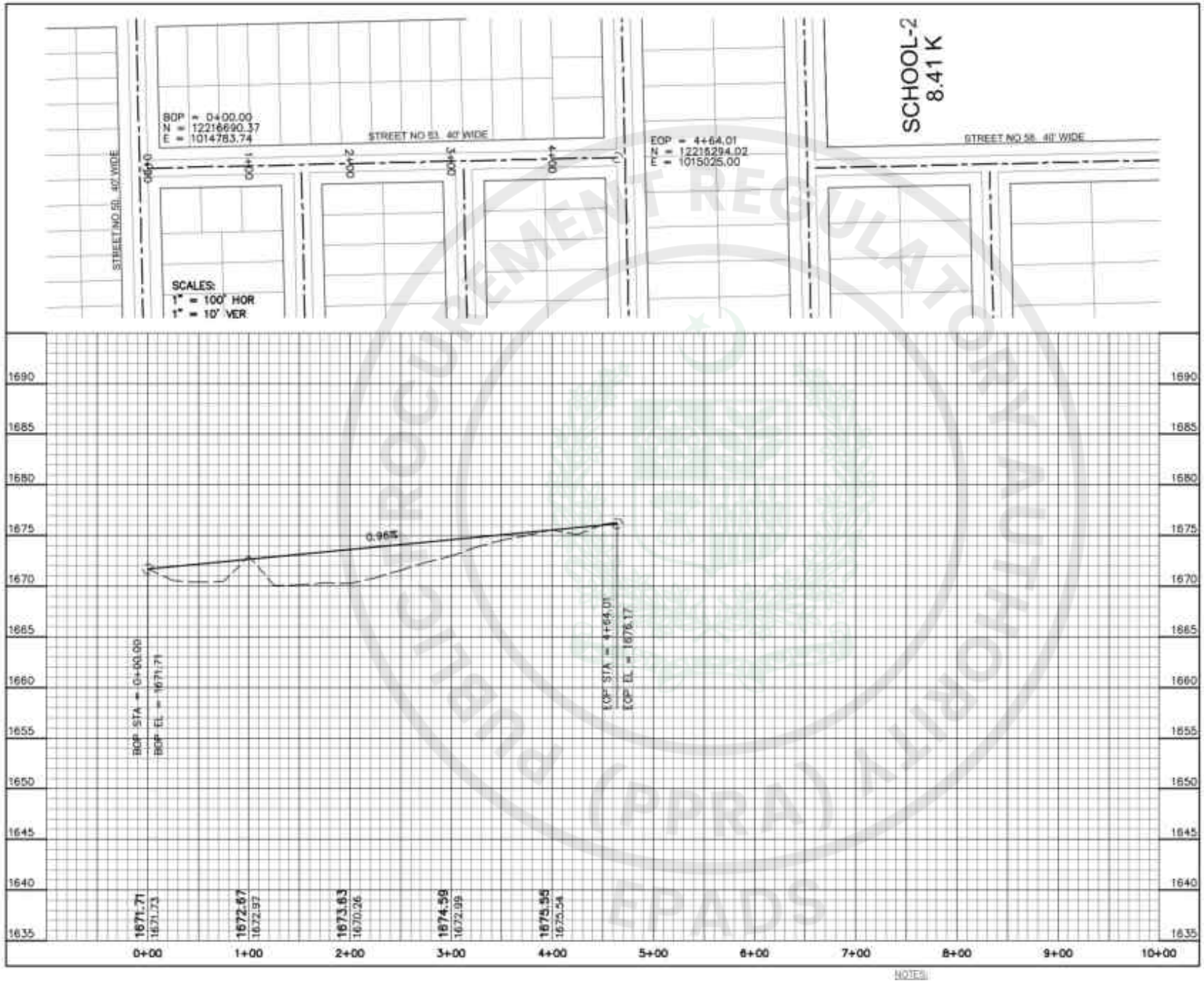

NOTES:

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 53 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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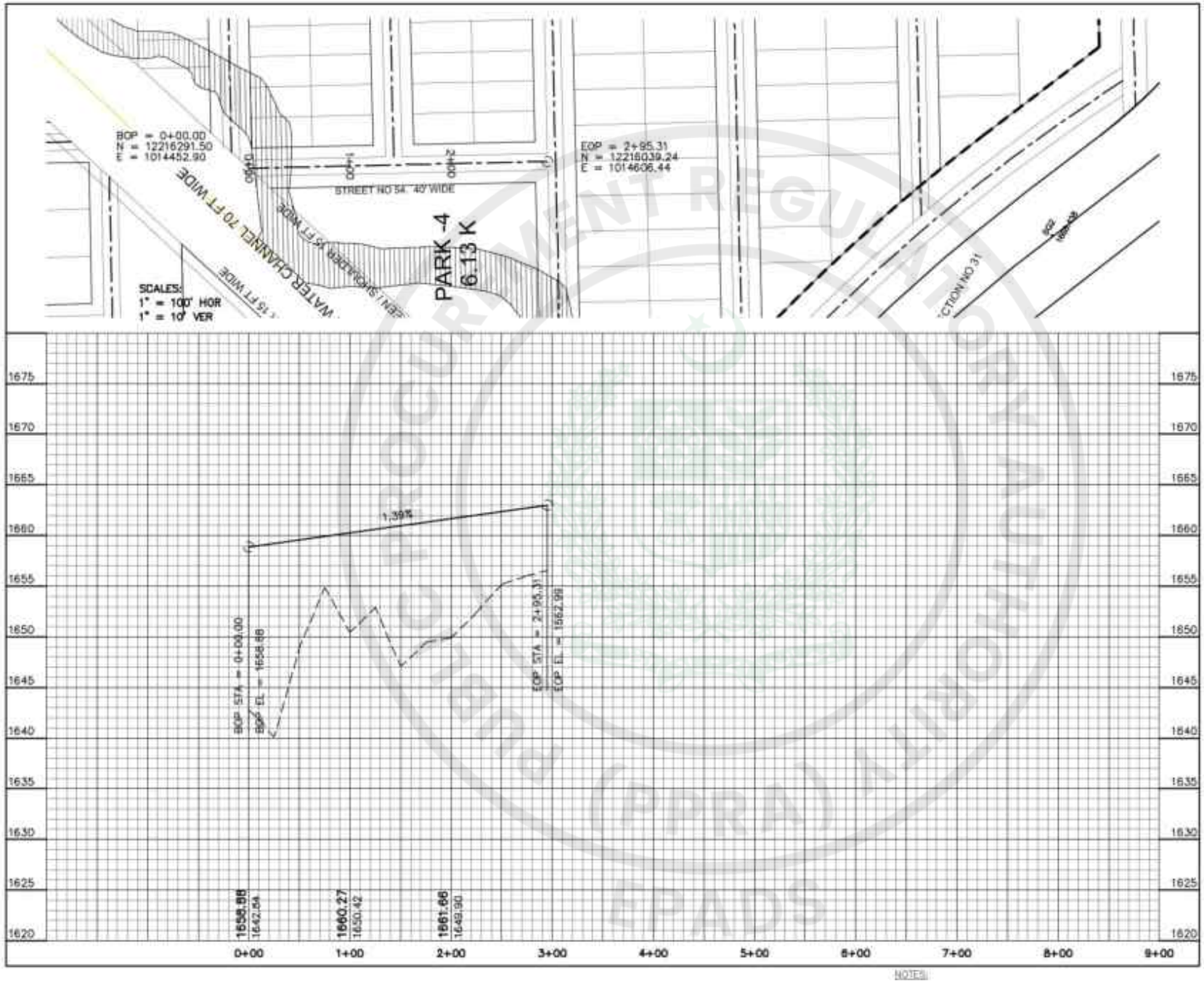

NOTES:

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 54 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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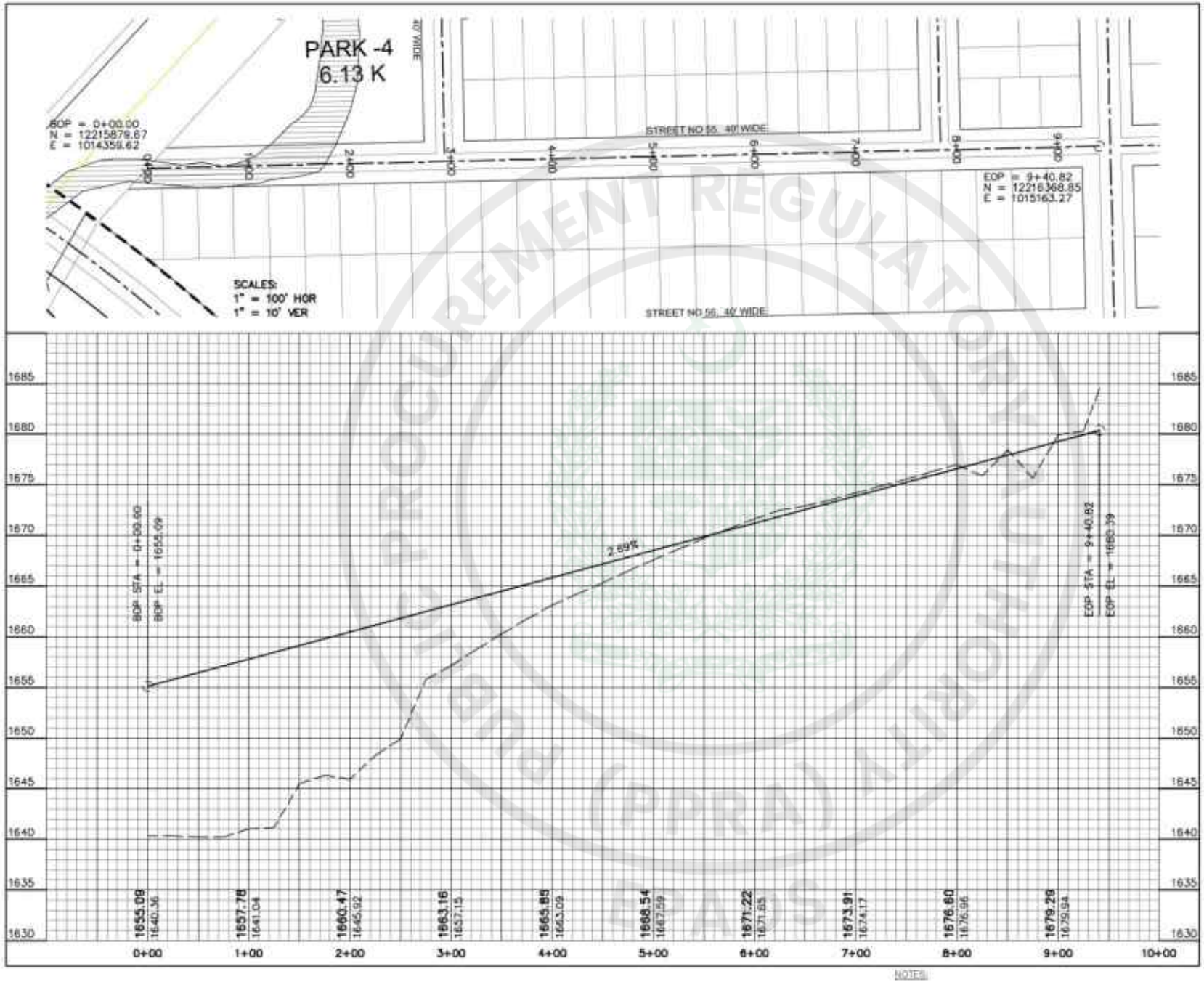

NOTES:

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 55 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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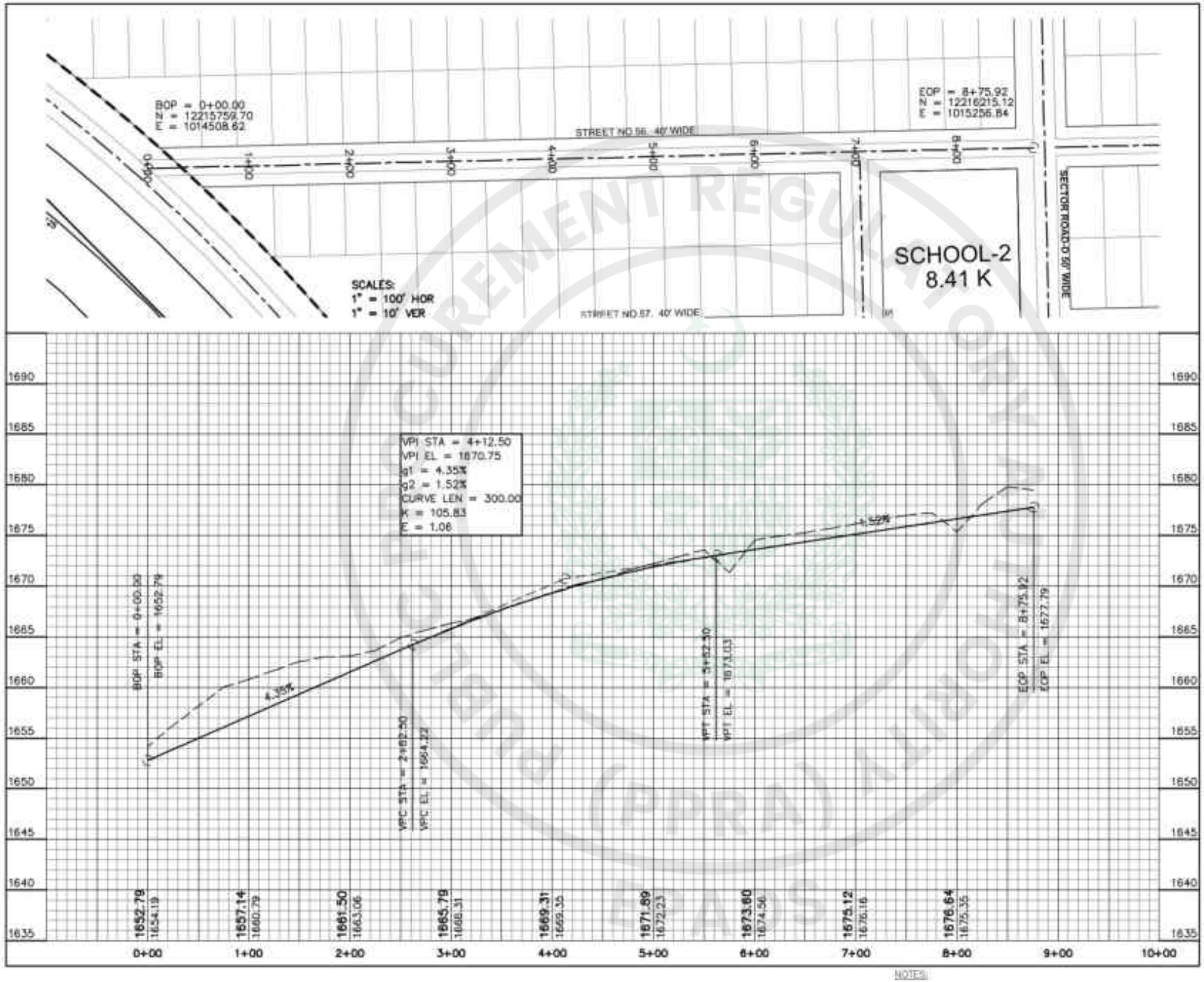

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PPLAN & ROFILE OF STREET NO. 56 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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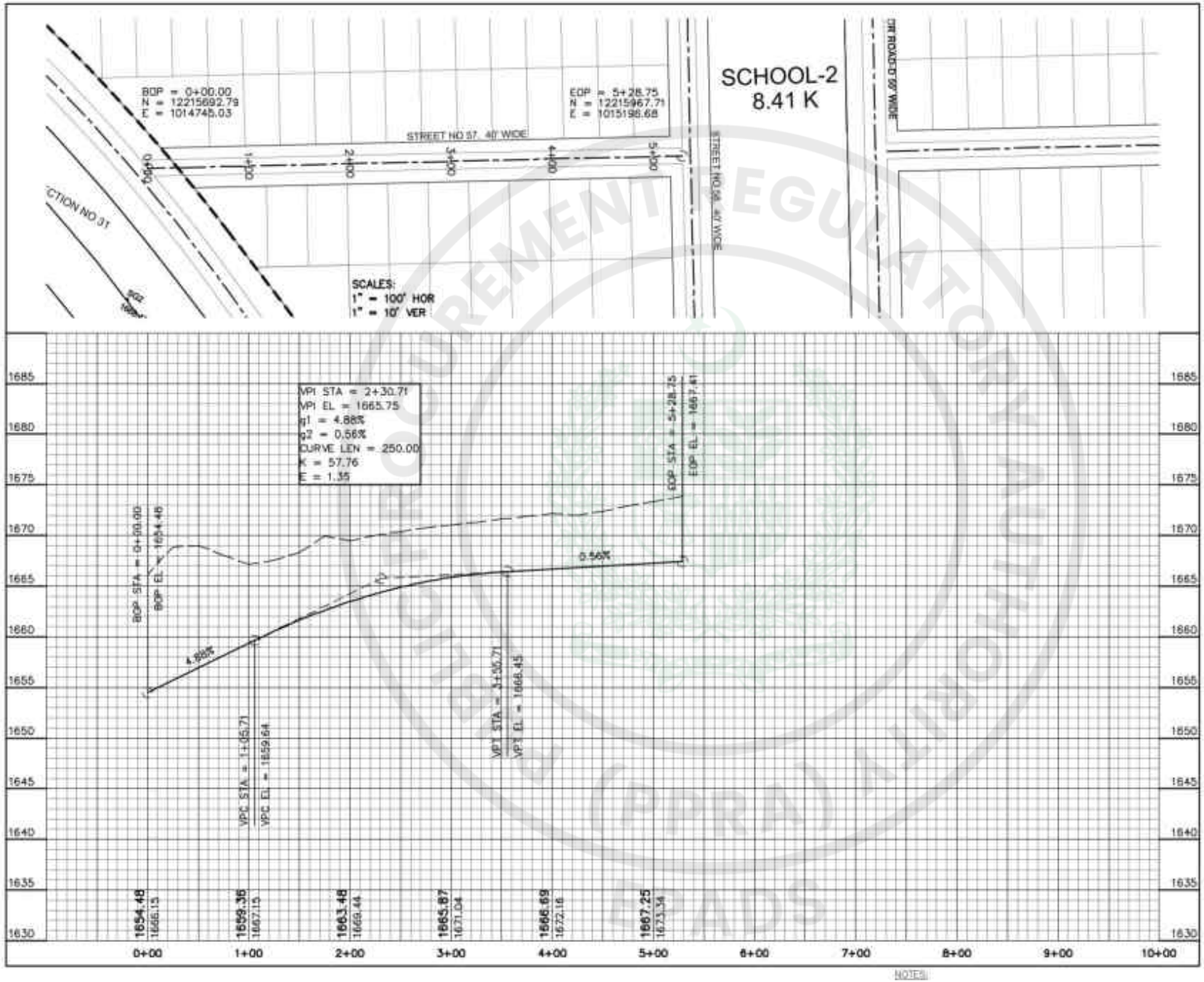

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PPLAN & ROFILE OF STREET NO. 57 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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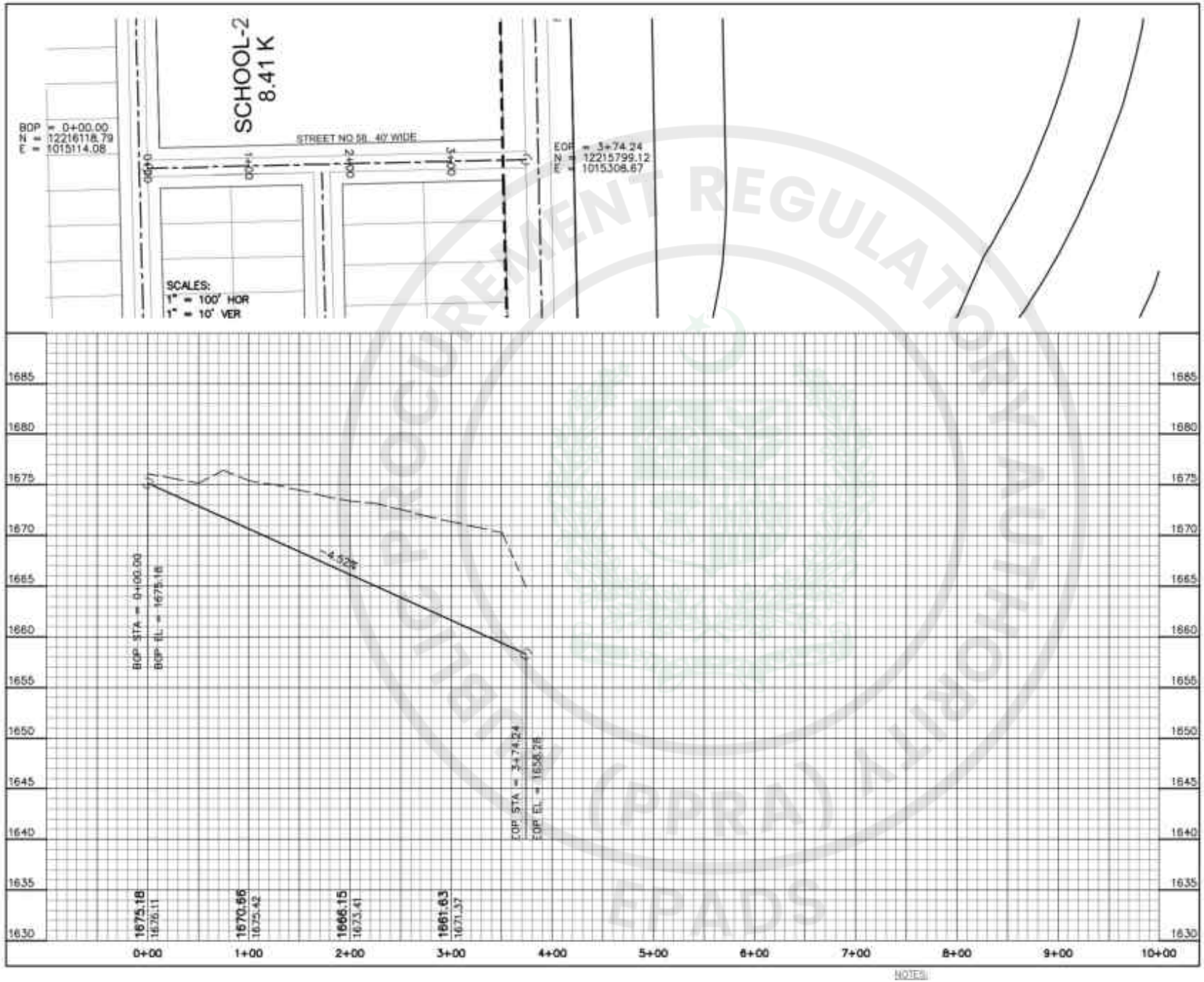

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 58 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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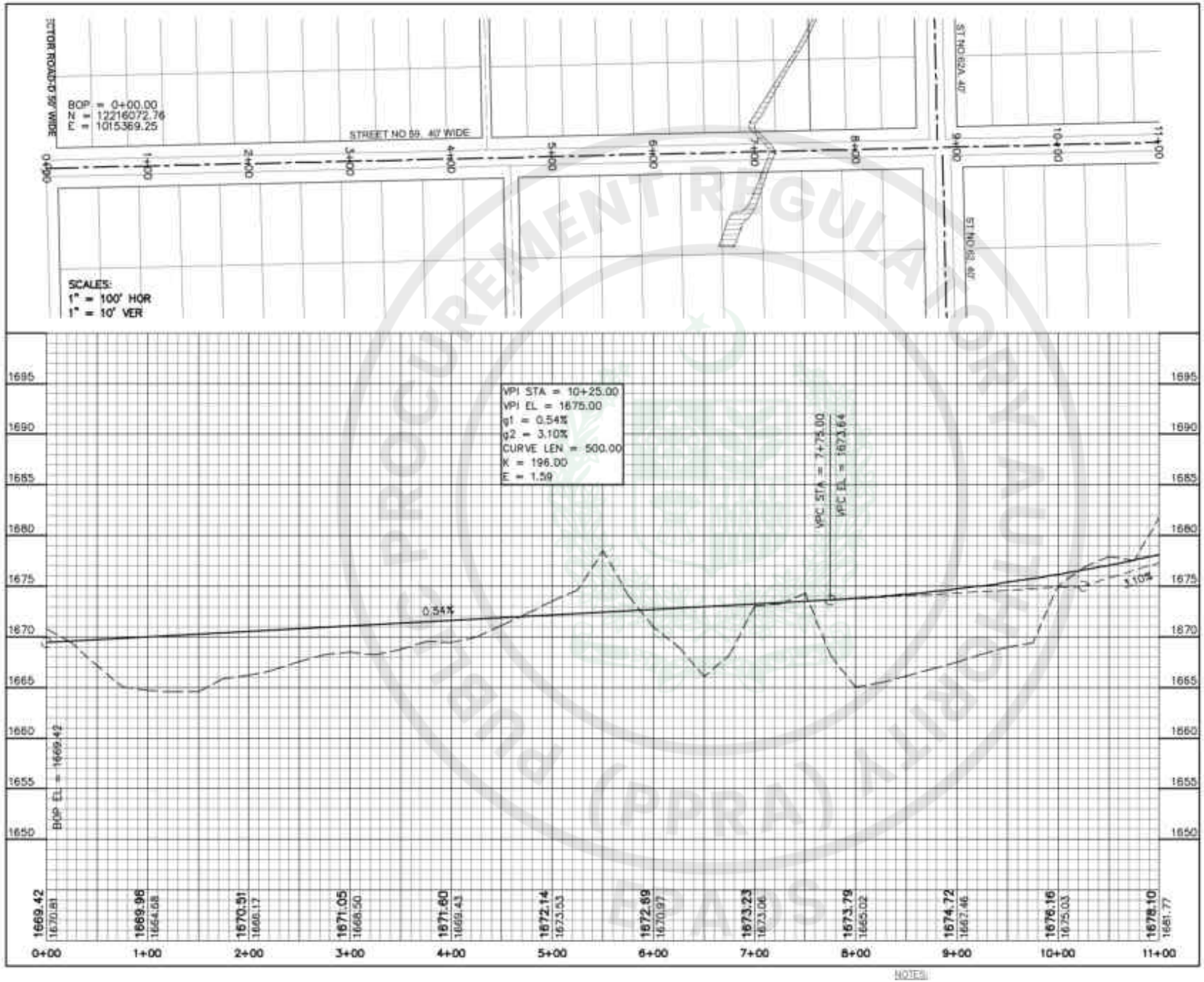

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 59 (40ft WIDE)
(SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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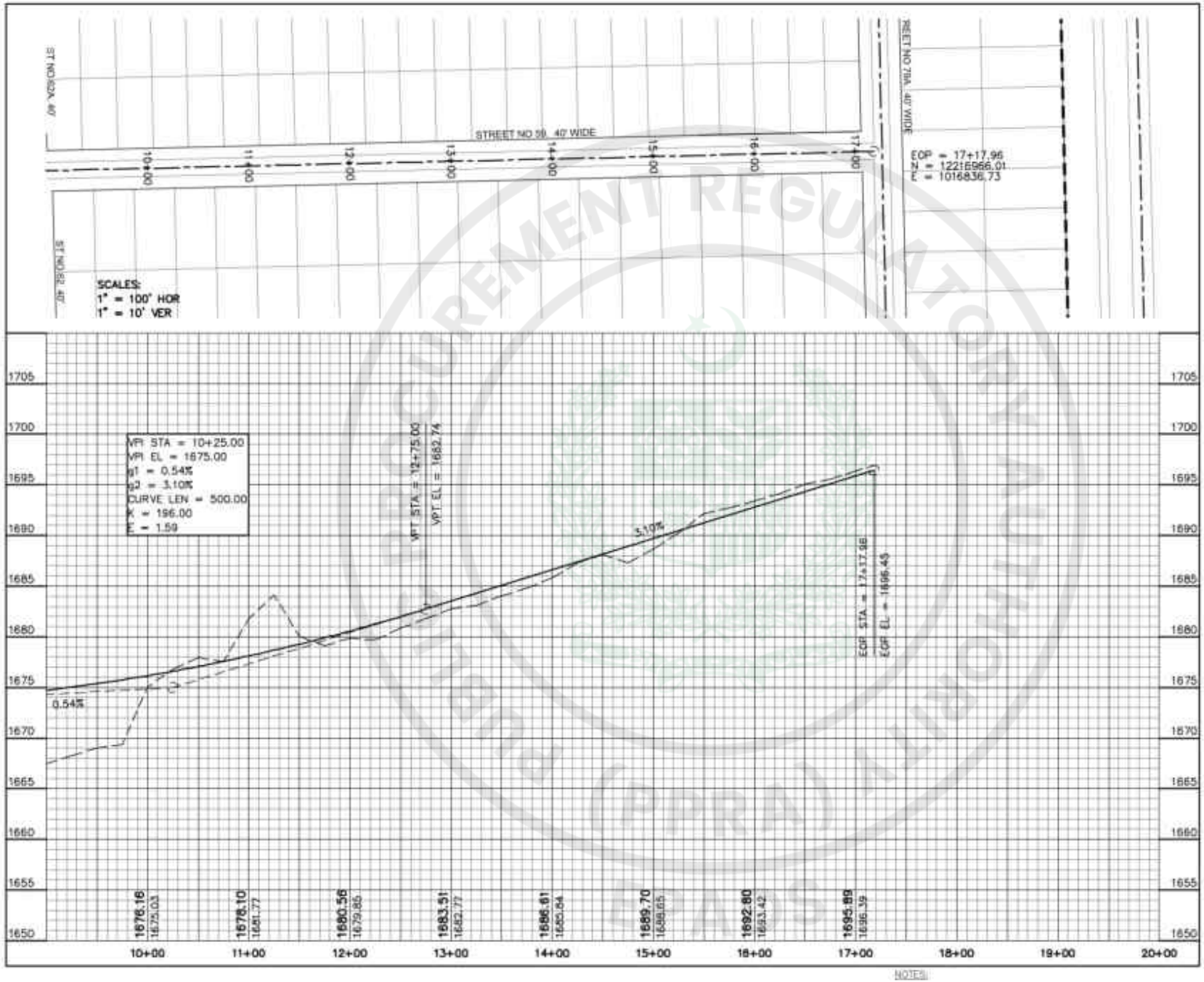

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 59 (40ft WIDE)
(SHEET 2 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESIGN	RECOMMENDED	CHECKED	APPROVED
DRAWN			
TRACED			
CHECKED	DATE	DRAWING NO.	REV.
SCALE		4156/324/BD/03C74	0

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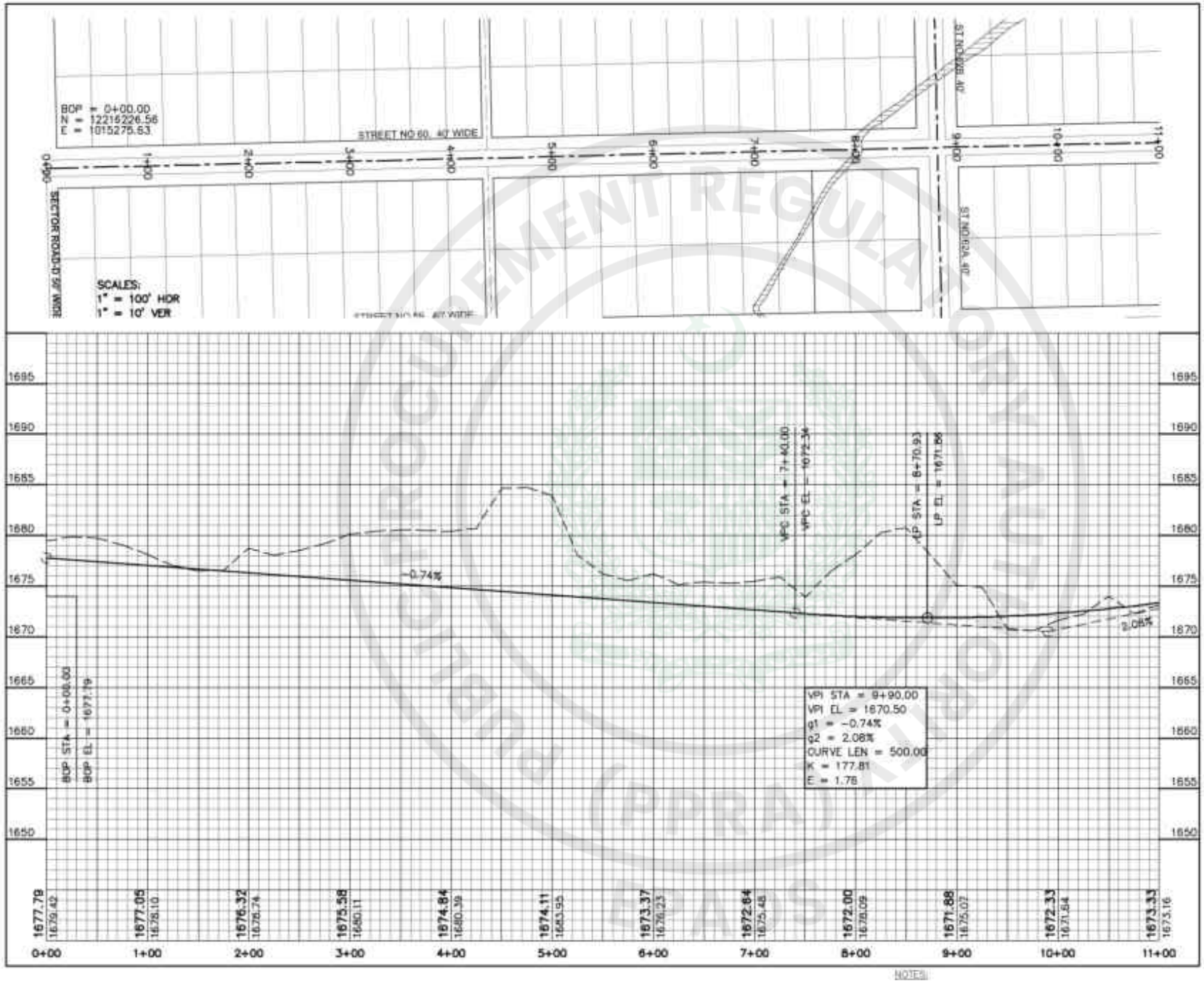

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 60 (40ft WIDE)
(SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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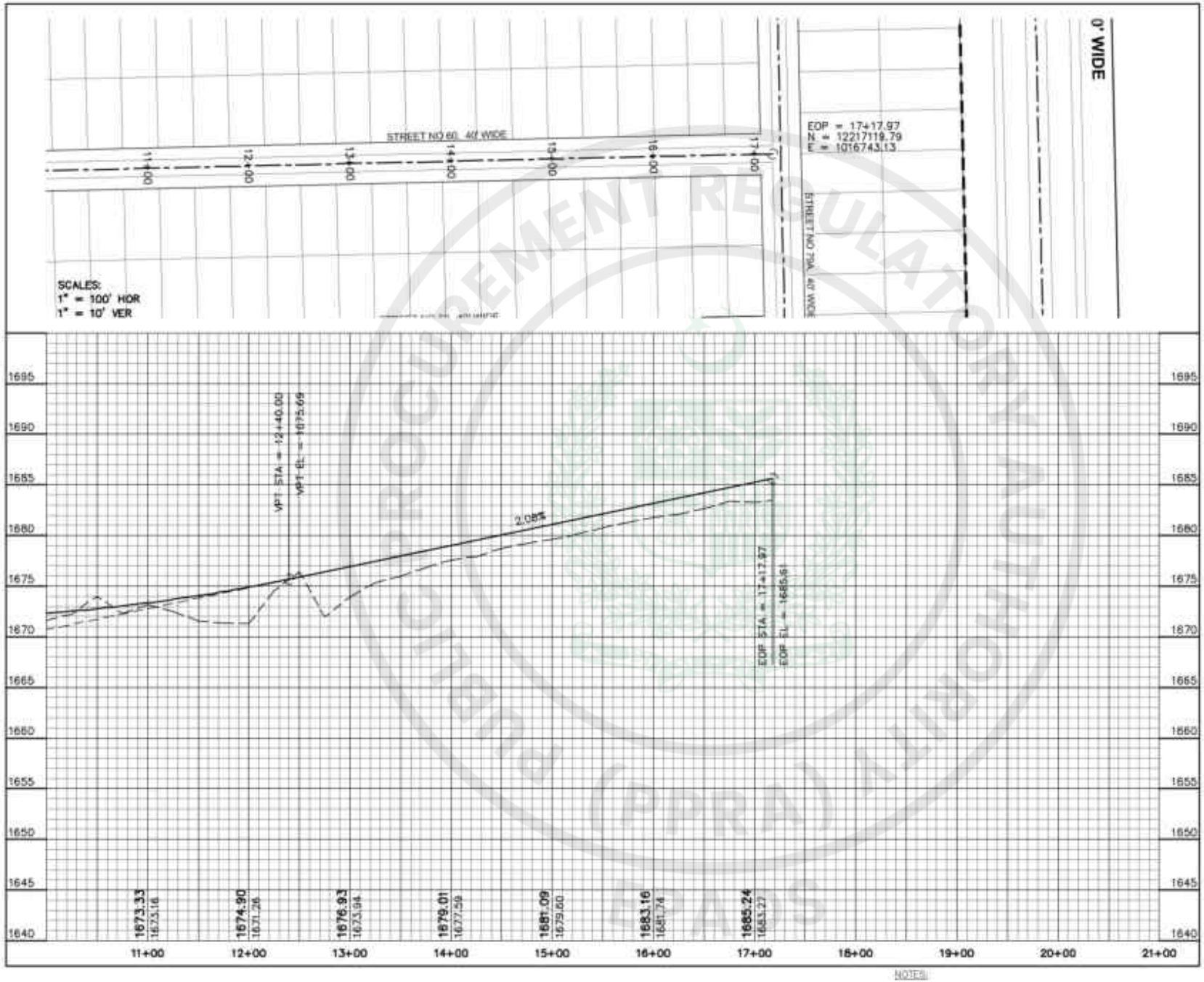

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 60 (40ft WIDE)
(SHEET 2 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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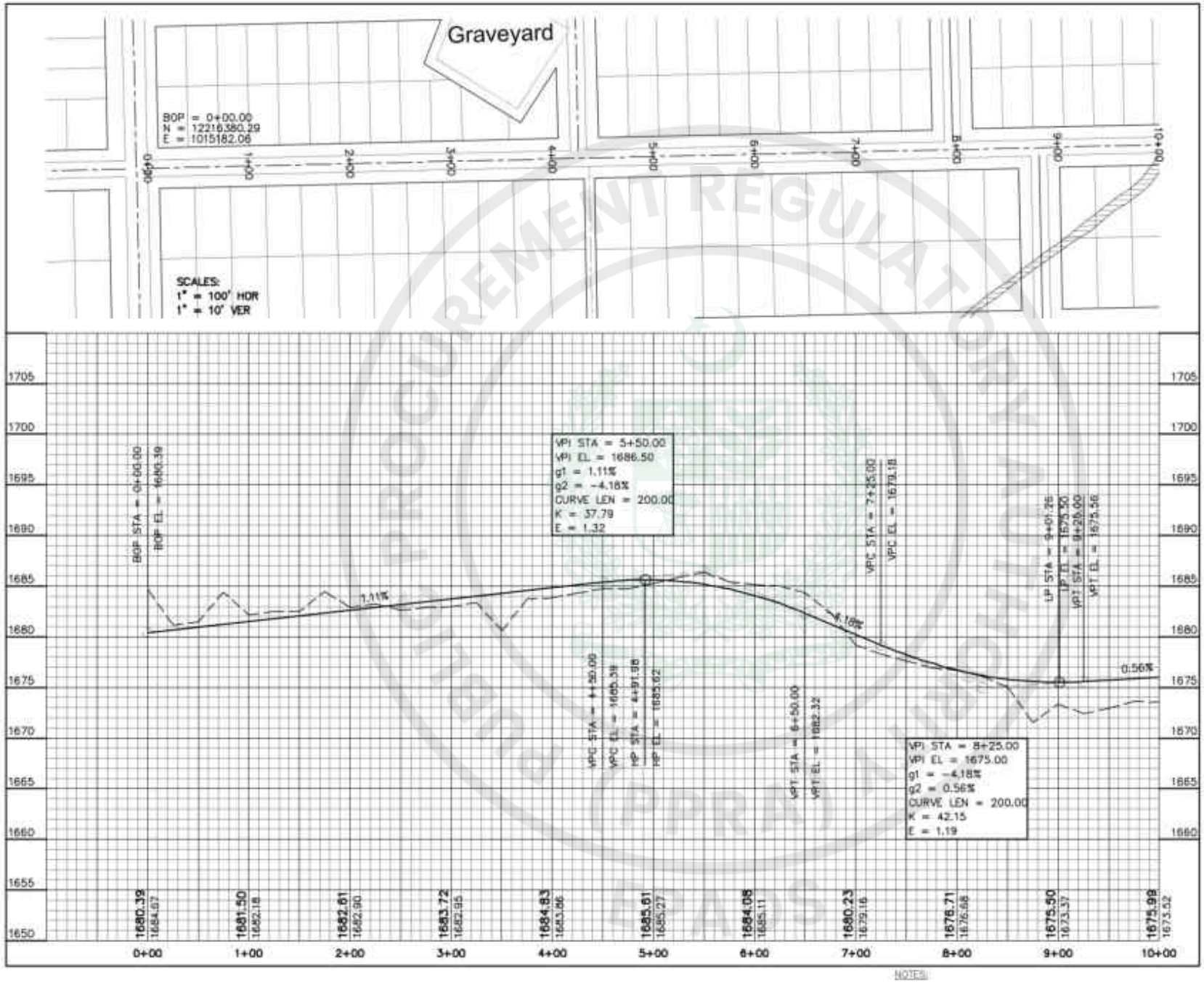

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 61 (40ft WIDE)
(SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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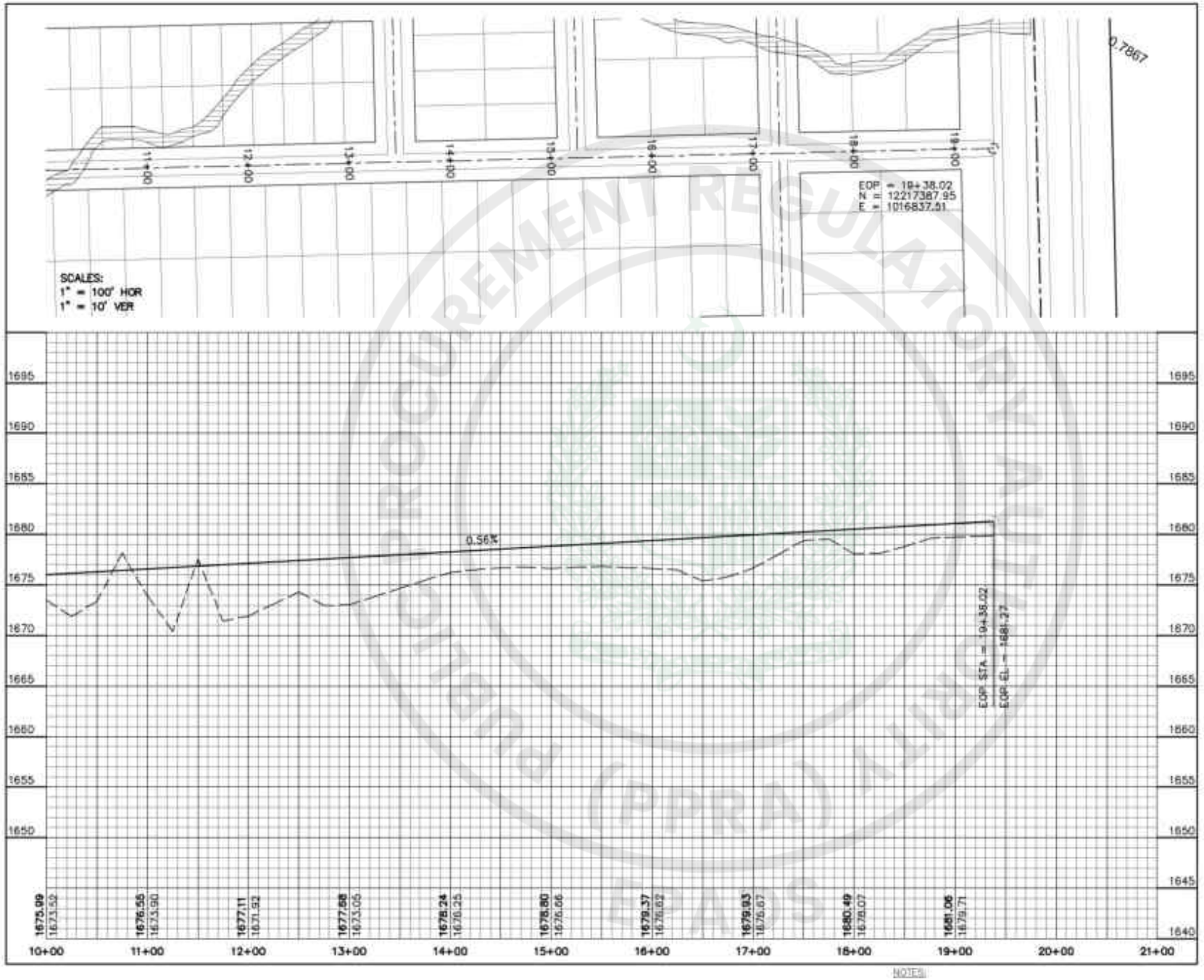

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 61 (40ft WIDE)
(SHEET 2 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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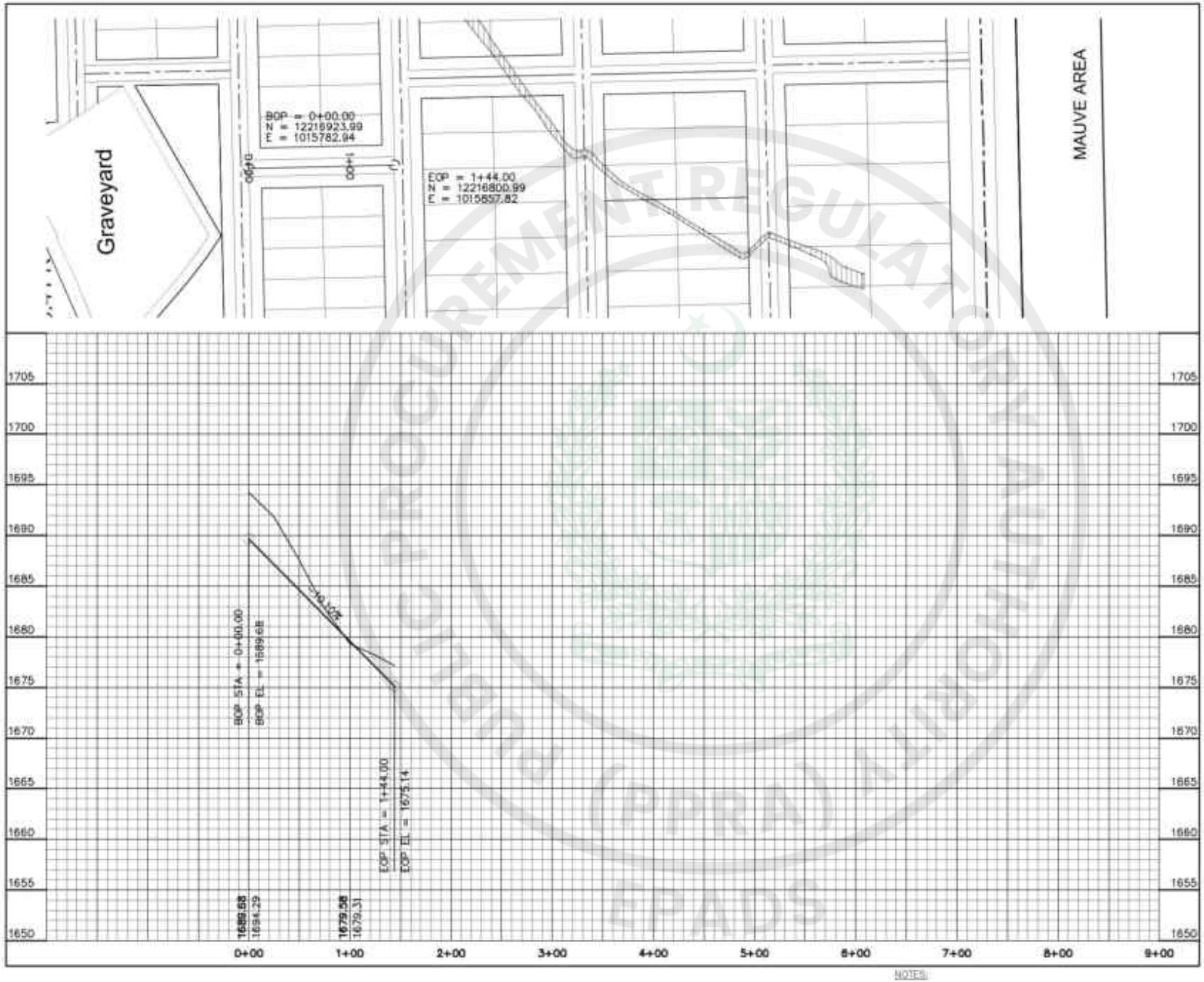

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 61A (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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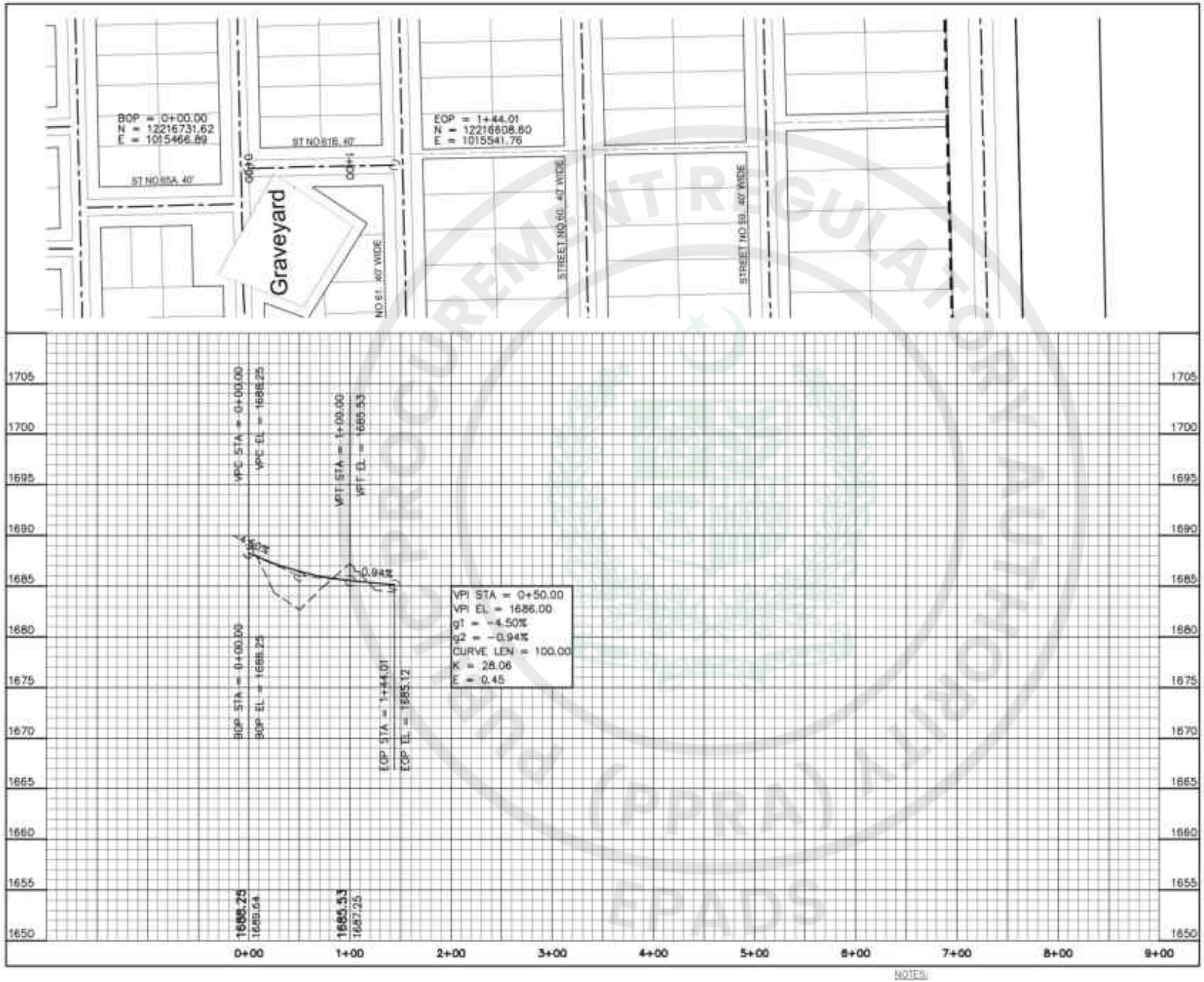

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 61B (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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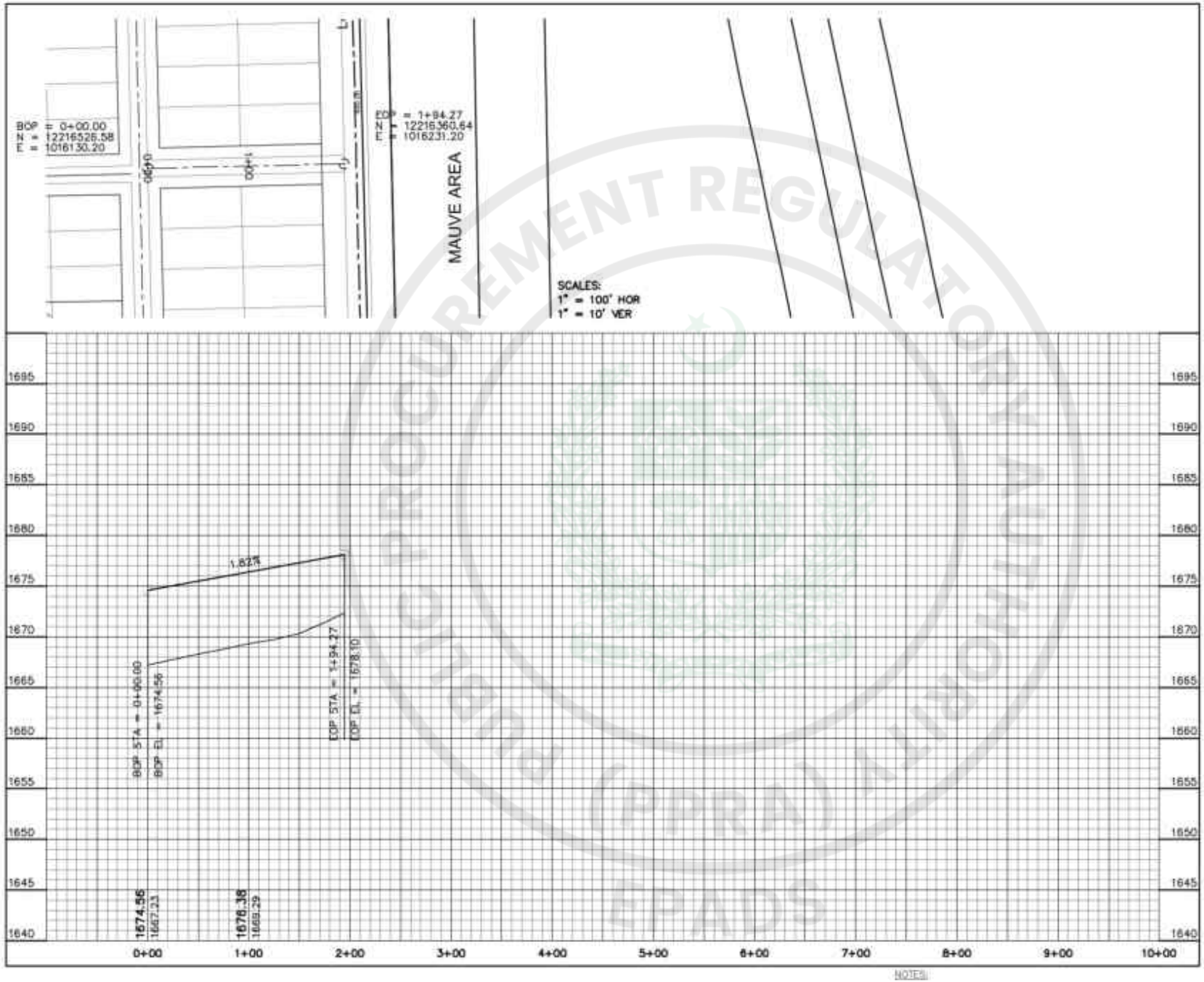

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 62 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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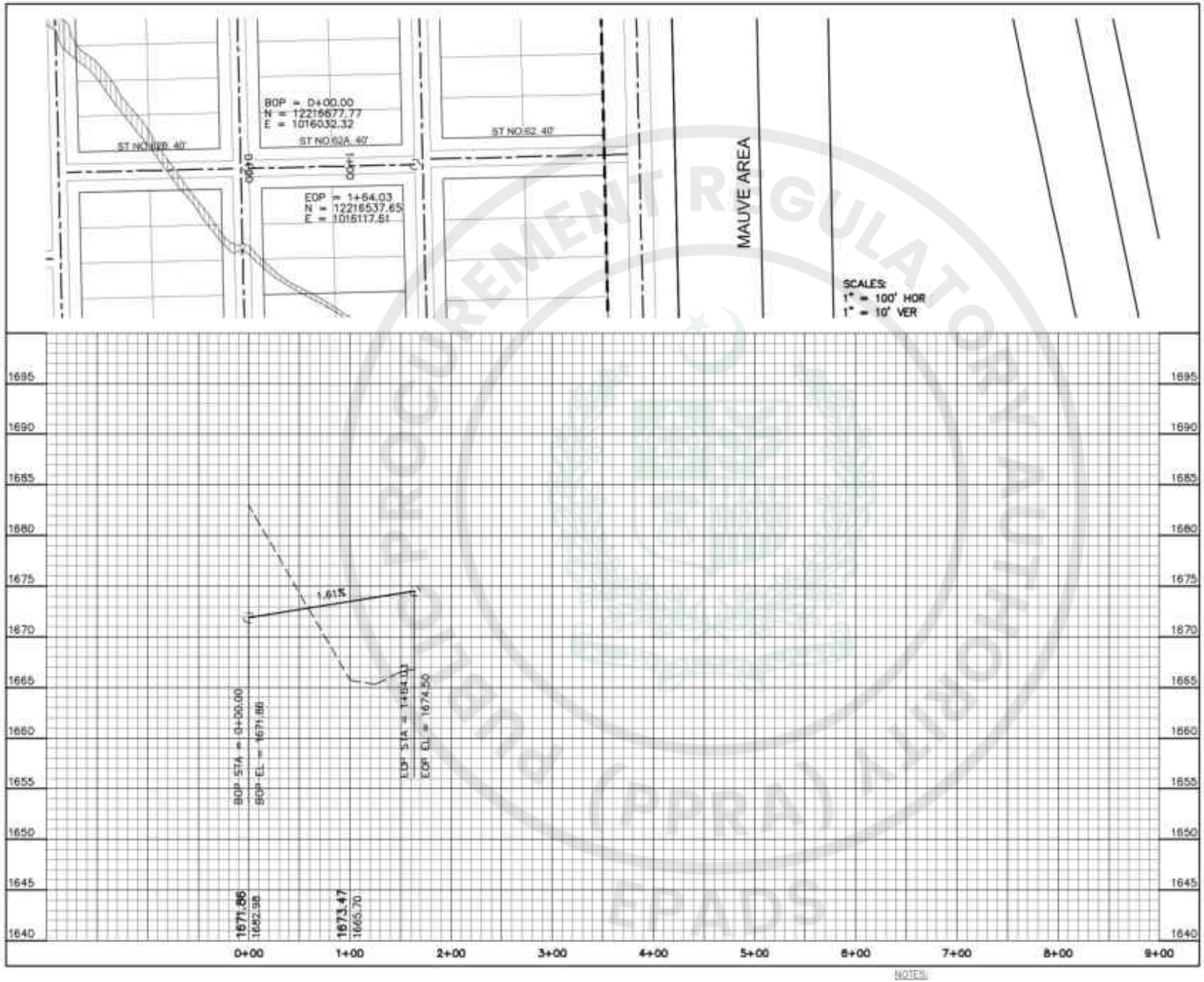

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 62A (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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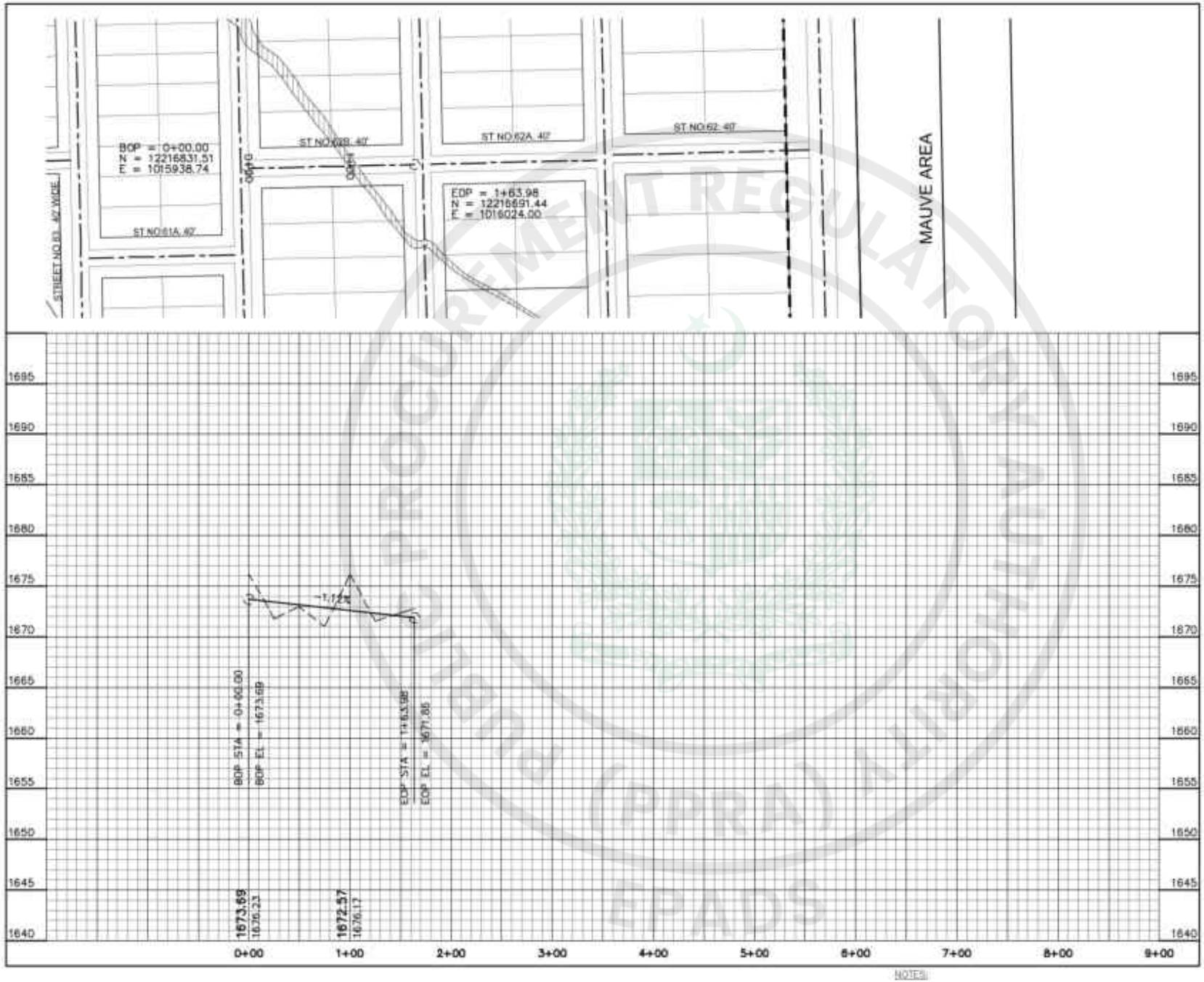

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 62B (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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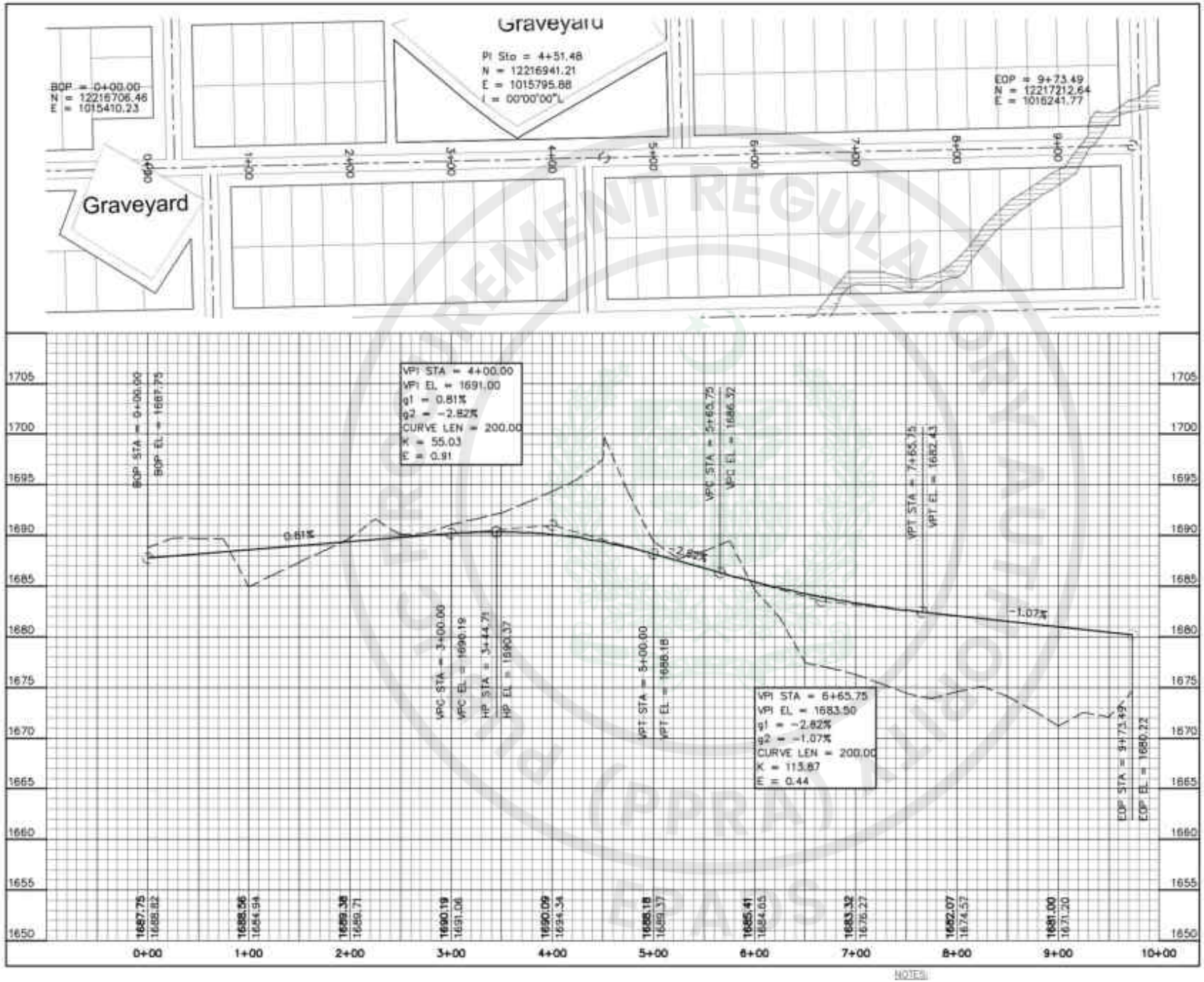

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 63 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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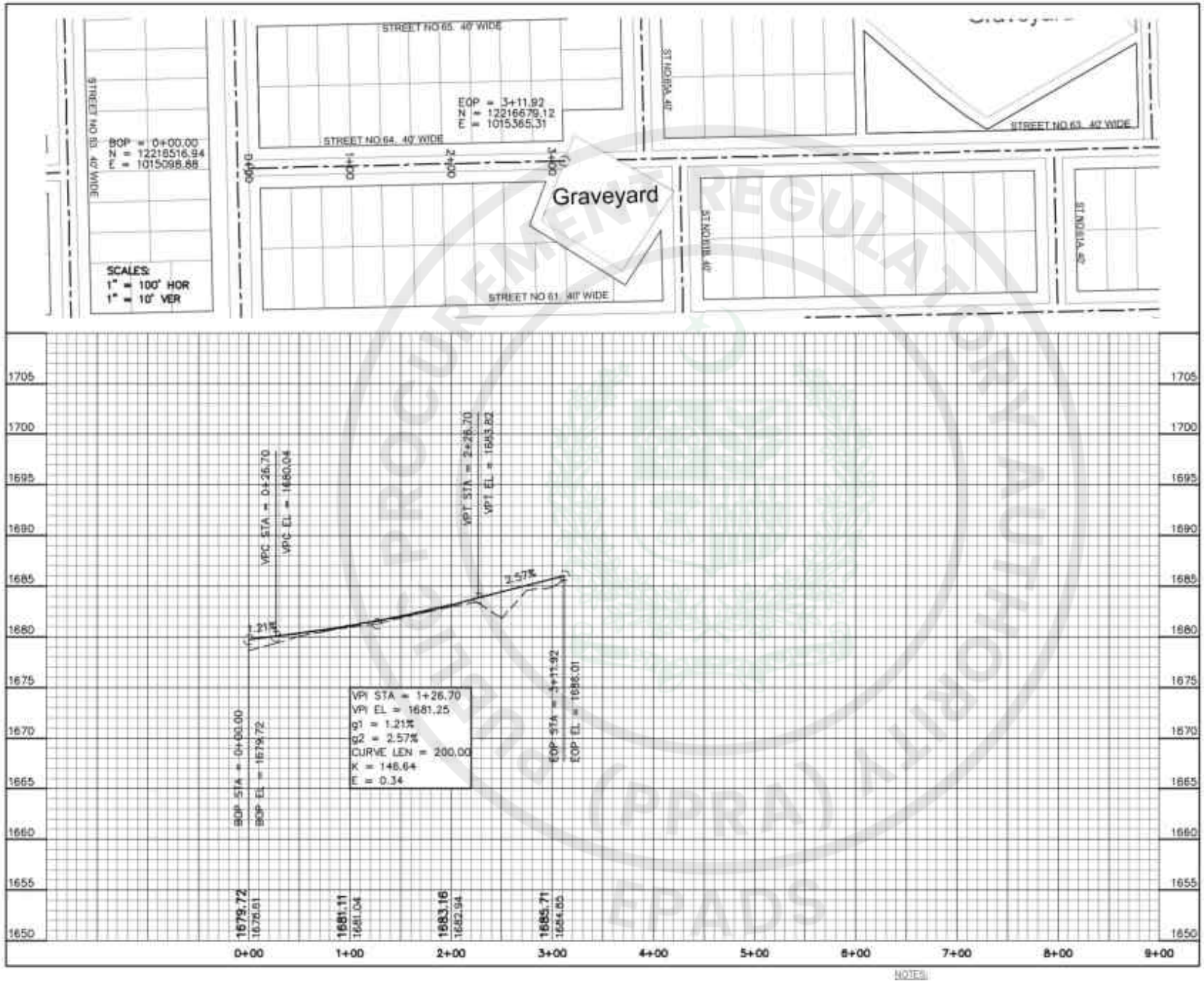

NOTES:

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 64 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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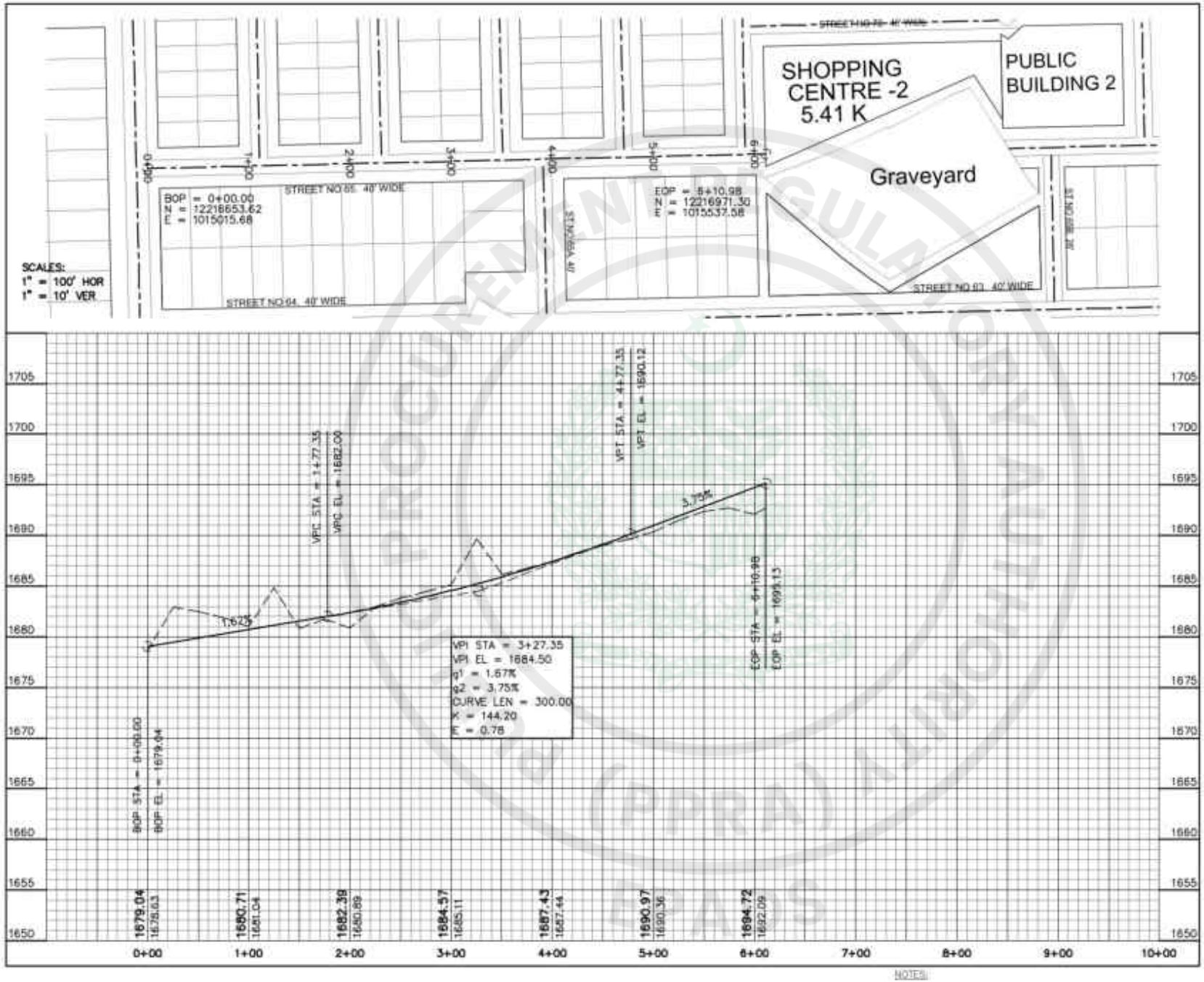

NOTES:

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 65 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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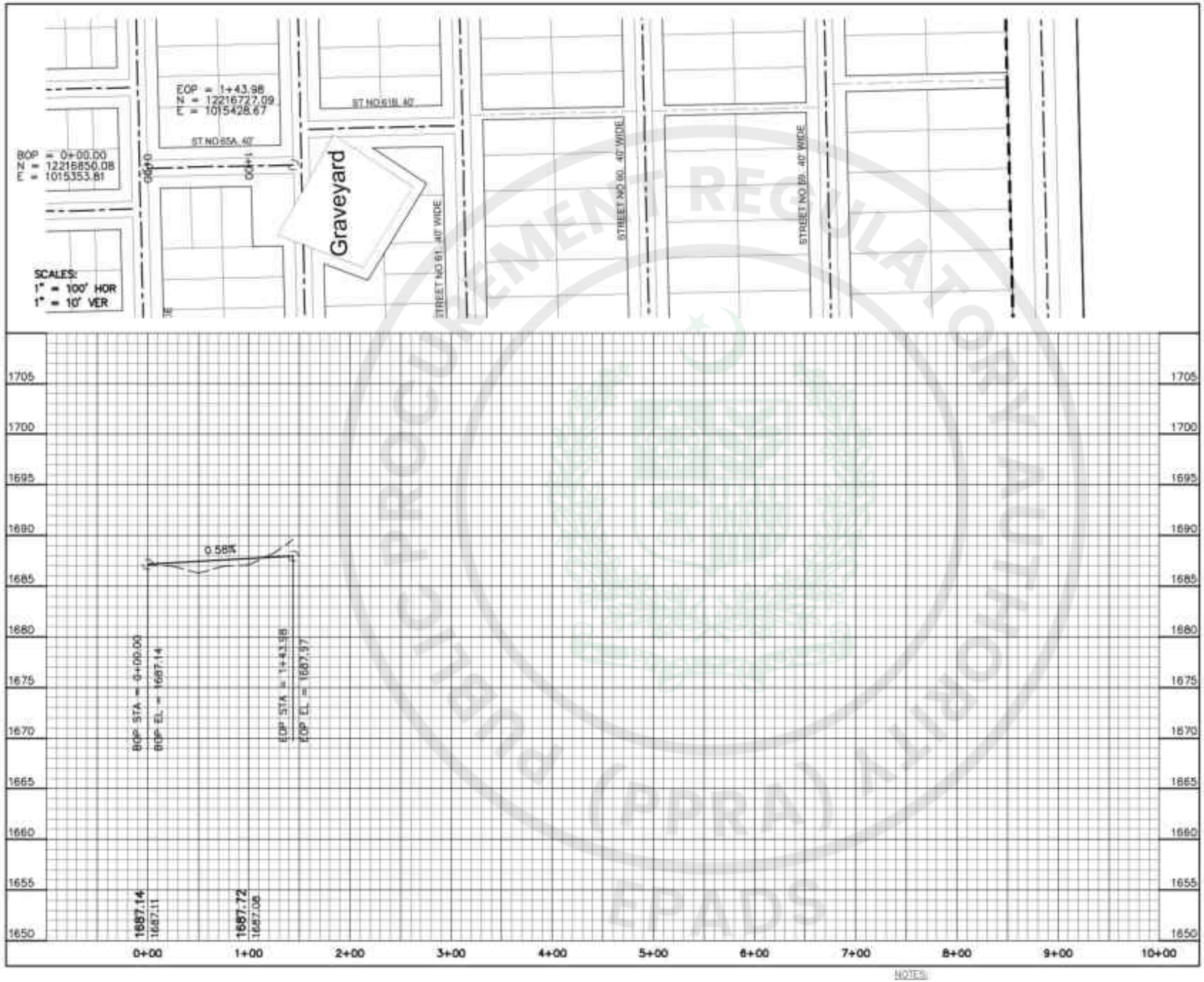

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 65A (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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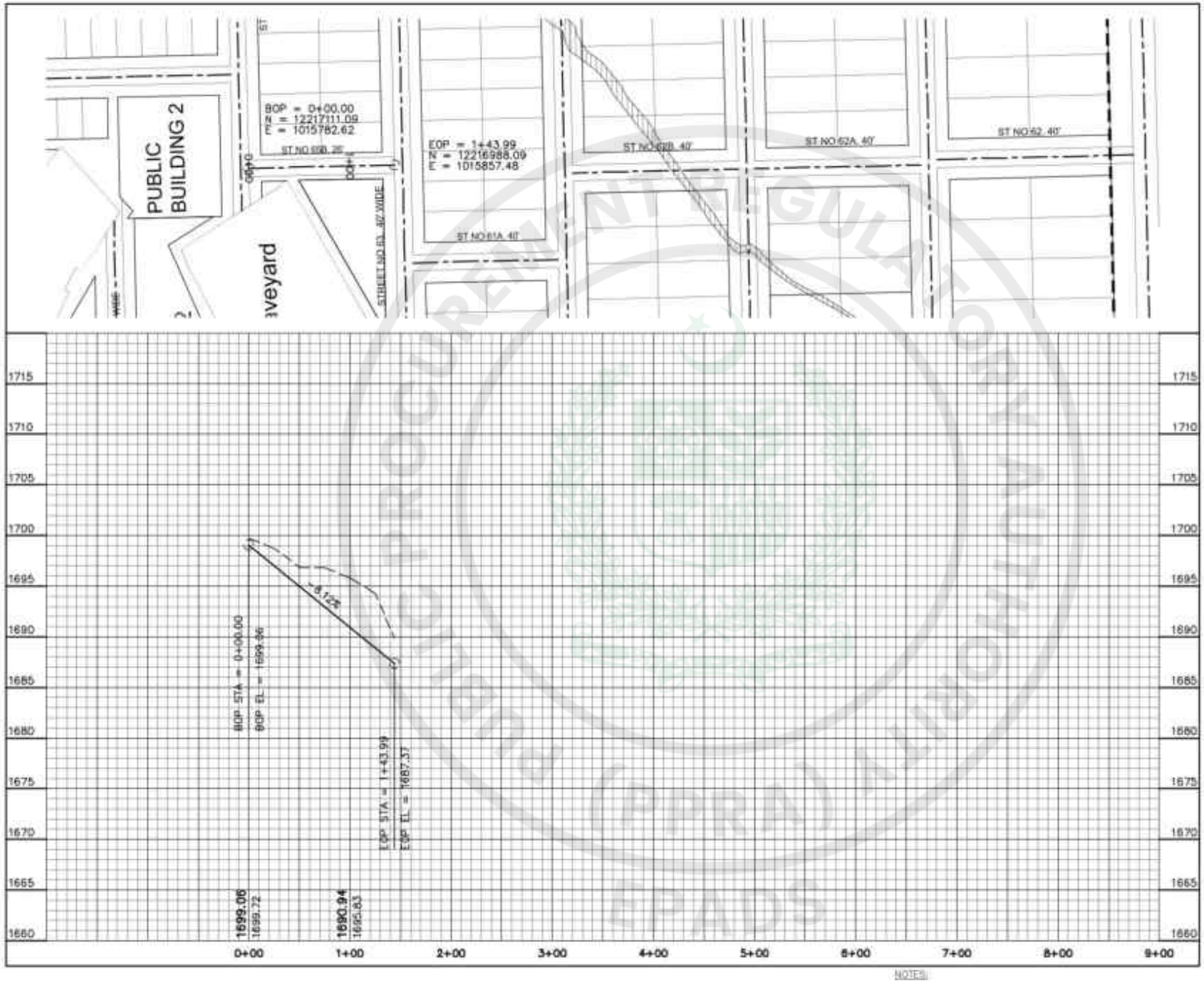

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 65B (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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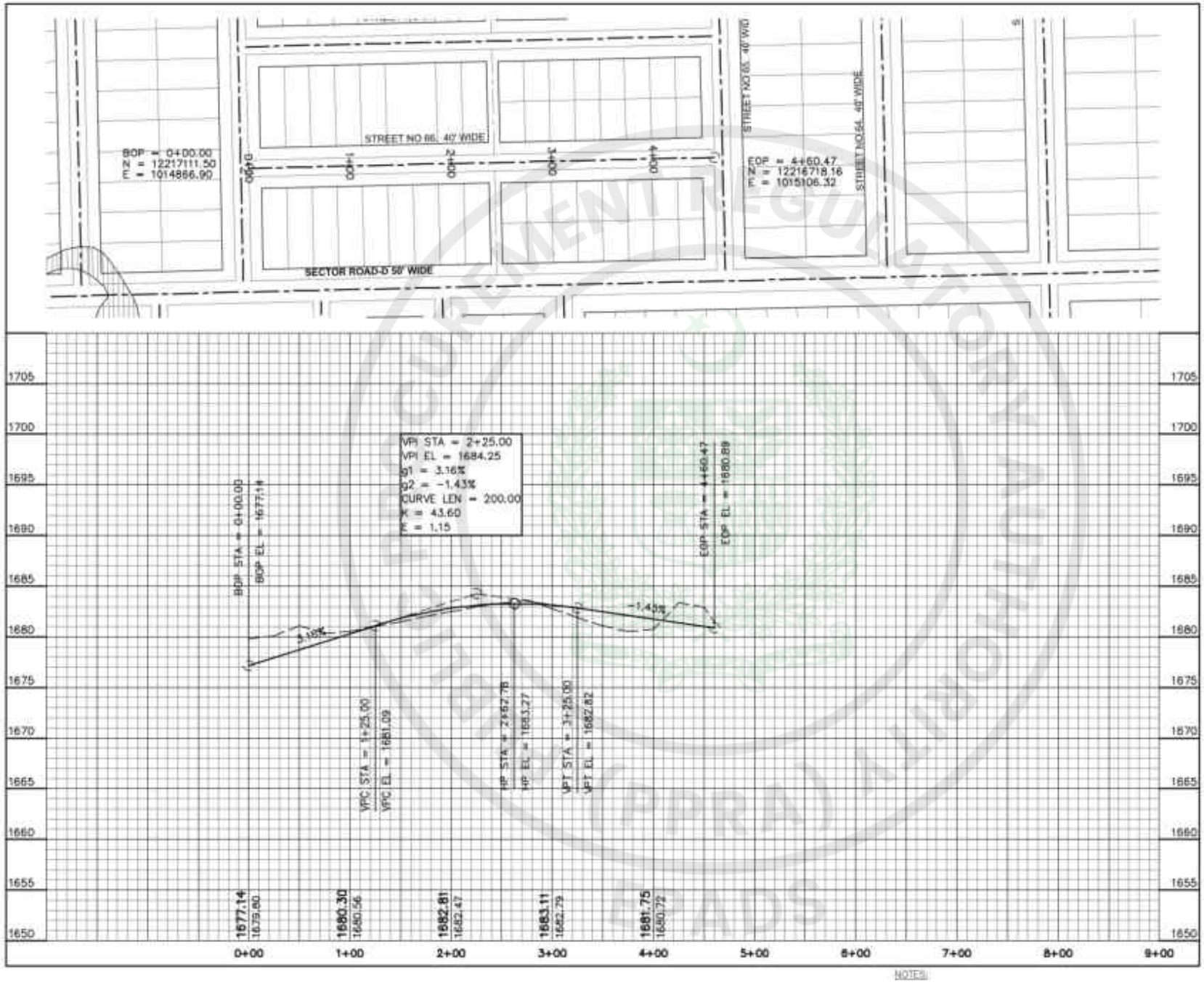

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 66 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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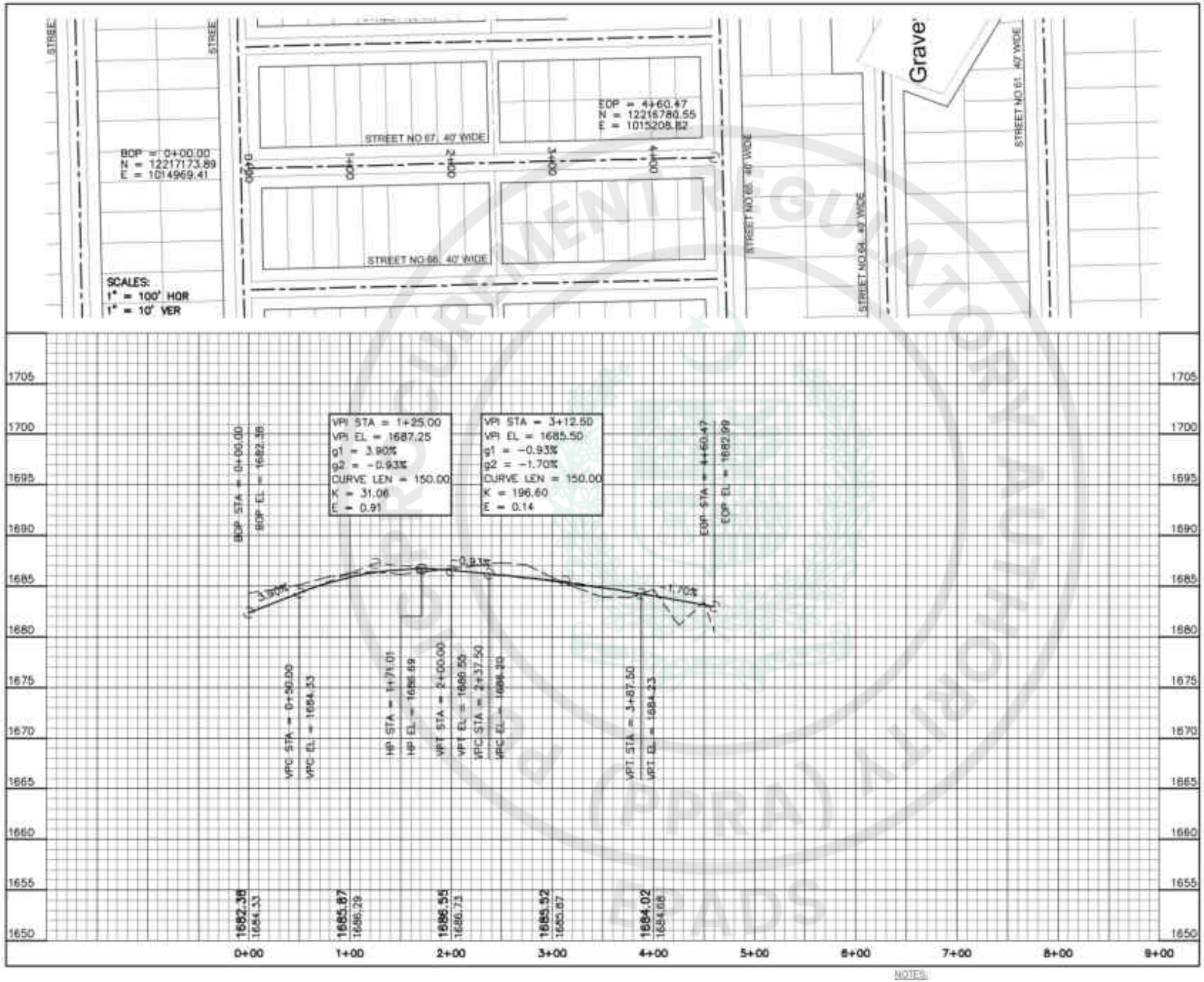

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 67 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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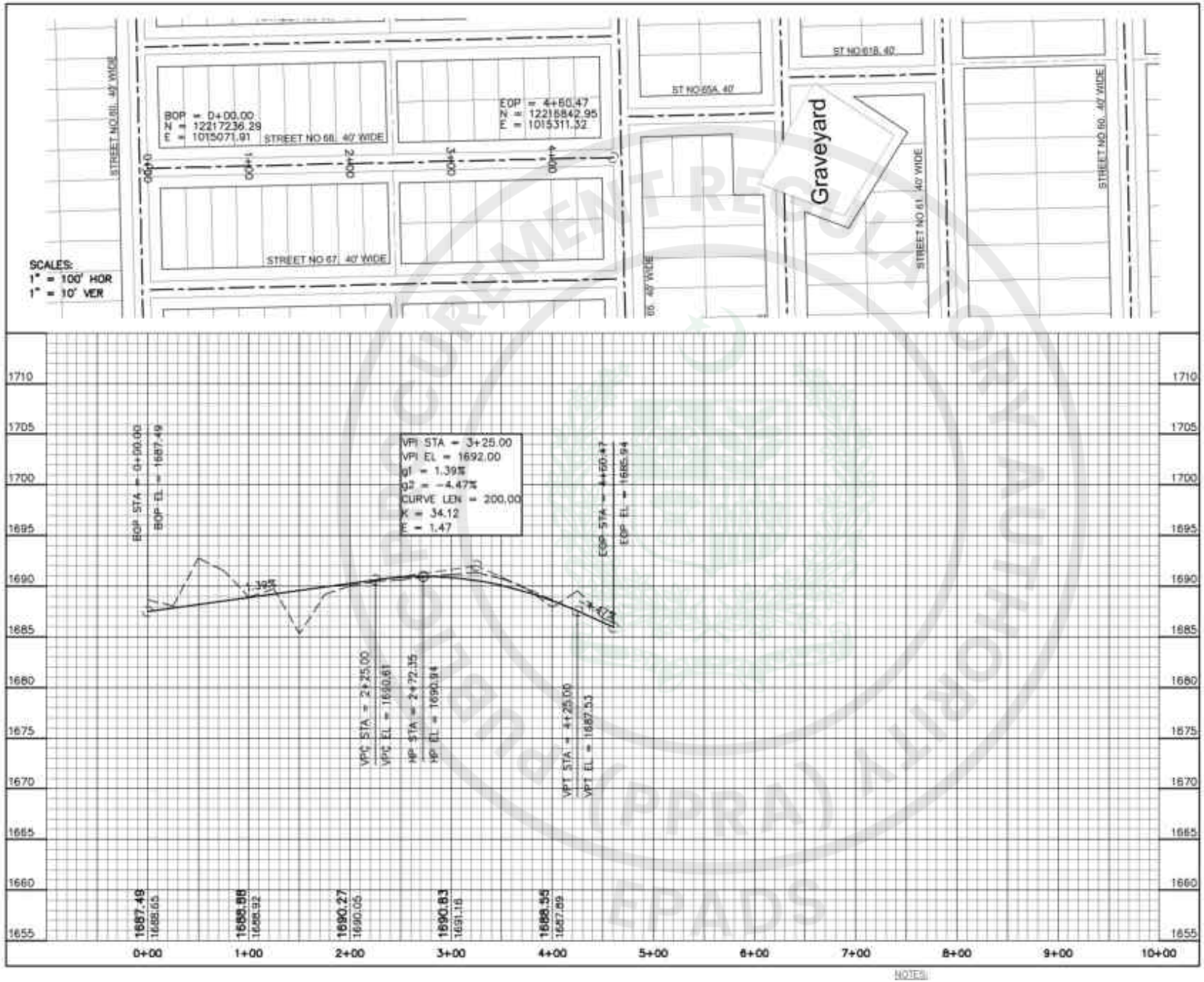

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 66 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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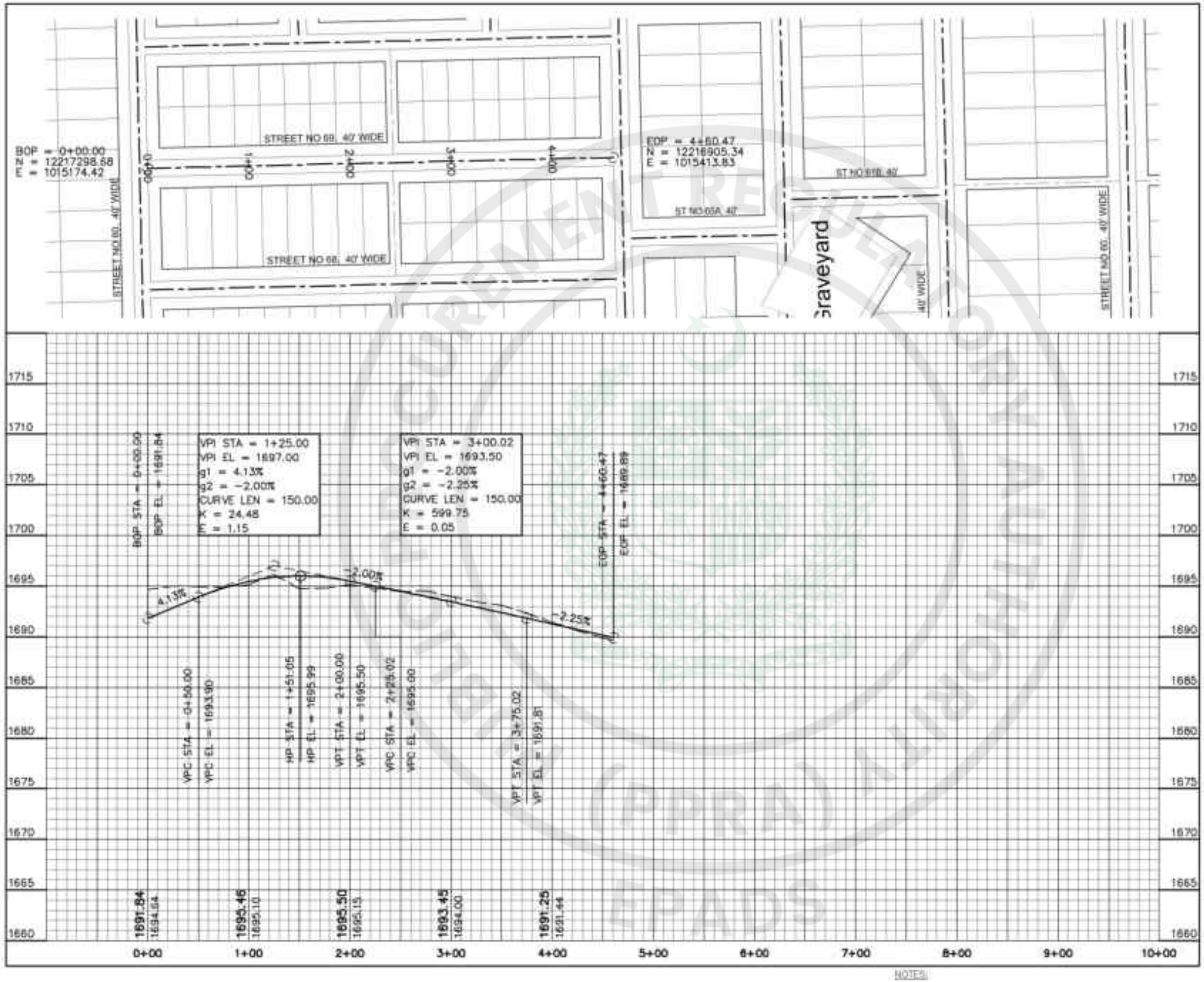

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 69 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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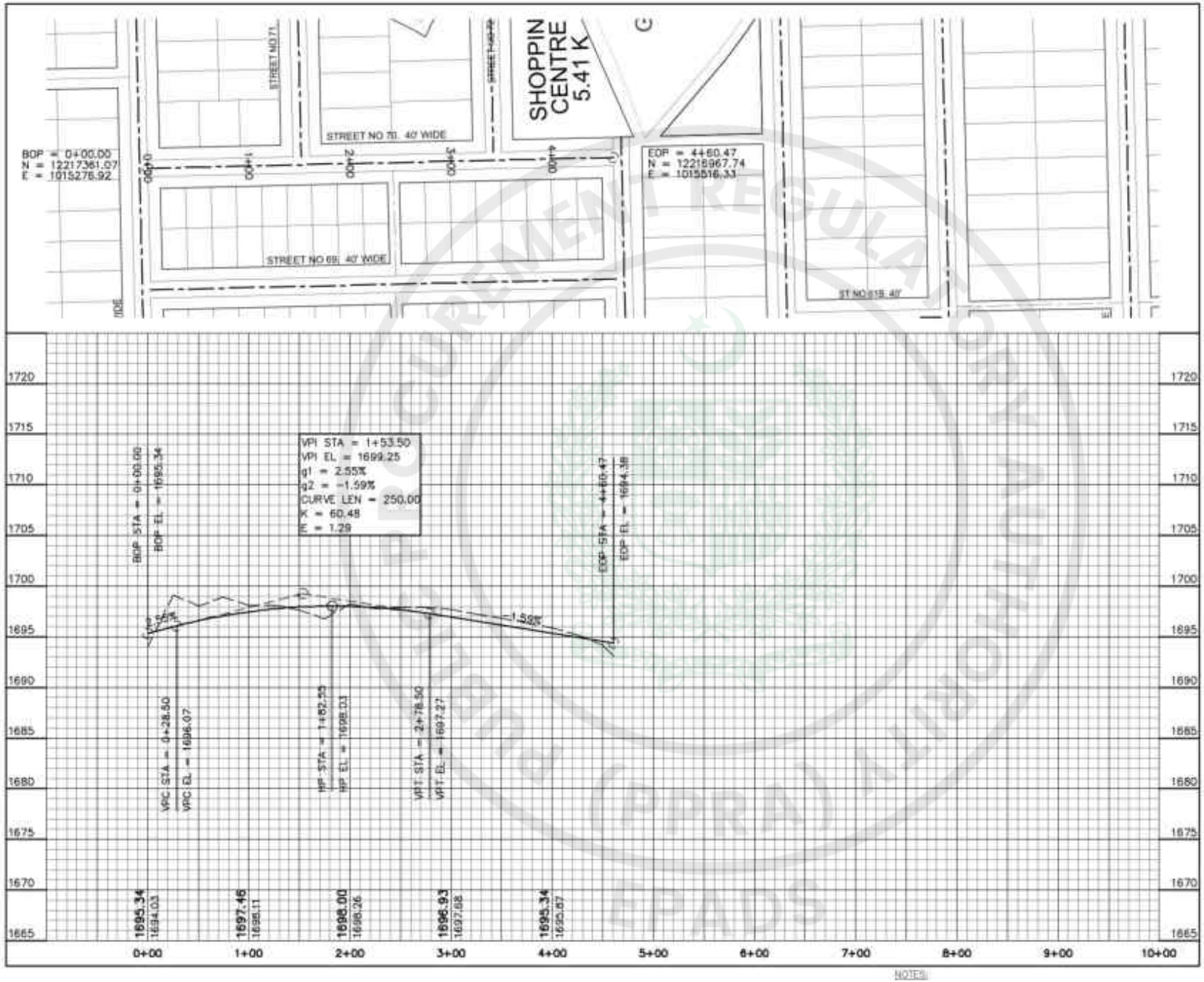

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 70 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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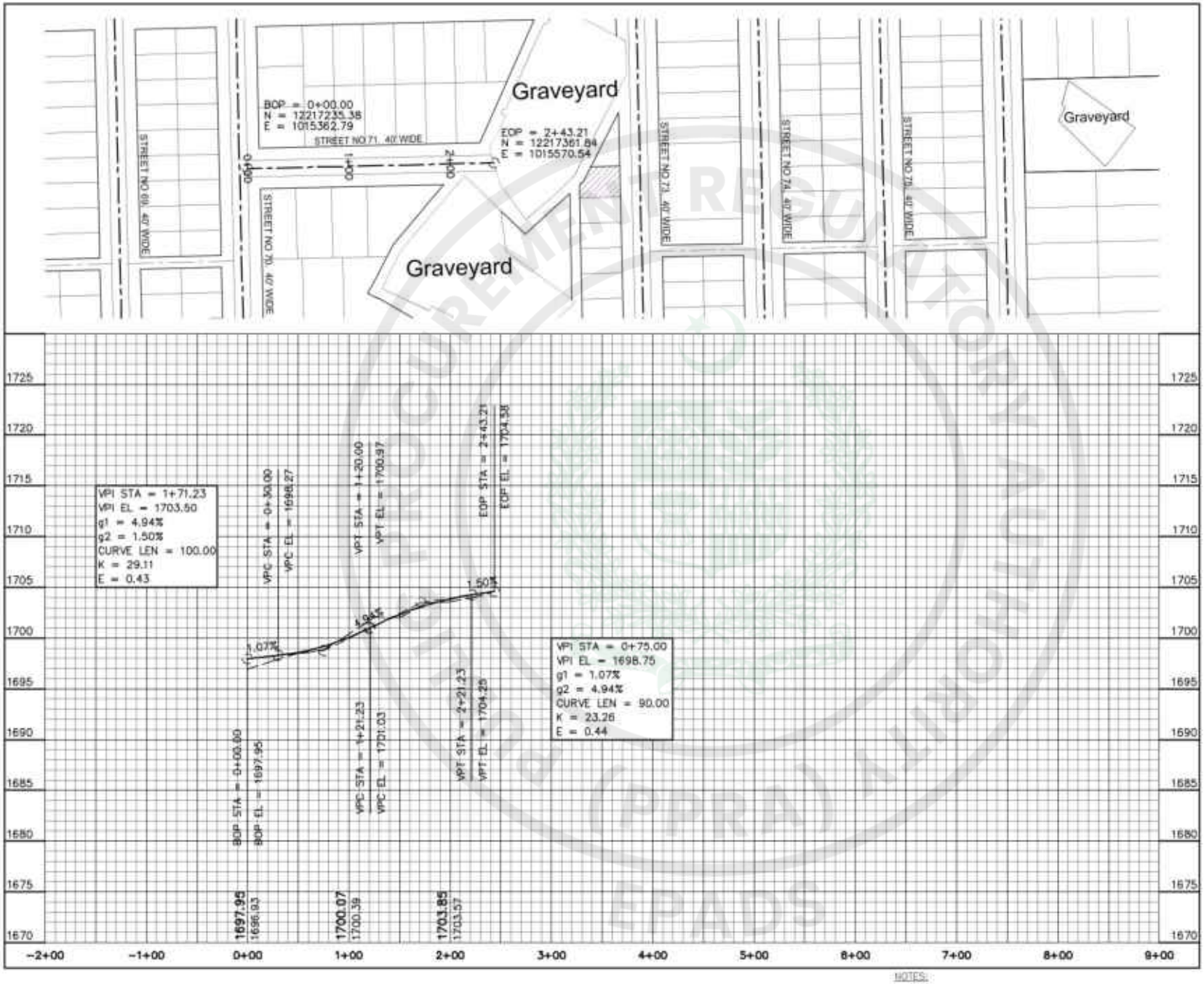

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 71 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES
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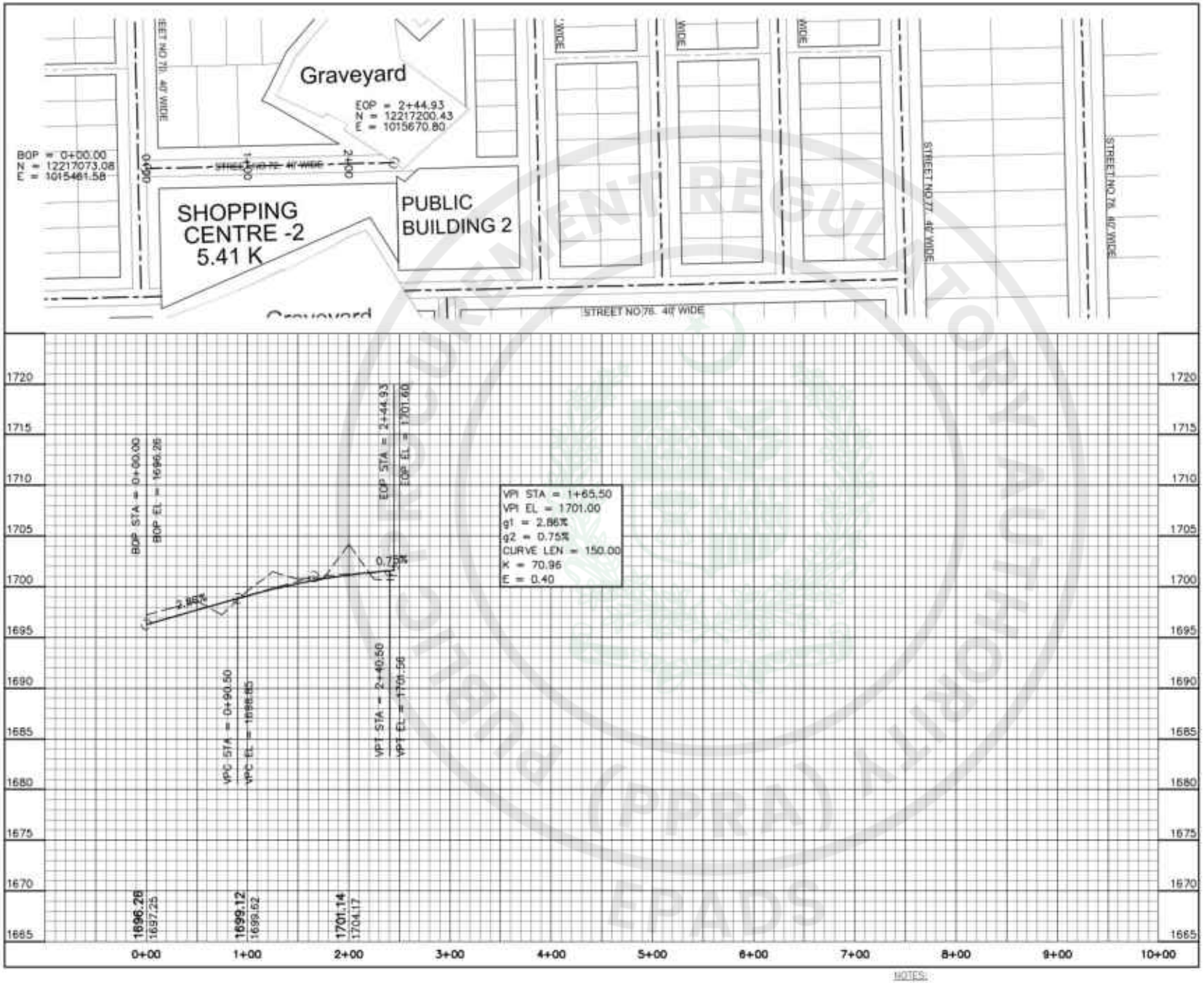

SCALES:
1" = 100' HOR
1" = 10' VER

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 72 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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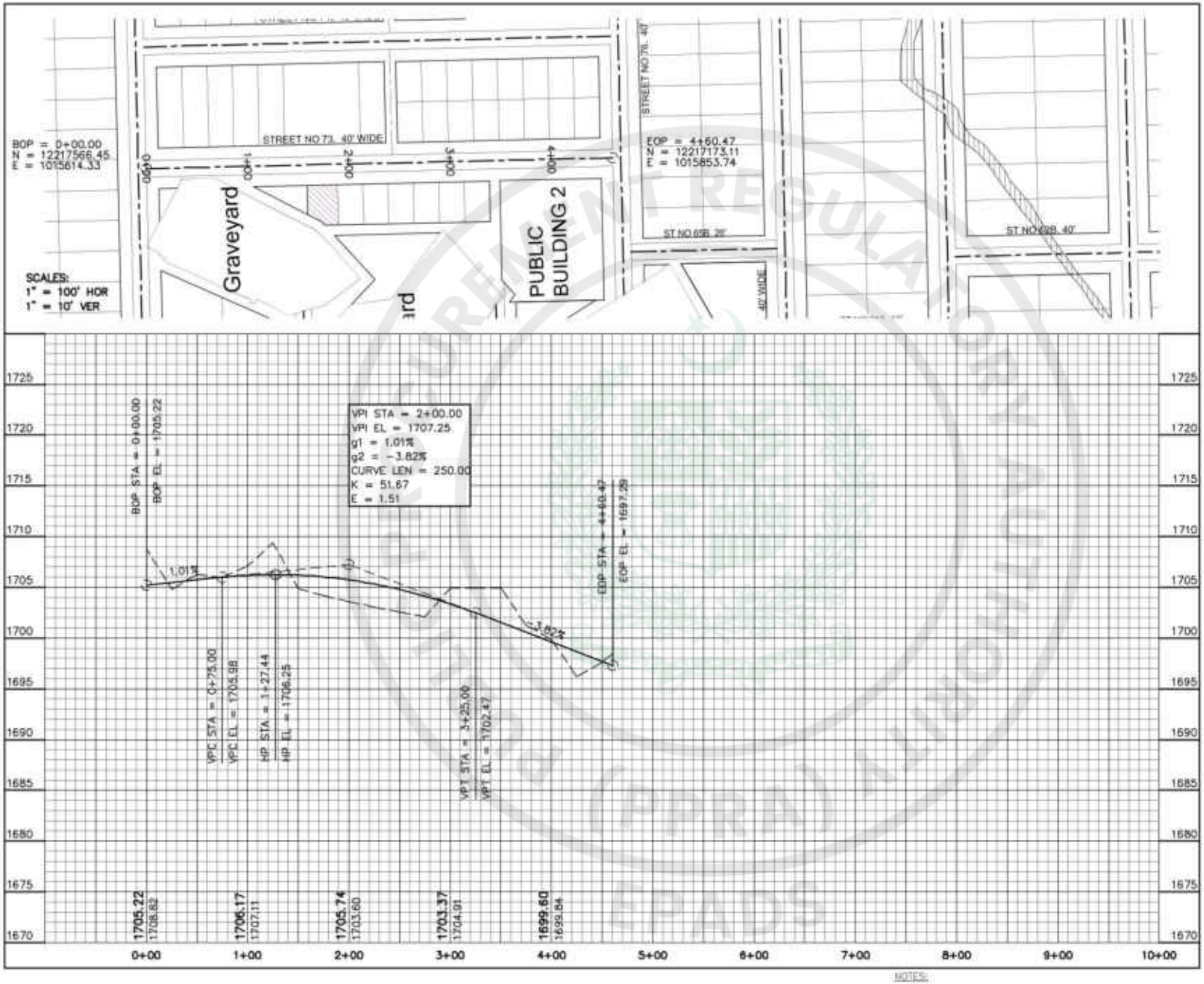

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 73 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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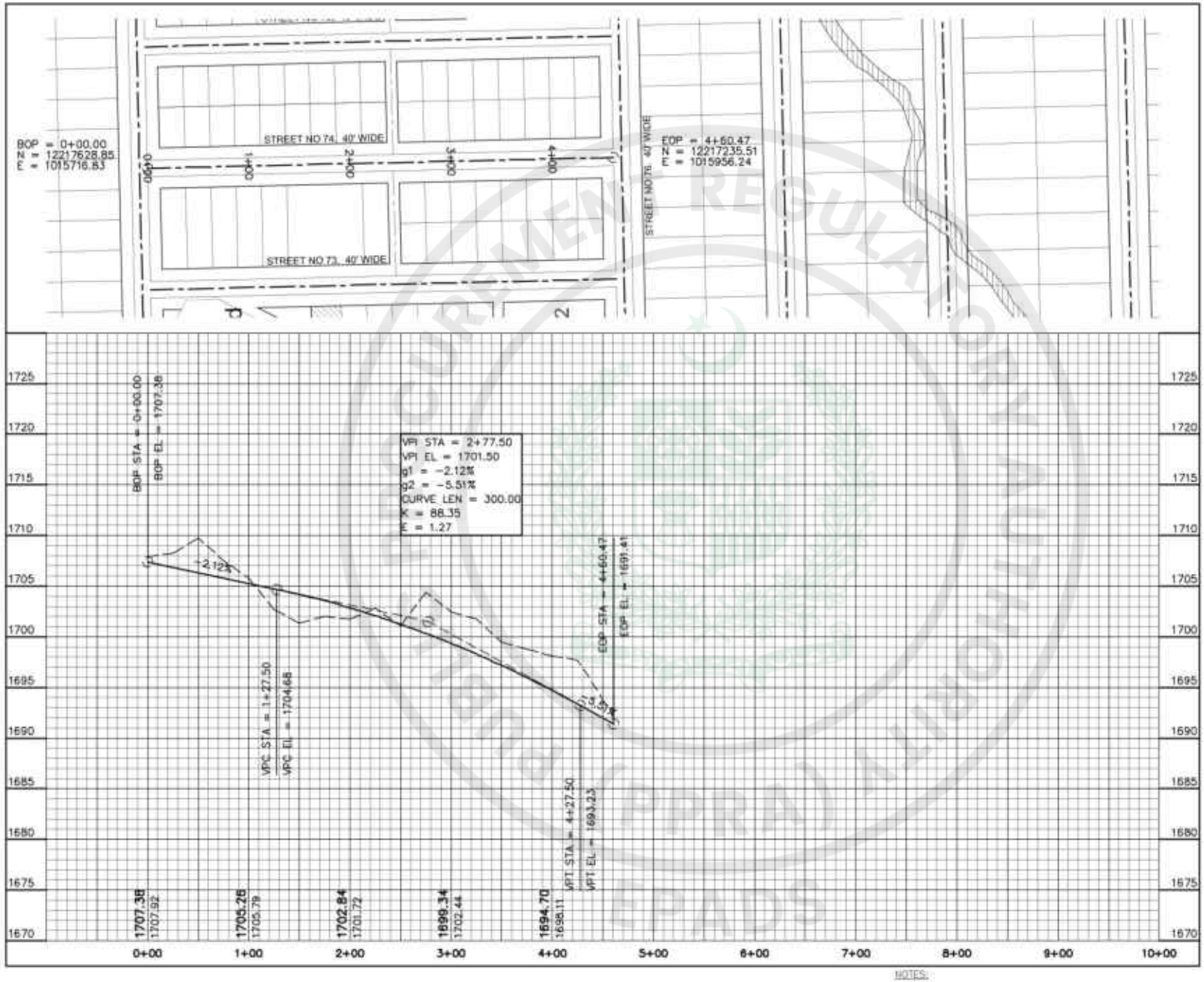

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 74 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

DESIGN	RECOMMENDED	VERIFIED	APPROVED
DRAWN			
TRACED			
CHECKED	DATE	DRAWING NO.	REV.
SCALE	AUG. 2020	4156/324/BD/03C97	0

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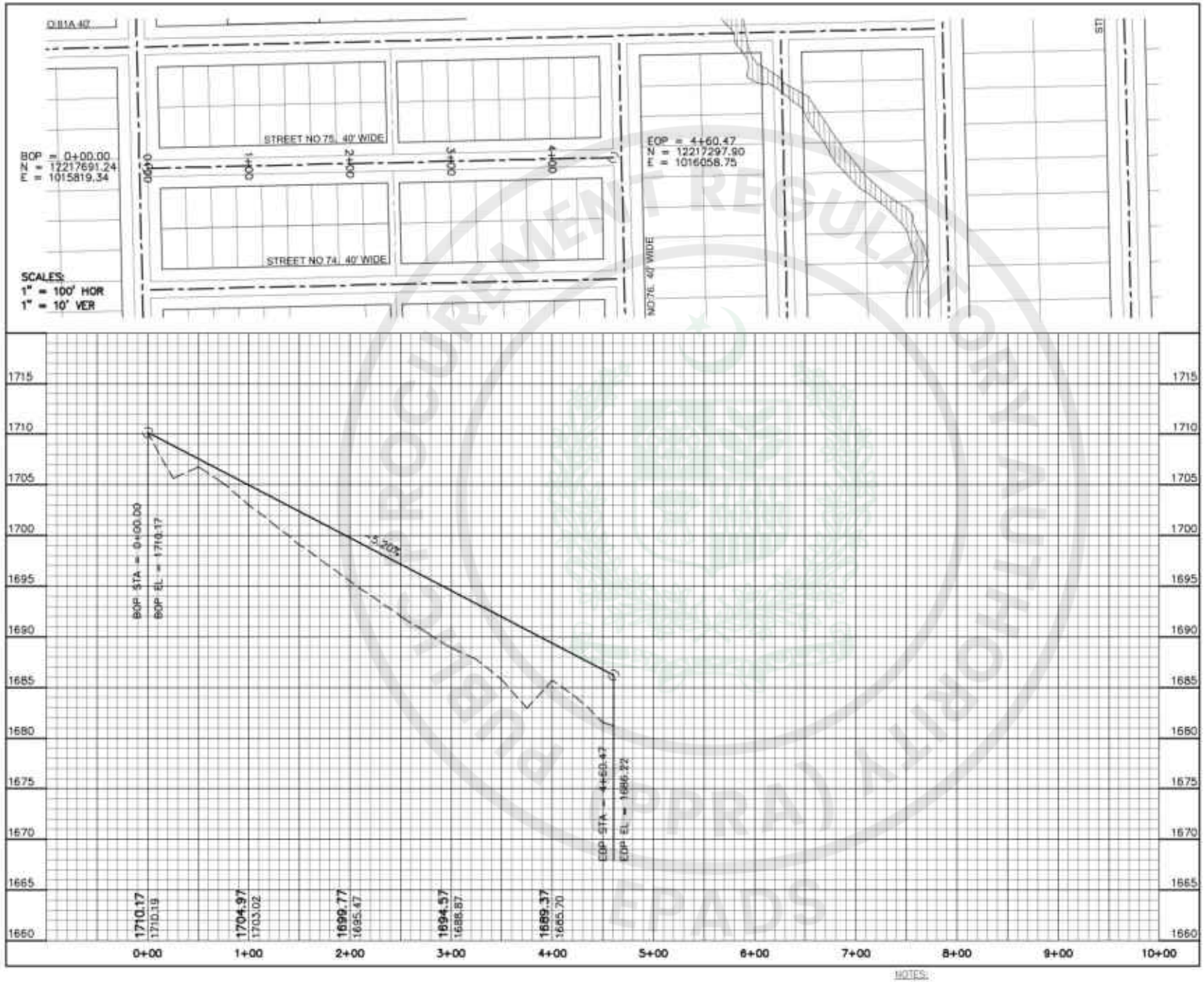

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 75 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

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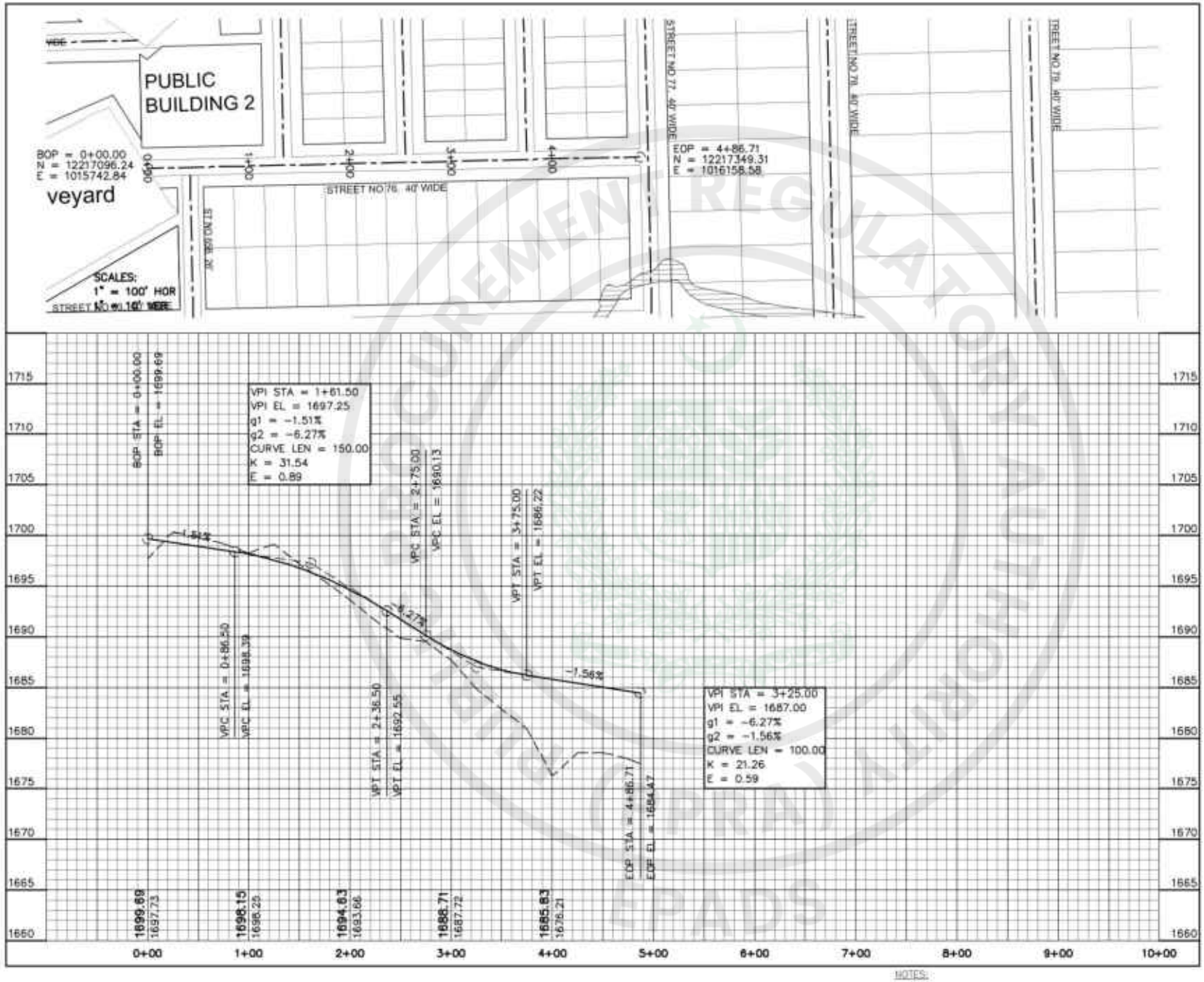

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 76 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES
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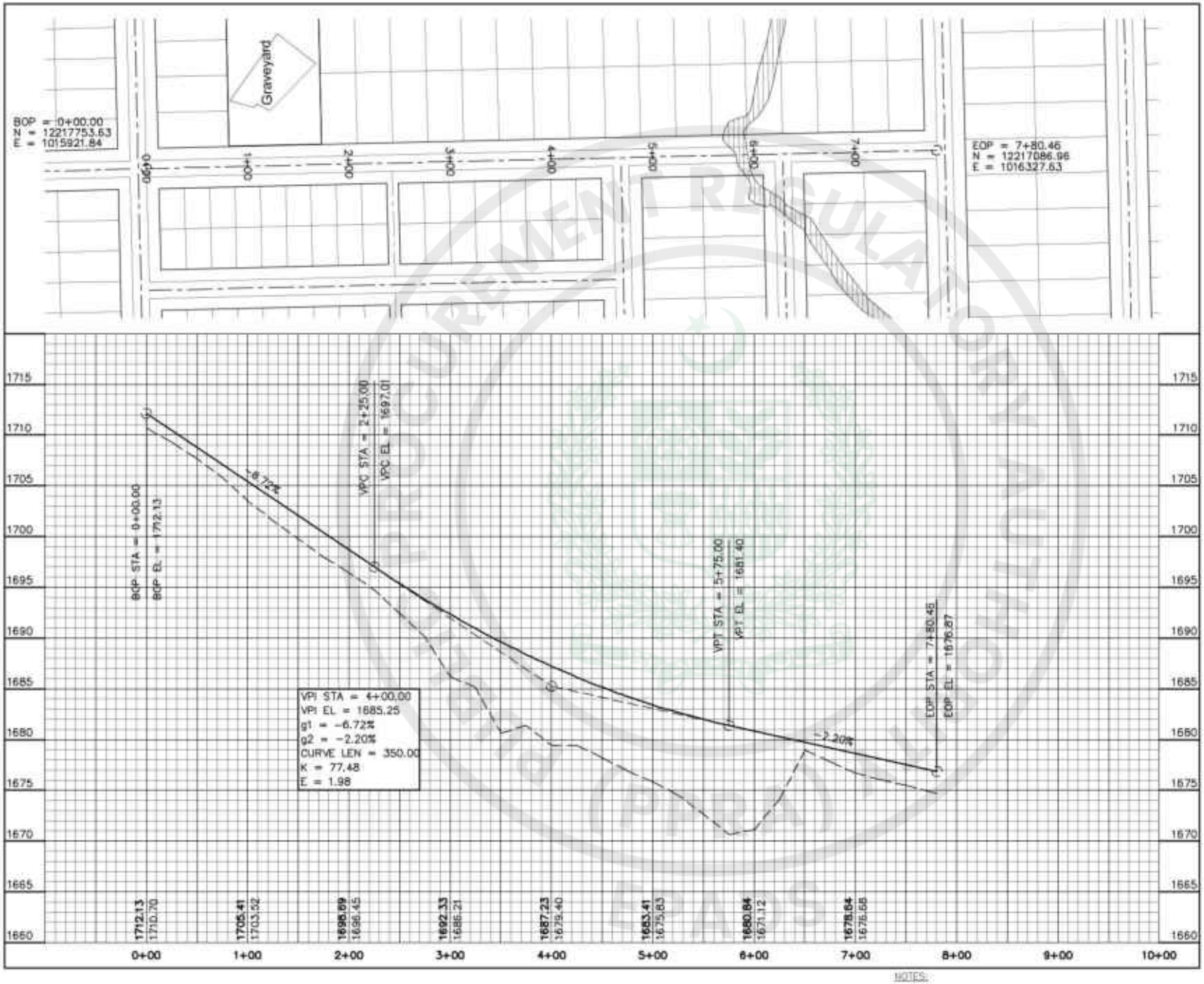

SCALES:
1" = 100' HOR
1" = 10' VER

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FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 77 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

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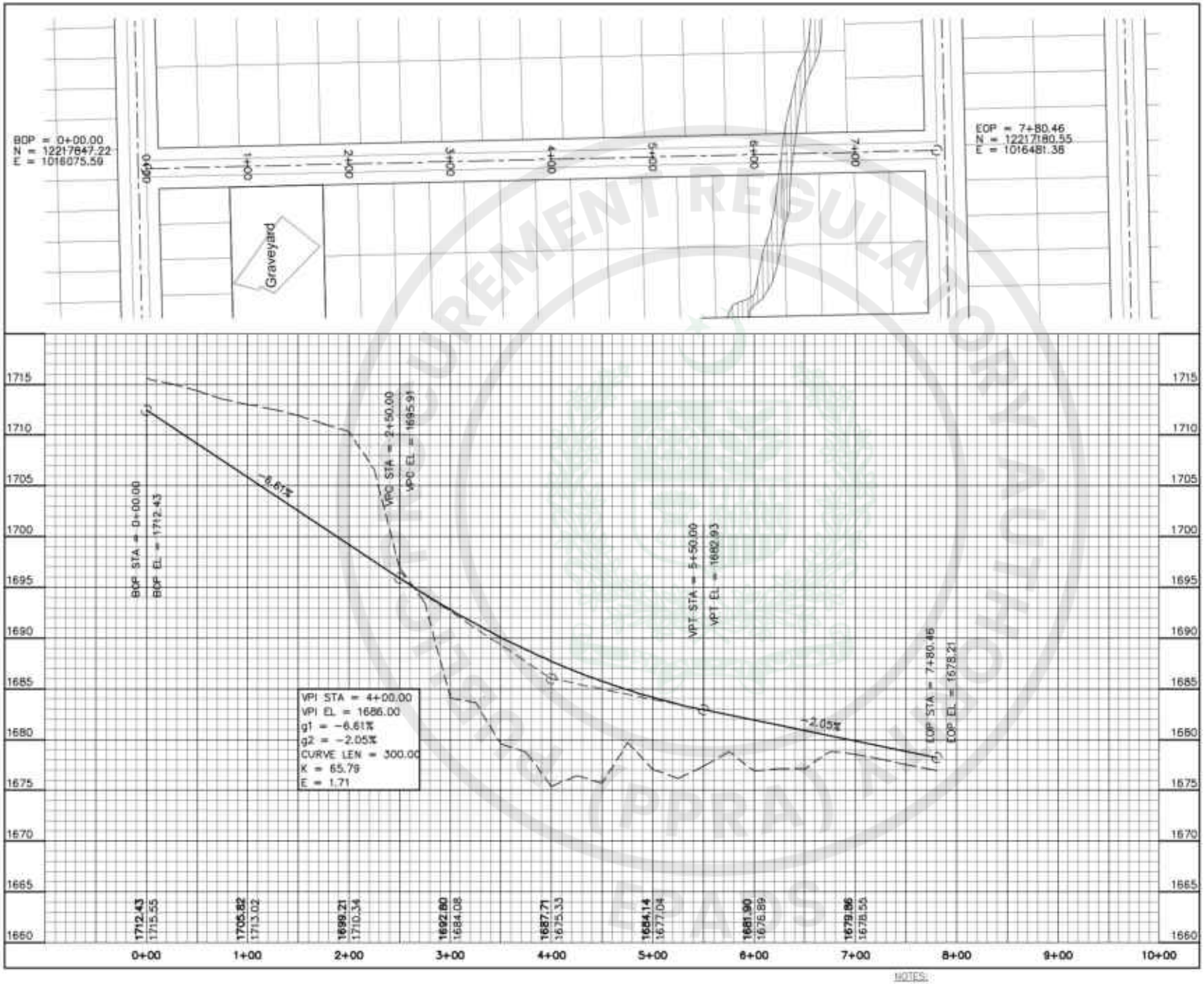

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 78 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES
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4156/324/BD/03C101 | 0

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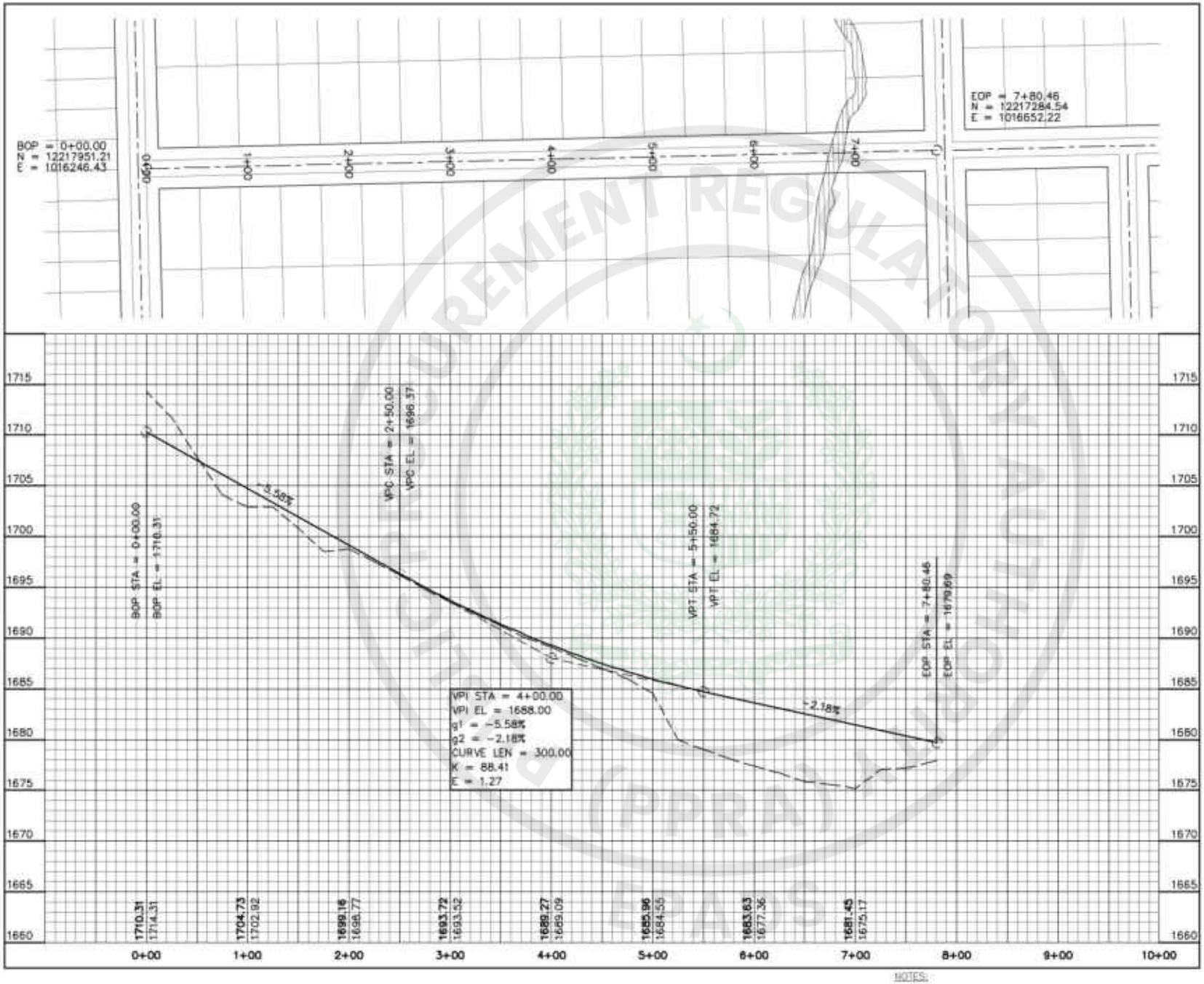

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 79 (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES
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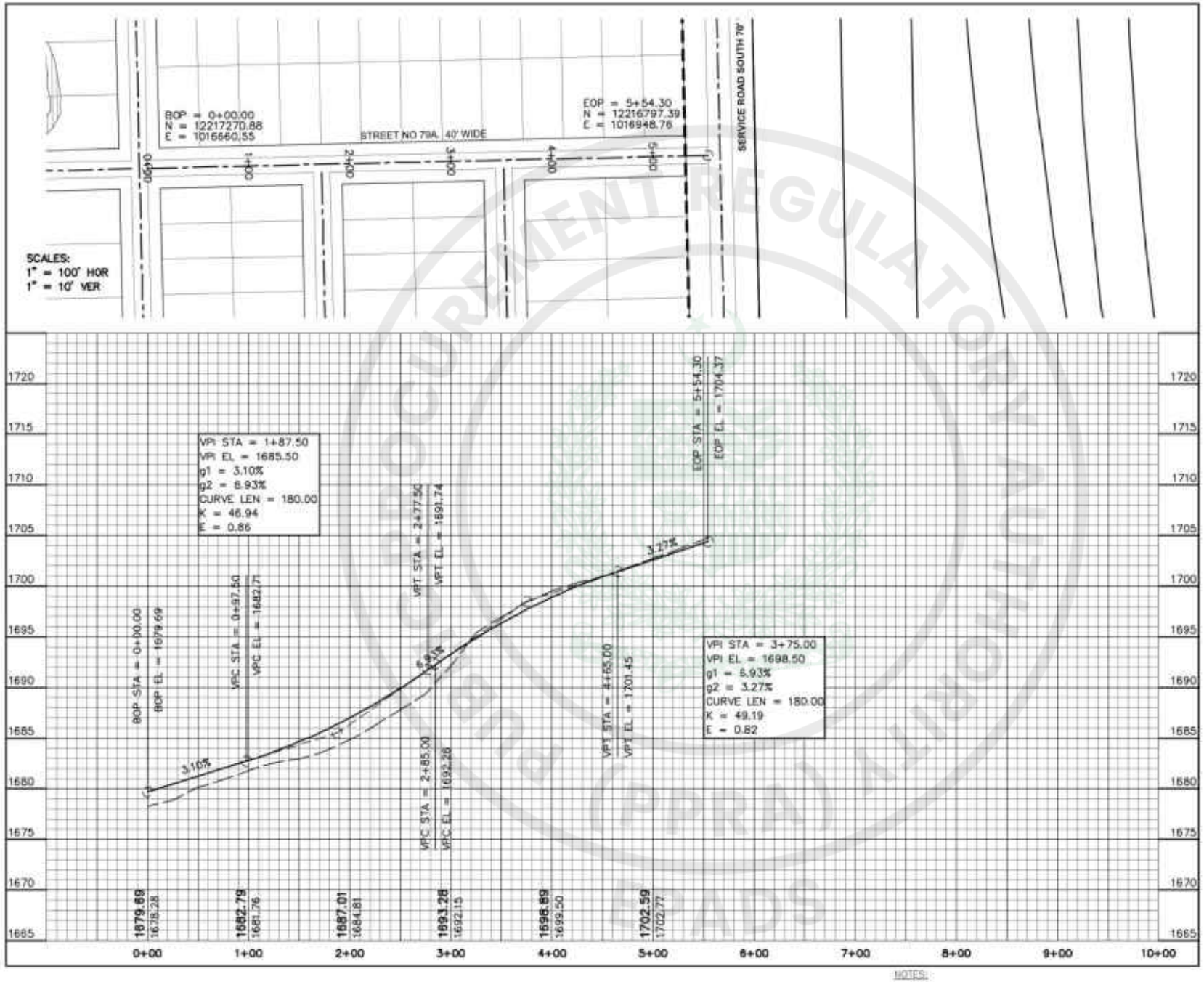

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 79A (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES
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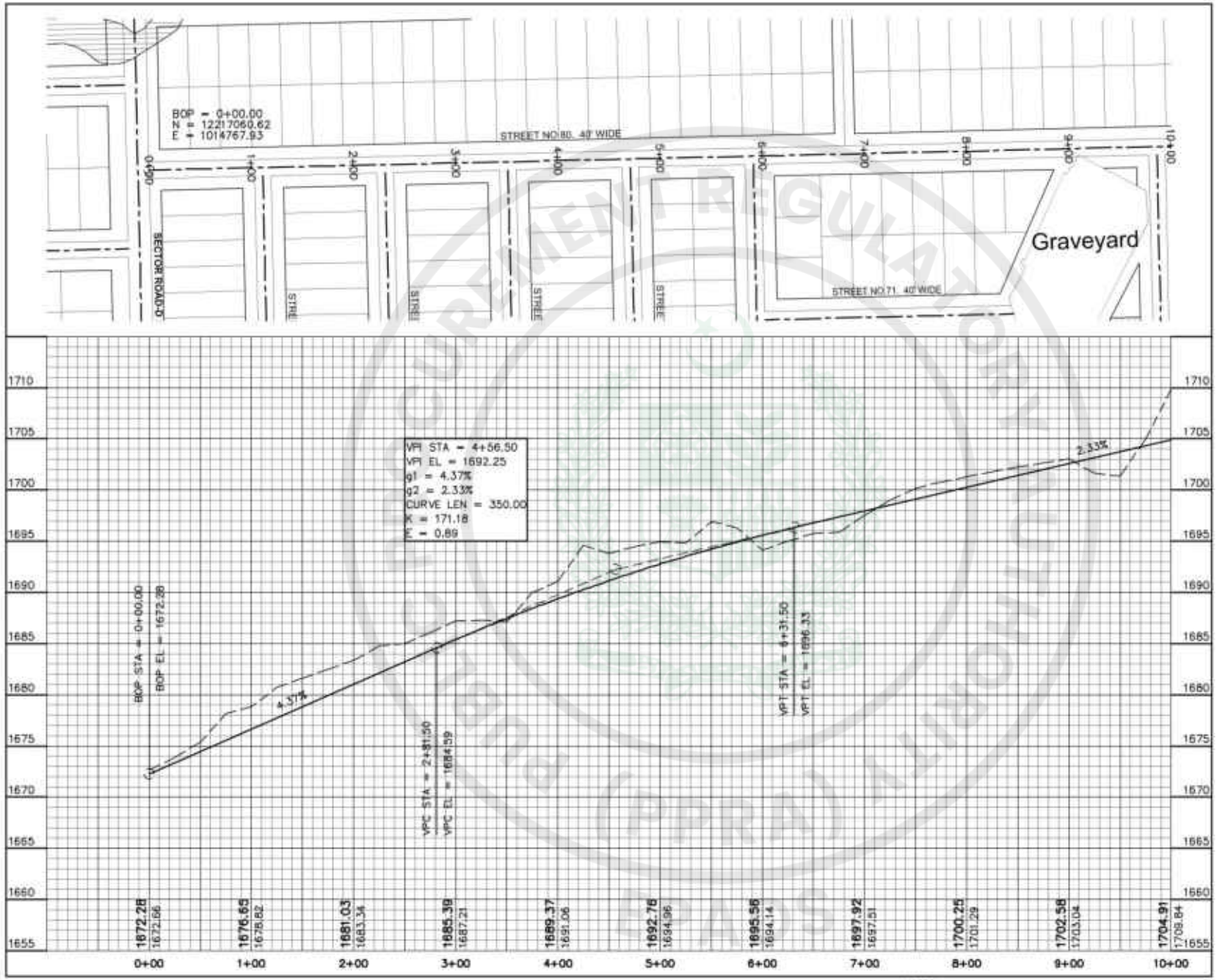

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 80 (40ft WIDE)
(SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

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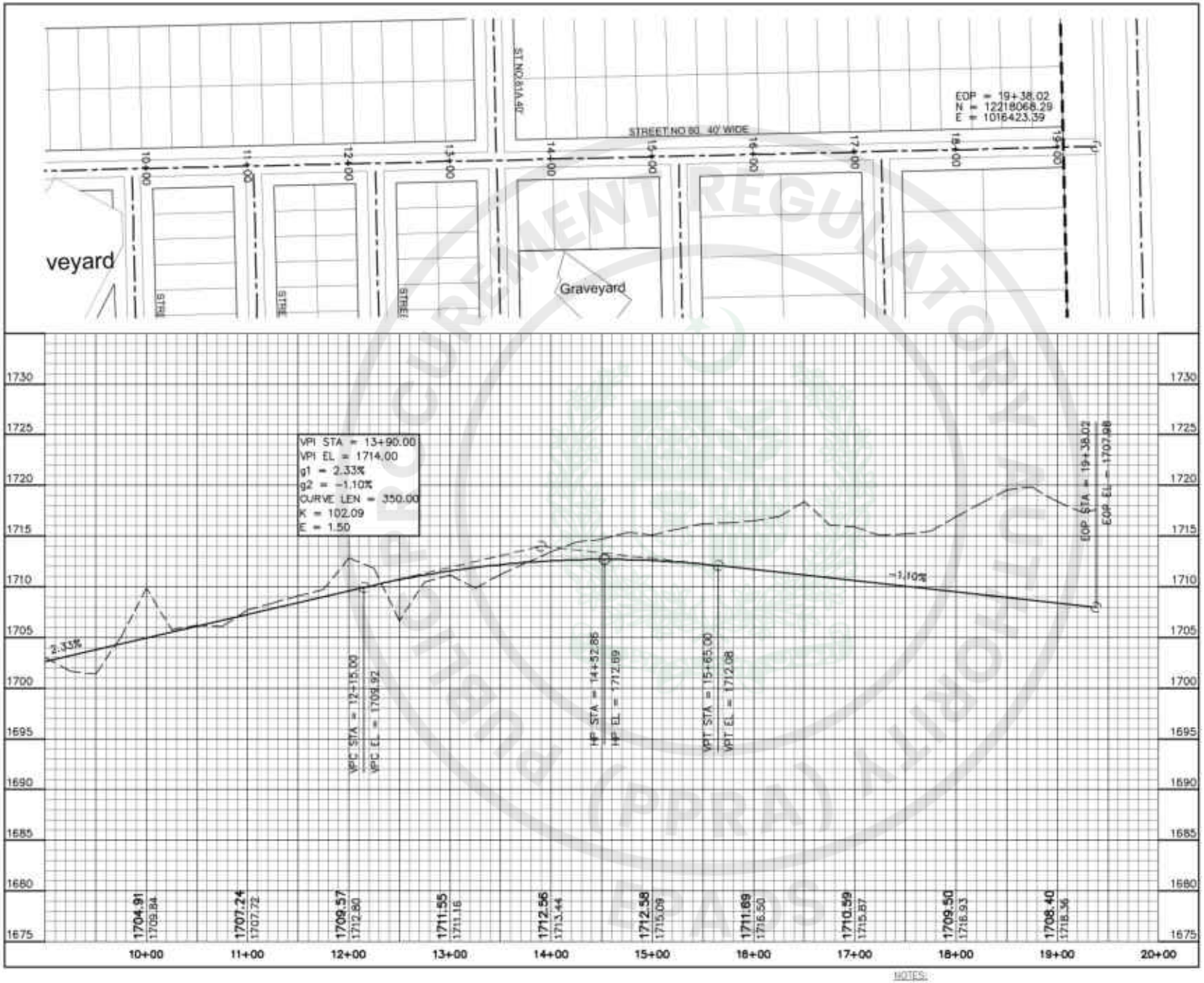

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

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(SHEET 2 OF 2)

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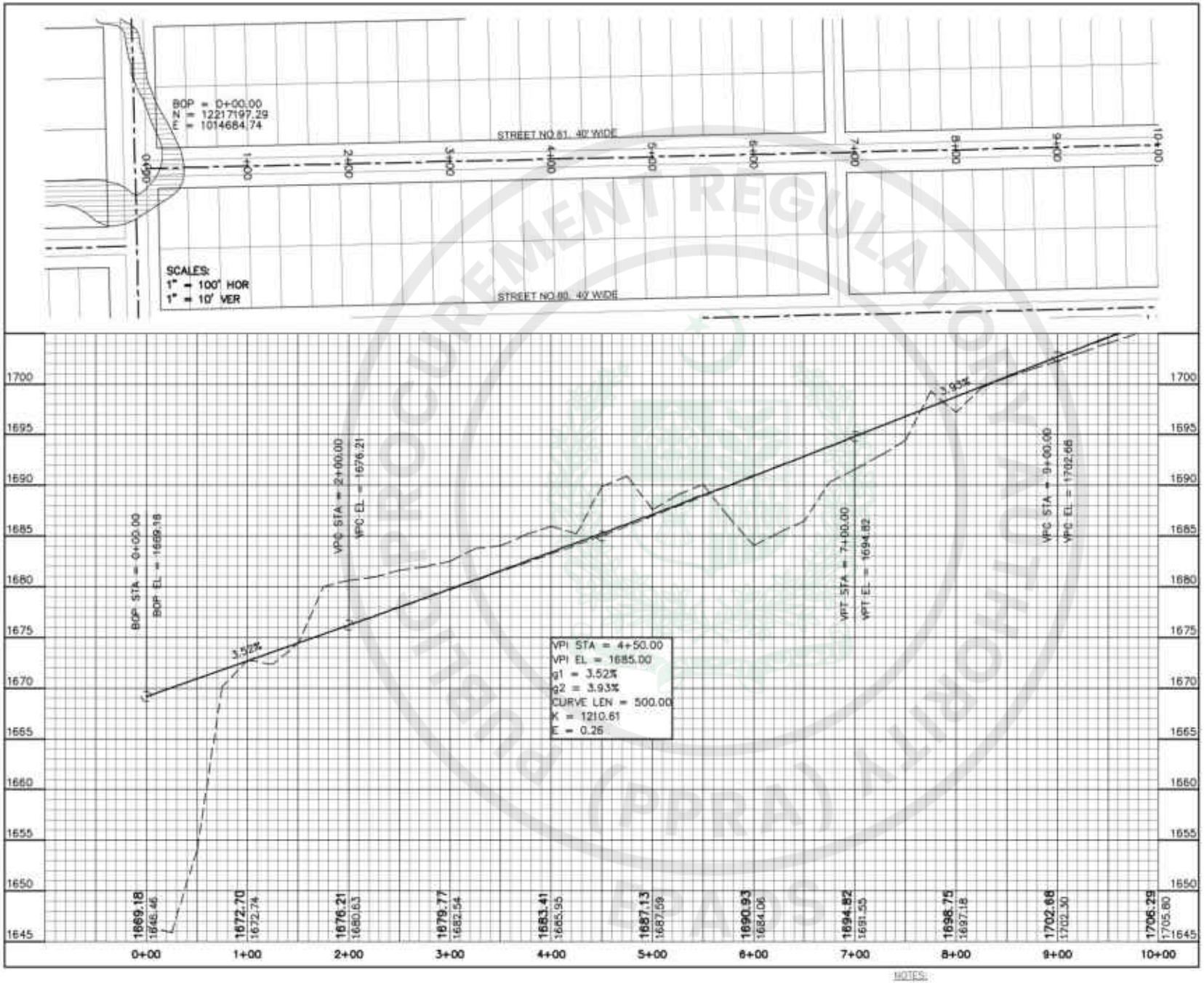

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 81 (40ft WIDE)
(SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

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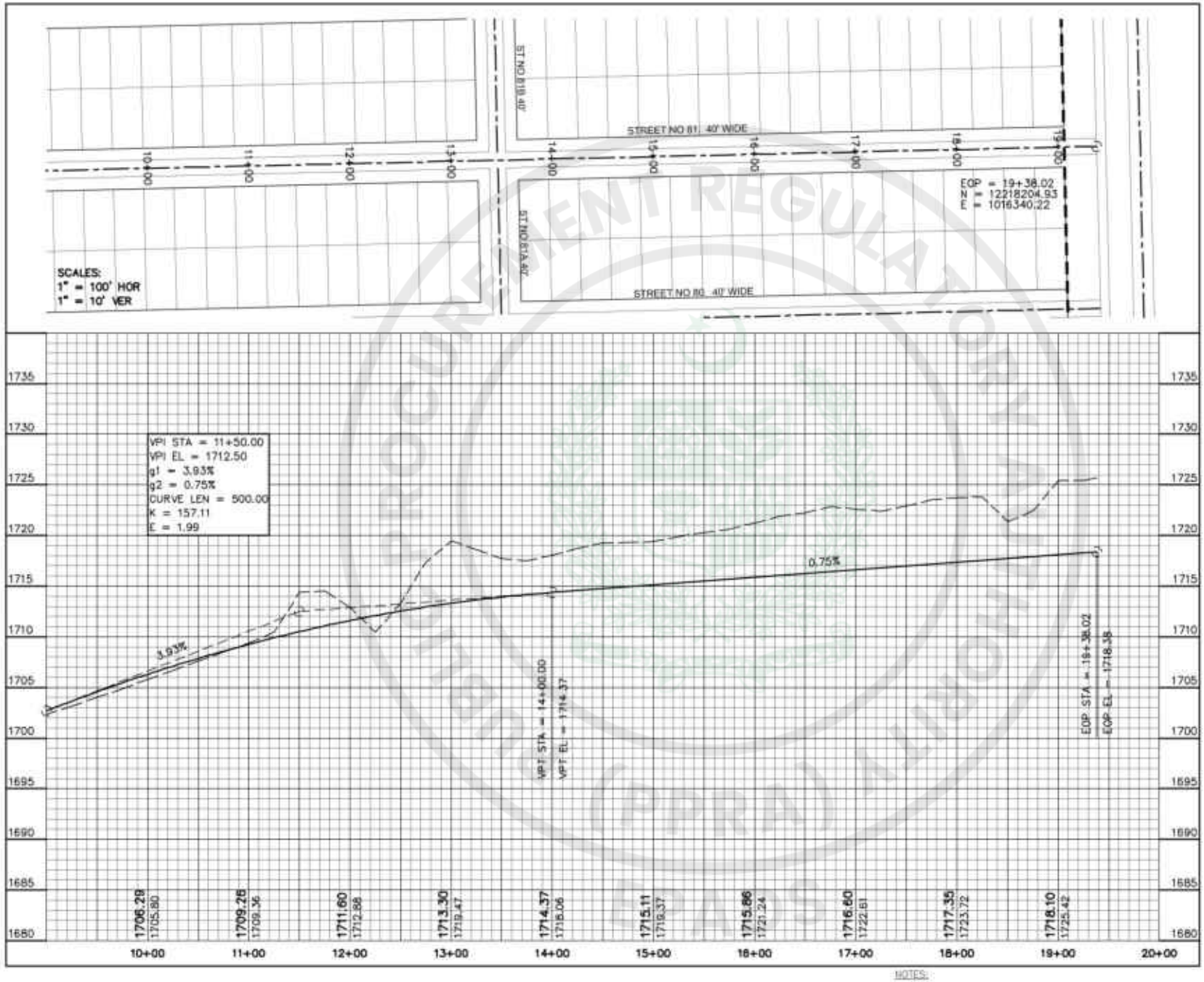

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INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

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NATIONAL ENGINEERING SERVICES
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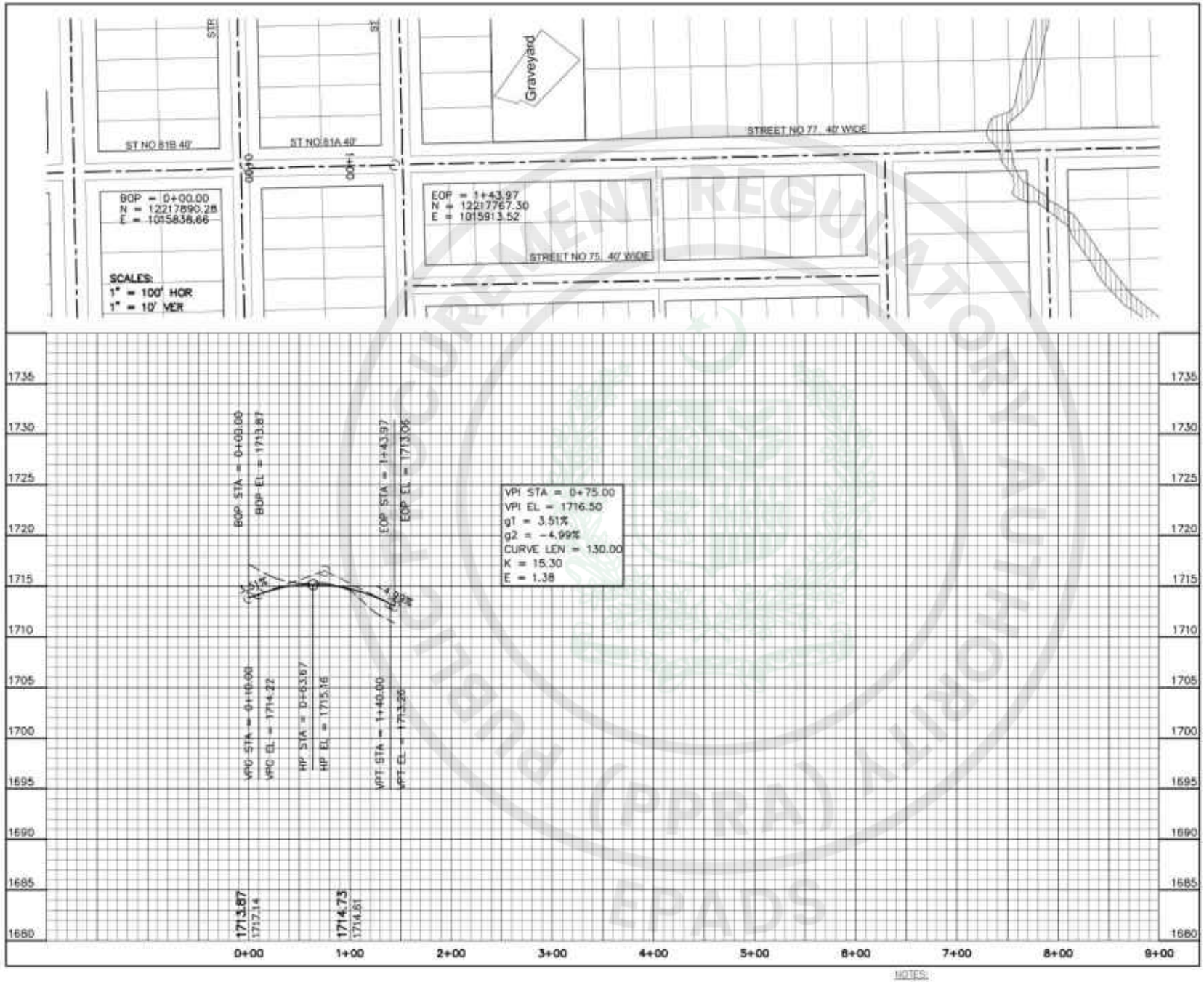

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

PLAN & PROFILE OF STREET NO. 81A (40ft WIDE)
(SHEET 1 OF 1)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

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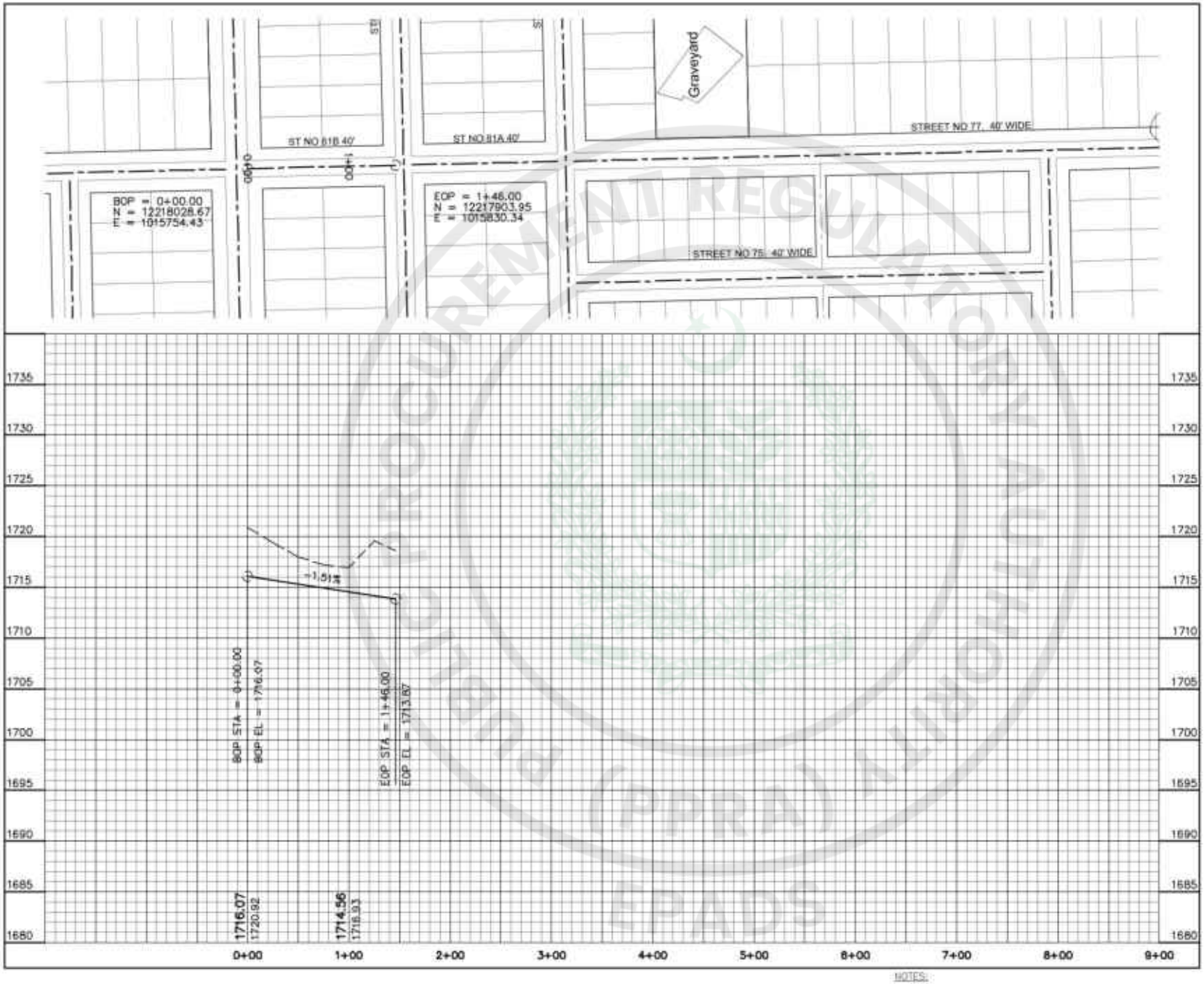

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

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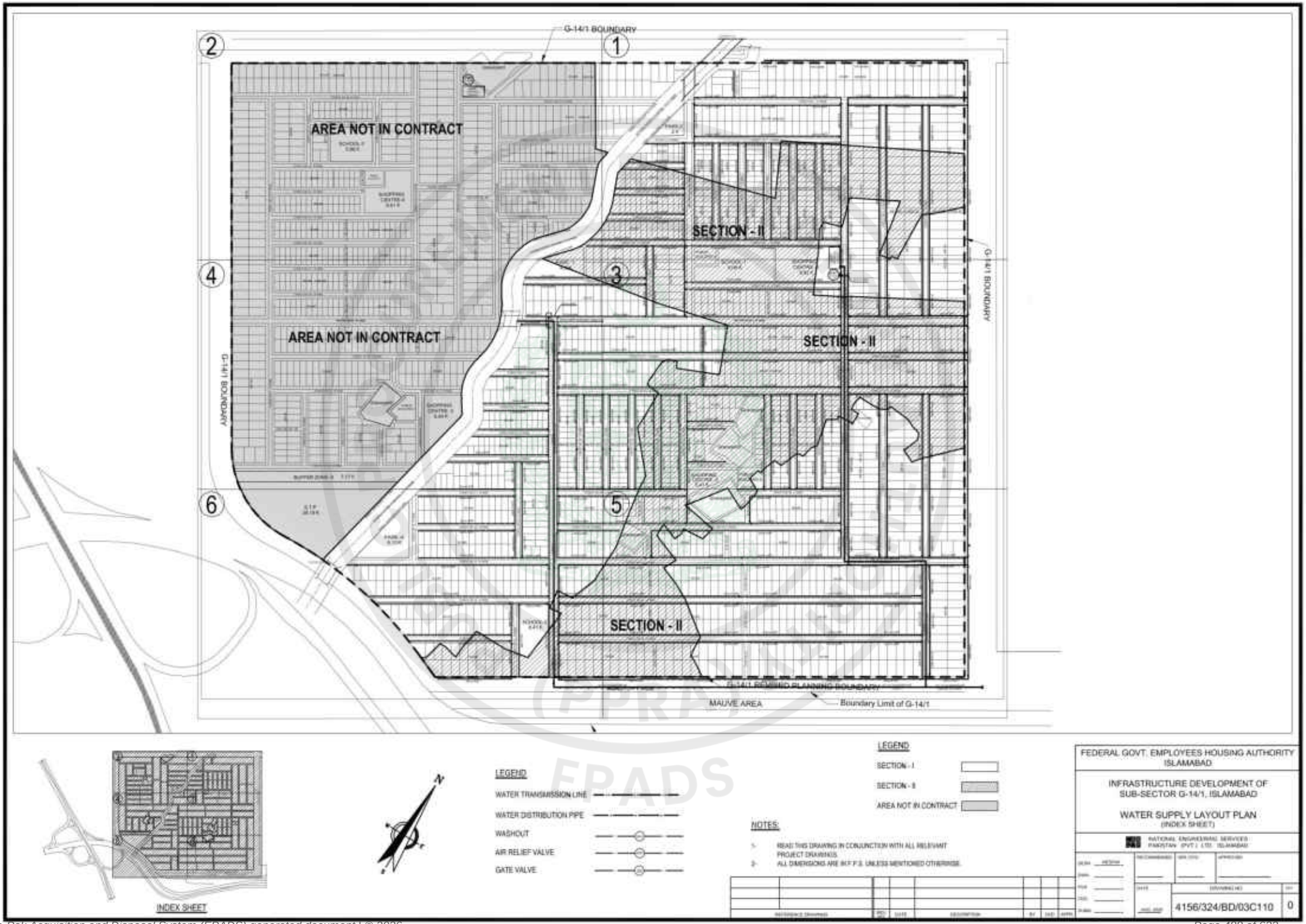

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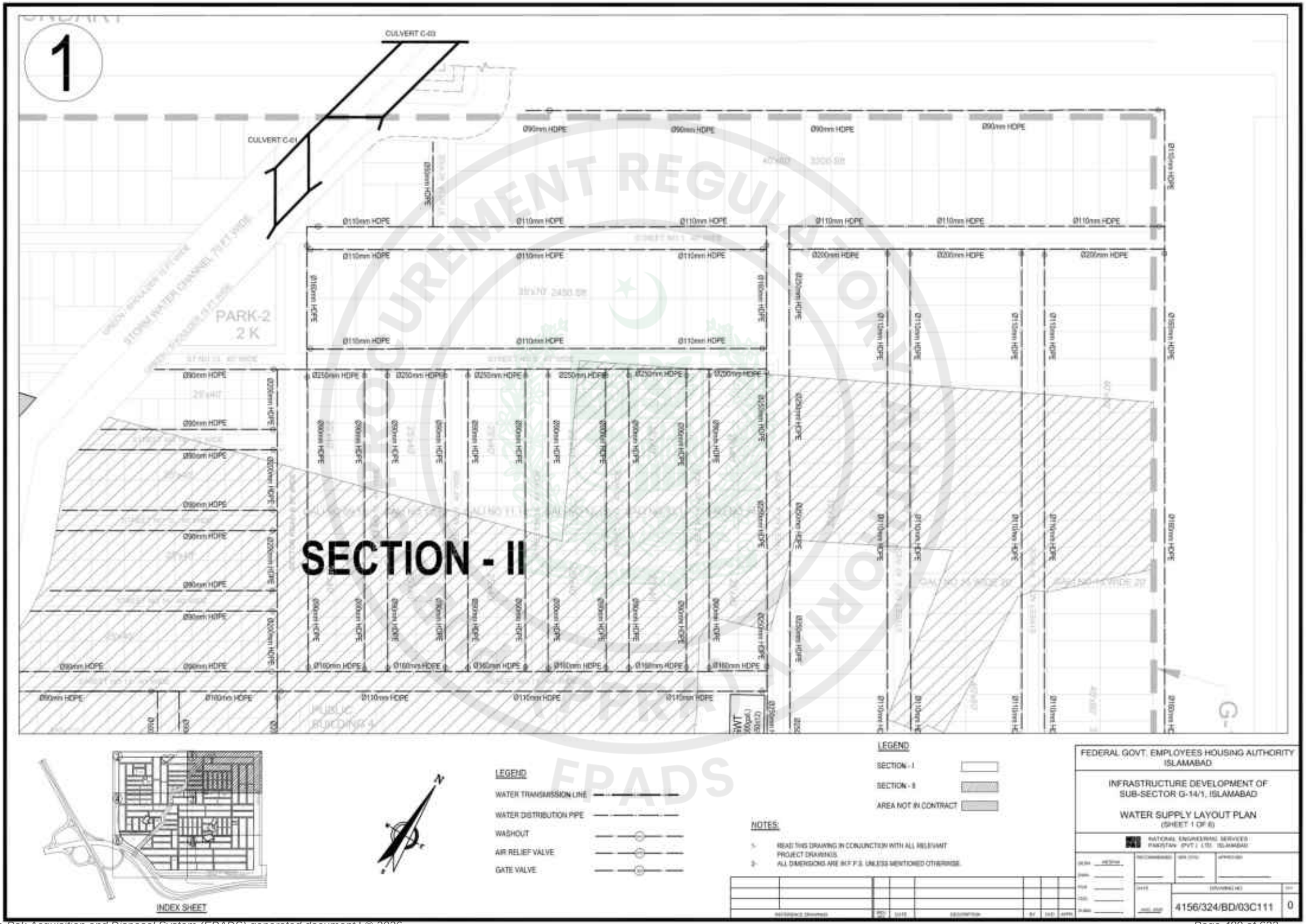

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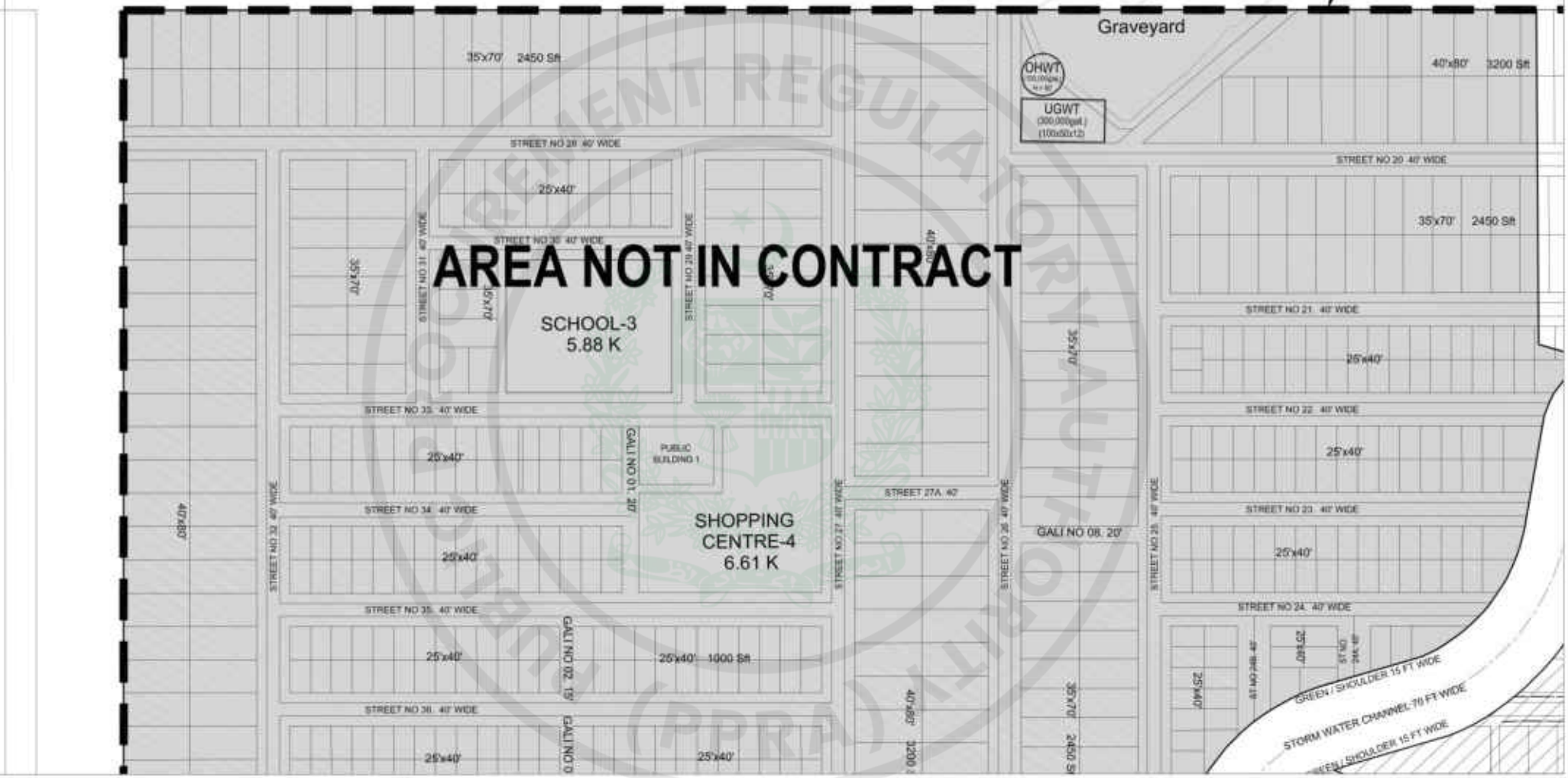

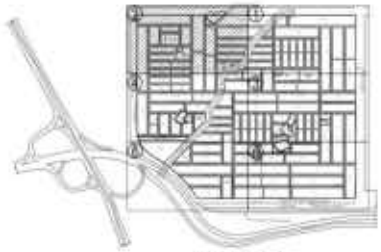

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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1, ISLAMABAD

WATER SUPPLY LAYOUT PLAN
(SHEET 2 OF 6)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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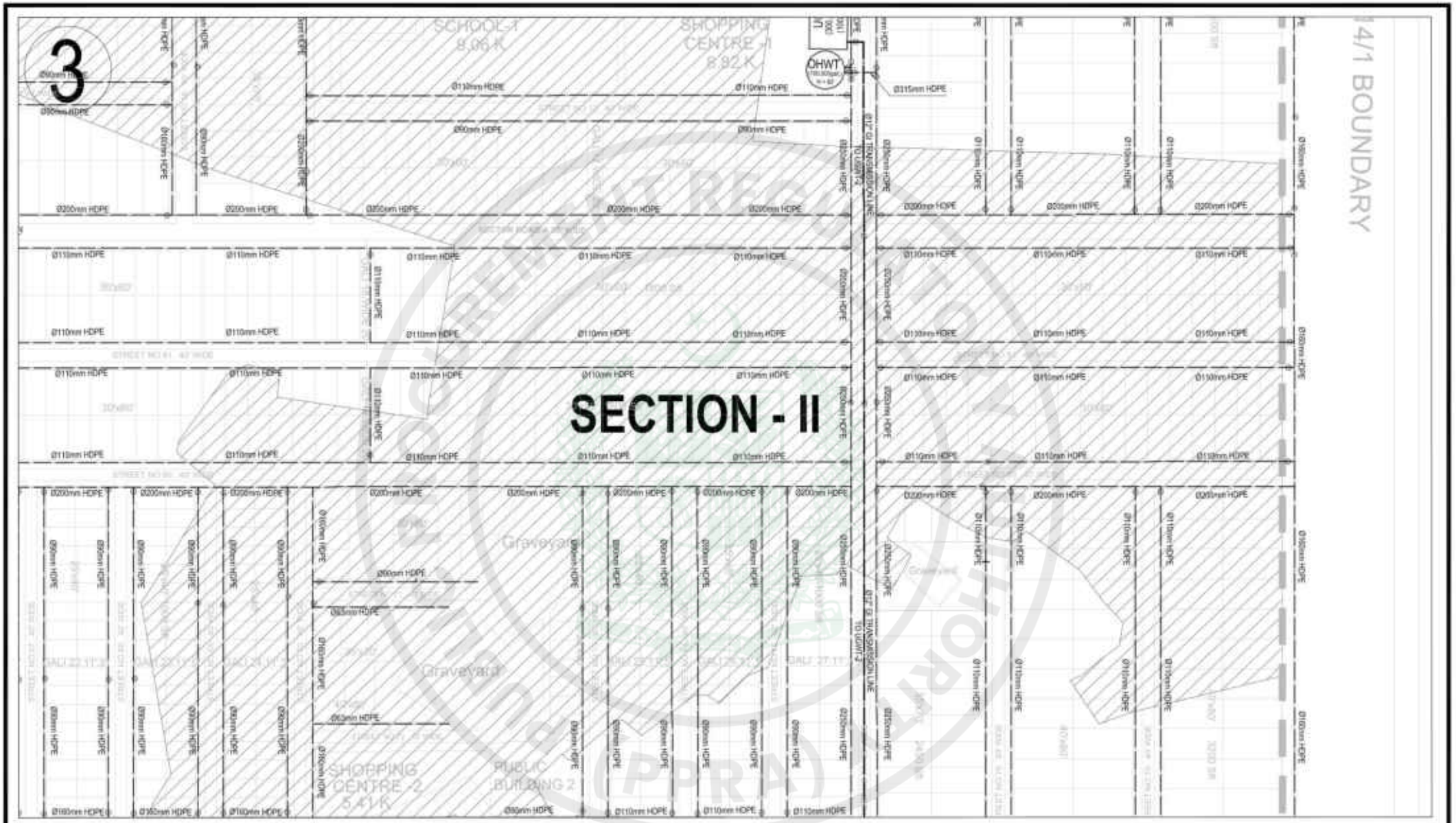

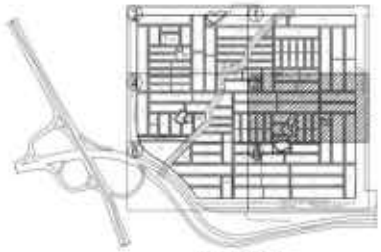

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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1, ISLAMABAD

WATER SUPPLY LAYOUT PLAN
(SHEET 3 OF 6)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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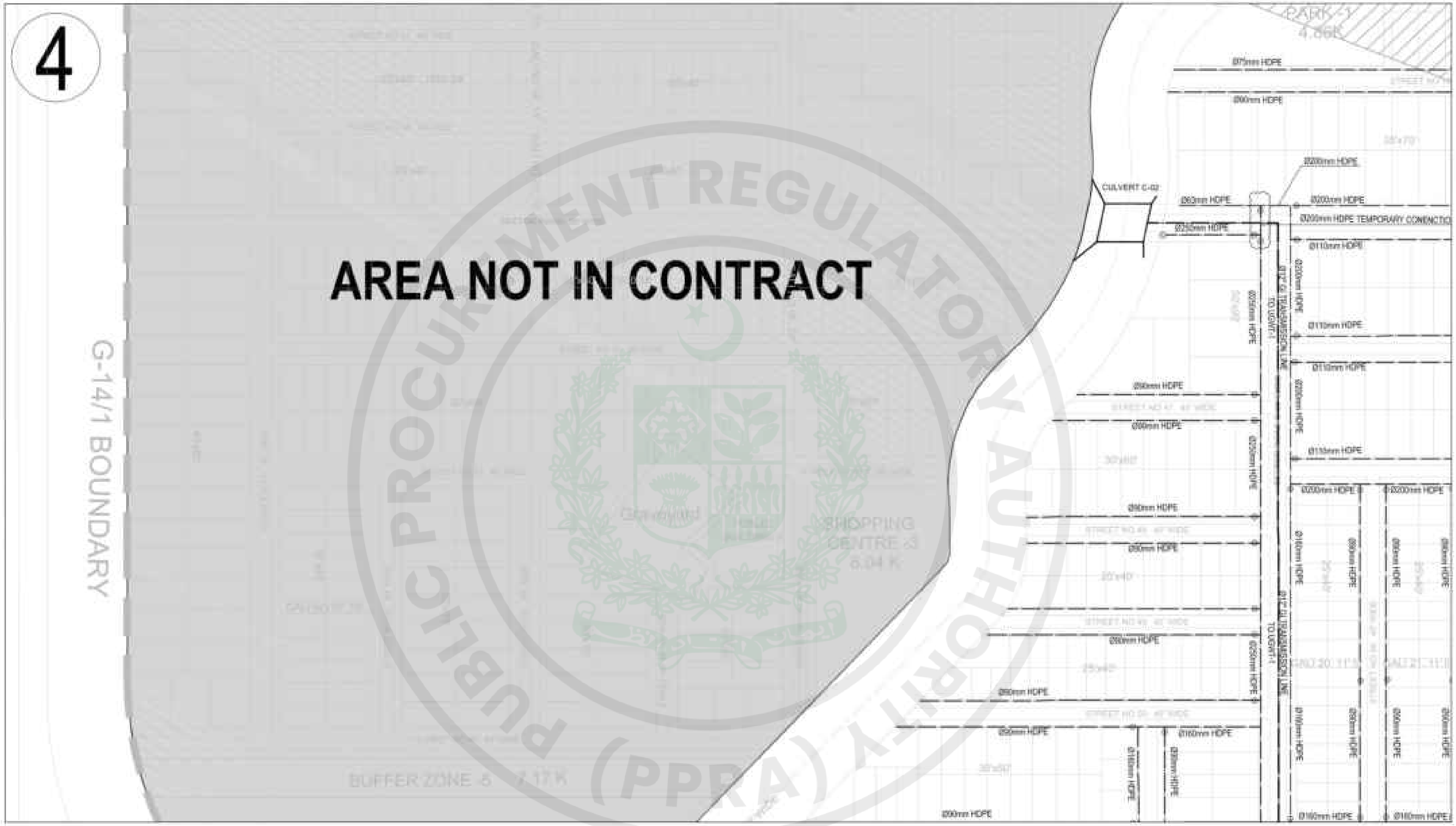

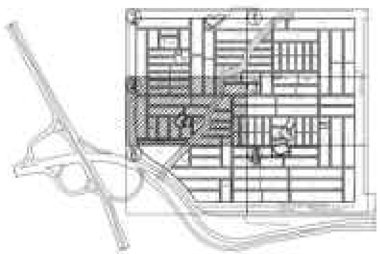

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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1, ISLAMABAD

WATER SUPPLY LAYOUT PLAN
(SHEET 4 OF 6)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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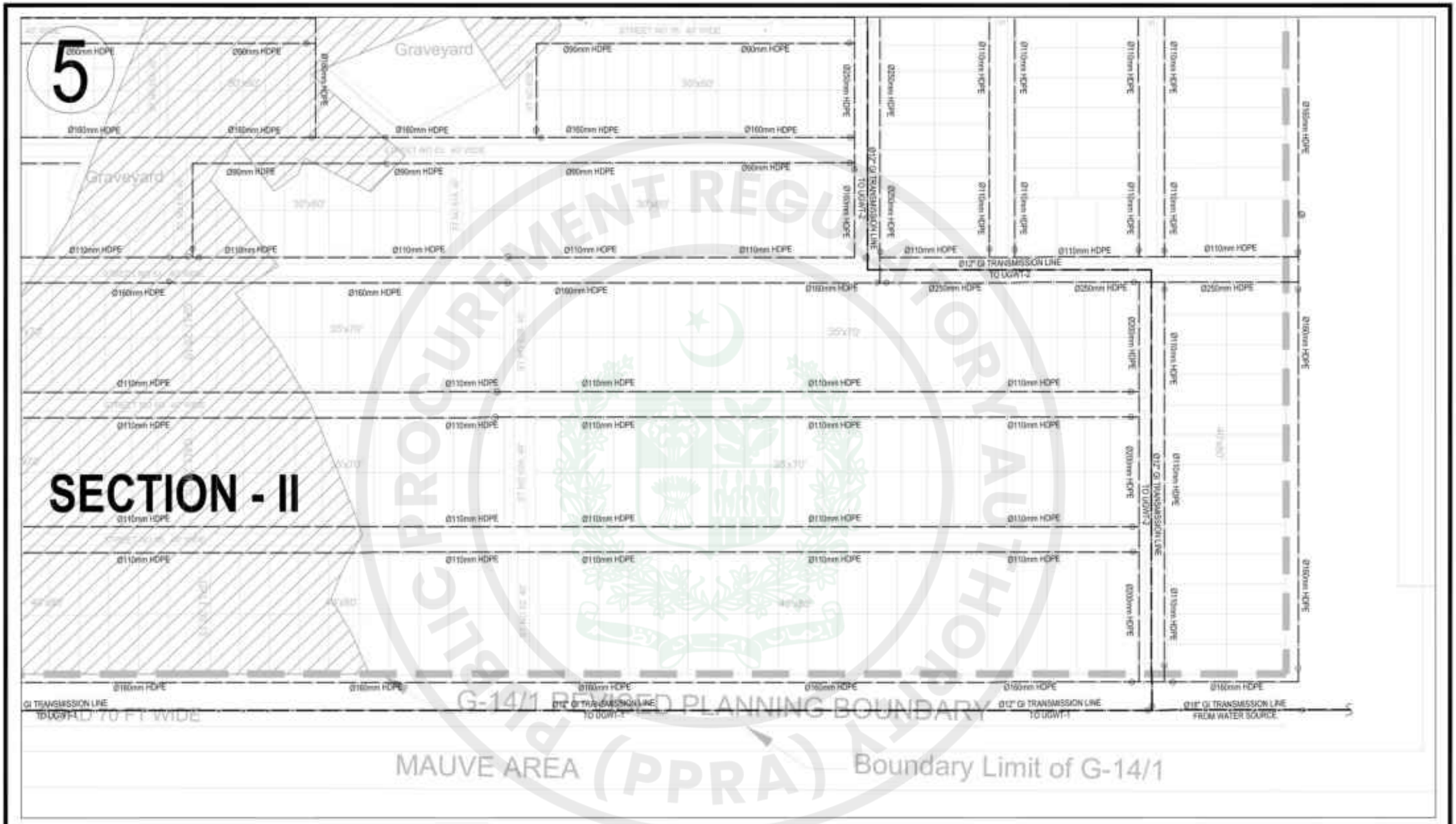

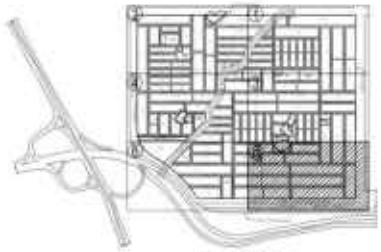

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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1, ISLAMABAD

WATER SUPPLY LAYOUT PLAN

(SHEET 5 OF 6)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

4156/324/BD/03C115

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PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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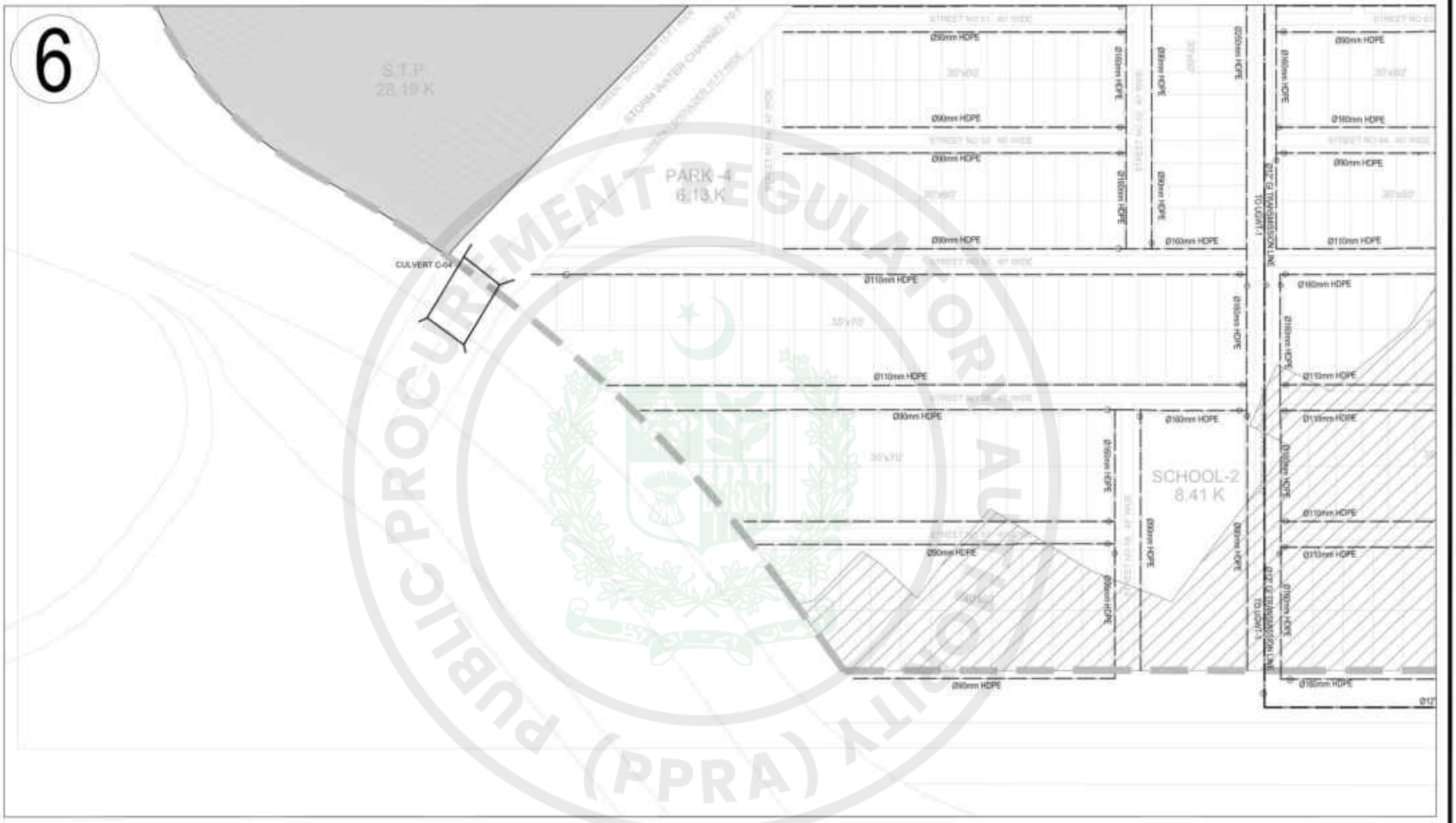

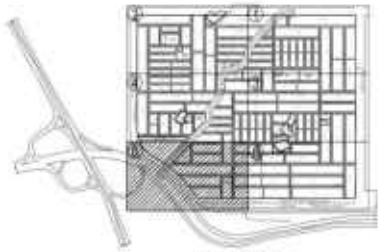

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REFERENCE DRAWINGS	NO.	DATE	DESCRIPTION	BY	CHD	APPD

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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1, ISLAMABAD

WATER SUPPLY LAYOUT PLAN
(SHEET 6 OF 6)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESIGN	RECOMMENDED	DATE (DD/M)	APPROVED
DRAWN			
TRACED			
CHKD			
SCALE	DRAWING NO.		REV.
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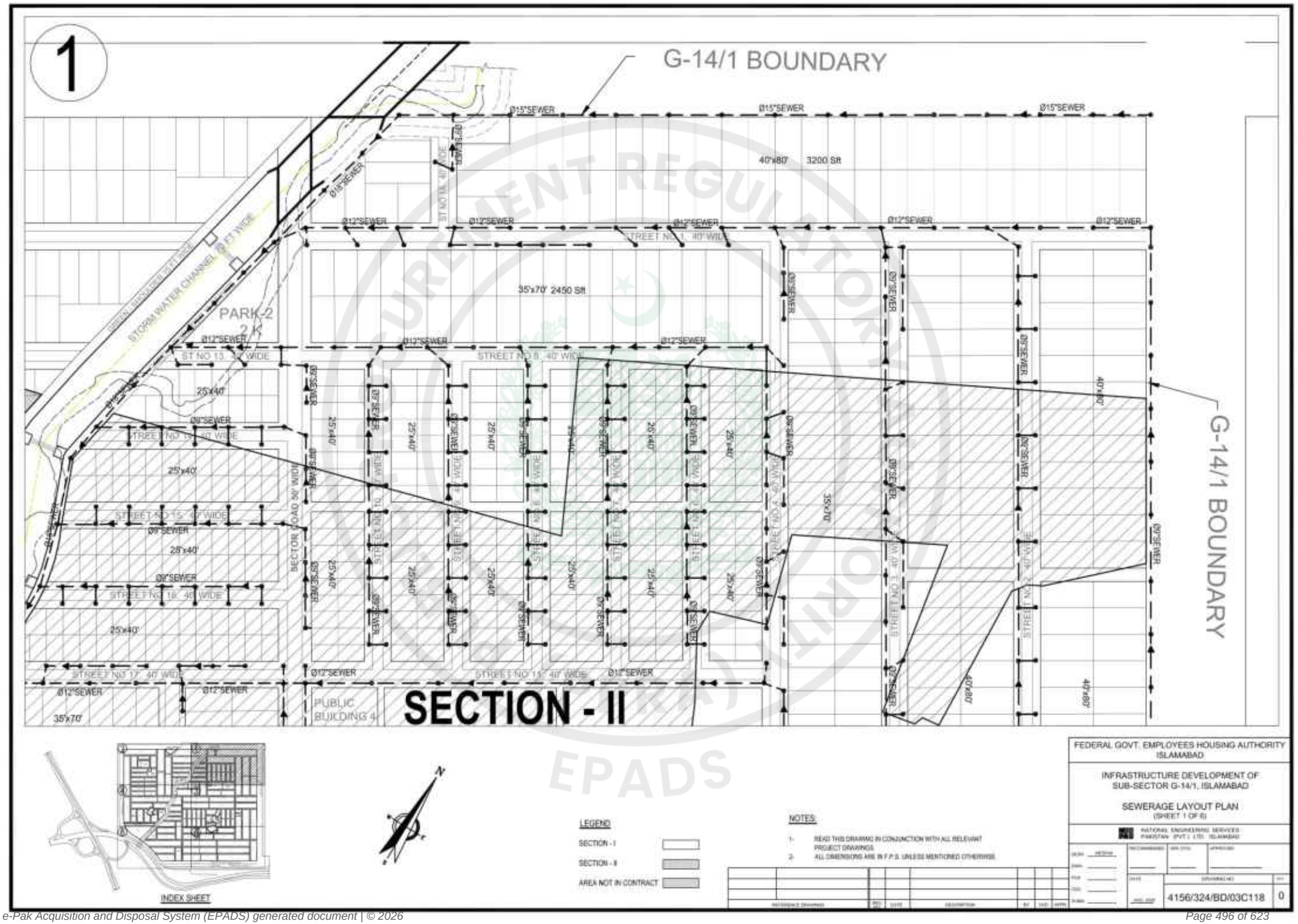

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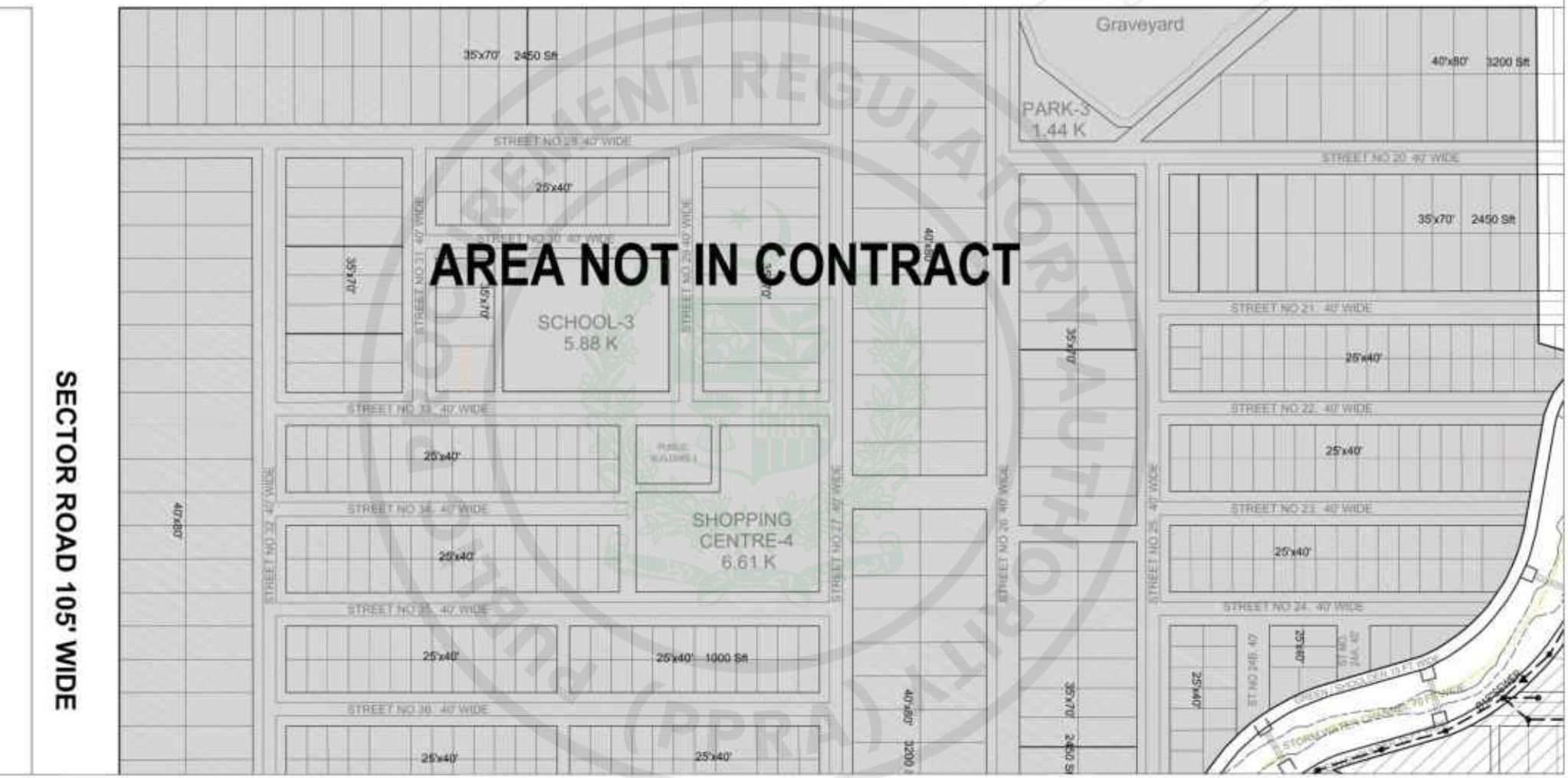

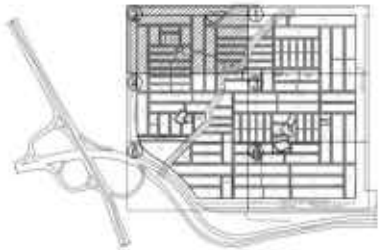

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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1, ISLAMABAD

SEWERAGE LAYOUT PLAN
(SHEET 2 OF 6)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

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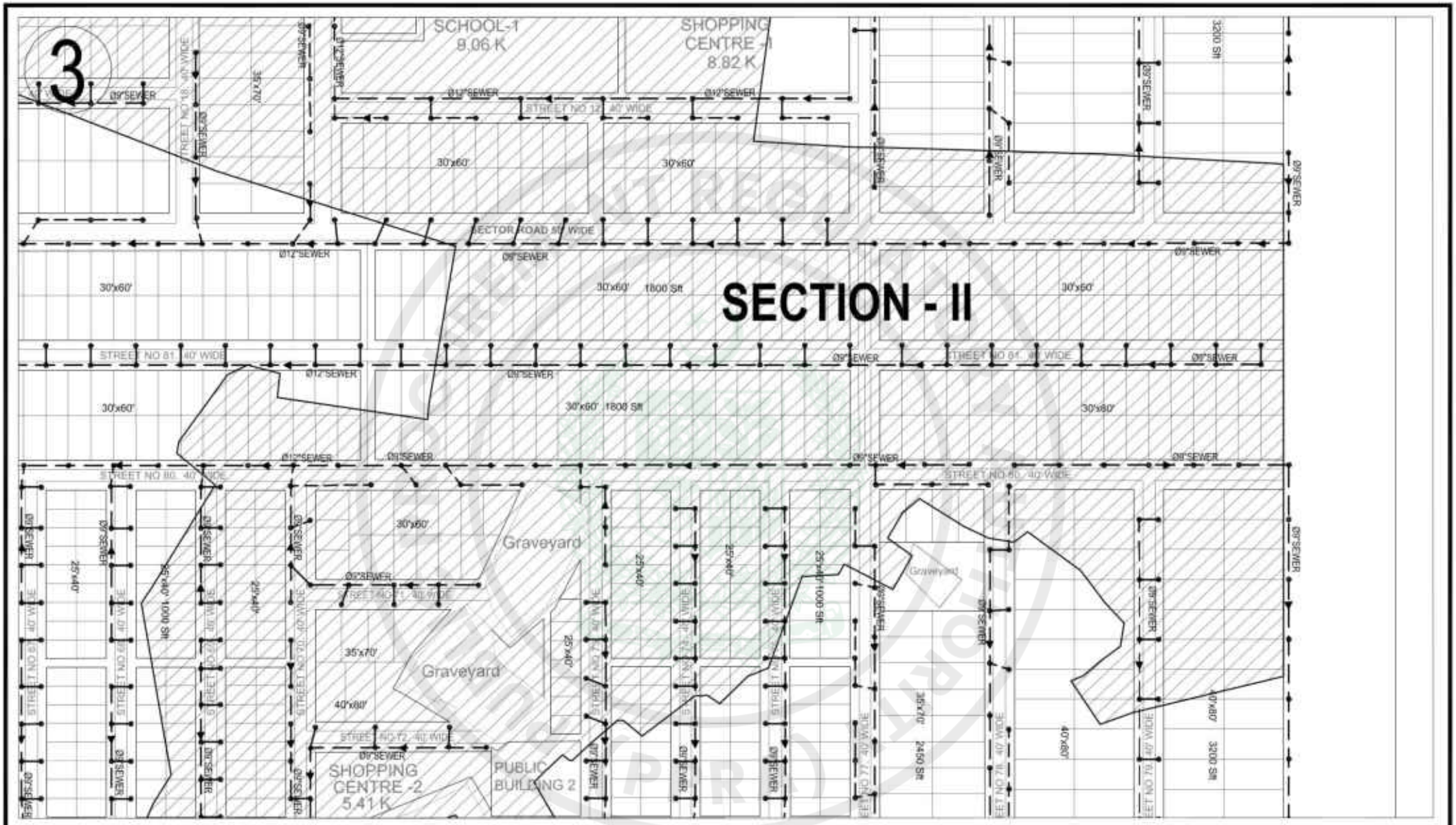

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ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

SEWERAGE LAYOUT PLAN
(SHEET 3 OF 6)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

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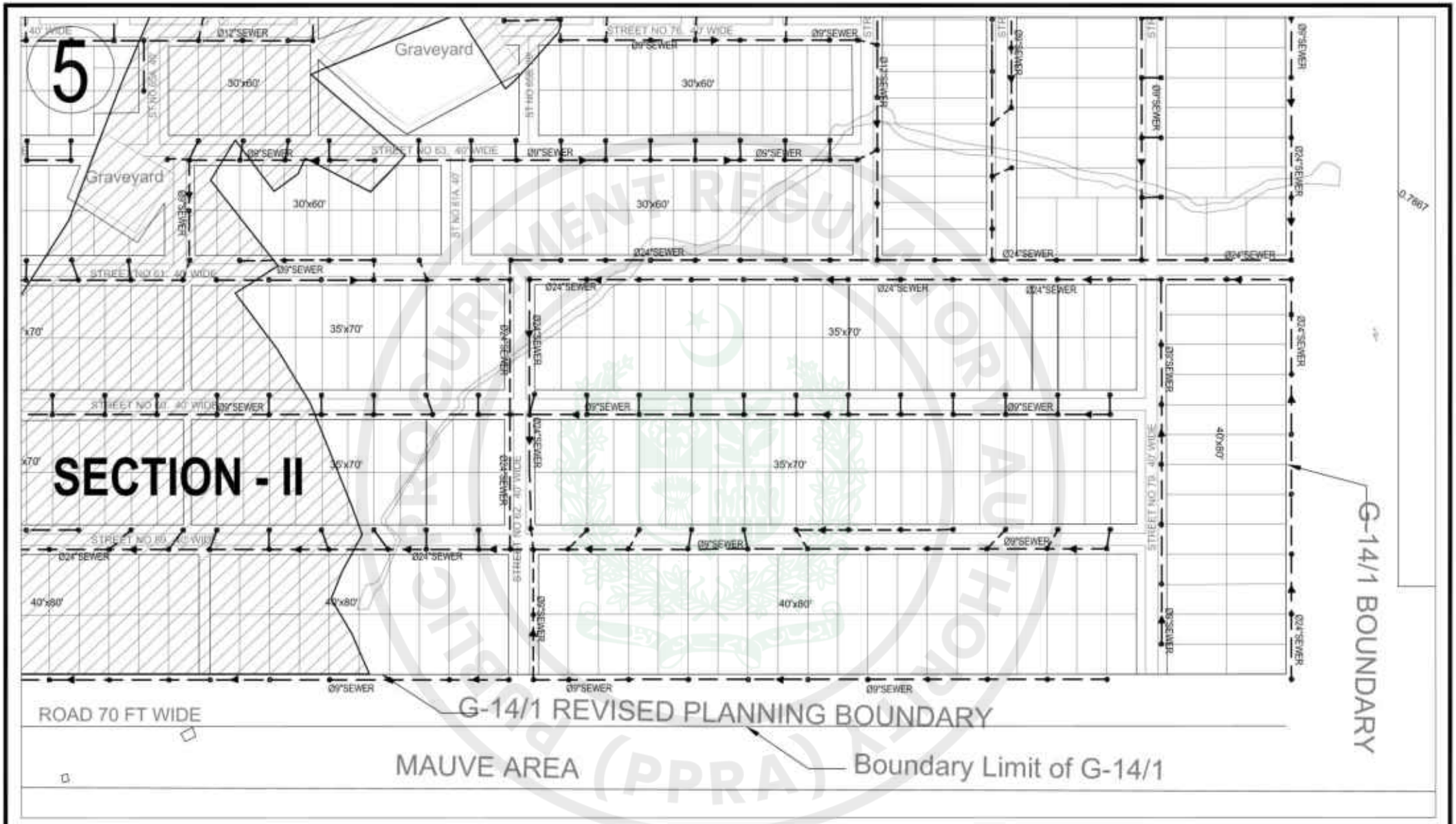

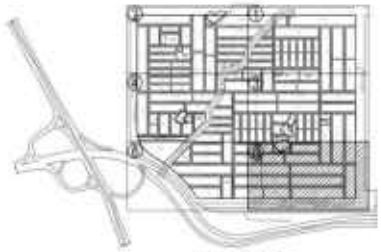

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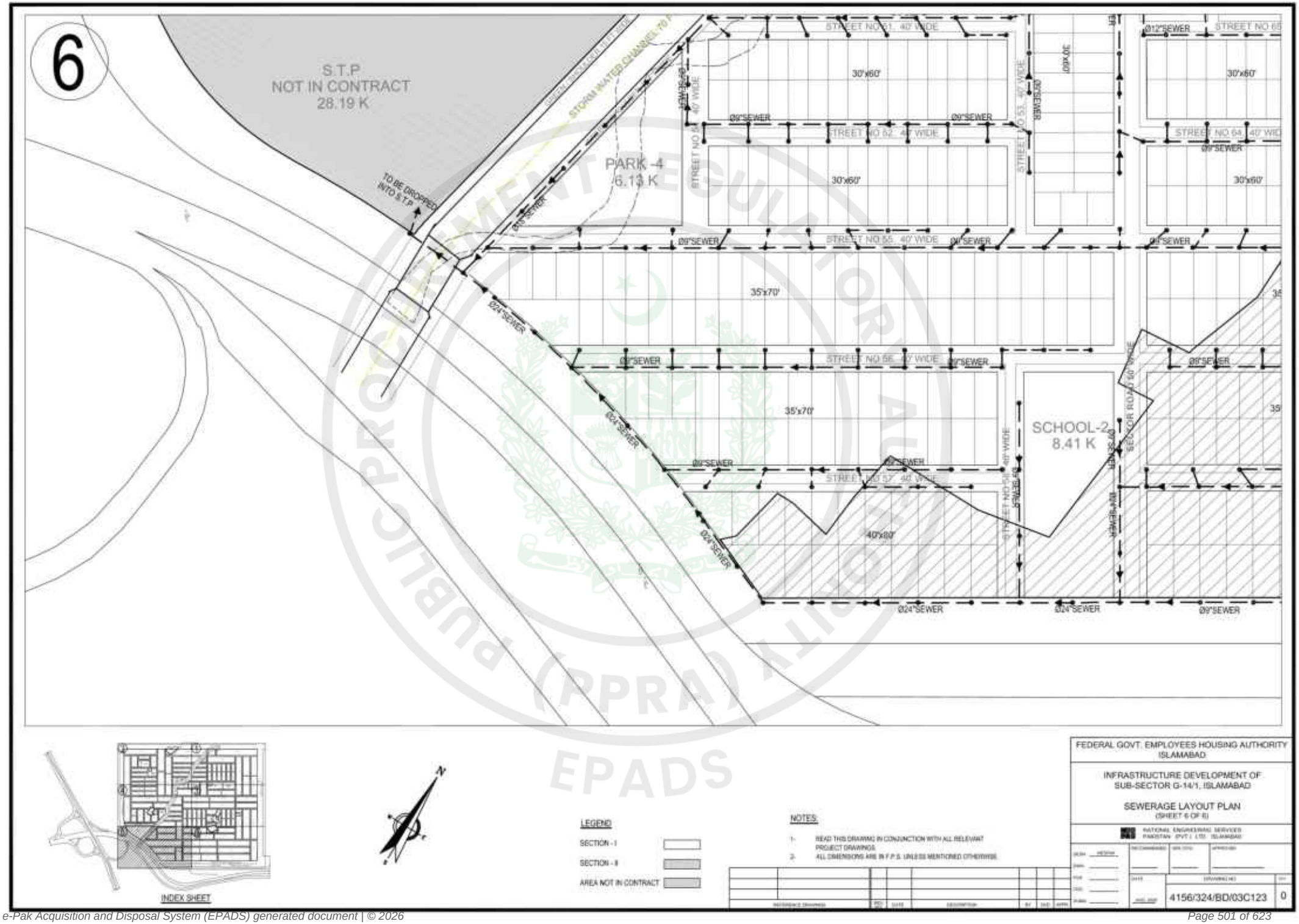
INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1, ISLAMABAD

SEWERAGE LAYOUT PLAN
(SHEET 5 OF 6)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DRAWING NO: 4156/324/BD/03C122 | 0

PROCUREMENT REGULATORY AUTHORITY PPRA EPADS



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NOTES

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2. ALL DIMENSIONS ARE IN F.P.S. UNLESS MENTIONED OTHERWISE.

FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

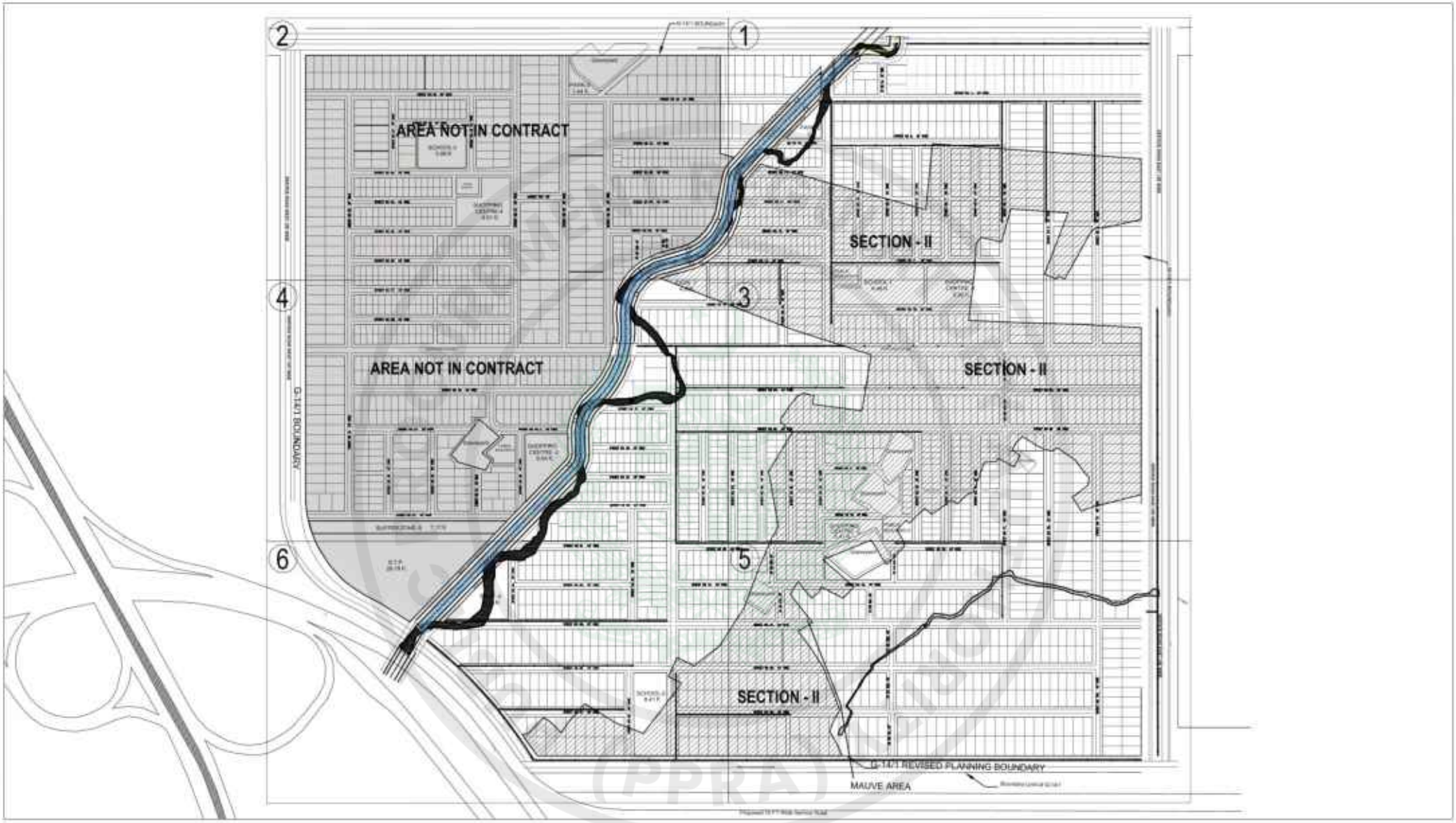
INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

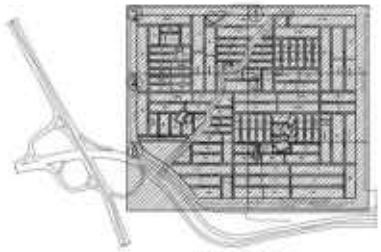
SEWERAGE LAYOUT PLAN
(SHEET 6 OF 6)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

DRAWING NO.	REV.
4156/324/BD/03C123	0

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA)
EPADS





INDEX SHEET

LEGEND

SECTION - I

SECTION - II

AREA NOT IN CONTRACT

NOTES:

1. READ THIS DRAWING IN CONJUNCTION WITH ALL RELEVANT PROJECT DRAWINGS.
2. ALL DIMENSIONS ARE IN F.P.S. UNLESS MENTIONED OTHERWISE.
3. ALL DRAINS ARE 2'-0" x 2'-0" EXCEPT NOTED OTHERWISE.

FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

STORM DRAINAGE LAYOUT PLAN
(INDEX SHEET)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

4156/324/BD/03C124 | 0

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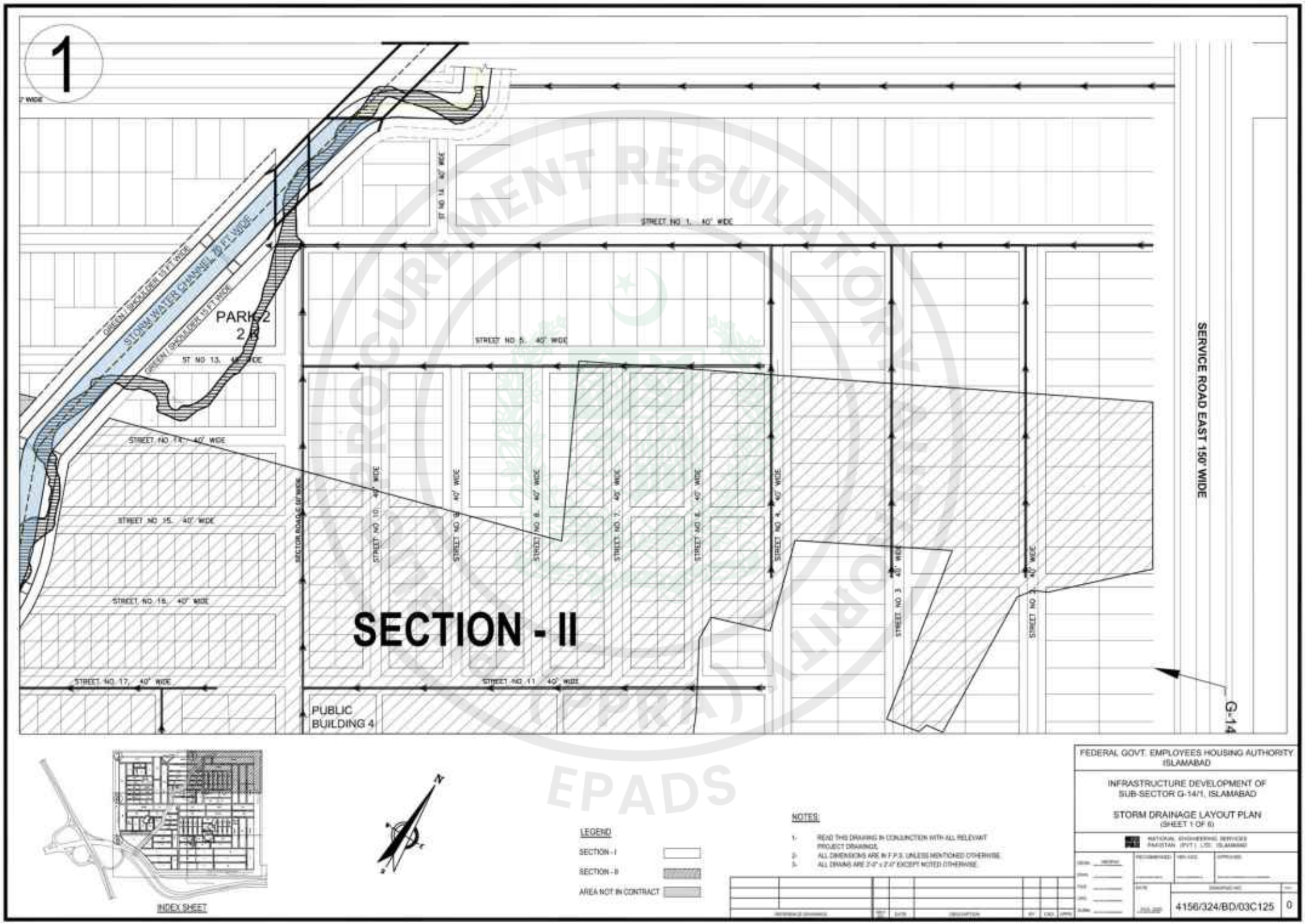

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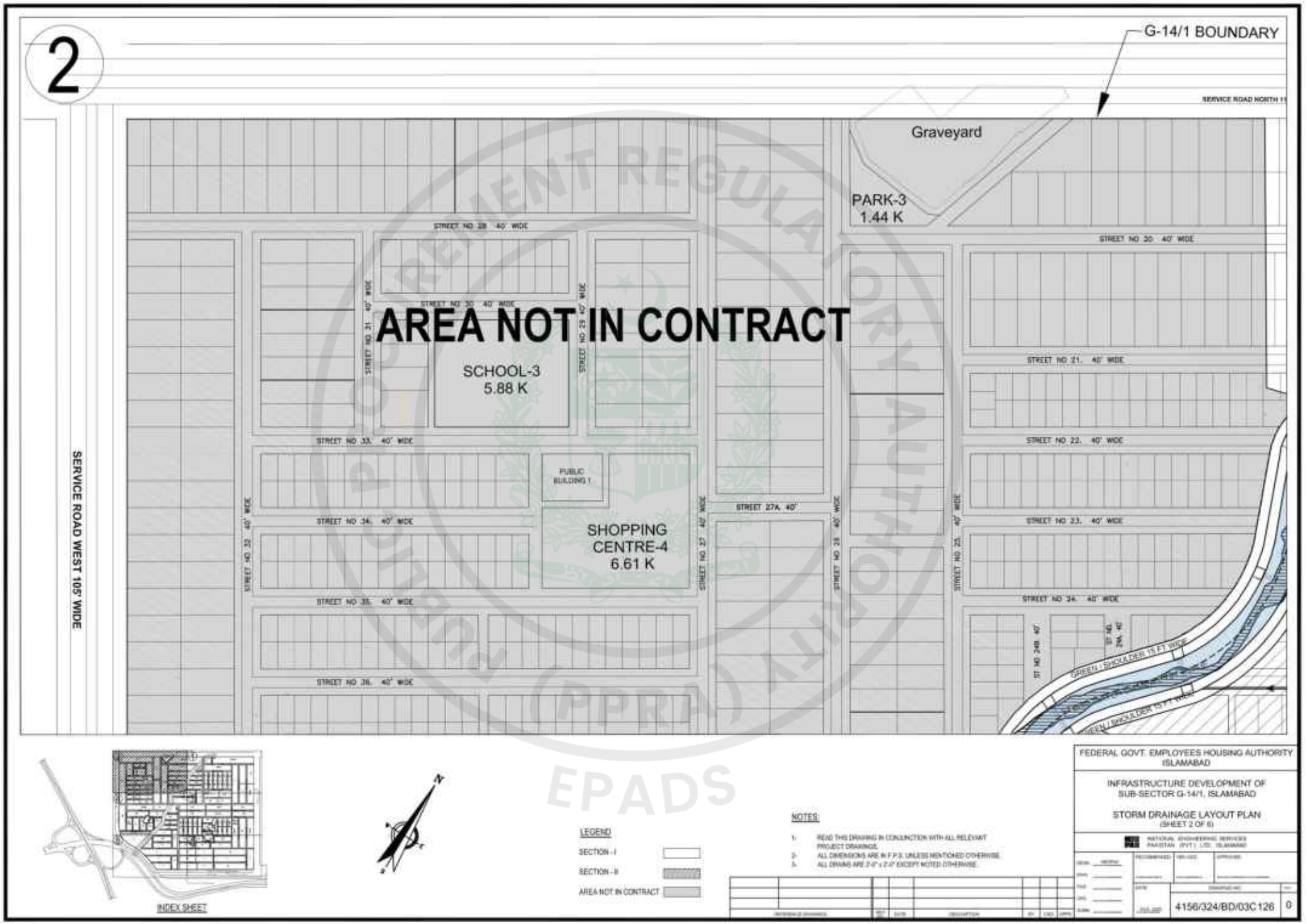
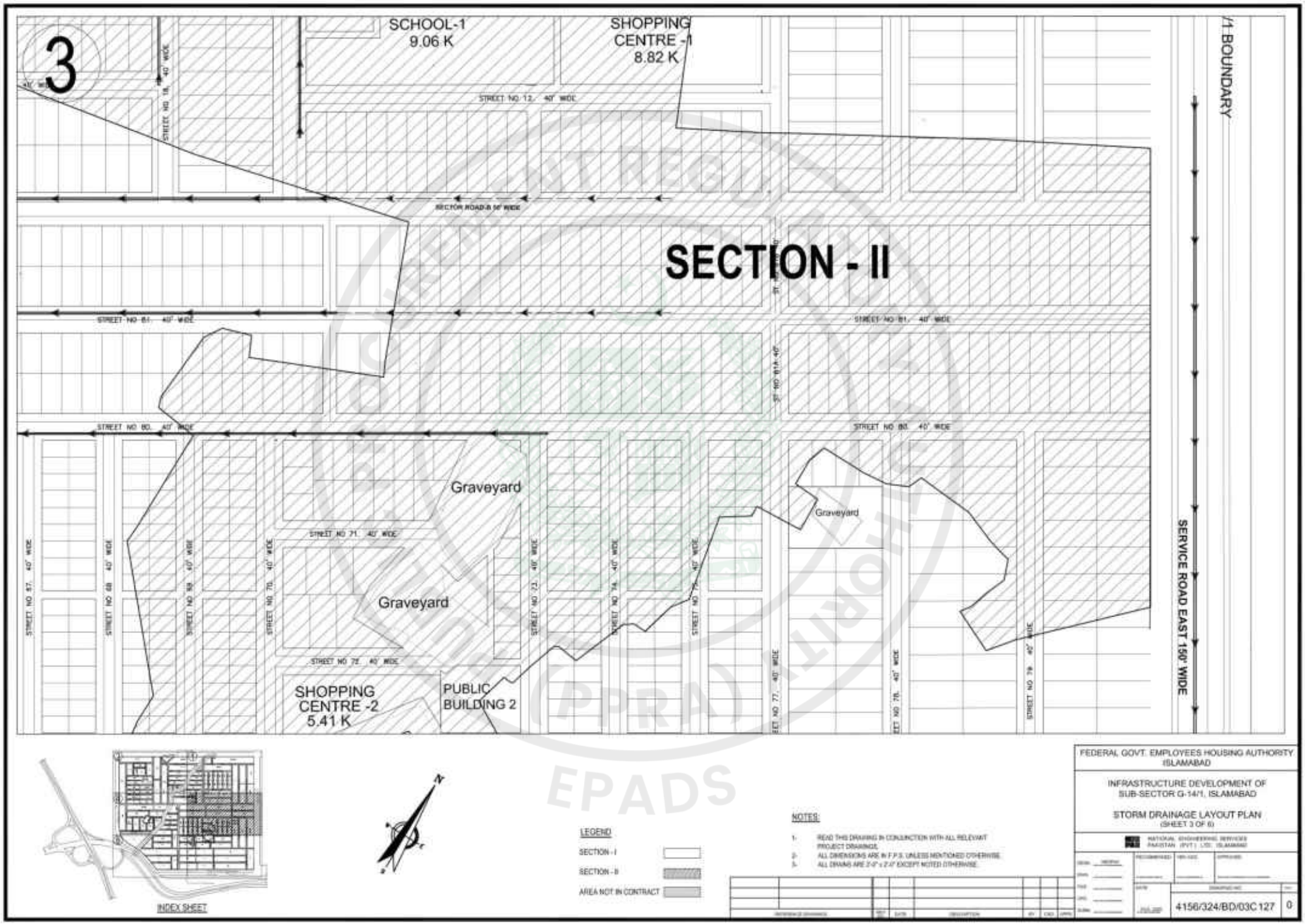


PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS



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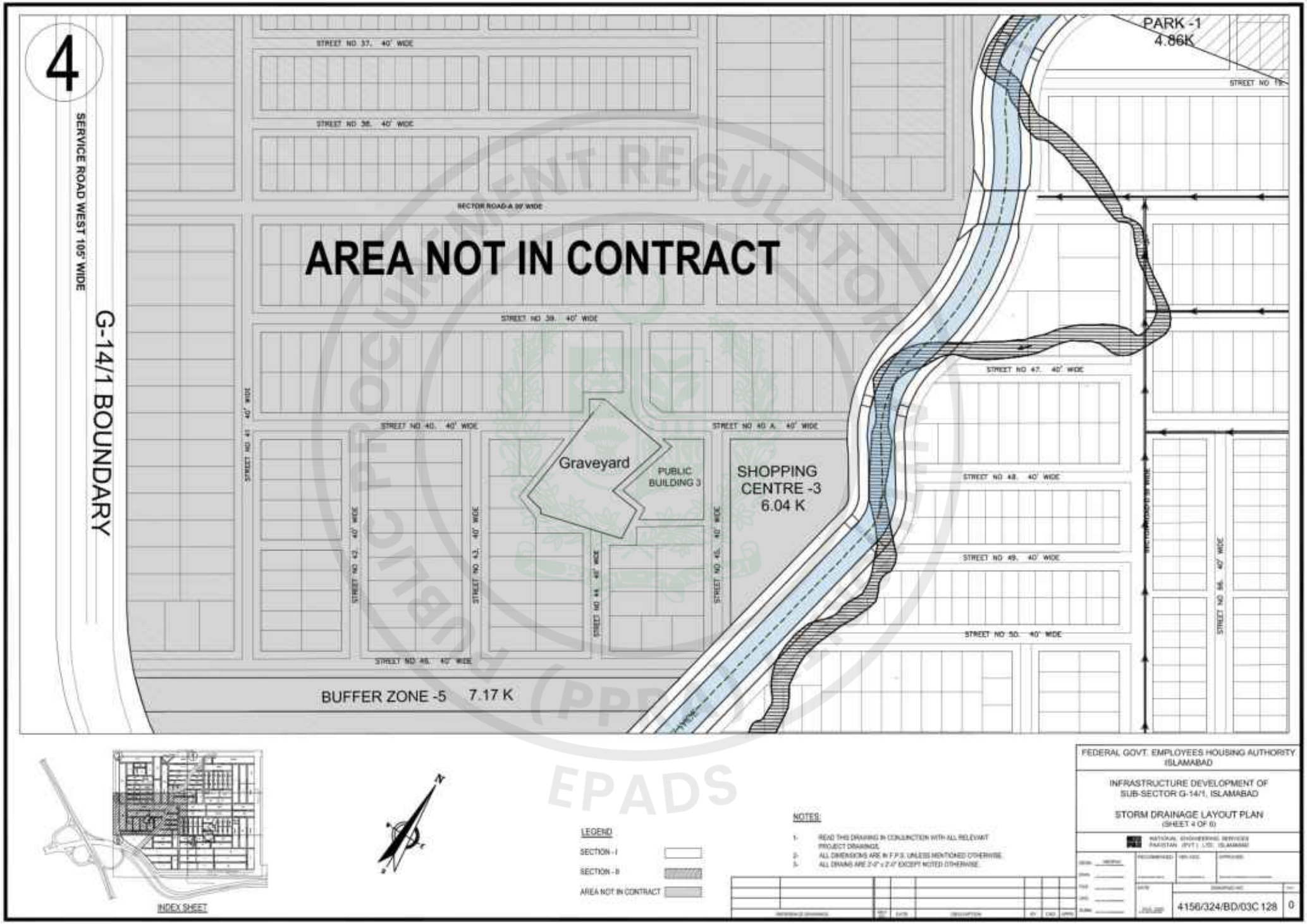

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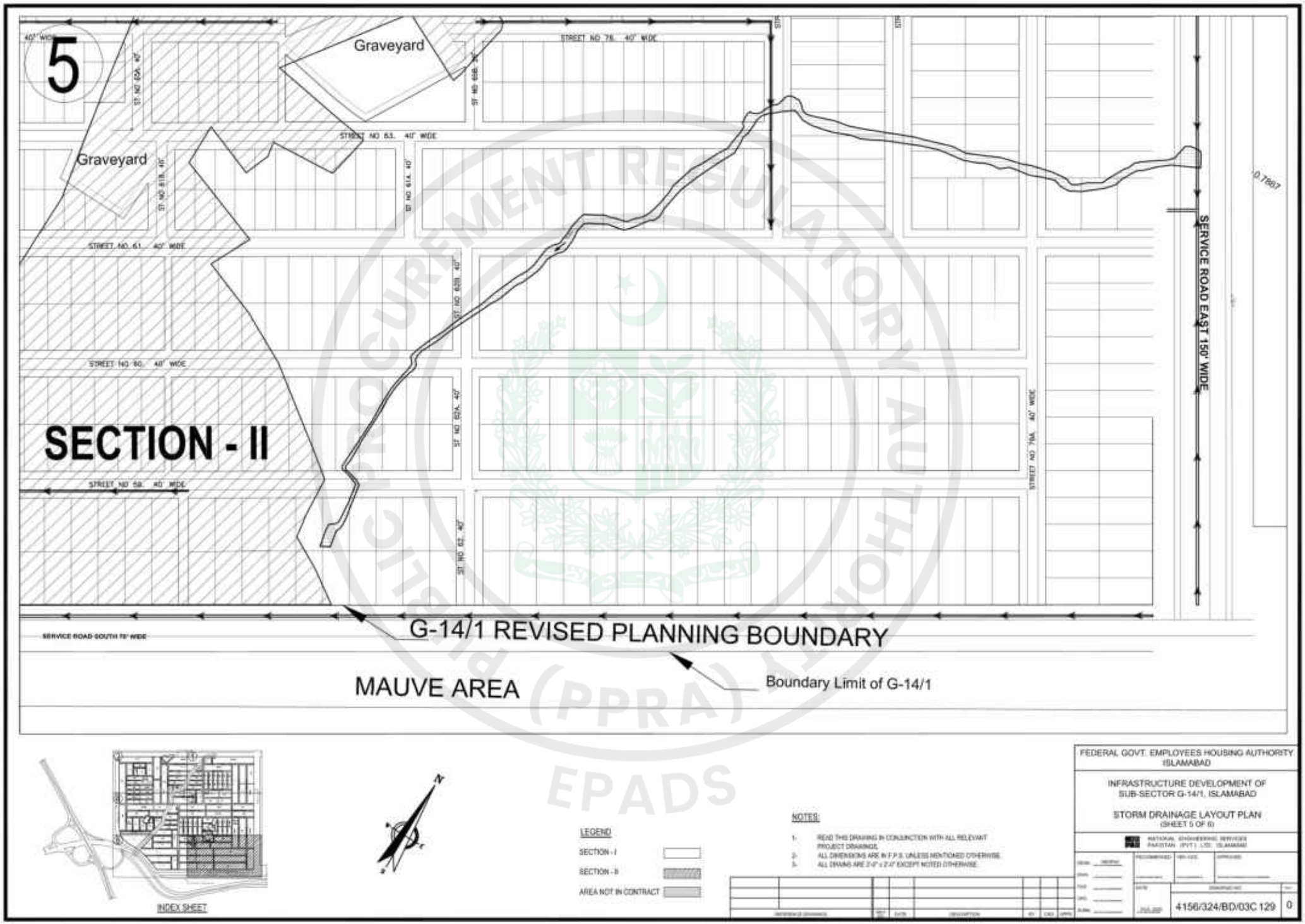

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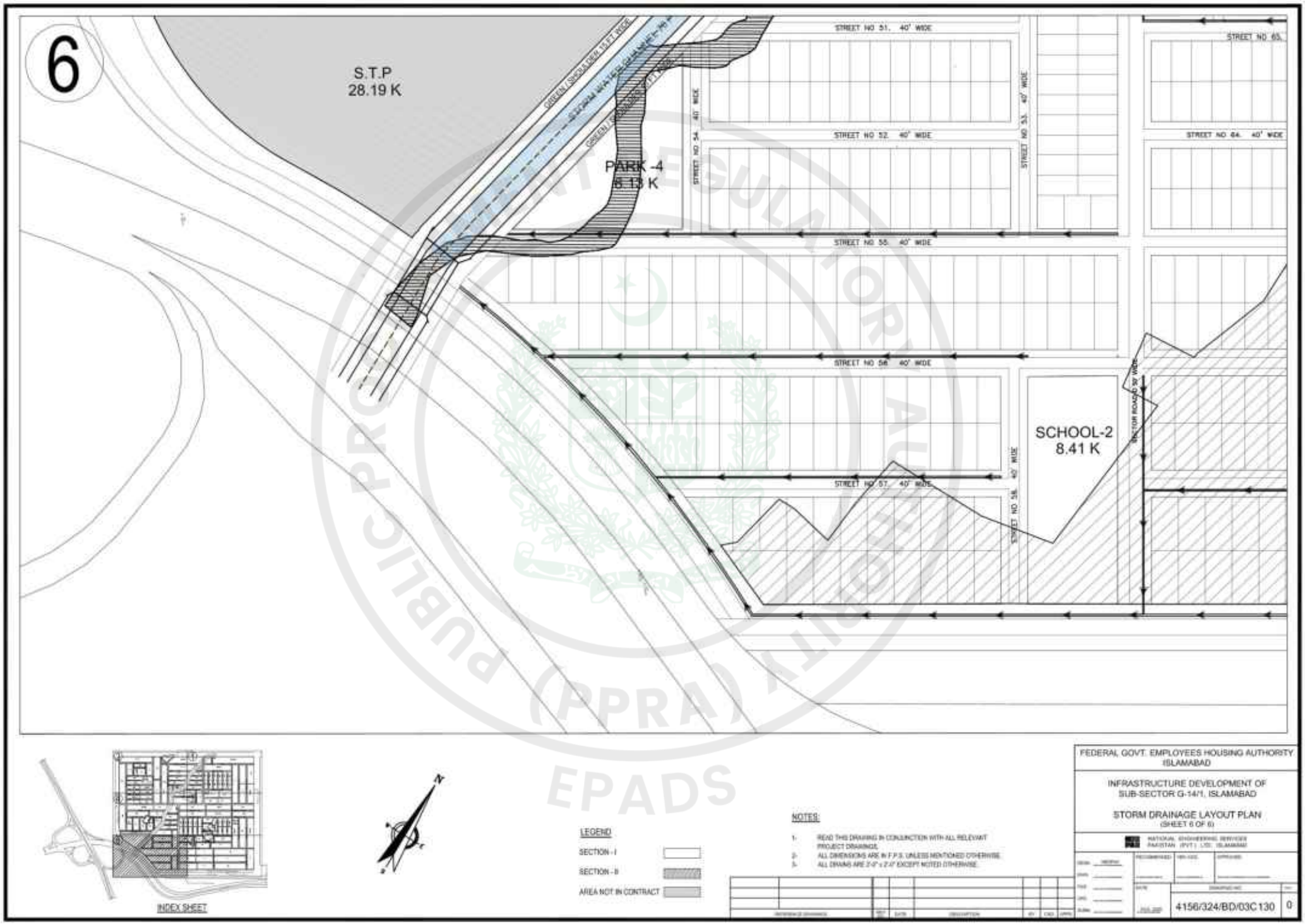

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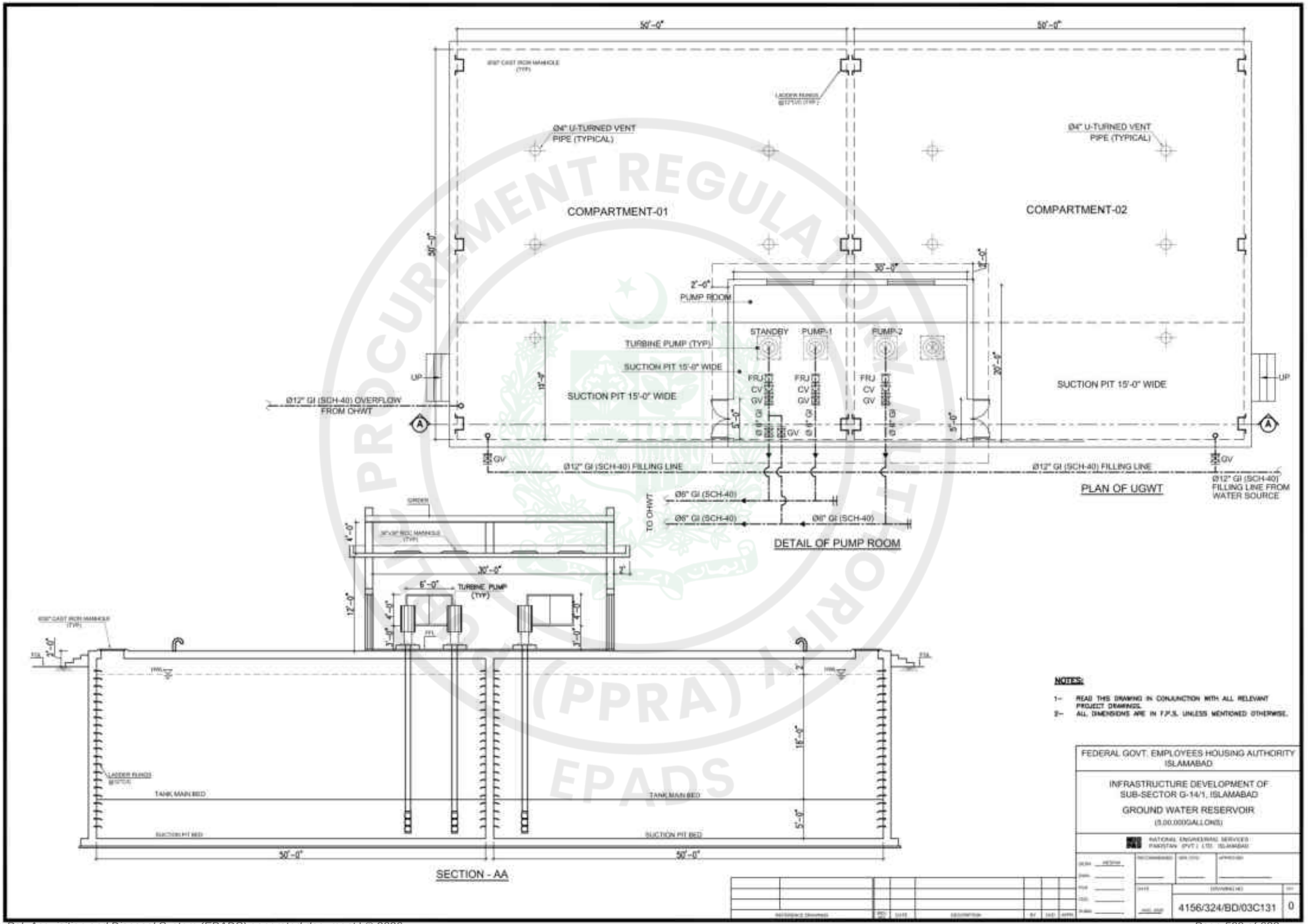

NOTES:

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2- ALL DIMENSIONS ARE IN F.P.S. UNLESS MENTIONED OTHERWISE.

FEDERAL GOVT. EMPLOYEES HOUSING AUTHCIRITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1, ISLAMABAD

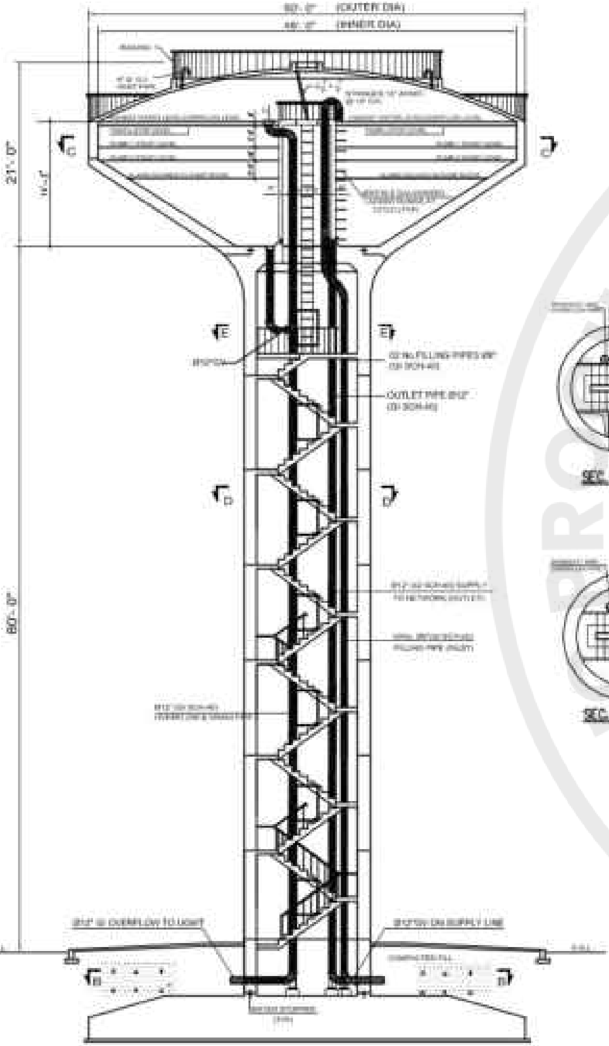
GROUND WATER RESERVOIR

(5,00,000GALLONS)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

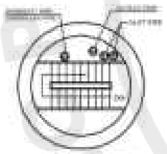
DRAWING NO: 4156/324/BD/03C131 | 0

PROCUREMENT REGULATORY AUTHORITY PPRA EPADS

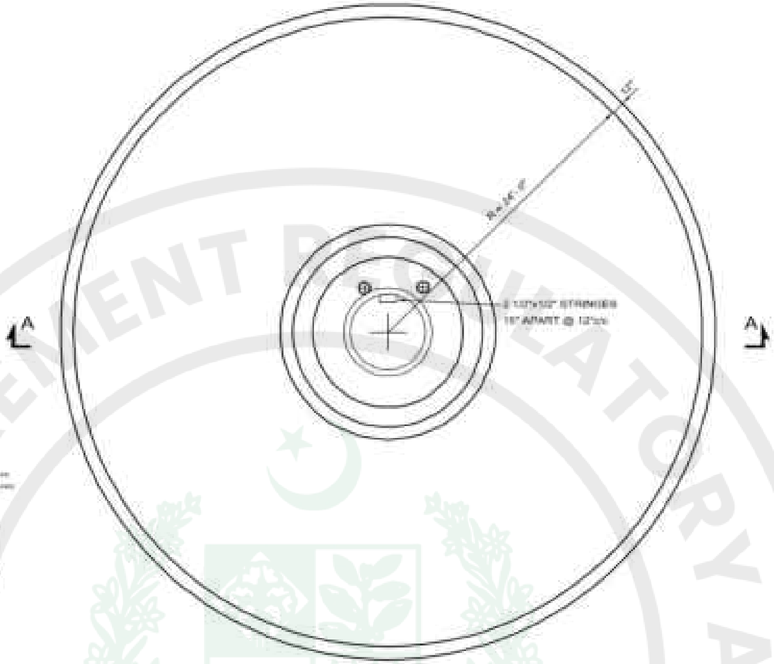


SECTION A-A

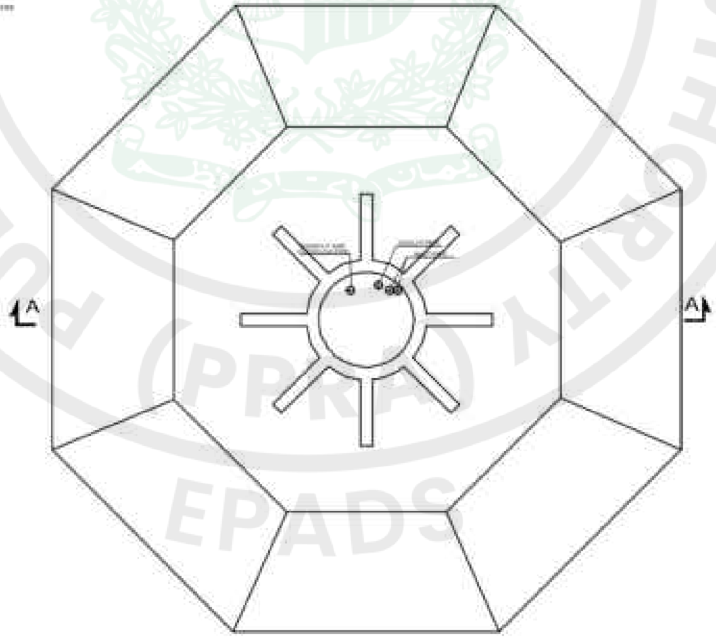
SEC. PLAN E-E



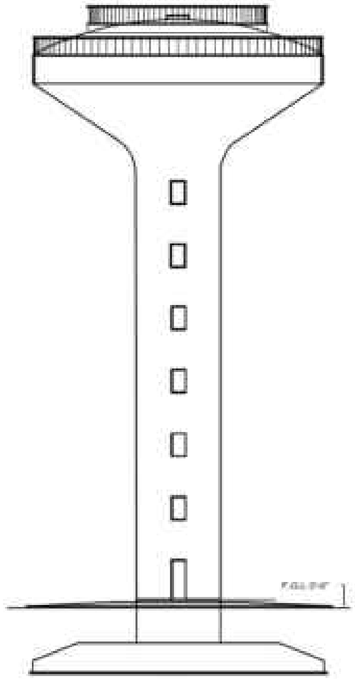
SEC. PLAN D-D



SEC. PLAN C-C



SEC. PLAN B-B



VIEW F-F

NOTES:

1- READ THIS DRAWING IN CONJUNCTION WITH ALL RELEVANT PROJECT DRAWINGS.
2- ALL DIMENSIONS ARE IN F.P.S. UNLESS MENTIONED OTHERWISE.

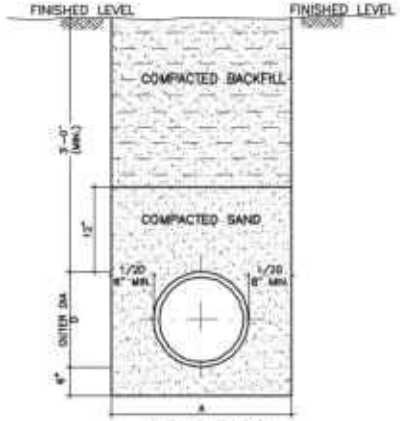
FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD

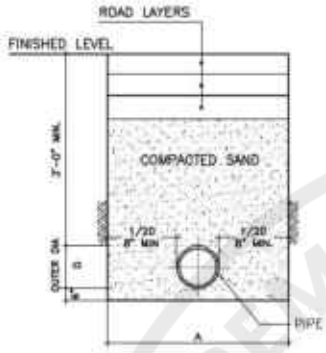
ELEVATED WATER TANK
(100,000 GALLONS)

NATIONAL ENGINEERING SERVICES
PAKISTAN (PVT.) LTD. ISLAMABAD

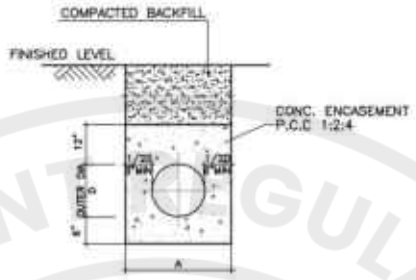
4156/324/BD/03C132 | 0



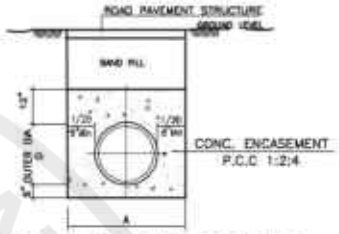
TRENCH DETAIL
(GENERAL)



DETAIL FOR PIPE
CROSSING UNDER ROAD
(COVER MORE THAN 3')

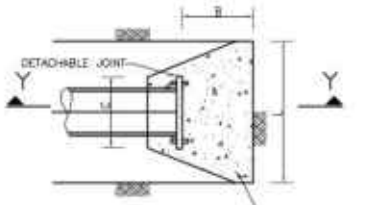


CONCRETE ENCASEMENT
(ONLY AT LOCATIONS APPROVED
BY THE ENGINEER)

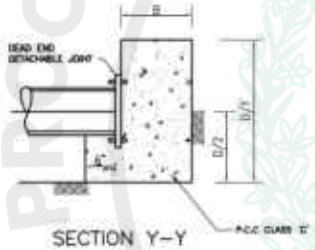


DETAIL FOR PIPE CROSSING
ROAD (COVER LESS THAN 3')

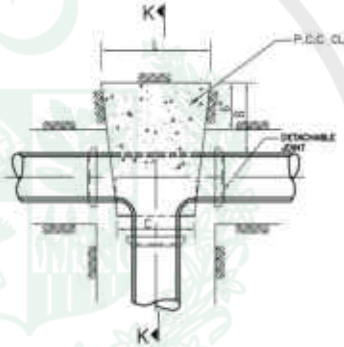
TABLE –2			
SEHEDULE OF TRENCH			
SR. NO.	PIPE INSIDE DIA.	WIDTH (A) WITH TIMBERING	WIDTH (A) WITHOUT TIMBERING
1	3"	2'–0"	3'–0"
2	4"	2'–0"	3'–0"
3	6" & 8"	2'–6"	3'–0"
4	10" & 12"	3'–0"	3'–0"
5	15" & ABOVE	4'–0"	4'–0"



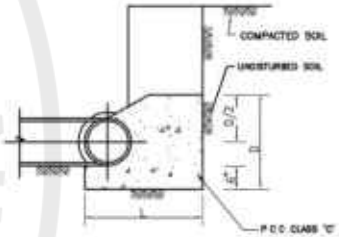
PLAN DEAD END BLOCK



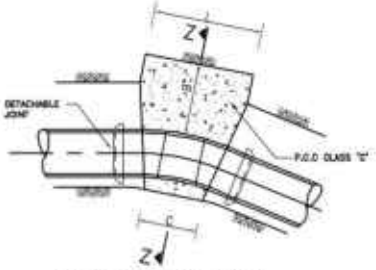
SECTION Y–Y



PLAN TEE



SECTION K–K



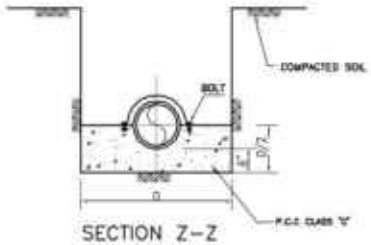
PLAN 22 1/2° BEND

PLAN 45° BEND

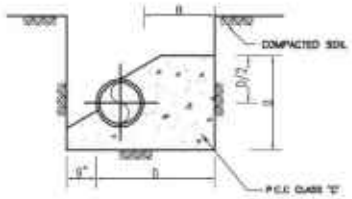
PLAN 90° BEND

ANCHOR BLOCK DIMENSIONS FOR PIPE FITTINGS																
DIA IN INCH	AT TEES AND DEAD ENDS				AT 90° BENDS				AT 45° BENDS				AT 22 1/2° BENDS			
	C	B	D	L	C	B	D	L	C	B	D	L	C	B	D	L
3	4	12	12	12	2	12	24	12	4	12	12	12	6	12	12	12
4	6	12	12	12	2	12	24	18	4	12	12	12	6	12	12	12
6	8	12	15	24	2	18	24	30	4	12	18	18	6	12	18	12
8	12	12	18	33	6	18	27	36	12	12	21	24	18	12	18	21
10	12	12	24	42	8	27	27	48	14	12	27	30	18	12	24	21
12	21	12	30	48	10	30	33	60	16	18	30	36	21	12	27	24

NOTE:– ALL DIMENSIONS ARE IN INCHES.



SECTION Z–Z



SECTION X–X

NOTES:–

1. ALL DIMENSIONS ARE IN FPS SYSTEM UNLESS MENTIONED OTHERWISE.
2. THRUST BLOCKS SHALL BE OF C3000 PSI CONCRETE.
3. READ THIS DRAWING IN CONJUNCTION WITH ALL RELEVANT DRAWINGS.
4. CONC. CLASS C, B & S CORRESPONDS TO MIX RATIO 1:2:4, 1:1.5:3 AND 1:1:2 RESPECTIVELY.
5. THRUST BLOCKS FOR 12" DIA. SHALL BE USED FOR FOR PIPE DIAS. ABOVE 12".

FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB SECTOR G-14/1, ISLAMABAD
MISCELLANEOUS DETAIL WATER WORKS
(SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

REFERENCE DRAWINGS	NO.	DATE	DESCRIPTION	BY	CHK.	APPD.

DESN.	RECOMMENDED	CHK.	APPROVED
DRN.			
CHK.			
DATE	DRAWING NO.		NO.
	4156/324/BD/03C133		0

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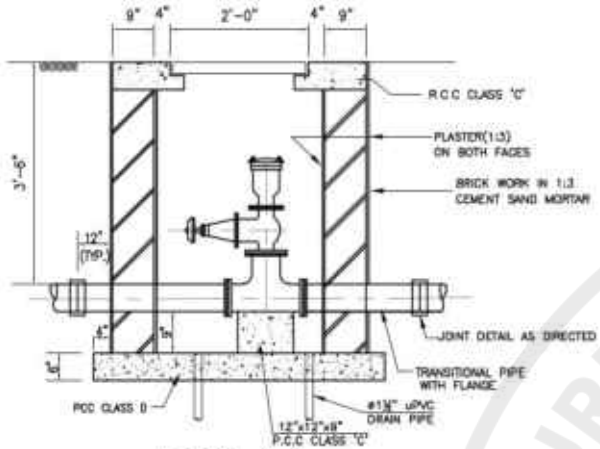
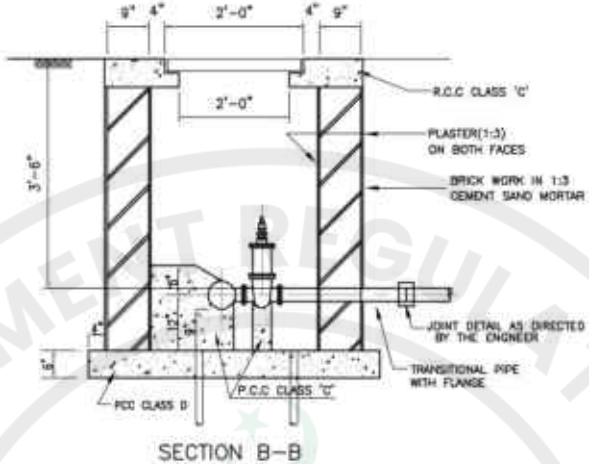


SECTION A–A



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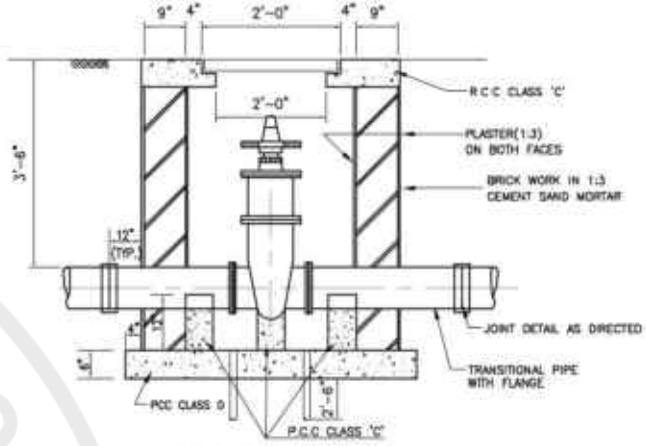
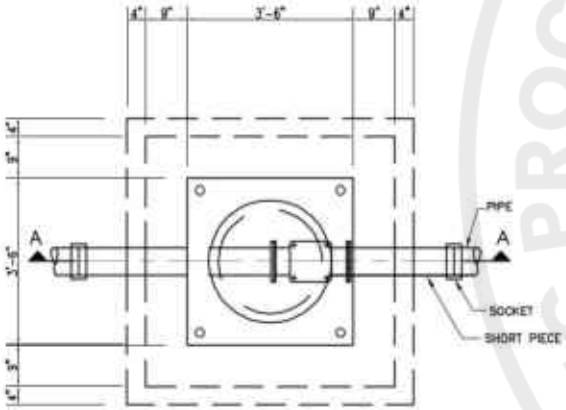
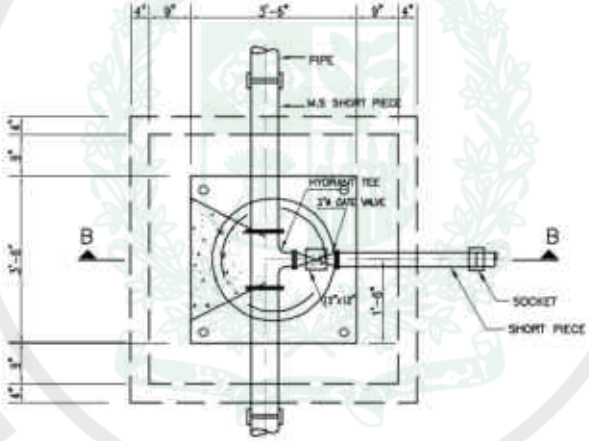


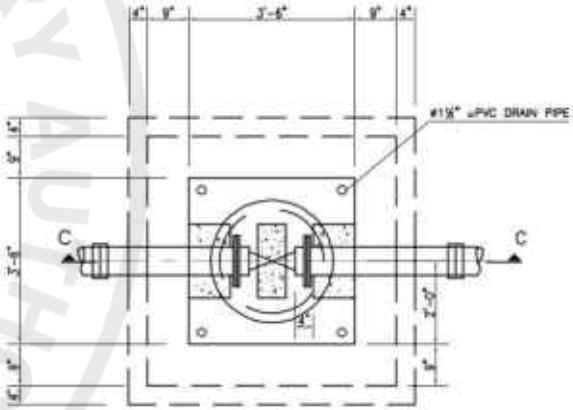
SECTION C–C



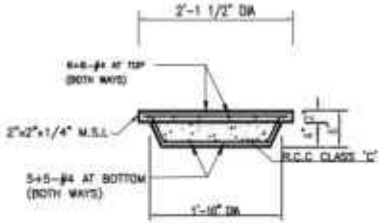
SECTIONAL PLAN OF AIR VALVE CHAMBER



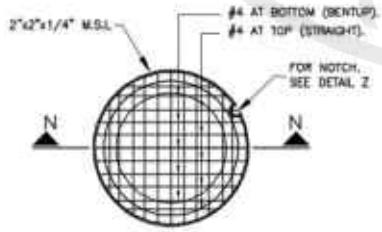
SECTIONAL PLAN OF WASHOUT CHAMBER



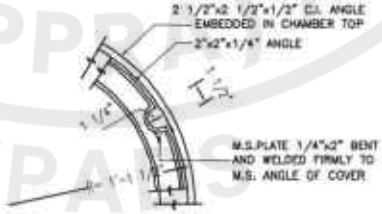
SECTIONAL PLAN OF GATE / SLUICE VALVE CHAMBER



SECTION N–N



DETAIL D
MANHOLE COVER PLAN



DETAIL–Z

NOTES:

1. READ THIS DRAWINGS IN CONJUNCTION WITH ALL RELEVANT PROJECT DRAWINGS.
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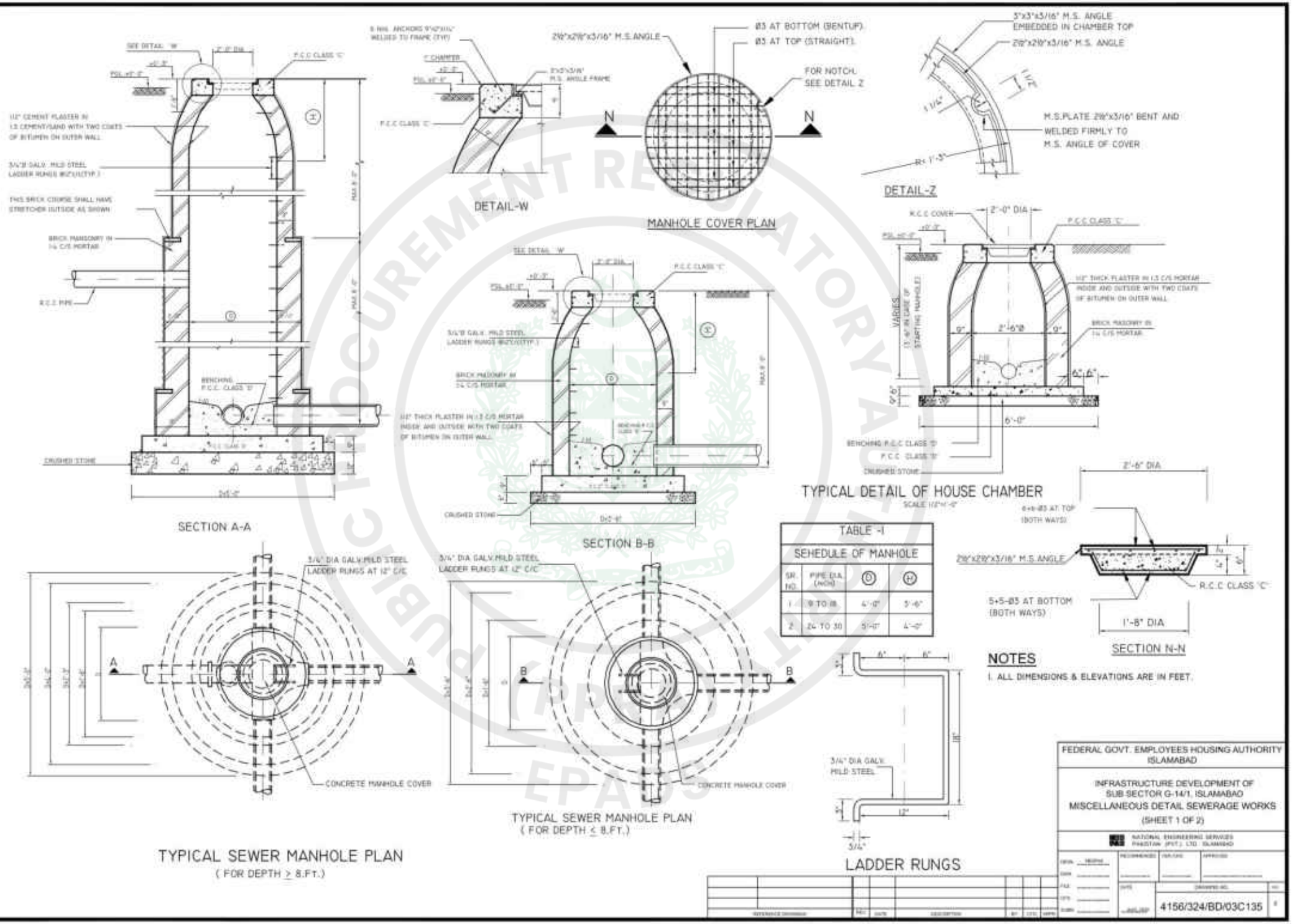
FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB SECTOR G-14/1, ISLAMABAD
MISCELLANEOUS DETAIL WATER WORKS
(SHEET 1 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DRAWING NO. 4156/324/BD/03C134

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS



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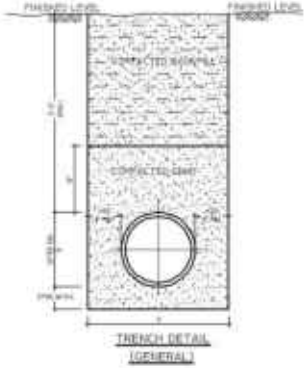
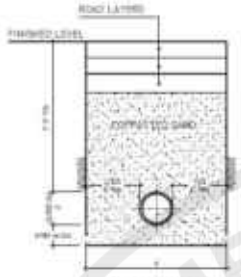
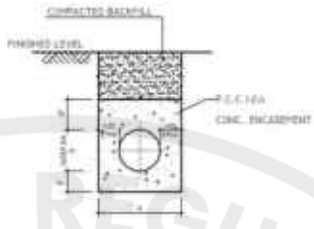


TRENCH DETAIL (GENERAL)



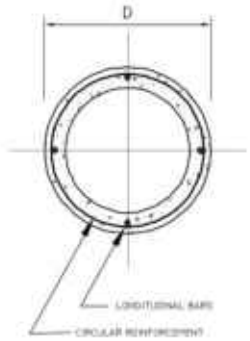
DETAIL FOR PIPE CROSSING UNDER ROAD (COVER MORE THAN 3')

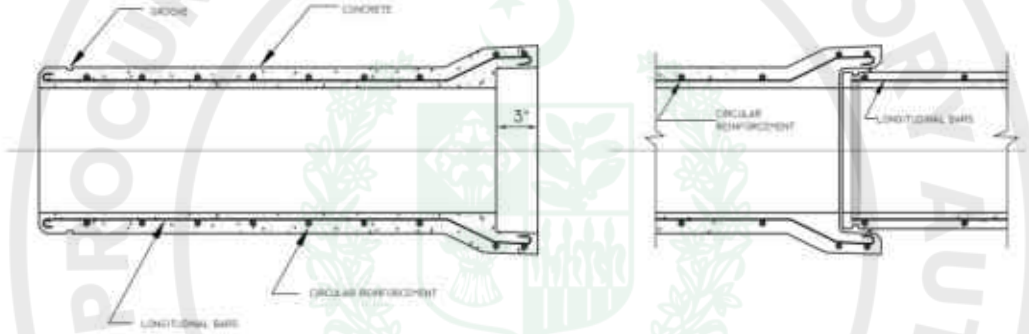


CONCRETE ENCASEMENT (ONLY AT LOCATIONS APPROVED BY THE ENGINEER)

DETAIL FOR PIPE CROSSING ROAD (COVER LESS THAN 3')

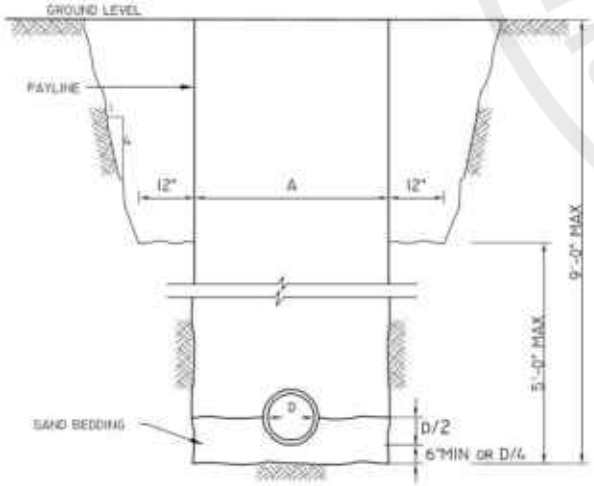
TABLE -1			
SEHEDULE OF TRENCH			
SR. NO.	PIPE INSIDE DIA.	WIDTH (A) WITH TIMBERING	WIDTH (A) WITHOUT TIMBERING
1	9"	2'-6"	3'-0"
2	12"	3'-0"	3'-6"
3	15"	3'-3"	4'-0"
4	18"	3'-6"	4'-6"
5	24"	4'-0"	5'-0"
6	30	4'-6"	5'-6"





SPECIFIC SOCKET AND SPIGOT JOINT AND REINFORCEMENT DETAILS

TABLE -2			
SLOPE OF SEWER			
SR. NO.	PIPE DIAMETER	MINIMUM SLOPE	MAXIMUM SLOPE
1	12"	0.5%	4%
2	18"	0.5%	3%
3	24"	0.5%	2%
4	30"	0.5%	1%



SECTION OF TRENCH WITHOUT TIMBERING & BRACING REFER TABLE-I

TABLE - 3									
RECOMMENDED R.C.C PIPES OF 8FT. BARREL LENGTH (WALL THICKNESS AND REINFORCEMANT DETAILS)									
SR. NO.	PIPE INNER DIA.	WALL THICKNESS	SIZE OF RING BARS	NOS.OF CIRCULAR RINGS		NO.OF RINGS FOR BELL	STAIRGHT BARS		
				INNER CAUGE	OUTER CAUGE		DIA.	NO. OF BARS INNER CAUGE	NO. OF BARS OUTER CAUGE
1	6" **	1"	3/16"	25	-	2	3/16"	4	-
2	9" **	1"	3/16"	25	-	2	3/16"	4	-
3	12" *	2"	3/16"	25	-	2	3/16"	4	-
4	15" *	2 1/4"	3/16"	25	-	2	3/16"	4	-
5	18" *	2 1/2"	3/16"	25	-	2	3/16"	4	-
6	24" *	3"	3/16"	25	-	2	3/16"	5	-

* ASTM C76/90 CLASS II WALL 'B' PIPES
** BSS 5911 PART 1 1981 CLASS 'L'

NOTES:
1. READ THIS DRAWING IN CONJUNCTION WITH ALL RELEVANT PROJECT DRAWINGS.
2. ALL DIMENSIONS ARE IN F.P.S. UNLESS MENTIONED OTHERWISE.
3. THE WEIGHT OF THE STEEL CAGE TO BE APPROVED BY THE SITE ENGINEER BASED UPON THE NUMBER OF BAR AS MENTIONED IN TABLE-3.

FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB SECTOR G-14/1, ISLAMABAD

MISCELLANEOUS DETAIL SEWERAGE WORKS

(SHEET 2 OF 2)

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DRAWING NO. 4156/324/BD/03C136

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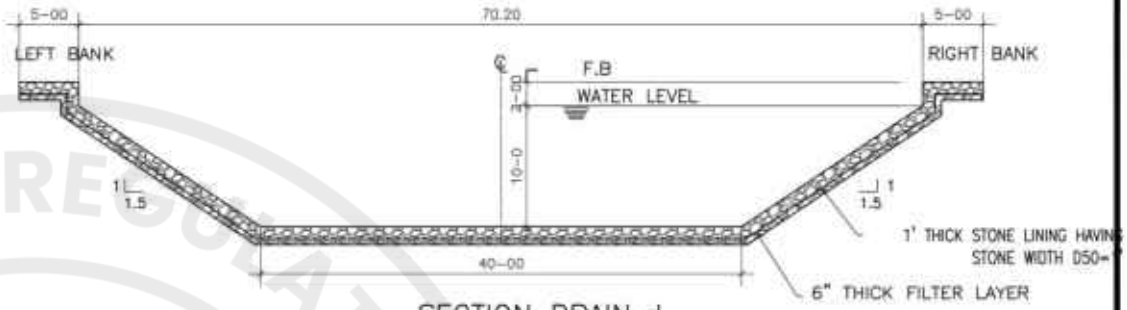
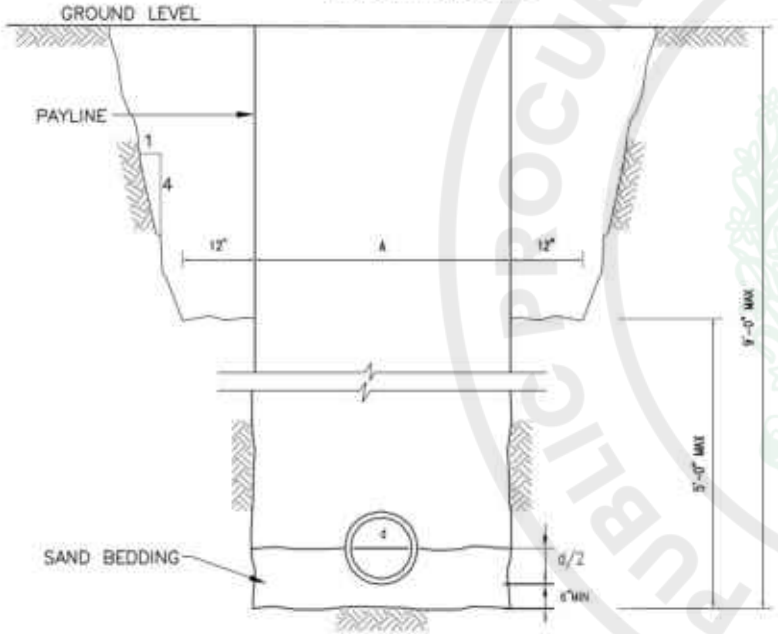
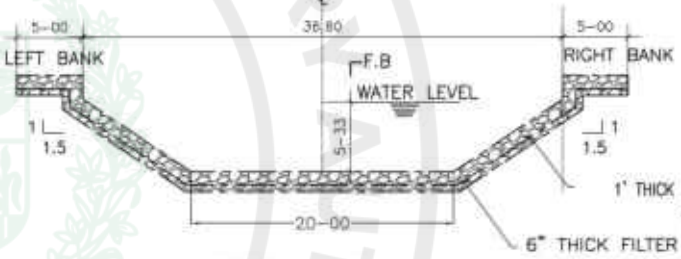
PLAN
TYPICAL DRAINAGE OUTLET STRUCTURE
WHERE NECESSARY



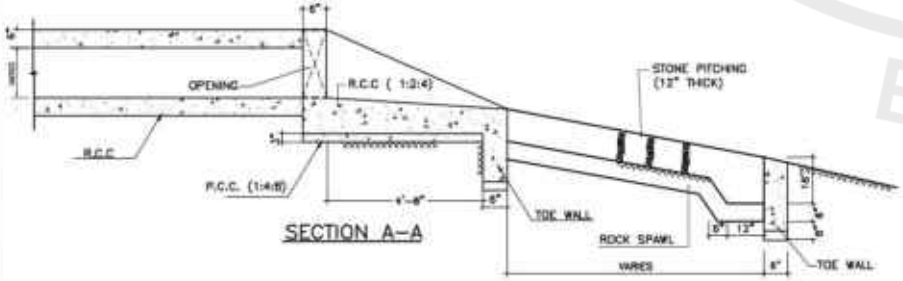
SECTION DRAIN-I
(NULLAH)



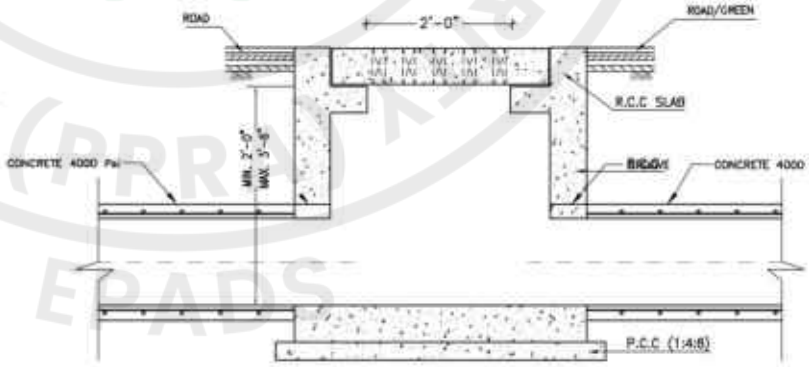
SECTION OF TRENCH
WITHOUT TIMBERING & BRACING



SECTION DRAIN-II
(NULLAH)



SECTION A-A



DRAIN PIPE COLLECTION CHAMBER
TYPICAL DETAIL

NOTES:
1. READ THIS DRAWING IN CONJUNCTION WITH ALL RELEVANT PROJECT DRAWINGS.
2. ALL DIMENSIONS ARE IN F.P.S. UNLESS MENTIONED OTHERWISE.

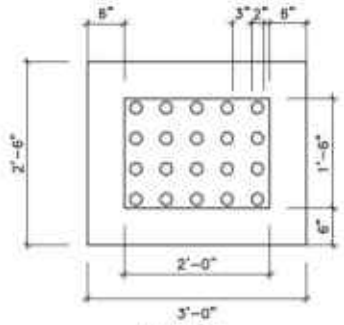
FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD
MISCELLANEOUS DETAIL DRAINAGE WORKS
(SHEET 1 OF 2)

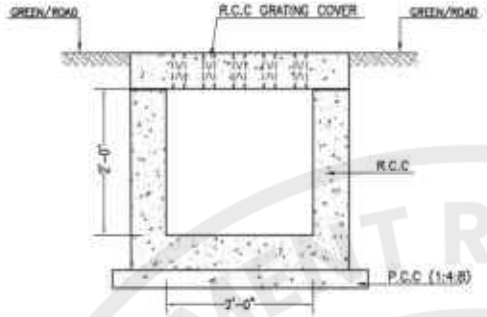
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DRAWING NO. 4156/324/BD/03C137

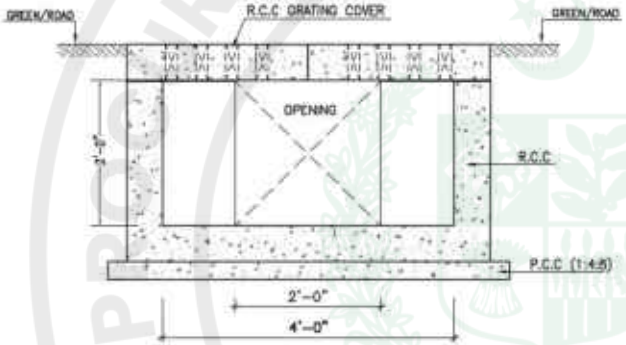
PUBLIC PROCUREMENT REGULATORY AUTHORITY
EPADS



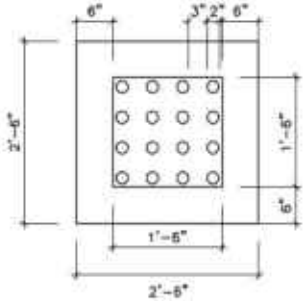
PLAN OF
RCC GRATING COVER (150mm THICK)
(3'-0" x 2'-6")
(OTHER THAN ROAD CROSSINGS)



SECTION D-D
RCC COLLECTION CHAMBER



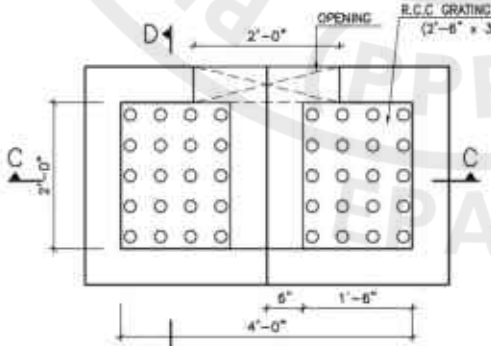
SECTION C-C
RCC COLLECTION CHAMBER



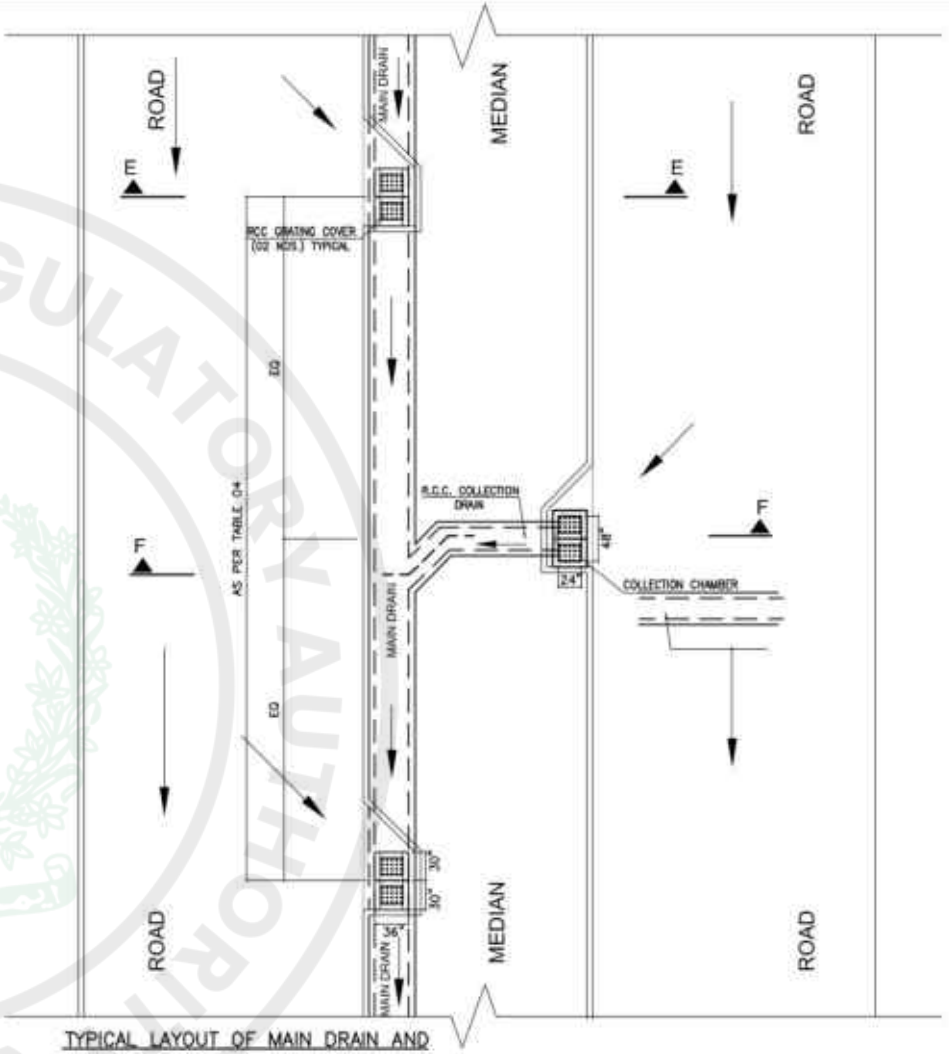
PLAN OF
RCC GRATING COVER (150mm THICK)
(2'-6" x 2'-6")
(OTHER THAN ROAD CROSSINGS)

TABLE-4

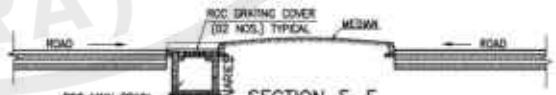
DISTANCE B/W COLLECTION CHAMBER	ROAD GRADIENT
100'	>4%
50'	2-4%
25'	<2%



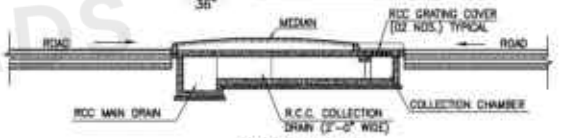
PLAN OF RCC COLLECTION CHAMBER



TYPICAL LAYOUT OF MAIN DRAIN AND
COLLECTION CHAMBER ALONG MEDIAN



SECTION E-E



SECTION F-F

NOTES:
1. READ THIS DRAWING IN CONJUNCTION WITH ALL RELEVANT PROJECT DRAWINGS.
2. ALL DIMENSIONS ARE IN F.P.S. UNLESS MENTIONED OTHERWISE.

FEDERAL GOVT. EMPLOYEES HOUSING AUTHORITY
ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF
SUB-SECTOR G-14/1, ISLAMABAD
MISCELLANEOUS DETAIL
MAIN DISPOSAL CHANNEL
(SHEET 2 OF 2)

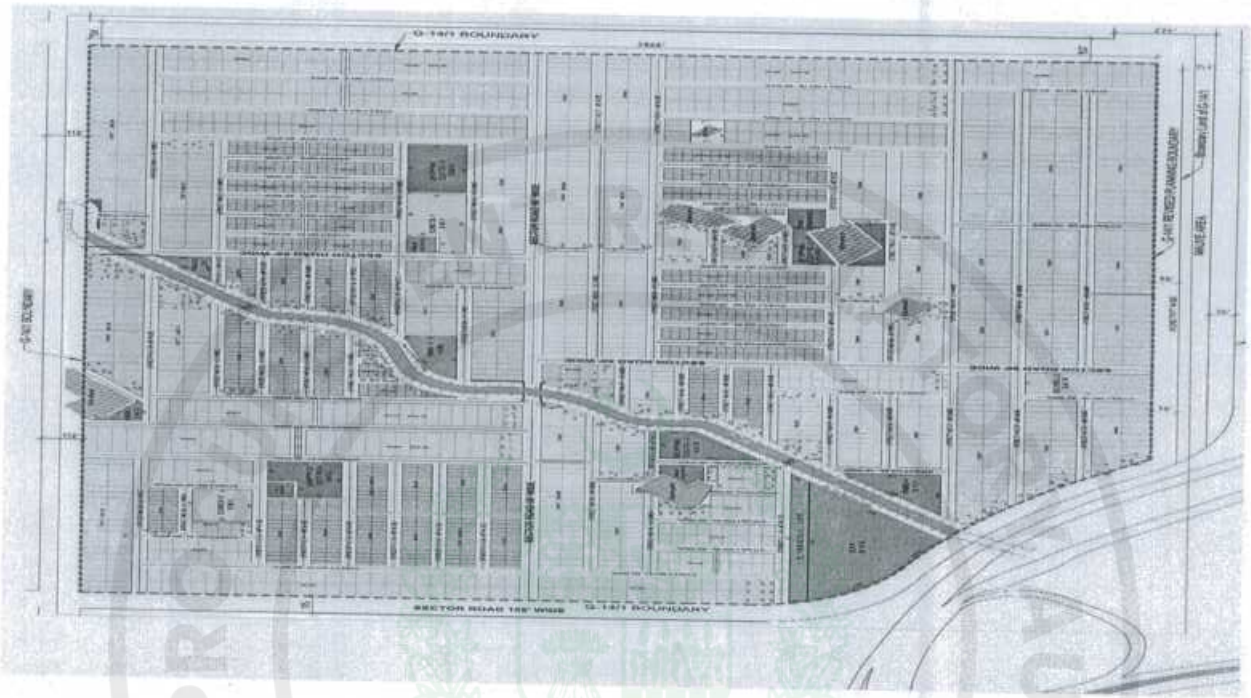
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. ISLAMABAD

DESIGN	RECOMMENDED	VERIFIED	APPROVED
DRAWN			
FILE			
CHECKED			
SCALE	DATE	DRAWING NO.	REV.
		4156/324/BD/03C138	0

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY, ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB SECTOR G-14/1, ISLAMABAD



PRICE BID

BIDDING DOCUMENT VOLUME – IV

LETTER OF PRICE BID
PREAMBLE TO ESTIMATES
ESTIMATES

SEPTEMBER 2026

Clearance Code	:	4156/321/BD/078(26)
Doc No	:	04
Rev No.	:	0

National Engineering Services Pakistan (Pvt.) Limited
NESPAK House Sector G-5/2, Islamabad, Pakistan
Phone: +92-51-9221910 - 13
Fax: +92-51-9221914
Email: Islamabad@nespak.com.pk
http://www.nespak.com.pk

Letter of Price Bid

Name of Contract: **"Infrastructure Development Works for Sub Sector G-14/1 (Phase-I), Islamabad"**

To: **Director Technical**
Federal Government Employees Housing Authority,
10-Mauve Areas, Sector G-10/4 Islamabad
Tel: 051-910 60 58

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 (IB)9;

(b) The total price of our Bid, excluding any discounts offered in item (c) below is:

Rs.....

(c) The discounts offered and the methodology for their application are:

Rs.....

(d) Our Bid shall be valid for a period of 120 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;

(e) If our Bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents;

(f) 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 and we do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other bidder for the Works.

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

(h) We agree to permit Employer or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors. This permission is extended for verification of any information provided in our Technical Bid which comprises all documents enclosed herewith in accordance with IB.11.1 of the Bidding Data Sheet.

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

Name .....

In the capacity of .....

Signed .....

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

Date .....

Address.....

ESTIMATES

PREAMBLE

1. **FOR SCHEDULED AND NON-SCHEDULED ITEMS, THE BIDDER SHALL QUOTE PERCENTAGE ABOVE OR BELOW ON THE AMOUNT PUT TO BID AND GIVEN IN THE SUMMERY OF COST OF ESTIMATE.**

2. The Estimate/ BOQ shall be read in conjunction with the Conditions of Contract, Specifications and Drawings.

3. The Quantities given in the Estimates/ BOQ are estimated and provisional quantities and are given to provide a common basis for bidding. The basis for payment will be the actual quantities of work executed and measured by the Contractor and verified by the Engineer and valued at the rates and prices entered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix with provisions of the Contract.

4. The rates and prices entered in the Priced Bill of Quantities shall, except insofar as it is otherwise provided under the Contract include all costs of Contractor's plant, labour, supervision, materials, execution, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out or implied in the Contract. Furthermore, all duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date 28 days prior to deadline for submission of Bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder.

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

6. In case of any discrepancy in description, unit or rate of any scheduled item provided in the BOQ is found, the description, unit or rate of item as provided in Pak. PWD Schedule of Rates 2022 shall prevail. In case any item of work is missing in the BOQ which is required to be executed at site, the same shall be obtained from Pak PWD schedule of rates provided the same is available in schedule of rates, contrary to this the item may be prepared based on market rates (with rate analysis) conforming to contractual procedures.

7. General directions and description of work and materials are not necessarily repeated nor summarised in the Priced BOQ. References to the relevant sections of the Bidding Documents shall be made.

8. The items mentioned in the BOQ consist of furnishing all plant, labor, equipment, machinery, appliances, materials, fittings, fixtures, fabrication, erection and installation required for completing the items/works. The work shall be done in accordance with the Drawings, Technical Specifications, BOQ and directions of the Engineer complete in all respect.

9. Pak. PWD Specifications and the Technical Specifications enclosed in Volume-II (Technical Provisions) of Bidding/Contract Documents shall be applicable for schedule Items and the non-schedule items, respectively. "Ref Spec. No. indicates the specification section number which as a whole or part (for which the Engineer shall be the sole judge) of these specifications are to be followed during execution of the item of work in accordance with the applicable drawings.

10. Complete description of items of works in the BOQ, general directions, conditions and limitations of works, location and place of works, applicable methods, means to be adopted, type and quality of materials, use of tools, plant, and machinery are not necessarily mentioned in the BOQ. Theses shall be referred to in accordance with the Drawings and Technical Specifications.

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11. The bidder may ensure himself of the correctness of quantities and application of the individual items of works as per the Drawings, Technical Specifications and Contract Documents.

12. Notwithstanding provisions of Clause 51 of the General Conditions of Contract Part-I, no claim for extra payment will be admissible on account of anticipated profit or variation in overheads expenditure for the works not actually performed nor will any adjustment in the unit rate set forth in the Estimate be made because of any increase or decrease in the quantities indicated therein.

13. Unless otherwise stated in the text of the priced Bill of Quantities, the quantities have to be measured and paid in accordance with the Measurement and Payment Clauses given in the relevant Technical Specifications or in accordance with implied meaning of the specifications. Any special method of measurement stated in the text of priced Bill of Quantities is limited to the concerned items only.

14. The following abbreviations for the Units have been used in the Estimate:

Unit	Abbreviations
Running feet	Rft. / Ft
Running Meter	M
Square feet	Sft.
Cubic feet	Cft.
Metric Ton	M.Ton.
Kilogram	Kg.
Per Number	Each, Number, No.
Lump Sum Job	Job, Lot

Authorized Signature and official Seal: _____

Name: _____

Date: _____

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INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB-SECTOR G-14/1 (PHASE-I), ISLAMABAD

BILL OF QUNATITIES / ESTIMATES

TABLE OF CONTENTS

Sr. No	BILL DESCRIPTION	PAGES
1.	Roads, walkways and Paved areas	01 to 09
2.	Storm water Drainage Works	01 to 06
3.	Sanitary Sewerage Works	01 to 10
4	Potable Water Supply Works	01 TO 07
5	Road/ street Lighting Works	01 TO 06
6	Elevated Water Tank (Civil Works)	01 TO 15
7	Elevated Water Tank (Plumbing Works)	01 TO 02
8	Elevated Water Tank (Electrical Works)	01 TO 04
9	Underground Water Tank/Pump Room(Civil Works)	01 TO 11
10	Underground Water Tank (Plumbing Works)	01 TO 03
11	Underground Water Tank (Electrical Works)	01 TO 05
12	Tubewell Room (Civil Works)	01 TO 08
13	Tubewell Drilling works (Plumbing Works)	01 TO 03
14	Tubewell Drilling / Room (Electrical Works)	01 TO 05
15	Cross Drainage Structures Works	01 TO 04
16	Nullah Channelization Works	01 TO 02
17	Geo-Technical Investigation Works	01 TO 03
18	Dismantling and Clearance of Site	01 to 03

Authorized Signature and official Seal: _____

Name: _____

Date: _____

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

ABSTRACT OF COST

S.No	Description	Unit	Amount
A	**SCHEDULED ITEMS- PWD SCHEDULE OF RATES - 2022**		
1	Roads Walkways and Paved areas	= Rs	730,952,455
2	Storm Water Drainage works	= Rs	168,639,445
3	Sanitary Sewerage Works	= Rs	208,809,003
4	Potable Water Supply works	= Rs	61,360,743
5	Road/ Street Lighting Works	= Rs	90,222,734
6	Elevated Water Tank		
a	Civil Works	= Rs	52,842,092
b	Plumbing Works	= Rs	87,930
c	Electrical works	= Rs	402,556
7	Underground Water Tank (02 Nos.)		
a	Civil Works	= Rs	99,653,632
b	Plumbing Works	= Rs	1,186,544
c	Electrical works	= Rs	4,399,096
8	Tubewells (02 Nos.)		
a	Civil Works	= Rs	1,452,132
b	Plumbing Works	= Rs	4,674,440
c	Electrical works	= Rs	1,066,420
9	Cross Drainage Works	= Rs	190,578,581
10	Channelization of Storm water Nallah	= Rs	84,112,791
11	Dismentaling	= Rs	144,807,076
	Total of Schedule Items without Premium	**= Rs**	**1,845,247,669**
	% Above / Below (----------)		
	Total of Scheduled Items with Premium (A)	**= Rs**	

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

ABSTRACT OF COST

S.No	Description	Unit	Amount
B	**NON-SCHEDULED ITEMS**		
1	Roads Walkways and Paved areas	= Rs	54,289,221
2	Storm Water Drainage works	= Rs	-
3	Sanitary Sewerage Works	= Rs	26,399,080
4	Water Supply works	= Rs	462,789,375
5	Road/ Street Lighting Works	= Rs	213,759,214
6	Elevated Water Tank		
a	Civil Works	= Rs	302,280
b	Plumbing Works	= Rs	7,892,175
c	Electrical works	= Rs	356,050
7	Underground Water Tank (02 Nos.)		
a	Civil Works	= Rs	4,937,250
b	Plumbing Works	= Rs	32,522,106
c	Electrical works	= Rs	989,876
8	Tubewells (02 Nos)		
a	Civil Works	= Rs	53,945
b	Plumbing Works	= Rs	20,130,514
c	Electrical works	= Rs	767,586
9	Geo-Technical Investigations	= Rs	1,185,550
10	Channelization of Storm water Nallah	= Rs	-
11	Dismentaling	= Rs	-
	Total of Non-Scheduled Items	**= Rs**	**826,374,222**
	% Above / Below) (----------)		
	Total of Non-Schedule Items with premium (B)	**= Rs**	
	Total Amount of (Scheduled & Non-Scheduled) Items with Premium (A+B)	**= Rs**	

Note:
Single rate will be quoted by bidder for all brands and it will be descretion of the Engineer/ Employer to approve the technical submittal of the same.

Total A+B (Scheduled + Non-scheduled) = _____

In Words:

(_____)

Note: The bidder shall carry over the Grand Total Amount to Letter of Price Bid page LPB-1

PUBLIC PROCUREMENT REGULATORY AUTHORITY PPRA EPADS

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

ROADS, WALKWAYS & PAVED AREAS

ENGINEER'S ESTIMATE

Item No.	Ref PWD CSR 2022	Description	Unit	Quantity	Unit Rate (Rs.)	Total Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		GENERAL NOTE				
		Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per specifications and as approved by the Engineer.				
		SCHEDULED ITEMS				
		SECTION-B. EARTHWORK				
RD-C-01	103-1	Excavation for foundation trenches and drains in all kinds of soil (except gravelly and murum soil, wet silt, clay or mud conglomeration of gravel and boulders, soft, sandy or disintegrated sandy and hard rock) and back filling the excavated material in foundation, plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead upto one chain (30.5 R.m)				
		Lift upto 5 feet	100 Cft	91,655	*1,624.63*	1,489,055
RD-C-02	103-2	Excavation for foundation trenches and drains in gravelly soil and back filling the excavated material in foundation trenches plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m).				
			100 Cft	53,403	*1,862.13*	994,433

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. NESPAK ISLAMABAD

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

ROADS, WALKWAYS & PAVED AREAS

ENGINEER'S ESTIMATE

Item No.	Ref PWD CSR 2022	Description	Unit	Quantity	Unit Rate (Rs.)	Total Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
RD-C-03	103-5	Excavation for foundation trenches and drains in strata of conglomeration of gravel and boulder by hammering ,chiselling and jumper work including stacking of serviceable and unserviceable material sparatly, lead upto one chain (30.5 R.m) and lift as follows:				
		Lift upto 5 feet	100 Cft	13,094.00	*5,547.38*	726,374
RD-C-04	103-7	Excavation for foundation trenches and drains in soft or disintegrated rock, by hammering ,chiselling and jumper work including stacking of serviceable and unserviceable material sparatly, lead upto one chain (30.5 R.m) and lift as follows:				
		Lift upto 5 feet	100 Cft	2,619.00	*2,328.63*	60,987
RD-C-05		Excavation for foundation trenches and drains in hard rock by hammering chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m).				
		Lift upto 5 feet	100 Cft	3,928	*4,434.88*	174,202
RD-C-06	127-165	Excavation or cutting unsuitable common material by mechanical means and dispose of surplus excavated material up to 10 miles lead complete as per direction of Engineer incharge.				
			100 Cft	530,353	*1,073.32*	5,692,385
RD-C-07	127-169	Excavation or cutting surplus common material by mechanical means and dispose of surplus excavated material up to 10 miles lead complete as per direction of Engineer incharge.				
			100 Cft	521,229	*960.21*	5,004,893

National Engineering Services Pakistan, NESPAK, Islamabad

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

ROADS, WALKWAYS & PAVED AREAS

ENGINEER'S ESTIMATE

Item No.	Ref PWD CSR 2022	Description	Unit	Quantity	Unit Rate (Rs.)	Total Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
RD-C-08	127-170	Excavation or cutting surplus hard rock material by mechanical means and dispose of surplus excavated material up to 10 miles lead complete as per direction of Engineer incharge.	100 Cft	86,871	*3,228.08*	2,804,265
RD-C-09	127-171	Excavation or cutting surplus medium rock material by mechanical means and dispose of surplus excavated material up to 10 miles lead complete as per direction of Engineer incharge.	100 Cft	130,307	*2,400.82*	3,128,437
RD-C-10	127-172	Excavation or cutting surplus soft rock material by mechanical means and dispose of surplus excavated material up to 10 miles lead complete as per direction of Engineer incharge.	100 Cft	130,307	*1,989.21*	2,592,080
RD-C-11	127-173	Compaction of natural ground i/c levelling,dressing and watering complete as per direction of Engineer	100 Sft	1,487,484	*263.16*	3,914,463
RD-C-12	127-174	Granular back fill including watering and compacting complete as per Engineer incharge,	100 Cft	19,756	*5,667.89*	1,119,748
RD-C-13	127-175	Common back fill including watering and compacting complete as per Engineer incharge.	100 Cft	11,340	*889.09*	100,823
RD-C-14	127-176	Formation of Embankment from road way excavation in Common material ,including watering and compacting complete as per Engineer incharge.	100 Cft	5,179,583	*1,158.89*	60,025,669

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

ROADS, WALKWAYS & PAVED AREAS

ENGINEER'S ESTIMATE

Item No.	Ref PWD CSR 2022	Description	Unit	Quantity	Unit Rate (Rs.)	Total Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
RD-C-15	127-177	Formation of Embankment from road way excavation in hard rock material ,including watering and compacting complete as per Engineer incharge.	100 Cft	591,952	*2,945.07*	17,433,401
RD-C-16	127-178	Formation of Embankment from road way excavation in medium rock material ,including watering and compacting complete as per Engineer incharge.	100 Cft	517,958	*3,020.60*	15,645,439
RD-C-17	127-179	Formation of Embankment from road way excavation in soft rock material ,including watering and compacting complete as per Engineer incharge.	100 Cft	1,109,911	*2,721.62*	30,207,560
RD-C-18	127-180	Formation of Embankment from Borrow excavation in common material ,including watering and compacting complete as per Engineer incharge.	100 Cft	868,714	*2,028.59*	17,622,645
RD-C-19	127-183	Subgrade prepration in earth cut ,including watering and compacting complete as per Engineer incharge.	100 Sft	640,345	*736.33*	4,715,052
RD-C-20	127-191	Traffic road signs categary-3 (a) , including fixing in cement concrete 1:2:4 complete as per Engineer incharge.	Per Each	206	*35,638.48*	7,334,399
RD-C-21	127-192	Traffic road signs categary-3 (b) , including fixing in cement concrete 1:2:4 complete as per Engineer incharge.	Per Each	36	*64,163.97*	2,290,654
RD-C-22	127-193	Traffic road signs categary-3 (c) , including fixing in cement concrete 1:2:4 complete as per Engineer incharge.	Per Sft	432	*2,588.38*	1,118,180

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

ROADS, WALKWAYS & PAVED AREAS

ENGINEER'S ESTIMATE

Item No. (a)	Ref PWD CSR 2022 (b)	Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Total Amount (Rs.) (g)
RD-C-23	127-203	Pavement marking in reflective TP Paint for line of 15cm width,with road marking machine complete as per Engineer incharge.	Per Rft	35,487	*52.82*	1,874,423
RD-C-24	127-213	Refelectorised plastic pavement studs (raised profile type- single) fixed with epoxy adhesive complete as per direction of the Engineer incharge	Each	2,205	*362.67*	799,687
		SECTION-C. ROAD PAVEMENTS				
RD-C-25	127-29	Supplying and laying machine crushed 2-1/2" to 3/4" (64 mm to 19 mm) stone ballast of approved grade and quality in sub-base or base courses in required grade and camber and compacting to the required density by approved mechanical means (Vibratory Roller, Road Packer and Smooth Wheel Roller etc.) including watering with all lead and lift complete (actual compacted depth shall be considered for payment).	100 Cft	1,244,348	*8,261.52*	102,802,059
RD-C-26	127-31	Supplying and laying machine crushed 2" to 1/2" (51 mm to 13 mm) stone ballast of approved grade and quality in sub-base or base courses in required grade and camber and compacting to the required density by approved mechanical means (Vibratory Roller, Road Packer and Smooth Wheel Roller etc.) including watering with all lead and lift complete (actual compacted depth shall be considered for payment)	100 Cft	693,607	*8,529.02*	59,157,880
RD-C-27	127-55	Supplying, stacking and spreading murum of approved quality over stone metalling or brick ballast including watering, consolidation with power roller including all lead and lift.	100 Cft	775,182	*8,169.30*	63,328,943

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ROADS, WALKWAYS & PAVED AREAS

ENGINEER'S ESTIMATE

Item No.	Ref PWD CSR 2022	Description	Unit	Quantity	Unit Rate (Rs.)	Total Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
RD-C-28	127-77	Providing and laying hot-mix bituminous concrete pavement laid with mechanical paver and mixed in central mixing plant in required thickness and density, rolled hot with different types of rollers complete as per specifications and job-mix formula and design: in single layer upto 1-1/2" (38 mm) thickness inculding priming coat @20 Lbs per %Sft complete.	Ton	11,664	*12,858.73*	149,984,227
RD-C-29	127-79 + 127-81	Providing and laying 4" (102 mm) thick not leaner than 1:2:4 cement concrete (minimum works cube crushing strength of 3000 Lbs. PSI (211 Kg. per Sq.cm. at 28 days) in road, paths, crete-ways etc. using graded screened bajri in panels of approved size laid to required gradient and camber over any sub-grade including cost of necessary form work and its removal, compacting with vibrators (immersion or screen or both) belting the surface with canvas belt, roughening the surface after laying concrete with brush and curing etc. complete..	100 Sft	5,500	*12,887.82*	708,830
RD-C-30	127-94	Providing and laying 1:4:8 cement concrete in any thickness using 2" (51 mm) and down gauge stone ballast of approved grade and quality over prepared sub-grade or sand cushion in roads, paths, creteways laid to required gradient and camber including cost of necessary form work and its removal compacting with vibrators including curing etc. complete .	100 Cft	1,000	*27,877.27*	278,773

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

ROADS, WALKWAYS & PAVED AREAS

ENGINEER'S ESTIMATE

Item No.	Ref PWD CSR 2022	Description	Unit	Quantity	Unit Rate (Rs.)	Total Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		SECTION-D. ANCILLARY / MISCELLANEOUS WORKS				
RD-C-31	106-5 + 106-32 + 106-52	Providing and laying in situ 1:2:4 (1 cement 2 sand and 4 coarse aggregate) cement concrete using using 50 % crushed graded boulders 3/4 inch (19 mm) and down gauge and 50 % graded screened bajri 3/4 inch (19 mm) and down gauge in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet depth (1.52 m) and plinth up to 4 feet (1.2 m) height from ground level .	100 Cft	10,717	*39,230.33*	4,204,314
RD-C-32	106-11	Providing and laying in situ 1:4:8 (1 cement 4 sand and 8 coarse aggregate) cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet (1.52 m) depth and plinth up to 4 feet (1.2 m) height from ground level.	100 Cft	84,456	*32,221.55*	27,213,032
RD-C-33	113-8	Providing and laying dry uncoursed rubble Pitching 6" to 12" (152mm to 305 mm) thick Comolete.	100 Cft	23,898	*15,906.25*	3,801,276
RD-C-34	113-10 + 113-50	Providing and laying stone masonry random rubble second sort in cement mortar 1:4 in foundation, plinth and basement including scaffolding, curing etc. complete.	100 Cft	197,558	*35,138.36*	69,418,641

PPRA REGULATORY AUTHORITY EPADS

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

ROADS, WALKWAYS & PAVED AREAS

ENGINEER'S ESTIMATE

Item No. (a)	Ref PWD CSR 2022 (b)	Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Total Amount (Rs.) (g)
RD-C-35	117-178	Providing and laying in floor C.C. 1:2:4: tuff paver 2" thick of approved design and colour pattren laid on sand cushion filling of joint with sand and warring etc. complete as per direction of Engineer Incharge. (the cost of sand cushion is included)				
		a) Average strength 7000 psi	Sft	83,190	*121.38*	10,097,602
RD-C-36	122-112	Raised or cut pointing on stone work with cement mortot 1:3 (one cement and three sand) in plinth and ground floor including ranking, out joints ,cutting,etc, complete.	100 Sft	37,275	*3,105.39*	1,157,534
RD-C-37	126-6	Supplying and stacking approved garden soil (sweet earth) free from salts, pebbles and grass roots etc. including all leads and lifts.	100 Cft	77,254	*3,456.25*	2,670,083
RD-C-38	126-7	Spreading approved garden soil (sweet earth) in uniform thickness including mixing and breaking clods and dressing fine for grassing including disposal of rubbish within 3 chains (92 m) complete .	100 Cft	77,254	*296.88*	229,351
RD-C-39	126-13	Grassing fine by dribbling grass roots 3" apart including watering, weeding till such time the grass is set and becomes green and is fit for mowing	100 Sft	145,856	*755.00*	1,101,213
RD-C-40	127-115	Providing and laying road kerb of precast cement concrete 1:2:4 (24" long 6" wide and 12" deep (610 mm long 152 mm wide and 305 mm deep) using screened graded bajri, from work and its removal compacting and curing laid in cement mortar 1:4 and cement plaster 1:4 neatly finished including cost of excavation and back filling of excavated stuff and its disposal within one chain lead as desired.	100 Rft	43,200	*33,910.87*	14,649,496

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

ROADS, WALKWAYS & PAVED AREAS

ENGINEER'S ESTIMATE

Item No. (a)	Ref PWD CSR 2022 (b)	Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Total Amount (Rs.) (g)
RD-C-41	127-156	Supplying and stacking with all lead and lift: coarse sand or fine aggregate of approved quality and grading..	100 Cft	10,000	*4,002.00*	400,200
RD-C-42	127-160 + 127-162	Supplying, stacking and filling with all lead and lift, pit sand (local) in trenches, with or without blinding with coarse sand or fine aggregate in different layers as per design and direction of the Engineer-in-Charge including watering, ramming etc., complete.	100 Cft	530,353	*5,768.13*	30,591,450
RD-C-43	134-2	Cartage of sand, bajri, lime, surkhi, murum, manure, earth, building rubbish including loading, unloading and stacking etc. at site:				
	i)	1/2 mile (0.80km) lead of part thereof.	100 Cft	318,212	332.98	1,059,582
	ii)	1 mile (1.6 km) lead.	100 Cft	106,071	383.79	407,088
	iii)	2 miles (3.2 km) lead.	100 Cft	79,553	483.37	384,535
	iv)	3 miles (4.8 km) lead.	100 Cft	63,642	576.78	367,076
	v)	Extra per mile (1.6 km) above 3 miles to 6 miles (4.8 km to 9.6 km) of lead.	100 Cft	53,035	84.72	44,932
	vi)	Extra per mile (1.6 km) above 6 miles to 10 miles (9.6 km to 16 km) of lead.	100 Cft	37,125	72.95	27,082
					TOTAL OF SCHEDULED ITEMS =	730,952,455
		NON-SCHEDULED ITEMS				
RD-C-57	NS-01	Applying two coat of paint on kerb stones as per specifications and quality as directed and approved by the engineer.	Sft	37,785	83.51	3,155,425
RD-C-58	NS-02	Providing and Fixing Precast Concrete 7000 psi TUFF Tiles 80mm over bed of 2" thick sand	Sft	127,169	109.18	13,[illegible]
RD-C-59	NS-03 NHA-203b	Asphaltic Base Course Plant Mix (CLASS "B")	Cu.m	1,803	19,937.59	35,947,[illegible]
RD-C-60	NS-04 NHA-303b	Emulsified Asphalt for Bituminous Tack Coat.	Sq.m	23,660	55.03	1,302,010
					TOTAL OF NON-SCHEDULED ITEMS =	54,289,221

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

STORM WATER DRAINAGE WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
		GENERAL NOTE Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.				
		1. SCHEDULED ITEMS				
		SECTION A: EARTH WORK				
DR-01		Excavation for foundation trenches and drains in all kinds of soil (except gravelly and murum soil, wet silt, clay or mud conglomeration of gravel and boulders, soft, sandy or disintegrated sandy and hard rock) and back filling the excavated material in foundation, plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead upto one chain (30.5 R.m) and lift as follows:				
	103-1	Lift upto 5 feet	100 Cft	229,383	1,624.63	3,726,626
	103-1 + 103-28	Lift 5 to 8 feet	100 Cft	76,461	1,862.13	1,423,804
DR-02		Excavation for foundation trenches and drains in gravelly soil and back filling the excavated material in foundation trenches plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed lead upto one chain (30.5 R.m) and lift as follows:				
	103-2	Lift upto 5 feet	100 Cft	114,692	1,862.13	2,135,705
	103-2 + 103-28	Lift 5 to 8 feet	100 Cft	38,231	2,099.63	802,609

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

STORM WATER DRAINAGE WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
DR-03		Excavation for foundation trenches and drains in strata of conglomeration of gravel and boulders by hammering, chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift as follows:				
	103-5	Lift upto 5 feet	100 Cft	45,877	5,547.38	2,544,950
	103-5 + 103-29	Lift 5 to 8 feet	100 Cft	15,292	5,844.26	893,716
DR-04		Excavation for foundation trenches and drains in soft or disintegrated rock by hammering, chiselling and Jumper work including, stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift as follows:				
	103-7	Lift upto 5 feet	100 Cft	36,701	2,328.63	854,637
	103-7 + 103-29	Lift 5 to 8 feet	100 Cft	12,234	2,625.51	321,199
DR-05		Excavation for foundation trenches and drains in hard rock by hammering chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift as follows:				
	103-8	Lift upto 5 feet	100 Cft	32,114	4,434.88	1,424,201
	103-8 + 103-29	Lift 5 to 8 feet	100 Cft	10,705	4,731.76	506,513
DR-06	104-7	Supplying earth from approved site within the area acquired including digging or cutting, loading, unloading and filling in foundation trenches, plinth or under floor etc. including breaking clods, dressing watering and consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction complete within a lead of one chain (30.5 R.m) and lift of 5 feet (1.52 m) as directed by the Engineer-in-charge.	100 Cft	63,470	1,507.81	957,007

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS
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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

STORM WATER DRAINAGE WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
		SECTION B: RCC & MISC WORKS				
DR-07	106-11	Providing and laying in situ 1:4:8 (1 cement 4 sand and 8 coarse aggregate) cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet (1.52 m) depth and plinth up to 4 feet (1.2 m) height from ground level.	100 Cft	44,842	32,221.55	14,448,727
DR-08	106-12	Providing and laying in situ 1:3:6 (1 cement 3 sand and 6 coarse aggregate) cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet (1.52 m) depth and plinth up to 4 feet (1.2 m) height from ground level .	100 Cft	10,500	34,857.58	3,660,046
DR-09	106-15	Providing and laying in situ 1:2:4 (1 cement 2 sand and 4 coarse aggregate) cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet (1.52 m) depth and plinth up to 4 feet (1.2 m) height from ground level .	100 Cft	2,500	39,059.08	976,477
DR-10	114-2 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge with lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch (20.69 N/mm^2) at 28 days with a mix not leaner than 1:2:4 in raft or strip foundation with columns and pillars, of any shape including form work and its removal, compacting, leveling and curing etc. complete but excluding the cost of reinforcement, in foundation basement and plinth	100 Cft	58,369	33,562.40	19,590,156

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

STORM WATER DRAINAGE WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
DR-11	114-9 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge with lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch (20.69 N/mm2) at 28 days with a mix not leaner than 1:2:4 in straight walls more than 6 inches (152 mm) thick including form work and its removal, compacting and curing etc. but excluding the cost of reinforcement, in foundation basement and plinth	100 Cft	38,120	45,915.19	17,502,870
DR-12	114-10 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge with lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch (20.69 N/mm2) at 28 days with a mix not leaner than 1:2:4 in straight walls 5" (127 mm) to 6" (152 mm) thick including form work and its removal, compacting and curing etc. but excluding the cost of reinforcement, in foundation basement and plinth	100 Cft	39,090	55,457.69	21,678,411
DR-13	114-56 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge with lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch (20.69 N/mm2) at 28 days with a mix not leaner than 1:2:4 in ordinary slab 5 inches (127 mm) to 6 inches (152 mm) thick Including form work and its removal compacting and curing etc. complete but excluding the cost of reinforcement, in basement plinth and ground floor	100 Cft	32,590	45,945.52	14,973,645

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STORM WATER DRAINAGE WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
DR-14	114-57 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge with lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch (20.69 N/mm2) at 28 days with a mix not leaner than 1:2:4 in ordinary slab more than 6 inches (152 mm) thick Including form work and its removal compacting and curing etc. complete but excluding the cost of reinforcement, in basement plinth and ground floor	100 Cft	28,590	44,075.39	12,601,154
DR-15	114-166	Providing and laying hard grade ribbed deformed (minimum yield point 60,000 psi) reinforcement bars with and including the cost of straightening, cutting, bending, binding, wastage and such overlaps as are not shown in the drawings, placing in position on cement concrete 1:2:4 precast or m.s. chairs, tying with binding wires, cost of chairs and wires etc. in all kinds of RCC works in foundation, basement, plinth and ground floor of building including septic tanks and under ground tanks and in projections for future extension.	kg	30,901	282.45	8,728,062
DR-16	114-167	Providing and laying ribbed deformed (minimum yield point 40,000 psi) reinforcement bars with and including the cost of straightening, cutting, bending, binding, wastage and such overlaps as are not shown in the drawings, placing in position on cement concrete 1:2:4 precast or m.s. chairs, tying with binding wires, cost of chairs and wires etc. in all kinds of RCC works in foundation, basement, plinth and ground floor of building including septic tanks and under ground tanks and in projections for future extension.	kg	92,704	266.70	24,724,101
		CARRIAGE				
DR-17	134-2	Cartage of sand, bajri, lime, surkhi, murum, manure, earth, building rubbish including loading, unloading and stacking etc. at site:				
	i)	1/2 mile (0.80km) lead of part thereof.	100 Cft	274,109	332.98	912,728
	ii)	1 mile (1.6 km) lead.	100 Cft	137,055	383.79	526,08[illegible]
	iii)	2 miles (3.2 km) lead.	100 Cft	54,822	483.37	264,99[illegible]
	iv)	3 miles (4.8 km) lead.	100 Cft	43,857	576.78	252,961

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

STORM WATER DRAINAGE WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
	v)	Extra per mile (1.6 km) above 3 miles to 6 miles (4.8 km to 9.6 km) of lead.	100 Cft	38,375	84.72	32,512
		uPVC PIPES				
DR-18		Providing and fixing un platisized polyvinyl chloride pipe (P.V.C) "D" class and specials etc. including cutting and fitting complete with and including the cost of cutting trench upto 1-1/2 feet deep refilling, watering, ramming, and disposal of surplus earth within one chain and after cleaning the pipe and cartage within 10 miles (16.09 km.) (working pressure 12 kg/cm^2)				
	306-25	4 inches (100 mm) dia pipe..	R.ft.	2000	600.01	1,200,020
	306-27	6 inches (150 mm) dia pipe..	R.ft.	1500	716.62	1,074,930
		RCC PIPES				
DR-19		Providing R.C.C. pipes and collars of class 'B' and fixing in trench including cutting, fitting and jointing with maxphalt composition and cement mortar (1:1) and back filling the excavated material in trench including testing with water to a pressure head of 50 feet (15.24m) and cartage within 10 miles (16.09 km), for the following				
	311-8	6 inches (610 mm) dia. pipe..	R.ft.	2500	1,821.32	4,553,300
	311-9	12 inches (765 mm) dia. pipe..	R.ft.	2300	2324.91	5,347,293
					TOTAL (SCHEDULED) =	168,639,445

PPRA REGULATORY AUTHORITY EPADS
FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY FGEHA
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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

SANITARY SEWERAGE WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

1. SCHEDULED ITEMS

SECTION-A - EARTH WORK FOR PIPE TRENCHES

SW-01 Excavation for foundation trenches and drains in all kinds of soil (except gravelly and murum soil, wet silt, clay or mud conglomeration of gravel and boulders, soft, sandy or disintegrated sandy and hard rock) and back filling the excavated material in foundation, plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead upto one chain (30.5 R.m) and lift as follows:

103-1	Lift upto 5 feet	100Cft	477000	1,624.63	7,749,485
103-1 + 103-28	Lift 5 to 8 feet	100Cft	198800	1,862.13	3,701,914
103-1 + 103-28	Lift 8 to 11 feet	100Cft	95400	2,099.63	2,003,047
103-1 + 103-28	Lift 11 to 14 feet	100Cft	23900	2,337.13	558,574

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

SANITARY SEWERAGE WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
SW-02		Excavation for foundation trenches and drains in gravelly soil and back filling the excavated material in foundation trenches plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed lead upto one chain (30.5 R.m) and lift as follows:				
	103-2	Lift upto 5 feet	100Cft	238500	1,862.13	4,441,180
	103-2 + 103-28	Lift 5 to 8 feet	100Cft	99400	2,099.63	2,087,032
	103-2 + 103-28	Lift 8 to 11 feet	100Cft	47700	2,337.13	1,114,811
	103-2 + 103-28	Lift 11 to 14 feet	100Cft	11900	2,574.63	306,381
SW-03		Excavation for foundation trenches and drains in strata of conglomeration of gravel and boulders by hammering, chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift as follows:				
	103-5	Lift upto 5 feet	100Cft	95400	5,547.38	5,292,201
	103-5 + 103-29	Lift 5 to 8 feet	100Cft	39800	5,844.26	2,326,015
	103-5 + 103-29	Lift 8 to 11 feet	100Cft	19100	6,141.14	1,172,958
	103-5 + 103-29	Lift 11 to 14 feet	100Cft	4800	6,438.02	309,025

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

SANITARY SEWERAGE WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
SW-04		Excavation for foundation trenches and drains in soft or disintegrated rock by hammering, chiselling and Jumper work including, stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift as follows:				
	103-7	Lift upto 5 feet	100Cft	76300	2,328.63	1,776,745
	103-7 + 103-29	Lift 5 to 8 feet	100Cft	31800	2,625.51	834,912
	103-7 + 103-29	Lift 8 to 11 feet	100Cft	15300	2,922.39	447,126
	103-7 + 103-29	Lift 11 to 14 feet	100Cft	3800	3,219.27	122,332
SW-05		Excavation for foundation trenches and drains in hard rock by hammering chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift as follows:				
	103-8	Lift upto 5 feet	100Cft	66800	4,434.88	2,962,500
	103-8 + 103-29	Lift 5 to 8 feet	100Cft	27800	4,731.76	1,315,429
	103-8 + 103-29	Lift 8 to 11 feet	100Cft	13400	5,028.64	673,838
	103-8 + 103-29	Lift 11 to 14 feet	100Cft	3300	5,325.52	175,742

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

SANITARY SEWERAGE WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
SW-06	104-7	Supplying earth from approved site within the area acquired including digging or cutting, loading, unloading and filling in foundation trenches, plinth or under floor etc. including breaking clods, dressing watering and consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction complete within a lead of one chain (30.5 R.m) and lift of 5 feet (1.52 m) as directed by the Engineer-in-charge.	100Cft	53700	1,507.81	809,694
SW-07	104-8	Supplying earth from approved outside sources within a radius of 5 miles(8 km) including digging, loading and unloading and filling in foundation trenches, plinth or under floor etc. including breaking clods, dressing watering and consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction complete within a lead of one chain (30.5 R.m) and lift of 5 feet (1.52 m) as directed by the Engineer-in-charge.	100Cft	6000	3,254.05	195,243
SW-08	104-9	Supplying stacking and filling sand of approved quality from outside sources in foundation, trenches, plinth or under floor, etc. including dressing, watering and consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction and lift upto 5 feet (1 .52 m).	100 Cft	528900	4,869.94	25,757,113
					TOTAL (A) =	66,133,297

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

SANITARY SEWERAGE WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		SECTION-B CONCRETE WORKS				
SW-09	106-5 + 106-32 + 106-52	Providing and laying in situ 1:2:4 (1 cement 2 sand and 4 coarse aggregates) cement concrete using 50% crushed graded bolders 3/4" (19mm) and down gauge and 50% graded screened bajri 3/4" (19mm) and down gauge with lawancepur sand in foundation, basement and plinth including formwork, compacting, curing and removal of formwork etc. complete foundation and basements upto 5 feet depth (1.52m) and plinth upto 4 feet(1.2m) height from ground level. (For concrete encasement)	100Cft	27800	39,230.33	10,906,032
					TOTAL (B) =	**10,906,032**
		SECTION C: RCC PIPES				
SW-10		Providing R.C.C. pipes and collars of class 'B' and fixing in trench including cutting, fitting and jointing with maxphalt composition and cement mortar (1:1) and back filling the excavated material in trench including testing with water to a pressure head of 50 feet (15.24m) and cartage within 10 miles (16.09 km), for the following pipes:				
	311-3	9 inches (230 mm) dia. pipe..	R.ft.	50200	463.49	23,267,198
	311-4	12 inches (305 mm) dia. pipe..	R.ft.	8900	548.16	4,878,624
	311-5	15 inches (380 mm) dia. pipe..	R.ft.	1200	873.72	1,048,464
	311-6	18 inches (460 mm) dia. pipe..	R.ft.	3300	1124.74	3,711,642
	311-7	21 inches (535 mm) dia. pipe..	R.ft.	10	1635.30	16,353
	311-8	24 inches (610 mm) dia. pipe..	R.ft.	6300	1821.32	11,474,316
	311-9	30 inches (765 mm) dia. pipe..	R.ft.	10	2324.91	23,249
					TOTAL (C) =	**[illegible]**

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

SANITARY SEWERAGE WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		SECTION D: BRICK MASONRY MANHOLES				
SW-11		Excavation for foundation trenches and drains in all kinds of soil (except gravelly and murum soil, wet silt, clay or mud conglomeration of gravel and boulders, soft, sandy or disintegrated sandy and hard rock) and back filling the excavated material in foundation, plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead upto one chain (30.5 R.m) and lift as follows:				
	103-1	Lift upto 5 feet	100Cft	159900	1,624.63	2,597,783
	103-1 + 103-28	Lift 5 to 8 feet	100Cft	66600	1,862.13	1,240,179
	103-1 + 103-28	Lift 8 to 11 feet	100Cft	32000	2,099.63	671,882
	103-1 + 103-28	Lift 11 to 14 feet	100Cft	8000	2,337.13	186,970
SW-12		Excavation for foundation trenches and drains in gravelly soil and back filling the excavated material in foundation trenches plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed lead upto one chain (30.5 R.m) and lift as follows:				
	103-2	Lift upto 5 feet	100Cft	80000	1,862.13	1,489,704
	103-2 + 103-28	Lift 5 to 8 feet	100Cft	33300	2,099.63	699,177
	103-2 + 103-28	Lift 8 to 11 feet	100Cft	16000	2,337.13	373,941
	103-2 + 103-28	Lift 11 to 14 feet	100Cft	4000	2,574.63	102,985

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

SANITARY SEWERAGE WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
SW-13		Excavation for foundation trenches and drains in strata of conglomeration of gravel and boulders by hammering, chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift as follows:				
	103-5	Lift upto 5 feet	100Cft	32000	5,547.38	1,775,162
	103-5 + 103-29	Lift 5 to 8 feet	100Cft	13300	5,844.26	777,287
	103-5 + 103-29	Lift 8 to 11 feet	100Cft	6400	6,141.14	393,033
	103-5 + 103-29	Lift 11 to 14 feet	100Cft	1600	6,438.02	103,008
SW-14		Excavation for foundation trenches and drains in soft or disintegrated rock by hammering, chiselling and Jumper work including, stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift as follows:				
	103-7	Lift upto 5 feet	100Cft	25600	2,328.63	596,129
	103-7 + 103-29	Lift 5 to 8 feet	100Cft	10700	2,625.51	280,930
	103-7 + 103-29	Lift 8 to 11 feet	100Cft	5100	2,922.39	149,042
	103-7 + 103-29	Lift 11 to 14 feet	100Cft	1300	3,219.27	41,851
SW-15		Excavation for foundation trenches and drains in hard rock by hammering chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift as follows:				
	103-8	Lift upto 5 feet	100Cft	22400	4,434.88	993,413

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

SANITARY SEWERAGE WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
	103-8 + 103-29	Lift 5 to 8 feet	100Cft	9300	4,731.76	440,054
	103-8 + 103-29	Lift 8 to 11 feet	100Cft	4500	5,028.64	226,289
	103-8 + 103-29	Lift 11 to 14 feet	100Cft	1100	5,325.52	58,581
SW-16	104-12	Supplying, stacking, spreading and filling stones of required size to required slope from approved quarries in plinth or under floor including filling voids with spawl and chips and consolidation by ramming layers not exceeding 9 inches (229 mm) in depth to full compaction lift upto 5 feet (1.52 m).	100 Cft	54000	4,562.87	2,463,950
SW-17	106-11	Providing and laying in situ 1:4:8 (1 cement 4 sand and 8 coarse aggregate) cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet (1.52 m) depth and plinth up to 4 feet (1.2 m) height from ground level .	100 Cft	100	32,221.55	32,222
SW-18	106-12	Providing and laying in situ 1:3:6 (1 cement 3 sand and 6 coarse aggregate) cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet (1.52 m) depth and plinth up to 4 feet (1.2 m) height from ground level .	100Cft	39800	34,857.58	13,873,317

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

SANITARY SEWERAGE WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
SW-19	106-5 + 106-32 + 106-52	Providing and laying in situ 1:2:4 (1 cement 2 sand and 4 coarse aggregates) cement concrete using 50% crushed graded bolders 3/4" (19mm) and down gauge and 50% graded screened bajri 3/4" (19mm) and down gauge with lawancepur sand in foundation, basement and plinth including formwork, compacting, curing and removal of formwork etc. complete foundation and basements upto 5 feet depth (1.52m) and plinth upto 4 feet(1.2m) height from ground level.	100Cft	8000	39,230.33	3,138,426
SW-20		Providing and laying first class solid burnt brick masonry set in cement mortar 1:4 in straight or curved walls 9" to 13-1/2 inches (228 mm to 343 mm) thick including scaffolding, raking out Joints and curing etc. complete in foundation, basement and plinth .				
	112-2 +112-79	foundation and basement masonry upto 5 feet (1.52 Ru.m.) depth and plinth upto 4 feet (1.2 Ru.m.) height from ground level	100Cft	57000	39,770.93	22,669,430
	112-2 + 112-20 + 112-79	Extra for every additional 5 feet (1.52 Ru.m.) depth or part thereof in foundation and basement masonry. (5 feet to 10 feet depth)	100Cft	29000	41,052.38	11,905,190
	112-2 + 112-20 + 112-79	Extra for every additional 5 feet (1.52 Ru.m.) depth or part thereof in foundation and basement masonry. (10 feet to 15 feet depth)	100Cft	9500	42,333.83	4,021,714
SW-21	122-3	1/2" (13 mm) thick cement plaster 1:3 on walls and columns etc. in basement, plinth, mezzanine and ground floor including making edges, corners, and curing etc., complete.	100 Sq.ft.	277200	4,707.17	13,048,275
SW-22	108-12	Providing a coat of bitumen emulsion at 10 Lbs per 100sft (0.49 kg/sm) on walls and floors in ground floor.	100 Sq.ft.	296800	1,010.75	2,999,906
					TOTAL (C) =	87,349,828
					TOTAL (Scheduled) =	208,809,003

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1 (PHASE-I), ISLAMABAD

SANITARY SEWERAGE WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		2. NON-SCHEDULED ITEMS (Ref. Specs: 2100, 2200, 2300)				
SW-23	NS-02	RCC manhole cover 24" dia, 2.5" MS angle, RCC 1:2:4 etc, complete with frame; as shown in drawing.	Each	1240	19,300	23,932,000
SW-24	NS-03	3/4inch diameter Galvanised MS ladder rungs for manholes; each rung of 18inch width, 6 inch projected outside the wall and 6 inch embeded in wall on both ends; including all necessary works for complete installation.	Each	1980	1,246	2,467,080
					SUB-TOTAL (NON-SCHEDULED) =	**26,399,080**

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1, ISLAMABAD

ENGINEER'S ESTIMATE

POTABLE WATER DISTRIBUTION WORKS

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)

GENERAL NOTE

Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.

1. SCHEDULED ITEMS

SECTION A: EARTH WORK FOR PIPE TRENCHES

WS-01	103-1	Excavation for foundation trenches and drains in all kinds of soil (except gravelly and murum soil, wet silt, clay or mud conglomeration of gravel and boulders, soft, sandy or disintegrated sandy and hard rock) and back filling the excavated material in foundation, plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m).	100 Cft	593,000	1,624.63	9,634,056
WS-02	103-2	Excavation for foundation trenches and drains in gravelly soil and back filling the excavated material in foundation trenches plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m).	100 Cft	247,000	1,862.13	4,599,461
WS-03	103-5	Excavation for foundation trenches and drains in strata of conglomeration of gravel and boulders by hammering, chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5R.m) and lift upto 5feet (1.52m)	100 Cft	148,000	5,547.38	8,210,122

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INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1, ISLAMABAD

ENGINEER'S ESTIMATE

POTABLE WATER DISTRIBUTION WORKS

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
WS-04	104-9	Supplying stacking and filling sand of approved quality from outside sources in foundation, trenches, plinth or under floor, etc. including dressing, watering and consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction and lift upto 5 feet (1 .52 m).	100 Cft	405,000	4,869.94	19,723,257
WS-05	106-5 + 106-32 + 106-52	Providing and laying in situ 1:2:4 (1 cement 2 sand and 4 coarse aggregates) cement concrete using 50% crushed graded bolders 3/4" (19mm) and down gauge and 50% graded screened bajri 3/4" (19mm) and down gauge with lawancepur sand in foundation, basement and plinth including formwork, compacting, curing and removal of formwork etc. complete foundation and basements upto 5 feet depth (1.52m) and plinth upto 4 feet(1.2m) height from ground level. (For concrete encasement and thrust blocks)	100Cft	19,800	39,230.33	7,767,605.34
		SECTION B: WATER SUPPLY PIPES & FITTINGS				
WS-06		Providing and fixing polyethylene pipe (HDPE) (PN-16) with specials including cutting and fitting complete and cartage within 10 miles of following diameters:				
	306-40	50mm e/d	Rft	150	295.13	44,269.50
	306-41	75mm e/d	Rft	300	669.70	200,910.00
		VALVES				
WS-07		Providing and fixing cast iron sluice valves with flanged ends and two tail pieces to each valve complete with bolts and nuts, including the cost of insertion rubber washers (valves to stand test pressure head of 400 feet (122 m). (in chambers on water supply network)				
	310-1	3 inches (80 mm) dia..	Each	110	7,961.40	875,754
	310-2	4 inches (100 mm) dia..	Each	62	10,236.40	634,657
	310-3	6 inches (150 mm) dia..	Each	17	12,516.80	212,786
	310-4	9 inches (230 mm) dia..	Each	21	24,422.20	512,866
	310-5	12 inches (305 mm) dia..	Each	4	32,477.60	129,910
	310-7	18 inches (460 mm) dia..	Each	1	82,772.80	82,773

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1, ISLAMABAD

ENGINEER'S ESTIMATE

POTABLE WATER DISTRIBUTION WORKS

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
WS-08		Providing and fixing cast iron non-return or reflex valve with gun metal working parts with hinged door, flanged end and rubber wahser and bolts and nuts of following dia:				
	310-16	12 inches (305 mm) dia..	Each	2	70,129.60	140,259
WS-09		Providing and fixing full way gun metal valves with wheels threaded or flanged ends with rubber washers, (standard pattern) of following diameters:				
	307-9	1 inch (25mm) dia	Each	5	4,012.90	20,064.50
	307-12	2 inch (50mm) dia	Each	5	8,699.40	43,497.00
		VALVE CHAMBERS				
WS-10	103-1	Excavation for foundation trenches and drains in all kinds of soil (except gravelly and murum soil, wet silt, clay or mud conglomeration of gravel and boulders, soft, sandy or disintegrated sandy and hard rock) and back filling the excavated material in foundation, plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m).	100 Cft	15950	1,624.63	259,128.49
WS-11	103-2	Excavation for foundation trenches and drains in gravelly soil and back filling the excavated material in foundation trenches plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m).	100 Cft	6650	1,862.13	123,831.65
WS-12	103-5	Excavation for foundation trenches and drains in strata of conglomeration of gravel and boulders by hammering, chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5R.m) and lift upto 5feet (1.52m)	100 Cft	4000	5,547.38	221,895.20

PROCUREMENT REGULATORY AUTHORITY (PRA) EPADS
FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. NESPAK ISLAMABAD

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1, ISLAMABAD

ENGINEER'S ESTIMATE

POTABLE WATER DISTRIBUTION WORKS

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
WS-13	106-5 + 106-32 + 106-52	Providing and laying in situ 1:2:4 (1 cement 2 sand and 4 coarse aggregates) cement concrete using 50% crushed graded bolders 3/4" (19mm) and down gauge and 50% graded screened bajri 3/4" (19mm) and down gauge with lawancepur sand in foundation, basement and plinth including formwork, compacting, curing and removal of formwork etc. complete foundation and basements upto 5 feet depth (1.52m) and plinth upto 4 feet(1.2m) height from ground level. (For concrete thrust blocks)	100Cft	250	39,230.33	98,075.83
WS-14	106-11	Providing and laying in situ 1:4:8 (1 cement 4 sand and 8 coarse aggregate) cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet (1.52 m) depth and plinth up to 4 feet (1.2 m) height from ground level .	100 Cft	1550	32,221.00	499,425.50
WS-15	106-12	Providing and laying in situ 1:3:6 (1 cement 3 sand and 6 coarse aggregate) cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet (1.52 m) depth and plinth up to 4 feet (1.2 m) height from ground level .	100Cft	2550	34,857.58	888,868.29

PAKISTAN REGULATORY AUTHORITY (PRA) EPADS

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1, ISLAMABAD

ENGINEER'S ESTIMATE

POTABLE WATER DISTRIBUTION WORKS

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
WS-16		Providing and laying first class solid burnt brick masonry set in cement mortar 1:4 in straight or curved walls 9" to 13-/2 inches (228 mm to 343 mm) thick including scaffolding, raking out Joints and curing etc. complete in foundation, basement and plinth .				
	112-2 +112-79	foundation and basement masonry upto 5 feet (1.52 Ru.m.) depth and plinth upto 4 feet (1.2 Ru.m.) height from ground level	100Cft	8800	39,770.93	3,499,841.84
WS-17	114-56 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge with lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch (20.69 N/mm2) at 28 days with a mix not leaner than 1:2:4 in ordinary slab 5 inches (127 mm) to 6 inches (152 mm) thick Including form work and its removal compacting and curing etc. complete but excluding the cost of reinforcement, in basement plinth and ground floor	100Cft	1500	45,945.52	689,182.80
WS-18	114-167	Providing and laying ribbed deformed (minimum yield point 40,000 psi) reinforcement bars with and including the cost of straightening, cutting, bending, binding, wastage and such overlaps as are not shown in the drawings, placing in position on cement concrete 1:2:4 precast or m.s. chairs, tying with binding wires, cost of chairs and wires etc. in all kinds of RCC works in foundation, basement, plinth and ground floor of building including septic tanks and under ground tanks and in projections for future extension.	Kg	3450	266.70	920,115.00
WS-19	122-3	1/2" (13 mm) thick cement plaster 1:3 on walls and columns etc. in basement, plinth, mezzanine and ground floor including making edges, corners, and curing etc., complete.	100 Sq.ft.	24350	4,707.17	1,146,195.90
WS-20	108-12	Providing a coat of bitumen emulsion at 10 Lbs per 100sft (0.49 kg/sm) on walls and floors in ground floor.	100 Sq.ft.	18000	1,010.75	181,935.00
					TOTAL (SCHEDULED) =	61,360,757.22

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1, ISLAMABAD

ENGINEER'S ESTIMATE

POTABLE WATER DISTRIBUTION WORKS

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
		2. NON-SCHEDULED ITEMS				
		SECTION C: WATER SUPPLY PIPES AND FITTINGS (Ref. Specs: 5216)				
WS-21	NS-01	Providing and laying Poly Ethylene Pressure Pipe (PN-12.5 & HDPE-100) conforming to ISO 4427:1996, DIN 8074/8075 with Compression / Butt fusion fittings,specials, provision of flanges (BS-4504; PN-16), reducers, pipe pieces for valves, (as required) in pipe trenches including flushing, cleaning and disinfecting as per specifications and as directed by the Engineer of following internal diameters.				
	(a)	63mm e/d	Rft	400	528.00	211,200
	(b)	90mm e/d	Rft	29200	1,010.00	29,492,000
	(c)	110mm e/d	Rft	32200	1,490.00	47,978,000
	(d)	160mm e/d	Rft	12400	3,094.00	38,365,600
	(e)	200mm e/d	Rft	5900	4,762.00	28,095,800
	(f)	250mm e/d	Rft	6900	7,405.00	51,094,500
	(g)	315mm e/d	Rft	100	11,851.00	1,185,100
WS-22	NS-02	Provide and install Polyethylene ferrule assembly for making house connections, including tapping saddle with nuts & bolts, rubber seal, pipe piece, reducers,adapters, end plug and all other fittings/accessories with drilling, strap etc. complete in all respect as directed by the Engineer,of following sizes:				
	(a)	63mm x 25mm	Each	5	2,381.00	11,905
	(b)	90mm x 25mm	Each	345	2,406.00	830,070
	(c)	110mm x 25mm	Each	380	2,612.00	992,560
	(d)	160mm x 25mm	Each	145	3,487.00	505,615
	(d)	200mm x 25mm	Each	70	5,931.00	415,170
	(d)	250mm x 25mm	Each	80	9,681.00	774,480

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INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1, ISLAMABAD

ENGINEER'S ESTIMATE

POTABLE WATER DISTRIBUTION WORKS

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
		VALVES (Ref. Specs: 5216, 5220)				
WS-23	NS-03	Provide and install double acting air relief valve (PN-16) of 2 inch (50mm) inner dia with integral isolating valve, in valve chamber, of approved manufacturers, including tees, Adapter, transition pipe pieces with flanges, making required type of joints on both ends as shown on drawing and as directed by the Engineer, complete in all respects.	Each	35	37,285.00	1,304,975
		VALVE CHAMBER COVERS (Ref. Specs: 2100, 2200, 2300)				
WS-24	NS-04	RCC valve chamber cover 24" dia, 2.5" MS angle RCC1:2:4 etc complete with frame as per drawings.	Each	250	19,300.00	4,825,000
		WATER TRANSMISSION LINE (Ref. Specs: 5216, 5220)				
WS-25	NS-05	Galvanized Iron (GI) pipes for potable water supply conforming to API 5L Grade-B / ASTM-A53 ERW Sch. 40, with specials/flanges hangers and clamps etc, including fixing, cutting, welding, fixing & support systems; giving anti corrosive treatment and other fittings complete with and including the cost of breaking, through walls and slabs, making walls & slabs good thereafter, etc, painting with two coats of approved enamel paint after cleaning the pipe.				
	(a)	12 inches	Rft	6600	17,209.00	113,579,400
	(b)	18 inches	Rft	4000	35,782.00	143,128,000
			TOTAL (NON-SCHEDULED) =			462,789,375

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		SCHEDULED ITEMS				
C- ET-01	(103-19)	Excavation for wells, circular underground tanks and soak spits etc., in all kinds of soil (except gravelly and murum soil, wet silt clay or mud, . conglomeration of gravel and boulders, soft. sandy or disintegrated and hard rock) and back filling the excavated material all round the trenches including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead up to one chain (30.5 Ru.m) and lift up to 5 feet (1.52 m).	%Cft	16,765.00	1,507.19	252,680
	(103-19) + (103-28)	Additional 3' lift (5' - 8')	%Cft	10,050.00	1,744.69	175,341
	(103-19) + (103-28)	Additional 3' lift (8' - 11')	%Cft	10,050.00	1982.19	199,210
	(103-19) + (103-28)	Additional 3' lift (11 - 14')	%Cft	10,050.00	2219.69	223,079
	(103-19) + (103-28)	Additional 3' lift (14' - 17')	%Cft	3,350.00	2457.19	82,316
C-ET-02	(103-20)	Excavation for wells, circular underground tanks and soak pits etc., in gravelly soil and back filling the excavated material all round the trenches including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead up to one chain (30.5 R.m) and lift up to 5 feet (1.52 m).	%Cft	2,395.00	1,744.69	41,785.33
	(103-20) + (103-28)	Additional 3' lift (5' - 8')	%Cft	1,440.00	1,982.19	28,543.54
	(103-20) + (103-28)	Additional 3' lift (8' - 11')	%Cft	1,440.00	2,219.69	31,963.54
	(103-20) + (103-28)	Additional 3' lift (11 - 14')	%Cft	1,440.00	2457.19	35,384

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
	(103-20) + (103-28)	Additional 3' lift (14' - 17')	%Cft	480.00	2694.69	12,935
C-ET-03	(103-25)	Excavation for wells, circular underground tanks and soak pits etc., in soft or disintegrated rock by hammering, chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead up to one chain (30.5 R.m) and lift up to 5 feet (1.52 m).	%Cft	2,395.00	3,152.00	75,490.40
	(103-25) + (103-29)	Additional 3' lift (5' - 8')	%Cft	1,440.00	3,448.88	49,663.87
	(103-25) + (103-29)	Additional 3' lift (8' - 11')	%Cft	1,440.00	3,745.76	53,938.94
	(103-25) + (103-29)	Additional 3' lift (11 - 14')	%Cft	1,440.00	4,042.64	58,214.02
	(103-25) + (103-29)	Additional 3' lift (14' - 17')	%Cft	480.00	4,339.52	20,829.70
C-ET-04	(103-26)	Excavation for wells, circular underground tanks and soak pits etc., in hard rock by . hammering, chiselling and jumper work including stacking of serviceable and unserviceable materials, separately, lead up to one chain (30.5 R.m) and lift up to 5 feet (1.52 m).	%Cft	2,395.00	4,864.50	116,504.78
	(103-26) + (103-29)	Additional 3' lift (5' - 8')	%Cft	1,440.00	5,161.38	74,323.87
	(103-26) + (103-29)	Additional 3' lift (8' - 11')	%Cft	1,440.00	5,458.26	78,598.94
	(103-26) + (103-29)	Additional 3' lift (11 - 14')	%Cft	1,440.00	5,755.14	82,874.02
	(103-26) + (103-29)	Additional 3' lift (14' - 17')	%Cft	480.00	6,052.02	29,049.70

PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS
FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY FGEHA
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. NESPAK ISLAMABAD

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C- ET-05	(104-9)	Supplying stacking and filling sand of approved quality from outside sources in foundation, trenches, plinth or under floor, etc. including dressing, watering and consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction and lift upto 5 feet (1 .52 m).	%Cft	810	4869.94	39,446.51
C- ET-06	(105-14) + (105-27) + (105-39)	Providing and laying 1:4:8 (1 cement 4 Lawrencepur sand and 8 coarse aggregate) cement concrete using crushed graded boulders 1 inch (25 mm) and down gauge in foundation including levelling, compacting and curing etc.complete.	%Cft	1145	24,933.34	285,487
C- ET-07	(106-15) + (106-52)	Providing and laying in situ 1:2:4 (1 cement 2 sand and 4 coarse aggregate) cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge Lawrencepur sand in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet (1.52 m) depth and plinth up to 4 feet (1.2 m) height from ground level	%Cft	325	39,417.83	128,108
C- ET-08	(108-12)	Providing 4 coats of bitumen emulsion at 10 Lbs. per % sft. (0.49 Kg/sm) per coat on walls and floors in ground floor (concrete surfaces conected with earth).	%Sft.	25400	1010.75	256,731
C- ET-09	(114-2) + (114-134) + (114-137) + (114-146)	Providing and laying reinforced cement concrete using crush graded bouldres 3/4" (19mm) and down guage and lawarancepur sand work having minimum works cube crushing strength of 3750 lbs per square inch after 28 days with a mix not leaner than 1:1-1/2:3 in **raft or strip foundation** with coloumns and pillars of any shape including form work and its removal compacting and curing etc.complete but excluding the cost of reinforcement , in foundation , basement and plinth.	%Cft	25175	37,273.04	9,383,488

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY
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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C- ET-10		Providing and laying reinforced cement concrete using crush graded bouldres 3/4" (19mm)and down guage and lawarancepur sand work having minimum works cube crushing strength of 3750 lbs per square inch after 28 days with a mix not leaner than 1:1-1/2:3 in straight stairs and landing of required section including (M.S Plates)form work and its removal compacting and curing etc . complete but excluding the cost of reinforcement , in basement and ground floor.				
(114-50) + (114-134) + (114-137) + (114-146) + (114-163)	a) Ground floor		%Cft	45	78922.51	35,515
(114-50) + (114-134) + (114-137) + (114-146) + (114-163) + (114-92)	b) First floor		%Cft	45	81733.97	36,780
(114-50) + (114-134) + (114-137) + (114-146) + (114-163) + (114-92,93)	c) Second floor		%Cft	45	83943.97	37,775
(114-50) + (114-134) + (114-137) + (114-146) + (114-163) + (114-92,93)	d) Third floor		%Cft	45	86153.97	38,769

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS
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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
	(114-50) + (114-134) + (114-137) + (114-146) + (114-163) + (114-92,93)	e) Fourth floor	%Cft	45	88363.97	39,764
	(114-50) + (114-134) + (114-137) + (114-146) + (114-163) + (114-92,93)	e) Fifth floor	%Cft	45	90573.97	40,758
	(114-50) + (114-134) + (114-137) + (114-146) + (114-163) + (114-92,93)	e) Sixth floor	%Cft	85	92783.97	78,866
C- ET-11		Providing and laying reinforced cement concrete using crushed graded bouldres 3/4" and down guage and lawarancepur sand work having minimum works cube crushing strength of 4500 lbs per square inch after 28 days with a mix not leaner than 1:1:2 in **ring beams of required section in circular** overhead water tank, bins, bunkers intze tank and silo upto height of 30 feet (9M) above ground including(M.S Plates) formwork and its removal compacting and curing etc . complete but excluding the cost of reinforcement in foundation, basement and plinth and ground floor.				
	(114-108) + (114-135) + (114-138) + (114-147) + (114-163) + (114-127)	a) At height between 75 to 80 feet	%Cft	875	113038.25	989,085

PROCUREMENT REGULATORY AUTHORITY
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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
	(114-108) + (114-135) + (114-138) + (114-147) + (114-163) + (114-127)	b) At height between 95 to 100 feet	%Cft	70	120973.45	84,681
C- ET-12		Providing and laying reinforced cement concrete using crushed graded bouldres 3/4"(19mm) and down guage and lawarancepur sand work having minimum works cube crushing strength of 3750 lbs per square inch after 28 days with a mix not leaner than 1:1-1/2:3 in **circular walls** of over head water tank, bins, bunkers intze tank and silo upto height of 30' above ground including (M.S Plates) formwork and its removal leveling, compacting and curing etc . complete but excluding the cost of reinforcement .				
	(114-110) + (114-134) + (114-137) + (114-146) + (114-162)	a) At height upto 30' feet	%Cft	2960	76895.21	2,276,098
	(114-110) + (114-134) + (114-137) + (114-146) + (114-162) + (114-127)	b) At height between 30 to 35 feet	%Cft	320	78879.01	252,413
	(114-110) + (114-134) + (114-137) + (114-146) + (114-162) + (114-127)	c) At height between 35 to 40 feet	%Cft	290	80862.81	234,502
	(114-110) + (114-134) + (114-137) + (114-146) + (114-162) + (114-127)	d) At height between 40 to 45 feet	%Cft	320	82846.61	265,109

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
	(114-110) + (114-134) + (114-137) + (114-146) + (114-162) + (114-127)	e) At height between 45 to 50 feet	%Cft	290	84830.41	246,008
	(114-110) + (114-134) + (114-137) + (114-146) + (114-162) + (114-127)	f) At height between 50 to 55 feet	%Cft	320	86814.21	277,805
	(114-110) + (114-134) + (114-137) + (114-146) + (114-162) + (114-127)	f) At height between 55 to 60 feet	%Cft	290	88798.01	257,514
	(114-110) + (114-134) + (114-137) + (114-146) + (114-162) + (114-127)	g) At height between 60 to 65 feet	%Cft	320	90781.81	290,502
	(114-110) + (114-134) + (114-137) + (114-146) + (114-162) + (114-127)	h) At height between 65 to 70 feet	%Cft	310	92765.61	287,573
	(114-110) + (114-134) + (114-137) + (114-146) + (114-162) + (114-127)	i) At height between 70 to 75 feet	%Cft	305	94749.41	288,986

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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C- ET-13		Providing and laying reinforced cement concrete using crushed graded bouldres 3/4"(19mm) and down guage and lawarancepur sand work having minimum works cube crushing strength of 4500 lbs per square inch after 28 days with a mix not leaner than 1:1:2 in circular walls of over head water tank, bins, bunkers intze tank and silo upto height of 30' above ground including(M.S Plates) formwork and its removal leveling, compacting and curing etc . complete but excluding the cost of reinforcement .				
	(114-110) + (114-135) + (114-138) + (114-147) + (114-162) + (114-127)	a) At height between 80 to 85 feet	%Cft	50	106292.89	53,146
	(114-110) + (114-135) + (114-138) + (114-147) + (114-162) + (114-127)	h) At height between 85 to 90 feet	%Cft	50	108276.69	54,138
	(114-110) + (114-135) + (114-138) + (114-147) + (114-162) + (114-127)	i) At height between 90 to 95 feet	%Cft	750	110260.49	826,954
C- ET-14		Providing and laying reinforced cement concrete using crushed graded bouldres 3/4" and down guage and lawarancepur sand work having minimum works cube crushing strength of 3750 lbs per square inch after 28 days with a mix not leaner than 1:1:2 in **circular bottom slab** of overhead water tank upto a height of 30 feet (9M) above ground including(M.S Plates) formwork and its removal compacting and curing etc . complete but excluding the				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS
FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
	(114-113) + (114-134) + (114-137) + (114-146) + (114-164) + (114-127)	a) At height between 75 to 80 feet	%Cft	20	110959.56	22,192
C- ET-15		Providing and laying reinforced cement concrete using crushed graded bouldres 3/4"(19mm) and down guage and lawarancepur sand work having minimum works cube crushing strength of 4500 lbs per square inch after 28 days with a mix not leaner than 1:1:2 in **conical bottom slab of circular** bins, bunkers intze tank and silo upto height of 30' above ground including(M.S Plates) formwork and its removal leveling, compacting and curing etc . complete but excluding the cost of reinforcement .				
	(114-117) + (114-135) + (114-138) + (114-147) + (114-164) + (114-127)	a) At height between 80 to 85 feet	%Cft	1180	129511.41	1,528,235
	(114-117) + (114-135) + (114-138) + (114-147) + (114-164) + (114-127)	b) At height between 85 to 90 feet	%Cft	1220	131495.21	1,604,242
C- ET-16		Providing and laying reinforced cement concrete using crushed graded bouldres 3/4"(19mm) and down guage and lawarancepur sand work having minimum works cube crushing strength of 4500 lbs per square inch after 28 days with a mix not leaner than 1:1:2 in roof **slab of over head water** tank upto height of 30' above ground including(M.S Plates) formwork and its removal leveling, compacting and curing etc . complete but excluding the cost of reinforcement .				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
	(114-118) + (114-135) + (114-138) + (114-147) + (114-164) + (114-127)	a) At height between 90 to 95 feet	%Cft	15	104400.36	15,660
C- ET-17		Providing and laying reinforced cement concrete using crushed graded bouldres 3/4"(19mm) and down guage and lawarancepur sand work having minimum works cube crushing strength of 4500 lbs per square inch after 28 days with a mix not leaner than 1:1:2 in **conical roof slab** of over head water tank upto a height of 30' above ground including(M.S Plates) formwork and its removal leveling, compacting and curing etc . complete but excluding the cost of reinforcement .				
	(114-121) + (114-135) + (114-138) + (114-147) + (114-164) + (114-127)	b) At height between 95 to 100 feet	%Cft	905	141160.99	1,277,507
C- ET-18		Providing and laying hard grade ribbed deformed (minimun yield point 60,000 psi) reinforcement bars with and including the cost of cutting, straightening, bending, binding, wastage and such overlaps as are not shown over the drawings, placing in position on cement concrete 1:1-1/2:3 precast or M.S chairs, tying with binding wires, etc. cost of chairs and wires etc.in overhead water tank bin. banker. intze tank and silo upto 30 feet				
	(114-170)		Kg.	70050	274.99	19,263,050
	(114-170) + (114-176)	a) 30' - 35'	Kg.	1290	278.03	358,659
	(114-170) + 2x(114-176)	b) 35' - 40'	Kg.	1180	281.07	331,663
	(114-170) + 3x(114-176)	c) 40' - 45'	Kg.	1290	284.11	366,502
	(114-170) + 4x(114-176)	d) 45' - 50'	Kg.	1180	287.15	338,837
	(114-170) + 5x(114-176)	e) 50' - 55'	Kg.	1290	290.19	374,345

PUBLIC PROCUREMENT REGULATORY AUTHORITY
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
	(114-170) + 6x(114-176)	f) 55' - 60'	Kg.	1180	293.23	346,011
	(114-170) + 7x(114-176)	g) 60' - 65'	Kg.	1290	296.27	382,188
	(114-170) + 8x(114-176)	h) 65' - 70'	Kg.	1370	299.31	410,055
	(114-170) + 9x(114-176)	i) 70' - 75'	Kg.	1180	302.35	356,773
	(114-170) + 10x(114-176)	j) 75' - 80'	Kg.	2780	305.39	848,984
	(114-170) + 11x(114-176)	k) 80' - 85'	Kg.	3940	308.43	1,215,214
	(114-170) + 12x(114-176)	l) 85' - 90'	Kg.	4090	311.47	1,273,912
	(114-170) + 13x(114-176)	m) 90' - 95'	Kg.	2890	314.51	908,934
	(114-170) + 14x(114-176)	n) 95' - 100'	Kg.	1040	317.55	330,252
C- ET-19		Providing and laying ribbed deformed steel reinforcement bars with guaranteed minimum yield stress of 40,000 psi with and including the cost of straightening, cutting, bending, binding, wastage, complete in all kinds of RCC work.				
	(114-167) + (114-174) + 14x (114-176)	n) 95' - 100'	Kg.	1230	318.14	391,312
C- ET-20	(117-2)	Providing and laying 1:4:8 cement concrete bed under floors using graded stone ballast 1 inches (25 mm) and down gauge with levelling and ramming, watering and curing etc. complete..	%Cft	1630	22036.75	359,199

PROCUREMENT REGULATORY AUTHORITY (PPRA) PAKISTAN

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C- ET-21	(117-6) + (114-136) + (114-145)	Providing and laying floors of 2 inches thick 1:2:4 cement concrete using crushed boulders 3/4 inch and down gauge, Lawranacepur sand in ground floor laid in with or without panels including formwork consolidation, finishing and curing etc. complete.	%Sft.	4890	7024.98	343,522
C- ET-22	(119-5)	Providing and fixing single leaf steel doors made to crittal or equivalent standard and of approved sections fully panelled with M.S sheet of 16 gauge painted with two coats of red oxide paint including, using approved brass section oxidized fittings iron lugs, cutting holes and making good damages to walls etc.complete as required in any floor.	Sq.ft.	25	933.84	23,346
C- ET-23	(119-120)	Providing and fixing plain glass panes of 6 mm thick to M.S Box pipe / Aluminium door, windows and ventilators including cost of labour but excluding the cost of M.S square pipe beading, rubber packing and screw in any floor at any height.	Sft.	130	297.02	38,613
C- ET-24	(119-25)	Providing and fixing fully glazed double leaf hung steel windows and ventilators made to crittal or equivalent standard and of approved sections painted with two coats of red oxide paint including, using approved brass section oxidized fitting, iron lugs, cutting holes and making good damages to walls etc.complete as required in any floor.	Sft.	130	1079.07	140,279
C- ET-25	(119-33)	Providing and fixing stair railing 3 feet height of M.S Squre pipes 1-1 /2" X 1-1/2" 16 SWG, vertical on alaternate step and M.S Square pipe 3/4" x 3/4" 16 SWG 2 Nos, horizontal pipes and 2-1/2" x 2-1/2" , 16 SWG, M.S Square pipe as top rail as per approved design including cutting, welding making holes fixing with sunk iron screws, painting two coats of red oxide paint etc. complete as required in any floor ..	Rft.	270	893.60	241,272

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C- ET-26	(119-44)	Providing and fixing M.S moulded steel door frames of 5.73"× 2-1/2"(146 mm × 63 mm) manufactured from mild steel sheet of 18 gauge (1.41 mm) conforming to B.S.S 1245 having a double rebate size 1-1/2" × 1/2" (38 mm × 12 mm) provision of 3 Nos. M.S. plate, section 1-1/2" × 1/4" (38 mm × 6 mm) (2 Nos. 6 inch long welded with frame at not less than 10 points and 1 Nos. 12 inch long welded with frame at not less than 20 points), with holes and threads for fixing steel hings, fitted with one locked box of same sheet (point welded inside the frame), 6 Nos. 6 inches long flat iron fixing lugs of 1-1/4" × 3/16" section, treated with special red oxide primer coat all around including cutting holes and filling the cavity with cement concrete 1:2:4 etc. in any floor at any height complete as directed by the Engineer- in-Charge.	Rft.	17	469.8	7,987
C- ET-27	(119-54)	Providing and fixing G.I. pipe railing of 2" (50 mm) diameter, comprising, vertical posts and horizontal bracing of G.I. pipe of the same dia as per design including cost of specials, bends, threading, cutting and making good the floor or wall of any kind in cement concrete 1:2:4 etc. 'complete in any floor.	Rft.	85	1,123.12	95,465
C- ET-28	(121-44)	Providing and fixing with brass screws approved brass quadrrant stays (heavy type) 8" (203mm) size.	No.	26	918.76	23,888
C- ET-29	(121-139)	Providing and fixing approved heavy type iron sliding or aldrop bolts 12" x 3/4" (305 mm x 19 mm) size with necessary iron screws, iron bolts and nuts .	No.	1	964.35	964

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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C- ET-30	(121-160)	Providing and fixing approved brass handles 5" size (127mm) heavy type with necessary iron screws.	No.	1	357.74	358
C- ET-31	(121-172)	Providing and fixing approved heavy type iron handles 4" size (127mm) with necessary iron screws.	No.	26	112.39	2,922
C- ET-32	(122-207)	Applying two coats of red oxide paint of approved quality complete on iron work at any height in any floor..	Sft.	47	2371.25	1,114
C- ET-33	(124-97)	Providing and fixing PVC ribbed water stops 9" wide in vertical or horizontal expansion joints including cutting or joining etc. complete in all floors.	Rft.	65	448.81	29,173
C- ET-34	(124-124)	Supplying and fixing ladder of flat iron 2" x 3/16" (51 mm x 4.8 mm) in section and step bars of 5/8" (16 mm) dia at 18" (457 mm) centre to centre including fixing flat iron stays as per approved design and direction of the Engineer-in-Charge .	Kg	130	328.04	42,645
C- ET-35	127-33	Supplying and laying machine crushed 1-1/2" to 1/2" (38 mm to 13 mm) stone ballast of approved grade and quality in sub-base or base courses in required grade and camber and compacting to the required density by approved mechanical means (Vibratory Roller, Road Packer and Smooth Wheel Roller etc.) including watering with 10 miles lead and all lift complete (actual compacted depth shall be considered for payment)	%Cft	1630	8654.02	141,061
C- ET-36	(134-2)	Cartage of sand, bajri, lime, surkhi, murum, manure, earth, building rubbish including loading, unloading and stacking etc. at site:				
		3 miles (4.8 km) lead.	%Cft	71850	576.78	414,416
		Extra per mile (1.6 km) above 3 miles to 6 miles (4.8 km to 9.6 km) of lead.(3 x 84.72=254.16)	%Cft	71850	254.16	182,614
					Total Scheduled Items =	52,842,092

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INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

CIVIL WORKS

ELEVATED WATER TANK (100,000 GALLONS)

ENGINEER'S ESTIMATE

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
		NON- SCHEDULED ITEMS				
C- ET-37	N.S	Preparation of 4000 Psi cylinder strength cocrete for tank bowl base slab, walls, roof slab of mix not leaner then 1:1:2 using admixture (Rheobuild or equivalent) as approved by engineer to gain required strength etc complete in all respect.	Cft	5135	28	143,780
C- ET-38	N.S	Application of cementitious based water proof coating as approved by the Engineer to internal face of water tank	Sft	3170	50	158,500
					Total Non- Scheduled Items =	302,280

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1 (PHASE-I), ISLAMABAD
ELEVATED WATER TANK (100,000 Gallons) - PLUMBING WORKS

ENGINEER'S ESTIMATE

ITEM NO.	PAK PWD SCHEDULE 2022 REF	DESCRIPTION	UNIT		UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		GENERAL NOTE				
		Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.				
		SCHEDULED ITEMS				
		VALVES				
WS-07		Providing and fixing cast iron sluice valves with flanged ends and two tail pieces to each valve complete with bolts and nuts, including the cost of insertion rubber washers (valves to stand test pressure head of 400 feet (122 m).				
	310-5	12 inches (305 mm) dia..	Each	3	32,477.60	97,433
		CAST IRON COVERS				
ET-P-01	315-28	Providing & fixing C.I Cover & Frame 30" dia (765 mm) weight 3 cwt (152.41 Kg.)	Each	2	43,965.00	87,930.00
					TOTAL (SCHEDULED) =	87,930
		NON-SCHEDULED ITEMS				
		WATER SUPPLY PIPES AND FITTINGS				
ET-P-02	NS-01	Galvanized Iron (GI) pipes for potable water supply conforming to API 5L Grade-B / ASTM A53 ERW Sch. 40, with specials/flanges hangers and clamps etc, including fixing, cutting, welding, fixing & support systems; giving anti corrosive treatment and other fittings complete with and including the cost of breaking, through walls and slabs, making walls & slabs good thereafter, etc, painting with two coats of approved enamel paint after cleaning the pipe.				
	(a)	12 inches	Rft	250	17,221	4,305,250
	(b)	08 inches	Rft	50	10,223	511,150
	(c)	06 inches	Rft	400	6,830	2,732,000

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INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1 (PHASE-I), ISLAMABAD
ELEVATED WATER TANK (100,000 Gallons) - PLUMBING WORKS

ENGINEER'S ESTIMATE

ITEM NO.	PAK PWD SCHEDULE 2022 REF	DESCRIPTION	UNIT		UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		MISCELLANEOUS				
ET-P-04	NS-03	Providing and fixing level indicator complete on Elevated water tank as per drawing and directed by the Engineer incharge.	Job	1	252,139	252,139
ET-P-05	NS-04	Dia 4" u-turned G.I. vent pipes, pudddle plate, with insect proof mesh at open end etc., complete in all respects.	Job	4	13,534	54,136
ET-P-06	NS-05	Galvanised MS ladder rings 3/4" dia inside and outside water tanks; Each rung of 18" width, 6" projected outside the wall and 6" embeded in RCC on both ends; including all necessary works for complete installation	Each	30	1,250	37,500
					TOTAL (NON-SCHEDULED) =	7,892,175

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

ELEVATED WATER TANK - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022 REF No./NS	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		SCHEDULED ITEMS				
		ELECTRICAL WORKS				
		Supply, installation, testing and commissioning of the following items of work (unless specifically stated otherwise) including all material, labour, tool, plant, accessories, related civil works etc., required for proper completion of each item as per specifications (Section-8001 "General Specifications for Electrical Works" shall be applicable to all BOQ items). The contractor is bound to submit all relevent data, information, literature, drawings, submittals etc. as per specifications & recommended manufacturers list to The Engineer for necessary approvals. Note: In case of any conflict PWD specifications & requirements will govern for Schedule Items.				
		LT Cable				
E-01	2-35-05	Wiring for sub-main with 2x10 mm², PVC insulated wire 300/500 volts grade, single core, stranded copper conductor wire in 25 mm (1") dia uPVC conduit recessed in the wall, column and roof etc including 2.5 mm² PVC insulated wire single core wire as ECC as required.	Rft.	200	351	70,200
E-02	3-09-01	Excavation in soft soil including lift upto 5ft and filling excavated earth including breaking clods dressing, watering, consolidation and ramming in layers to full compaction i/c disposal of surplus excavated stuff as directed as required.	P/CFT	6,000	11	66,000

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

ELEVATED WATER TANK - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022 REF No./NS	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		Wiring				
E-03	2-35-02	Wiring for sub-main with 2x2.5 mm², PVC insulated wire 300/500 volts grade, single core, stranded copper conductor wire in 20 mm (3/4") dia PVC conduit recessed in the wall, column and roof etc including 1.5 mm² PVC insulated wire single core wire as ECC as required. (from DB to Switch, Switch to Switch & Socket to Socket)	Rft.	300	137	41,100
		Wiring Accessories				
E-04	2-66-01	Providing & fixing 10 Amps Polycarbonate flame retardant S.P Switch with fancy required gang plate fixed on die fabricated, powder coated, metal board recessed in the wall or column including connection as required. (Schneider / Philips)	Each	5	471	2,355
		Conduits & Pipes				
E-05	2-61-05	Supply & fixing 50mm (2") dia uPVC conduit with all especial such as bends, sockets, Junction etc fitted on surface as required.	P/Rft	200	231	46,200
E-06	2-61-02	Supply & fixing 25mm (1") dia uPVC conduit with all especial such as bends, sockets, Junction etc fitted on surface as required.	P/Rft	50	58	2,900
E-07	2-61-01	Supply & fixing 20mm (3/4") dia uPVC conduit with all especial such as bends, sockets, Junction etc fitted on surface as required.	P/Rft	300	45	13,500

PPRA REGULATORY AUTHORITY EPADS
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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

ELEVATED WATER TANK - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022 REF No./NS	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		Earthing and Lightning Protection				
E-08	3-8-04	Providing and fixing 1" diameter 3ft long lighting copper rod with five spikes and balls on its head as required.	Job	1	26,301	26,301
E-09	3-8-05	Providing and fixing 1-1/2" x 1/3" Thick copper strip with suitable saddle at 12" intervals complete as required.	P/Rft	500	268	134,000
					TOTAL OF SCHEDULED ITEMS	402,556

NON-SCHEDULED ITEMS

E. ELECTRICAL WORKS

Supply, installation, testing and commissioning of the following items of work (unless specifically stated otherwise) including all material, labour, tool, plant, accessories, related civil works etc required for proper completion of each item as per specifications (Section-8001 "General Specifications for Electrical Works" shall be applicable to all BOQ items). The contractor is bound to submit all relevent data, information, literature, drawings, submittals etc. as per specifications & recommended manufacturers list to The engineer for necessary approvals.

LT Distribution Boards

Ref Spec Sec: 8001, 8133

E-10	NS-01	Following 14 SWG and 16 SWG MS sheet, recessed / surface mounted on wall or floor LT Distribution Boards (as per single line diagram shown on drawings) including electrical & mechanical components, electrolytic tinned copper busbars, control wiring, related civil works and all accessories, complete in all respect.				
	a)	DB-OHWT	Job.	1	76,275	76,275

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) GOVERNMENT OF PAKISTAN
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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

ELEVATED WATER TANK - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022 REF No./NS	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		Light Fixtures Ref. Specs Sec. 8001, 8150				
E-11	NS-02	Following light fixtures as per lighting fixture schedule (as shown on drawing) installed on surface or wall or floor or false ceiling or columns or masts complete with all accessories such as lamps, lamp holders, ballasts, starters, ignitors, capacitors, LED drivers as applicable, etc. including all relevant installation material as required and approved by the Engineer. (Note: The contractor shall be reponsible for compatibility of recessed mounted light fixtures with gypsum / aluminium / dampa etc., false ceiling types in coordination with architectural design.)				
	a)	Surface Mounted Light Fixture with 10W LED bulb	No.	14	2,850	39,900
	b)	Supply and Installation of Air Craft Warning Light with daylight switch battery & Solar Panel for charging the battery complete in all respects.	No.	1	222,875	222,875
		LIGHTNING PROTECTION SYSTEM **(Ref. Spec. Sec. 8001, 8250)**				
E-12	NS-03	Earth electrode comprising of 14mm dia, 3 m long Copper deposited steel rod, including appropriate clamp for clamping of the down conductor. The copper deposited steel rod shall be hammered into the ground to the depth of twelve inches below the ground surface. The earth electrode includes excavation, backfilling, etc.	Job.	2	8,500	17,000
					TOTAL OF NON-SCHEDULED ITEMS =	356,050

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		GENERAL NOTE. SCOPE : *(Applicable to all sections)* Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per specifications and as approved by the Engineer.				
		SCHEDULE ITEMS				
C-UT-01	(103-10)	Excavation for raft foundations, underground tanks and septic tanks (rectangular or square) in all kinds of soil (except gravelly and murum soil wet silt, clay or mud, conglomeration of gravel and boulders, soft, sandy or disintegrated and hard rock) and back filling the excavated material all round the trenches including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead up to one chain (30.5 R.m) and lift upto 5 feet (1.52 m).	%Cft	24235	1358.75	329,286.27
	(103-10) + (103-28)	Additional 3' lift (5' - 8')	%Cft	14545	1596.25	232,166.58
	(103-10) + (103-28)	Additional 3' lift (8' - 11')	%Cft	14545	1833.75	266,709.77
	(103-10) + (103-28)	Additional 3' lift (11' - 14')	%Cft	14545	2071.25	301,252.96
	(103-10) + (103-28)	Additional 3' lift (14' - 17')	%Cft	14545	2308.75	335,796.14

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UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
	(103-10) + (103-28)	Additional 3' lift (17' - 20')	%Cft	14545	2546.25	370,339.33
	(103-10) + (103-28)	Additional 3' lift (20' - 23')	%Cft	5415	2783.75	150,726.14
	(103-10) + (103-28)	Additional 3' lift (23' - 26')	%Cft	4655	3021.25	140,639.19
C-UT-02	(103-11)	Excavation for raft foundations, underground tanks, septic tanks (rectangular or square) in gravelly soil and back filling the excavated material all round the trenches including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead up to one chain (30.5 R.m) and lift upto 5 feet (1.52 m).	%Cft	3465	1,566.56	54,281.30
	(103-11) + (103-28)	Additional 3' lift (5' - 8')	%Cft	2080	1,804.06	37,515.43
	(103-11) + (103-28)	Additional 3' lift (8' - 11')	%Cft	2080	2,041.56	42,454.24
	(103-11) + (103-28)	Additional 3' lift (11' - 14')	%Cft	2080	2,279.06	47,393.05
	(103-11) + (103-28)	Additional 3' lift (14' - 17')	%Cft	2080	2,516.56	52,331.87
	(103-11) + (103-28)	Additional 3' lift (17' - 20')	%Cft	2080	2,754.06	57,270.68
	(103-11) + (103-28)	Additional 3' lift (20' - 23')	%Cft	775	2,991.56	23,169.63

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD Sch. 2022 Ref No. (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
	(103-11) + (103-28)	Additional 3' lift (23' - 26')	%Cft	665	3,229.06	21,473.25
C-UT-03	(103-16)	Excavation for raft foundations, underground tanks and septic tanks (rectangular or square) in soft of disintegrated rock by hammering and chiselling, and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift up to 5 feet (1.52 m).	%Cft	3460	3,033.25	104,950.45
	(103-16) + (103-29)	Additional 3' lift (5' - 8')	%Cft	2075	3,330.13	69,083.55
	(103-16) + (103-29)	Additional 3' lift (8' - 11')	%Cft	2075	3,627.01	75,242.32
	(103-16) + (103-29)	Additional 3' lift (11' - 14')	%Cft	2075	3,923.89	81,401.10
	(103-16) + (103-29)	Additional 3' lift (14' - 17')	%Cft	2075	4,220.77	87,559.87
	(103-16) + (103-29)	Additional 3' lift (17' - 20')	%Cft	2075	4,517.65	93,718.65
	(103-16) + (103-29)	Additional 3' lift (20' - 23')	%Cft	775	4,814.53	37,288.53
	(103-16) + (103-29)	Additional 3' lift (23' - 26')	%Cft	665	5,111.41	33,990.88

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C-UT-04	(103-17)	Excavation for raft foundations underground tanks and septic tanks (rectangular or square) in hard rock by hammering, chiselling, and jumper work including stacking of serviceable and unserviceable materials separately, lead up to one chain (30.5 Ru.m) and lift up to 5 feet (1.52 m).	%Cft	3460	4,434.88	153,446.85
	(103-17) + (103-29)	Additional 3' lift (5' - 8')	%Cft	2075	4,731.76	98,160.36
	(103-17) + (103-29)	Additional 3' lift (8' - 11')	%Cft	2075	5,028.64	104,319.14
	(103-17) + (103-29)	Additional 3' lift (11' - 14')	%Cft	2075	5,325.52	110,477.91
	(103-17) + (103-29)	Additional 3' lift (14' - 17')	%Cft	2075	5,622.40	116,636.69
	(103-17) + (103-29)	Additional 3' lift (17' - 20')	%Cft	2075	5,919.28	122,795.46
	(103-17) + (103-29)	Additional 3' lift (20' - 23')	%Cft	775	6,216.16	48,144.16
	(103-17) + (103-29)	Additional 3' lift (23' - 26')	%Cft	665	6,513.04	43,311.72
C-UT-05	(105-14) + (105-27) + (105-39)	Providing and laying 1:4:8 (1 cement 4 Lawrencepur sand and 8 coarse aggregate) cement concrete using crushed graded boulders 1 inch (25 mm) and down gauge in foundation including levelling, compacting and curing etc.complete.	%Cft	3085	24933.34	769,193.54
C-UT-06	108-12	Providing 4 coat of bitumen emulsion at 10 Lbs. per % sft. (0.49 Kg/sm) on walls and floor in ground floor.	%Sft	32780	1010.75	331,323.85

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UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C-UT-07	(112-25)	Providing and laying first class solid burnt brick masonry set in cement mortar 1:6 in straight or curved walls 9 to 13-1/2 inches (229 mm to 343 mm) thick including scaffolding, raking, out joints and curing etc. complete in ground floor superstructure .	%Cft	745	41260.97	307,394.23
C-UT-08	(114-4) + (114-134) + (114-137) + (114-146)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge,Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 **in columns of square or rectangular shape** of regular section including form work and its removal, compacting and curing etc. but excluding the cost of reinforcement, **in foundation basement and plinth .**	%Cft	340	45990.01	156,366.03
C-UT-09	(114-24) + (114-134) + (114-137) + (114-146) + (114-161)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge,Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 **in columns of square or rectangular shape** of regular section including (M.S Plates)form work and its removal, compacting and curing etc. but excluding the cost of reinforcement, **in the ground floor.**	%Cft	190	61951.46	117,707.77
	(114-24) + (114-134) + (114-137) + (114-146) + (114-161) + (114-92)	**FIRST FLOOR**	%Cft	20	64762.92	12,952.58

PROCUREMENT REGULATORY AUTHORITY
EPADS
GOVERNMENT EMPLOYEES HOUSING AUTHORITY
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C-UT-10	(114-32) + (114-134) + (114-137) + (114-146) + (114-162)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 **in straight walls vertical fins etc. 3 inches (70 mm) and less than 5 inches (127 mm) thick** including (M.S Plates) form work and its removal, compacting and curing etc. complete but excluding the cost of reinforcement. in ground floor.	%Cft	55	86381.49	47,509.82
C-UT-11	(114-38) + (114-134) + (114-137) + (114-146) + (114-163)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge,Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 **in straight beams, lintels cantilever beams** of required shape or section including (M.S Plates) form work and its removal, compacting and curing etc. complete but excluding the cost of reinforcement, in basement and ground floor.	%Cft	735	68415.37	502,852.97
C-UT-12	(114-57) + (114-134) + (114-137) + (114-146) + (114-164)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 in **ordinary slab more than 6 inches (152 mm) thick** including (M.S Plates) form work and its removal compacting and curing etc. complete but excluding the cost of reinforcement, in basement plinth and ground floor.	%Cft	475	63024.24	299,365.14

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UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C-UT-13	(114-61) + (114-134) + (114-137) + (114-146) + (114-164)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 in **ordinary cantilevered slab** horizontal sun-shade or chajja tapered or straight average more than 6 inches (152 mm) thick including (M.S Plates) form work and its removal, compacting and curing etc. complete but excluding the cost of reinforcement, in basement plinth and ground floor.	%Cft	155	71825.75	111,329.91
C-UT-14	(114-99) + (114-134) + (114-137) + (114-146)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 **in foundation** or bottom slab of rectangular **underground tank** including form works and its removal, levelling, compacting and curing etc. complete but excluding the cost of reinforcement..	%Cft	12650	35500.8	4,490,851.20
C-UT-15	(114-101) + (114-134) + (114-137) + (114-146) + (114-162)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 **in walls** of rectangular **underground water tank or septic tank** including (M.S Plates) form works and its removal, compacting and curing etc. complete, but excluding the cost of reinforcement..	%Cft	12260	69453.8	8,515,035.88

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UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C-UT-16	(114-104) + (114-134) + (114-137) + (114-146) + (114-164)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 **in top slab** of rectangular **underground water tank or septic tank** including (M.S Plates) form works and its removal, compacting and curing etc. complete, but excluding the cost of reinforcement..	%Cft	3365	66059.83	2,222,913.28
C-UT-17	(114-166)	Providing and laying hard grade ribbed deformed (minimum yield point 60,000 psi) reinforcement bars with & including the cost of straightening, cutting, bending, binding, wastage, and such overlaps as are not shown in the drawings, placing in position on cement concrete 1:2:4 precast or m.s. chairs, tying with binding wire, cost of chairs and wires etc. in all kinds of RCC work in foundation, basement, plinth and ground floor of building including septic tanks and under ground tanks and in projections for future extension .	Kg	87420	282.45	24,691,779.00
C-UT-18	114-167	Providing and laying ribbed deformed steel reinforcement bars with guaranteed minimum yield point 40,000 psi) with & including the cost of straightening, cutting, bending, binding, wastage, complete in all kinds of RCC work in foundation, basement, plinth and ground floor of building including septic tanks and under ground tanks and in projections for future extension .	Kg	5050	266.70	1,346,835.00
C-UT-19	(117-7) + (114-136) + (114-145)	Providing, and laying **floors of 3 inches** (76 mm) thick 1:2:4 (1 cement 2 Lawrencepur sand and 4 coarse aggregate) cement concrete using crush graded boulders 3/4 inches (19 mm) and down gauge in **ground floor** laid in panels including form work, consolidation, finishing, curing etc. complete.	%Sft	765	9780.36	74,819.75

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UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C-UT-20	(118-2)	Providing and laying dado and skirting with 1/2 inch (13 mm) thick cement plaster 1:3 in ground floor including finishing smooth with a floating coat of neat cement, rounding corners and curing etc. complete..	%Sft.	55	6,170.64	3,393.85
C-UT-21	(119-32)	Providing and fixing iron grills with required section of flat iron as per approved design including welding all sides of the section at the junction, and fixing with sunk iron screws, painting two coats of red oxide paint etc. complete as required in any floor in masonry or concrete work.	Kg.	25	290.89	7,272.25
C-UT-22	(119-97)	Providing and fixing fully glazed **Bronze anodized or Powder Coated** aluminum Sliding windows as per British standard manufactured by **Lucky, Prime, Chawla, Krudson and Pakistan Cables.** (fixing through their approved fabricators), prime model box section 101mm x 30mm and **2mm** thick including the cost of aluminum netting ,fitting, with all accessories cutting hole etc. and making good damages to walls etc. complete as required in any floor as per direction of engineer-in-charge, but excluding the cost of glass pans.	Sft	50	1,367.19	68,359.50
C-UT-23	(119-121)	Providing and fixing Tinted glass panes 5mm thick to M.S. Box pipe / Aluminium doors, windows and ventilators etc including the cost of labour but excluding the cost of M.S. square pipe beading, rubber packing and screw in any floor at any height.	Sft	50	371.82	18,591.00
C-UT-24	(122-2)	1/4" thick cement plaster 1:4 on soffits of ceiling cantilever slabs sides and soffits of beams etc. in basement mezzanine and ground floor including making edges corners and curing etc. complete.	%Sft	1115	3852.59	42,956.38
C-UT-25	(122-4)	1/2" (13 mm) thick cement plaster 1:4 on walls and columns etc. in basement, plinth, mezzanine and ground floor including making edges, corners, and curing etc., complete .	%Sft	2965	4381.84	129,921.56

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UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
C-UT-26	(122-162)	Painting with (ICI) Dulux Plastic emulsion paint VIP of approved shade two coats over and including the cost of wall putti / priming coat complete over plastered surface at any height in any floor.	%Sft	2385	6737.38	160,686.51
C-UT-27	(122-172)	Painting three coats with weather shield paint deluxe (ICI) make of approved shade on plaster surface (External) and including the cost of cleaning the surface, sand papering etc. complete at any height in any floor.	%Sft	1695	4408.75	74,728.31
C-UT-28	(124-94)	Providing and fixing plain polyvinyl chloride (PVC) water stops 8" (203 mm) wide in vertical or horizontal expansion joints including cutting and jointing etc. complete in all floors .	Rft	320	405.31	129,699.20
C-UT-29	(124-170)	Providing and laying3/8"(9mm) thick Marble patties (Panel strips) upto 1" depth in floor and dado of any description in all floors.	Rft.	640	17.38	11,123.20
C-UT-30	(132-2)	Cartage of sand, bajri, lime, surkhi, murum, manure, earth, building rubbish including loading, unloading and stacking etc. at site:				
		3 miles (4.8 km) lead.	%Cft	152873	576.78	881,738.01
		Extra per mile (1.6 km) above 3 miles to 6 miles (4.8 km to 9.6 km) of lead. (3 x 84.72=254.16)	%Cft	152873	254.16	388,540.75
C-UT-31	(315-29)	Providing & laying R.C.C 1:2:4 slab cover 3" thick average (precost complete with M.S flat iron, M.S bars embedded in concrete) of any shape including the cost of reinforcement and welding etc. as per direction of Engineer Incharge.	Cft	30	2274.73	68,241.90
		Total of Scheduled Items (02 Nos) =				**99,653,632**

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UNDERGROUND WATER TANK AND PUMP ROOM

CIVIL WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		NON- SCHEDULE ITEMS				
C-UT-32	NS-01	Provide & fix 22-SWG. 6"-wide (minimum) G.I. Expended Metal Lathe to be fixed using 1"-long Stainless Steel Nails with 1"-dia. 20-SWG. G.I. Washers @18"-c/c in staggered pattern, complete in all respects.	Sft.	410	90	36,900
C-UT-33	NS-02	Bitumen coated cast iron cover with frame conforming to BS-497, on over under ground water tank including all fittings for complete installation. (a) 900mm x 900mm (90 kg)	Each	12	21613	259,356
C-UT-34	NS-03	Application of cementitious based water proof coating as approved by the Engineer to internal face of water tank	Sft	14025	135	1,893,375
C-UT-35	NS-04	Providing and fixing in position steel girders I beam 10" x 5" including red oxide coating, enamel painting, complete in all respect as per specifications / details shown on drawing.	Kgs	320	450	143,994
C-UT-36	NS-05	Steel doors (plain/louvered) comprising steel frame and steel shutter with 18 SWG sheet welded both sides, steel louvers where ever shown, including locks, all hardware fittings as per schedule, including painting with red-oxide and matt enamel paint, complete in all respects as per design, approved shop drawings/mock-up samples of the type .	Sft.	75	1800	135,000
		Total of Non- Scheduled Items (02 Nos) =				**4,937,250**

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1(PHASE-I), ISLAMABAD

UNDERGROUND WATER TANK - PLUMBING WORKS

ENGINEER'S ESTIMATE

ITEM No	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		GENERAL NOTE				
		Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per drawings, specifications and as approved by the Engineer.				
		SCHEDULED ITEMS				
		WATER SUPPLY PIPES AND FITTINGS				
		Providing G.I. pipes, specials and clamps etc., including fixing cutting and fitting complete with and including the cost of breaking through walls and roof, making good etc., painting 2 coats after cleaning the pipe etc.; with white zinc paint with pigment to match the colour of the building and testing with water to a pressure head of 200 feet (61 M) and cartages within 10 miles (16.09 km.) (ILLM)				
UT-P-01	305-7	03 inches (80 mm) dia pipe (ILLM).	Rft	10	1,142.06	11,420.60
UT-P-02	305-8	04 inches (100 mm) dia pipe (ILLM).	Rft	10	1,787.59	17,875.90
		VALVES				
		Providing and fixing cast iron sluice valves with' flanged ends and two tail pieces to each valve complete with bolts and nuts, including the cost of insertion rubber washers (valves to stand test pressure head of 400 feet (122 m). 3 inches (80 mm) dia..				
UT-P-03	310-01	03 inches (80 mm) dia..	Each	2	7,961.40	15,922.80
UT-P-04	310-02	04 inches (100 mm) dia.	Each	2	10,236.40	20,472.80
		CAST IRON COVERS				
UT-P-06	315-28	Providing & fixing C.I Cover & Frame 30" dia (765 mm) weight 3 cwt (152.41 Kg.)	Each	12	43,965.00	527,580.00
		TOTAL OF SCHEDULED ITEMS (02 Nos)=				**1,186,544**

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1(PHASE-I), ISLAMABAD

UNDERGROUND WATER TANK - PLUMBING WORKS

ENGINEER'S ESTIMATE

ITEM No	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		NON-SCHEDULED ITEMS				
		PUMPING MACHINERY				
UT-P-07	NS-01	Automatically operated Vertical Turbine type centrifugal pump set (in pump room with UGWT) for lifting water from Underground water tank to Elevated water tank, comprising two (03) number pumps with electric motors with VFD device in MCU (two working one standby),Each of Head=150feet and discharge=500gpm, including all accessories, level switches to be installed in Elevated & under ground water tank for automatic operation of pumps at set levels, dry running protection, combined motor control unit & automatic duty cycle relay, pressure guages, foot check valve, Gate and swing check valves PN-16, flexible joints PN-16, Y-strainers PN-16, manual tools, spare parts etc, complete in all respects as shown in drawings and as directed by the Engineer,	Job	1	13,337,835	13,337,835
		WATER SUPPLY PIPES AND FITTINGS				
UT-P-08	NS-02	Galvanized Iron (GI) pipes for potable water supply conforming to API 5L Grade-B / ASTM A53 ERW Sch. 40, with specials/flanges hangers and clamps etc, including fixing, cutting, welding, fixing & support systems; giving anti corrosive treatment and other fittings complete with and including the cost of breaking, through walls and slabs, making walls & slabs good thereafter, etc, painting with two coats of approved enamel paint after cleaning the pipe.				
	(a)	12 inches	Rft	20	17,221	344,420
	(b)	06 inches	Rft	300	6,830	2,049,000
	(c)	04 inches	Rft	10	3,940	39,400
	(d)	03 inches	Rft	10	2,799	27,990

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INFRASTRUCTURE DEVELOPMENT WORKS FOR G-14/1(PHASE-I), ISLAMABAD

UNDERGROUND WATER TANK - PLUMBING WORKS

ENGINEER'S ESTIMATE

ITEM No	PAK PWD Sch. 2022 Ref No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		MISCELLANEOUS				
UT-P-10	NS-04	Dia 4" u-turned G.I. vent pipes, pudddle plate, with insect proof mesh at open end etc., complete in all respects.	Job	12	13,534	162,408
UT-P-11	NS-05	Galvanised MS ladder rings 3/4" dia inside and outside water tanks; Each rung of 18" width, 6" projected outside the wall and 6" embeded in RCC on both ends; including all necessary works for complete installation	Each	240	1,250	300,000
		TOTAL OF NON-SCHEDULED ITEMS (02 Nos) =				**32,522,106**

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1 (PHASE-I), ISLAMABAD

UNDERGROUND WATER TANK - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM NO.	PAK PWD SCH.2022/ NS REF.No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		SCHEDULED ITEMS				
		LT Cable				
E-01	2-26-10'	Supply & drawing of 70 mm², single core, PVC insulated wire in all kinds of existing or given conduit/cable duct as required.	P/Rft.	250	825	206,250
E-02	3-4-01-h	Providing & laying 4 core, 120 mm², PVC insulated & PVC sheathed, 600/1000 volts grade with stranded copper conductor , un armoured, L.T cable in existing all kind of conduit or cable duct as per Pak. P.W.D specification as required.	P/Rft.	50	5,593	279,650
E-03	3-4-01-h	Providing & laying 4 core, 150 mm², PVC insulated & PVC sheathed, 600/1000 volts grade with stranded copper conductor , un armoured, L.T cable in existing all kind of conduit or cable duct as per Pak. P.W.D specification as required.	P/Rft.	200	6,856	1,371,200
E-04	3-9-01	Excavation in soft soil including lift upto 5ft and filling excavated earth including breaking clods dressing, watering, consolidation and ramming in layers to full compaction i/c disposal of surplus excavated stuff as directed as required.	P/CFT	3,000	11	33,000
		Wiring				
E-05	2-35-02	Wiring for sub-main with 2x2.5 mm², PVC insulated wire 300/500 volts grade, single core, stranded copper conductor wire in 20 mm (3/4") dia PVC conduit recessed in the wall, column and roof etc including 1.5 mm² PVC insulated wire single core wire as ECC as required. (from DB to Switch, Switch to Switch & Socket to Socket)	Rft.	300	137	41,100

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1 (PHASE-I), ISLAMABAD

UNDERGROUND WATER TANK - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM NO.	PAK PWD SCH.2022/ NS REF.No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
E-06	2-35-01	Wiring for sub-main with 2x1.5 mm², PVC insulated wire 300/500 volts grade, single core, stranded copper conductor wire in 20 mm (3/4")dia PVC conduit recessed in the wall, column and roof etc including 1mm² PVC insulated wire single core wire as ECC as required. (from Switch to Light Point and from Light Point to Light Point))	Rft.	500	99	49,500
E-07	2-35-03	Wiring for sub-main with 2x4 mm², PVC insulated wire 300/500 volts grade, single core, stranded copper conductor wire in 20 mm (3/4") dia PVC conduit recessed in the wall, column and roof etc including 1.5 mm² PVC insulated wire single core wire as ECC as requried.(from DB to 13A/15A Socket & 15A socket to socket)	Rft.	100	195	19,500
		Wiring Accessories				
E-08	2-66-01	Providing & fixing 10 Amps Polycarbonate flame retardant S.P Switch with fancy required gang plate fixed on die fabricated, powder coated, metal board recessed in the wall or column including connection as required. (Schneider / Philips)	Each	12	471	5,652
E-09	2-66-05	Providing & fixing 13 Amps Polycarbonate flame retardant 3-Pin switch socket unit with fancy gang plate fixed on die fabricated, powder coated metal board recessed in wall or column including connection as required. (Schneider / Philips)	Each	7	1,120	7,840
E-10	2-66-06	Providing & fixing 15 Amps Polycarbonate flame retardant 3-Pin switch socket unit with fancy gang plate fixed on die fabricated, powder coated metal board recessed in wall or column including connection as required. (Schneider / Philips)	Each	2	1,290	2,580
E-11	2-66-11	Providing & fixing Polycarbonate flame				

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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD
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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1 (PHASE-I), ISLAMABAD

UNDERGROUND WATER TANK - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM NO.	PAK PWD SCH.2022/ NS REF.No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		retardant, 400 watts fan dimmer with plate fixed on die fabricated, powder coated, metal board recessed in the wall or column including connection as required. (Schneider / Philips)	Each	4	1,197	4,788
		Light Fixtures				
E-12	2-77-09-e	Providing, Installation, Testing & Commissioning of 18-20 Watts LED Batten Lights including driver, having warm / neutral white / cool white colour, 90-100 lm/watts efficiency, 0.9 or above power factor, 20000-25000 hours life cycle, including connection, complete in all respect as approved by the Engineer Incharge	No.	6	3,925	23,550
E-13	2-77-01-c	Providing, Installation, Testing & Commissioning of 9-10 Watts recessed / surface mounted ceiling lights / downlights including driver, having warm / neutral white / cool white colour, 80-90 lm/watts efficiency, 0.9 or above power factor, 20000-25000 hours life cycle, including connection, complete in all respect as approved by the Engineer Incharge	No.	15	2,330	34,950
		Miscellaneous Items				
E-14	2-80-03	Providing & installing 140 Cm (56") sweep ceiling fan with blades, canopy, standard length of down rod including connection with 14.0076" flexable wire complete as required. (without regulator) Pak, Royal, GFC, Younas, Millat.	Each	4	9,349	37,396
E-15	2-83-03	Providing & installing 40 Cm (16") sweep, mettalic body Exhaust fan complete with blades, motor, etc fitted in existing hole including connection with 14/.0076" flexable wire complete as required Pak, Royal, GFC, Younas, Millat.	Each	1	6,263	6,263

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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD
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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1 (PHASE-I), ISLAMABAD

UNDERGROUND WATER TANK - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM NO.	PAK PWD SCH.2022/ NS REF.No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		Conduits & Pipes				
E-16	2-61-05	Supply & fixing 50mm (2") dia uPVC conduit with all especial such as bends, sockets, Junction etc fitted on surface as required.	P/Rft	50	231	11,550
E-17	2-61-02	Supply & fixing 25mm (1") dia uPVC conduit with all especial such as bends, sockets, Junction etc fitted on surface as required.	P/Rft	100	58	5,800
E-18	2-61-01	Supply & fixing 20mm (3/4") dia uPVC conduit with all especial such as bends, sockets, Junction etc fitted on surface as required.	P/Rft	100	45	4,500
		Earthing and Lightning Protection				
E-19	3-8-01	Providing and fixing Earthing set with 2'x2'x1/8" copper plate buried in the ground at the depth of 12 feet or less if water comes out from the ground level (with salt and charcol or earthing chemical powder) etc making the pit 12 feet deep by excavation of all type of soil (except soft or hard rock)i/c fixing of 8 SWG copper wire in 1/2" GI conduit complete in all respect as required.	Job	1	54,479	54,479
					TOTAL of SCHEDULED ITEMS (02 Nos) =	**4,399,096**

NON-SCHEDULED ITEMS

E. ELECTRICAL WORKS

Supply, installation, testing and commissioning of the following items of work (unless specifically stated otherwise) including all material, labour, tool, plant, accessories, related civil works etc required for proper completion of each item as per specifications (Section-8001 "General Specifications for Electrical Works" shall be applicable to all BOQ items). The contractor is bound to submit all relevent data, information, literature, drawings, submittals etc. as per specifications & recommended manufacturers list to The

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1 (PHASE-I), ISLAMABAD

UNDERGROUND WATER TANK - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM NO.	PAK PWD SCH.2022/ NS REF.No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
		engineer for necessary approvals.				
		LT Distribution Boards Ref Spec Sec: 8001, 8133				
E-20	NS-01	Following 14 SWG and 16 SWG MS sheet, recessed / surface mounted on wall or floor LT Distribution Boards (as per single line diagram shown on drawings) including electrical & mechanical components, electrolytic tinned copper busbars, control wiring, related civil works and all accessories, complete in all respect.				
	a)	DB-UGWT	Job.	1	253,938	253,938
		Conduits & Pipes Ref. Specs Sec. 8230				
E-21	NS-02	Following sizes of uPVC class-D pipes installed on surface / concealed in wall, slab & floor including pull wire and all accessories as required etc., complete in all respects.				
	a)	4" dia	Rft.	200	1,205	241,000
		TOTAL OF NON-SCHEDULED ITEMS (02 Nos) =				**989,876**

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL ROOM - CIVIL WORKS

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022 REF No./NS	Item Description	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		GENERAL NOTE. SCOPE : *(Applicable to all sections)* Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per specifications and as approved by the Engineer.				
		SCHEDULE ITEMS				
TW-C-01	103-10	Excavation for raft foundations, underground tanks and septic tanks (rectangular or square) in all kinds of soil (except gravelly and murum soil wet silt, clay or mud, conglomeration of gravel and boulders, soft, sandy or disintegrated and hard rock) and back filling the excavated material all round the trenches including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed, lead up to one chain (30.5 R.m) and lift upto 5 feet (1.52 m).	%Cft	425	1358.75	5,775
TW-C-02	104-1	Filling excavated earth available at site in foundation, plinth or under floor, etc. including breaking clods, dressing, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction complete within a lead of one chain (30.5 R.m) and lift of 5 feet (1.52m).	%Cft	75	735.19	551
TW-C-03	105-14 + 105-27 + 105-39	Providing and laying 1:4:8 (1 cement 4 Lawrencepur sand and 8 coarse aggregate) cement concrete using crushed graded boulders 1 inch (25 mm) and down gauge in foundation including leveling, compacting and curing etc.complete.	%Cft	35	24933.34	8,727

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TUBE WELL ROOM - CIVIL WORKS

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022 REF No./NS	Item Description	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
TW-C-04	108-12	Providing 4 coat of bitumen emulsion at 10 Lbs. per % sft. (0.49 Kg/sm) on walls and floor in ground floor.	%Sft	428	1010.75	4,326
TW-C-05	108-17	Providing and laying heated asphalt on ground floor roof at the rate of 40 Lbs. per hundred square feet (1.95 Kg per s.m) finished with washed gravel 3/8 inch (9.5 mm) down gauge at 3 cubic feet per % sft. (0.086 Cu.m. per s.m) including ramming with thappies and rounding of comers with cement mortar etc. complete .	%Sft	155	4750.47	7,363
TW-C-06	109-113 + 109-120 + 109-146	Providing and laying 1:3:6 (1 cement 3 Lawrencepur sand and 6 coarse aggregate) cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge in steps including cost of form work and its removal etc. complete in ground floor.	%Cft	7	29460.48	2,062
TW-C-07	112-02 + 112-76	Providing and laying first class solid burnt brick masonry set in cement mortar 1:5 in straight or curved walls of 9" to 13-1/2" thick including scaffolding , racking out joints and curing etc.complete in foundation ,basements and plinth (foundation and basement masonry upto 5 feet or 1.52 M. depth and plinth upto 4 feet or 1.2 M.height from ground level)	%Cft	120	39146.30	46,976
TW-C-08	112-25 + 112-76	Providing and laying first class solid burnt brick masonry set in cement mortar 1:6 in straight or curved walls 9 to 13-1/2 inches (229 mm to 343 mm) thick including scaffolding, raking, out joints and curing etc. complete in ground floor superstructure .	%Cft	350	41824.42	146,385

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL ROOM - CIVIL WORKS

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022 REF No./NS	Item Description	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
TW-C-09	114-2 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch at 28 days with a mix not leaner than 1:2:4 **in raft or strip foundation** with columns and pillars, of any shape including form work and its removal, compacting, leveling and curing etc. complete but excluding the cost of reinforcement, in foundation basement and plinth	%Cft	56	33562.40	18,795
TW-C-10	114-11 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch at 28 days with a mix not leaner than 1:2:4 **in straight walls 3 inch (102 mm) thick and lesthen 5 inch (127 mm)** including form work and its removal, compacting and curing etc. but excluding the cost of reinforcement, in foundation basement and plinth .	%Cft	20	69294.44	13,859
TW-C-11	114-38 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch at 28 days with a mix not leaner than 1:2:4 **in straight beams, lintels cantilever beams** of required shape or section including form work and its removal, compacting and curing etc. complete but excluding the cost of reinforcement, in basement and ground floor.	%Cft	50	47681.64	23,841

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL ROOM - CIVIL WORKS

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022 REF No./NS	Item Description	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
TW-C-12	114-56 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge,Lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch at 28 days with a mix not leaner than 1:2:4 in **ordinary slab 5 inches to 6 inches (152 mm) thick** including form work and its removal compacting and curing etc. complete but excluding the cost of reinforcement, in basement plinth and ground floor.	%Cft	75	45945.52	34,459
TW-C-13	114-59 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge,Lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch at 28 days with a mix not leaner than 1:2:4 **in ordinary cantilevered slab horizontal sun-shade or chajja tapered or straight average 5 inches (127 mm) to 6 inches (152 mm) thick** including form work and its removal compacting and curing etc. complete but excluding the cost of reinforcement, in basement plinth and ground floor.	%Cft	3	53015.50	1,590
TW-C-14	114-166	Providing and laying hard grade ribbed deformed (minimum yield point 60,000 psi) reinforcement bars with & including the cost of straightening, cutting, bending, binding, wastage, and such overlaps as are not shown in the drawings, placing in position on cement concrete 1:2:4 precast or m.s. chairs, tying with binding wire, cost of chairs and wires etc. in all kinds of RCC work in foundation, basement, plinth and ground floor of building including septic tanks and under ground tanks and in projections for future extension .	Kg	80	282.45	22,596

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL ROOM - CIVIL WORKS

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022 REF No./NS	Item Description	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
TW-C-15	114-167	Providing and laying ribbed deformed steel reinforcement bars with guaranteed minimum yield stress of 40,000 psi with and including the cost of straightening, cutting, bending, binding, wastage, complete in all kinds of RCC work .	Kg	280	266.70	74,676
TW-C-16	117-2	Providing and laying 1:4:8 cement concrete bed under floor using graded stone ballast 2" and down gauge with leveling and ramming, ramming, watering and curing etc. complete in ground floor.	%Cft	65	22036.75	14,324
TW-C-17	117-6 + 114-136 + 114-145	Providing, and laying **floors of 2 inches** (51 mm) thick 1:2:4(1 cement 2 Lawrencepur sand and 4 coarse aggregate) cement concrete using graded crushed boulders 3/4 inches (19 mm) and down gauge in ground floor laid in panels including form work, consolidation,	%Sft	185	7751.02	14,339
TW-C-18	118-2 + 118-11	Providing and laying dado and skirting with 1/2 inch (13 mm) thick cement plaster 1:3 in **basement and mezzanine** floor including finishing smooth with a floating coat of neat cement, rounding corners and curing etc. complete..	%Sft.	15	6,764.39	1,015
TW-C-19	119-5	Providing and fixing single leaf steel doors made to crittal or equivalent standard and of approved sections fully panelled with M.S sheet of 16 gauge painted with two coats of red oxide paint including, using approved brass section oxidized fittings iron lugs, cutting holes and making good damages to walls etc.complete as required in any floor.	Sq.ft.	28	933.84	26,148

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL ROOM - CIVIL WORKS

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022 REF No./NS	Item Description	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
TW-C-20	119-25	Providing and fixing fully glazed double leaf hung steel windows and ventilators made to crittal or equivalent standard and of approved sections painted with two coats of red oxide paint including, usi ng approved brass section oxidized fittings iron lugs, cutting holes and making good damages to walls etc.complete as required in any floor.	Sft.	90	1079.07	97,116
TW-C-21	119-119	Providing and fixing plain glass panes 5mm thick to M.S. Box pipe / Aluminium doors, windows and ventilators etc including the cost of labour but excluding the cost of M.S. square pipe beading, rubber packing and screw in any floor at any height.	Sft	12	859.72	10,317
TW-C-22	122-2	1/4" thick cement plaster 1:4 on soffits of ceiling cantilever slabs sides and soffits of beams etc. in basement mezzanine and ground floor including making edges corners and curing etc. complete.	%Sft	250	3852.59	9,631
TW-C-23	122-4	1/2" (13 mm) thick cement plaster 1:4 on walls and columns etc. in basement, plinth, mezzanine and ground floor including making edges, corners, and curing etc., complete .	%Sft	1070	4381.84	46,886
TW-C-24	122-151	Distempering with vinyle distemper (ICI) Dulux Paintex of approved make and shade in two coats over and including the cost of one priming coat of lime wash including sand papering, dusting, and filling the holes, cracks and inequalities, if any, at any height in any floor.	%Sft	550	3401.25	18,707
TW-C-25	122-172	Painting three coats with weather shield paint deluxe (ICI) make of approved shade on plaster surface (External) and including the cost of cleaning the surface, sand papering etc. complete at any height in any floor.	%Sft	705	4408.75	31,082

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL ROOM - CIVIL WORKS

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022 REF No./NS	Item Description	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
TW-C-26	124-171	Providing and laying 1/2" (13mm) thick marble patties (panel strip) upto 1-1/2" (38 mm) depth in floor and dado of any description in all floors.	Rft.	115	20.19	2,322
TW-C-27	127-32	Supplying and laying hand broken 1-1/2" to 1/2" (38 mm to 13 mm) stone ballast of approved grade and quality in sub-base or base courses in required grade and camber and compacting to the required density by approved mechanical means (Vibratory Roller, Road Packer and Smooth Wheel Roller etc.) including watering with all lead and lift complete (actual compacted depth shall be considered for payment)	%Cft	65	8341.52	5,422
TW-C-28	134-2	Cartage of sand, bajri, lime, surkhi, murum, manure, earth, building rubbish including loading, unloading and stacking etc. at site:				
		3 miles (4.8 km) lead.	%Cft	265	576.78	1,528
		Extra per mile (1.6 km) above 3 miles to 6 miles (4.8 km to 9.6 km) of lead.	%Cft	265	254.16	674
					Total of Scheduled Items =	**726,066**
					For 02 Numbers TubeWell =	**1,452,132**

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD
INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL ROOM - CIVIL WORKS

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022 REF No./NS	Item Description	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
		NON- SCHEDULE ITEMS				
		Ref. Spec. No. 1600				
TW-C-29	NS-1	Termite control treatment in areas as specified.	Sft.	460	20.00	9,200
		Ref. Spec. No. 3000				
TW-C-30	NS-2	Provide & fix 22-SWG. 6"-wide (minimum) G.I. Expended Metal Lathe to be fixed using 1"-long Stainless Steel Nails with 1"-dia. 20-SWG. G.I. Washers @18"-c/c in staggered pattern, complete in all respects.	Sft.	190	86.78	16,488
					Total of Non- Scheduled Items =	**26,973**
					For 02 Numbers TubeWell =	**53,945**

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELLS DRILLING WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 REF No./NS (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
		GENERAL NOTE				
		Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per specifications and as approved by the Engineer.				
		SCHEDULED ITEMS				
		TUBEWELL				
TW-01	5-17-01	Conducting Electric Resistivity survey at different locations to configure the subsurface lithologies/possibilty of ground water suitable for drilling tube well.	Job	1	33,000	33,000
TW-02	5-17-04	Drilling of Trial Bore in shingle gravel and rock including sinking and with drawing of casing pipes 6"-10" dia				
	a	Ground level to 250 Rft-(8" dia Trial bore)	Rft	100	1,764	176,400
	b	Exceeding 250 Rft-(8" dia Trial bore)	Rft	100	901	90,100
TW-03	5-17-05	Conversion of Trial Bore in shingle gravel and rock including sinking and with drawing of casing pipes 15"-18" dia				
	a	Ground level to 250 Rft-(18" dia bore)	Rft	100	2,531	253,100
	b	Exceeding 250 Rft-(18" dia bore)	Rft	100	2,729	272,900
TW-04	5-17-06	Drilling of Trial Bore in all type of soil except shingle gravel and rock including sinking and with drawing of casing pipe complete as required: 6"-10" dia				
	a	Ground level to 250 Rft-(8" dia Trial bore)	Rft	150	1,388	208,200
	b	Exceeding 250 Rft-(8" dia Trial bore)	Rft	250	1,542	385,500

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELLS DRILLING WORKS

ENGINEER'S ESTIMATE

ITEM No.	PAK PWD SCHEDULE 2022 REF No./NS	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
TW-05	5-17-07	Conversion of Trial Bore into successful bore in all type of soil except shingle gravel and rock including sinking and with drawing of casing pipe complete as required: **6"-10" dia** **15"-18" dia (TYPO ERROR CORRECTED)**				
	a	Ground level to 200 Rft-(18" dia bore)	Rft	100	1,718	171,800
	b	Exceeding 200 Rft-(18" dia bore)	Rft	300	1,938	581,400
TW-06	5-17-14	Shrouding with graded PEA gravel into the space between bore hole and blind pipe/strainer.	Cft	650	150	97,500
TW-07	5-17-15	Electric/video logging of successful bore hole for proper placement of strainer/blind pipe etc complete as required.	Job	1	33,000	33,000
TW-08	5-17-17	Testing develop and sterlize of tube well through compressor upto 1.5 cusecs discharge in accordance with approved procedure upto duration of 72 hours as required by the Engineer	Job	1	34,320	34,320
					TOTAL OF SCHEDULED ITEMS =	**2,337,220**
					FOR 02 NUMBERS TUBEWELLS =	**4,674,440**
		NON-SCHEDULED ITEMS (Ref. Spec. 5240, 5600)				
		TUBEWELL				
TW-09	NS-01	Mobilization and de-mobilization of drilling rig and related equipments at drilling site.	Job	1	80,000	80,000
TW-10	NS-02	Collection of lithological samples at every 5 feet interval or change of lithology whichever is less.	Job	1	20,000	20,000

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELLS DRILLING WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 REF No./NS (b)	DESCRIPTION (c)	UNIT (d)	QTY. (e)	UNIT RATE (Rs.) (f)	TOTAL AMOUNT (Rs.) (g)
TW-11	NS-03	Yield test by air compressor.	Job	1	100,000	100,000
TW-12	NS-04	Supply and installation of Fiberglass Blind pipe,12" dia and 8 mm thick, complete in all respects.	Rft	400	5,480	2,192,000
TW-13	NS-05	Supply and installation of Fiberglass Strainer pipe,12" dia and 8 mm thick, complete in all respects.	Rft	200	5,811	1,162,200
TW-14	NS-06	Supply and installation of Bail Plug, 12" dia of approved specifications.	Rft	10	6,000	60,000
TW-P-18	NS-06	Furnishing sample of water from bore hole and getting water quality test report from approved Laboratory.	Job	1	20,000	20000
TW-15	NS-07	Supply and install Centralizers as per specifications.	No	10	3000	30,000
TW-16	NS-08	Provision and fixing 2 Nos. dia 2" PVC gravel feed pipe including sanitary seal to min. 20 ft. depth from top level of tubewell, complete in all respects.	Job	1	50,000	50,000
		PUMPING MACHINERY				
TW-17	NS-09	Submersible deep well pump with motor, including control panel outdoor weather resistant type (location as per plan), appropriate power cable from panel to motor, valves, GI (ASTM A53 Sch-40) Riser pipe upto ground of required dia. & standard specifications and all other installation accessories as required/ recommended by the pump manufacturer for complete installation and operation, of following tentative requirements: Discharge = 4000-5000 gph; Head=500-600 feet & Setting Depth=350-400 feet	Job	1	6,351,057	6,351,057
					TOTAL OF NON-SCHEDULED ITEMS =	**10,065,257**
					FOR 02 NUMBERS TUBEWELLS =	**20,130,514**

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM NO. (a)	PAK PWD SCH.2022/ NS REF.No.	DESCRIPTION (b)	UNIT (c)	QTY. (d)	UNIT RATE (Rs.) (e)	TOTAL AMOUNT (Rs.) (f)
		SCHEDULED ITEMS				
		LT Cable				
E-01	2-26-06'	Supply & drawing of 16 mm², single core, PVC insulated wire in all kinds of existing or given conduit/cable duct as required.	P/Rft.	100	209	20,900
E-02	3-4-01-h	Providing & laying 4 core, 35 mm², PVC insulated & PVC sheathed, 600/1000 volts grade with stranded copper conductor , un armoured, L.T cable in existing all kind of conduit or cable duct as per Pak. P.W.D specification as required.	P/Rft.	200	1,668	333,600
		Wiring				
E-03	2-35-02	Wiring for sub-main with 2x2.5 mm², PVC insulated wire 300/500 volts grade, single core, stranded copper conductor wire in 20 mm (3/4") dia PVC conduit recessed in the wall, column and roof etc including 1.5 mm² PVC insulated wire single core wire as ECC as required. (from DB to Switch, Switch to Switch & Socket to Socket)	Rft.	150	137	20,550
E-04	2-35-01	Wiring for sub-main with 2x1.5 mm², PVC insulated wire 300/500 volts grade, single core, stranded copper conductor wire in 20 mm (3/4")dia PVC conduit recessed in the wall, column and roof etc including 1mm² PVC insulated wire single core wire as ECC as required. (from Switch to Light Point and from Light Point to Light Point))	Rft.	300	99	29,700

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM NO.	PAK PWD SCH.2022/ NS REF.No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
E-05	2-35-03	Wiring for sub-main with 2x4 mm², PVC insulated wire 300/500 volts grade, single core, stranded copper conductor wire in 20 mm (3/4") dia PVC conduit recessed in the wall, column and roof etc including 1.5 mm² PVC insulated wire single core wire as ECC as requried.(from DB to 13A/15A Socket & 15A socket to socket)	Rft.	100	195	19,500
		Wiring Accessories				
E-06	2-66-01	Providing & fixing 10 Amps Polycarbonate flame retardant S.P Switch with fancy required gang plate fixed on die fabricated, powder coated, metal board recessed in the wall or column including connection as required. (Schneider / Philips)	Each	5	471	2,355
E-07	2-66-05	Providing & fixing 13 Amps Polycarbonate flame retardant 3-Pin switch socket unit with fancy gang plate fixed on die fabricated, powder coated metal board recessed in wall or column including connection as required. (Schneider / Philips)	Each	4	1,120	4,480
E-08	2-66-06	Providing & fixing 15 Amps Polycarbonate flame retardant 3-Pin switch socket unit with fancy gang plate fixed on die fabricated, powder coated metal board recessed in wall or column including connection as required. (Schneider / Philips)	Each	2	1,290	2,580
E-09	2-66-11	Providing & fixing Polycarbonate flame retardant, 400 watts fan dimmer with plate fixed on die fabricated, powder coated, metal board recessed in the wall or column including connection as required. (Schneider / Philips)	Each	1	1,197	1,197

PROCUREMENT REGULATORY AUTHORITY
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NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM NO. (a)	PAK PWD SCH.2022/ NS REF.No.	DESCRIPTION (b)	UNIT (c)	QTY. (d)	UNIT RATE (Rs.) (e)	TOTAL AMOUNT (Rs.) (f)
		Light Fixtures				
E-10	2-77-09-e	Providing, Installation, Testing & Commissioning of 18-20 Watts LED Batten Lights including driver, having warm / neutral white / cool white colour, 90-100 lm/watts efficiency, 0.9 or above power factor, 20000-25000 hours life cycle, including connection, complete in all respect as approved by the Engineer Incharge	No.	2	3,925	7,850
E-11	2-77-01-c	Providing, Installation, Testing & Commissioning of 9-10 Watts recessed / surface mounted ceiling lights / downlights including driver, having warm / neutral white / cool white colour, 80-90 lm/watts efficiency, 0.9 or above power factor, 20000-25000 hours life cycle, including connection, complete in all respect as approved by the Engineer Incharge	No.	4	2,330	9,320
		Miscellaneous Items				
E-12	2-80-03	Providing & installing 140 Cm (56") sweep ceiling fan with blades, canopy, standard length of down rod including connection with 14.0076" flexable wire complete as required. (without regulator) Pak, Royal, GFC, Younas, Millat.	Each	1	9,349	9,349
		Conduits & Pipes				
E-13	2-61-05	Supply & fixing 50mm (2") dia uPVC conduit with all especial such as bends, sockets, Junction etc fitted on surface as required.	P/Rft	50	231	11,550
E-14	2-61-02	Supply & fixing 25mm (1") dia uPVC conduit with all especial such as bends, sockets, Junction etc fitted on surface as required.	P/Rft	100	58	5,800

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM NO. (a)	PAK PWD SCH.2022/ NS REF.No.	DESCRIPTION (b)	UNIT (c)	QTY. (d)	UNIT RATE (Rs.) (e)	TOTAL AMOUNT (Rs.) (f)
		Earthing and Lightning Protection				
E-15	3-8-01	Providing and fixing Earthing set with 2'x2'x1/8" copper plate buried in the ground at the depth of 12 feet or less if water comes out from the ground level (with salt and charcol or earthing chemical powder) etc making the pit 12 feet deep by excavation of all type of soil (except soft or hard rock)i/c fixing of 8 SWG copper wire in 1/2" GI conduit complete in all respect as required.	Job	1	54,479	54,479
					TOTAL OF SCHEDULED ITEMS =	**533,210**
					FOR 02 NUMBERS TUBEWELL =	**1,066,420**

NON-SCHEDULED ITEMS

E. ELECTRICAL WORKS

Supply, installation, testing and commissioning of the following items of work (unless specifically stated otherwise) including all material, labour, tool, plant, accessories, related civil works etc required for proper completion of each item as per specifications (Section-8001 "General Specifications for Electrical Works" shall be applicable to all BOQ items). The contractor is bound to submit all relevent data, information, literature, drawings, submittals etc. as per specifications & recommended manufacturers list to The engineer for necessary approvals.

LT Distribution Boards

Ref Spec Sec: 8001, 8133

Following 14 SWG and 16 SWG MS sheet, recessed / surface mounted on wall or floor LT Distribution Boards (as per single line diagram shown on drawings) including electrical & mechanical components, electrolytic tinned copper busbars, control wiring, related civil works and all accessories, complete in all respect.

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

TUBE WELL - ELECTRICAL WORKS

ENGINEER'S ESTIMATE

ITEM NO.	PAK PWD SCH.2022/ NS REF.No.	DESCRIPTION	UNIT	QTY.	UNIT RATE (Rs.)	TOTAL AMOUNT (Rs.)
(a)		(b)	(c)	(d)	(e)	(f)
E-16	NS-01	**DB-TW** shall comprise; 01 No. 100 Amps TP MCCB RC-25 kA 03 Nos. 2 Amps Protection Fuses. 01 No. Analog Voltmeter. 03 Nos. 220 VAC indication lights. Electrolytic copper busbars with connection arrangement of outgoing cables. Nut and bolts, washers, bus bar insulations. 01 No. 80 Amps TP MCCB RC-15 kA 01 No. 30 Amps TP MCCB RC-15 kA 03 Nos. 20 Amps SP MCB RC-06 kA	Job	1	142,793.00	142,793
		Conduits & Pipes Ref. Specs Sec. 8230				
E-17	NS-02	Following sizes of uPVC class-D pipes installed on surface / concealed in wall, slab & floor including pull wire and all accessories as required etc., complete in all respects.				
	a)	4" dia	Rft.	200	1,205	241,000
					TOTAL OF NON-SCHEDULED ITEMS =	**383,793**
					FOR 02 NUMBERS TUBEWELL =	**767,586**

PPRA PROCUREMENT REGULATORY AUTHORITY

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WOKS OF SUB-SECTOR G-14/1(PHASE-I)

CROSS DRAINAGE STRUCTURES

ENGINEER'S ESTIMATE

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	Item Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Amount (Rs.) (g)
		GENERAL NOTE				
		Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per specifications and as approved by the Engineer.				
		SECTION A: EARTHWORK				
CV-C-01		Excavation for foundation trenches and drains in wet silt clay or mud and back illing the excavated material in foundation trenches, plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m).				
	103-1	Lift upto 5 feet	100 Cft	55,484	2,755.25	1,528,730
	103-1 + 103-28	Lift 5 feet to 8 feet	100 Cft	55,484	2,992.75	1,660,505
	103-1 + 2X 03-28	Lift 8 feet to 11 feet	100 Cft	55,484	3,230.25	1,792,280
	103-1 + 3X 03-28	Lift 11 feet to 14 feet	100 Cft	27,742	3,467.75	962,028
CV-C-02		Excavation for foundation trenches and drains in strata of conglomeration of gravel and boulders by hammering, chiselling and jumper work including stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m).				
	103-5	Lift upto 5 feet	100 Cft	6,528	5,547.38	362,151
	103-5 + 103-29	Lift 5 feet to 8 feet	100 Cft	6,528	5,844.26	381,532
	103-5 + 2X 03-29	Lift 8 feet to 11 feet	100 Cft	6,528	6,141.14	400,914

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INFRASTRUCTURE DEVELOPMENT WOKS OF SUB-SECTOR G-14/1(PHASE-I)

CROSS DRAINAGE STRUCTURES

ENGINEER'S ESTIMATE

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	Item Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Amount (Rs.) (g)
	103-5 + 3X 03-29	Lift 11 feet to 14 feet	100 Cft	6,528	6,438.02	420,295
CV-C-03		Excavation for foundation trenches and drains in soft or disintegrated rock by hammering, chiselling and Jumper work including, stacking of serviceable and unserviceable materials separately, lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m).				
	103-7	Lift upto 5 feet	100 Cft	3,263	2,328.63	75,975
	103-7 + 103-29	Lift 5 feet to 8 feet	100 Cft	3,263	2,625.51	85,662
	103-7 + 2X 03-29	Lift 8 feet to 11 feet	100 Cft	3,263	2,922.39	95,348
	103-7 + 3X 03-29	Lift 11 feet to 14 feet	100 Cft	3,263	3,219.27	105,034
CV-C-04	(104-9)	Supplying stacking and filling sand of approved quality from outside sources in foundation, trenches, plinth or under floor, etc. including dressing, watering and consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction and lift upto 5 feet (1 .52 m).	100 Cft	39043	4869.94	1,901,346
CV-C-05	(104-13)	Supplying, stacking, spreading soil aggregate (Ghara / Pit pan gravel) and sand (a mixture of natured and crushed stone) as approved by Engineer 13 incharge i/c watering , conslidation_ , compaction to required density with power robber i/c all lead and lift (actual compacted depth shall be considered for payment.	100 Cft	86,240	5736.25	4,946,942
		SECTION B CONCRETE WORKS				
CV-C-06	(105-14) + (105-27) + (105-39)	Providing and laying 1:4:8 (1 cement 4 Lawrencepur sand and 8 coarse aggregate) cement concrete using crushed graded boulders 1 inch (25 mm) and down gauge in foundation including leveling, compacting and curing etc.complete.	100 Cft	15685	24933.34	3,910,794

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INFRASTRUCTURE DEVELOPMENT WOKS OF SUB-SECTOR G-14/1(PHASE-I)

CROSS DRAINAGE STRUCTURES

ENGINEER'S ESTIMATE

Item No.	PAK PWD SCHEDULE 2022	Item Description	Unit	Quantity	Unit Rate (Rs.)	Amount (Rs.)
(a)	(b)	(c)	(d)	(e)	(f)	(g)
CV-C-08	(114-2) + (114-134) + (114-137) + (114-146)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 **in raft or strip foundation** with columns and pillars, of any shape including form work and its removal, compacting, leveling and curing etc. complete but excluding the cost of reinforcement, in foundation basement and plinth	100 Cft	50485	37273.04	18,817,294
CV-C-09	(114-9) + (114-134) + (114-137) + (114-146)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge, Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 **in straight walls more than 6 inches (152 mm) thick** including form work and its removal, compacting and curing etc. but excluding the cost of reinforcement, in foundation basement and plinth	100 Cft	45,860	49625.83	22,758,406
CV-C-10	(114-57) + (114-134) + (114-137) + (114-146)	Providing and laying reinforced cement concrete using crush graded boulders 3/4 inch (19 mm) and down gauge,Lawrencepur sand having a minimum works cube crushing strength of 3750 lbs. per sq inch at 28 days with a mix not leaner than 1:1-1/2:3 in **ordinary slab more than 6 inches (152 mm) thick** including form work and its removal, compacting and curing etc. complete but excluding the cost of reinforcement, in basement plinth and ground floor.	100 Cft	30,770	47786.03	14,703,761

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INFRASTRUCTURE DEVELOPMENT WOKS OF SUB-SECTOR G-14/1(PHASE-I)

CROSS DRAINAGE STRUCTURES

ENGINEER'S ESTIMATE

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	Item Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Amount (Rs.) (g)
CV-C-11	114-167	Providing and laying hard grade ribbed deformed (minimum yield point 60,000 psi) reinforcement bars with & including the cost of straightening, cutting, bending, binding, wastage, and such overlaps as are not shown in the drawings, placing in position on cement concrete 1:2:4 precast or m.s. chairs, tying with binding wire, cost of chairs and wires etc. in all kinds of RCC work in foundation, basement, plinth and ground floor of building including septic tanks and under ground tanks and in projections for future extension .	kg	400,000	282.45	112,980,000
		G. MISCELLANEOUS				
CV-C-07	(108-12)	Providing 4 coat of bitumen emulsion at 10 Lbs. per % sft. (0.49 Kg/sm) on walls and floor in ground floor.	100 Sft	195940	1010.75	1,980,464
CV-C-12	124-97	Providing and fixing PVC ribbed water stops 9" (229 mm) wide in vertical or horizontal expansion joints including cutting or jointing etc., complete in all floors.	Rft	1,580	448.81	709,120
					TOTAL SCHEDULED ITEMS =	**190,578,581**

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY FGEHA

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

NULLAH CHANNELIZATION WORKS (CIVIL)

ENGINEER'S ESTIMATES

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	Item Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Amount (Rs.) (g)
		SCHEDULED ITEMS				
		SECTION A: EARTHWORKS				
NC-C-1	103-4	Excavation for foundation trenches and drains in wet silt clay or mud and back filling the excavated material in foundation trenches, plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m).	100Cft	793,800	2755.25	21,871,175
NC-C-2	103-4 + 103-30x2	Excavation for foundation trenches and drains in wet silt clay or mud and back filling the excavated material in foundation trenches, plinth or under floor including breaking clods, watering, consolidation by ramming in layers not exceeding 9 inches (229 mm) in depth to full compaction, dressing and disposal of surplus excavated stuff as directed lead upto one chain (30.5 R.m) and lift upto 5 feet (1.52 m). Add for additional lift of every three feet (30.9 R.m).	100Cft	198,450	3230.25	6,410,431
NC-C-3	104-10	Supplying, stacking and spreading murum from approved quarries to required slope including consolidation by ramming and watering etc. complete.	100Cft	236,250	3369.94	7,961,483
		SECTION B: CONCRETE WORKS				
NC-C-4	106-11	Providing and laying in situ 1:4:8 (1 cement 4 sand and 8 coarse aggregate) cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge in foundation, basement and plinth including form work, compacting, curing and removal of form work etc. complete, foundation and basement up to 5 feet (1.52 m) depth and plinth up to 4 feet (1.2 m) height from ground level.	100Cft	1100	32,221.55	354,437

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INFRASTRUCTURE DEVELOPMENT WORKS FOR SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

NULLAH CHANNELIZATION WORKS (CIVIL)

ENGINEER'S ESTIMATES

Item No. (a)	PAK PWD SCHEDULE 2022 (b)	Item Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Amount (Rs.) (g)
NC-C-5	114-2 + 114-136 + 114-145	Providing and laying reinforced cement concrete using crushed graded boulders 3/4 inch (19 mm) and down gauge with lawrencepur sand having a minimum works cube crushing strength of 3000 lbs. per sq inch (20.69 N/mm^2) at 28 days with a mix not leaner than 1:2:4 in raft or strip foundation with columns and pillars, of any shape including form work and its removal, compacting, leveling and curing etc. complete but excluding the cost of reinforcement, in foundation basement and plinth	100Cft	7350	33,562.40	2,466,836
NC-C-6	114-167	Providing and laying ribbed deformed (minimum yield point 40,000 psi) einforcement bars with & including the cost of straightening, cutting, bending, binding, wastage, and such overlaps as are not shown in the drawings, placing in position on cement concrete 1 :2:4 precast or m.s. chairs, tying with binding wire, cost of chairs and wires etc. in all kinds of RCC work in foundation, basement, plinth' and ground floor of building including septic tanks and under ground tanks and in projections for future extension .	Kg	13500	266.70	3,600,450
		SECTION C: STONE MASONRY WORKS				
NC-C-7	127-163	Providing and laying dry stone uncoarsed rubble pitching up to 12" (305 mm) thick in bottom and sides of channel or drain as per direction of the Engineer-in-Charge .	100Cft	209,160	10,001.00	20,918,092
NC-C-8	127-164	Cement pointing to stone pitching in 1:2 cement mortar in channels or drain including curing etc. and raking out joint complete	100Sft	255,150	2307.19	5,886,795
NC-C-9	401h *(NHA CSR 2022)*	Plum (Cycloprean) / Ruble) Concrete (2:1 Concrete, Stone Ration)	Cum	1635	8,955.74	14,643,091
					TOTAL =	**84,112,791**

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD
INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

GEOTECHNICAL INVESTIGATIONS WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	Description (c)	Unit (d)	Qty. (e)	Unit Rate (Rs.) (f)	Amount (Rs.) (g)
		FIELD INVESTIGATIONS				
GI-C-01	NS-GI-01	Mobilization and demobilization of at least one (01) straight rotary / percussion drilling rig alongwith allied accessories at site including setting up and shifting from one investigation point to another. The equipment should be sufficient enough to complete the work within scheduled time.	L.S.	Job	100,000	100,000
GI-C-02	NS-GI-02	Execution of: i) Two (02) boreholes upto a maximum depth of 25 m at OHWT/UGWT locations ii) Two (02) boreholes upto a maximum depth of 10 m at culvert locations below NSL or rock strike level whichever is met earlier, by straight rotary / percussion drilling method including backfilling of boreholes to their original position using cement, sand and bentonite mix. Minimum permissible diameter of borehole is 250 mm for precussion method and 101 mm for straight rotary method.	L.M.	60	6,500	390,000
GI-C-03	NS-GI-03	Continuous core drilling in bedrock (NX size in general) up to a maximum depth of 5 m below rock strike level, including preservation of core samples in core boxes, waxing of core samples, photography of rock cores and transportation of core samples to the laboratory.	L.M.	10	11,000	110,000
GI-C-04	NS-GI-04	Performance of Standard Penetration Tests (SPTs) in boreholes along with collection of SPT samples at 1 m interval in general, or as necessary, including their labelling, packing, storage & transportation to an approved testing laboratory.	No.	55	1,000	55,000
GI-C-05	NS-GI-05	Collection of undistrubed soil samples from boreholes through Shelby/Denison/Pitcher samplers, including their waxing, labelling, packing, storage & transportation to an approved testing laboratory.	No.	5	3,500	17,500
GI-C-06	NS-GI-06	Excavation of ten (10) test pits up to a maximum depth of 3.0 m in overburden soils or rock strike level whichever is met earlier along the road network/sewerage network locations, including backfilling of pits to their original condition.	L.M.	30	3,000	90,000

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD
INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

GEOTECHNICAL INVESTIGATIONS WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	Description (c)	Unit (d)	Qty. (e)	Unit Rate (Rs.) (f)	Amount (Rs.) (g)
GI-C-07	NS-GI-07	Performance of field density tests by sand replacement method in test pits generally @ 2 tests/pit at selected horizons, including determination of in-situ bulk and dry density and collection of small disturbed samples in moisture tins for moisture content determination in laboratory by oven drying method as well as labelling, packing, storage & transportation to an approved testing laboratory.	No.	20	3,500	70,000
GI-C-08	NS-GI-08	Excavation of five (05) test pits in borrow areas upto a maximum depth of 2 m including backfilling of pits to their original condition. (for subgrade A-3/A-4 and for subbase A-1/A-2)	No.	10	3,000	30,000
GI-C-09	NS-GI-09	Collection of composite soil samples (at least 50 kg for A-3/A-4 and 120 kg for A-1/A-2) from nearby borrow areas including their labelling, packing, storage & transportation to an approved testing laboratory.	No.	5	3,000	15,000
GI-C-10	NS-GI-10	Collection of bulk composite soil samples (60 kg for sandy/clayey soils) from testpits including their labelling, packing, storage & transportation to an approved testing laboratory.	No.	10	3,000	30,000
GI-C-11	NS-GI-11	Collection of water samples (if encountered) from boreholes/testpits including their labelling, packing, storage & transportation to an approved testing laboratory.	No.	4	1,000	4,000
		LABORATORY TESTING				
GI-C-12	NS-GI-12	Sieve analysis	No.	35	800	28,000
GI-C-13	NS-GI-13	Hydrometer Analysis	No.	8	850	6,800
GI-C-14	NS-GI-14	Liquid and plastic limits	No.	20	800	16,000
GI-C-15	NS-GI-15	Bulk density & dry density	No.	5	450	2,250
GI-C-16	NS-GI-16	Consolidation with Swell Pressure Measurement	No.	3	6,000	18,000
GI-C-17	NS-GI-17	Unconfined compression (for soil samples)	No.	3	2,500	7,500
GI-C-18	NS-GI-18	Uniaxial Compression (for rock samples)	No.	3	1,500	4,500
GI-C-19	NS-GI-19	Direct Shear Test (for soil samples)	No.	3	2,500	7,500

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FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD
INFRASTRUCTURE DEVELOPMENT OF SUB-SECTOR G-14/1(PHASE-I), ISLAMABAD

GEOTECHNICAL INVESTIGATIONS WORKS

ENGINEER'S ESTIMATE

ITEM No. (a)	PAK PWD SCHEDULE 2022 (b)	Description (c)	Unit (d)	Qty. (e)	Unit Rate (Rs.) (f)	Amount (Rs.) (g)
GI-C-20	NS-GI-20	Point Load Index (for rock samples)	No.	3	1,500	4,500
GI-C-21	NS-GI-21	Modified AASHTO Compaction (for on-site and borrow)	No.	15	2,000	30,000
GI-C-22	NS-GI-22	3-point soaked CBR (for on-site and borrow)	No.	15	8,000	120,000
GI-C-23	NS-GI-23	Sulphate content of soil	No.	5	1,000	5,000
GI-C-24	NS-GI-24	Chloride content of soil	No.	5	1,000	5,000
GI-C-25	NS-GI-25	Organic matter content of soil	No.	5	1,000	5,000
GI-C-26	NS-GI-26	Complete chemical analysis of water samples i/c TDS, Cl, SO4 & pH	No.	4	3,500	14,000
					Total =	1,185,550

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INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1(PHASE-I)ISLAMABAD

DISMANTLING AND SITE CLEARANCE

ENGINEER'S ESTIMATE

Item No. (a)	Ref PWD CSR 2022 (b)	Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Total Amount (Rs.) (g)
		GENERAL NOTE				
		Supply, installation, testing and commissioning of the following items of work, including all labour, tools, plant, accessories, etc. required for completion of each item as per specifications and as approved by the Engineer.				
		SCHEDULED ITEMS				
		SECTION-A. DISMENTALING				
RD-C-01	123-3	Dismantling stone masonry in lime or cement mortar in foundation, plinth and ground floor including stacking salvaged material (serviceable) and disposing surplus stuff as directed within three chains (91.5 m)	100 Cft	497,420	*4,787.50*	23,813,983
RD-C-02	123-9	Dismantling burnt brick masonry in lime or cement mortar foundation, basement, plinth and ground floor including stacking salvaged material (serviceable) and disposing of surplus material as directed within three chains (91.5 m)..	100 Cft	994,840	*3,006.25*	29,907,378
RD-C-03	123-11	Dismantling cement concrete block masonry work in lime or cement mortar in foundation, basement, plinth and ground floor including stacking salvaged material (serviceable) and disposing of surplus material as directed with in three chains (91.5 m).	100 Cft	497,420	*3,006.25*	14,953,689
RD-C-04	123-12	Dismantling hollow cement concrete block masonry in lime or cement mortar in foundation, basement, plinth and ground floor including stacking salvaged material (serviceable) and disposing..of surplus material as directed within three chains (91.5 m) .	100 Cft	497,420	*3,303.75*	16,430,429

PPRA REGULATORY AUTHORITY PROCUREMENT
FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY
NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD
INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1(PHASE-I)ISLAMABAD

DISMANTLING AND SITE CLEARANCE
ENGINEER'S ESTIMATE

Item No. (a)	Ref PWD CSR 2022 (b)	Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Total Amount (Rs.) (g)
RD-C-05	123-15	Dismantling R.C.C. including separating reinforcement from concrete in foundation, basement, plinth and ground floor including stacking at site and disposing of unserviceable material within three chains (91.5 m)	100 Cft	327,026	*8,456.25*	27,654,153
RD-C-06	123-16	Dismantling C.C. work cast in situ in foundation, basement, plinth and ground floor including disposing of the material as directed within three chains (91.5 m).	100 Cft	327,717	*6,587.50*	21,588,357
RD-C-07	123-58	Dismantling rolled steel sections in frames and trusses in ground floor and stacking as directed within three chains (91.5 m)	Cwt	300	*2,426.88*	728,064
RD-C-08	127-134	Dismantling bitumen carpet of any description from existing road surface including its removal and disposal within three chains (91 m) lead as desired.	100 Sft	20,000	*1,190.00*	238,000
RD-C-09	127-135	Dismantling of stone metalling from existing road from where bitumen carpet has already been removed and stacking the useful material within one chain (30.5 m) lead including disposal of surplus stuff within 3 chains (91 m) lead as desired.	100 Cft	10,000	*5,940.00*	594,000
		SECTION-B. CLEARING OF SITE				
RD-C-10	102-1	Clearing jungle (ordinary) by cutting, removing all shrubs, trees, upto 6 inches (152 mm) girth, etc. and taking out their entire roots and filling the hollows with earth complete with dressing, consolidating and watering the filling including stacking the serviceable materials and disposal of useless material as directed, lead to 10 chains (305 Rm), cost of earth included.	100 Sft	1,963,316	*25.23*	495,345

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT) LTD. ISLAMABAD

FEDERAL GOVERNMENT EMPLOYEES HOUSING AUTHORITY ISLAMABAD

INFRASTRUCTURE DEVELOPMENT WORKS OF SUB SECTOR G-14/1(PHASE-I)ISLAMABAD

DISMANTLING AND SITE CLEARANCE

ENGINEER'S ESTIMATE

Item No. (a)	Ref PWD CSR 2022 (b)	Description (c)	Unit (d)	Quantity (e)	Unit Rate (Rs.) (f)	Total Amount (Rs.) (g)
RD-C-11	102-3	Felling trees of any height, girth exceeding 6 inches to one foot (152 mm to 305 mm), cutting into portable pieces, taking out their entire roots and filling hollows with earth complete with dressing, consolidating and watering the filling including stacking the serviceable materials and disposal of useless materials as directed, lead upto 10 chains (305 Rm), cost of earth included.	Each	100	*623.75*	62,375
RD-C-12	102-4	Felling trees of any height, girth exceeding one foot (305 Rm), cutting into portable pieces, taking out their entire roots and filling the hollows with earth complete with dressing, consolidating and watering the filling including stacking the serviceable materials as directed, lead upto 10 chains (305 Rm), cost of earth included.	Foot Girth	100	*853.85*	85,385
RD-C-56	134-2	Cartage of sand, bajri, lime, surkhi, murum, manure, earth, building rubbish including loading, unloading and stacking etc. at site:				
	i)	1/2 mile (0.80km) lead of part thereof.	100 Cft	746,130	332.98	2,484,464
	ii)	1 mile (1.6 km) lead.	100 Cft	497,420	383.79	1,909,048
	iii)	2 miles (3.2 km) lead.	100 Cft	373,065	483.37	1,803,284
	iv)	3 miles (4.8 km) lead.	100 Cft	298,452	576.78	1,721,411
	v)	Extra per mile (1.6 km) above 3 miles to 6 miles (4.8 km to 9.6 km) of lead.	100 Cft	248,710	84.72	210,707
	vi)	Extra per mile (1.6 km) above 6 miles to 10 miles (9.6 km to 16 km) of lead.	100 Cft	174,097	72.95	127,004
					TOTAL SCHEDULED ITEMS =	**144,807,076**

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