



NCA
Guldara Project



**Building Resilience through
Investment & Developing Growers in
Local Economies (BRIDGE) Projects**

**Quality Control Plan for Construction
of Stone Masonry Irrigation Canals**

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Brief Information about the Projects and Locations

NCA has two major projects in the Guldara District, CR-WIP and BRIDGE. Guldara District is located north of Kabul, at Kunduz-Kabul Highway; average distance from Kabul airport is 40.7 Km.

CR-WIP and BRIDGE consist of activities which are: construction of stone masonry check dams, weir, and intake and irrigation canals. These projects include excavation, site grading, casting plain cement, stone masonry, precast RCC canal and its placement. This Quality Control plan is prepared for construction activities only.

1. Quality Control Plan

1.1 Purpose

The purpose of this Quality Control Plan is to provide control and describe the actions necessary to ensure compliance with the requirements of the contract, and delineate in specifications of the designed documents, i.e., blueprints, specifications, submittals, shop drawings, etc. This Quality Control Plan is designed to be preventive and corrective in nature.

I. Preventive

The purpose of the program is to evaluate, and inspect materials, methods of workmanship, and to review details in advance (blueprints and specifications) to ensure that the work to be accomplished will meet the requirements. Non-confirmed items will be investigated, and a course of action devised to prevent reoccurrence.

II. Corrective

It is the responsibility of the quality control manager to address non-conformance, i.e., materials, equipment, conditions & workmanship and to implement appropriate corrective actions necessary to correct the defect.

1.2 Revisions and Distribution

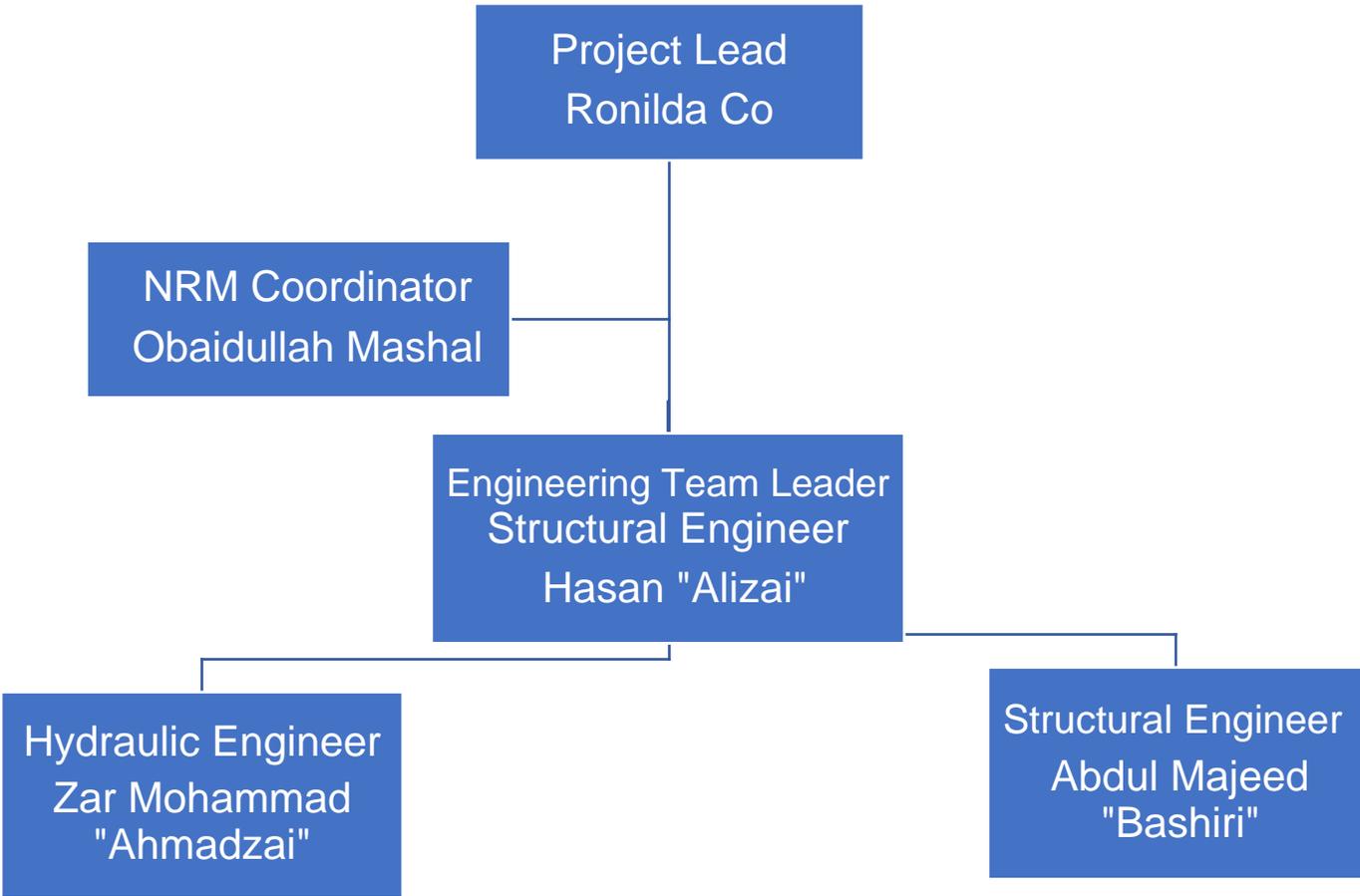
This Quality Control Plan shall be revised by the NCA team when any changes in the quality organization and/or procedures occur. This will ensure that the plan is current during the life of the project. A master copy of the Quality Control Plan is kept by the quality control manager who shall be responsible for updating and revising of the plan and for replacing obsolete issues with revised issues for all holders of the plan.

1.3 Program Criteria

- a) The quality control program defines, the organization and system providing control (and verification) for procurement, fabrication and construction activities which affect the quality of materials and workmanship.
- b) Construction activities shall be accomplished under controlled conditions, which include appropriate prerequisites, i.e., Preparatory meeting, initial inspections, and follow-up inspections.
- c) Non-conforming material parts, workmanship and/or services shall be identified and corrected in timely manner.
- d) Reports and procedures document and control the quality control program; identify the individuals or groups responsible of the planning and implementation of the program and identify the items

and services to which the program applies. Documentation relating the onsite and offsite activities shall be prepared, reviewed, and maintained to provide the substantiations of the quality obtained. Daily, the construction or project manager shall prepare and submit a daily activity report to the quality control manager. Relevant information, contained in the report (number of personnel, hours worked, equipment, material received and other pertinent information applicable to that day), shall be incorporated into the contractor's quality control report (prepare by the quality control manager) and submitted to the Contractor Project Manager (PM), NCA team.

2. Quality Control Organization Chart



3. Resumes

Structural Engineers and Hydraulic Engineer for Guldara Project are also responsible for quality control of these projects.

4. Roles and Responsibilities

4.1 Scope

This section establishes the organization structure and responsibilities of personnel involved in the management direction and execution of the quality control plan.

4.2 Organization and Responsibility

4.2.1. The NCA Engineering Team reports to the Project Lead. The Quality Control & Project Manager of the contractor are responsible for the implementation of the Quality Control Plan. Inspectors, technicians, laboratory and/or specialized personnel shall be assigned to the Guldara Projects Engineering Team according to the specific requirement of the project.

4.2.2. NCA Engineering Team is responsible for the following:

- Administration of this Quality Control Plan.
- Implementation of the Three-Phase inspection program.
- Preview the specification and recommend any changes thereto.
- Ensure that the quality control measure of specifications are incorporated in procurement documents.
- Review design and as-built drawings.
- Inspect construction activities.
- Establish testing requirements.
- Document non-conforming items or conditions and ensure corrective measures have been implemented.
- Substantiate the quality of materials and workmanship by inspection.
- Stop the work if it is not as per drawing and specifications.
- Review the methods and procedures of work for the virus subcontractors to ensure their understanding and compliance with plans and specifications.
- Inspect all materials delivered at the time of receipt, to ensure compliance with submittals, specifications, plans or shop drawings.

4.2.3 Quality Control inspectors are responsible for the following:

- Review the design are documents, i.e., plans, specifications, and shop drawings.
- Review submittals for compliance with the design documents.
- Maintain continuous inspections of all phases of construction.
- Report all quality control efforts and results on a daily basis.
- Maintain plan, shop drawings, submittals, daily reports, etc.
- Witness and document test reports.
- Develop and maintain a report with PM engineer and representative of the UNDP keeping them informed of all phases of construction and work stoppage due to deficient construction efforts or safety violations.
- Become thoroughly familiar with the Quality Control Plan.
- Before the start of the work, the inspector shall thoroughly review the applicable submittals, blueprints, shop drawings and specifications associated with that activity to ensure compliance.

- Document non-conforming conditions, items and/or workmanship.
- Follow the approved accident prevention plan, and the Safety Plan.

4.3 Operations

- The Guldara Projects Engineering Team shall be responsible for verifying that materials and equipment meet the specifications. Contractor Quality control personnel shall inspect material when it arrives; work at the construction site (including the subcontractor’s work) and prepare daily reports of ongoing construction activities.
- The Guldara Projects Engineering Team shall include a sufficient number of inspection and may be augmented by engineers and/or technicians. The number of personnel assigned to the department shall be determined by the Contractor Quality Control Manager. Inspection of materials and workmanship shall be made by qualified inspectors, engineers and/or technicians. Criteria for workmanship shall be established through preparatory meetings, initial inspections and follow up inspections and/or outlined in the specifications, referenced codes and/or standard and/or generally accepted construction practice.

5. Definable Features of Work

Definable Features of Work	Remark
Site preparation (Existing site cleaning and removing the debris along the river upstream of check dam)	
Excavation, backfilling and compaction of the irrigation canal lining and intake and removing extra excavated material from the site	
Stone boulder Placement	
Casting Plain Cement Concrete (PCC)	
Casting Reinforced Cement Concrete (RCC)	
Stone Masonry	
Formwork/ Reinforcement	
Steel Work	
Placement of Precast Canal	
Diversion canal	
Pointing	
Puch-out	
Pre-final & Final Inspections	
Final Acceptance	

Note:

Definable features of the work list will be arranged based on the initial preparatory meeting of NCA engineering team and UNDP engineering team, as necessary.

6. Three Phases of Inspection

6.1 Scope

This section establishes the requirement for the inspection and testing of construction installation and activities to ensure compliance with the contractual requirements.

6.2 Construction Inspection

The NCA Guldara Engineering Team shall be responsible for coordinating inspections to verify that construction installation activities of contractor meet the requirements of the contractual requirements, i.e., blueprints, specifications, shop drawings, etc. Installation shall be inspected which do not confirm to the requirements shall be documented on a non-conformance report (refer to Appendix-I Standard Forms) and shall be issued by a quality control representative for such conditions.

Inspection and testing documents shall be filed and maintained in accordance; reports and records and shall be available for review by the UNDP representator weekly (or as needed). Quality Control Staff meeting shall be held to discuss non-conforming items and/or inspection related issues. During these meetings a course of action shall be determined, task assigned to specific person(s) and a timetable set for accomplishing the tasks. Follow-up for accomplishing the task(s) shall be routinely addressed in each meeting. Weekly, Quality Assurance/ Quality Control shall have a joint meeting to discuss quality issues and/or concerns. Meeting minute shall be forwarded to UNDP Engineer in charge of these projects.

6.3 Phases of inspection

a) Preparatory Meetings

Preparatory Meetings shall be performed prior to the beginning of any major definable feature of work. A meeting shall be held for each crew performing such feature or when members of the crew change. Preparatory Meetings shall be conducted by the Project Lead and/or designee after a complete review of all applicable blueprints, specifications, shop drawings and related submittals has been made. A Preparatory Meeting Agenda (refer to Appendix-I Standard Forms) shall be completed for each definable feature of work and distributed at the meetings. At the Preparatory Meeting, the Superintendent and Foreman (involved in this phase of construction) shall coordinate with Quality Assurance, Quality Control and Safety Personnel and shall introduce their plan for accomplishing the work. UNDP Engineers shall be notified at least 48 hours in advance of the Preparatory Meeting. The following items shall be discussed at such meetings:

- Review of the applicable specifications.
- Review of applicable blueprints and shop drawings.
- Review of related submittal and a check that all related submittals, and materials have been tested (if applicable), submitted and approved.
- Review of the detailed sequence of the execution of the work.
- Discuss required testing and frequency.
- Review provisions to ensure controlled inspection and testing.
- Examination of work area to ensure that all required preliminary work has been completed and is in compliance with the contract.

- Examination of the related material, review of the receiving Inspection Reports and verification that the items received are in compliance with the contract and are properly stored.
- Review of the Activity Hazard Analysis Report to ensure that all safety precautions are met, and the required safety equipment has been purchased and is available.
- Review and document the workmanship expected for the definable feature of work.
- Meeting Minutes shall be recorded and distributed (UNDP Engineers) within 48 hours of the conclusion of the meeting.

b) Initial Inspections

Initial Inspections shall be performed at the beginning of any definable feature of work and must be repeated at any time new workmen or new crews are assigned to the work or if the required standard of work is not being met. NCA Engineers shall be notified at least 48 hours in advance. The same personnel who attended the Preparatory Meeting also attend the Initial Inspection. These should include: The Superintendent and Foreman, Safety Personnel, and the Quality Assurance/Quality Control staff. The following shall be accomplished during such meetings:

- Review the minutes of the Preparatory Meeting and verify that the work complies with the design documents, i.e., submittals, specifications, blueprints and/or shop drawings.
- Resolve all differences.
- Verify adequacy of inspection and testing.
- Establish a level of workmanship and verify that it meets the requirements.
- Check safety and review the activity Hazard Analysis Reports.
- Provide documentation of the previous inspection of the work area.
- Re-examine the work area for compliance.
- Meeting minutes shall be recorded and distributed within 48 hours of the conclusion of the meeting.

Note: Preparatory Meeting and initial Inspections are intended to prevent non-conformances from occurring.

Inspection Schedule		
1. Reinforcing, Formwork and Cast-in- Place Concrete		
Inspection Parameter	Minimum QC Inspection Frequency	Acceptance Criteria
Reinforcing Material Condition	Upon receipt at the site	No visible defects or damage, no unscheduled kinks or bend
Reinforcing Material Storage	Daily	In accordance with manufacturer's recommendations and approved work plan
In-Place reinforcing	Prior to closing forms and continuous during pouring	In accordance with approved work plan, no excess water, hardened concrete, debris, or foreign materials inside of forms, wet wood forms sufficiently to tighten up cracks
Subgrade Preparation	Prior to pouring of concrete	Fine grade earth and aggregate smooth and level

Concrete placement	Continuous during pouring of concrete	In accordance with approved work plan and according to mix design, height of concrete drop not to exceed 5 feet, place and compact within 60 minutes after water is first added, do not place after evidence of initial set, Temperature of concrete and ambient should maintain according to the requirement of normal weather and Cold Weather Plan
Formed Concrete Curing	Daily during curing of concrete	Forms maintained in wet condition until removed, concrete continuously moist for minimum of 7 days after pouring. According to ACI 308.1-98)

c) Follow- Up Inspections

Follow-up inspections shall be performed daily to ensure that the control established during Preparatory Meeting and initial inspection continues to provide a product that conforms to the contractual requirements.

Construction activities will be inspected by assigned Quality Control in accordance with Quality Control Procedures. Forms for various activities (refer to Appendix-I standard forms) shall be filed and attached to the Contractor’s Quality Control Report. Installation and testing activities which do not comply with the requirements shall be documented on a Non-Conformance Report (NCR). Modifications require re-inspection and/or retest to verify acceptability. Inspection and testing documents shall be filled and maintained in accordance with reports and records and shall be available for review by the Engineering team.

d) Punch- out Inspection.

Near the completion of construction, the NCA Engineering Team shall coordinate a Punch-out inspection and develop a “Punch-List” of deficiencies noted. A list shall be submitted to the responsible engineer for corrective action.

e) Pre-final Inspection

After the completion of the Punch-Out inspection, the NCA engineers shall perform a Pre-final Inspection and develop a joint “Punch List” of noted deficiencies. The Punch List shall be formally documented along with the estimated date by which the deficiencies will be corrected. The Guldara Projects Engineering Team shall perform follow-up inspections to ensure that all deficiencies have been corrected.

f) Final Inspections

Upon the completion of the items listed in the Pre-Final Inspection “Punch List”, NCA Structural Engineer (Hasan Alizai) shall notify UNDP representative 7 days prior to the Final Inspection (or as agreed to) with the assurance that all items listed in the pre-final inspection and all other remaining work has been completed and shall be acceptable by the date of the Final inspection.

g) General Notes

Work inspected, at any stage of construction, which is found to be unsatisfactory, shall be re-inspected after correction of the noted deficiencies have been made. When required, and/or start-up commissioning procedures, pertaining to certain mechanical systems, such as those to be performed by manufacturer's representatives, shall be furnished to UNDP representative for review and comment prior to Preparatory Meeting. Quality Control Reports shall be created and/or reviewed (as necessary) to implement the Quality Control Program

7. Testing and Records

7.1 Purpose

To ensure that tests are adequately planned and that the necessary testing procedures are available to conduct the test in a satisfactory manner. This procedure established the methods to be used when conducting tests listed in the specifications. Test reports shall be filed and logged accordingly.

7.2 Testing

A list of tests required, to verify that control measures are adequate, shall be delineated in the specifications and/or determined upon the completion of the design. The list shall include the test name, specification paragraph, feature of work to be tested, the test frequency and the organization that will perform the test. The Project Leader shall notify UNDP representative of the proposed test 48 hours in advance. The NCA Engineering Team shall witness the test with the appropriate organization and/or individual qualified to perform the designated test(s).

7.3 Failed Tests

Failing test shall be cleared through one of the following methods:

- Retest – Retest if there is any doubt that the first test was not adequate.
- Rework – Re-inspect and retest.
- Failed Material – Remove, replace re-inspect and retest.

7.4 Procedures

- The NCA and UNDP Engineers and/or staff members shall review the testing requirements to ensure that the planned test is in accordance with the design documents: i.e., plans, specifications, shop drawings and/or other documents.
- Instruments used for testing shall be calibrated in accordance with established calibration procedures. Specialists experienced in such work shall perform the calibration.
- Technicians performing tests shall provide copies of calibration certificates and their field notes and reports to the responsible Engineer.
- NCA Engineering Team shall witness all required tests delineated in the design documents (blueprints, specifications, shop drawings, etc.).
- UNDP team (or Representative) shall be notified of all scheduled tests.
- Test reports, when completed, shall be attached to the Contractor's Quality Control Report, and submitted to UNDP team.

7.5 Concrete Mark Controlling

- After the mix design, all the concrete marks are applied in the field according to the design and BOQ. The concrete mark's control is done using a standard aggregate measuring box.

8. Reports and Records

8.1 Scope

This section establishes a system for the control of documentation and records which provide objective evidence of the quality of items and activities performed in accordance with the programmatic requirements. The NCA structural Engineer (Hasan Alizai) is responsible for the control, review, verifications, and maintenance of the documentation delineated in the specifications.

8.2 Reporting and Distribution of Reports

After reviewing reports, the Project Lead shall submit the documentation to the UNDP representative. All inspections and testing shall be summarized and recorded in a Contractor's Quality Control Report (CQCR). A copy of the CQCR shall be sent to UNDP Engineers, and NCA Structural Engineer (Hasan Alizai) reports shall be retained by the Project Lead. Field notes, inspection forms, and test reports shall be filed and available for review by UNDP Engineers.

The NCA Quality Control Report shall include the following:

- Contractor and subcontractor area of responsibility.
- Working, idle and down time hours for equipment.
- Work accomplished each day indicating the location, activity and by whom.
- Laboratory test reports, including the test results (passing or failing), location of test and specification reference.
- Deficiencies and corrective actions.
- Material received on site.
- Offsite surveillance, including action taken.
- Safety violations and corrective action implemented.
- UNDP Engineers instructions received and/or conflicts encountered in the plans and/or specifications.
- Contractor's verification statement.

8.3 Storage and Retention

I. Pre-final Inspection

Records shall be stored in areas which shall protect them from damage, deterioration and/or loss at the site Quality Control Office during the construction period. Records shall be accessible to UNDP Engineers.

II. Pre-final Inspection

Records shall be stored for a period as determined by the destroyed or otherwise disposed of within that period. Control and final disposition of subcontractors and supplier records, both onsite and offsite, shall be in accordance with the contractual documents.

9. Required Tests

Applicable tests, delineated in the design documents (plans, specifications, shop drawings, etc.) shall be witnessed and documented by the NCA Engineering Team . UNDP shall be advised of all scheduled testing 48 hours in advance. A copy of each completed test report shall be submitted to UNDP (via the Contractor’s Quality Control Report).

General Testing Plan/Schedule			
1. Aggregate Material			
Test Parameter	Test Method	Minimum QC Testing Frequency	Acceptance Criteria
Grain – Size Distribution	ASTM D433 or C136	1 per stockpile and source change	According to Drawing & Specification
Moisture Content	ASTM D2974	1 per stockpile and source change	According to Drawing & Specification
Compaction Characteristics	ASTM D1557	1 per stockpile and source change	According to Drawing & Specification
2. Portland Cement			
Test Parameter	Test Method	Minimum QC Testing Frequency	Acceptance Criteria
Chemical & Physical Requirement	ASTM C150	Prior to use in concrete mix in absence of material certification	According to Drawing & Specification
2. Concrete Mix			
Test Parameter	Test Method	Minimum QC Testing Frequency	Acceptance Criteria
Compressive Strength	ASTM C39 Cast-in-place Cylinders (ASTM C873)	Preliminary testing of mix design, test at 7, 14, 21, 28 days	According to Drawing & Specification
Compressive strength	ASTM C805 Rebound Hammer or Schmidt Hammer	After Cylinder test failed.	According to Drawing & Specification
Compressive Strength	ASTM C42 Drilled Core	After Cylinder test failed. NCA and UNDP team will decide to specify the tests after failed cylinder test.	According to Drawing & Specification

Slump Test	ASTM C143	1 per batch prior to pouring concrete	According to Drawing & Specification
Temperature Test	ASTM C1064	1 per batch prior to pouring concrete.	According to Drawing & Specification
3. Steel Rebar			
Test Parameter	Test Method	Minimum QC testing frequency	Acceptance Criteria
Tensile test	ASTM A370	Once per brand	According to Drawing & Specification
Bend Test	ASTMA615, A706, and A1035	Once per brand	According to Drawing & Specification
4. Stone Test			
Test Parameter	Test Method	Minimum QC Testing Frequency	Acceptance Criteria
Compressive strength	ASTM C170	1 per source prior to commencing of work.	According to Drawing & Specification
5. Masonry Mortar			
Test Parameter	Test Method	Minimum QC Testing Frequency	Acceptance Criteria
Compressive strength	ASTM C109	1 per batch prior to pouring Mortar	According to Drawing & Specification

10. Testing Laboratory

The contractor-designated testing laboratory to complete, as applicable, the required tests for, concrete, etc. The profile and pertinent documents of the laboratory shall be reviewed and verified by NCA. The testing laboratory document will be shared with the UNDP team for each project. The testing laboratory shall work under the direction of the contractor.

11. Tracking Deficiencies

Deficiencies are most common construction mistakes in building process. It is the responsibility of Engineering Team Leader to inspect all projects structures on following right processing steps as per approved drawing and specification. Upon discovery of any deficiency onsite, the Engineering Team Leader (Hasan Alizai) shall report it to the Project Lead (Ronilda Co) to take required action.

12. Daily Report

This part establishes for better control of daily report documentation and provides objective evidence of the quality/quantity/duration of items and activities performed in accordance with the programmatic requirements. The Engineering Team Leader is responsible for preparing, reviewing, verifications and maintenance of the daily report documentation delineated in the specifications.

Note: The appendix forms are attached in a separate file.