



**CARE Afghanistan**  
Community-Based Agriculture and Rural Development -Access to Licit  
Livelihood (CBARD-ALL) Project

**Scope of Work (SOW)**  
**For construction company**

Province: Balkh

District: Chaharbolak

Project name: Wacha Wana Omarkhil

Subproject code #: AFG/CARE/CBARD/BLK/CHBK/IRR/005

## **General Description of the Works:**

### **Coordinates:**

GPS Coordination:: E.66°78' 654"                      N: 36°72' 497"

This scope of works defines the requirements for the Improvement of **Wacha wana Omarkhil 500 m** Irrigation Canal lining of **Chaharbolak** District, **Balkh** Province, Afghanistan. The major activities shall be as follows:

### **Detailed Description of the Works:**

The work includes all activities, materials, equipment, transport, labor, etc, required to complete the project as presented herein, including anything not specifically mentioned but required to complete the work. The contractor is responsible to ensure that all costs required to complete the work are distributed within the unit prices within the bid form. The rates and prices shall include all cost pertaining to salaries, wages, housing, security, insurances, company overhead, profit, taxes and other incidental costs.

The **Scope of Work** will include but not be limited to the following:

This scope of work is for Irrigation canal improvement for Improvement of Irrigation canal in **Wacha wana Omarkhil** Irrigation Canal in **Chaharbolak** District, Balkh Province. This rehabilitation will be located in **Wacha wana Omarkhil** Irrigation Canal starting point (Intake) in **Chaharbolak** District, Balkh Province and along a **0.500 Km** length of **the Wacha wana Omarkhil** irrigation Canal beginning and ending approximately at the GPS Coordinates shown above. The project includes the construction of both side of the mentioned canal. See the attached site plan and engineering drawings for exact location of individual Structures, gate entire activities.

#### **I. General Requirements:**

- Mobilization and demobilization/Site Cleaning

#### **II. Rehabilitation of Canal.**

##### **A. EARTHWORKS**

- Site Clearance.
- Excavation of foundation and canal bed.
- Filling and compaction with Common Material.

##### **B. CONCRETE AND MASONRY WORKS:**

Including shuttering, curing works and all other necessary activities

- Stone Masonry in Foundations (1:4 Cement Mortar).
- PCC (M150) 1:2:4
- PCC (M200) 1:1.5:3.
- Construction of water regulator for sub canals regarding to sub canals section and water discharge the responsibility of construction company.
- Curing duration for compacted gravel, Stone masonry, PCC, pointing ...etc (28) days.

### **C. FINISHING WORKS**

- Pointing on Masonry Works (1:3 Cement Mortar).
- Dry Stone or gravel Pitching with watering and compaction.
- Installation of PVC water stopper & Kock for canal bed and both side walls (expansion joint) see the drawings).
- Installation of 4mm glass in the top pcc in both side walls.

#### **Period of Performance:**

The Subcontractor shall complete all work under this subcontract within a period of **120 calendar days** from the time of issuance of Notice to Proceed and shall expeditiously work to complete the project to the standards and quality that the subcontract stipulates.

#### **Mobilization for Construction Works:**

Upon (contract award)/(signing of the contract and issuance of the Notice to Proceed), the sub-contractor shall mobilize to the site all the required experienced personnel (Project Manager, Supervisors, Project/Site Engineers, Surveyors, Foremen and Skilled Staffs) as well as equipment (Concrete Mixers, Vibrators, etc.), tools and materials. The sub-contractor shall provide these in sufficient number as required to initiate and complete the total construction.

The construction shall adhere strictly to the approved plans, drawings, technical specifications that will be provided by the CBARD engineering unit for implementation. Any changes and/or variations will be for the approval of the engineer.

#### **Testing Plan, Equipment, Standards and Procedures:**

The contractor shall submit a soil and concrete testing plan for CBARD approval within ten days of contract signing. The contractor shall mobilize the required testing equipment, complete with test manuals for performing the tests on soils and concrete. Imported materials that cannot be tested on site and are delivered to the site shall bear with them certifications of their suitability to be utilized (e.g. cement and reinforcing steel). The CBARD Engineer shall be furnished copies of the certification from manufacturers that illustrate the classification, strength capacities, and material properties of these items. Sample of materials shall be provided and approved by CBARD representative at the site before it is used in the works. These samples shall be kept for reference purposes. Materials that do not meet the requirements shall not be used and shall be disposed off site. Local materials should be used when possible. However, the CBARD Engineers has the authority and may allow use of local materials even without testing if according to his judgment the materials are suitable for use.

#### **Submittals:**

All materials shall be new and free of defects and in good condition. Final product, materials and construction must meet the minimum standards as described in the subcontract documents and technical specification. The CBARD Engineer may call for the subcontractor to provide and supply samples of all materials and equipment proposed for this work in order to review and approve them on site. All material product sheets shall be delivered to the CBARD Engineer. The Subcontractor shall also maintain a record all these material and equipment specification sheets. **The requirements of this project construction is High quality mountain stone, best quality sand & gravel, and 400 mark fresh cement.**

### **Safety Requirements:**

The contractor shall ensure that employees are supplied with and use proper safety equipment (hard hats, gloves, safety glasses, viscoat and boots) and follow work procedures that protect contractor employees. The contractor shall establish a safety zone around the work areas and establish a safety system and practices to prevent staff injuries. This includes signage, roping, and cleaning up the site at the end of each day's work. The contractor shall be liable for any injury or damage to any staff and/or property during the course of this job. This includes all costs involved with such injury or damage. It is the responsibility of the contractor to take care of care of their staff and equipment during the life of the project.

### **Delivery and Storage of Materials and Equipment:**

The contractor shall be responsible for all materials transport, storage, and providing any necessary security containers, and fencing and protection from the weather. At the end of the project, the contractor shall remove all debris created by construction activities. The contractor is responsible to control all theft and unauthorized use of materials and equipment on site.

### **Scope of Work:**

- 1) The Scope of Work will include the following items and not limited to the following.
  - a) Constructing the various structures based on specifications and information provided by CBARD. Transport of all materials is to include all documentation, customs and import certificates, secure warehousing, handling, etc. as necessary.
  - b) The Contractor will manage all construction related activities including any clearing, foundation, superstructure, finishes, installations, and site restoration.
  - c) The Contractor is responsible for coordinating all relevant activities to whatever extent necessary with the community organization and site selection.
  - d) The Contractor will manage, monitor and report on all activities including safety, quality and progress of construction on a regular basis. The Contractor will ensure the use of local labor as possible.
  - e) The Contractor will mobilize, commence rehabilitation and construction activities, complete the works, and demobilize from site on schedule. All pay items will be completed before issuing the Certificate of Completion.
  - f) The Contractor will warrant all construction and materials for based on government of Afghanistan roll and regulation and will promptly honor and address all warranty items with due diligence.
- 2) Organizing and use of local subcontractors.
  - a) The Contractor will not hire a subcontractor for any of the civil works.
- 3) Contractor Scheduling and Reporting
  - a) The Contractor will submit to CBARD on a regular basis schedules documenting milestones and progress at each site. The schedules will be submitted to the CBARD Project Manager or his designated representative. The schedules will address activities such as construction progress, contracted activities, and demobilization activities. The Contractor will provide a "rolling" two-week schedule to CBARD which includes all major milestones. Anticipated problems or delays will be reported to CBARD immediately upon recognition of problem.
  - b) The Contractor will meet with CBARD regularly to report and discuss all related project activities. These activities include but are not limited to schedule, materials, labor, local conditions, construction, shipping and transport, community and contractor relations, quality and safety.

#### 4) **Contractor Responsibilities:**

- a) The Contractor will be expected to utilize and train local labor, supervision, and management to the maximum extent possible.
- b) Local materials will be used to the maximum extent practical without compromising quality.
- c) Contractor will ensure all work is done in an efficient workmanlike manner at all times and will maintain the site in a safe, secure and clean manner at all times.
- d) The Contractor will not engage in any activities that are illegal or reflect negatively on themselves, the CBARD.
- e) The Contractor will maintain all equipment and tools in an operable and safe condition. All work will be executed in a safe manner as to not endanger life, limb or property.
- f) Mobilization and demobilization of work site is to be orderly and timely. The work site shall be left clean and free from debris and waste resulting from the construction effort.
- g) Any required testing of materials, soils, mixes, etc. are the responsibility of the Contractor.
- h) The Contractor shall confine all operations (including storage of materials) on worksite premises to areas authorized or approved by Employer. The Contractor shall hold and save CBARD, its officers and agents, free and harmless from liability of any nature occasioned by the contractor's performance.
- i) The Contractor shall preserve and protect all structures, equipment, and vegetation on or adjacent to the work site, which is not to be removed and which does not unreasonably interfere with the work required under this contract. The Contractor shall protect from damage all existing improvements and utilities at or near the work site, and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor.

#### **Schedule**

The project must be completed within four calendar months.

The tenderer should provide the schedule for the project construction as part of the proposal.

5)he Defects Liability and Maintenance Period will be one year after the Completion of the Works.

#### **Deliverable during the Construction:**

Before and during the implementation of the project, the contractor shall deliver to CBARD the following:

- Works Schedule
- QA/QC Plan
- Monthly Progress Report with Photographs
- Updates to the Work Schedule
- Invoices
- As Built Drawings, Completion Photographs and Warranties
- Final Report
- Request for Final Acceptance
- Original copies of daily attendance sheets for unskilled laborers on a monthly basis with totals. Attendance sheets must be signed, or thumb printed each day by each unskilled laborers.

**Clean up:**

The contractor shall keep the work site clean and neat at all times, removing all debris and refuse promptly at the end of each day from the site. At the end of the project work, the contractor shall clean up the site to the satisfaction of the CBARD staff responsible for the site.

**Inspection and Acceptance:****Workmanship, Quality Control and Superintendence:**

In accordance with standards "Superintendence by the Contractor" at all times during performance of this contract and until the Works are completed and accepted, the Offeror shall have on the work site a competent Site Supervisor who is approved and accepted by CBARD. The Site Supervisor will have authority to act on behalf of the Offeror.

The Offeror is expected to produce Works which conform in quality and accuracy of detail to the standards, drawings, and specifications. Offeror shall institute a quality control system and provide, dependent on the project scope and as agreed with CBARD, experienced staff such as, but not limited to, managers, engineers, foremen, surveyors, materials technicians, and other technical staff, together with all transport, instruments, and equipment, to ensure adequate supervision and execution of the Works at all times. The contractor shall keep daily records of all work performed and tested.

Workmanship of the complete projects is expected to be commensurate with construction of similar construction in the private sector in the region. All items of the work will be inspected by CBARD Engineers to confirm quality of workmanship. The contractor is liable to replace any rejected work in a reasonable time frame. The representatives from CBARD.

**The cost of all supervision and process control, including testing, so carried out by the Offeror shall be deemed to be included in the overall contract cost. As such the contractor shall include such costs within the work item unit rates.**

**Quality Control:**

Upon award, the contractor shall institute an appropriate inspection system set forth in a quality control plan. The plan shall include checklists of duties to be carried out, ensuring these duties are carried out by the supervisory staff and senior employees, and carrying out daily and weekly inspections to determine whether the various services are being performed according to the contract. The contractor shall photograph construction operations daily. Contractor shall submit a weekly status report to CBARD. Copies of the weekly reports and photographs shall be submitted to the CBARD Project Manager.

The contractor shall correct and improve promptly any shortcomings and substandard conditions noted during CBARD inspection. The contractor shall bring any conditions beyond the responsibility of the contractor to the attention of the CBARD Project Manager.

**Tools and equipment for irrigation canal lining rehabilitation:**

- Mixer for Concrete and Mortar.
- Hand tools.
- Concrete vibrators.
- Wheelbarrow.
- Water pump

- Generator.
- Contractor responsible for all Another equipment will be need in project site.

**Staff requirement list for irrigation canal lining implementation (Personal):**

The Key Professionals and their Minimum Educational Qualification/Experience will be as under:

Srl	Position	Minimum Educational Qualification	Minimum Experience
a	Project Manager/Senior Irrigation Design Engineer	Master's Degree in Irrigation/Water Resources Engineer	15 years in Civil Eng Projects and irrigation projects Design.
b	Social Expert	BSc. in the relevant Field	3~6 years' experience on similar irrigation projects
c	Environmental Expert	BSc. in the relevant Field	3~5 years' experience on similar irrigation projects.
d	Irrigation Design Engineer	BSc. in Civil/Irrigation/Water Resources Eng.	5~10 years of Experience on similar irrigation projects.
e	Surveyor/Topographer	BSc. in the relevant Field	5-10 years of Experience on similar irrigation projects
f		The age of skilled and unskilled labors should not be less than 18 years old.	

**Evaluation Criteria:**

**Technical and Financial/Management Capability:** The Offerors' proposal shall be evaluated to determine overall technical capability to effectively implement the project. The sub factors used to determine this will be:

- Demonstrated Geographic Experience (5 points) – This score is relates to the experience of the Offeror in implementing projects within the Province and District described in the SOW.

- b. Number of similar Projects (25 points) - This is whether the Offeror has experience implementing projects that are similar in scope to the work described.
- c. Number of Ongoing Projects (10 points) – This is whether the Offeror has the capability of implementing a project in addition to its current portfolio of ongoing projects.
- d. Past Performance (20 points) – This is dependent upon all information presented by the Offeror
- e. Proposed Key Staff (20 points) – This whether the proposed technical and managerial staff has skills, education and experience necessary to implement the activity.
- f. Implementation Plan and Timeline (10 points) – This is whether the Offeror understands the activities to be undertaken, the order in which they should occur and timeline by which they should be completed. This will be an evaluation of Appendix I - Implementation Plan and Timeline.
- g. Equipment (5 points) – Points will be awarded based on the Offerors proposed equipment.
- h. Financial and Management Capacity (5points) – This is whether the Offeror has the financial and management capacity to complete the activity. will be reviewed and evaluated.

**7.2 Best Value Determination** - CBARD will not select an Offeror for award on the basis of a superior technical proposal without consideration of cost. Cost will be evaluated on the basis of cost reasonableness, allowability, and realism. Cost realism will be based on the following considerations:

- Are proposed costs realistic for the work to be performed under the award?
- Do the costs reflect a clear understanding of the work requirements?
- Are the costs consistent with the various elements of the Offeror's technical proposal?

**Attachments:**

CBARD will provide BOQ (Standard Works and Custom Works), Illustrative Drawings and Specifications for the works. The contractor is expected to follow the BOQ, Illustrative Drawings and Specifications.

**SECTION 400: HYDRAULIC STRUCTURES AND PROTECTION WORKS****401 GENERAL REQUIREMENTS FOR HYDRAULIC STRUCTURES AND PROTECTION WORKS****401.1 Description**

This Clause lays down the general requirements as regards location and construction of hydraulic structures and protection works.

**401.2 General Requirements**

- 1) All hydraulic structures and protection works shall be constructed at the locations and to the size, dimensions, and other details shown on the Drawings. Since there is a possibility of changes in the hydraulic condition since preparation of the design, prior to taking up the work, each location shall be inspected by the Employer's Representative jointly with the Contractor to see whether any modifications in the location, skew angle, type, and details of the structure are required. Only after written permission of the Employer's Representative, incorporating modifications if any, shall the Contractor proceed with the work.
- 2) For each culvert location, the Contractor shall prepare a cross-section of the road along the centerline of the structure and as well as a longitudinal section of the water course for 50 m on the upstream and downstream sides. He shall also prepare other survey details of the locations as required by the Employer's Representative. Based on these, the Contractor shall prepare and submit in duplicate shop drawings showing, inter-alia, the length of barrel on either side of the road centerline, the invert level, the bed slope, the details of inlet and outlet structures erosion protection works, the extent of channel excavation both on upstream and downstream, etc. The Employer's Representative shall approve with modification, if any, and return one copy to the Contractor. On the same lines, for the cases of Irish crossings, intakes, outlets, aqueducts, barrages, chutes and similar works, the Contractor shall carry out the needed surveys and prepare shop drawings for the approval of the Employer's Representative.

The Contractor shall carry out the works accordingly. The survey and drawing work shall be considered incidental to hydraulic works and shall not be measured for payment.

- 3) Drainage chutes downstream of conveyance structures in hilly areas shall be taken down to the point where the soil is not erodible, and anchored to the ground by with a cut-off wall.

- 4) The structural works shall also include such works as are necessary to control soil erosion.
- 5) The completed water management system including side drains, culverts, crossings, other structures, protection works, etc. shall be freely operating without ponding or causing erosion or damage to other properties.
- 6) During the course of the works and until the works are finally accepted, the Contractor shall ensure that all channels, culverts, and other hydraulic structures are maintained in a clean and satisfactory condition and that they function efficiently.

## **402 STONE MASONRY, BOULDER MASONRY, & GROUTED STONE RIPRAP**

### **402.1 Description**

The work shall consist of construction of lined channels, chutes, toe walls, retaining walls head walls, wing walls, aprons, and slope protection works using natural stones set in cement mortar in the type of masonry specified.

### **402.2 Materials**

**Stones:** Stones used shall be hard and durable without weak seams or cracks and of rectangular shape. The Los Angeles Abrasion Value shall not exceed 50. The apparent specific gravity shall not be less than 2.2 and water absorption when tested in accordance with AASHTO T85 shall not exceed 5 percent.

**Mortar:** Mortar shall be made of a mixture of cement and sand in the proportion of one cement to three sand. Cement shall be Portland cement conforming to AASHTO M85, Type II for work above ground level and Type V for work in contact with soil and or water. Sand shall be crushed stone or natural sand or a combination thereof conforming to AASHTO M45. Water added shall be just adequate for making a workable mix and shall be subject to the approval of the Employer's Representative.

### **402.3 Construction Requirements**

#### **402.3.1 *Stone Masonry***

Stone masonry shall be used for walls of different types above the ground level. The stones shall be approximately cubic or prismatic shape with the length of any stone not exceeding 3 times its height, with the breadth on the bed not less than 150 mm nor greater than three quarters of the thickness of the wall. Unless otherwise directed, stones shall have thickness not less than 15 cm.

All stone possessing bedding planes shall be laid with its natural bed as nearly as possible at right angles to the direction of load, and in case of arch rings, the natural bed shall be radial.

Each course shall have a uniform horizontal plane of equal height. Vertical joints shall be broken by the adjoining courses. All joints shall be sufficiently thick to prevent stone-to-stone contact and shall be completely filled with mortar. On the exposed face, no part of the masonry shall deviate from the general line of the wall by more than 10 mm.

Walls of stone masonry shall be provided with weep holes as shown on the Drawings or directed by the Employer's Representative. In continuous long structures, expansion joints shall be formed as shown on the Drawings subject to a minimum spacing of 10 m.

All face joints shall be finished almost flush with the surface of the work without covering the stones. The top surface of all walls shall be provided with a minimum 2 cm thick cement mortar coping with a crossfall for shedding rainwater or as otherwise directed by the Employer's Representative.

Newly laid masonry shall be protected against the harmful effects of weather and cured for a minimum period of 4 days. All visible surfaces of the masonry shall be clean and free from mortar stains and other blemishes.

Backfill behind the stone masonry walls shall be placed only after the masonry work has been in place for at least 14 days, or as directed by the Employer's Representative.

#### **402.3.2**      *Boulder Masonry*

Boulder masonry shall be used for walls of different types below ground level. The construction is similar to stone masonry except that the stones may not be laid in regular course and that the surface tolerance may be up to 50 mm.

#### **402.3.3**      *Grouted Stone Riprap*

This type of masonry that is constructed in a single layer over a bed of mortar shall be used for hydraulic structures, aprons, chutes, lined channels, and slope protection. The stones shall be of regular shape and uniform thickness. Prior to laying of the stones, the base shall be brought to regular shape and levels, watered and well compacted. The stones shall be placed over a bed of mortar about 2 cm thick. After placing the stones by hand, all the joints shall be completely filled with cement mortar. The finished work shall present a uniform surface with no point deviating from the general line by more than 15 mm. The finished work shall be protected against the adverse effects of weather and cured for at least 4 days.

**402.4 Mortar**

Cement, fine aggregate, and water shall conform to the respective requirements for those materials as specified under Item 601.3, Structural Concrete, except as to the grading of the fine aggregate, which shall all pass the 2.36 mm (no. 8) sieve not less than 15 nor more than 40 percent shall pass the 0.3 mm (No. 25) sieve, and not more than 10 percent shall pass the 0.15 mm (No. 100) sieve.

The mortar for the masonry shall be composed of one part Portland cement and three parts of fine aggregate by volume and sufficient water to make the mortar of such consistency that it can be handled easily and spread with a trowel. Mortar shall be mixed only in those quantities required for immediate use. Unless an approved mortar mixing machine is used, the fine aggregate and cement shall be mixed dry in a tight box until the mixture assumes a uniform color, after which, water shall be added as the mixing continues until the mortar attains the proper consistency. Mortar that is not used within 90 minutes after water has been added shall be discarded. Retempering of mortar will not be permitted.

The compressive strength of mortar after seven days shall be around 70% of the 28-day compressive strength of 400 kg/cm<sup>2</sup> as tested according to AASHTO T 22 and AASHTO 23.

**402.5 Pointing**

Both bed and vertical joints shall be finished as shown on the Drawings or as directed by the Engineer. The mortar in joints on top of surface of masonry shall be crowned slightly at the center of the masonry to provide drainage.

**403 GABIONS****403.1 Description**

The work shall consist of furnishing and placing wire mesh boxes of rectangular shape filled with clean and uniform rocks larger than the mesh openings in accordance with these specifications and to the lines, grades, dimensions, and arrangements shown on the Drawings or ordered by the Employer's Representative.

**403.2 Materials**

The gabion boxes shall be Maccaferri or equivalent type. The wire mesh shall consist of steel wire galvanized in accordance with BS 443 and fabricated in double twist woven hexagonal shape with the maximum linear dimension and area of opening limited to 100 mm and 80 cm<sup>2</sup>, respectively. The wire making the mesh shall have minimum tensile strength of 400 kg. Gabion baskets shall be rectangular with edges manufactured into a securely connected selvedge

suitable for preventing unraveling or having the ability to resist pulling apart at any of the twist or connections forming the wire mesh when a single wire strand in a section is cut.

When the gabion length exceeds its width, it shall be equally divided by diaphragms of the same mesh and material as the gabion body to form individual cells whose lengths do not exceed the width of the basket.

The stones to be used shall be well shaped, hard, dense and durable. Individual pieces shall weigh between 7 and 70 kg of which seventy per cent shall be 20 kg or larger. The specific gravity shall not be less than 2.2. The stones in contact with the wire mesh fabric shall have a minimum size of 150 mm and those in the middle of the unit shall have minimum size of 100 mm.

### **403.3 Construction Requirements**

Excavation required for the placement of gabions shall be made in accordance with the lines and dimensions shown on the Drawings or as directed by the Employer's Representative to the requirements of Clause 302. The base shall be watered, well compacted, and made smooth.

Gabions shall be constructed in unit-baskets to the specified dimensions and installed according to the manufacturer's recommendations. The sides, ends, and diaphragm shall be lifted into a vertical position and joined together with a binding wire to form a base. The binding shall be carried out in a continuous lacing operation, the wire being passed through each mesh and around both selvages which must be tied together with two round turns after every second mesh.

The gabion basket shall be packed first at its sides to form a wall, using the largest pieces with the majority placed as headers with broken joints to present a neat outside face. The interior may be packed with smaller pieces and the top layers shall be finished off with larger pieces. The complete interior and top layers shall be packed tight and hammered into place to present a neat and truly rectangular shape.

Assembled gabions may be placed in position either singly or in groups suitable for manhandling. Where there is more than one course of gabions, the upper layer must be tied to the lower layer. Gabions shall be slightly overfilled to allow for subsequent settlement.

**404 REPAIR WORKS FOR EXISTING HYDRAULIC STRUCTURES****404.1 Description**

This Clause describes certain types repair works required to be executed on existing hydraulic structures at the site. The different items of work shall be executed at such locations and to such widths and lengths as demarcated at site by the Employer's Representative and to details shown on the Drawings or as directed by the Employer's Representative.

**404.2 Repairs to Expansion Joints of Bridges and Culverts**

The joints shall be thoroughly cleaned of the remnants of the existing joint filler and sealing compound. Preformed joint filler board to a width of 150 mm, thickness of the existing expansion gap plus 1.5 mm, and length to the length of the joint, shall be cut and firmly pressed into the joint gap in such a way that the top edge of the board is 5 mm below the adjoining deck level.

The exposed end of the joint shall be sealed against water penetration by hot-poured sealing compound.

**404.3 Repair to Cracks in Concrete Members**

Cracks in concrete members of existing structures shall be sealed with epoxy resin or epoxy resin mortar, depending on the width of the crack, and to the directions of the Employer's Representative.

The epoxy resin shall conform to Type IV of AASHTO M235. The work shall be finished flush with the adjoining surface.

**404.4 Bonding New RCC Slab Over Existing Concrete**

The work shall consist of bonding a new RCC overlay slab to an existing concrete surface with necessary bonding between the two. Bonding shall be effected through any or all of the following methods as shown on the drawings or as directed by the Employer's Representative.

- i) Holes, 20 mm diameter shall be drilled into the existing concrete surface up to a depth at 200 mm. The holes shall be at 1.0 m staggered intervals in both directions. The drilled holes shall be thoroughly cleaned, and 12 mm dia., 500 mm long deformed dowel bars hooked at the top to tie with the reinforcement of the overlay slab shall be fixed to the holes with polyester resin grout (Lokset or FOSROC or equivalent).
- ii) The existing surface shall be thoroughly cleared of oil, grease, mud, and other extraneous matter and given a detergent wash.

- iii) On the cleared surface, epoxy-bonding agent (Nitobond or FOSROC or equivalent) shall be applied prior to application of the overlay.

The overlay shall be of Class AA concrete. Steel reinforcement and dowel bars shall conform the standards. Construction joints of the overlay slab shall match with those of the existing concrete.

#### **404.5 Lifting the Level of Stone Masonry Walls**

The work shall consist of lifting of raising the level of existing walls of side drains and cut off walls of Irish dips abutting the road pavement to be in line with the raised levels of the improved structure as needed.

In case the raising required is 150 mm or more, the top joints of the existing masonry wall shall be raked to a depth of 10 mm or more, the surface cleaned of loose and extraneous matter, and new stone masonry to required elevation constructed over it to Clause 402.

Where the required raising is less than 150 mm, the top layer of stone of the existing wall shall be dismantled, and a new layer to a thickness suiting the raised level shall be constructed as stone masonry to Clause 402.

#### **404.6 Dry Rip-Rap**

The work shall consist of placing 150 mm to 300 mm size stone/boulders at the toe of hydraulic structures or on upstream and downstream of Irish dips for protection against erosion. Placing by tipping without the need for hand packing shall be permitted. The stone used shall be hard and durable as is required for grouted stone rip rap work.

#### **404.7 Reconstruction of Parapet or Wingwalls of Culverts and other Structures**

The work shall consist of reconstruction of damaged or broken parapets or wingwalls of hydraulic structures as directed by the Employer's Representative. The work shall be in Class "A" Concrete, and reinforcing bars as ordered by the Employer's Representative shall be introduced. The new work shall be suitably bonded with the existing member and be of such size and shape as to be compatible with the existing structure.

### **405 GATES AND APPURTENCES**

#### **405.1 Gates**

Gates are to be installed at the locations shown on the Drawings or as directed by the Employer's Representative.

Gates, lifts, and accessories shall be of the size, type, and construction shown

on the drawings, and as specified herein. They shall be the product of one manufacturer regularly engaged in the manufacture of gates and accessories.

The gates, lifts, valves, and accessories shall operate properly for the use intended, with a practical degree of water-tightness and have seating heads equal to, or in excess of, the heads shown on the Drawings. The seating head shall be the vertical distance from the centerline of the gate opening to the maximum water surface.

The gates shall have a flatback design, and bronze seats, rising stem, galvanized assembly bolts, galvanized anchor bolts, and galvanized frame.

#### **405.2 Gate Stem and Lift**

The gate stems shall be naval bronze and cold rolled steel, as shown on the Drawings, with cold drawn steel stem splices, as recommended by the manufacturer.

The gate lift shall be manually operated, and shall be sized to operate the gate with a pull of not more than 20 kg when raising or lowering the gate under maximum operating head. The lift nuts shall be bronze, and the anchor bolts shall be galvanized.

The oil seals shall be as recommended by the manufacturer.

#### **406 CLEARING AND GRUBBING OF DAM AREA**

Areas to be cleared consist of the reservoir area, site of dam embankment, a 7.5-meter strip adjoining toe downstream toe of the dam embankment, spillway area, and borrow and stockpile areas. Clearing shall consist of removal and disposal of all trees, brush, down timber, rubbish, and any existing fences.

The entire foundation area for the dam embankment and other structures and all portions of the borrow area shall be grubbed. Grubbing of foundation area shall consist of the removal of all stumps and roots 4 cm or more in diameter to a depth of 1.0 m below natural ground surface. The borrow areas shall be grubbed to the extent necessary to obtain material free of stumps and roots.

#### **407 CUTOFF TRENCH CONSTRUCTION**

##### **407.1 Cutoff Trench Preparation**

The entire area to be occupied by the foundation of the dam shall be stripped to material having strength parameters equal to or greater than those required

of the embankment material or as otherwise directed by the employer's Representative. The contractor shall excavate the cutoff to impervious, moderately weathered rock or as otherwise directed by the Employer's Representative.

#### 407.2 Cleanup

All loose rock fragments, dirt, gravel, standing or running water, and other objectionable materials shall be removed from the surface of the entire area of the cutoff trench foundations, by hand or necessary, to the extent directed by the Employer's representative. Open cracks or joints shall be filled with backfill concrete or grout after removing soft or erodible crack-filling materials to a depth directed by the Employer's Representative. No fill shall be placed in the trench until the area to be covered has been inspected and approved by the Employer's Representative.

#### 408 MEASUREMENT AND PAYMENT

The accepted and measured quantities shall be paid at the contract unit price for each of the Pay Items listed below that is included in the Bill of Quantities. The payment shall constitute full compensation all materials including all labor, equipment, tools, and incidentals necessary to complete the work prescribed in this Item.

Payment will be made under:

Description	Unit of Measurement
Placing Dry Riprap	M <sup>3</sup>
Mortared Stone Masonry	M <sup>3</sup>
Mortared Boulder Masonry	M <sup>3</sup>
1:3 Cement : Sand Mortar	M <sup>3</sup>
Pointing with 1:3 Mortar	M <sup>2</sup>
Grouted Stone Riprap	M <sup>3</sup>
Gabions	M <sup>3</sup>
Sand bedding for structures	M <sup>3</sup>
Gates and Accessories	Each/or Sq.m
Trash racks and Other Accessories	Each



*CARE Afghanistan*  
*CBARD Project*



*Wocha Wona Oer Khil Irrigation Canal Technical Drawings*

*Province : Balkh*

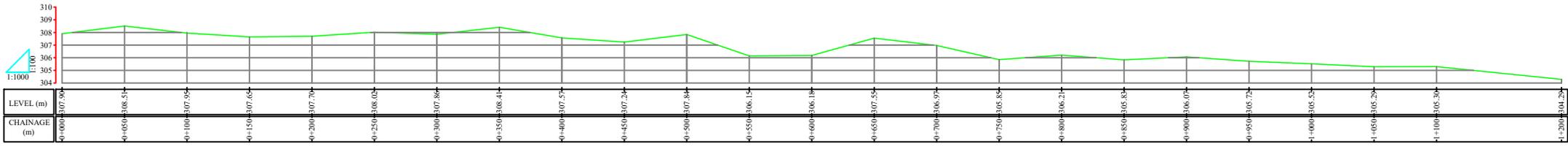
*District : Chaharbolak*

*Village : Wocha Wona Omer Khil*

*Sub Project Name :Wocha Wona Oer Khil Canal*

*Year: 2024*

# Long Profile of Canal



CHAINAGE : 0+000- 1+200

Long Profile  
SCALE \_\_\_\_\_ NTS

	SURVEYED BY	Eng. Fahim Jan Mohammadi, Zulfaqar OriyaKhil	CHECKED BY	Eng. Shaikhmir Abed	PROVINCE	Balkh	SCALE	H,V,TOFIT	PROJECT NAME: Wocha Wona Omer Khil Canal  DRAWING TITLE: Long Profile of Canal	SHEET NO 
	DRAWN BY	Eng. Abdul Waheed Abed	APPROVED BY	Eng. Mohammad Wakil Nayeb	DISTRICT	Chaharbolak	SURVEY DATE	29-05-2024		
	DESIGNED BY	Eng. Abdul Waheed Abed	VILLAGE	Wocha Wona Omer khil	DESIGN DATE	09-06-2024				

# Wocha Wona Omerkhil Canal Site Plan

Proposed Canal Site Plan through Google Earth

Wocha Wona Canal Start Point

**Legend**

- Wocha Wona Omerkhil Canal Path
- Wocha Wona Omerkhil Canal Points

Wocha Wona Omerkhil Canal End Point

Google Earth  
Image © 2024 CUES, Airbus

300 ft



SURVEYED BY	Eng. Fahim Jan Mohammadi, Zulfaqar Oriyakhil
DRAWN BY	Eng. Abdul Waheed Abed
DESIGNED BY	Eng. Abdul Waheed Abed

CHECKED BY	Eng. Shaikhmir Abed
APPROVED BY	Eng. Mohammad Wakil Nayeb

PROVINCE	Balkh
DISTRICT	Chaharbolak
VILLAGE	Wocha Wona Omer khil

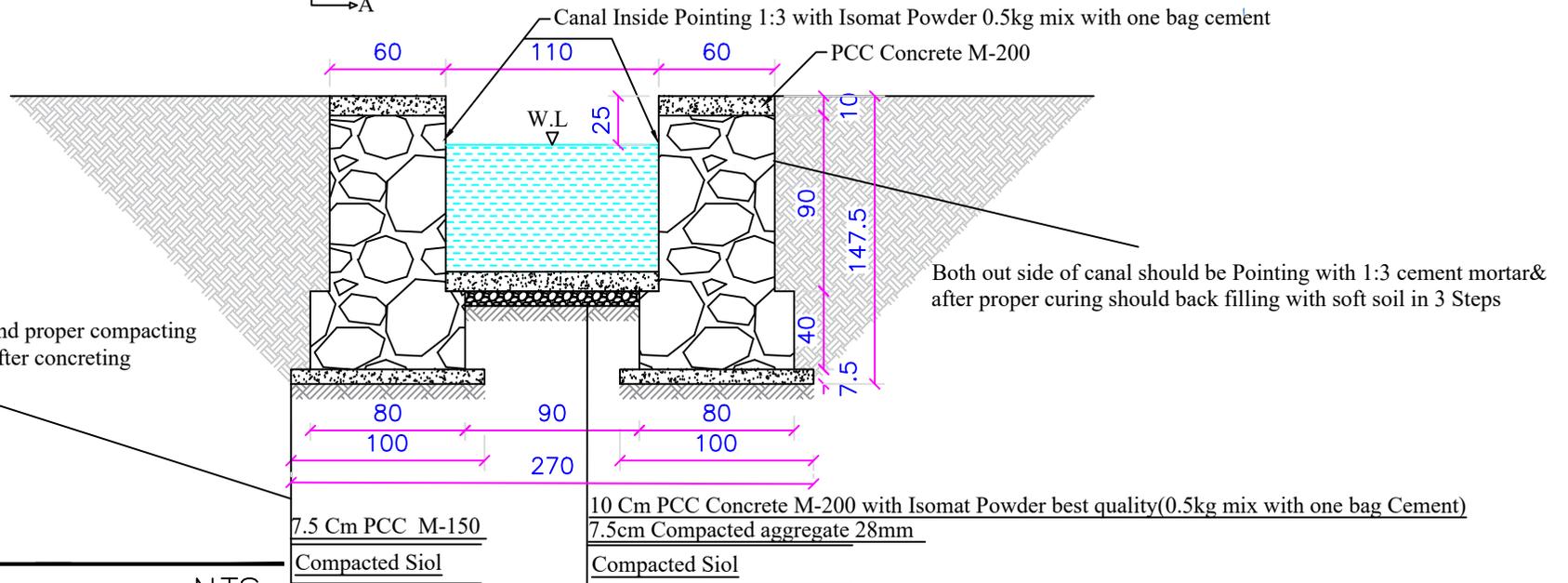
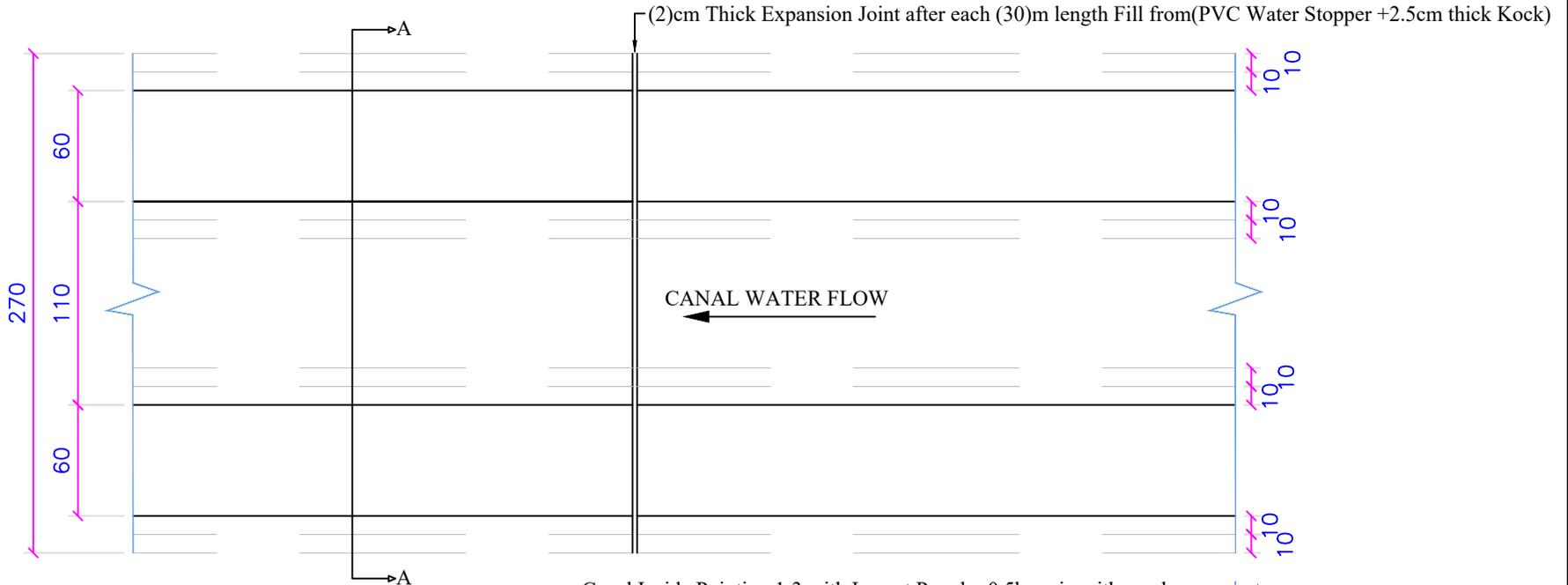
SCALE	H,V,TOFIT
SURVEY DATE	29-05-2024
DESIGN DATE	09-06-2024

PROJECT NAME:	Wocha Wona Omer Khil Canal
DRAWING TITLE:	Site Plane Through Google Earth

SHEET NO. **A**  
2  
7

STONE MASONRY CANAL PLAN LENGTH (500m) from Intake

Plane



PCC Work should be done after leveling and proper compacting of base, Stone work should be done 24hr after concreting

Both out side of canal should be Pointing with 1:3 cement mortar & after proper curing should back filling with soft soil in 3 Steps

Plan and Section

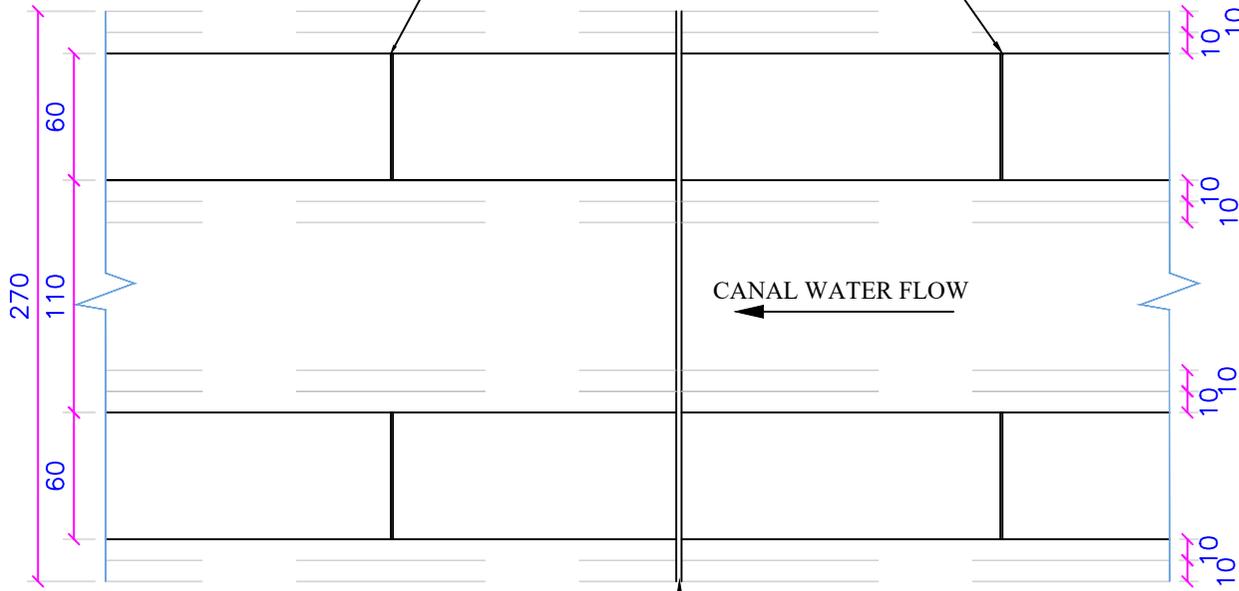
SCALE

NTS

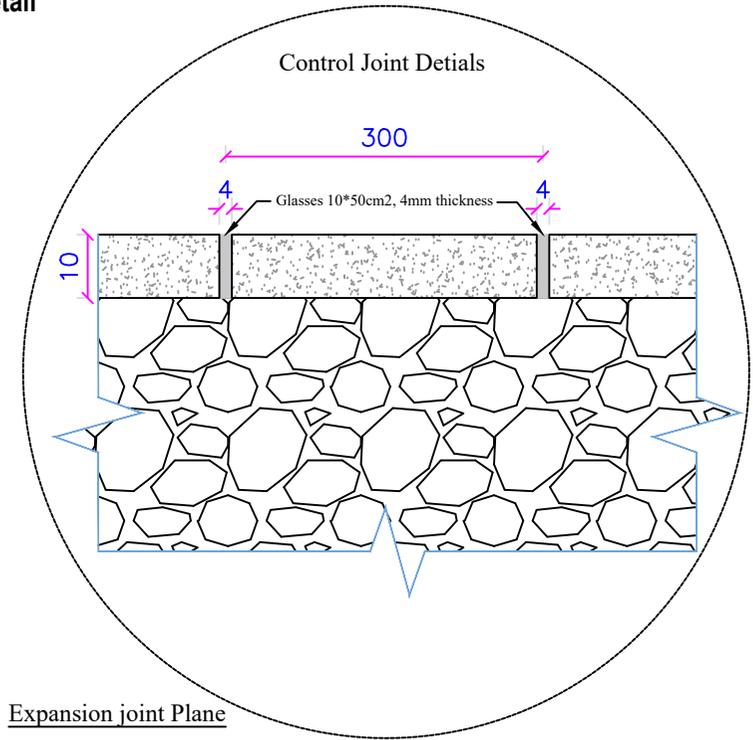
SECTION A-A

# Expansion Joint Plan, Section, Detail and Control joint Detail

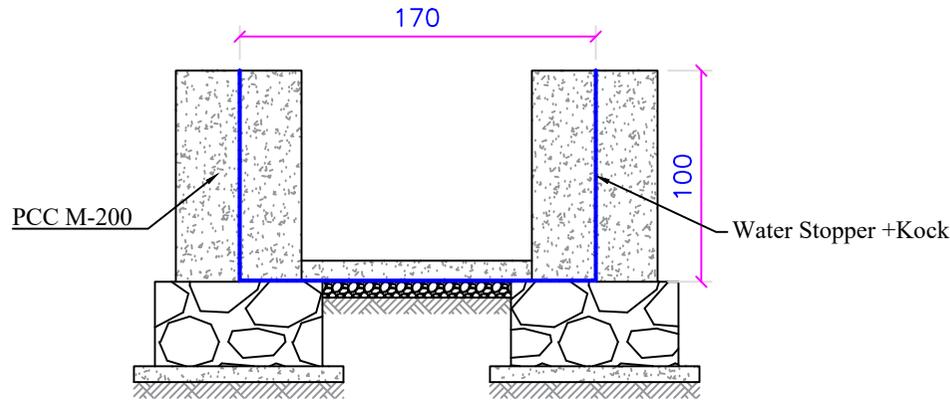
0.4cm Wide and 10cm deep Control Joint after each (3)m C/C length fill with 4mm thick glasses on top PCC of both side of canal walls



Control Joint Details

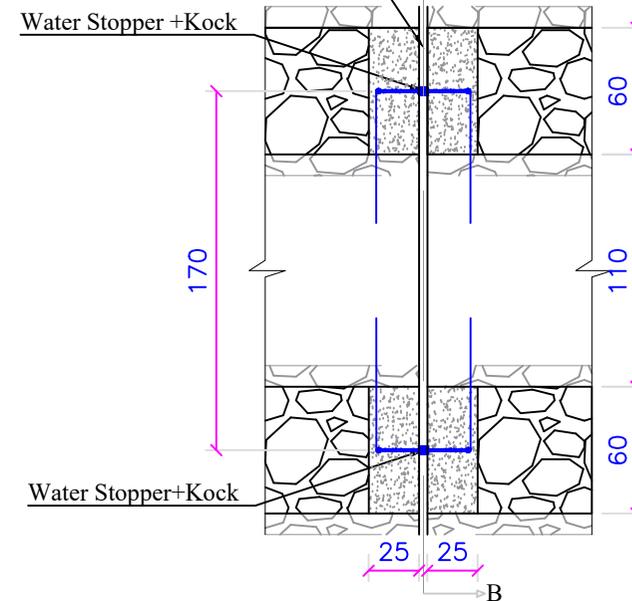


(2)cm Thick Expansion Joint after each (30)m length Fill from (PVC Water Stopper + 2.5cm thick Kock)



SECTION B-B

Expansion Joint Details Plane View



Expansion Joint Plan, Section, Detail and Control joint Detail  
SCALE \_\_\_\_\_ NTS

# Isometric View

## Proposed Canal Technical Data :

Canal Water Discharge: 0.221m<sup>3</sup>/sec

Canal Longitudinal Slope: 0.003

Canal discharge velocity: 0.629m/sec

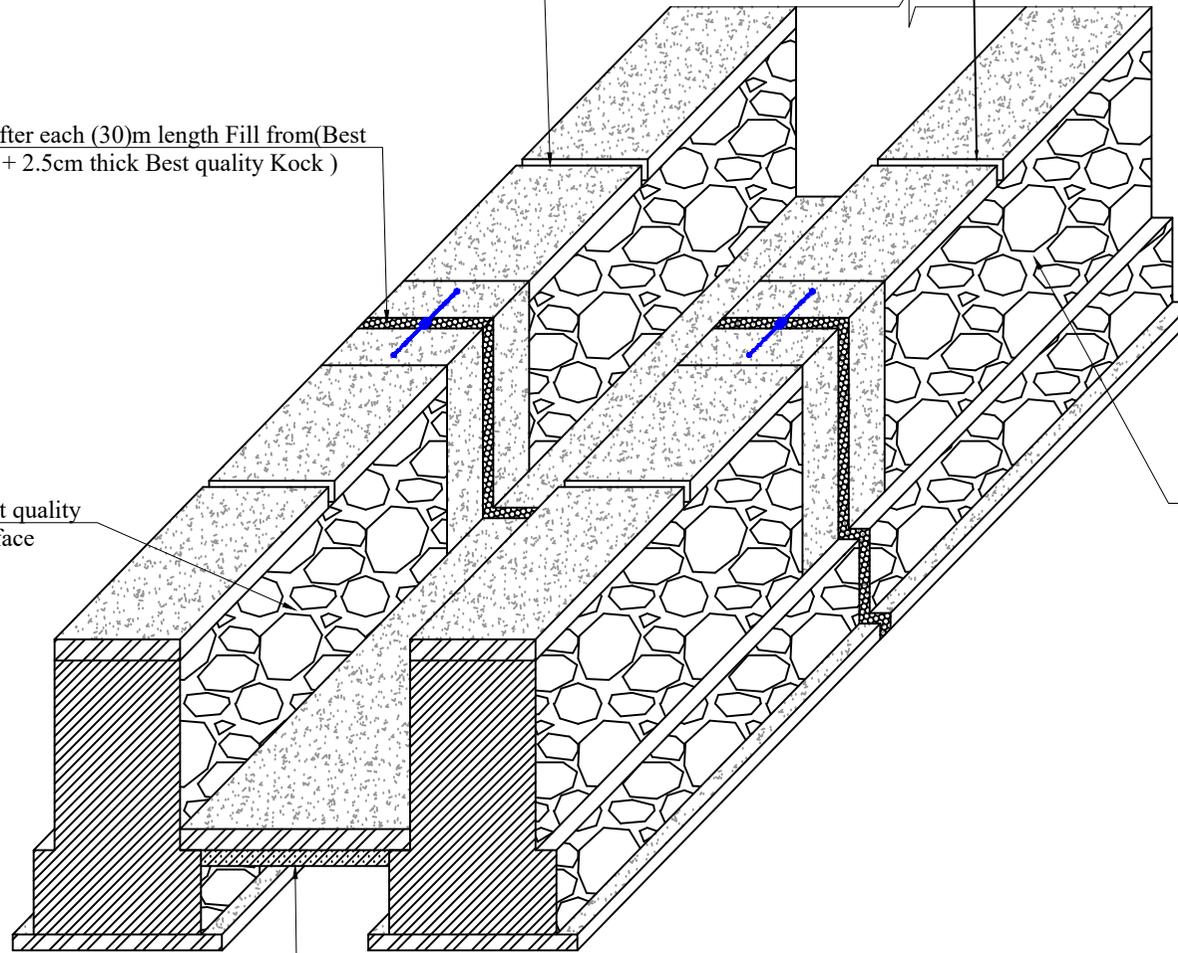
Length Canal proposed for Lining=500m

(2)cm Thick Expansion Joint after each (30)m length Fill from(Best quality PVC Water Stopper + 2.5cm thick Best quality Kock )

0.4cm Wide and 10cm deep Control Joint after each (3)m length fill with 4mm thick Glasses on top PCC of both side of canal walls

Both inside of canal Pointing with cement mortar 1:3 and best quality Isomat admixture, 0.5cm deeper than stone masonry surface

Both out side of canal Pointing with cement mortar 1:3



Bed PCC M-200 with Best quality Isomat Powder should bed done after graveling and proper compacting

Isometric View  
SCALE \_\_\_\_\_ NTS

## 1-CEMENT :

ORDINARY PORTLAND CEMENT

### a) SETTING TIME :

INITIAL SETTING TIME : NOT LESS THAN 45 MINUTES FINAL

SETTING TIME : NOT GREATER THAN 8 HOURS

### b) STRENGTH :

COMPRESSING STRENGTH (STANDARD CUBE) : 28 DAYS :  
450MPa (6500 psi)

### c) QUALITY :

A- Original Packing .

B- Free From Caked/ lump.

C- Slippery when rubbed by Finger.

D- feel Cool when placed hand in the Cement .

E- feel Hot when a grip of Cement placed into water .

F- Good Drinking water to be Used .

## 2-CONCRETE :

A-FOR ALL LEAN CONCRETE (PCC): 28 DAYS

STANDARD CYLINDER STRENGTH :  $f_c' = 20 \text{ N/mm}^2$  (2800 psi )

B-Weight per unit volume of concrete  $W=2400 \text{ kgf/m}^3$

C-Concrete design based on a compressive strength of  $f_c = 250 \text{ kg/cm}^2$  or as specified.

## 3-STONE:

A- Almost Regular and Shape.

B- Stone Size not Less then 200mm in minimum dimension and not more then 500mm in thickness and shall have a length less then 1.5 time of their width.

C- well Solid.

D- Crushed mountainous stone.

E- Not Rounded River Stone .

F- Do not have lime in its composition

G- Do not have crack and do not absorb water

## 4-SAND:

A- Free From Clay and Vegetation.

B- Should be Free From Salt.

C- Well Graded .

## Technical Specification

### 5-GOOD QUALITY OF MASONRY WORK:

A- well socked stone to be used .

B- Clean Stone to be Used .

C- Gaps Between Stone must be filled with mortar.

D- Joint Should be staggered.

E- Height of Masonry work will be Maximum 1.2m of one day .

F- Masonry work must be Cured for 14 days.

### GENERAL NOTE:

1- Duration of curing of all concrete work, Stone Masonry work and Pointing work not be less than 15 days.

2-All mortar for pointing 1:3 , stone masonry 1:4 and PCC 1:1.5:3, PCC Concrete and Stone stone Masonry

Mortar Should be Mixing by Mixer Machine

3-The Max slump should be between 5-7.5 cm

4-All dimensions are in centimeter or as specified.

5-Scale is vertical to horizontal fit.

6-All exposed surfaces to water of stone masonry should be pointed.

7-Contractor must adapt designs to site conditions under the direction and with the prior approval of the CARE provincial office .

8-The setting out of the structure and elevations must be confirmed on the site.

9-General and technical specifications, as included on the bidding documents.

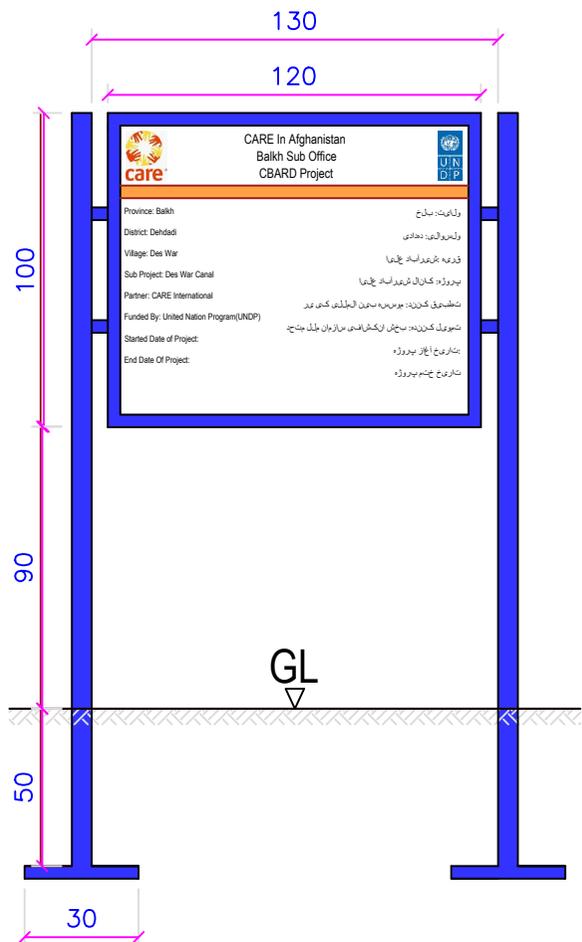
10-Sand or fine aggregate shall be free from salt,alkali,calcium sulphate or vegetable and it shall not contain more than 0.5 percent by weight of clay.

11-Location of the structure, setting out and elevations to be confirmed by the Engineer before construction.

12-The contractor shall construct and maintain all necessary channels, diversions and other temporary works necessary to ensure that irrigation water supplies are not interrupted during construction works.

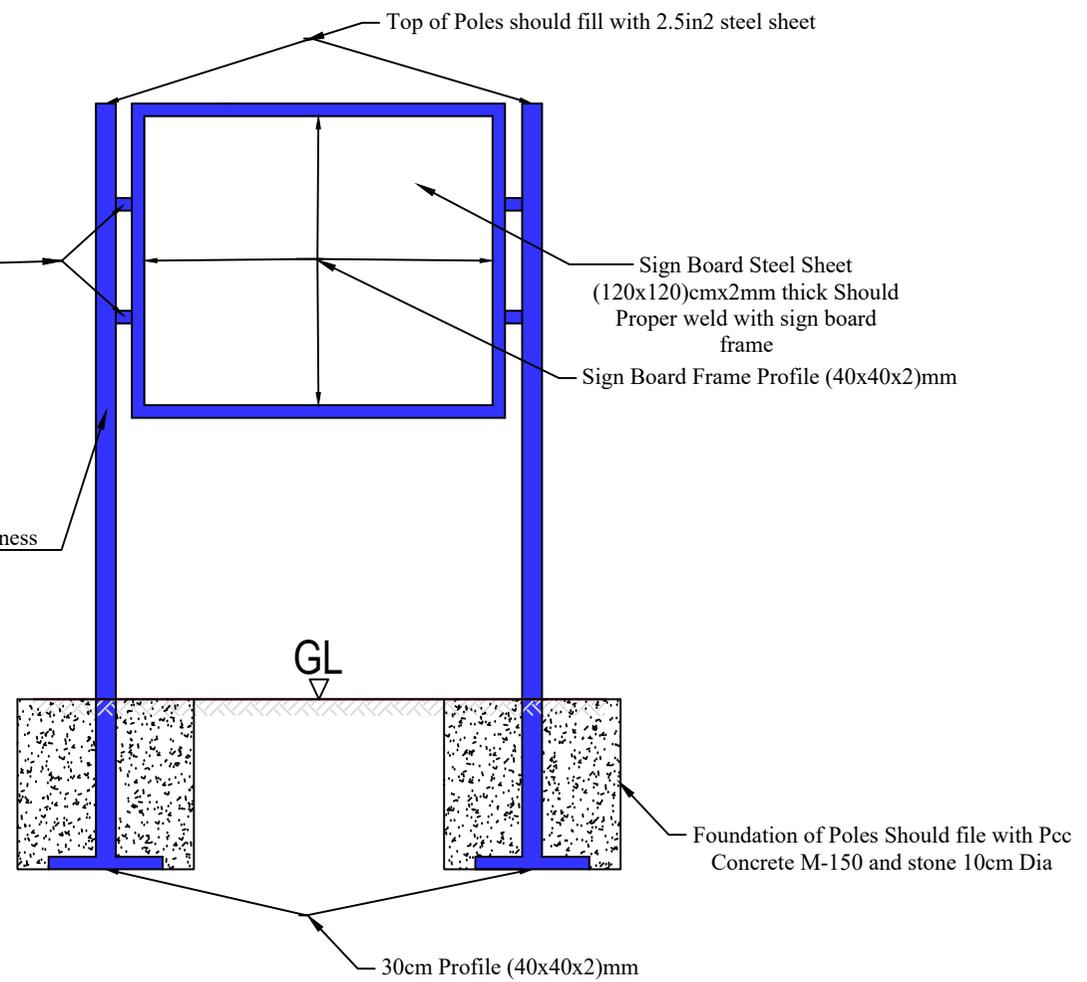
13-Site engineer should check all design and existing elevations and adjust the structure according to the site because the riverbed is changing season by season and the bed is scoured.

14-During the cold weather, concreting should be stop or the contractor has to consider the cold weather



Profile (40x40x2)mm 5cm Length Should be proper weld with poles and sign board fram

Poles GI Pipe 2.5inch Diameter and 2mm Thickness



All Sign board should Paint with Blue oil Color

Sign Board Drawing and Details

SCALE \_\_\_\_\_ NTS



SURVEYED BY	Eng. Fahim Jan Mohammadi, Zulfaqar Oriyakhil	CHECKED BY	Eng. Shaikhmir Abed
DRAWN BY	Eng. Abdul Waheed Abed	APPROVED BY	Eng. Mohammad Wakil Nayeb
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PROVINCE	Balkh	SCALE	H,V,TOFIT
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VILLAGE	Wocha Wona Omer khil	DESIGN DATE	09-06-2024

PROJECT NAME:	Wocha Wona Omer Khil Canal
DRAWING TITLE:	Sign board Detail and Specification

