



GROWTH WITH
EQUITY IN
MINDANAO 3
PROGRAM

INFRASTRUCTURE PROGRAM

QUALITY ASSURANCE/QUALITY CONTROL PLAN AND MANUAL

2008

Growth with Equity in Mindanao Program

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FOREWORD

The Growth with Equity in Mindanao (GEM) Program, USAID Contract No. 492-C-00-08-00001-00, prepared this Quality Assurance/Quality Control (QA/QC) Plan and Manual to establish a comprehensive, consistent, and common system for quality assurance and quality control during implementation of Regional Impact Projects (RIPs) and Barangay Infrastructure Projects (BIPs).

This Manual was prepared in order that technicians and engineers involved in the quality control aspects had ready reference and guidance during project implementation. Engineers must be aware of the importance of materials quality control and contract requirements and specification in the implementation of various infrastructure projects.

To make it easier and convenient to the user, the Quality Assurance/Quality Control Plan and Manual was revised and prepared to include six appendices, namely: List of Minimum Testing Equipments and Minimum Testing Requirements (Appendix A), Material Testing Forms (Appendix B), Quality Control/Quality Assurance Documents (Appendix C), Checklists and Forms of Billing Documents (Appendix D) Subcontractor's Monthly Progress Report Formats (Appendix E) and List of Material Sources of Aggregates.

The Plan and Manual should be kept in a loose leaf so that any additions or modifications can be easily incorporated later, if required.

Based on the nature of different contract packages, the relevant portions can be supplied to Subcontractors, Proponents, and Recipients for day-to-day reference.

It is hoped that this Manual will be an effective tool in ensuring the implementation of infrastructure projects in accordance with the materials specifications prescribed for the projects.

Barangay Infrastructure Projects are much smaller in scope than Regional Impact Program projects, and it was found during GEM 2 that the use of the GEM 2 QA/QC Manual was not necessarily applicable for such projects. To correct this, the BIP team developed an abridged and simplified QA/QC Manual for Barangay Infrastructure Projects. This appears in Chapter 11 of this RIP QA/QC Manual.

**GROWTH WITH EQUITY IN MINDANAO
(USAID CONTRACT NO. 492-C-00-08-00001-00)**

QUALITY ASSURANCE/QUALITY CONTROL MANUAL

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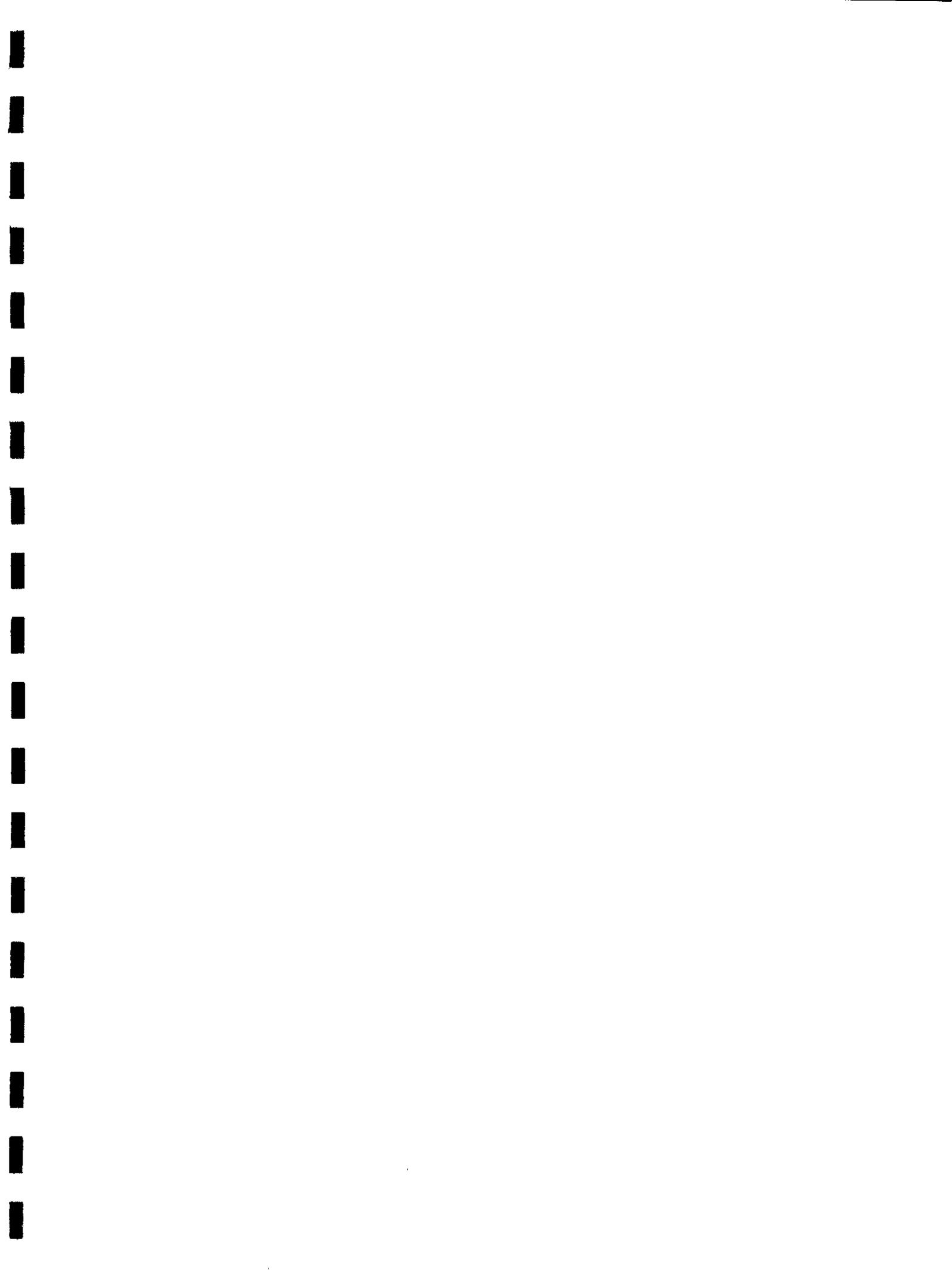
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LIST OF TERMS

ABBREVIATION	DESCRIPTION
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ASTM	American Society for Testing and Materials
AWWA	American Water Works Association
BAC	Bids and Awards Committee
BEC	Bid Evaluation Committee
BM	Bituminous Macadam
BME	Benefit Monitoring and Evaluation
CBR	California Bearing Ratio
CI	Cast Iron
CQC	Construction Quality Control
DC	Direct Current
DENR	Department of the Environment and Natural Resources
RIP/BIP-E	Regional Infrastructure Project/Barangay Infrastructure Project-Engineer
PM-CA&A	Program Manager for Contracts, Accounting and Administration
COP	Chief of Party
DCOP	Deputy Chief of Party
PM-1	Program Manager for Infrastructure
DPWH	Department of Public Works and Highways
DTN	Design Transmittal Note
Engineer	Program Manager or his representative
FDT	Field Density Test
GEM	Growth with Equity in Mindanao
GL	Ground Level
GSB	Granular Sub-Base
GSW	Glazed Stoneware (Pipe)
HV	High Voltage
IDTN	Internal Design Transmittal Note
IPC	Interim Progress Payment

LAM	Los Angeles Method
LCB	Local Competitive Bidding
LGU	Local Government Unit
PL & LL	Plastic limit & Liquid Limit
PI	Plasticity Index
MC	Moisture Content
MDD	Maximum Dry Density
MS	Mild Steel
RIP	Regional Infrastructure Project
MV	Medium Voltage
NGO	Non-Government Organization
NIA	National Irrigation Administration
O&M	Operation and Maintenance
OBC	Optimum Bitumen Content
OMC	Optimum Moisture Content
PAP	Project Affected Person
PCC	Plain Cement Concrete
PI	Plasticity Index
PMO	Project Management Office (of GEM)
PPC	Progress Payment Certificate
PSC	Pre-stressed Concrete
PVC	Poly-Vinyl Chloride (Pipes)
QA	Quality Assurance
QC	Quality Control
QS	Quality System
RC	Reinforced Concrete
RDA	Request for Design Approval
SPT	Standard Penetration Test
STL	Sub-grade Top Level
TC	Test Certificate
TPI	Third Party Inspection
USAID	United States Agency for International Development
VO	Variation Order



1 INTRODUCTION

This section of the Quality Assurance/Quality Control Manual presents the Project's background, defines quality-related terms, and gives an outline of the Manual.

1.1 Background

The Regional Impact Program (RIP) and Barangay Infrastructure Projects (BIPs) are component of the Growth with Equity in Mindanao (GEM, the Project) Program, which is being implemented during the period from 2007 to 2012 with assistance from the United States Agency for International Development (USAID). The Regional Impact Program's and Barangay Infrastructure Project's primary focus will be the Autonomous Region of Muslim Mindanao (ARMM) and the Conflict Affected Areas in Mindanao (CAAM).

Infrastructure facilities to be improved or constructed shall include port, water supply, roads, bridges, irrigation, drainage, flood control, and general civil works. The Regional Impact Program and Barangay Infrastructure Projects professionals mobilized in January 2008.

The Project is unique in its nature and complexity, characterized by its spread across varied locations, approximately 20 Regional Impact Program (RIP) and 1000 Barangay Infrastructure Project construction contracts of different nature, and participation by multiple agencies. In view of this complexity, it is essential and important to establish a comprehensive, consistent, and common system for quality assurance and control during implementation. GEM prepared this document with this purpose in mind.

1.2 Quality Definitions

Quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy the subproject's functional requirements. The quality of outputs is always agreed upon between the supplier and the client (in the Project works, Subcontractor and the Employer, respectively), and the quality objective must be to achieve zero defects. This is possible only by ensuring the quality at all stages of the Project works.

The following are some definitions pertaining to quality and how to achieve it.

1. **Quality:** Conformance to requirements.
2. **Quality Control (QC):** The operational techniques and activities (such as reviewing, checking, inspecting, testing, etc.) that are used to fulfill requirements for quality.
3. **Quality Assurance (QA):** The planned and systematic actions necessary to provide adequate confidence that the work will satisfy quality requirements.
4. **Quality System (QS):** A set of documented processes that seek to provide confidence that the subproject outputs will fulfill the functional requirements. The Quality System should encompass the organization, responsibilities, human resources, materials, equipment, processes, inspections, testing, and other parameters of the subproject. A key element of QS is the QA/QC Manual.
5. **Quality Surveillance:** This normally covers two aspects.
 - At the overall level, a review to ensure that the quality practices are implemented and documented in relation to the quality system; and

- At the contract package level, inspection and testing to ensure that the works executed meet the required quality standards.

1.3 QA/QC Manual

This QA/QC Manual focuses on the implementation activities of the subproject following contract award, and primarily on supervision and quality control of construction works. Other aspects of subproject implementation are also covered but in less detail. The QA/QC Manual is intended to be used primarily by the Regional Impact Program and Barangay Infrastructure Project as well as Subcontractors.

The QA/QC Manual does not attempt to suggest technical specifications, since these are stated in the contract documents. Its aim is to ensure that the works are executed as per specifications, i.e. it is a means to achieve the end results. Quality control and test results shall be interpreted as applicable for different packages, in accordance with the contract conditions.

The subsequent sections of this Manual are as follows:

- Organization, Responsibilities, and Authorities
- Design Control
- Construction Quality Control – General
- Requirements for Materials Quality Control
- Control of General Civil and Structural Works
- Control of Road Works
- Control of Water/Pipeline Works
- Control of Other Specialized Works
- Control for Runway Construction
- Barangay Infrastructure QA/QC Procedure
- Document Control
- Reporting

2 ORGANIZATION, RESPONSIBILITIES, AND AUTHORITIES

This section of the QA/QC Manual describes the organizational arrangements for subproject implementation and outlines the responsibilities of each organization.

2.1 Subproject Implementation Arrangements

1. As agreed between the Government of the Philippines and the United States Agency for International Development, the Growth with Equity in Mindanao (GEM) Program will be executed through the Project Management Office (PMO) of the GEM Program. USAID has appointed a Chief of Party for the PMO, and the PMO has the overall responsibility for coordination and management of the GEM activities, including subproject design and implementation and coordinating the work of all consulting services under the Project.
2. GEM's Area Offices in Cotabato and Zamboanga will support the PMO in its works. Construction engineers based in these offices will have the primary responsibility for supervising construction of the subprojects in these regions.
3. GEM is authorized to make speedy decisions regarding all subproject components. The Program Manager (Team Leader) for Infrastructure (PM-I) and his representatives (the Regional Impact Program and Barangay Infrastructure Project Program Managers/Engineers), have full authority regarding all technical inputs of subproject implementation aspects. The GEM Chief of Party through the Program Manager of Party for Contracts, Accounting and Administration (PM-CA&A) will award all contracts and has role authority for all contractual aspects of the contract.
4. Local committees, LGUs, or government agencies (the Proponent) have been consulted for each subproject to review the subproject and to assist in coordinating construction work.
5. The Regional Impact Program and Barangay Infrastructure Project Engineer will prepare the technical and financial details for each subproject. USAID will approve the technical components and financial estimates for each subproject.
6. GEM has established a committee for evaluating the prequalification documents that potential subcontractors have submitted. The evaluation committee will finalize the pre-qualified subcontractor's list. A Bid Evaluation Committee (BEC) will be formed to facilitate approval of civil works tenders. This committee will evaluate the tenders under local competitive bidding. GEM will negotiate with the lowest evaluated bidder and submit an evaluation report and a draft contract to USAID for approval.
7. Many of the subproject activities are traditionally implemented by existing line agencies or LGUs. These organizations, however, will support but not be responsible for subproject implementation. They will assist in formulating subprojects and will have an important role of providing the details concerning the existing status, providing available studies and reports, making counterpart contributions and in general planning and monitoring the works to be taken up. They will ultimately take over the assets after the works have been completed.
8. USAID has recruited an international consulting firm, the Louis Berger Group, Inc. to implement the GEM Program, including the Regional Impact Program and Barangay Infrastructure Project. The GEM Program is based in Davao and is responsible for planning, implementing, managing, and monitoring all subproject activities

9. The Infrastructure team includes the Regional Infrastructure Project Managers/Engineers. The Regional Impact Program and Barangay Infrastructure Project Engineers, under the direction of the Regional Impact Program and Barangay Infrastructure Project Managers, will prepare the detailed design for each subproject. This work also includes identifying the work packages as well as preparing cost estimates and tender documents. The Regional Impact Program and Barangay Infrastructure Project Managers and Engineers are also responsible for supervising construction and quality assurance.
10. The LGUs or line agencies will conduct any community awareness and participation programs as needed.
11. Some responsibilities as generally elaborated above overlap between different groups. Individual responsibilities for each organization activities are identified in Table 2.1 to avoid any misunderstanding. Some of the items in the list of responsibilities enumerated in Table 2.1 might not appear to have a direct bearing on the quality, but they help clarify the responsibilities and, hence, help organize the works better. This list is only to facilitate smooth functioning and is not meant in any way to dilute the responsibilities and authority that various organizations have in their respective jurisdiction.

Table 2.1: Responsibilities of Key Organizations

No.	Task	Responsibility	Unit
1.0	APPROVAL OF WORKS		
1.1	Administrative and financial approval of the subproject.	Submission Approval	PM-CA&A USAID
1.2	Identification of detailed work packages with preliminary estimates for administrative approval.	Compilation Feasibility and estimation	DCOP-I and Proponent RIP/BIP Manager/Engineer
1.3	Approval of work packages.	Review Approval	PM-I PM CA&A/USAID
1.4	Subsequent changes in the works.	Submission Approval	PM-I PM-CA&A & USAID
2.0	TECHNICAL APPROVAL		
2.1	Collect data, conduct necessary surveys and investigations, and prepare detailed design, drawings, and cost estimates.	Preparation Review and approval	RIP/BIP Engineer, USAID
3.0	CONCEPT DESIGNS AND PARAMETERS		
3.1	Concept designs after preliminary investigation including different alternatives and proposed design parameters for all major works and specialized works.	Preparation Review and approval	RIP/BIP Engineer
3.2	Prepare typical drawings for the subproject.	Preparation Approval	RIP/BIP Engineer
4.0	TENDER DOCUMENTS		

No.	Task	Responsibility	Unit
4.1	Prequalification documents for local competitive bidding.	Preparation Approval Concurrence	RIP/BIP Manager/Engineer USAID/PM-CA&A
4.2	Tender documents for local works.	Preparation Evaluation Approval	RIP/BIP Manager/ Engineer PM-CA&A
5.0 TENDER AND AWARD			
5.1	Prequalification of subcontractors.	Invitation Receive applications Evaluation	PM-CA&A PM-CA&A PM-CA&A
5.2	Tenders for works.	Invitation Receive tenders Evaluation Approval	PM-CA&A PM-CA&A BEC USAID/PM-CA&A
5.3	Issue of work orders, sign agreements including upkeep of original contract documents for all works and local procurement.	Issuance	PM-CA&A and PM-I
6.0 CONTRACT ADMINISTRATION AND CONSTRUCTION SUPERVISION			
6.1	a. Overall technical administration and management of the contracts. b. If there are cost or contractual implications.	Management	RIP/BIP Manager/Engineer PM-CA&A
6.2	Review and revise construction drawings as may be necessary and provide clarifications or explanations on the designs and drawings to the subcontractor.	Submission Review and recommend Approval	RIP/BIP Manager/Engineer USAID/PM-CA&A
6.3	Provide levels and layouts for work items where dimensional accuracy has a direct bearing on the quality and performance of the finished work to ensure conformity with the quality requirements stipulated in the contract.	Primary Secondary	Subcontractor RIP/BIP Manager/Engineer
6.4	a. Assess the adequacy of the inputs such as materials, labor, and equipment provided by the subcontractor as well as the proposed construction methods; ensure that they are satisfactory with reference to the technical requirements, implementation schedule, environmental aspects, and safety of the works, subproject personnel, and general public welfare; inform PMO in writing of any	Primary Secondary	RIP/BIP Manager/Engineer

No.	Task	Responsibility	Unit
	deficiencies found, and recommend any remedial actions which are required to be taken at no change in cost. b. If there are cost or contractual implications	Approval	PM-CA&A
6.5	Maintain proper inventories and accounts for all dismantled materials, particularly for those materials which are to be re-used in the works.	Primary Secondary	Subcontractor RIP/BIP Engineer
6.6	Maintain the work site in a neat, orderly, and safe manner.	Primary Secondary	Subcontractor RIP/BIP Engineer
6.7	Minimize inconveniences to the public.	Primary Secondary	Subcontractor RIP/BIP Engineer
6.8	Necessary assistance to solve any contractual dispute and sort out issues requiring external interdepartmental coordination to ensure the successful implementation of the subproject works.	Primary Secondary	Engineer and PM-CA&A RIP/BIP Engineer
6.9	Providing continuous on-site supervision during construction and ensuring the safety of the works.	Primary Secondary	Subcontractor RIP/BIP Engineer
6.10	a. Supervising and monitoring the progress of the works, including identifying causes of delays, determining remedial actions to correct such delays, and issuing instructions to Subcontractor. b. If there are cost or contractual implications	Primary Approval	RIP/BIP Engineer PM-CA&A
6.11	The subcontractor fulfills all contractual obligations and complies with all applicable statutes, regulations, contract conditions, specifications and instructions.	Primary Secondary	Subcontractor Engineer
6.12	The Subcontractor completes the work within the Scheduled time.	Primary Secondary	Subcontractor RIP/BIP Engineer
6.13	Ensuring that Site Order Books are properly maintained.	Primary Secondary	Subcontractor RIP/BIP Engineer
6.14	Making test records and results available for review and assessment.	Primary Secondary	Subcontractor RIP/BIP Engineer
6.15	a. Act on subproject issues and problems as they arise, and promptly issuing written instructions to the subcontractors to address the problems. Contractual notices can be given by the PM-CA&A only, but letters for quality and other matters can be given by Regional Impact Program and Barangay Infrastructure Project Engineer. b. If there are cost or contractual implication.	Primary Approval	RIP/BIP Engineer PM-CA&A
6.16	Ensuring that the Subcontractor properly prepares the "As Built" drawings for the completed works.	Primary Secondary	Subcontractor RIP/BIP Engineer

No.	Task	Responsibility	Unit
6.17	Ensuring that the Subcontractor prepares and submit Monthly Progress Report in the approved format and on time.	Primary Secondary	Subcontractor RIP/BIP Engineer
6.18	Developing and implementing efficient O&M procedures and practices for subproject infrastructure; ensuring the participation of project affected persons in planning, implementation, and monitoring.		RIP/BIP Engineer)
7.0	QUALITY ASSURANCE AND INSPECTIONS		
7.1	Assist in providing on-the-job training on using the Manual Subcontractor staff.		RIP/BIP Manager/Engineer
7.2	Provide effective supervision of the works in order to ensure the quality and conformity with the standards and specifications prescribed in the contract.		RIP/BIP Manager/Engineer
7.3	Inspect all work sites regularly to check the nature and quality of work; verify the materials, equipment, and labor engaged at the site; review the quality control tests and test results; ensure that the work is being implemented in accordance with the approved standards; and that the quality control procedures set forth under the contract are followed. Note the problems and actions taken or to be taken; record them in the site order book and sign it.		RIP/BIP Manager/Engineer
7.4	Witness all quality control sampling and testing the subcontractor does. Compile and review all quality control data obtained from tests the Subcontractor or others conduct; verify the accuracy of the test data by checking the procedures used in the field for sampling and testing the materials and works. Take samples and test independently testing wherever considered necessary, or as required to check and verify the accuracy of the test results the Subcontractor conducts. Assess the test results and accept the materials supplied and on the works completed. Ensure that proper records of the tests conducted are maintained.		RIP/BIP Manager/Engineer
7.5	Inspect interim work as required to accept or reject completion stages (i.e., completion of subgrade, subbase, base course, etc.) before permitting the Subcontractor to proceed with further works. Enter all approvals in the site order book and have it signed by all parties. Do not permit further stages of work until the earlier stage work is inspected and accepted. If that work fails to meet the required standards, explain any removal and replacement or other remedial measures that may be required provide a schedule for completing such work.		RIP/BIP Manager/Engineer
7.6	a. Joint final inspections of the completed works, preparing a statement of exceptions for any works that remains to be completed, approve and accept the completed works, when issuance of the Certificate of	Joint inspection Acceptance	RIP/BIP Manager/Engineer and Subcontractor RIP/BIP

No.	Task	Responsibility	Unit
	Acceptance and the final payment to the Subcontractor. Final issuance of certificate of acceptance.	Administrative Approval	Manager/Engineer PM-CA&A
7.7	Inspect the completed works ensuring that any defects in materials or workmanship are properly identified in a timely manner; ensure satisfactory defect and liability of the works for one year following completion as per contract.	Primary	RIP/BIP Manager/Engineer
7.8	a. Conduct monthly inspections and site coordination meetings for all works to review the overall progress and quality of the works; review the problems that have arisen, the instructions that issued to the Subcontractor address these problems, and the Subcontractor's compliance with these instructions; agree on further actions that may be required to improve the progress or quality of the works. Prepare the minutes of the site coordination meetings in order to maintain a permanent record of all agreements reached, instructions issued, and actions to be taken. b. The PMO PM-CA&A will be solely responsible to issue any written instructions dealing with contractual issues.	Primary Secondary Approval/Action	RIP/BIP Manager/Engineer and Subcontractor RIP/BIP Manager/Engineer PM-CA&A
7.9	Certify the quality of the works accomplished and included in the Subcontractor's monthly progress payments and its conformity to the specifications and drawings; accept the works and prepare progress payments for the completed works. If any work item or construction material is substandard or unacceptable, deduct such work or supply of material from the progress payment or defer payment until the Subcontractor rectifies and explains in writing the deficiencies noted along with necessary supporting data and including test results to the Engineer. Recommend remedial measures to bring substandard work up to the necessary standard.	Primary Secondary	RIP/BIP Manager/Engineer
7.10	a. Prior to the expiration of the defect liability period, inspect the works, identify any defects in materials or workmanship, assure correction of defects b. Release the security deposit or balance of security deposit following satisfactory correction of all defects.	Primary	RIP/BIP Manager/Engineer PM-CA&A
8.0	CONTRACT VARIATIONS		
8.1	a. Assess monthly progress and quality of the works; recommend necessary contract variations, such as work programs, procedures, inputs, safety, quality, variation orders, completion dates, and/or other matters that affect the timely and satisfactory completion of the work. Propose and present for approval any changes in the plans that are necessary; indicate any effect such	Prepare	RIP/BIP Manager/Engineer USAID

No.	Task	Responsibility	Unit
	changes may have on the contract. Prepare variation orders with recommendation for approval. b. Final Review/approval and issuance to subcontractor	Approval/Action	PM-CA&A
8.2	a. Examine all proposed variation orders or claims from the subcontractor for time extensions, extra compensation, expenses, or other similar matters; prepare justifications and recommendations for variation orders. b. Final Review/approval and issuance of variation orders. c. If 5% variation for RIP, or 15% variation for BIP	Prepare Approval Approval	RIP/BIP Manager/Engineer PM –CA&A USAID
9.0	MEASUREMENT AND PREPARING BILLS AND PAYMENTS		
9.1	Conduct joint measurements of the works with the Subcontractor and record them in the stipulated format for payment and ensure timely approval and payment to the Subcontractor; certify the quality of the works accomplished and its conformity to the specifications and drawings.	Measure quantities for progress payments Approval/Payment	RIP/BIP Manager/Engineer PM-CA&A
9.2	Conduct joint measurement of the works with the Subcontractor for final payment after satisfactory completion of works as per the contract provisions; certify the quality of the works accomplished and their conformity to the specifications and drawings; accept and prepare payment for the completed works.	Measure quantities for final payment Approval/Payment	RIP/BIP Manager/Engineer PM-CA&A
9.3	Record measurements that cannot be verified subsequently.	Measure and record	RIP/BIP Manager/Engineer
9.4	Prepare necessary release order of security and payment after completion of the defect liability period as per the contract; certify fulfillment of conditions related to the defect liability period.	Prepare and verify bills Approval/Payment	RIP/BIP Manager/Engineer PM-CA&A
9.5	Verify materials and bills for supplies received under the material procurement components after due inspection and checking and payment; certify full conformity of the goods to the specifications and being in good condition.	Inspect and verify materials and bills Approval/Payment	RIP/BIP Manager/Engineer PM-CA&A
10.0	REPORTING		
10.1	Submit Monthly Subproject Progress Report.	Submission	Subcontractor
10.2	Prepare and submit Monthly and quarterly Progress Reports in the approved format to PMO that includes physical and financial progress, problems encountered and actions taken for each subproject.	Submission	RIP/BIP Engineer

No.	Task	Responsibility	Unit
10.3	Report overall physical and financial progress of work, with specific mention of problems encountered and actions taken or remedial measures recommended, variation orders approved, anticipated slippage in any item of work, rectification measures recommended, and any specific assistance required from the PMO.	Submission Comments and recommendations	RIP/BIP Engineer
10.4	Submit the contract completion report to PMO summarizing the construction activities and indicating, among other things, contract changes, claims or disputes, or any other substantive matters having an effect on the cost and progress of the works and accurate complete "As Built" drawings (to be submitted by the Subcontractor) for the completed works.	Primary	RIP/BIP Engineer
10.5	Consolidate project monthly and quarterly progress report for submission to USAID.	Submission	PMO
11.0 BUDGET			
11.1	Prepare annual work plan and forecast fund requirements for each component of the subproject.	Prepare Review	RIP/BIP Manager/Engineer PMO
12.0 FINANCE AND MAINTAINANCE OF ACCOUNTS			
12.1	Financial management control and maintenance of subproject accounts.	Primary Assist	PM-CA&A RIP/BIP Manager/Engineer
12.2	Prepare and submit claims with recommendations for each subproject to PM-CA&A.	Prepare Approval/Action	RIP/BIP Manager/Engineer PM-CA&A
12.3	Compile, prepare, and submit claims for the subproject to USAID.	Prepare Assist	PM-CA&A RIP/BIP Manager/Engineer
13.0 INTER-DEPARTMENTAL AFFAIRS			
13.1	Land acquisition where necessary.	Identification Acquisition	RIP/BIP Manager/Engineer Proponent
13.2	a. Identify power connections, road crossings, pipeline interconnections with existing systems, permission for use of forest land, etc.	Primary	RIP/BIP Engineer and Subcontractor
	b. Assure acquisition of RROW and related payments by others.	Action	RIP/BIP Manager/Engineer
13.3	a. Obtain permits from the other departments and organizing the works as required through them.	Primary Secondary	Proponent Subcontractor
	b. Assure acquisition of such	Primary	RIP/BIP Manager/Engineer

No.	Task	Responsibility	Unit
14.0	OTHER RESPONSIBILITIES		
14.1	Select appropriate commercially available software for routine activities.		RIP/BIP Manager/Engineer
14.3	Generate draft operational and maintenance procedures and budgets for new works and facilities.		RIP/BIP Manager/Engineer
14.4	Implement cost recovery measures for recovering the cost of the capital improvements or meeting the recurring O & M expenditure.	Primary Secondary	Proponent PMO
14.5	Review and assess training needs and requirements of the beneficiaries and proponents.		RIP/BIP Manager/Engineer
14.6	Develop and assure implementation and training plan to meet identified needs; is required		RIP/BIP Manager/Engineer
14.7	Prepare training manuals and modules.		RIP/BIP Manager/Engineer
14.8	Assure provision and on the job training for beneficiary and proponent staff; as required	Primary Secondary	RIP/BIP Manager/Engineer Proponent

Note: The above procedures are prepared with a view of ensuring smooth action in various activities that might have overlapping responsibilities. They are only a clarification on the responsibilities as prescribed in the respective contract documents. In case of variance, the contract documents will prevail over the stipulations above. Wherever responsibilities are for more than one unit, the order of precedence of responsibility is from top and bottom.

2.1.1 GENERAL RESPONSIBILITIES

Subcontractors are responsible for executing the works in conformance with the requirements of the contract documents. Specifically, Subcontractors are responsible for providing the following items.

- All necessary plant, labor, equipment, and construction materials to be used in the works;
- All plant, equipment, materials, and labor for temporary and auxiliary works;
- All equipment and components to be installed or incorporated in the works;
- Transportation and storage facilities for all materials and equipment.
- Office and accommodation for staff and labor;
- Sanitation facilities at the site; and
- All necessary staff and equipment for testing and quality control.

Subcontractors are responsible for executing and completing the works in accordance with the specified standards and specifications, within the contractual time allowed, and within the contract price for these works.

2.1.2 QUALITY ASSURANCE/QUALITY CONTROL DUTIES

Table 2.2 summarizes the subcontractor’s QA/QC duties. The Subcontractor shall perform other duties as stipulated in the contract documents, and as directed by the Engineer in accordance with the contract.

Table 2.2: List of Subcontractor’s QA/QC Duties

Activity/Item	Subcontractor’s QA/QC Duties
Designs for unit cost contracts	<ul style="list-style-type: none"> • Maintain design/drawing register at site • Use only approved drawings for construction
Test laboratory and equipment	<ul style="list-style-type: none"> • Provide Regional Impact Program and Barangay Infrastructure Project Engineer the details and date of completion with requisite manufacturers’ and calibration certificates • Maintain the equipment in good condition and calibrate as necessary
Materials testing	<ul style="list-style-type: none"> • Prepare mix designs as required by contract and submit test results to Regional Impact Program and Barangay Infrastructure Project Engineer • Take test samples in presence of Regional Impact Program and Barangay Infrastructure Project Engineer when requested • Perform materials tests • Submit test reports to Regional Impact Program and Barangay Infrastructure Project Engineer with monthly reports • Maintain test instruction log
Rejected materials	<ul style="list-style-type: none"> • Enter in material register at site • Inform Regional Impact Program and Barangay Infrastructure Project Engineer in writing the proposed date of removal from site and confirm after removal
Material consumption	<ul style="list-style-type: none"> • Enter daily consumption of materials in material register and indicate balance quantity
Construction equipment	<ul style="list-style-type: none"> • Provide Regional Impact Program and Barangay Infrastructure Project Engineer the details and date of mobilization along with requisite insurance certificate • Maintain equipment in good working condition

Activity/Item	Subcontractor's QA/QC Duties
Construction	<ul style="list-style-type: none"> • Inform Regional Impact Program and Barangay Infrastructure Project Engineer in writing when construction is going to commence and what activities are proposed to be undertaken. • Inform Regional Impact Program and Barangay Infrastructure Project Engineer in advance when critical works, such as concreting, embankment, paving, pipeline laying and jointing, testing, etc., would be undertaken, along with the test certificates of the materials proposed to be used in these works. No critical activity shall start unless the material test certificates are verified and approved by the Engineer. • Provide necessary QA/QC
Daily work progress	<ul style="list-style-type: none"> • Maintain in daily construction log
Testing of works in progress	<ul style="list-style-type: none"> • Perform tests as per contract requirements • Submit test reports to Regional Impact Program and Barangay Infrastructure Project Engineer • Maintain test report log
Rejected work items	<ul style="list-style-type: none"> • Inform Regional Impact Program and Barangay Infrastructure Project Engineer in writing the proposed date of removal from site and confirm after removal, or
Rectification	<ul style="list-style-type: none"> • Rectify defective work and invite Regional Impact Program and Barangay Infrastructure Project Engineer for re-inspection (if agreed by Regional Impact Program and Barangay Infrastructure Project Engineer).
Instructions from Engineer	<ul style="list-style-type: none"> • Enter site instructions, letters and minutes of meetings issued by the Engineer in the Construction Log. The PM-CA&A is authorized solely to issue variation orders.
Inspection of Engineer	<ul style="list-style-type: none"> • Take instructions noted by the Engineer in Site Order Book. • Advise Regional Impact Program and Barangay Infrastructure Project Engineer of compliance
Progress scheduling and control	<ul style="list-style-type: none"> • Prepare and maintain subproject schedules and undertake work in accordance with approved schedule
Reporting	<ul style="list-style-type: none"> • Prepare and submit Monthly Progress Reports
Records	<p>Maintain the following records on site:</p> <ul style="list-style-type: none"> • Site Order Book • Design/Drawing Register • Test Report Logbook

Activity/Item	Subcontractor's QA/QC Duties
	<ul style="list-style-type: none"> • Instruction Log (to be maintained both by Regional Impact Program and Barangay Infrastructure Project Engineer and Subcontractor) • Approved Construction Drawings • Test Reports • Checklist of Site Laboratory Equipment • Permissions Issued by Departments • Correspondence Record • Copies of Monthly Subproject Progress Reports • Any other records as specified in the Contract and/or as instructed by the Engineer

3 DESIGN CONTROL

This section outlines the final design preparation and review processes under the Regional Impact Program and Barangay Infrastructure Project and presents basic design review criteria. The Regional Impact Program and Barangay Infrastructure Project Engineer shall prepare all unit cost contracts. The Regional Impact Program and Barangay Infrastructure Project engineer will review, check, and approve the designs.

Design control requirements are outlined below. The flow, handling, and control of documents during design preparation and review are discussed in Section 10 of this Manual.

3.1 Design Preparation Process

Designs shall be prepared in accordance with the Regional Impact Program and Barangay Infrastructure Project requirements as well as applicable design standards and criteria, codes, specifications, and methodologies.

For design calculations performed by computer, the design engineer shall verify design inputs and check outputs for reasonableness and compliance to requirements. Calculations prepared by hand shall be rechecked. The design engineer shall check the prepared designs and documents for completeness, correctness, and legibility.

Design documents and calculations shall be reviewed by a senior engineer to ensure that the design method is acceptable and in accordance with the contractual design criteria, codes, and standards, and that the inputs are correct and the outputs reasonable.

Drawings will generally be prepared by Computer Aided Design (CAD) methods. As with design calculations, the designer shall check drawings for completeness, correctness, legibility, and conformance to the design calculations, design standards, codes, and specifications. A senior engineer shall then review drawings.

A common discussion with the senior Regional Impact Program and Barangay Infrastructure Project engineer shall be held. The comments of the Regional Impact Program and Barangay Infrastructure Project engineer shall be incorporated.

Design documents, calculations, and drawings shall be signed and dated by the CAD engineer (if applicable), the design engineer, and the reviewing Regional Impact Program and Barangay Infrastructure Project engineer.

3.2 Design Review Process

A Regional Impact Program and Barangay Infrastructure Project design reviewer shall examine the design documents. If he has comments, he shall prepare comment sheets and mark up a copy of the documents. If designs need to be reviewed by more than one person or agency, the primary reviewer shall consider the comments of other reviewers, discuss them as needed, and incorporate them into the marked up copy of the document.

Each design document and drawing shall be reviewed for compliance with contract requirements, specifications, applicable standards, codes, and other necessary criteria. If the reviewer questions the accuracy of calculations or dimensions established by the designer, he shall ask the designer to verify them but shall not change them himself. The Regional Impact Program and Barangay Infrastructure Project engineer will certify the design for approval after for checking the design.

3.3 Design Review Checklist

A basic design review checklist is as follows.

- Check document revision number and revision dates (if applicable).
- Check that the designer and reviewer have signed the document.
- Verify the list of reference drawings and sources of special information and refer to the listed documents when necessary.
- Check the general notes for clarity and completeness.
- Review contract plans, specifications, addenda, and all approved variation orders, and check that documents comply with them.
- Check the accuracy and completeness of a representative set of calculations.
- Consider the aspect of constructability.
- Annotate the drawings, specifications, addenda, or other documents as appropriate.
- Return the documents to the Regional Impact Program and Barangay Infrastructure Project engineer for additional comments before returning the design to the PMO.

Specific items to be checked depend on the type of facility being designed.

4 CONSTRUCTION QUALITY CONTROL – GENERAL

This section provides an overview of construction quality control activities that include testing and site inspection. Minimum testing requirements in each item of works are presented in detail in Section 5.

4.1 Introduction

Construction quality control (CQC) is intended to provide a comprehensive, common, and consistent framework for quality control across various contract packages

4.2 Testing

Various site tests on materials and works are required to be carried out by the Subcontractor during construction. A well-equipped and properly operating site test laboratory is an important element of the quality assurance plan. Table 4.1 presents a checklist showing typical testing equipment the Subcontractor should provide at his site laboratory.

The Subcontractor shall set up the site laboratory at the start of his subproject and inform the Regional Impact Program and Barangay Infrastructure Project Engineer when conducting inspections. Laboratory equipment shall be properly calibrated and calibration certificates should be kept at the laboratory for Engineer's review as necessary. Specialized tests at outside laboratories shall only be undertaken with the Regional Impact Program and Barangay Infrastructure Project Engineer's prior approval.

Tests should be performed in accordance with the contract documents, as described in Sections 5 through 8 of this Manual. The control of test reports shall be done as stipulated in Section 10 of this Manual. All test samples should be preserved with proper identification numbers, test log reference, test date, and other applicable information. The Subcontractor must store these samples on site.

The Subcontractor is responsible to inform the Regional Impact Program and Barangay Infrastructure Project Engineer with sufficient notice time so they can witness all tests.

In addition to tests performed on site, the Subcontractor is responsible for specialized tests conducted at approved laboratories as well as for factory inspections and tests performed by manufacturers or third parties during the manufacturing of various materials and equipment components, as stipulated in the contract documents.

4.3 Site Inspections

Site inspections shall be carried out to ensure that the materials and construction activities conform to the prescribed standards. Site inspections can be divided into day-to-day supervision and periodic quality inspection. The procedures for these two types of inspections are described below.

4.3.1 DAY-TO-DAY SUPERVISION

The Regional Impact Program and Barangay Infrastructure Project Engineer shall carry out day-to-day site supervision of all construction activities. This includes checking of lines, levels, and layouts and on-site checks. The Regional Impact Program and Barangay Infrastructure Project Engineer shall also carry out progress monitoring and expediting. The Regional Impact Program and Barangay Infrastructure Project Engineer shall ensure that rejected materials or those without a conformance report are not used in works.

Construction equipment is a major component of the quality assurance system. The contract documents specify the equipment requirements. The Regional Impact Program and Barangay Infrastructure Project Engineer must check the adequacy of the equipment that the Subcontractor will use for construction to ensure that it meets the prescribed standards and specifications. The equipment used for construction shall be recorded in the daily logs.

4.3.2 PERIODIC QUALITY INSPECTIONS

The Regional Impact Program and Barangay Infrastructure Project engineers shall conduct periodic quality inspections while work is in process, stage completion, interfacing, and completion as well as during all critical activities as per the following examples:

- excavation
- forming embankments
- placing reinforcing steel
- concrete batching and pouring (100% in presence of QA/QC Engineer)
- hot mix operation
- laying of pavement layers
- laying and jointing of pipes
- installing electrical and mechanical equipment
- testing, trial runs, and commissioning of electro-mechanical equipment and plant.

The Regional Impact Program and Barangay Infrastructure Project Engineer shall also inspect the materials certified by manufacturers and materials and equipment components approved by third parties upon delivery to the site. The Subcontractor shall give advance notice to the Regional Impact Program and Barangay Infrastructure Project Engineer when critical activities are proposed or major equipment items are to be delivered.

Upon completion of one stage of the construction and before proceeding to the next stage (such as from sub-base to base in road works or from steel binding to concreting for RCC works) the Regional Impact Program and Barangay Infrastructure Project Engineer shall inspect and certify the quality of the works completed before authorizing the next stage of the works to start. The final inspection shall encompass tests on completion and trial runs. The certification of quality will be based on the documents and the periodic site visits.

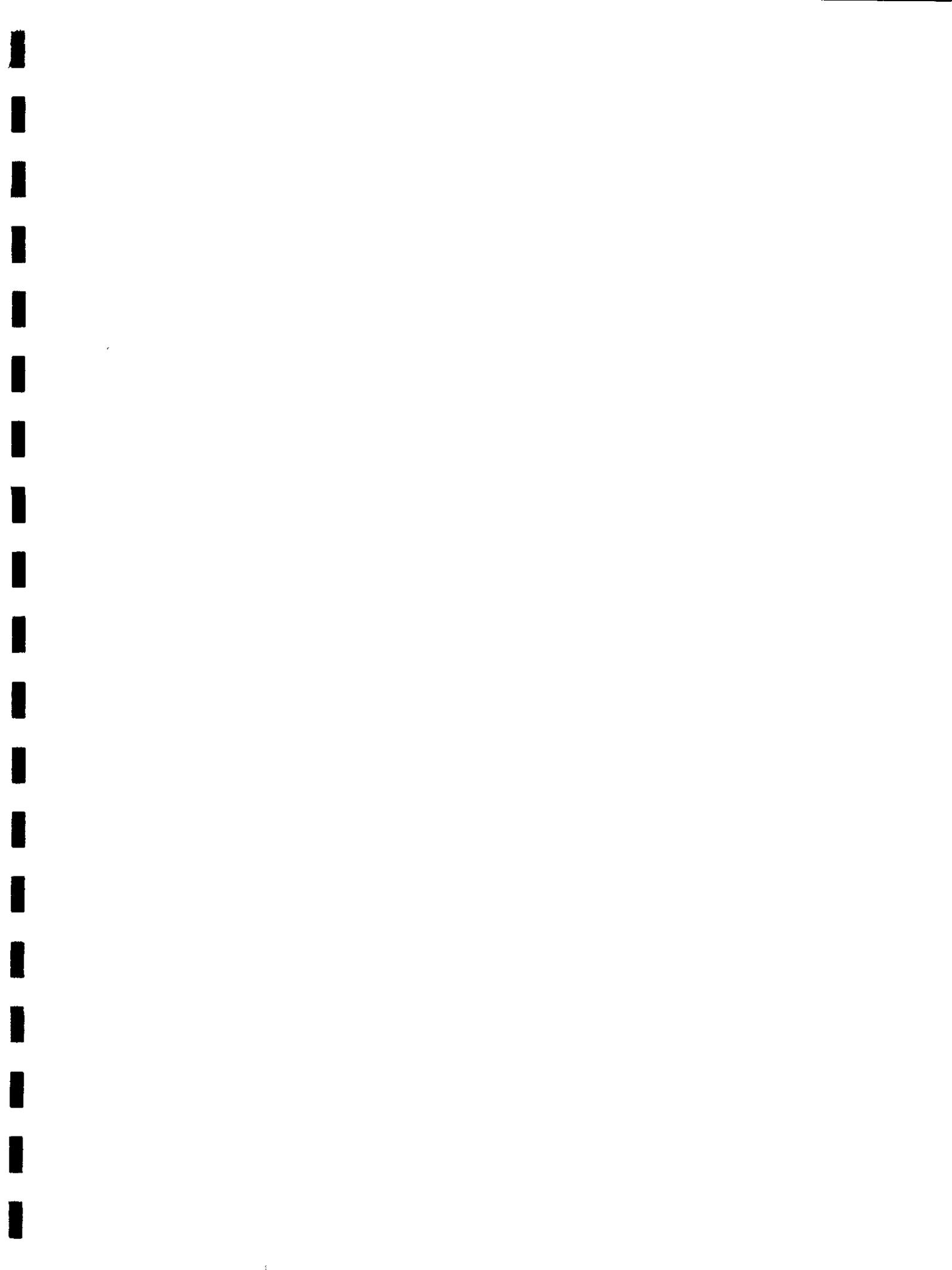
4.3.3 SQUAD CHECKS

The concept of squad checks has been adopted to have an external review of quality of works executed. The squad checks should be conducted by the Regional Impact Program and Barangay Infrastructure Project engineer. A fixed timetable is not suggested for this. The tentative agenda for the squad checks is described below.

- Physical inspection of the works under execution and inspection of quality of workmanship;
- Review of site documentation and subcontractor compliance;
- Sample verification of test reports and quality certificates;
- Review of issues, constraints and other topics in quality system implementation;
- Preparing of action plans for improving the quality; and
- Performance appraisal of the subcontractors.

4.4 Quality Certification and Acceptance

The Regional Impact Program and Barangay Infrastructure Project Engineer shall certify that the items included in the Subcontractor's Monthly Progress Billing satisfy the required quality of works and are acceptable with regard to the specifications and standards prescribed under the contract before the progress bill is passed for payment. The PM should signify acceptance of the Regional Impact Program's and Barangay Infrastructure Project's quality certification by countersigning it. A format for this quality certification and acceptance is included in Appendix C, as RIP-BF-11.



5 REQUIREMENTS FOR MATERIALS QUALITY CONTROL

This section provides an overview of the Minimum Testing Requirements (General) which includes the item of works, description, frequency of test; type and the number of test required, test report formats and the timing of test/inspection.

The subcontractor shall submit the Quality Control program of the subcontract project to the Regional Impact Program and Barangay Infrastructure Project Engineer for review and approval. All necessary testing listed in the quality control program must be done unless otherwise revised. A revision of quality control program must be check, review and approve by the Regional Impact Program and Barangay Infrastructure Project Engineer.

5.1 General

Control and approval of construction materials and equipment components to be incorporated in the works shall be based on the following items.

1. Test reports for materials tested at site, such as soil and concrete aggregates. The Subcontractor will perform all tests. The Regional Impact Program and Barangay Infrastructure Project Engineer shall witness all the Laboratory and field testing. The Regional Impact Program and Barangay Infrastructure Project Engineer shall sign the report in token of witnessing.
2. Material sources/quarries for soil and soil aggregates, size stone, lime, soil, shall be obtain from identified and approved sources with appropriate quarrying or extraction permits from concern government agencies such as the DPWH and DENR.

5.2 Materials Tested on Site

The materials to be tested on site include water, concrete hollow blocks, concrete cylinder/beam samples, soil and concrete aggregates and bituminous materials for road works, etc;,. For soil and concrete aggregates, the Subcontractor shall obtain the approval of the borrow source or quarry from the Regional Impact Program and Barangay Infrastructure Project Engineer before extracting material. Test report formats are included in Appendix B. The reports shall be maintained in a bound register, where in three copies of report will be prepared. The Subcontractor shall submit two copies with its monthly report to Regional Impact Program and Barangay Infrastructure Project Engineer and retain the third copy.

5.3 Minimum Testing Requirements

Appendix A refers to the minimum testing requirement which includes all items of works and its corresponding description as per revised technical specification. All necessary tests, type of tests, frequency or the minimum number of tests to be conducted to the corresponding items of works, timing of test and the proper time of inspection including the test report formats are listed in this Appendix.

6 CONTROL OF GENERAL CIVIL AND STRUCTURAL WORKS

This section of the QA/QC Manual covers the testing of works and the inspection of workmanship for general civil and structural works. The key elements to be inspected in these works are concreting, stone masonry, hollow block work, and finishes. The requirements for testing and control of materials for these works are described in Section 5.

6.1 Construction Sequence and Control Flow Charts

Flow charts indicating the construction sequence and control points for cement concrete and mortar works are shown in Figures 6.1 to 6.3, respectively.

6.2 Testing of Works

The works to be tested on site include excavation, cement concreting, stone and hollow block masonry. All the materials proposed to be used in these works must have been tested by the Subcontractor and approved by the Regional Impact Program and Barangay Infrastructure Project Engineer well in advance of these works. The Subcontractor shall submit the concrete pouring report to the Regional Impact Program and Barangay Infrastructure Project Engineer as and when concreting is done, and shall obtain the approval of the Regional Impact Program and Barangay Infrastructure Project Engineer when a particular stage is completed and before proceeding to the next stage.

6.3 Inspection Checklists

Inspection checklists for concreting, stone masonry work and finishes, and building services and finishes are presented in Appendix B.

7 CONTROL OF ROAD WORKS

This section of the QA/QC Manual covers the testing of works and the inspection of workmanship for road works, including earthworks, placement of sub-base, base coarse, and WBM layers, application of prime and tack coats, and placement of bituminous layers. The requirements for testing and control of materials for road works are described in Section 5 (General).

7.1 Construction Sequence and Control Flow Charts

Flow charts indicating the construction sequence and control points for road works are shown in Figures 7.1 to 7.5.

7.2 Testing of Works

The works to be tested on site include earthworks, placement of granular sub-base, base coarse, and WBM layers, application of prime and tack coats, and placement of bituminous layers. All the materials proposed to be used in these works must have been tested by the subcontractor and approved by the Regional Impact Program and Barangay Infrastructure Project Engineer well in advance of the works. The Subcontractor shall obtain the approval of the Regional Impact Program and Barangay Infrastructure Project Engineer when a particular stage is completed and before proceeding to the next stage. Surface regularity and alignments shall be checked by leveling instrument.

Hot mix designs shall be submitted by the Subcontractor to the Regional Impact Program and Barangay Infrastructure Project Engineer for review and approval well before the planned start of hot mix operations. The hot mix plant shall be inspected and approved by the Regional Impact Program and Barangay Infrastructure Project Engineer before commencing operations. Temperature tests on bitumen shall be carried out at the hot mix plant before delivery to the site, and immediately before placing and after compaction. Temperature tests shall be carried out by using metal contact digital thermocouple based temperature-measuring device. The Subcontractor shall provide such devices as part of his site laboratory, and in sufficient quantity so that all required testing can be carried out as and when required. The Subcontractor shall take the temperature readings in the presence of the Regional Impact Program and Barangay Infrastructure Project Engineer and shall submit his test reports daily.

CHECKLIST OF MINIMUM TESTING EQUIPMENTS				
Item No	Description	Quantity	REMARKS	
			Yes	No
	Sieve, Standard 200mm diameter opening			
1	75 mm (3")	1 pc		
2	63 mm (2 1/2")	1 pc		
3	50 mm (2")	1 pc		
4	37.50 mm (1 1/2")	1 pc		
5	25 mm (1")	1 pc		
6	19 mm (3/4")	1 pc		
7	12.50 mm (1/2")	1 pc		
8	9.50 mm (3/8")	1 pc		
9	4.75 mm (No.4)	1 pc		
10	2.36 mm (No.8)	1 pc		
11	2.00 mm (No.10)	1 pc		
12	1.18 mm (No.16)	1 pc		
13	0.600 mm (No30)	1 pc		
14	0.425 mm (No.40)	1 pc		
15	0.300 mm (No.50)	1 pc		
16	0.150 mm (No.100)	1 pc		
17	0.075 mm (No.200)	1 pc		
18	Pan, brass, 200 m dia x 50 mm deep	1 pc		
19	Cover, brass, sieve	1 pc		
20	Brush, fine sieve	1 pc		
21	Brush wire sieve	1 pc		
22	Mortas and Pestle	1 pc		
23	Liquid Limt Test Set, consisting of:	1-set		
	Liquid limit device	1 pc		

	Mixing dish	1 pc		
	Spatula	1 pc		
	Graduated Cylinder, glass, 100 ml	1 pc		
	Moisture Content can, 60ml tin	12 pcs.		
24	Glass Plate, Plastic Limit	1 pc		
25	Rammer, Modified Compaction	1 pc		
26	Mold, Compaction, 152.40 mm diameter x 116.40 mm height	1 pc		
27	Moisture content can, 225 ml tin	12 pcs.		
28	Field Density Test Set, Consisting of	1-set		
	Sand Density Cone	1 pc		
	Jug, Glass or Plastic, 4L Capacity	1 pc		
	Density Plate	1 pc		
	Straight Edge	1 pc		
	Spoon	1 pc		
	25mm chisel, Steel	1 pc		
	4-L Field can	1 pc		
	Mallet, rubber	1 pc		
	Scoop	1 pc		
		1 pc		
		1 pc		
29	Balance Triple Beam, 311grams capacity., 0.01g sensitivity	1 pc		
30	Balance Triple Beam, 2610grams capacity., 0.1g sensitivity	1 pc		
31	Balance Triple Beam, 20 Kgs capacity., 1.0g sensitivity	1 pc		
32	Auger, Post Hole, with 2m extension	1 pc		
33	Cylinder glass, double graduated, 500 ml cap	1 pc		
34	Bowl, mixing, 250 mm diameter x 90 mm high	6 pcs		
35	Pan Square, G.I. 600 mm x 75 mm	1 pc		

36	Spade or shovel	1 pc		
37	Pickaxe	1 pc		
38	Crowbar	1 pc		
39	Concrete Measure 0.014 cu.m. capacity (1/2 cu.m. ft.)	1 pc		
40	Oven, field, with temperature control	1-unit		
41	Straight Edge, 300mm long	1 pc		
42	Slump Cone, complete with base, taping rod and trowel, triangle or rectangular blade, 90 x 180 mm	1-set		
43	Thermometer, metal, dial type, 0-250 degree centigrade	1 pc		
44	Concrete mixer, Portable	1-unit		
45	Wire Mesh Baket (#4 wire mesh)	1 pc		
46	Volumetric flask (500 ml capacity with cover)	1 pc		
47	CBR apparatus complete with accessories	1-set		
48	Los Angeles Abrasion Machine complete with abrasive Steel	1-set		
49	Concrete core drilling machine with accessories	1-set		
50	sample splitter	1 pc		
51	Mold, steel, steel cylinder (150 mm x 300 mm)	12 pcs.		
52	Mold, steel, beam 6" x 6" x 21"	12 pcs.		
53	Compression machine, portable	1-unit		
54	Concrete Beam tester, flexural machine	1-unit		
55	Vertical Capping Set, consisting of;	1-set		
	Vertical cylinder capper with capping plate, 150 mm dia.	1 pc		
	Capping compound warmer pot 4-L capacity	1 pc		
	Capping Ladle	1 pc		
	Cartoon capping compound	1-pack		
56	Extractor, Centrifuge or reflux, 1500g capacity	1-unit		
57	Marshall Stability Apparatus complete with accssories	1-set		

In addition to tests performed on site, the Subcontractor is responsible for specialized tests conducted at approved laboratories as well as for factory inspections and tests performed by manufacturers or third parties during the manufacturing of various materials and equipment components, as stipulated in the contract documents.

4.3 Site Inspections

Site inspections shall be carried out to ensure that the materials and construction activities conform to the prescribed standards. Site inspections can be divided into day-to-day supervision and periodic quality inspection. The procedures for these two types of inspections are described below.

4.3.1 DAY-TO-DAY SUPERVISION

The Regional Impact Program and Barangay Infrastructure Project Engineer shall carry out day-to-day site supervision of all construction activities. This includes checking of lines, levels, and layouts and on-site checks. The Regional Impact Program and Barangay Infrastructure Project Engineer shall also carry out progress monitoring and expediting. The Regional Impact Program and Barangay Infrastructure Project Engineer shall ensure that rejected materials or those without a conformance report are not used in works.

Construction equipment is a major component of the quality assurance system. The contract documents specify the equipment requirements. The Regional Impact Program and Barangay Infrastructure Project Engineer must check the adequacy of the equipment that the Subcontractor will use for construction to ensure that it meets the prescribed standards and specifications. The equipment used for construction shall be recorded in the daily logs.

4.3.2 PERIODIC QUALITY INSPECTIONS

The Regional Impact Program and Barangay Infrastructure Project engineers shall conduct periodic quality inspections while work is in process, stage completion, interfacing, and completion as well as during all critical activities as per the following examples:

- excavation
- forming embankments
- placing reinforcing steel
- concrete batching and pouring (100% in presence of QA/QC Engineer)
- hot mix operation
- laying of pavement layers
- laying and jointing of pipes
- installing electrical and mechanical equipment
- testing, trial runs, and commissioning of electro-mechanical equipment and plant.

The Regional Impact Program and Barangay Infrastructure Project Engineer shall also inspect the materials certified by manufacturers and materials and equipment components approved by third parties upon delivery to the site. The Subcontractor shall give advance notice to the Regional Impact Program and Barangay Infrastructure Project Engineer when critical activities are proposed or major equipment items are to be delivered.

Upon completion of one stage of the construction and before proceeding to the next stage (such as from sub-base to base in road works or from steel binding to concreting for RCC works) the Regional Impact Program and Barangay Infrastructure Project Engineer shall inspect and certify the quality of the works completed before authorizing the next stage of the works to start. The final inspection shall encompass tests on completion and trial runs. The certification of quality will be based on the documents and the periodic site visits.

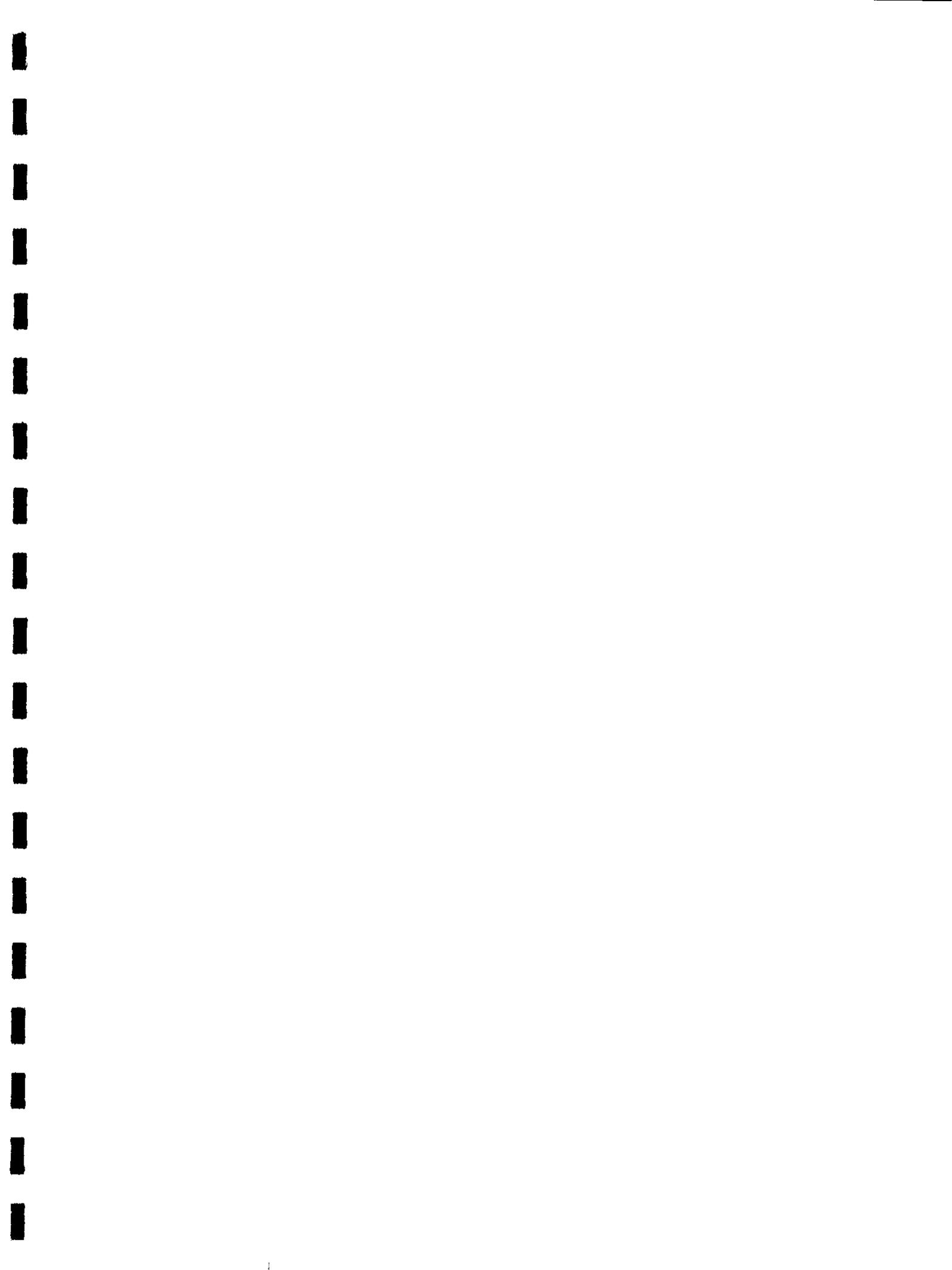
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The concept of squad checks has been adopted to have an external review of quality of works executed. The squad checks should be conducted by the Regional Impact Program and Barangay Infrastructure Project engineer. A fixed timetable is not suggested for this. The tentative agenda for the squad checks is described below.

- Physical inspection of the works under execution and inspection of quality of workmanship;
- Review of site documentation and subcontractor compliance;
- Sample verification of test reports and quality certificates;
- Review of issues, constraints and other topics in quality system implementation;
- Preparing of action plans for improving the quality; and
- Performance appraisal of the subcontractors.

4.4 Quality Certification and Acceptance

The Regional Impact Program and Barangay Infrastructure Project Engineer shall certify that the items included in the Subcontractor's Monthly Progress Billing satisfy the required quality of works and are acceptable with regard to the specifications and standards prescribed under the contract before the progress bill is passed for payment. The PM should signify acceptance of the Regional Impact Program's and Barangay Infrastructure Project's quality certification by countersigning it. A format for this quality certification and acceptance is included in Appendix C, as RIP-BF-11.



5 REQUIREMENTS FOR MATERIALS QUALITY CONTROL

This section provides an overview of the Minimum Testing Requirements (General) which includes the item of works, description, frequency of test; type and the number of test required, test report formats and the timing of test/inspection.

The subcontractor shall submit the Quality Control program of the subcontract project to the Regional Impact Program and Barangay Infrastructure Project Engineer for review and approval. All necessary testing listed in the quality control program must be done unless otherwise revised. A revision of quality control program must be check, review and approve by the Regional Impact Program and Barangay Infrastructure Project Engineer.

5.1 General

Control and approval of construction materials and equipment components to be incorporated in the works shall be based on the following items.

1. Test reports for materials tested at site, such as soil and concrete aggregates. The Subcontractor will perform all tests. The Regional Impact Program and Barangay Infrastructure Project Engineer shall witness all the Laboratory and field testing. The Regional Impact Program and Barangay Infrastructure Project Engineer shall sign the report in token of witnessing.
2. Material sources/quarries for soil and soil aggregates, size stone, lime, soil, shall be obtain from identified and approved sources with appropriate quarrying or extraction permits from concern government agencies such as the DPWH and DENR.

5.2 Materials Tested on Site

The materials to be tested on site include water, concrete hollow blocks, concrete cylinder/beam samples, soil and concrete aggregates and bituminous materials for road works, etc;., For soil and concrete aggregates, the Subcontractor shall obtain the approval of the borrow source or quarry from the Regional Impact Program and Barangay Infrastructure Project Engineer before extracting material. Test report formats are included in Appendix B. The reports shall be maintained in a bound register, where in three copies of report will be prepared. The Subcontractor shall submit two copies with its monthly report to Regional Impact Program and Barangay Infrastructure Project Engineer and retain the third copy.

5.3 Minimum Testing Requirements

Appendix A refers to the minimum testing requirement which includes all items of works and its corresponding description as per revised technical specification. All necessary tests, type of tests, frequency or the minimum number of tests to be conducted to the corresponding items of works, timing of test and the proper time of inspection including the test report formats are listed in this Appendix.

6 CONTROL OF GENERAL CIVIL AND STRUCTURAL WORKS

This section of the QA/QC Manual covers the testing of works and the inspection of workmanship for general civil and structural works. The key elements to be inspected in these works are concreting, stone masonry, hollow block work, and finishes. The requirements for testing and control of materials for these works are described in Section 5.

6.1 Construction Sequence and Control Flow Charts

Flow charts indicating the construction sequence and control points for cement concrete and mortar works are shown in Figures 6.1 to 6.3, respectively.

6.2 Testing of Works

The works to be tested on site include excavation, cement concreting, stone and hollow block masonry. All the materials proposed to be used in these works must have been tested by the Subcontractor and approved by the Regional Impact Program and Barangay Infrastructure Project Engineer well in advance of these works. The Subcontractor shall submit the concrete pouring report to the Regional Impact Program and Barangay Infrastructure Project Engineer as and when concreting is done, and shall obtain the approval of the Regional Impact Program and Barangay Infrastructure Project Engineer when a particular stage is completed and before proceeding to the next stage.

6.3 Inspection Checklists

Inspection checklists for concreting, stone masonry work and finishes, and building services and finishes are presented in Appendix B.

Figure 6.1 PROCESS CHART FOR CONCRETE MIX DESIGN

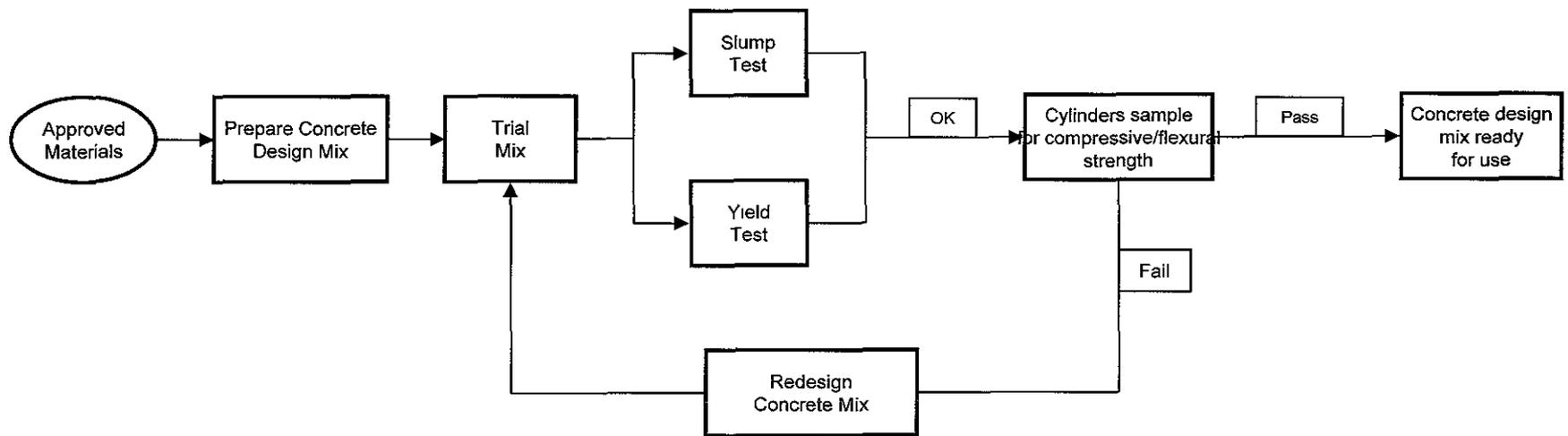
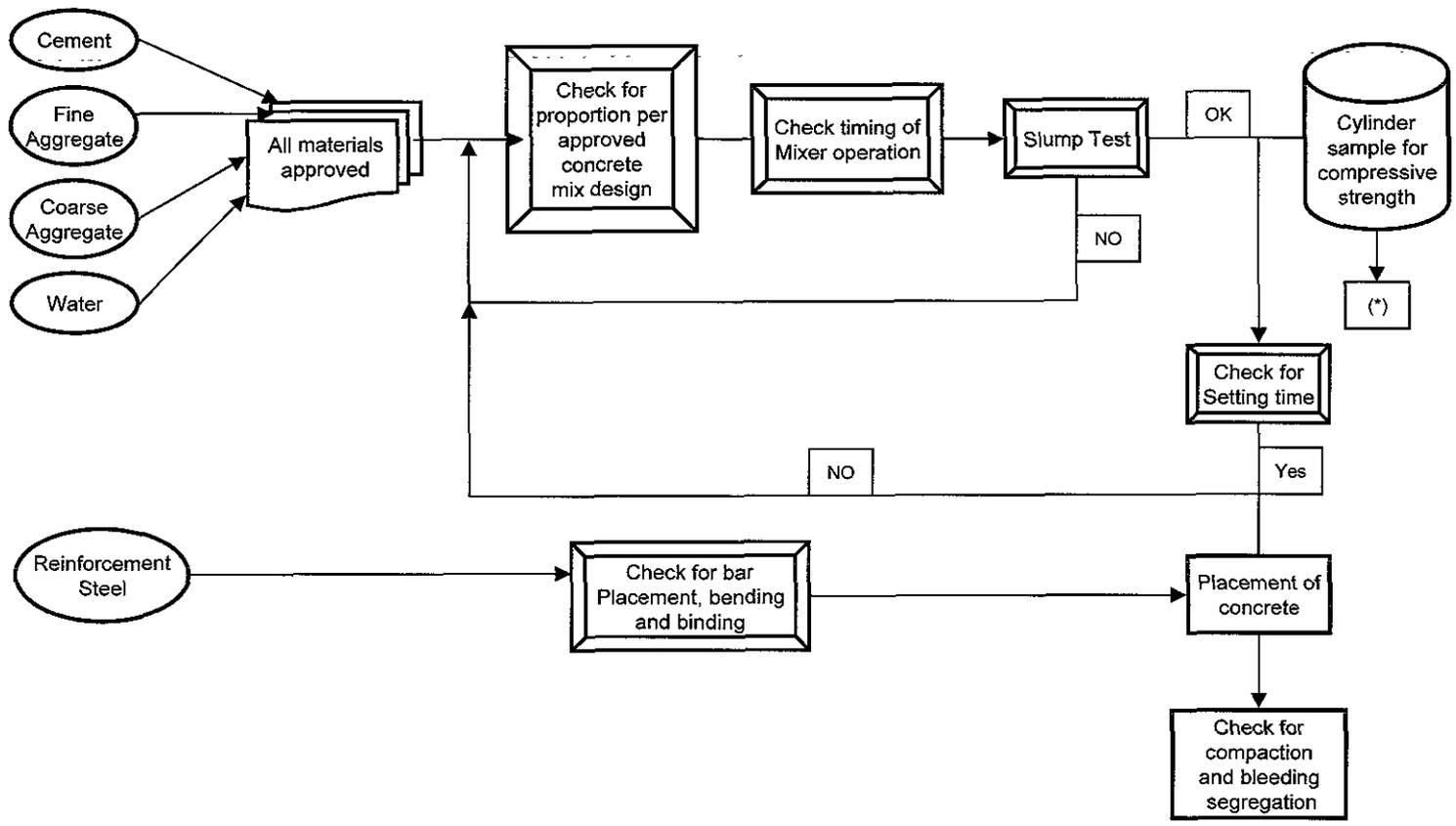
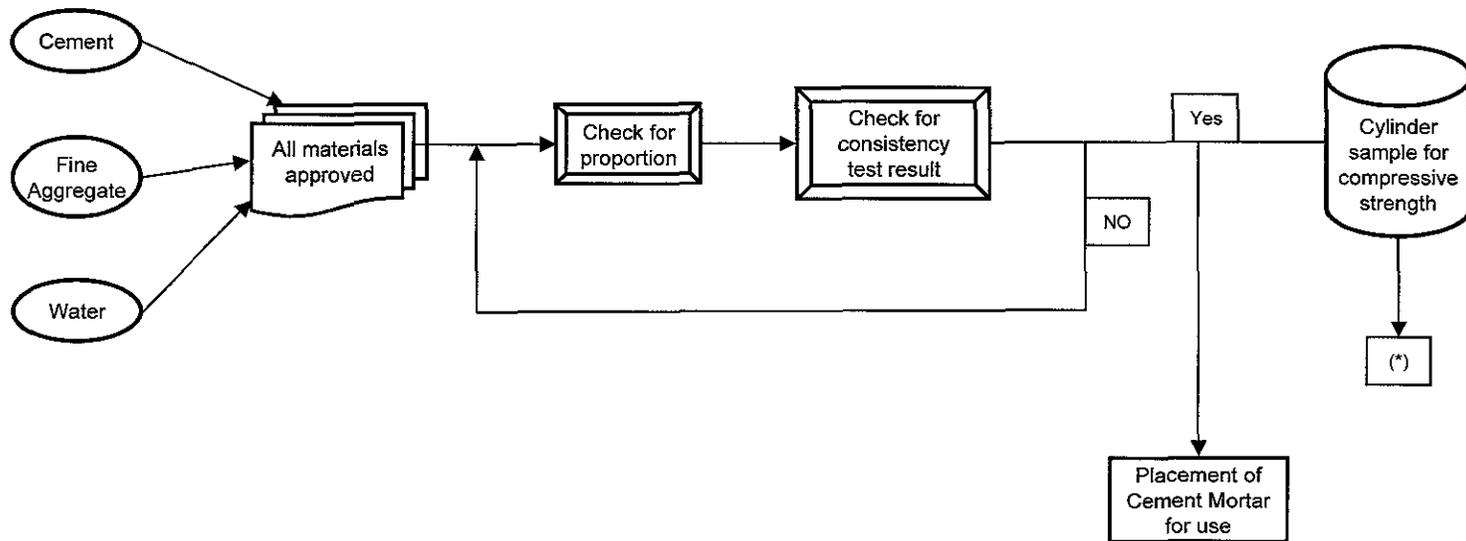


Figure 6.2 PROCESS CHART FOR PLAIN CEMENT CONCRETING/RCC WITH STAGES OF INSPECTION



Note (*) If test results are not satisfactory, corrective actions shall be taken as directed by the engineer

Figure 6.3 PROCESS CHART FOR CEMENT MORTAR WITH STAGES OF INSPECTION



Note (*): If test results are not satisfactory, corrective actions shall be taken as directed by the engineer

7 CONTROL OF ROAD WORKS

This section of the QA/QC Manual covers the testing of works and the inspection of workmanship for road works, including earthworks, placement of sub-base, base coarse, and WBM layers, application of prime and tack coats, and placement of bituminous layers. The requirements for testing and control of materials for road works are described in Section 5 (General).

7.1 Construction Sequence and Control Flow Charts

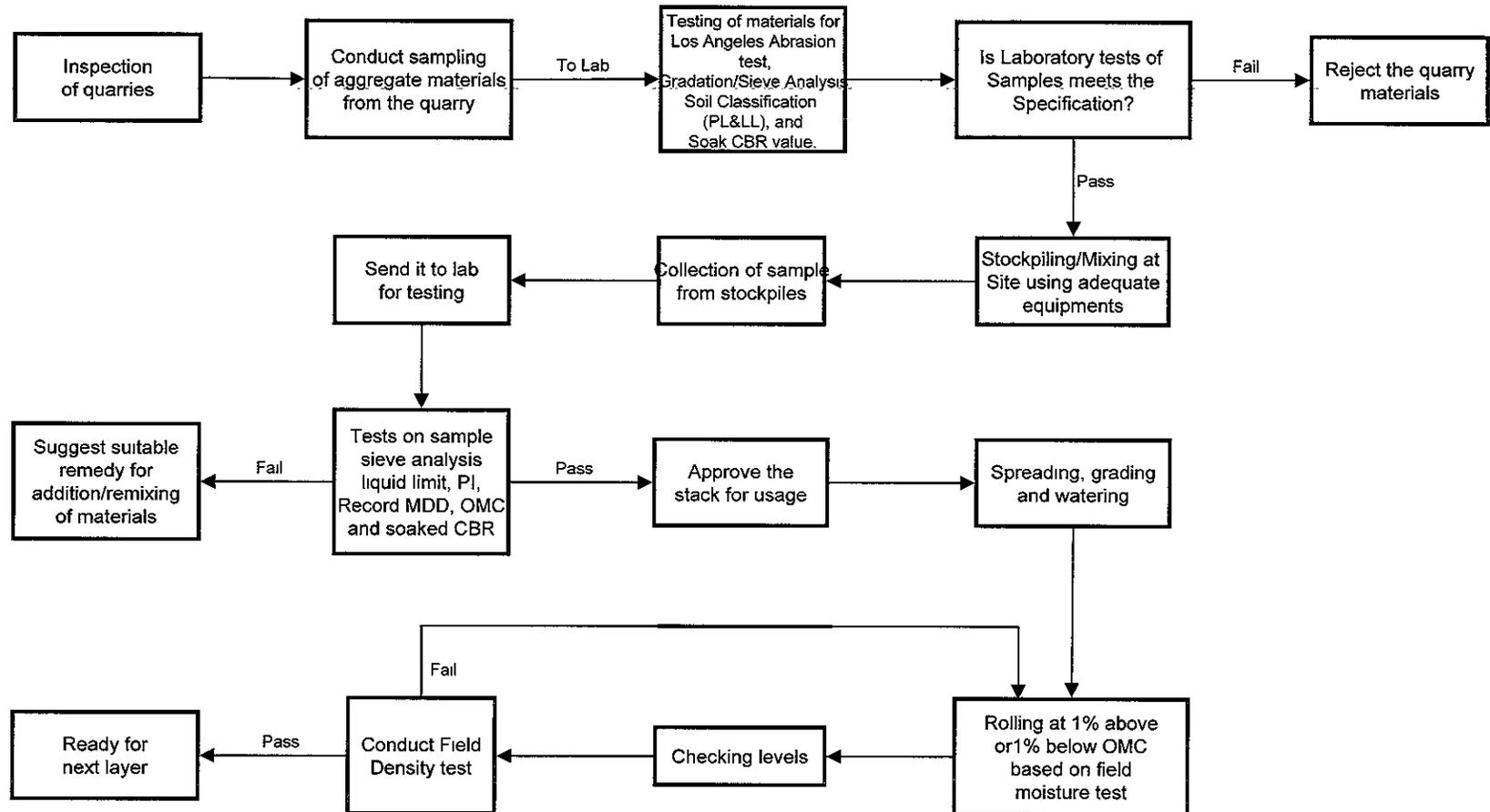
Flow charts indicating the construction sequence and control points for road works are shown in Figures 7.1 to 7.5.

7.2 Testing of Works

The works to be tested on site include earthworks, placement of granular sub-base, base coarse, and WBM layers, application of prime and tack coats, and placement of bituminous layers. All the materials proposed to be used in these works must have been tested by the subcontractor and approved by the Regional Impact Program and Barangay Infrastructure Project Engineer well in advance of the works. The Subcontractor shall obtain the approval of the Regional Impact Program and Barangay Infrastructure Project Engineer when a particular stage is completed and before proceeding to the next stage. Surface regularity and alignments shall be checked by leveling instrument.

Hot mix designs shall be submitted by the Subcontractor to the Regional Impact Program and Barangay Infrastructure Project Engineer for review and approval well before the planned start of hot mix operations. The hot mix plant shall be inspected and approved by the Regional Impact Program and Barangay Infrastructure Project Engineer before commencing operations. Temperature tests on bitumen shall be carried out at the hot mix plant before delivery to the site, and immediately before placing and after compaction. Temperature tests shall be carried out by using metal contact digital thermocouple based temperature-measuring device. The Subcontractor shall provide such devices as part of his site laboratory, and in sufficient quantity so that all required testing can be carried out as and when required. The Subcontractor shall take the temperature readings in the presence of the Regional Impact Program and Barangay Infrastructure Project Engineer and shall submit his test reports daily.

Figure 7.2 FLOW CHART FOR THE CONSTRUCTION OF GRANULAR SUBBASE AND BASE COARSE



Note: MDD = Maximum Dry Density (Modified Proctor)

Figure 7.3 FLOW CHART FOR THE CONSTRUCTION OF WBM LAYERS

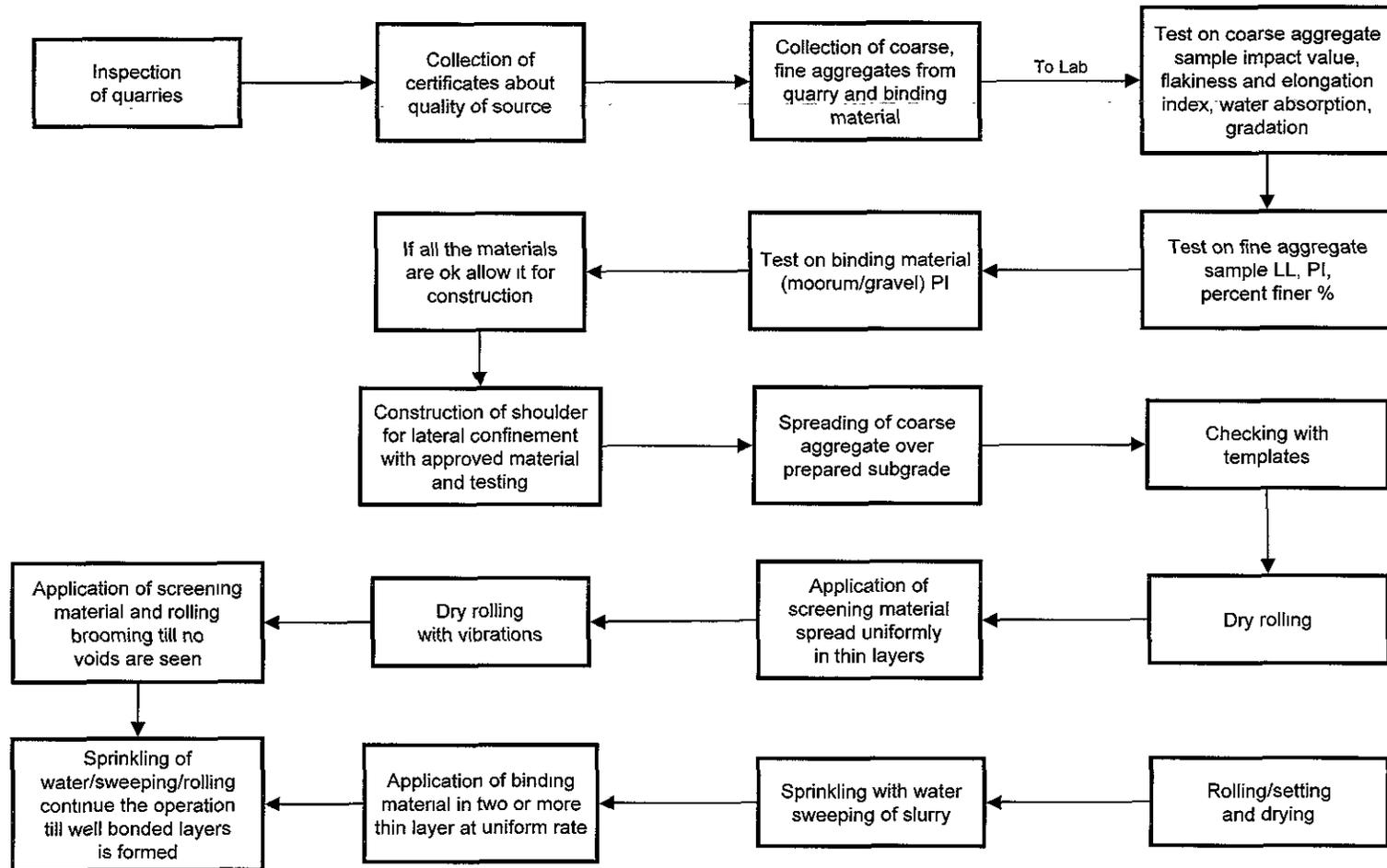
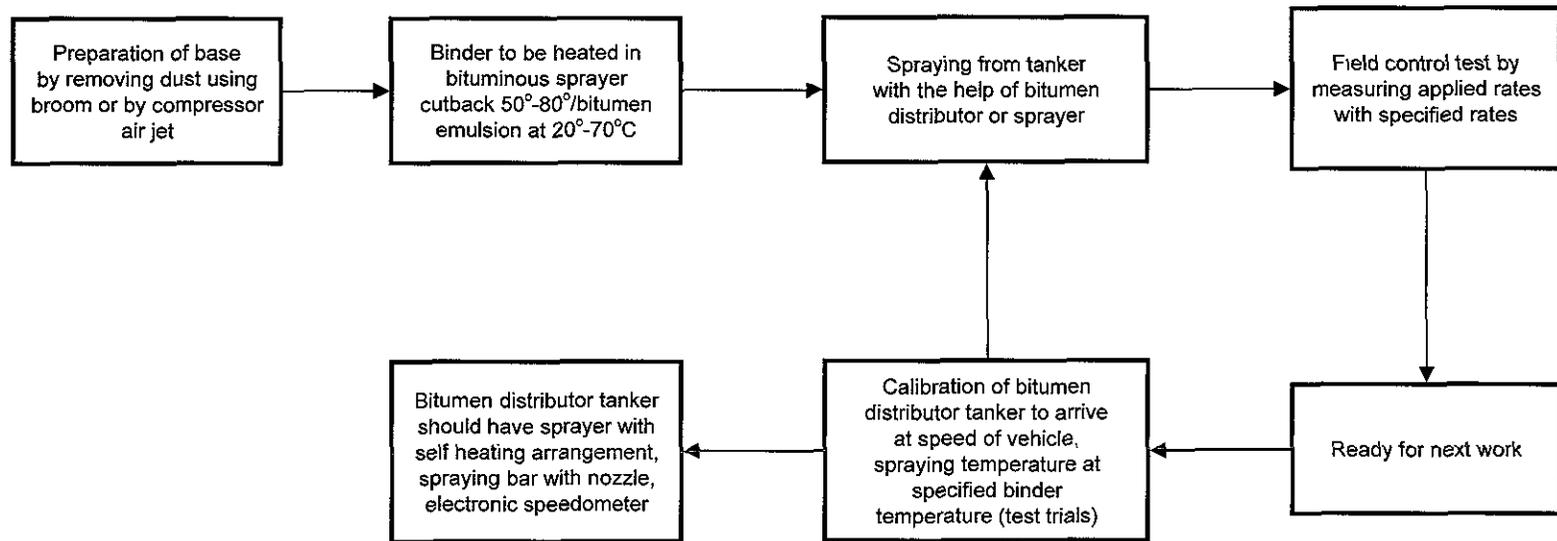
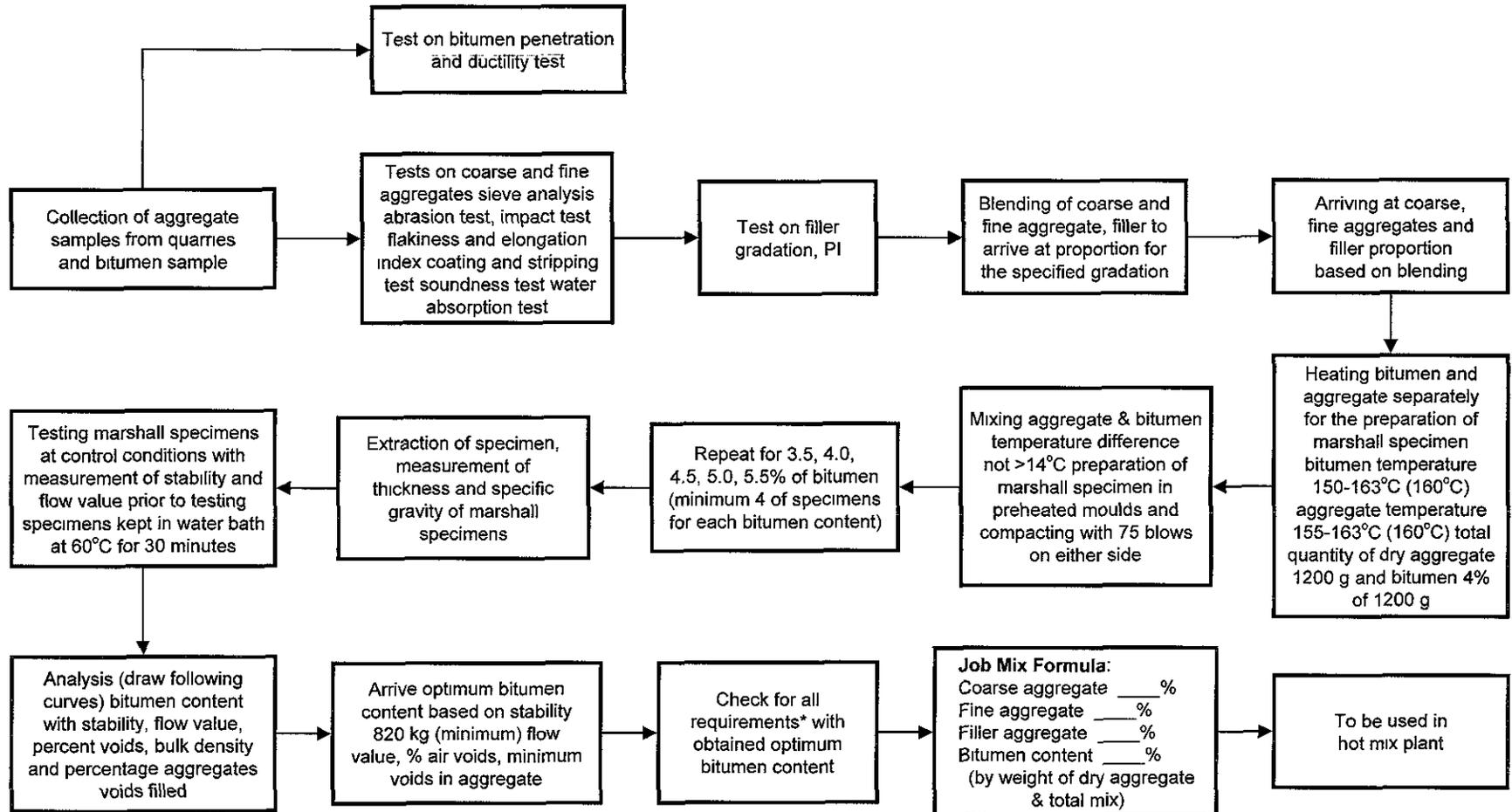


Figure 7.4 FLOW CHART FOR APPLICATION OF PRIMER/TACK COAT



FLOW CHART FOR BITUMINOUS MIX DESIGN (DBM)



7.3 Guidelines for Pavement Layers

Guidelines for applying the prime and tack coats are given in Table 7.3. Note that these guidelines are provided for easy reference. The standards and specifications stipulated in the contract shall prevail.

Table 7.3 Guidelines for Prime/Tack Coat Application

Particulars	Standard Specified Rate (kg/m ²)
Granular surface treated with primer	0.25 - 0.30
Granular base not primed	0.35 - 0.40
Normal bituminous surfaces	0.20 - 0.25

7.4 Tolerances

Requirements for surface regularity and tolerances are given below. Note that these requirements are for easy reference. The standard and special technical specifications as per the contract shall prevail.

7.4.1 HORIZONTAL ALIGNMENT TOLERANCES

The horizontal alignment with respect to the centerline of the carriageway shall have a tolerance of ± 10 mm at the edges of roadway and of ± 25 mm for the lower layers.

7.4.2 SURFACE LEVELS TOLERANCES

Surface level tolerances are shown in Table 7.4.

Table 7.4: Surface Level Tolerances

Type of Surface	Tolerance in Level Compared with Longitudinal and Cross Profile
Subgrade	+20 mm/-25 mm
Subbase	+10 mm/-20 mm
Base Course: (a) Machine laid	± 10 mm
(b) Manually laid	± 15 mm
Wearing Course: (a) Machine laid	± 6 mm
(b) Manually laid	± 10 mm
Cement concrete pavement	+5 mm -6 mm*

* This may not exceed -8 mm at 0-30 cm from the edges.

7.4.3 SURFACE REGULARITY OF PAVEMENT COURSES

The maximum allowable difference between the road surface and a straight line parallel with or at right angles to the centerline of the road at points shall be:

- For bituminous surface: 3 mm
- For GSB/base courses: 8 mm

The maximum permitted number of surface irregularities measured under a 3-m long straight edge at the middle of each traffic lane along a line parallel to the centerline of the road shall be as shown in Table 7.5.

Table 7.5 Maximum Numbers of Surface Irregularities

Maximum Number of Surface Irregularities on Bituminous Road and Shoulders				
Irregularity	4 mm		7 mm	
	300	75	300	75
Length (m)	300	75	300	75
National/Provincial Highways	20	9	2	1
Municipality or City Roads	40	18	4	2

8 CONTROL OF WATER/PIPELINE WORKS

This section of the QA/QC Manual covers the testing of works and the inspection of workmanship for pipeline works and liquid retaining structures. The requirements for testing and control of input materials are described in Section 5 (General).

8.1 Construction Sequence and Control Flow Charts

Flow charts indicating the construction sequence and control points for materials used in pipeline work and for pipeline works are shown in Figures 8.1 to 8.3, respectively.

8.2 Testing of Works

The works to be tested on site include bedding for pipelines, pipeline laying and jointing, as well as hydrostatic, leakage, and water tightness tests after completion. All the materials proposed to be used in these works must have been tested by the Subcontractor and approved by the Regional Impact Program and Barangay Infrastructure Project Engineer well in advance of commencing works. The Subcontractor shall obtain the approval of the Regional Impact Program and Barangay Infrastructure Project Engineer when a particular stage is completed and before proceeding to the next stage.

Minimum Testing Requirements for pipeline works and liquid retaining structures are listed in Appendix A, under the referenced test numbers. Refer to Sections 6 and 7 of this Manual for excavation, backfilling, and re-paving works. Test report formats are included in Appendix B.

Figure 8.1 CHECKS FOR MATERIALS USED IN PIPELINE WORKS

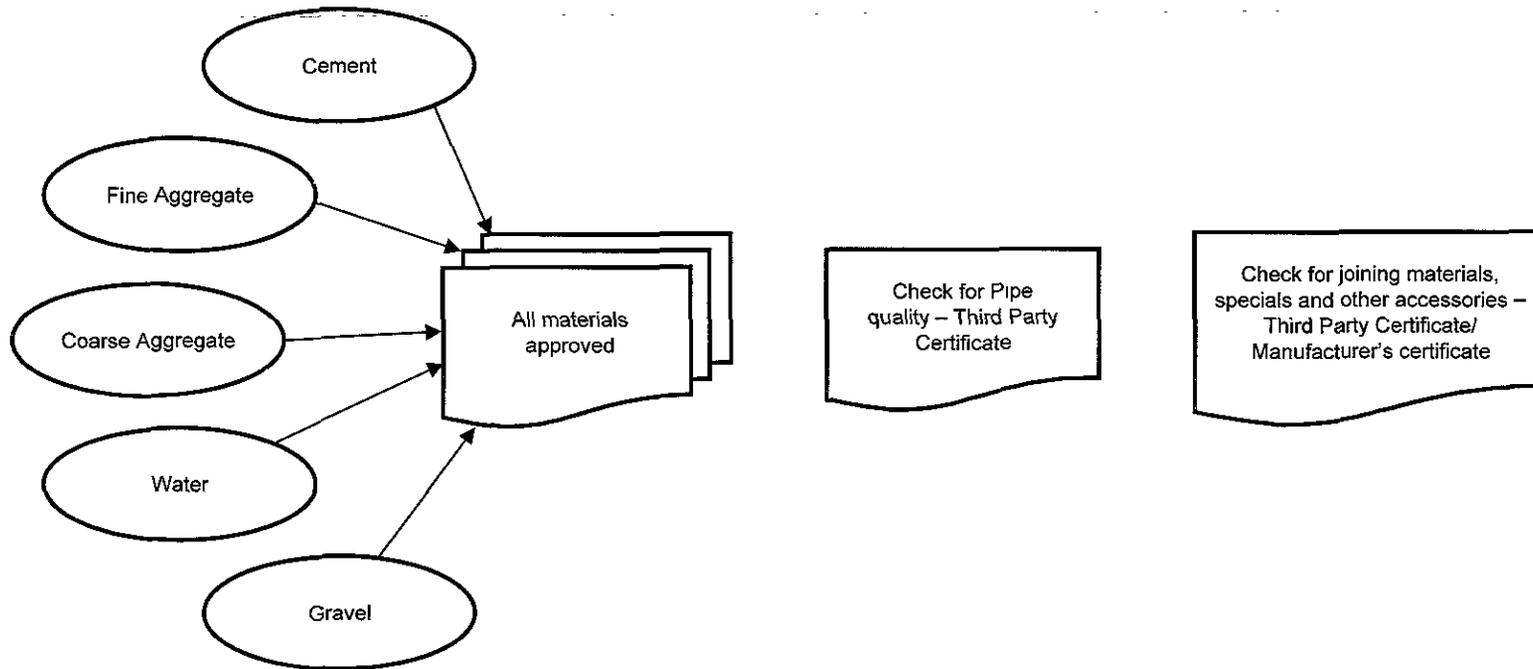


Figure 8.2 CHECKS FOR PREPARATORY WORKS BEFORE LAYING WATER SUPPLY/SEWERAGE PIPE LINES

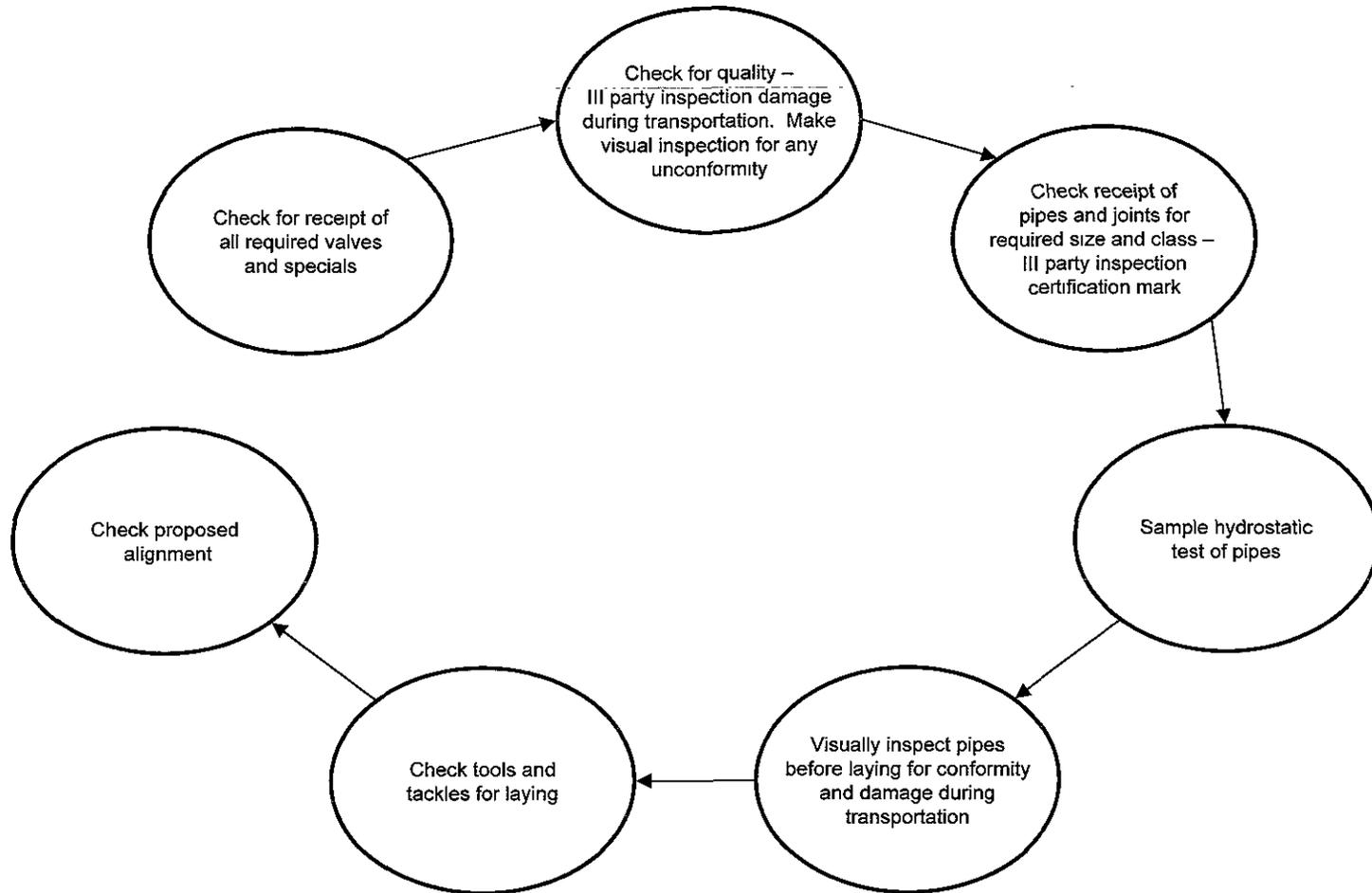
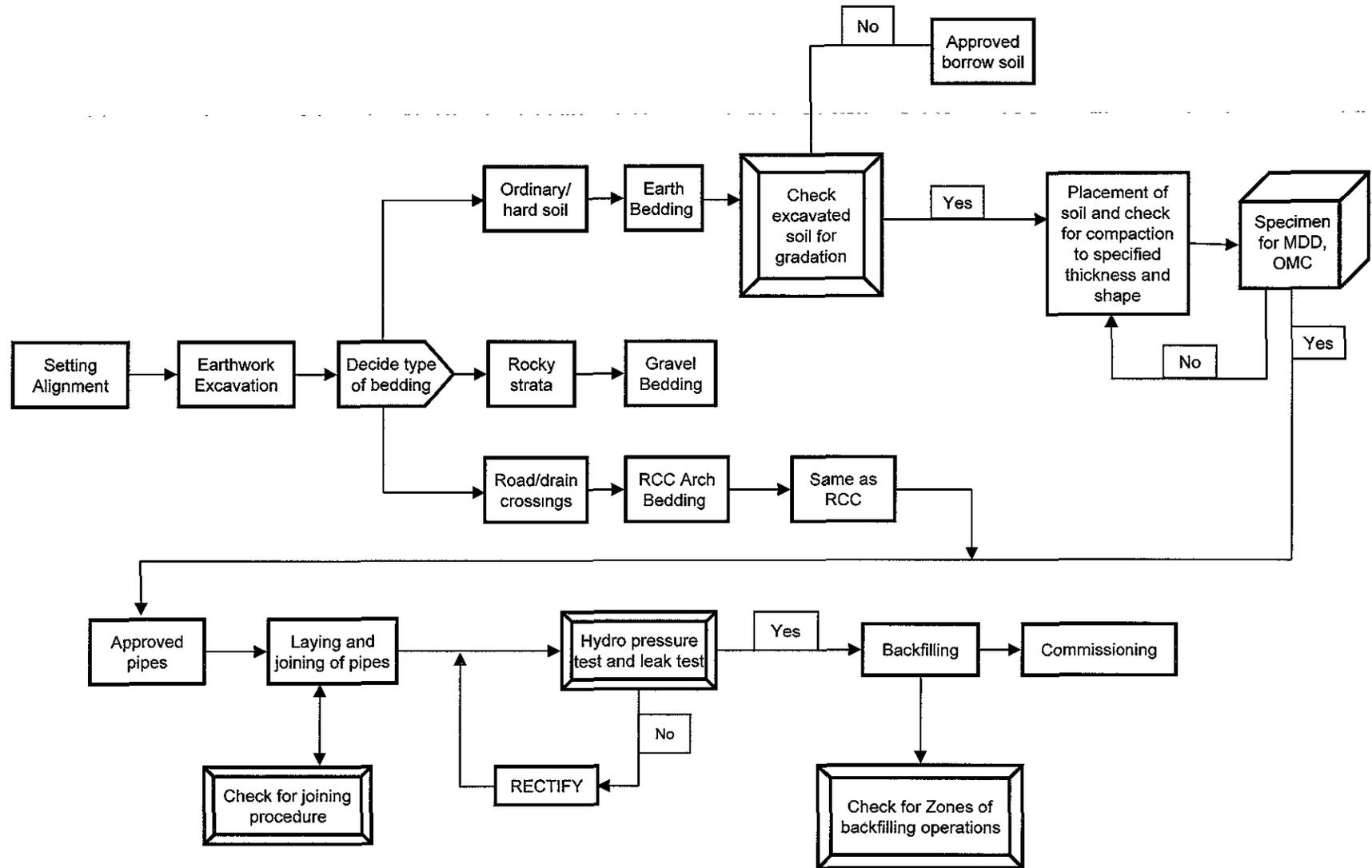


Figure 8.3 PROCESS CHART FOR PIPELINE WORKS WITH STAGES OF INSPECTION



9 CONTROL OF OTHER SPECIALIZED WORKS

This section of the QA/QC Manual gives an overview of the quality control requirements for other specialized works such as port improvement and electromechanical works. The requirements for testing and control of input materials and components, including manufacturers' certification, are described in Section 5.

Materials and components to be incorporated into port improvement and electromechanical works shall be inspected by the Regional Impact Program and Barangay Infrastructure Project Engineer as soon as they are delivered to ensure that they meet the specifications and design requirements, are in agreement with shipping documentation, and are accompanied by manufacturer's certifications or third party inspection certificates, as applicable. Accepted materials and equipment shall be properly stored by the Subcontractor until needed. If the manufacturer's installation instructions conflict with design or contract requirements, the Regional Impact Program and Barangay Infrastructure Project Engineer shall be notified immediately. Installation shall proceed only after the conflict has been resolved.

The Subcontractor or the equipment manufacturer shall perform a series of inspections and tests during installation and completion of the port improvement materials and electromechanical works for the Regional Impact Program and Barangay Infrastructure Project Engineer to witness, including:

1. **Preparatory Inspections:** Prior to installation, the civil and structural works where electromechanical equipment is to be installed shall be inspected to ensure conformance with designs and equipment installation requirements.
2. **Installation Inspections and Tests:** A system of inspections and tests, as specified in the contract or recommended by the equipment manufacturer, shall be employed throughout movement to position and installation of equipment and systems. Inspections shall be performed by the Regional Impact Program and Barangay Infrastructure Project Engineer at critical points during installation. Surveillance shall be provided by the Regional Impact Program and Barangay Infrastructure Project Engineer throughout the progress of work to ensure that installation is performed in accordance with the contract requirements, approved drawings, acceptable workmanship standards, and configuration control requirements. All field modifications and retrofit work shall be performed under the surveillance of the Regional Impact Program and Barangay Infrastructure Project Engineer.
3. **Installation Verification Inspections:** Prior to all mechanical and electrical testing, verification inspections shall be performed to ensure that equipment has been installed satisfactorily.
4. **System Tests:** These tests shall be conducted as appropriate to demonstrate that the installed systems were not damaged during shipment and installation, and that equipment performs in accordance with specifications.
5. **Integrated Tests:** After completing system tests, integrated tests shall be performed to demonstrate that the system performs satisfactorily when connected to its interfacing systems or subsystems. These tests will be followed up by commissioning tests.
6. **Commissioning Tests:** These consist of a series of tests performed under service operating procedures to demonstrate compatibility of the physical plant with operating procedures.

7. **Final Inspections:** Final inspections shall be performed to ensure that the completed work is in accordance with the contract and that all previously identified discrepancies have been resolved satisfactorily.

10 CONTROLS FOR RUNWAY CONSTRUCTION

This section of QA/QC Manual covers quality control/testing of works and procedural construction for embankment, subgrade, subbase and base course and surface coarse material for airports/runway construction.

10.1 Testing of works

The critical materials to be tested on site includes earthworks for embankment and subgrade, sub-base and base course materials, concrete aggregates, Reinforcing steel bars, Portland cement and Bituminous materials if Portland Cement concrete pavement and Asphalt cement Pavement is use respectively. Minimum testing requirements of construction materials are presented in Section 5 of this manual. (See Appendix A).

10.1.1 Material Requirements

10.1.1.1 Embankment materials – Embankment materials shall be suitable with no mucks, pets, sod and other organic or deleterious matter, it can be common material or rock. It shall conform to the testing requirements as stipulated in Section 5, (Appendix A of this manual).

10.1.1.2 Subbase course – Materials use as subbase shall consist of hard, durable particles of crushed stone or natural gravel and filler of natural or crushed sand or other finely divided mineral matter. The composite material shall be free from organic materials and shall be of such nature that it can be compacted readily to form a firm stable subbase. The subbase materials shall passed and conformed to the required/type of test as stipulated in Section 5, (Appendix A of this manual).

10.1.1.3 Base course – Aggregates for base course shall consist of hard, durable particles of crushed stone or natural gravel and filler of natural or crushed sand or other finely divided mineral matter. The composite material shall be free from vegetable matters and lumps or balls of clay and shall be of such nature that can be compacted readily to form a firm stable base. The base materials shall meet and conformed to the required/type of test as stipulated in Section 5, (Appendix A of this manual).

10.1.1.4 Filler for blending. If filler, in addition to that naturally present in the base course material, is necessary for satisfactory bonding of the material, or for changing the soil constants of the material passing the No. 40 (0.42 mm) mesh sieve, or for correcting the gradation to the limitations of the specified gradation, it shall be uniformly blended with the base course material on the pavement or at the plant. The material for such purpose shall be obtained from sources approved by the Engineer and shall be of a gradation necessary to accomplish the specified gradation in the final processed material.

10.1.1.5 Concrete Aggregates

1. **Fine aggregates** – Fine aggregates use for concrete shall consist of natural sand, stone screening or other inert materials with similar characteristics or other combination thereof, having hard, strong and durable particles. Fine aggregate from different sources of supply shall not be mixed or stored in the same pile nor used alternately in the same

class of concrete without the approval of the Engineer. It shall conform to the testing requirements as stipulated in Section 5, (Appendix A of this manual).

2. **Coarse aggregates** – Coarse aggregates use for concrete shall consist of crushed stone or natural gravel, or other inert materials of similar characteristics or combination thereof, having hard, strong and durable pieces and free from any adherent coatings. It shall conform to the type/required test as stipulated in Section 5, (Appendix A of this manual).

10.1.1.6 Reinforcing steel bars – It shall conform to the testing requirements as stipulated in Section 5, (Appendix A of this manual).

10.1.1.7 Portland Cement - It shall conform to the applicable requirements of Item 700, Hydraulic Cement. Only Type I Portland Cement shall be used unless otherwise provided for in the Special Provisions. Different brands or the same brands from different mills shall not be mixed nor shall they be used alternately unless the mix is approved by the Engineer. However, the use of Portland Pozzolan Cement Type IP meeting the requirements of AASHTO M 240/ASTM C 695, Specifications for Blended Hydraulic Cement shall be allowed, provided that trial mixes shall be done and that the mixes meet the concrete strength requirements, the AASHTO/ASTM provisions pertinent to the use of Portland Pozzolan Type IP shall be adopted.

Cement which for any reason, has become partially set or which contains lumps of caked cement will be rejected. Cement salvaged from discarded or used bags shall not be used.

Samples of Cement shall be obtained in accordance with AASHTO T 127.

10.1.1.8 Bituminous Material – It shall be either Medium Curing (MC) Cut-Back Asphalt Cement or Asphalt Cement whichever is called for in the Bill of Quantities. It shall conform to the requirements of Item 702 in the Technical Specification.

10.2. CONSTRUCTION METHODS/REQUIREMENTS

10.2.1 Clearing and Grubbing - All surface objects and all trees, stumps, roots and other protruding obstructions, not designated to remain, shall be cleared and/or grubbed.

Clearing and grubbing shall consist of clearing the surface of the ground of the designated areas of all trees, stumps, down timber, logs, snags, brush, undergrowth, hedges, heavy growth of grass or weeds, fences, structures, debris, and rubbish of any nature, natural obstructions or such material which in the opinion of the Engineer is unsuitable for the foundation of strips, pavements, or other required structures, including the grubbing of stumps, roots, matted roots, foundations, and the disposal from the project of all spoil materials resulting from clearing and grubbing by burning or otherwise.

The areas denoted on the plans to be cleared or cleared and grubbed shall be staked on the ground by the Engineer. The clearing and grubbing shall be done at a satisfactory distance in advance of the grading operations.

All spoil materials removed by clearing or by clearing and grubbing shall be disposed of by burning, when permitted by local laws, or by removal to approved disposal areas. When burning of material is permitted, it shall be burned under the constant care of competent watchmen so that the surrounding vegetation and other adjacent property will not be jeopardized. Burning shall be done in accordance with all applicable laws, ordinances, and regulations. Before starting any burning operations, the Subcontractor shall notify the agency having jurisdiction.

As far as practicable, waste concrete and masonry shall be placed on slopes of embankments or channels. When embankments are constructed of such material, this material shall be placed in accordance with requirements for formation of embankments. Any broken concrete or masonry that cannot be used in construction, and all other materials not considered suitable for use elsewhere, shall be disposed of by the Subcontractor. In no case shall any discarded materials be left in windrows or piles adjacent to or within the airport limits. The manner and location of disposal of materials shall be subject to the approval of the Engineer and shall not create an unsightly or objectionable view. When the Subcontractor is required to locate a disposal area outside the airport property limits at his/her own expense, he shall obtain and file with the Engineer, permission in writing from the property owner for the use of private property for this purpose.

If the plans or the specifications require the saving of merchantable timber, the Contractor shall trim the limbs and tops from designated trees, saw them into suitable lengths, and make the material available for removal by other agencies.

Any blasting necessary shall be done at the Subcontractor's responsibility, and the utmost care shall be taken not to endanger life or property.

10.2.2 Excavation and Embankment - Before beginning excavation, grading, and embankment operations in any area, the area shall be completely cleared and grubbed in accordance with Item Section 10.1.1.

The suitability of material to be placed in embankments shall be subject to approval by the Engineer. All unsuitable material shall be disposed of in waste areas shown on the plans. All waste areas shall be graded to allow positive drainage of the area and of adjacent areas. The surface elevation of waste areas shall not extend above the surface elevation of adjacent usable areas of the airport, unless specified on the plans or approved by the Engineer.

Those areas outside of the pavement areas in which the top layer of soil material has become compacted, by hauling or other activities of the Contractor shall be scarified and disked to a depth of 4 inches (100 mm), in order to loosen and pulverize the soil.

10.2.2.1 Excavation. No excavation shall be started until the work has been staked out by the Subcontractor and the Engineer has obtained elevations and measurements of the ground surface. All suitable excavated material shall be used in the formation of embankment, subgrade, or for other purposes shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

When the volume of the excavation exceeds that required to construct the embankments to the grades indicated, the excess shall be used to grade the areas of ultimate development or disposed of as directed. When the volume of excavation is not sufficient for constructing the fill to the grades indicated, the deficiency shall be obtained from borrow areas.

The grade shall be maintained so that the surface is well drained at all times. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water that may affect the work.

Where excavation to the finished graded section results in a subgrade or slopes of unsuitable soil, the Engineer may require the Subcontractor to remove the unsuitable material and backfill to the finished graded section with approved material. The Subcontractor shall conduct his operations in such a way that the Engineer can take the necessary cross-sectional measurements before the backfill is placed.

The excavation of muck shall be handled in a manner that will not permit the entrapment of muck within the backfill. The material used for backfilling up to the ground line or water level,

whichever is higher, shall be rock or other suitable granular material selected from the roadway excavation, if available. If not available, suitable material shall be obtained from other approved sources. Unsuitable material removed shall be disposed off in designated areas shown on the Plans or approved by the Engineer.

10.2.2.2 Compaction Requirements. The subgrade under areas to be paved shall be compacted to a depth of specified on the plans and to a density of not less than 95 percent of the maximum density. The material to be compacted shall be within +/- 2 percent of optimum moisture content before rolled to obtain the prescribed compaction.

10.2.2.3 Embankment - Prior to construction of embankment, all necessary clearing and grubbing in that area shall have been performed in conformity with Section 10.2.1, Clearing and Grubbing.

Embankment construction shall consist of constructing runway embankments, including preparation of the areas upon which they are to be placed. Embankments and backfills shall contain no muck, peat, sod, roots or other deleterious matter.

Where shown on the Plans or directed by the Engineer, the surface of the existing ground shall be compacted to a depth of 150 mm (6 inches) and to the specified requirements of this Item.

Where provided on the Plans and Bill of Quantities the top portions of the roadbed in both cuts and embankments, as indicated, shall consist of selected borrow for topping from excavations.

Where there is evidence of discrepancies on the actual elevations and that shown on the Plans, a preconstruction survey referred to the datum plane used in the approved Plan shall be undertaken by the Subcontractor under the control of the Engineer to serve as basis for the computation of the actual volume of the embankment materials.

When embankment is to be placed and compacted on hillsides, or when new embankment is to be compacted against existing embankments, or when embankment is built one-half width at a time, the existing slopes that are steeper than 3:1 when measured at right angles to the roadway shall be continuously benched over those areas as the work is brought up in layers. Benching will be subject to the Engineer's approval and shall be of sufficient width to permit operation of placement and compaction equipment. Each horizontal cut shall begin at the intersection of the original ground and the vertical sides of the previous cuts. Material thus excavated shall be placed and compacted along with the embankment material in accordance with the procedure described in this Section.

Unless shown otherwise on the Plans or special Provisions, where an embankment of less than 1.2 m (4 feet) below subgrade is to be made, all sod and vegetable matter shall be removed from the surface upon which the embankment is to be placed, and the cleared surfaced shall be completely broken up by plowing, scarifying, or steeping to a minimum depth of 150 mm except as provided in Subsection 102.2.2. This area shall then be compacted as provided in Subsection 104.3.3. Sod not required to be removed shall be thoroughly disc harrowed or scarified before construction of embankment. Wherever a compacted road surface containing granular materials lies within 900 mm (36 inches) of the subgrade, such old road surface shall be scarified to a depth of at least 150 mm (6 inches) whenever directed by the Engineer. This scarified materials shall then be compacted as provided in Subsection 104.3.3.

When shoulder excavation is specified, the roadway shoulders shall be excavated to the depth and width shown on the Plans. The shoulder material shall be removed without disturbing the adjacent existing base course material, and all excess excavated materials shall be disposed off

as provided in Subsection 102.2.3. If necessary, the areas shall be compacted before being backfilled.

Roadway embankment of earth material shall be placed in horizontal layers not exceeding 200 mm (8 inches), loose measurement, and shall be compacted as specified before the next layer is placed. However, thicker layer maybe placed if vibratory roller with high compactive effort is used provided that density requirement is attained and as approved by the Engineer. Trial section to this effect must be conducted and approved by the Engineer. Effective spreading equipment shall be used on each lift to obtain uniform thickness as determined in the trial section prior to compaction. As the compaction of each layer progresses, continuous leveling and manipulating will be required to assure uniform density. Water shall be added or removed, if necessary, in order to obtain the required density. Removal of water shall be accomplished through aeration by plowing, blading, discing, or other methods satisfactory to the Engineer.

Where embankment is to be constructed across low swampy ground that will not support the mass of trucks or other hauling equipment, the lower part of the fill may be constructed by dumping successive loads in a uniformly distributed layer of a thickness not greater than necessary to support the hauling equipment while placing subsequent layers.

When excavated material contains more than 25 mass percent of rock larger than 150 mm in greatest diameter and cannot be placed in layers of the thickness prescribed without crushing, pulverizing or further breaking down the pieces resulting from excavation methods, such materials may be placed on the embankment in layers not exceeding in thickness the approximate average size of the larger rocks, but not greater than 600 mm (24 inches).

Even though the thickness of layers is limited as provided above, the placing of individual rocks and boulders greater than 600 mm in diameter will be permitted provided that when placed, they do not exceed 1200 mm (48 inches) in height and provided they are carefully distributed, with the interstices filled with finer material to form a dense and compact mass.

Each layer shall be leveled and smoothed with suitable leveling equipment and by distribution of spalls and finer fragments of earth. Lifts of material containing more than 25 mass percent of rock larger than 150 mm in greatest dimensions shall not be constructed above an elevation 300 mm (12 inches) below the finished subgrade. The balance of the embankment shall be composed of suitable material smoothed and placed in layers not exceeding 200 mm (8 inches) in loose thickness and compacted as specified for embankments.

Dumping and rolling areas shall be kept separate, and no lift shall be covered by another until compaction complies with the requirements of Subsection 104.3.3.

Hauling and leveling equipment shall be so routed and distributed over each layer of the fill in such a manner as to make use of compaction effort afforded thereby and to minimize rutting and uneven compaction.

10.2.2.4 Compaction

Compaction Trials

Before commencing the formation of embankments, the Subcontractor shall submit in writing to the Engineer for approval his proposals for the compaction of each type of fill material to be used in the works. The proposals shall include the relationship between the types of compaction equipment, and the number of passes required and the method of adjusting moisture content. The Subcontractor shall carry out full scale compaction trials on areas not less than 10 m wide and 50 m long as required by the Engineer and using his proposed procedures or such amendments thereto as may be found necessary to satisfy the Engineer that all the specified requirements regarding compaction can be consistently achieved.

Compaction trials with the main types of fill material to be used in the works shall be completed before work with the corresponding materials will be allowed to commence.

Throughout the periods when compaction of earthwork is in progress, the Subcontractor shall adhere to the compaction procedures found from compaction trials for each type of material being compacted, each type of compaction equipment employed and each degree of compaction specified.

10.2.2.5 Earth - The Subcontractor shall compact the material placed in all embankment layers and the material scarified to the designated depth below subgrade in cut sections, until a uniform density of not less than 95 mass percent of the maximum dry density determined by AASHTO T 99 Method C, is attained, at a moisture content determined by Engineer to be suitable for such density.

The Engineer shall during progress of the Work, make density tests of compacted material in accordance with AASHTO T 191, T 205, or other approved field density tests, including the use of properly calibrated nuclear testing devices. A correction for coarse particles may be made in accordance with AASHTO T 224. If, by such tests, the Engineer determines that the specified density and moisture conditions have not been attained, the Subcontractor shall perform additional work as may be necessary to attain the specified conditions.

At least one group of three in-situ density tests shall be carried out for each 500 m of each layer of compacted fill.

10.2.2.6 Rock - Density requirements will not apply to portions of embankments constructed of materials which cannot be tested in accordance with approved methods.

Embankment materials classified as rock shall be deposited, spread and leveled the full width of the fill with sufficient earth or other fine material so deposited to fill the interstices to produce a dense compact embankment. In addition, one of the rollers, vibrators, or compactors shall compact the embankment full width with a minimum of three complete passes for each layer of embankment.

10.2.3 Subgrade Preparation

10.2.3.1 Subgrade in Common Excavation

Unless otherwise specified, all materials below subgrade level in earth cuts to a depth 150 mm or other depth shown on the Plans or as directed by the Engineer shall be excavated. The material, if suitable, shall be set side for future use or, if unsuitable, shall be disposed off in designated area.

All materials immediately below subgrade level in earth cuts to a depth of 150 mm, or to such greater depth as may be specified, shall be compacted in accordance with the requirements of Subsection 10.2.2.4.

10.2.3.2 Subgrade in Rock Excavation

Surface irregularities under the subgrade level remaining after trimming of the rock excavation shall be leveled by placing specified material and compacted to the requirements of Subsection 10.2.2.4.

10.2.3.3 Subgrade on Embankment

After the embankment has been completed, the full width shall be conditioned by removing any soft or other unstable material that will not compacted properly. The resulting areas and all other low sections, holes, or depressions shall be brought to grade with suitable material. The entire roadbed shall be shaped and compacted. Scarifying, blading, dragging, rolling, or other

methods of work shall be performed or used as necessary to provide a thoroughly compacted roadbed shaped to the cross-sections shown on the Plans.

10.2.3.4 Finishing and Protection of subgrade. After the subgrade has been substantially completed the full width shall be conditioned by removing any soft or other unstable material that will not compact properly. The resulting areas and all other low areas, holes or depressions shall be brought to grade with suitable select material. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans.

Grading of the subgrade shall be performed so that it will drain readily. The Subcontractor shall take all precautions necessary to protect the subgrade from damage. He/she shall limit hauling over the finished subgrade to that which is essential for construction purposes.

All ruts or rough places that develop in a completed subgrade shall be smoothed and recompacted.

No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been approved by the Engineer.

10.2.3.5 Subgrade Level Tolerances

The finished compacted surface of the subgrade shall conform to the allowable tolerances as specified hereunder:

Table 10.2.3.5

Permitted variation from	+	20 mm
design LEVEL OF SURFACE	-	30 mm
Permitted SURFACE IRREGULARITY MEASURED BY 3-m STRAIGHT EDGE		30 mm
Permitted variation from		
design CROSSFALL OR CAMBER	±	0.5 %
Permitted variation from	±	0.1 %
design LONGITUDINAL GRADE over 25 m length		

10.2.4 Aggregate Subbase Course - Before any subbase material is placed, the underlying course shall be prepared and conditioned as specified. The course shall be checked and accepted by the Engineer before placing and spreading operations are started.

To protect the subgrade and to ensure proper drainage, the spreading of the subbase shall begin along the centerline of the pavement on a crowned section or on the high side of pavements with a one-way slope.

10.2.4.1 Materials Acceptance in existing Condition - When the entire subbase material is secured in a uniform and satisfactory condition and contains approximately the required moisture, such approved material may be moved directly to the spreading equipment

for placing. The material may be obtained from gravel pits, stockpiles, or may be produced from a crushing and screening plant with the proper blending. The materials from these sources shall meet the requirements for gradation, quality, and consistency. It is the intent of this section of the specifications to secure materials that will not require further mixing. The moisture content of the material shall be approximately that required to obtain maximum density. Any minor deficiency or excess of moisture may be corrected by surface sprinkling or by aeration. In such instances, some mixing or manipulation may be required, immediately preceding the rolling, to obtain the required moisture content. The final operation shall be blading or dragging, if necessary, to obtain a smooth uniform surface true to line and grade.

10.2.4.2 Plant Mixing - When materials from several sources are to be blended and mixed, the subbase material shall be processed in a central or travel mixing plant. The subbase material, together with any blended material, shall be thoroughly mixed with the required amount of water. After the mixing is complete, the material shall be transported to and spread on the underlying course without undue loss of the moisture content.

10.2.4.3 Mixed in Placed - When materials from different sources are to be proportioned and mixed or blended in place, the relative proportions of the components of the mixture shall be as designated by the Engineer.

When the required amount of materials have been placed, they shall be thoroughly mixed and blended by means of graders, discs, harrows, rotary tillers, supplemented by other suitable equipment if necessary. The mixing shall continue until the mixture is uniform throughout. Areas of segregated material shall be corrected by the addition of binder or filler material and by thorough remixing. Water in the amount and as directed by the Engineer shall be uniformly applied prior to and during the mixing operations, if necessary, to maintain the material at its required moisture content. When the mixing and blending has been completed, the material shall be spread in a uniform layer which, when compacted, will meet the requirements of thickness and typical cross section.

10.2.4.4 Placing - The subbase course shall be constructed in layers. Any layer shall be not less than 3 inches (75 mm) nor more than 8 inches (200 mm) of compacted thickness. The subbase material shall be deposited and spread evenly to a uniform thickness and width. The material, as spread, shall be of uniform gradation with no pockets of fine or coarse materials.

When more than one layer is required, the construction procedure described herein shall apply similarly to each layer.

During the placing and spreading, sufficient caution shall be exercised to prevent the incorporation of subgrade, shoulder, or foreign material in the subbase course mixture.

10.2.4.5 FINISHING AND COMPACTING. After spreading or mixing, the subbase material shall be thoroughly compacted by rolling and sprinkling, when necessary. Sufficient rollers shall be furnished to adequately handle the rate of placing and spreading of the subbase course.

The field density of the compacted material shall be at least 100 percent of the maximum density of laboratory specimens prepared from samples of the subbase material delivered to the jobsite.

10.2.4.6 Maintenance - Following the final shaping of the material, the subbase shall be maintained throughout its entire length by the use of standard motor graders and rollers until, in the judgment of the Engineer, the subbase meets all requirements and is acceptable for the construction of the next course.

10.2.4.7 Tolerances - Aggregate subbase shall be spread with equipment that will provide a uniform layer which when compacted will conform to the designed level and transverse slopes as shown on the Plans. The allowable tolerances shall be as specified hereunder:

Table 10.2.4.7

Permitted variation from design THICKNESS OF LAYER	± 20 mm
Permitted variation from design LEVEL OF SURFACE	+10 mm -20 mm
Permitted SURFACE IRREGULARITY Measured by 3-m straight-edge	20 mm
Permitted variation from design CROSSFALL OR CAMBER	±0.3%
Permitted variation from design LONGITUDINAL GRADE over 25 m in length	±0.1%

10.2.5 Aggregate Base Course - The underlying course shall be checked and accepted by the Engineer before placing and spreading operations are started. Any ruts or soft yielding places caused by improper drainage conditions, hauling, or any other cause shall be corrected at the Subcontractor's expense before the base course is placed thereon. Material shall not be placed on frozen subgrade.

10.2.5.1 Methods of production

a. **Plant Mix.** When provided in the proposal, or when selected by the Subcontractor and approved by the Engineer, the base material shall be uniformly blended or mixed in an

approved plant. The mixing plant shall include bins for storage and batching of the aggregate, pump and tanks for water, and batch mixers of either the pugmill or drum type. All mineral aggregates shall be batched into the mixer by weight. The agitation shall be such that a thorough dispersion of moisture is obtained. The size of the batch and the time of mixing shall be fixed by the Engineer and shall produce the results and requirements specified. The base course material produced by combining two or more materials from different sources shall be mixed in a mixing plant described herein. The mixture material shall be at a satisfactory moisture content to obtain maximum density.

b. Travel Plant. When the use of a traveling plant is allowed, the plant shall blend and mix the materials to meet these specifications. It shall accomplish a thorough mixing in one trip. The agitation shall be such that the dispersion of the moisture is complete. The machine shall move at a uniform rate of speed and this speed shall be regulated to fix the mixing time. If a windrow-type of travel plant is employed for mixing, the aggregate shall be placed in windrows parallel to the pavement centerline.

The windrow volume shall be sufficient to cover exact areas as planned. The windrow contents shall produce a mixture of the required gradation and bonding qualities. If a travel plant is used which is of the type that mixes previously spread aggregates in-place, the material shall have been spread in such thickness and proportions as may be handled by the machine to develop a base course of the thickness of each layer and of the gradation required. With either type of equipment, the mixed material shall be at a satisfactory moisture content to obtain the maximum density.

10.2.5.2 Mixing. The aggregate shall be uniformly blended during crushing operations or mixed in a plant. The materials shall be mix properly to meet the specifications and to secure the proper moisture content for compaction.

10.2.5.3 Placing - The aggregate base material that is correctly proportioned, or has been processed in a plant, shall be placed on the prepared underlying course and compacted in layers of the thickness shown on the plans. The depositing and spreading of the material shall commence where designated and shall progress continuously without breaks. The material shall be deposited and spread in lanes in a uniform layer and without segregation of size to such loose depth that, when compacted, the layer shall have the required thickness. The base aggregate shall be spread by spreader boxes or other approved devices having positive thickness controls that shall spread the aggregate in the required amount to avoid or minimize the need for hand manipulation.

The aggregate base material that has been processed in a traveling plant, or mixed and blended in-place, shall be spread in a uniform layer of required depth and width and to the typical cross section. The spreading shall be by a self-powered blade grader, mechanical spreader, or other approved method. In spreading, care shall be taken to prevent cutting into the underlying layer. The material shall be bladed until a smooth, uniform surface is obtained, true to line and grade.

The base course shall be constructed in a layer not less than 3 inches (75 mm) nor more than 6 inches (150 mm) of compacted thickness. The aggregate as spread shall be of uniform grading with no pockets of fine or coarse materials.

When more than one layer is required, the construction procedure described herein shall apply similarly to each layer.

During the mixing and spreading process, sufficient caution shall be exercised to prevent the incorporation of subgrade, subbase, or shoulder material in the base course mixture.

10.2.5.3 Compaction. Immediately upon completion of the spreading operations, the aggregate shall be thoroughly compacted. The number, type, and weight of rollers shall be sufficient to compact the material to the required density.

The moisture content of the material during placing operations shall not be below, nor more than 2 percentage points above, the optimum moisture content.

10.2.5.4 Acceptance sampling and Testing for Density. Aggregate base course shall be accepted for density on a lot basis. Each lot shall be divided into 500 square meters. One test consisting of 3 holes shall be made for each subplot. Sampling locations will be determined by the Engineer on a random basis in accordance with the technical specifications. Each lot will be accepted for density when the field density is at least 100 percent of the maximum density of laboratory specimens prepared from samples of the base course material delivered to the job site. The specimens shall be compacted and tested in accordance with technical specification. If the specified density is not attained, the entire lot shall be reworked and/or recompacted and additional random tests made. This procedure shall be followed until the specified density is reached.

10.2.5.5 Tolerances - The aggregate base course shall be laid to the designed level and transverse slopes shown on the Plans. The allowable tolerances shall be in accordance with following:

Table 10.2.5.5

Permitted variation from design THICKNESS OF LAYER	± 10 mm
Permitted variation from design LEVEL OF SURFACE	+ 5 mm -10 mm
Permitted SURFACE IRREGULARITY Measured by 3-m straight-edge	5 mm
Permitted variation from design CROSSFALL OR CAMBER	± 0.2%
Permitted variation from design LONGITUDINAL GRADE over 25 m in length	± 0.1%

10.2.6 Portland Cement Concrete Pavement – It shall conform to the material requirements and construction procedure of Item 306 of Gem Technical Specification.

10.2.7 Bituminous Concrete Surface Course – It shall conform to the material requirements and construction procedure of Item 309 of Gem Technical specification.

10.3 QUALITY CONTROL PROGRAM

10.3.1 GENERAL. The Subcontractor shall establish, provide, and maintain an effective Quality Control Program that details the methods and procedures that will be taken to assure that all materials and completed construction required by this contract conform to contract plans, technical specifications and other requirements, whether manufactured by the Subcontractor, or vendors. Although guidelines are established and certain minimum requirements are specified herein and elsewhere in the contract technical specifications, the Subcontractor shall assume full responsibility for accomplishing the stated purpose.

The intent of this section is to enable the Subcontractor to establish a necessary level of control that will:

- a. Adequately provide for the production of acceptable quality materials.
- b. Provide sufficient information to assure both the Subcontractor and the Engineer that the specification requirements can be met.
- c. Allow the Subcontractor as much latitude as possible to develop his or her own standard of control.

The Subcontractor shall be prepared to discuss and present, at the preconstruction conference, his/her understanding of the quality control requirements. The Subcontractor shall not begin any construction or production of materials to be incorporated into the completed work until the Quality Control Program has been reviewed by the Engineer. No partial payment will be made for materials subject to specific quality control requirements until the Quality Control Program has been reviewed.

The quality control requirements contained in this section and elsewhere in the contract technical specifications are in addition to and separate from the acceptance testing requirements. Acceptance testing requirements are the responsibility of the Engineer.

10.3.2 DESCRIPTION OF PROGRAM.

a. General Description. The Subcontractor shall establish a Quality Control Program to perform inspection and testing of all items of work required by the technical specifications, including those performed by subcontractors. This Quality Control Program shall ensure conformance to applicable specifications and plans with respect to materials, workmanship, construction, finish, and functional performance. The Quality Control Program shall be effective for control of all construction work performed under this Contract and shall specifically include surveillance and tests required by the technical specifications, in addition to other requirements of this section and any other activities deemed necessary by the Subcontractor to establish an effective level of quality control.

b. Quality Control Program. The Subcontractor shall describe the Quality Control Program in a written document that shall be reviewed by the Engineer prior to the start of any production, construction, or off-site fabrication. The written Quality Control Program shall be submitted to the Engineer for review at least 5 calendar days before the preconstruction conference or the start of the work is recommended.

The Quality Control Program shall be organized to address, as a minimum, the following items:

- a. Quality control organization;
- b. Project progress schedule;
- c. Submittals schedule;
- d. Inspection requirements;
- e. Quality control testing plan;
- f. Documentation of quality control activities; and
- g. Requirements for corrective action when quality control and/or acceptance criteria are not met.

The Subcontractor is encouraged to add any additional elements to the Quality Control Program that he/she deems necessary to adequately control all production and/or construction processes required by this contract.

10.3.3 PROJECT PROGRESS SCHEDULE. The Subcontractor shall submit a coordinated construction schedule for all work activities. The schedule shall be prepared as a network diagram in Critical Path Method (CPM), PERT, or other format, or as otherwise specified in the contract. As a minimum, it shall provide information on the sequence of work activities, milestone dates, and activity duration.

The Subcontractor shall maintain the work schedule and provide an update and analysis of the progress schedule on a twice monthly basis, or as otherwise specified in the contract. Submission of the work schedule shall not relieve the Subcontractor of overall responsibility for scheduling, sequencing, and coordinating all work to comply with the requirements of the contract.

10.3.4 SUBMITTALS SCHEDULE. The Subcontractor shall submit a detailed listing of all submittals (e.g., mix designs, material certifications) and shop drawings required by the technical specifications. The listing can be developed in a spreadsheet format and shall include:

- a. Specification item number;
- b. Item description;
- c. Description of submittal;
- d. Specification paragraph requiring submittal; and
- e. Scheduled date of submittal.

10.3.5 INSPECTION REQUIREMENTS. Quality control inspection functions shall be organized to provide inspections for all definable features of work, as detailed below. All inspections shall be documented by the Subcontractor as specified by Section 10.3.6.

Inspections shall be performed daily to ensure continuing compliance with contract requirements until completion of the particular feature of work. These shall include the following minimum requirements:

- a. During plant operation for material production, quality control test results and periodic inspections shall be utilized to ensure the quality of aggregates and other mix components, and to adjust and control mix proportioning to meet the approved mix design and other requirements of the technical specifications. All equipment utilized in proportioning and mixing shall be

inspected to ensure its proper operating condition. The Quality Control Program shall detail how these and other quality control functions will be accomplished and utilized.

b. During field operations, quality control test results and periodic inspections shall be utilized to ensure the quality of all materials and workmanship. All equipment utilized in placing, finishing, and compacting shall be inspected to ensure its proper operating condition and to ensure that all such operations are in conformance to the technical specifications and are within the plan dimensions, lines, grades, and tolerances specified. The Program shall document how these and other quality control functions will be accomplished and utilized.

10.3.6 QUALITY CONTROL TESTING PLAN. As a part of the overall Quality Control Program, the Subcontractor shall implement a quality control testing plan, as required by the technical specifications. The testing plan shall include the minimum tests and test frequencies required by each technical specification Item, as well as any additional quality control tests that the Subcontractor deems necessary to adequately control production and/or construction processes.

The testing plan can be developed in a spreadsheet fashion and shall, as a minimum, include the following:

- a. Specification item number
- b. Item description (e.g., Plant Mix Bituminous Pavements);
- c. Test type (e.g., gradation, grade, asphalt content);
- d. Test standard (e.g., ASTM or AASHTO test number, as applicable);
- e. Test frequency (e.g., as required by technical specifications or minimum frequency when requirements are not stated);
- f. Responsibility (e.g., plant technician); and
- g. Control requirements (e.g., target, permissible deviations).

The testing plan shall contain a statistically-based procedure of random sampling for acquiring test samples in accordance with the specification. The Engineer shall be provided the opportunity to witness quality control sampling and testing.

All quality control test results shall be documented by the Subcontractor as required by Section 10.3.7.

10.3.7 DOCUMENTATION. The Subcontractor shall maintain current quality control records of all inspections and tests performed. These records shall include factual evidence that the required inspections or tests have been performed, including type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, etc.; proposed remedial action; and corrective actions taken.

These records must cover both conforming and defective or deficient features, and must include a statement that all supplies and materials incorporated in the work are in full compliance with the terms of the contract. Legible copies of these records shall be furnished to the Engineer daily. The records shall cover all work placed subsequent to the previously furnished records and shall be verified and signed by the Subcontractor's Materials Engineer.

Specific Subcontractor quality control records required for the contract shall include, but are not necessarily limited to, the following records:

a. **Daily Inspection Reports.** Each Subcontractor quality control technician shall maintain a daily log of all inspections performed by the Subcontractor operations on a form

acceptable to the Engineer. These technician's daily reports shall provide factual evidence that continuous quality control inspections have been performed and shall, as a minimum, include the following:

- (1) Technical specification item number and description;
- (2) Compliance with approved submittals;
- (3) Proper storage of materials and equipment;
- (4) Proper operation of all equipment;
- (5) Adherence to plans and technical specifications;
- (6) Review of quality control tests; and
- (7) Safety inspection.

The daily inspection reports shall identify inspections conducted, results of inspections, location and nature of defects found, causes for rejection, and remedial or corrective actions taken or proposed.

The daily inspection reports shall be signed by the responsible quality control technician and the Subcontractor's Material Engineer. The Engineer shall be provided at least one copy of each daily inspection report on the work day following the day of record.

b. Daily Test Reports. The Subcontractor shall be responsible for establishing a system that will record all quality control test results. Daily test reports shall document the following information:

- (1) Technical specification item number and description;
- (2) Test designation;
- (3) Location;
- (4) Date of test;
- (5) Control requirements;
- (6) Test results;
- (7) Causes for rejection;
- (8) Recommended remedial actions; and
- (9) Retests.

Test results from each day's work period shall be submitted to the Engineer prior to the start of the next day's work period. When required by the technical specifications, the Subcontractor shall maintain statistical quality control charts. The daily test reports shall be signed by the responsible quality control technician and the subcontractor's Material Engineer.

10.3.8 CORRECTIVE ACTION REQUIREMENTS. The Quality Control Program shall indicate the appropriate action to be taken when a process is deemed, or believed, to be out of control (out of tolerance) and detail what action will be taken to bring the process into control. The requirements for corrective action shall include both general requirements for operation of the Quality Control Program as a whole, and for individual items of work contained in the technical specifications.

The Quality Control Program shall detail how the results of quality control inspections and tests will be used for determining the need for corrective action and shall contain clear sets of rules to gauge when a process is out of control and the type of correction to be taken to regain process control.

When applicable or required by the technical specifications, the Subcontractor shall establish and utilize statistical quality control charts for individual quality control tests. The requirements for corrective action shall be linked to the control charts.

10.3.9 SURVEILLANCE BY THE ENGINEER. All items of material and equipment shall be subject to surveillance by the Engineer at the point of production, manufacture or shipment to determine if the Subcontractor, producer, manufacturer or shipper maintains an adequate quality control system in conformance with the requirements detailed herein and the applicable technical specifications and plans. In addition, all items of materials, equipment and work in place shall be subject to surveillance by the Engineer at the site for the same purpose.

Surveillance by the Engineer does not relieve the Subcontractor of performing quality control inspections of either on-site or off-site Subcontractor's work.

10.3.10 NONCOMPLIANCE.

a. The Engineer will notify the Subcontractor of any noncompliance with any of the foregoing requirements. The Subcontractor shall, after receipt of such notice, immediately take corrective action. Any notice, when delivered by the Engineer or his/her authorized representative to the Subcontractor or his/her authorized representative at the site of the work, shall be considered sufficient notice.

b. In cases where quality control activities do not comply with either the Subcontractor Quality Control Program or the contract provisions, or where the Subcontractor fails to properly operate and maintain an effective Quality Control Program, as determined by the Engineer, the Engineer may:

(1) Order the Subcontractor to replace ineffective or unqualified quality control personnel.

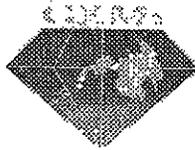
(2) Order the Subcontractor to stop operations until appropriate corrective actions are taken.

11 BARANGAY INFRASTRUCTURE PROGRAM QA/QC PROCEDURE

This section of the QA/QC manual covers the simplified procedure for Barangay Infrastructure Program projects.

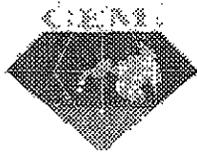
The subsequent sections are as follows:

- 11.1 Simplified QA/QC for Boat Landing
- 11.2 Simplified QA/QC for Box Culverts
- 11.3 Simplified QA/QC for Community/Trading Center
- 11.4 Simplified QA/QC for Drainage Canal
- 11.5 Simplified QA/QC for Grain Warehouse and Solar Dryer
- 11.6 Simplified QA/QC for Grain Warehouse
- 11.7 Simplified QA/QC for Irrigation System
- 11.8 Simplified QA/QC for Steel/Concrete Footbridge
- 11.9 Simplified QA/QC for Road Upgrading
- 11.10 Simplified QA/QC for Seaweed Solar Dryer
- 11.11 Simplified QA/QC for Suspension Footbridge
- 11.12 Simplified QA/QC for Water System
- 11.13 Simplified QA/QC for Grain Solar Dryer



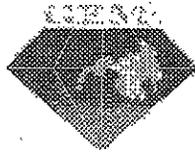
Field Inspector's QA/QC Work Guide
(Applicable for Boat Landing Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment
101)-Removal of Structures and Obstructions 101-1)- Site Works	Lay-out the construction limits as per identified project bench marks in the presence of the GEM Engineer. Check if the designed excavation depth for boulder/stone embankments has already reached the stable based as assumed on plans. Temporary wood piles could also be installed around the structure perimeter to minimize the continuous impact of sea waves during construction activities.
103)-Structure Excavation	This Item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures. This may also include backfilling of pipe culverts and/or removal of excavated materials as provided in the specifications and when the GEM Engineer so order in conformity with the Plan. Other necessary items covered in the Technical Specifications may include diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill.
104)-Embankment	Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m.at fraction thereof) at 150 mm thick (6") . Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness determination test shall be conducted together with the GEM Materials Engineer.
400)-Piling	This Item shall consist of piling, furnished either driven or placed, cut, and spliced in accordance with this Specification and in conformity with the Plans. See types of piles indicated in the plans and specifications.
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	This Item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer.
	Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance. No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 6% variance in diameter is acceptable. Follow rebar schedule indicated in the plans at all times.



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DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
<p>405)-Structural Concrete</p> <p>Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 . 2 : 4)</p>	<p>This Item shall consist of furnishing, placing, and finishing concrete in all structures except pavements. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer.</p> <p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board. It shall not spread flat like "<i>lugaw</i>" in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days.</p>
<p>Portland Cement</p>	<p>Use only Ordinary Portland Cement Type 1 or Type 1P. Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label. Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture. Cement bags shall be opened just prior to use.</p>
<p>Fine Aggregates</p>	<p>River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.</p>
<p>Coarse Aggregates</p>	<p>River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.</p>
<p>Water</p> <p>Concrete Mixing Admixtures</p>	<p>Use only water that is clean and clear. Drinking water is acceptable. Presence of salts, oil and silt in water must be avoided. If source is questionable, Quality Test is required prior to use in concreting.</p> <p>The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.</p>
<p>504)-Riprap and Grouted Riprap</p>	<p>This Item shall consist of the furnishing and placing of riprap, with or without grout as the case may be, with or without filter backing, furnished and constructed in accordance with this</p>



Field Inspector's QA/QC Work Guide
(Applicable for Boat Landing Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	<p>The grouted riprap shall be laid on a compacted fill according to the desired slope. Install batter boards to maintain the slope and thickness of the grouted riprap during construction. Alternate layers of stone and mortar to the full</p> <p>Check that only approved materials are used for cement mortar works. The specified mixing ratio of Portland cement to fine sand shall be followed at all times with only enough</p>
709)-Paints	This item covers all paint materials including vehicles, pigments, pastes, driers, thinners and mixed paints for steel and wooden structures. For small bridges, rubberized and reflector paint shall be used for guard rails, curves and gutter.
714)-Water	This item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical specification.
SPL-1)-Shed Structure	All lumber materials shall be of uniform dimensions and smooth-finished on its four sides before use. All metal materials must also be either galvanized or painted to protect from corrosion.
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	
	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plyboard material.



**GROWTH WITH
EQUITY IN
MINDANAO 3
PROGRAM**

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Makati City, 1200 Philippines
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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
 Project Location : _____
 Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks
					Actual		Required		
					psi	%	psi	%	
Class A concrete	Class A-01			7			2130	71	(Passed or Failed)
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

- All concrete pouring must be supervised by the assigned GEM Field Inspector.
- All concrete sampling must be supervised by the assigned GEM Field Inspector.
- All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer
- All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

 Contractor's Project Engineer
 (Signature over printed name))

 GEM Construction Inspector
 (Signature over printed name))



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E-mail: gemakati@mezc.com

List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (initial delivery)	Engineer's Certificate + Pictures	
101)-Removal of Structures and Obstructions		Engineer's Certificate + Pictures
101-1) Site Works		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
400)-Piling		Engineer's Certificate + Pictures
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m. of concrete or fraction thereof
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
504)-Riprap and Grouted Riprap		Engineer's Certificate + Pictures
709)-Paints		Mills/Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
SPL-1)-Shed Structure		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period



Field Inspector's QA/QC Work Guide
(Applicable for Box Culvert Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment
101)-Removal of Structures and Obstructions 101-1)- Pre-construction/As-stake survey	Instruct the contractor to carefully removed salvageable materials and turn it over to the proponent for their use. Disposable materials shall be deposited in an As soon as cleaning is completed, the subcontractor, in the presence of the GEM Engineer, will then start pre-construction (as-stake) survey to establish elevations of the drainage lines and grades that will be used as basis in setting and quantifying the works done. Locations and elevations of drainage structure shall be according to plan unless changes are effected by the GEM Engineer to conform to certain field conditions
103)-Structure Excavation	Unsuitable excavated materials must be disposed of and not to be utilized as backfill. This item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures. This may also include backfilling of pipe culverts and/or removal of excavated materials as provided in the specifications and when the GEM Engineer so order in conformity with the Plan. Other necessary items covered in the Technical Specifications may include diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill
104)-Embankment	Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m. at fraction thereof) at 150 mm thick (6") Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness determination test shall be conducted together with the GEM Materials Engineer
105)-Subgrade Preparation	This item shall consist of the preparation of the subgrade for the support of the overlaying structural layers. It shall extend to full width of the roadway
106)- Compaction equipment and density control strip	This Procedure will be used to determine density requirements of selected embankments, sub-grade, bases and bituminous concrete. The procedure will consist of control strip construction to establish targets densities for the specified course plus use of sand-cone method of density testing equipment to determine in-place densities obtained during the construction process. Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The equipment shall be modern, efficient compacting units approved by the GEM Engineer. The compacting units may be of any type provided they are capable of compacting material and specified and meet the minimum requirements as contained herein
200)-Aggregate Subbase Course	This item shall consist of furnishing, placing, and compacting of aggregate sub-base course on prepared sub-grade
201)-Aggregate Base Course	This item shall consist of furnishing, placing, and compacting of aggregate base course on a prepared sub-grade or sub-base in accordance with this Specification and the lines, grades, thickness, and typical cross-sections shown on the Plans, or as established by the GEM Engineer. Aggregate for base course shall consist of hard, durable particles or fragments of crushed slag, crushed gravel or natural gravel and filler of natural sand, crushed sand, or other finely divided mineral matter. The composite material shall be free from vegetable matter and lumps or balls of clay, and shall be of such nature that it can be compacted readily to form a firm, stable base.
300)-Aggregate Surface Course	This item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities.
400)-Piling	This item shall consist of piling, furnished either driven or placed, cut, and spliced in accordance with this Specification and in conformity with the Plans. See types of piles indicated in the plans and specifications
401)-Railings	This item shall consist of furnishing or fabricating and/or placing railings for bridges and other structures of the material or combination of materials shown on the Plans, constructed in conformity with this Specification and to the lines, grades, and dimensions shown on the Plans. Railings shall be classified as concrete, steel, aluminum, or timber in accordance with the predominating material contained in each



Field Inspector's QA/QC Work Guide
(Applicable for Box Culvert Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	<p>This item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer.</p> <p>Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 6% variance in diameter is acceptable. Follow rebar schedule indicated in the plans at all times.</p>
405)-Structural Concrete Concrete Class "A" (1 2 3) Concrete Class " B " (1 2 4)	<p>This item shall consist of furnishing, placing, and finishing concrete in all structures except pavements. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer.</p> <p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board. It shall not spread flat like "lugaw" in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days.</p>
Portland Cement	<p>Use only Ordinary Portland Cement Type 1 or Type 1P. Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label. Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture. Cement bags shall be opened just prior to use.</p>
Fine Aggregates	<p>River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.</p>
Coarse Aggregates	<p>River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.</p>
Water	<p>Use only water that is clean and clear. Drinking water is acceptable. Presence of salts, oil and silt in water must be avoided. If source is questionable, Quality Test is required prior to use in concreting.</p>
Concrete Mixing Admixtures	<p>The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.</p>
405-1)-Lean Concrete 407)-Concrete Structures 504)-Riprap and Grouted Riprap	<p>Ensure the base area is stable before pouring will be allowed. The required mixing ratio must be followed at all times.</p> <p>This item shall consist of the general description of the materials, equipment, workmanship and construction requirements of concrete structures and the concrete portions of composite structures conforming to the alignment, grades, design, dimensions, and details shown on the Plans and in accordance with the Specifications for piles, reinforcing steel, structural steel, structural concrete and other items which constitute the completed structure. Item 407 concerns much with the methodology being used. The class of concrete to be used in the structure or part of the structure shall be as specified in Item 405, Structural Concrete.</p> <p>This item shall consist of the furnishing and placing of riprap, with or without grout as the case may be, with or without filter backing, furnished and constructed in accordance with this Specification and to the lines, grades, and dimensions shown on the Plans.</p>



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Field Inspector's QA/QC Work Guide
(Applicable for Box Culvert Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment
101)-Removal of Structures and Obstructions 101-1)- Pre-construction/As-stake survey	Instruct the contractor to carefully removed salvageable materials and turn it over to the proponent for their use. Disposable materials shall be deposited in an As soon as clearing is completed, the subcontractor, in the presence of the GEM Engineer, will then start pre-construction (as-stake) survey to establish elevations of the drainage lines and grades that will be used as basis in setting and quantifying the works done. Locations and elevations of drainage structure shall be according to plan unless changes are effected by the GEM Engineer to conform to certain field conditions.
103)-Structure Excavation	Unsuitable excavated materials must be disposed of and not to be utilized as backfill! This item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures. This may also include backfilling of pipe culverts and/or removal of excavated materials as provided in the specifications and when the GEM Engineer so order in conformity with the Plan. Other necessary items covered in the Technical Specifications may include diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill
104)-Embankment	Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m. at fraction thereof) at 150 mm thick (6") Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness determination test shall be conducted together with the GEM Materials Engineer
105)-Subgrade Preparation	This item shall consist of the preparation of the subgrade for the support of the overlaying structural layers. It shall extend to full width of the roadway
106)- Compaction equipment and density control strip	This Procedure will be used to determine density requirements of selected embankments, sub-grade, bases and bituminous concrete. The procedure will consist of control strip construction to establish target densities for the specified course plus use of sand-cone method of density testing equipment to determine in-place densities obtained during the construction process. Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The equipment shall be modern, efficient compacting units approved by the GEM Engineer. The compacting units may be of any type provided they are capable of compacting material and specified and meet the minimum requirements as contained herein
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201)-Aggregate Base Course	This item shall consist of furnishing, placing, and compacting of aggregate base course on a prepared sub-grade or sub-base in accordance with this Specification and the lines, grades, thickness, and typical cross-sections shown on the Plans, or as established by the GEM Engineer. Aggregate for base course shall consist of hard, durable particles or fragments of crushed slag, crushed gravel or natural gravel and filler of natural sand, crushed sand, or other finely divided mineral matter. The composite material shall be free from vegetable matter and lumps or balls of clay, and shall be of such nature that it can be compacted readily to form a firm, stable base.
300)-Aggregate Surface Course	This item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities
400)-Piling	This item shall consist of piling, furnished either driven or placed, cut, and spliced in accordance with this Specification and in conformity with the Plans. See types of piles indicated in the plans and specifications
401)-Railings	This item shall consist of furnishing or fabricating and/or placing railings for bridges and other structures of the material or combination of materials shown on the Plans, constructed in conformity with this Specification and to the lines, grades, and dimensions shown on the Plans. Railings shall be classified as concrete, steel, aluminum, or timber in accordance with the predominating material contained in each



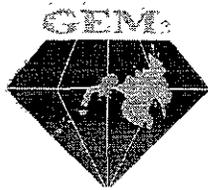
Field Inspector's QA/QC Work Guide
(Applicable for Box Culvert Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
<p>404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33</p>	<p>This Item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer.</p> <p>Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 6% variance in diameter is acceptable. Follow repair schedule indicated in the plans at all times</p>
<p>405)-Structural Concrete Concrete Class "A" (1 2 3) Concrete Class " B " (1 2 4)</p>	<p>This Item shall consist of furnishing, placing, and finishing concrete in all structures except pavements. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer.</p> <p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board. It shall not spread flat like "lugaw" in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days</p>
<p>Portland Cement</p>	<p>Use only Ordinary Portland Cement Type 1 or Type 1P. Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label. Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture. Cement bags shall be opened just prior to use.</p>
<p>Fine Aggregates</p>	<p>River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.</p>
<p>Coarse Aggregates</p>	<p>River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.</p>
<p>Water</p>	<p>Use only water that is clean and clear. Drinking water is acceptable. Presence of salts, oil and silt in water must be avoided. If source is questionable, Quality Test is required prior to use in concreting.</p>
<p>Concrete Mixing Admixtures</p>	<p>The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.</p>
<p>405-1)-Lean Concrete 407)-Concrete Structures</p>	<p>Ensure the base area is stable before pouring will be allowed. The required mixing ratio must be followed at all times.</p> <p>This item shall consist of the general description of the materials, equipment, workmanship and construction requirements of concrete structures and the concrete portions of composite structures conforming to the alignment, grades, design, dimensions, and details shown on the Plans and in accordance with the Specifications for piles, reinforcing steel, structural steel, structural concrete and other items which constitute the completed structure. Item 407 concerns much with the methodology being used. The class of concrete to be used in the structure or part of the structure shall be as specified in Item 405, Structural Concrete.</p>
<p>504)-Riprap and Grouted Riprap</p>	<p>This item shall consist of the furnishing and placing of riprap, with or without grout as the case may be, with or without filter backing, furnished and constructed in accordance with this Specification and to the lines, grades, and dimensions shown on the Plans.</p>



Field Inspector's QA/QC Work Guide
(Applicable for Box Culvert Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	<p>The grouted riprap shall be laid on a compacted fill according to the desired slope. Install batter boards to maintain the slope and thickness of the grouted riprap during construction. Alternate layers of stone and mortar to the full thickness of the masonry shall be maintained. All voids shall be filled with mortar. Rocks shall be of the specified quality and size and shall be laid on a stable formation.</p> <p>Check that only approved materials are used for cement mortar works. The specified mixing ratio of Portland cement to fine sand shall be followed at all times with only enough mixing water to produce a trowable mortar. Mixed cement mortar shall be applied within 30 minutes. Partially set cement mortar shall be disposed off and not retempered with water and reused.</p>
505) Stone Masonry	This Item shall consist of stone masonry in minor structures, headwalls for culverts, retaining walls at the toes of slopes, and other places called for on the Plans, constructed on the prepared foundation bed.
506)-Hand-laid Rock Embankment	This Item shall consist of hand laid rock embankment, as designated in the Bill of Quantities, constructed in accordance with this Specification, and in conformity with the lines and grades shown on the Plans or established by the GEM Engineer.
508)-Concrete Slope Protection	This Item shall consist of the furnishing and placing of concrete slope protection including all necessary excavation, a bed course, and reinforced concrete to the required thickness and extent to protect slopes against erosion. Construction details shall be as shown on the Plans.
509)-Gabions	This Item shall consist of furnishing and installing rock and wire mesh baskets (gabions) at the designated locations in accordance with this Specification and in conformity with the lines, grades, dimensions, and arrangements shown on the Plans or as ordered by the GEM Engineer.
703)-Aggregates	Uniformly graded sand and gravel, crushed slag or crushed stone. Its main classification is fine and coarse aggregates. Its grading classifications are according to its percentage of passing in different sieve sizes, compositions, soundness, abrasions, plasticity index and other bearing tests. Aggregates are classified to determine its use such as in structural concrete, concrete roads, pavements, sub-base course, base course or surface courses.
706)-Concrete, Clay Plastic and Fiber Pipe	This item covers several types of pipes that may include in the plans the following: non reinforced concrete pipe, reinforced concrete pipe, perforated concrete pipe, drain tile, porous concrete pipe, vitrified clay lined reinforced concrete pipe, perforated vitrified clay pipe, vitrified clay pipe, cradle invert clay pipe, asbestos cement pipe, perforated asbestos cement pipe, bituminized fiber pipe, perforated bituminized fiber pipe, reinforced concrete arch culvert, storm drain, and sewer pipe, reinforced concrete.
709)-Paints	This item covers all paint materials including vehicles, pigments, pastes, driers, thinners and mixed paints for steel and wooden structures. For small bridges, rubberized and reflector paint shall be used for guard rails, curves and gutter.
714)-Water	This item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical specification.
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plywood material.



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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks
					Actual		Required		
					psi	%	psi	%	(Passed or Failed)
Class A concrete	Class A-01			7			2130	71	
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

All concrete pouring must be supervised by the assigned GEM Field Inspector.

All concrete sampling must be supervised by the assigned GEM Field Inspector.

All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer

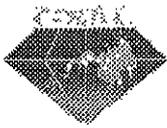
All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



GROWTH WITH
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List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
101)-Removal of Structures and Obstructions		Engineer's Certificate + Pictures
101-1) Pre-construction/As-stake survey		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
105)-Subgrade Preparation		Quality Test Report and Field Density Test Report
106)- Compaction equipment and density control strip		Quality Test Report and Field Density Test Report
200)-Aggregate Subbase Course		Quality Test Report and Field Density Test Report
201)-Aggregate Base Course		Quality Test Report and Field Density Test Report
300)-Aggregate Surface Course		Quality Test Report and Field Density Test Report
400)-Piling		Engineer's Certificate + Pictures
401)-Railings		Concrete Compressive Strength Test Report(refer for Concrete Structures)
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m. of concrete or fraction thereof.
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		Engineer's Certificate + Pictures
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
405-1)-Lean Concrete		Engineer's Certificate + Pictures
407)-Concrete Structures		Concrete Compressive Strength Test Report(refer for Concrete Structures)
504)-Riprap and Grouted Riprap		Engineer's Certificate + Pictures
505) Stone Masonry		Engineer's Certificate + Pictures
506)-Hand-laid Rock Embankment		Engineer's Certificate + Pictures
508)-Concrete Slope Protection		Engineer's Certificate + Pictures
509)-Gabions		Mill/Engineer's Certificate + Pictures
703)-Aggregates		Engineer's Certificate + Pictures
706)-Concrete, Clay Plastic and Fiber Pipe		Engineer's Certificate + Pictures
709)-Paints		Mill/Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period



Field Inspector's QA/QC Work Guide
(Applicable for Community/Trading Center Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment
1 01)-Removal of Structures & Obstructions	
1 01-1)-Site Preparation	Clearing works consist of removing and disposing all vegetables and debris, except those designated to remain in place which must be preserved from injury or defacement
1 01-2)-Lay-out of lines and grades	As soon as the subcontractor has mobilized the necessary initial manpower and construction materials on-site, the subcontractor's Project Engineer (P.E.) with the presence of GEM Engineer, shall establish the structure's horizontal alignment and vertical (elevation) controls as per plan using the survey instruments through the identified project bench
1 03)-Structure Excavation	Unsuitable excavated materials must be disposed of and not to be utilized as backfill. This item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures not otherwise provided for in the Specifications Except as provided for pipe culverts, the backfilling of completed structures and the disposal of all excavated materials shall be in accordance with these Specifications and in reasonably close conformity with the Plans or as established by the GEM Engineer. This item shall include necessary diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill. It shall also include the furnishing and placing of approved foundation fill material to replace unsuitable material encountered below the foundation elevation of structures
1 04)-Embankment	Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m. at fraction thereof) at 150 mm thick (6") Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness determination test shall be conducted together with the GEM Materials Engineer
1 05)-Subgrade Preparation	This item shall consist of the preparation of the subgrade for the support of the overlaying structural layers. It shall extend to full width of the roadway
1 06)- Compaction equipment and density control strip	This Procedure will be used to determine density requirements of selected embankments, sub-grade, bases and bituminous concrete. The procedure will consist of control strip construction to establish target densities for the specified course plus use of sand-cone method of density testing equipment to determine in-place densities obtained during the construction process. Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The equipment shall be modern, efficient compacting units approved by the GEM Engineer. The compacting units may be of any type provided they are capable of compacting material and specified and meet the minimum requirements as contained herein
3 00)-Aggregate Surface Course	This item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities.
4 00)-Piling	This item shall consist of piling, furnished either driven or placed, cut, and spliced in accordance with this Specification and in conformity with the Plans. See types of piles indicated in the plans and specifications
4 03)-Metal Structures	This work shall consist of steel structures and the steel structure portions of composite structures, constructed in conformity with the lines, grades, and dimensions shown on the Plans or established by the GEM Engineer. The work will include the furnishing, fabricating, hauling, erecting, welding, and painting of structural metals called for in the Special Provisions or shown on the Plans. Structural metals will include structural steel, rivets, welding, special and alloy steels, steel forgings and castings, and iron castings. This work will also include any incidental metal construction not otherwise provided for, all in accordance with these Specifications, Plans, and Special Provisions
4 04)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	This item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer



Field Inspector's QA/QC Work Guide
(Applicable for Community/Trading Center Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	<p>Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 6% variance in diameter is acceptable. Follow rebar schedule indicated in the plans at all times.</p>
<p>4.05-Structural Concrete Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)</p>	<p>This item shall consist of furnishing, placing, and finishing concrete in all structures except pavements. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer.</p> <p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board. It shall not spread flat like <i>"lugaw"</i> in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days.</p>
<p>Portland Cement</p>	<p>Use only Ordinary Portland Cement Type 1 or Type 1P. Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label. Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture. Cement bags shall be opened just prior to use.</p>
<p>Fine Aggregates</p>	<p>River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.</p>
<p>Coarse Aggregates</p>	<p>River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.</p>
<p>Water</p>	<p>Use only water that is clean and clear. Drinking water is acceptable. Presence of salts, oil and silt in water must be avoided. If source is questionable, Quality Test is required prior to use in concreting.</p>
<p>Concrete Mixing Admixtures</p>	<p>The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.</p>
<p>7.04)-Masonry Units</p>	<p>This includes concrete units such as bricks, hollow blocks, concrete blocks and decorative blocks. This may also include plastering and finishing as maybe indicated in the Plans and Specifications.</p>
<p>7.06)-Concrete, Clay Plastic and Fiber Pipe</p>	<p>This item covers several types of pipes that may include in the plans the following: non reinforced concrete pipe, reinforced concrete pipe, perforated concrete pipe, drain tile, porous concrete pipe, vitrified clay lined reinforced concrete pipe, perforated vitrified clay pipe, vitrified clay pipe, cradle invert clay pipe, asbestos cement pipe, perforated asbestos cement pipe, bituminized fiber pipe, perforated bituminized fiber pipe, reinforced concrete arch culvert, storm drain, and sewer pipe, reinforced concrete.</p>
<p>7.09)-Paints</p>	<p>This item covers all paint materials including vehicles, pigments, pastes, driers, thinners and mixed paints for steel and wooden structures. For small bridges, rubberized and reflector paint shall be used for guard rails, curves and gutter.</p>
<p>7.14)-Water</p>	<p>This item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical specification.</p>
<p>SPL-1)-Tinsmithry Works</p>	<p>Corrugated 0.35 mm thick roofing sheet (Including Ridge Roll & End Flashing) of which color be specified by the GEM Engineer or as indicated in the drawings, Color 0.35 mm thick Galva Steel roofing sheet (Including Ridge Roll & End Flashing) of which color be specified by the GEM Engineer or as indicated in the drawings.</p>



GROWTH WITH
EQUITY IN
MINDANAO 3
PROGRAM

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Field Inspector's QA/QC Work Guide
(Applicable for Community/Trading Center Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	1.3 Metalplus Corrugated 1.5mm thick roofing sheet (Including Ridge Roll & End Flashing) of which color be specified by the GEM Engineer or as indicated in the drawings
	Prior to installation of roofing, purlins shall have been placed and spaced properly to fit the length of the roofing sheets to be used such that the centerline of the purlins at end laps are 150 mm from the bottom line of end laps, and intermediate purlins placed equidistantly
	Installation of roofing sheets shall begin at the lower part of the roof and proceed toward the direction on monsoon wind with side laps 2-1/2 corrugations and end laps at 250 mm minimum
	Ridge Rolls shall lap at least 600mm over roofing sheets or as shown on the plans and shall be riveted at every second corrugation.
	Flashing shall be at least 600mm over end lapping with edge turned down or as shown on the plans and shall be riveted of every location of purlins
SPL-2)-Electrical Works	The electrical items under this contract shall be installed according to the requirements of the latest Philippine Electrical Code, the rules and regulations of the Authority concerned, and the requirements of the local power company. No work shall conflict with the National and the Local Ordinances or laws governing the installation of the electrical works and all laws and ordinances are hereby made part of these specifications. The subcontractor is required to meet these requirements.
	The contract drawings, which constitute an integral part of this contract, shall serve as working drawings. They indicate the general layout of the complete electrical system and show the arrangements of feeder circuits, outlets, and switches control panel boards, service equipment fixtures and other works. The subcontractor shall check the architectural, structural and plumbing plans to avoid possible installation conflicts. Should drastic changes from original plans be necessary to resolve such conflicts, the subcontractor shall notify the GEM Engineer and shall secure from him written approval and agreement concerning necessary changes and adjustments before altered installation work starts.
	The subcontractor shall submit to the GEM Engineer for approval samples of circuits, wire cables, wiring devices, finished plates and any items as may be required by the GEM Engineer. The subcontractor shall prepare and submit for approval the shop drawings of catalogues of fixtures, lamps and equipment.
	The plans are based upon architectural plans and details and show conditions as accurately as is possible to indicate them in scale. The plans are indicative and do not necessarily show all fittings, etc., necessary to suit the site conditions. The location of lighting fixtures, convenience outlets and switches shown on the plans are approximate. The subcontractor shall be responsible for the proper location in order to make them conform to the architectural details.
	The subcontractor shall guarantee that the electric systems are free from all defective workmanship and materials and will remain so for a period of one (1) year from date of acceptance of work. Any defects, appearing within this period shall be remedied by the subcontractor at his own expense. The subcontractor shall identify and save the GEM Engineer and his duly authorized representative against all liability for damages arising from injuries or disabilities to persons or damage to property occasioned by any act or omission of the subcontractor, including and all expenses, legal or otherwise, which may be incurred by the GEM Engineer in the defense of any claim, action or suit.
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plywood material.



GROWTH WITH
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MINDANAO 3
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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks
					Actual		Required		
					psi	%	psi	%	
Class A concrete	Class A-01			7			2130	71	(Passed or Failed)
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	(Passed or Failed)
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

All concrete pouring must be supervised by the assigned GEM Field Inspector.

All concrete sampling must be supervised by the assigned GEM Field Inspector.

All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer

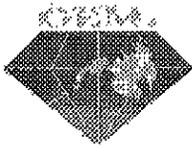
All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



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E-mail gemakati@mozcom.com

List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
101)-Removal of Structures and Obstructions		
101-1)Site Preparation		Engineer's Certificate + Pictures
101-2)Lay-out of lines and grades		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
105)-Subgrade Preparation		Quality Test Report and Field Density Test Report
106)- Compaction equipment and density control strip		Engineer's Certificate + Pictures
300)-Aggregate Surface Course		Quality Test Report and Field Density Test Report
400)-Piling		Engineer's Certificate + Pictures
403)-Metal Structures		Engineer's Certificate + Pictures
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 . 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m of concrete or fraction thereof.
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		Engineer's Certificate + Pictures
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
704)-Masonry Units		Engineer's Certificate + Pictures
706)-Concrete, Clay Plastic and Fiber Pipe		Engineer's Certificate + Pictures
709)-Paints		Mills/Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
SPL-1 Tinsmithry Works		Mills/Engineer's Certificate + Pictures
SPL-2 Electrical Works		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period

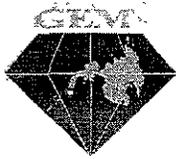


Field Inspector's QA/QC Work Guide
(Applicable for Drainage Canal Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment.
100)-Clearing and Grubbing	This item shall consist of clearing, grubbing, removing, and disposing all vegetables and debris. The work shall also include the preservation from injury or defacement of all objects designated to remain.
101)-Removal of Structures and Obstructions	As the case may be, this item shall consist of the removal, wholly or in part, and satisfactory disposal of all buildings, fences, structures, old pavements, abandoned pipelines, and any other obstructions which are not designated or permitted to remain. It shall also include the salvaging of designated materials and backfilling the resulting trenches, holes, and pits.
102)-Excavation	This Item shall consist of borrow excavation and the disposal of material in accordance with this Specification and in conformity with the lines, grades, and dimensions shown on the Plans or established by the GEM Engineer.
103)-Structure Excavation	This Item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures. This may also include backfilling of pipe culverts and/or removal of excavated materials as provided in the specifications and when the GEM Engineer so order in conformity with the Plan. Other necessary items covered in the Technical Specifications may include diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill.
104)-Embankment	Quality Test must first be conducted on the embankment materials You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m.at fraction thereof) at 150 mm thick (6") . Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness dtermination test shall be conducted together with the GEM Materials Engineer.
200)- Aggregate Sub-base Course	This Item shall consist of furnishing, placing, and compacting of an aggregate sub-base course on prepared sub-grade.
300)- Aggregate Surface Course	This Item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities.
306)-Portland Cement Concrete Pavement	This item shall consist of a pavement of Portland Cement Concrete, with or without reinforcement, constructed on the prepared base in accordance with this Specification and in conformity with the lines, grades, thickness, and typical cross sections shown on the Plans.
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	This Item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	<p>Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance. No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 6% variance in diameter is acceptable. Follow rebar schedule indicated in the plans at all times.</p>
<p>405)-Structural Concrete Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)</p>	<p>This item shall consist of furnishing, placing, and finishing concrete in all structures except pavements. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer</p> <p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board. It shall not spread flat like "<i>jugaw</i>" in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days.</p>
<p>Portland Cement</p>	<p>Use only Ordinary Portland Cement Type 1 or Type 1P. Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label. Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture. Cement bags shall be opened just prior to use.</p>
<p>Fine Aggregates</p>	<p>River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.</p>
<p>Coarse Aggregates</p>	<p>River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.</p>
<p>Water</p>	<p>Use only water that is clean and clear. Drinking water is acceptable. Presence of salts, oil and silt in water must be avoided. If source is questionable, Quality Test is required prior to use in concreting.</p>
<p>Concrete Mixing Admixtures</p>	<p>The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.</p>
<p>407)-Concrete Structures</p>	<p>This item shall consist of the general description of the materials, equipment, workmanship, and construction requirements which constitute the complete structure.</p>
<p>500)-Pipe Culverts and Storm Drains</p>	<p>This item shall consist of the construction or reconstruction of pipe culverts and storm drains, hereinafter referred to as "conduit" which may include the following: a) Zinc coated (galvanized) corrugated iron or steel culverts and underdrains; b) Cast iron culvert pipe; c) Concrete sewer, storm drain, and culvert pipe; d) Reinforced concrete culvert, storm drain, and sewer pipe ; e) Bituminous coated corrugated metal culvert pipe and pipe arches; f) Reinforced concrete arch culvert, storm</p>

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
504)-Riprap and Grouted Riprap	<p>This Item shall consist of the furnishing and placing of riprap, with or without grout as the case may be, with or without filter backing, furnished and constructed in accordance with this Specification and to the lines, grades, and dimensions shown on the Plans.</p> <p>The grouted riprap shall be laid on a compacted fill according to the desired slope. Install batter boards to maintain the slope and thickness of the grouted riprap during construction. Alternate layers of stone and mortar to the full thickness of the masonry shall be maintained. All voids shall be filled with mortar. Rocks shall be of the specified quality and size and shall be laid on a stable formation.</p>
	<p>Check that only approved materials are used for cement mortar works. The specified mixing ratio of Portland cement to fine sand shall be followed at all times with only enough mixing water to produce a trowable mortar. Mixed cement mortar shall be applied within 30 minutes. Partially set cement mortar shall be disposed off and not retempered with water and reused.</p>
603)-Guardrails	<p>This Item shall consist of furnishing and constructing posts and guardrails of the types called for in the contract and in accordance with this Specification at the locations and in conformity with the lines and grades shown on the Plans or as required by the GEM Engineer.</p>
703)-Aggregates	<p>Uniformly graded sand and gravel, crushed slag or crushed stone. Its main classification is fine and coarse aggregates. Its grading classifications are according to its percentage of passing in different sieve sizes, compositions, soundness, abrasions, plasticity index and other bearing tests. Aggregates are classified to determine its use such as in structural concrete, concrete roads, pavements, sub-base course, base course or surface course.</p>
704)-Masonry Units	<p>This includes concrete units such as bricks, hollow blocks, concrete blocks and decorative blocks. This may also include plastering and finishing as maybe indicated in the Plans and Specifications.</p>
705)-Joint Materials	<p>This item may consists of joint fillers, joint mortar, rubber gaskets, oakum, mortar for masonry beds and joints, rubber water stops, plastic water stops, hot poured pipe-joint sealing compound, pipe-joint packing compound and/or preformed plastic sealing compound.</p>
709)-Paints	<p>This item covers all paint materials including vehicles, pigments, pastes, driers, thinners and mixed paints for steel and wooden structures. For small bridges, rubberized and reflector paint shall be used for guard rails, curves and gutter.</p>
714)-Water	<p>This item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical specification.</p>
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	
	<p>Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plyboard material</p>



GROWTH WITH
EQUITY IN
MINDANAO 3
PROGRAM

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225-1569 to 75 Fax: (63-82)225-
1479 E-mail:
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Avenues Makati City, 1200
Philippines Tel:
(632) 812-1647
Fax: (632) 818-8900
E-mail: gemakati@mozcom.com

CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks (Passed or Failed)
					Actual		Required		
					psi	%	psi	%	
Class A concrete	Class A-01			7			2130	71	
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

All concrete pouring must be supervised by the assigned GEM Field Inspector.

All concrete sampling must be supervised by the assigned GEM Field Inspector.

All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer

All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



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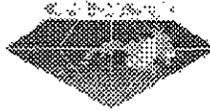
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Fax: (632) 818-8900
E-mail gemakati@gnoc.com

List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
100)-Clearing and Grubbing		Engineer's Certificate + Pictures
101)-Removal of Structures and Obstructions		Engineer's Certificate + Pictures
102)-Excavation		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
200)-Aggregate Sub-base Course		Quality Test Report and Field Density Test Report
300)-Aggregate Surface Course		Quality Test Report and Field Density Test Report
306)-Portland Cement Concrete Pavement		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu m. of concrete or fraction thereof.
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 . 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu m. of concrete or fraction thereof.
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		Engineer's Certificate + Pictures
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
407)-Concrete Structures		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m. of concrete or fraction thereof.
500)-Pipe Culverts and Storm Drains		Engineer's Certificate + Pictures
504)-Riprap and Grouted Riprap		Engineer's Certificate + Pictures
603)-Guardrails		Mill/Engineer's Certificate + Pictures
703)-Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
704)-Masonry Units		Engineer's Certificate + Pictures
705)-Joint Materials		Engineer's Certificate + Pictures
709)-Paints		Mill/Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period



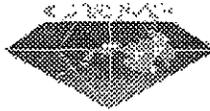
Field Inspector's QA/QC Work Guide
(Applicable for Grains Warehouse and Solar Dryer Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment
101)-Removal of Structures & Obstructions	
101-1)-Site Preparation	Clearing works consist of removing and disposing all vegetables and debris, except those designated to remain in place which must be preserved from injury or defacement
101-2)-Lay-out of lines and grades	As soon as the subcontractor has mobilized the necessary initial manpower and construction materials on-site, the subcontractor's Project Engineer (P.E.) with the presence of GEM Engineer, shall establish the structure's horizontal alignment and vertical (elevation) controls as per plan using the survey instruments through the identified project bench
103)-Structure Excavation	Unsuitable excavated materials must be disposed of and not to be utilized as backfill This Item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures not otherwise provided for in the Specifications. Except as provided for pipe culverts, the backfilling of completed structures and the disposal of all excavated materials shall be in accordance with these Specifications and in reasonably close conformity with the Plans or as established by the GEM Engineer. This Item shall include necessary diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of crabs and cofferdams, and furnishing the materials therefore, and the subsequent removal of crabs and cofferdams and the placing of all necessary backfill. It shall also include the furnishing and placing of approved foundation fill material to replace unsuitable material encountered below the foundation elevation of structures
104)-Embankment	Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m. at fraction thereof) at 150 mm thick (6") . Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness determination test shall be conducted together with the GEM Materials Engineer This Item shall consist of the construction of embankment in accordance with this Specification and in conformity with the lines, grades, and dimensions shown on the Plans or established by the GEM Engineer
106)- Compaction equipment and density control strip	This Procedure will be used to determine density requirements of selected embankments, sug-garde, bases and bituminous concrete. The procedure will consist of control strip construction to establish target densities for the specified course plus use of sand-cone method of density testing equipment to determine in-place densities obtained during the construction process. Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The equipment shall be modern, efficient compacting units approved by the GEM Engineer. The compacting units may be of any type provided they are capable of compacting material and specified and meet the minimum requirements as contained herein
300)-Aggregate Surface Course	This Item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities
400)-Piling	This Item shall consist of piling, furnished either driven or placed, cut, and spliced in accordance with this Specification and in conformity with the Plans. See types of piles indicated in the plans and specifications
403)-Metal Structures	This work shall consist of steel structures and the steel structure portions of composite structures, constructed in conformity with the lines, grades, and dimensions shown on the Plans or established by the GEM Engineer. The work will include the furnishing, fabricating, hauling, erecting, welding, and painting of structural metals called for in the Special Provisions or shown on the Plans. Structural metals will include structural steel, rivets, welding, special and alloy steels, steel forgings and castings, and iron castings. This work will also include any incidental metal construction not otherwise provided for, all in accordance with these Specifications, Plans, and Special Provisions
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	This Item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer



Field Inspector's QA/QC Work Guide
(Applicable for Grains Warehouse and Solar Dryer Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	<p>Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 8% variance in diameter is acceptable. Follow rebar schedule indicated in the plans at all times.</p>
<p>405)-Structural Concrete Concrete Class "A" (1 . 2 3) Concrete Class " B " (1 . 2 4)</p>	<p>This item shall consist of furnishing, placing, and finishing concrete in all structures except pavements. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer.</p> <p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board. It shall not spread flat like "<i>lugaw</i>" in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days.</p>
<p>Portland Cement</p>	<p>Use only Ordinary Portland Cement Type 1 or Type 1P. Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label. Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture. Cement bags shall be opened just prior to use.</p>
<p>Fine Aggregates</p>	<p>River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.</p>
<p>Coarse Aggregates</p>	<p>River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.</p>
<p>Water</p>	<p>Use only water that is clean and clear. Drinking water is acceptable. Presence of salts, oil and silt in water must be avoided. If source is questionable, Quality Test is required prior to use in concreting.</p>
<p>Concrete Mixing Admixtures</p>	<p>The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.</p>
<p>704)-Masonry Units</p>	<p>This includes concrete units such as bricks, hollow blocks, concrete blocks and decorative blocks. This may also include plastering and finishing as maybe indicated in the Plans and Specifications.</p>
<p>706)-Concrete, Clay Plastic and Fiber Pipe</p>	<p>This item covers several types of pipes that may include in the plans the following: non reinforced concrete pipe, reinforced concrete pipe, perforated concrete pipe, drain tile, porous concrete pipe, vitrified clay lined reinforced concrete pipe, perforated vitrified clay pipe, vitrified clay pipe, cradle invert clay pipe, asbestos cement pipe, perforated asbestos cement pipe, bituminized fiber pipe, perforated bituminized fiber pipe, reinforced concrete arch culvert, storm drain, and sewer pipe, reinforced concrete.</p>
<p>709)-Paints</p>	<p>This item covers all paint materials including vehicles, pigments, pastes, driers, thinners and mixed paints for steel and wooden structures. For small bridges, rubberized and reflector paint shall be used for guard rails, curves and gutter.</p>
<p>714)-Water</p>	<p>This item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical specification.</p>
<p>SPL-1)-Tinsmithry Works</p>	<p>Corrugated 0.35 mm thick roofing sheet (Including Ridge Roll & End Flashing) of which color be specified by the GEM Engineer or as indicated in the drawings, Color 0.35 mm thick Galva Steel roofing sheet (Including Ridge Roll & End Flashing) of which color be specified by the GEM Engineer or as indicated in the drawings.</p>



Field Inspector's QA/QC Work Guide
(Applicable for Grains Warehouse and Solar Dryer Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	1.3 Metalplus Corrugated 1.5mm thick roofing sheet (Including Ridge Roll & End Flashing) of which color be specified by the GEM Engineer or as indicated in the drawings
	Prior to installation of roofing, purlins shall have been placed and spaced properly to fit the length of the roofing sheets to be used such that the centerline of the purlins at end laps are 150 mm from the bottom line of end laps, and intermediate purlins placed equidistantly
	Installation of roofing sheets shall begin at the lower part of the roof and proceed toward the direction on monsoon wind with side laps 2-1/2 corrugations and end laps at 250 mm minimum
	Ridge Rolls shall lap at least 600mm over roofing sheets or as shown on the plans and shall be riveted at every second corrugation.
	Flashing shall be at least 600mm over end lapping with edge turned down or as shown on the plans and shall be riveted of every location of purlins
SPL-2)-Electrical Works	The electrical items under this contract shall be installed according to the requirements of the latest Philippine Electrical Code, the rules and regulations of the Authority concerned, and the requirements of the local power company. No work shall conflict with the National and the Local Ordinances or laws governing the installation of the electrical works and all laws and ordinances are hereby made part of these specifications. The subcontractor is required to meet these requirements.
	The contract drawings, which constitute an integral part of this contract, shall serve as working drawings. They indicate the general layout of the complete electrical system and show the arrangements of feeder circuits, outlets, and switches control panel boards, service equipment fixtures and other works. The subcontractor shall check the architectural, structural and plumbing plans to avoid possible installation conflicts. Should drastic changes from original plans be necessary to resolve such conflicts, the subcontractor shall notify the GEM Engineer and shall secure from him written approval and agreement concerning necessary changes and adjustments before altered installation work starts.
	The subcontractor shall submit to the GEM Engineer for approval samples of circuits, wire cables, wiring devices, finished plates and any items as may be required by the GEM Engineer. The subcontractor shall prepare and submit for approval the shop drawings of catalogues of fixtures, lamps and equipment.
	The plans are based upon architectural plans and details and show conditions as accurately as is possible to indicate them in scale. The plans are indicative and do not necessarily show all fittings, etc., necessary to suit the site conditions. The location of lighting fixtures, convenience outlets and switches shown on the plans are approximate. The subcontractor shall be responsible for the proper location in order to make them conform to the architectural details.
	The subcontractor shall guarantee that the electric systems are free from all defective workmanship and materials and will remain so for a period of one (1) year from date of acceptance of work. Any defects, appearing within this period shall be remedied by the subcontractor at his own expense. The subcontractor shall identify and save the GEM Engineer and his duly authorized representative against all liability for damages arising from injuries or disabilities to persons or damage to property occasioned by any act or omission of the subcontractor, including and all expenses, legal or otherwise, which may be incurred by the GEM Engineer in the defense of any claim, action or suit.
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plywood material.



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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks
					Actual		Required		
					psi	%	psi	%	(Passed or Failed)
Class A concrete	Class A-01			7			2130	71	
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

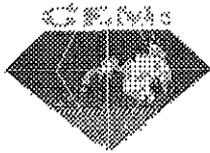
- All concrete pouring must be supervised by the assigned GEM Field Inspector.
- All concrete sampling must be supervised by the assigned GEM Field Inspector.
- All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer
- All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



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List of QA/QC Requirements

Project Name :
Project Location :
Contractor :

DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
101)-Removal of Structures and Obstructions		
101-1)Site Preparation		Engineer's Certificate + Pictures
101-2)Lay-out of lines and grades		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
106)- Compaction equipment and density control strip		Engineer's Certificate + Pictures
300)-Aggregate Surface Course		Quality Test Report and Field Density Test Report
400)-Piling		Engineer's Certificate + Pictures
403)-Metal Structures		Engineer's Certificate + Pictures
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu m. of concrete or fraction thereof
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		Engineer's Certificate + Pictures
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
704)-Masonry Units		Engineer's Certificate + Pictures
706)-Concrete, Clay Plastic and Fiber Pipe		Engineer's Certificate + Pictures
709)-Paints		Mill/Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
SPL-1 Tinsmithry Works		Mill/Engineer's Certificate + Pictures
SPL-2 Electrical Works		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period



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E-mail: gemakab@mozcom.com

Field Inspector's QA/QC Work Guide
(Applicable for Grains Warehouse Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment
101)-Removal of Structures & Obstructions	
101 -1)-Site Preparation	Cleaning works consist of removing and disposing all vegetables and debris, except those designated to remain in place which must be preserved from injury or defacement
101 -2)-Lay-out of lines and grades	As soon as the subcontractor has mobilized the necessary initial manpower and construction materials on-site, the subcontractor's Project Engineer (P E) with the presence of GEM Engineer, shall establish the structure's horizontal alignment and vertical (elevation) controls as per plan using the survey instruments through the identified project bench
103)-Structure Excavation	Unsuitable excavated materials must be disposed of and not to be utilized as backfill This item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures not otherwise provided for in the Specifications. Except as provided for pipe culverts, the backfilling of completed structures and the disposal of all excavated materials shall be in accordance with these Specifications and in reasonably close conformity with the Plans or as established by the GEM Engineer. This item shall include necessary diverting of live streams, bailing, pumping, dewatering, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill. It shall also include the furnishing and placing of approved foundation fill material to replace unsuitable material encountered below the foundation elevation of structures
104)-Embankment	Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m.at fraction thereof) at 150 mm thick (6") Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness determination test shall be conducted together with the GEM Materials Engineer This item shall consist of the construction of embankment in accordance with this Specification and in conformity with the lines, grades, and dimensions shown on the Plans or established by the GEM Engineer
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300)-Aggregate Surface Course	This item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities
400)-Piling	This item shall consist of piling, furnished either driven or placed, cut, and spliced in accordance with this Specification and in conformity with the Plans. See types of piles indicated in the plans and specifications
403)-Metal Structures	This work shall consist of steel structures and the steel structure portions of composite structures, constructed in conformity with the lines, grades, and dimensions shown on the Plans or established by the GEM Engineer. The work will include the furnishing, fabricating, hauling, erecting, welding, and painting of structural metals called for in the Special Provisions or shown on the Plans. Structural metals will include structural steel, rivets, welding, special and alloy steels, steel forgings and castings, and iron castings. This work will also include any incidental metal construction not otherwise provided for, all in accordance with these Specifications, Plans, and Special Provisions
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	This item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer



Field Inspector's QA/QC Work Guide
(Applicable for Grains Warehouse Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	<p>Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance. No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 6% variance in diameter is acceptable. Follow rebar schedule indicated in the plans at all times</p>
<p>405)-Structural Concrete Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 . 2 : 4)</p>	<p>This item shall consist of furnishing, placing, and finishing concrete in all structures except pavements. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer</p> <p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board. It shall not spread flat like "<i>lugaw</i>" in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days</p>
<p>Portland Cement</p>	<p>Use only Ordinary Portland Cement Type 1 or Type 1P. Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label. Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture. Cement bags shall be opened just prior to use.</p>
<p>Fine Aggregates</p>	<p>River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.</p>
<p>Coarse Aggregates</p>	<p>River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.</p>
<p>Water</p>	<p>Use only water that is clean and clear. Drinking water is acceptable. Presence of salts, oil and silt in water must be avoided. If source is questionable, Quality Test is required prior to use in concreting.</p>
<p>Concrete Mixing Admixtures</p>	<p>The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.</p>
<p>704)-Masonry Units</p>	<p>This includes concrete units such as bricks, hollow blocks, concrete blocks and decorative blocks. This may also include plastering and finishing as maybe indicated in the Plans and Specifications.</p>
<p>706)-Concrete, Clay Plastic and Fiber Pipe</p>	<p>This item covers several types of pipes that may include in the plans the following: non reinforced concrete pipe, reinforced concrete pipe, perforated concrete pipe, drain tile, porous concrete pipe, vitrified clay lined reinforced concrete pipe, perforated vitrified clay pipe, vitrified clay pipe, cradle invert clay pipe, asbestos cement pipe, perforated asbestos cement pipe, bituminized fiber pipe, perforated bituminized fiber pipe, reinforced concrete arch culvert, storm drain, and sewer pipe, reinforced concrete.</p>
<p>709)-Paints</p>	<p>This item covers all paint materials including vehicles, pigments, pastes, driers, thinners and mixed paints for steel and wooden structures. For small bridges, rubberized and reflector paint shall be used for guard rails, curves and gutter.</p>
<p>714)-Water</p>	<p>This item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical specification.</p>
<p>SPL-1)-Tinsmithry Works</p>	<p>Corrugated 0.35 mm thick roofing sheet (Including Ridge Roll & End Flashing) of which color be specified by the GEM Engineer or as indicated in the drawings, Color 0.35 mm thick Galva Steel roofing sheet (Including Ridge Roll & End Flashing) of which color be specified by the GEM Engineer or as indicated in the drawings</p>



GROWTH WITH
EQUITY IN
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Quality Assurance/Quality Control Manual
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Field Inspector's QA/QC Work Guide
(Applicable for Grains Warehouse Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	1.3 Metalplus Corrugated 1.5mm thick roofing sheet (Including Ridge Roll & End Flashing) of which color be specified by the GEM Engineer or as indicated in the drawings
	Prior to installation of roofing, purlins shall have been placed and spaced properly to fit the length of the roofing sheets to be used such that the centerline of the purlins at end laps are 150 mm from the bottom line of end laps, and intermediate purlins placed equidistantly
	Installation of roofing sheets shall begin at the lower part of the roof and proceed toward the direction on monsoon wind with side laps 2-1/2 corrugations and end laps at 250 mm minimum
	Ridge Rolls shall lap at least 600mm over roofing sheets or as shown on the plans and shall be riveted at every second corrugation
	Flashing shall be at least 600mm over end lapping with edge turned down or as shown on the plans and shall be riveted of every location of purlins
SPL-2)-Electrical Works	The electrical items under this contract shall be installed according to the requirements of the latest Philippine Electrical Code, the rules and regulations of the Authority concerned, and the requirements of the local power company. No work shall conflict with the National and the Local Ordinances or laws governing the installation of the electrical works and all laws and ordinances are hereby made part of these specifications. The subcontractor is required to meet these requirements
	The contract drawings, which constitute an integral part of this contract, shall serve as working drawings. They indicate the general layout of the complete electrical system and show the arrangements of feeder circuits, outlets, and switches control panel boards, service equipment fixtures and other works. The subcontractor shall check the architectural, structural and plumbing plans to avoid possible installation conflicts. Should drastic changes from original plans be necessary to resolve such conflicts, the subcontractor shall notify the GEM Engineer and shall secure from him written approval and agreement concerning necessary changes and adjustments before altered installation work starts
	The subcontractor shall submit to the GEM Engineer for approval samples of circuits, wire cables, wiring devices, finished plates and any items as may be required by the GEM Engineer. The subcontractor shall prepare and submit for approval the shop drawings of catalogues of fixtures, lamps and equipment
	The plans are based upon architectural plans and details and show conditions as accurately as is possible to indicate them in scale. The plans are indicative and do not necessarily show all fittings, etc., necessary to suit the site conditions. The location of lighting fixtures, convenience outlets and switches shown on the plans are approximate. The subcontractor shall be responsible for the proper location in order to make them conform to the architectural details
	The subcontractor shall guarantee that the electric systems are free from all defective workmanship and materials and will remain so for a period of one (1) year from date of acceptance of work. Any defects, appearing within this period shall be remedied by the subcontractor at his own expense. The subcontractor shall identify and save the GEM Engineer and his duly authorized representative against all liability for damages arising from injuries or disabilities to persons or damage to property occasioned by any act or omission of the subcontractor, including and all expenses, legal or otherwise, which may be incurred by the GEM Engineer in the defense of any claim, action or suit
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	
	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plyboard material



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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks
					Actual		Required		
					psi	%	psi	%	
Class A concrete	Class A-01			7			2130	71	(Passed or Failed)
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

All concrete pouring must be supervised by the assigned GEM Field Inspector.

All concrete sampling must be supervised by the assigned GEM Field Inspector.

All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer

All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



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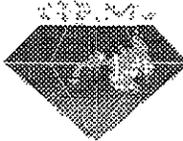
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List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

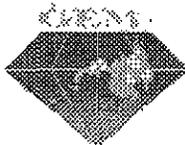
DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
101)-Removal of Structures and Obstructions		
101-1)Site Preparation		Engineer's Certificate + Pictures
101-2)Lay-out of lines and grades		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
106)- Compaction equipment and density control strip		Engineer's Certificate + Pictures
300)-Aggregate Surface Course		Quality Test Report and Field Density Test Report
400)-Piling		Engineer's Certificate + Pictures
403)-Metal Structures		Engineer's Certificate + Pictures
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m. of concrete or fraction thereof.
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		Engineer's Certificate + Pictures
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
704)-Masonry Units		Engineer's Certificate + Pictures
706)-Concrete, Clay Plastic and Fiber Pipe		Engineer's Certificate + Pictures
709)-Paints		Mills/Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
SPL-1 Tinsmithry Works		Mills/Engineer's Certificate + Pictures
SPL-2 Electrical Works		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period



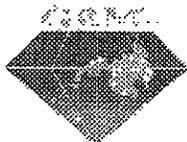
Field Inspector's QA/QC Work Guide
(Applicable for Irrigation System Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment.
100)-Clearing and Grubbing	This item shall consist of clearing, grubbing, removing, and disposing all vegetables and debris. The work shall also include the preservation from injury or defacement of all objects designated to remain.
101)-Removal of Structures and Obstructions	As the case may be, this item shall consist of the removal, wholly or in part, and satisfactory disposal of all buildings, fences, structures, old pavements, abandoned pipelines, and any other obstructions which are not designated or permitted to remain. It shall also include the salvaging of designated materials and backfilling the resulting trenches, holes, and pits.
102)-Excavation	This item shall consist of borrow excavation and the disposal of material in accordance with this Specification and in conformity with the lines, grades, and dimensions shown on the Plans or established by the GEM Engineer
103)-Structure Excavation	This item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures. This may also include backfilling of pipe culverts and/or removal of excavated materials as provided in the specifications and when the GEM Engineer so order in conformity with the Plan. Other necessary items covered in the Technical Specifications may include diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill.
104)-Embankment	Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m. at fraction thereof) at 150 mm thick (6") Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness determination test shall be conducted together with
200)- Aggregate Sub-base Course	This item shall consist of furnishing, placing, and compacting of an aggregate sub-base course on prepared sub-grade.
300)- Aggregate Surface Course	This item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities
306)-Portland Cement Concrete Pavement	This item shall consist of a pavement of Portland Cement Concrete, with or without reinforcement, constructed on the prepared base in accordance with this Specification and in conformity with the lines, grades, thickness, and typical cross sections shown on the Plans.
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	This item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer. Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance. No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 6% variance in diameter is acceptable. Follow rebar schedule indicated in the plans at all times



Field Inspector's QA/QC Work Guide
(Applicable for Irrigation System Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
<p>405)-Structural Concrete Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)</p>	<p>This Item shall consist of furnishing, placing, and finishing concrete in all structures except pavements. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer.</p> <p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board. It shall not spread flat like "lugaw" in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days.</p>
<p>Portland Cement</p>	<p>Use only Ordinary Portland Cement Type 1 or Type 1P. Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture Cement bags shall be opened just prior to use.</p>
<p>Fine Aggregates</p>	<p>River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.</p>
<p>Coarse Aggregates</p>	<p>River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.</p>
<p>Water</p>	<p>Use only water that is clean and clear. Drinking water is acceptable Presence of salts, oil and silt in water must be avoided If source is questionable, Quality Test is required prior to use in concreting.</p>
<p>Concrete Mixing Admixtures</p>	<p>The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.</p>
<p>407)-Concrete Structures 500)-Pipe Culverts and Storm Drains</p>	<p>This Item shall consist of the general description of the materials, equipment, workmanship, and construction requirements which constitute the complete structure.</p> <p>This Item shall consist of the construction or reconstruction of pipe culverts and storm drains, hereinafter referred to as "conduit" which may include the following: a) Zinc coated (galvanized) corrugated iron or steel culverts and underdrains, b) Cast iron culvert pipe, c) Concrete sewer, storm drain, and culvert pipe; d) Reinforced concrete culvert, storm drain, and sewer pipe ; e) Bituminous coated corrugated metal culvert pipe and pipe arches; f) Reinforced concrete arch culvert, storm drain, and sewer.</p>
<p>504)-Riprap and Grouted Riprap</p>	<p>This Item shall consist of the furnishing and placing of riprap, with or without grout as the case may be, with or without filter backing, furnished and constructed in accordance with this Specification and to the lines, grades, and dimensions shown on the Plans.</p>



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Field Inspector's QA/QC Work Guide
(Applicable for Irrigation System Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	The grouted riprap shall be laid on a compacted fill according to the desired slope. Install batter boards to maintain the slope and thickness of the grouted riprap during construction. Alternate layers of stone and mortar to the full thickness of the masonry shall be maintained. All voids shall be filled with mortar. Rocks shall be of the specified quality and size and shall be laid on a stable formation.
	Check that only approved materials are used for cement mortar works. The specified mixing ratio of Portland cement to fine sand shall be followed at all times with only enough mixing water to produce a trowable mortar. Mixed cement mortar shall be applied within 30 minutes. Partially set cement mortar shall be disposed off and not retempered with water and reused.
505)-Stone Masonry	This item shall consist of stone masonry in minor structures, headwalls for culverts, retaining walls at the toes of slopes, and other places called for on the Plans, constructed on the prepared foundation bed.
506)-Hand-laid Rock Embankment	This item shall consist of hand laid rock embankment, as designated in the Bill of Quantities, constructed in accordance with this Specification, and in conformity with the lines and grades shown on the Plans or established by the GEM Engineer.
603)-Guardrails	This item shall consist of furnishing and constructing posts and guardrails of the types called for in the contract and in accordance with this Specification at the locations and in conformity with the lines and grades shown on the Plans or as required by the GEM Engineer.
709)-Paints	This item covers all paint materials including vehicles, pigments, pastes, driers, thinners and mixed paints for steel and wooden structures. For small bridges, rubberized and reflector paint shall be used for guard rails, curves and gutter
714)-Water	This item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical specification.
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	
	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plyboard material.



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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks (Passed or Failed)
					Actual		Required		
					psi	%	psi	%	
Class A concrete	Class A-01			7			2130	71	
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

- All concrete pouring must be supervised by the assigned GEM Field Inspector.
- All concrete sampling must be supervised by the assigned GEM Field Inspector.
- All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer
- All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by.

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



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E-mail gemakal@incozcom.com

List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
100)-Clearing and Grubbing		Engineer's Certificate + Pictures
101)-Removal of Structures and Obstructions		Engineer's Certificate + Pictures
102)-Excavation		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
200)-Aggregate Sub-base Course		Quality Test Report and Field Density Test Report
300)-Aggregate Surface Course		Quality Test Report and Field Density Test Report
306)-Portland Cement Concrete Pavement		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu m. of concrete or fraction thereof Quality Test Report for Grade 230 Mpa
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m. of concrete or fraction thereof.
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		Engineer's Certificate + Pictures
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
407)-Concrete Structures		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m. of concrete or fraction thereof.
500)-Pipe Culverts and Storm Drains		Engineer's Certificate + Pictures
504)-Riprap and Grouted Riprap		Engineer's Certificate + Pictures
505)-Stone Masonry		Engineer's Certificate + Pictures
506)-Hand-laid Rock Embankment		Engineer's Certificate + Pictures
603)-Guardrails		Mill/Engineer's Certificate + Pictures
709)-Paints		Mill/Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be Issued by the assigned GEM Construction Inspector for every billing period



Field Inspector's QA/QC Work Guide
(Applicable for Rigid Steel/Concrete Footbridge Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment.
101)-Removal of Structures and Obstructions	Instruct the contractor to carefully removed salvageable materials and turn it over to the proponent for their use. Disposable materials shall be deposited in
101-1)- Site Works	The detour route will be temporarily utilized by pedestrians and commuters until the new footbridge will be completed and ready for use. Existing footbridge could also be used as a detour route as determined by the GEM Engineer until the completion of the proposed project. Clearing works consist of removing and disposing all vegetables and debris, except those designated to remain in place which must be preserved from injury or defacement. Removal of the existing structure is included if the new structure will be built on the same location or if its existence provides a hindrance in the execution of the subcontractor's activities.
101-1)- Lay-out of lines and grades	As soon as the subcontractor has mobilized the necessary initial manpower and construction materials on-site, the subcontractor's Project Engineer (P.E.) with the presence of GEM Engineer, shall establish the structure's horizontal alignment and vertical (elevation) controls as per plan using the survey instruments through the identified project bench marks.
103)-Structure Excavation	Unsuitable excavated materials must be disposed of and not to be utilized as backfill This item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures. This may also include backfilling of pipe culverts and/or removal of excavated materials as provided in the specifications and when the GEM Engineer so order in conformity with the Plan. Other necessary items covered in the Technical Specifications may include diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill.
104)-Embankment	Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m.at fraction thereof) at 150 mm thick (6") Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness determination test shall be conducted together with the GEM Materials En
300)-Aggregate Surface Course(Grafill fill)	This Item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities.
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	This Item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance. No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 6% variance in diameter is acceptable. Follow rebar schedule indicated in the plans at all times.
405)-Structural Concrete	This Item shall consist of furnishing, placing, and finishing concrete in all structures except pavements. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer.



Field Inspector's QA/QC Work Guide
(Applicable for Rigid Steel/Concrete Footbridge Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)	<p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board. It shall not spread flat like "lugaw" in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days.</p>
Portland Cement	Use only Ordinary Portland Cement Type 1 or Type 1P. Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label. Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture. Cement bags shall be opened just prior to use.
Fine Aggregates	River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.
Coarse Aggregates	River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.
Water	Use only water that is clean and clear. Drinking water is acceptable. Presence of salts, oil and silt in water must be avoided. If source is questionable, Quality Test is required prior to use in concreting.
Concrete Mixing Admixtures	The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.
405-1) Lean Concrete	Ensure the base area is stable before pouring will be allowed. The required mixing ratio must be followed at all times.
504) Riprap and Grouted Riprap	<p>This item shall consist of the furnishing and placing of riprap, with or without grout as the case may be, with or without filter backing, furnished and constructed in accordance with this Specification and to the lines, grades, and dimensions shown on the Plans.</p> <p>The grouted riprap shall be laid on a compacted fill according to the desired slope. Install batter boards to maintain the slope and thickness of the grouted riprap during construction. Alternate layers of stone and mortar to the full thickness of the masonry shall be maintained. All voids shall be filled with mortar. Rocks shall be of the specified quality and size and shall be laid on a stable formation.</p> <p>Check that only approved materials are used for cement mortar works. The specified mixing ratio of Portland cement to fine sand shall be followed at all times with only enough mixing water to produce a trowable mortar. Mixed cement mortar shall be applied within 30 minutes. Partially set cement mortar shall be disposed off and not retempered with water and reused.</p>
505) Stone Masonry	This item shall consist of stone masonry in minor structures, headwalls for culverts, retaining walls at the toes of slopes, and other places called for on the Plans, constructed on the prepared foundation bed.



Field Inspector's QA/QC Work Guide
(Applicable for Rigid Steel/Concrete Footbridge Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
509)-Gabions	This Item shall consist of furnishing and installing rock and wire mesh baskets (gabions) at the designated locations in accordance with this Specification and in conformity with the lines, grades, dimensions, and arrangements shown on the Plans or as ordered by the GEM Engineer.
709)-Paints	This Item covers all paint materials including vehicles, pigments, pastes, driers, thinners and mixed paints for steel and wooden structures. For small bridges, rubberized and reflector paint shall be used for guard rails, curves and gutter.
714)-Water	This Item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical specification.
SPL-1)Walkway Assembly	This work item consists of installation of IWRC main cable, IWRC vertical cable, transom, stringer, metal mesh, cross-bracings and G.I. railings for ramps. Main cable is only allowed to be installed when the concrete portal columns has already hardened and passed the minimum concrete compressive strength test requirement. Wire mesh installation is also included.
SPL-2)Falsework	Falseworks will follow after the reinforcing steel bars are put in place. It includes installation of formworks and scaffoldings for concrete works at portals and deadman structures. Scaffoldings are also necessary for walkway assembly works. For concrete works, formworks should be of good quality and durability. It must be watertight to prevent leakage of fresh mortar upon placement and consolidation of concrete. Scaffoldings must be strong enough to carry the weight of fresh concrete without forming bulges, thus, it must be composed of mature and straight lumbers.
SPL-3)Project Safety	Setting-up of construction limits, which includes the subcontractor's working area, shall be done when the horizontal and vertical controls of the structure are established. Wooden barricades painted with compulsory markers (warning signal and signage) shall be placed at the proper location as directed by the GEM Engineer. Installation of safety fence/line using yellow tape materials may also be necessary to further establish the "no entry zone" for non-workers.
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	
	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plyboard material.



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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks (Passed or Failed)
					Actual		Required		
					psi	%	psi	%	
Class A concrete	Class A-01			7			2130	71	
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

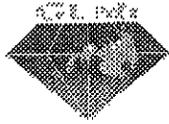
- All concrete pouring must be supervised by the assigned GEM Field Inspector.
- All concrete sampling must be supervised by the assigned GEM Field Inspector.
- All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer
- All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



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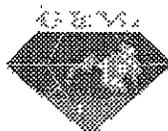
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E-mail gemakati@mozcom.com

List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
101)-Removal of Structures and Obstructions		Engineer's Certificate + Pictures
101-1) Site Works		Engineer's Certificate + Pictures
101-2) Lay-out of lines and grades		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
300)-Aggregate Surface Course(Gravel Fill)		Quality Test Report and Field Density Test Report
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m. of concrete or fraction thereof.
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		Engineer's Certificate + Pictures
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
405-1)-Lean Concrete		Engineer's Certificate + Pictures
504)-Riprap and Grouted Riprap		Engineer's Certificate + Pictures
505) Stone Masonry		Engineer's Certificate + Pictures
509)-Gablons		Mill/Engineer's Certificate + Pictures
709)-Paints		Mill/Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
SPL-1)-Walkway Assembly		Engineer's Certificate + Pictures
SPL-2)-Falsework		Engineer's Certificate + Pictures
SPL-3)-Project Safety		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period



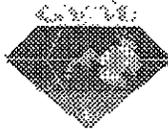
Field Inspector's QA/QC Work Guide
(Applicable for Road Upgrading Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization
101)-Removal of Structures and Obstructions	Instruct the contractor to carefully removed salvageable materials and turn it over to the proponent for their use. Disposable materials shall be deposited in an environmentally safe and location and with proper permission from the concerned authorities.
101-1)- Pre-construction/As-stake survey	As soon as clearing is completed, the subcontractor, in the presence of the GEM Engineer, will then start pre-construction (as-stake) survey to establish elevations of the drainage lines and grades that will be used as basis in setting and quantifying the works done. Locations and elevations of drainage structure shall be according to plan unless changes are effected by the GEM Engineer to conform to certain field conditions.
103)-Structure Excavation	<p>Unsuitable excavated materials must be disposed of and not to be utilized as backfill.</p> <p>This item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures. This may also include backfilling of pipe culverts and/or removal of excavated materials as provided in the specifications and when the GEM Engineer so order in conformity with the Plan. Other necessary items covered in the Technical Specifications may include diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill.</p>
104)-Embankment	<p>Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m.at fraction thereof) at 150 mm thick (6"). Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness dtermination test shall be conducted together with the GEM Materials Engineer.</p>
105)-Subgrade Preparation	This item shall consist of the preparation of the subgrade for the support of the overlaying structural layers. It shall extend to full width of the roadway



Field Inspector's QA/QC Work Guide
(Applicable for Road Upgrading Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
106)- Compaction equipment and density control strip	This Procedure will be used to determine density requirements of selected embankments, sug-garde, bases and bituminous concrete. The procedure will consist of control strip construction to establish targets densities for the specified course plus use of sand-cone method of density testing equipment to determine in-place densities obtained during the construction process. Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The equipment shall be modern, efficient compacting units approved by the GEM Engineer. The compacting units may be of any type provided they are capable of compacting material and specified and meet the minimum requirements as contained herein.
201)-Aggregate Base Course	This Item shall consist of furnishing, placing, and compacting of aggregate base course on a prepared sub-grade or sub-base in accordance with this Specification and the lines, grades, thickness, and typical cross-sections shown on the Plans, or as established by the GEM Engineer. Aggregate for base course shall consist of hard, durable particles or fragments of crushed slag, crushed gravel or natural gravel and filler of natural sand, crushed sand, or other finely divided mineral matter. The composite material shall be free from vegetable matter and lumps or balls of clay, and shall be of such nature that it can be compacted readily to form a firm, stable base.
300)-Aggregate Surface Course	This Item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities.
500)-RCPC Cross Drain Structures	This Item shall consist of the construction or reconstruction of pipe culverts and storm drains, hereinafter referred to as "conduit" which may include the following: a) Zinc coated (galvanized) corrugated iron or steel culverts and underdrains; b) Cast iron culvert pipe; c) Concrete sewer, storm drain, and culvert pipe; d) Reinforced concrete culvert, storm drain, and sewer pipe ; e) Bituminous coated corrugated metal culvert pipe and pipe arches; f)
504)-Riprap and Grouted Riprap	<p>This Item shall consist of the furnishing and placing of riprap, with or without grout as the case may be, with or without filter backing, furnished and constructed in accordance with this Specification and to the lines, grades, and dimensions shown on the Plans.</p> <p>The grouted riprap shall be laid on a compacted fill according to the desired slope. Install batter boards to maintain the slope and thickness of the grouted riprap during construction. Alternate layers of stone and mortar to the full thickness of the masonry shall be maintained. All voids shall be filled with mortar. Rocks shall be of the specified quality and size and shall be laid on a stable formation.</p>



Field Inspector's QA/QC Work Guide
(Applicable for Road Upgrading Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	Check that only approved materials are used for cement mortar works. The specified mixing ratio of Portland cement to fine sand shall be followed at all times with only enough mixing water to produce a trowable mortar. Mixed cement mortar shall be applied within 30 minutes. Partially set cement mortar shall be disposed off and not retempered with water and reused.
505) Stone Masonry	This Item shall consist of stone masonry in minor structures, headwalls for culverts, retaining walls at the toes of slopes, and other places called for on the Plans, constructed on the prepared foundation bed.
508)-Concrete Slope Protection	This Item shall consist of the furnishing and placing of concrete slope protection including all necessary excavation, a bed course, and reinforced concrete to the required thickness and extent to protect slopes against erosion. Construction details shall be as shown on the Plans.
714)-Water	This Item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	
	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plywood material.



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Fax: (632) 818-8900
E-mail: gemakati@mozcom.com

CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks (Passed or Failed)
					Actual		Required		
					psi	%	psi	%	
Class A concrete	Class A-01			7			2130	71	
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

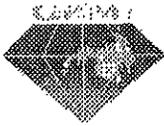
- All concrete pouring must be supervised by the assigned GEM Field Inspector.
- All concrete sampling must be supervised by the assigned GEM Field Inspector.
- All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer
- All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



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List of QA/QC Requirements

Project Name : _____
Project Location : _____
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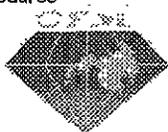
DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
101)-Removal of Structures and Obstructions		Engineer's Certificate + Pictures
101-1) Pre-construction/As-stake survey		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
105)-Subgrade Preparation		Quality Test Report and Field Density Test Report
106)- Compaction equipment and density control strip		Quality Test Report and Field Density Test Report
201)-Aggregate Base Course		Quality Test Report and Field Density Test Report
300)-Aggregate Surface Course		Quality Test Report and Field Density Test Report
5000-RCPC Cross Drain Structures		Engineer's Certificate + Pictures
504)-Riprap and Grouted Riprap		Engineer's Certificate + Pictures
505) Stone Masonry		Engineer's Certificate + Pictures
508)-Concrete Slope Protection		Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be Issued by the assigned GEM Construction Inspector for every billing period



Field Inspector's QA/QC Work Guide
(Applicable for Seaweed Solar Dryer Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment.
101)-Removal of Structures & Obstructions	
101-1)-Site Preparation	Clearing works consist of removing and disposing all vegetables and debris, except those designated to remain in place which must be preserved from injury or defacement.
101-2)-Lay-out of lines and grades	As soon as the subcontractor has mobilized the necessary initial manpower and construction materials on-site, the subcontractor's Project Engineer (P.E) with the presence of GEM Engineer, shall establish the structure's horizontal alignment and vertical (elevation) controls as per plan using the survey instruments through the identified project bench
103)-Structure Excavation	<p>Unsuitable excavated materials must be disposed of and not to be utilized as backfill.</p> <p>This item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures not otherwise provided for in the Specifications. Except as provided for pipe culverts, the backfilling of completed structures and the disposal of all excavated materials shall be in accordance with these Specifications and in reasonably close conformity with the Plans or as established by the GEM Engineer. This item shall include necessary diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill. It shall also include the furnishing and placing of approved foundation fill material to replace unsuitable material encountered below the foundation elevation of structures.</p>
104)-Embankment	<p>Quality Test must first be conducted on the embankment materials You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m. at fraction thereof) at 150 mm thick (6"). Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness determination test shall be conducted together with the GEM</p> <p>This item shall consist of the construction of embankment in accordance with this Specification and in conformity with the lines, grades, and dimensions shown on the Plans or established by the GEM Engineer.</p>
106)- Compaction equipment and density control strip	This Procedure will be used to determine density requirements of selected embankments, sug-garde, bases and bituminous concrete. The procedure will consist of control strip construction to establish target densities for the specified course plus use of sand-cone method of density testing equipment to determine in-place densities obtained during the construction process. Compaction equipment shall be capable of obtaining compaction requirements without detrimentally affecting the compacted material. The equipment shall be modern, efficient compacting units approved by the GEM Engineer. The compacting units may be of any type provided they are capable of compacting material and specified and meet the minimum requirements as contained herein.



Field Inspector's QA/QC Work Guide
(Applicable for Seaweed Solar Dryer Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
Concrete Mixing Admixtures	The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.
706)-Concrete, Clay Plastic and Fiber Pipe	This item covers several types of pipes that may include in the plans the following: non reinforced concrete pipe, reinforced concrete pipe, perforated concrete pipe, drain tile, porous concrete pipe, vitrified clay lined reinforced concrete pipe, perforated vitrified clay pipe, vitrified clay pipe, cradle invert clay pipe, asbestos cement pipe, perforated asbestos cement pipe, bituminized fiber pipe, perforated bituminized fiber pipe, reinforced concrete arch culvert, storm drain, and sewer
714)-Water	This item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical
SPL-1)-Carpentry Works	The work includes carpentry and joinery, complete in accordance with this specification unless specified otherwise in the drawings. Lumber shall be of approved quality of the respective kinds required for the various parts of the work, well seasoned, thoroughly dry, and free from large, loose, or unsound knots, saps, shakes, and other imperfections in pairing its strength, durability and appearance. Any lumber for the purpose may be substituted for the kinds specified provided that the substitution shall be acceptable to the GEM Engineer.
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	
	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plyboard material



GROWTH WITH
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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks (Passed or Failed)
					Actual		Required		
					psi	%	psi	%	
Class A concrete	Class A-01			7			2130	71	
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

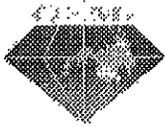
- All concrete pouring must be supervised by the assigned GEM Field Inspector.
- All concrete sampling must be supervised by the assigned GEM Field Inspector.
- All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer
- All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))

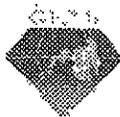


List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
101)-Removal of Structures and Obstructions		
101-1)Site Preparation		Engineer's Certificate + Pictures
101-2)Lay-out of lines and grades		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
106)- Compaction equipment and density control strip		Engineer's Certificate + Pictures
300)-Aggregate Surface Course		Quality Test Report and Field Density Test Report
400)-Piling		Engineer's Certificate + Pictures
403)-Metal Structures		Engineer's Certificate + Pictures
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu m. of concrete or fraction thereof.
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		Engineer's Certificate + Pictures
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
704)-Masonry Units		Engineer's Certificate + Pictures
706)-Concrete, Clay Plastic and Fiber Pipe		Engineer's Certificate + Pictures
709)-Paints		Mills/Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
SPL-1 Tinsmithry Works		Mills/Engineer's Certificate + Pictures
SPL-2 Electrical Works		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period



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Field Inspector's QA/QC Work Guide
(Applicable for Suspension Footbridge Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment.
101)-Removal of Structures and Obstructions	<u>Instruct the contractor to carefully removed salvageable materials and turn it over to the proponent for their use. Disposable materials shall be</u>
101-1)- Site Works	The detour route will be temporarily utilized by pedestrians and commuters until the new footbridge will be completed and ready for use. Existing footbridge could also be used as a detour route as determined by the GEM Engineer until the completion of the proposed project. Clearing works consist of removing and disposing all vegetables and debris, except those designated to remain in place which must be preserved from injury or defacement. Removal of the existing structure is included if the new structure will be built on the same location or if its existence provides a hindrance in the execution of the subcontractor's activities
101-1)- Lay-out of lines and grades	As soon as the subcontractor has mobilized the necessary initial manpower and construction materials on-site, the subcontractor's Project Engineer (P E) with the presence of GEM Engineer, shall establish the structure's horizontal alignment and vertical (elevation) controls as per plan using the survey instruments through the identified project bench marks.
103)-Structure Excavation	Unsuitable excavated materials must be disposed of and not to be utilized as backfill. This Item shall consist of the necessary excavation for foundations of bridges, culverts, underdrains, and other structures. This may also include backfilling of pipe culverts and/or removal of excavated materials as provided in the specifications and when the GEM Engineer so order in conformity with the Plan. Other necessary items covered in the Technical Specifications may include diverting of live streams, bailing, pumping, draining, sheeting, bracing, and the necessary construction of cribs and cofferdams, and furnishing the materials therefore, and the subsequent removal of cribs and cofferdams and the placing of all necessary backfill.
104)-Embankment	Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m.at fraction thereof) at 150 mm thick (6"). Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction Thickness determination test shall be conducted together with the GEM Materials Engineer.
300)-Aggregate Surface Course(Grafill fill)	This Item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities.
304)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	This Item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer. Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 6% variance in diameter is acceptable Follow rebar schedule indicated in the plans at all times
405)-Structural Concrete Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 , 2 : 4)	This Item shall consist of furnishing, placing, and finishing concrete in all structures except pavements Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer.



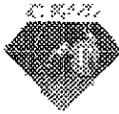
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Field Inspector's QA/QC Work Guide
(Applicable for Suspension Footbridge Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	<p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board, it shall not spread flat like "lugaw" in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days.</p>
Portland Cement	<p>Use only Ordinary Portland Cement Type 1 or Type 1P. Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label. Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture. Cement bags shall be opened just prior to use.</p>
Fine Aggregates	<p>River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.</p>
Coarse Aggregates	<p>River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.</p>
Water	<p>Use only water that is clean and clear. Drinking water is acceptable. Presence of salts, oil and silt in water must be avoided. If source is questionable, Quality Test is required prior to use in concreting.</p>
Concrete Mixing Admixtures	<p>The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.</p>
405-1)-Lean Concrete	<p>Ensure the base area is stable before pouring will be allowed. The required mixing ratio must be followed at all times.</p>
504)-Riprap and Grouted Riprap	<p>This item shall consist of the furnishing and placing of riprap, with or without grout as the case may be, with or without filter backing, furnished and constructed in accordance with this Specification and to the lines, grades, and dimensions shown on the Plans.</p> <p>The grouted riprap shall be laid on a compacted fill according to the desired slope. Install batter boards to maintain the slope and thickness of the grouted riprap during construction. Alternate layers of stone and mortar to the full thickness of the masonry shall be maintained. All voids shall be filled with mortar. Rocks shall be of the specified quality and size and shall be laid on a stable formation.</p> <p>Check that only approved materials are used for cement mortar works. The specified mixing ratio of Portland cement to fine sand shall be followed at all times with only enough mixing water to produce a trowable mortar. Mixed cement mortar shall be applied within 30 minutes. Partially set cement mortar shall be disposed off and not retempered with water and reused.</p>
505) Stone Masonry	<p>This item shall consist of stone masonry in minor structures, headwalls for culverts, retaining walls at the toes of slopes, and other places called for on the Plans, constructed on the prepared foundation bed</p>
508)-Concrete Slope Protection	<p>This item shall consist of the furnishing and placing of concrete slope protection including all necessary excavation, a bed course, and reinforced concrete to the required thickness and extent to protect slopes against erosion. Construction details shall be as shown on the Plans</p>



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Area Inspector's QA/QC Work Guide
(Applicable for Suspension Footbridge Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
509)-Gabions	This item shall consist of furnishing and installing rock and wire mesh baskets (gabions) at the designated locations in accordance with this Specification and in conformity with the lines, grades, dimensions, and arrangements shown on the Plans or as ordered by the GEM Engineer.
709)-Paints	This item covers all paint materials including vehicles, pigments, pastes, driers, thinners and mixed paints for steel and wooden structures. For small bridges, rubberized and reflector paint shall be used for guard rails, curves and gutter.
714)-Water	This item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical specification.
SPL-1)Walkway Assembly	This work item consists of installation of IWRC main cable, IWRC vertical cable, transom, stringer, metal mesh, cross-bracings and G.I. railings for ramps. Main cable is only allowed to be installed when the concrete portal columns has already hardened and passed the minimum concrete compressive strength test requirement. Wire mesh installation is also included.
SPL-2)-Falsework	Falseworks will follow after the reinforcing steel bars are put in place. It includes installation of formworks and scaffoldings for concrete works at portals and deadman structures. Scaffoldings are also necessary for walkway assembly works. For concrete works, formworks should be of good quality and durability. It must be watertight to prevent leakage of fresh mortar upon placement and consolidation of concrete. Scaffoldings must be strong enough to carry the weight of fresh concrete without forming bulges, thus, it must be composed of mature and straight lumbers.
SPL-3)-Project Safety	Setting-up of construction limits, which includes the subcontractor's working area, shall be done when the horizontal and vertical controls of the structure are established. Wooden barricades painted with compulsory markers (warning signal and signage) shall be placed at the proper location as directed by the GEM Engineer. Installation of safety fence/line using yellow tape materials may also be necessary to further establish the "no entry zone" for non-workers.
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	
	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plyboard material.



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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks (Passed or Failed)
					Actual		Required		
					psi	%	psi	%	
Class A concrete	Class A-01			7			2130	71	
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

All concrete pouring must be supervised by the assigned GEM Field Inspector.

All concrete sampling must be supervised by the assigned GEM Field Inspector.

All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer

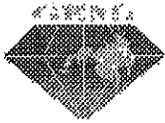
All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



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List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
101)-Removal of Structures and Obstructions		Engineer's Certificate + Pictures
101-1) Site Works		Engineer's Certificate + Pictures
101-2) Lay-out of lines and grades		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
300)-Aggregate Surface Course(Gravel Fill)		Quality Test Report and Field Density Test Report
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m. of concrete or fraction thereof
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		Engineer's Certificate + Pictures
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
405-1)-Lean Concrete		Engineer's Certificate + Pictures
504)-Riprap and Grouted Riprap		Engineer's Certificate + Pictures
505) Stone Masonry		Engineer's Certificate + Pictures
509)-Gabions		Mill/Engineer's Certificate + Pictures
709)-Paints		Mill/Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
SPL-1)-Walkway Assembly		Engineer's Certificate + Pictures
SPL-2)-Falsework		Engineer's Certificate + Pictures
SPL-3)-Project Safety		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period





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Field Inspector's QA/QC Work Guide
(Applicable for Water System Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment.
100)-Clearing and Grubbing	This item shall consist of clearing, grubbing, removing, and disposing all vegetables and debris. The work shall also include the preservation from injury or defacement of all objects designated to remain.
101)-Removal of Structures and Obstructions	As the case may be, this item shall consist of the removal, wholly or in part, and satisfactory disposal of all buildings, fences, structures, old pavements, abandoned pipelines, and any other obstructions which are not designated or permitted to remain. It shall also include the salvaging of designated materials and backfilling the resulting trenches, holes, and pits.
101-1)-Site Works	This includes provision of detour route, item 100 (Clearing and Grubbing) and Item 101 (Removal of Structures & Obstructions). This is usually done by the LGU as part of their counterpart and should be completed before the project starts. Clearing works consist of removing and disposing all vegetables and debris, except those designated to remain in place which must be preserved from injury or defacement. Removal of the existing structure is included if the new structure will be built on the same location or if its existence provides a hindrance in the execution of the subcontractor's activities.
101-2)-Lay-out of lines and grades	As soon as the subcontractor has mobilized the necessary initial manpower and construction materials on-site, the subcontractor's Project Engineer (P.E.) with the presence of GEM Engineer, shall establish the structure's horizontal alignment and vertical (elevation) controls as per plan using the survey instruments through the identified project bench marks.
102)-Excavation	This Item shall consist of borrow excavation and the disposal of material in accordance with this Specification and in conformity with the lines, grades, and dimensions shown on the Plans or established by the GEM Engineer
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	This Item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer. Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance. No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 5% variance in diameter is acceptable. Follow rebar schedule indicated in the plans at all times.
407)-Concrete Structures	This Item shall consist of the general description of the materials, equipment, workmanship, and construction requirements which constitute the complete structure.
704)-Masonry Units	This includes concrete units such as bricks, hollow blocks, concrete blocks and decorative blocks. This may also include plastering and finishing as maybe indicated in the Plans and Specifications.



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Field Inspector's QA/QC Work Guide
(Applicable for Water System Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
714)-Water	This Item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical
800)-Piping	The Subcontractor shall furnish and install all pipe, valves and fittings, closure pieces, supports, bolts, nuts, gaskets, jointing materials, and appurtenances as shown and specified, and as required for a complete and workable piping system. Shop drawings of all piping systems shall be furnished.
802)-PVC (Polyvinyl Chloride) Pipe	Pipe shall conform to the requirements as specified in the Construction Drawings and Specifications as approved by the GEM Engineer. The pipe shall have steel pipe equivalent or cast iron equivalent outside dimensions and furnished with rubber ring gasket joints. Fittings shall be of Polyvinyl Chloride (PVC). PVC fittings shall in general conform to "Socket Type Polyvinyl Chloride (PVC) Plastic Pipe Fittings Schedule 40 (ASTM D 2466), Type 1 (normal impact). The inside diameter of fittings shall be suitable for making a watertight joint with the pipe furnished. Joints for pipe and fittings shall be especially constructed for joining with neoprene ring gaskets. A sufficient number of ring gaskets and lubricant shall be furnished to provide for a 2% over-run. Pipe and fittings shall be labeled by the manufacturer to indicate class rating, type material, manufacturer's trade name, and production code.
803)- PE (POLYETHYLENE) Plastic Tubing	The services line piping 50 mm (2 in) and smaller shall be polyethylene as specified herein and in the sizes shown on the construction drawings. Service piping having diameter larger than 50 mm (2 in) shall be constructed of the same materials approved for water mains of similar sizes. Small tubing-size for service connections lines of 19 mm (¾ in) shall have brass fittings as shown on the construction standard drawings using cold flare method of connection or compression type connections and stainless steel inserts as shown. Where saddles are required, as shown on the construction standard drawings, they shall conform to whatever is acceptable to the GEM Engineer. Welded outlets on steel pipe shall be insulated from brass fittings with nylon bushings approved by the GEM Engineer.
804)-Valves	The Subcontractor shall furnish and install all valves as specified herein and as shown on the drawings. All valves shall be new and of current manufacture. Flanged valves may be raised or plain faced with serrated gasket surface. Flanges of valves for water working pressure of 1.2 MPa (175 psi) or less shall be faced and drilled to 125 lb dimension; flanges of valves for water working pressure greater than 1.2 MPa (175 psi) shall be faced and drilled to 250 lb dimension.



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Field Inspector's QA/QC Work Guide
(Applicable for Water System Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
805)-Miscellaneous Existing Watermain Works	The work under this item shall consist of removing existing plugs or fittings and making the connections as required to the existing pipe or fitting and shall include all trenching, bedding, laying and jointing of pipe, backfilling and clean-up, and other items necessary to complete the work as specified including all necessary adapters and fittings. All connections to existing pipelines shall be made with Ring-tight joints in accordance to manufacturer's recommendations. Should a transition coupling be required to connect with PVC to rough barrel AC it is to be rebar style or equivalent. Cut-in to existing water main shall consist of cutting into existing pipes in order to install fittings to make the connections as required and shall include all trenching, bedding, laying and jointing of pipe, backfilling and clean-up, and other items necessary to complete the work as specified including all necessary adapters and fittings. Relocation of an existing water main shall be carried out in accordance with the Matenal Specifications, installation of Waterworks Specifications, and all other relevant Specifications and Detailed Engineering Drawings.
SPL-1)-Falsework	Falseworks will follow after the reinforcing steel bars are put in place. It includes instaliation of formworks and scaffoldings for concrete works at portals and deadman structures. Scaffoldings are also necessary for walkway assembly works. For concrete works, formworks should be of good quality and durability. It must be watertight to prevent leakage of fresh mortar upon placement and consolidation of concrete. Scaffoldings must be strong enough to carry the weight of fresh concrete without forming bulges, thus, it must be composed of mature and straight lumbers. Concrete forms shall be mortar tight, true to the dimensions, lines, and grades of the structure and with the sufficient strength, rigidity, shape, and surface smoothness as to leave the finished works true to the dimensions shown on the Plans or required by the GEM Engineer, and with the surface finish as specified.
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	
	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plywood material.



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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks (Passed or Failed)
					Actual		Required		
					psi	%	psi	%	
Class A concrete	Class A-01			7			2130	71	
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

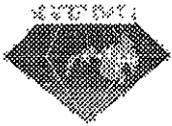
- All concrete pouring must be supervised by the assigned GEM Field Inspector.
- All concrete sampling must be supervised by the assigned GEM Field Inspector.
- All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer
- All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

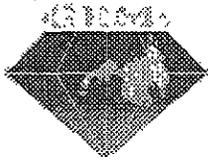
DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
100)-Clearing and Grubbing		Engineer's Certificate + Pictures
101)-Removal of Structures and Obstructions		
101-1)-Site Works		Engineer's Certificate + Pictures
101-2)-Lay-out of lines and grades		Engineer's Certificate + Pictures
102)-Excavation		Engineer's Certificate + Pictures
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
407)-Concrete Structures		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m. of concrete or fraction thereof.
704)-Masonry Units		Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
800)-Piping		Mill/Engineer's Certificate + Pictures
802)-PVC (Polyvinyl Chloride) Pipe		Mill/Engineer's Certificate + Pictures
803)- PE (POLYETHYLENE) Plastic Tubing		Mill/Engineer's Certificate + Pictures
804)-Valves		Mill/Engineer's Certificate + Pictures
805)-Miscellaneous Existing Watermain Works		Engineer's Certificate + Pictures
SPL-1)-Falsework		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		Engineer's Certificate + Pictures
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period



Field Inspector's QA/QC Work Guide
(Applicable for Grains Solar Dryer Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	All initial delivery of materials shall be checked and verified for conformance to plans and specifications. The contractor must submit pictures of all initially delivered materials together with his request for Mobilization Payment.
101)-Removal of Structures & Obstructions	
101-1)-Site Preparation	This item is composed of clearing & grubbing works in order to remove unsuitable materials and other obstructions such as roots of trees. In cases where the site needs to be elevated in order to level with the outside existing ground, embankment works are usually included as part of the proponent's project counterpart.
101-2)-Lay-out of lines and grades	Lay-out of the desired elevation shall be based on the highest ground of the dryer corner to ensure that the rain water will be properly drained to the lower grounds on all sides of the dryer.
103)-Structure Excavation	Unsuitable excavated materials must be disposed of and not to be utilized as backfill. Stiffener column and wall footing excavation works shall be done until the desired stable base is reached. Stable base of the excavated footings could also be attained through compaction works. In cases where there is presence of water, wooden piles using round timbers can be an alternative.
104)-Embankment	Quality Test must first be conducted on the embankment materials. You shall supervise the actual sampling and instruct the contractor to submit the samples to the designated materials laboratory with the filled up sample card. The materials Engineer must be informed of the test being conducted so he or his assigned representative can witness the actual testing. The Quality Test Report must be presented to you showing that it has passed the required materials quality before any spreading and compaction is started. Embankment shall progress by layer of 200mm thick loose measurement and compacted properly by mechanical compactor as per equipment schedule. Each layer to be fully compacted before adding the next layer until the desired elevation is reached. On the final layer, Field Density Test (FDT) must be conducted on the compacted surface at one (1) set of three (3) holes for (every 500sq. m.at fraction thereof) at 150 mm thick (6"). Standard FDT apparatus shall be used. No surface course shall be laid on top of the embankment if it has not attained the desired degree of compaction. Thickness dtermination test shall be conducted together with the GEM Mate
300)-Aggregate Surface Course(Gravel Bedding)	This Item shall consist of the construction of embankment in accordance with this Specification and in conformity with the lines, grades, and dimensions shown on the Plans or established by the GEM Engineer.
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33	This Item shall consist of a wearing or top course composed of gravel or crushed aggregate and filler material, whichever is called for in the Bill of Quantities. Gravel fill materials shall be laid evenly on the prepared sub-base. Proper compaction works is also necessary
	This Item shall consist of furnishing, bending, fabricating, and placing of steel reinforcement of the type, size, shape, and grade required in accordance with this Specification and in conformity with the requirements shown on the Plans or as directed by the GEM Engineer.



Field Inspector's QA/QC Work Guide
(Applicable for Grains Solar Dryer Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
	Grade 230 MPa (33,000 psi) rebars requires Complete Quality Test for acceptance. No fabrication and installation of bars shall be allowed until the Quality Test Reports are submitted. The nominal (average) diameter for every bar size must equal its designation as a measure of acceptance for RSB. Using your caliper, measure the smallest diameter (away from the rib and corrugation) and the largest diameter along the corrugation and compute the average. A 6% variance in diameter is acceptable. Follow rebar schedule indicated in the plans at all times.
405)-Structural Concrete Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 : 4)	<p>This Item shall consist of furnishing, placing, and finishing concrete in all structures except pavements. Concrete shall consist of a mixture of Portland cement, fine aggregate, coarse aggregate, admixtures when specified, and water mixed in the proportions specified or approved by the GEM Engineer</p> <p>All concreting activities must be supervised by the GEM Field Inspector. The specified mixing ratio for each class of concrete must be followed at all times. The amount of mixing water to be added must be controlled to produce concrete of proper consistency. Concrete of proper consistency must form a mound when dropped from the mixer and into the mixing board It shall not spread flat like "<i>lugaw</i>" in a plate. No excess water or cement grout shall flow from the concrete mix. Concrete vibrator and appropriate finishing tools are required at all times. Curing by continuous water application of the newly concreted structure for the first seven (7) days shall be strictly observed. Take four (4) concrete cylinder samples per concrete class on the first day of concreting activities. One (1) cylinder shall be tested at 7 days and another two (2) cylinders tested at 28 days. The fourth cylinder shall be kept as a spare sample in case of failure at 28 days.</p>
Portland Cement	Use only Ordinary Portland Cement Type 1 or Type 1P Portland cement Type 1S shall not be allowed. They must come in sealed bags with clear and visible company markings and label. Cement bags where some cement powder has hardened shall be rejected entirely and the remaining soft cement powder in the bag shall not be used. Store cement bags properly, away from direct sunlight and covered to protect from moisture. Cement bags shall be opened just prior to use
Fine Aggregates	River sand from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Oversized gravel must be removed by screening. The presence of clay, silt and soil must be eliminated by washing the sand with clean water. River sand from sources not listed in the GEM Materials Map must pass Quality Test before use.
Coarse Aggregates	River gravel from sources listed in the Gem Materials Map can be used without test subject to GEM Field Inspector's approval for grading requirements. Gravel size must conform to the specified maximum size and oversized gravel must be removed by screening The presence of clay, silt and soil must be eliminated by washing the gravel with clean water. River gravel from new sources must pass Quality Test before use.



Field Inspector's QA/QC Work Guide
(Applicable for Grains Solar Dryer Projects)

DESCRIPTION OF WORK	CONSTRUCTION QUALITY CONTROL
Water	Use only water that is clean and clear. Drinking water is acceptable. Presence of salts, oil and silt in water must be avoided. If source is questionable, Quality Test is required prior to use in concreting.
Concrete Mixing Admixtures	The contractor should first seek the approval of the GEM Material Engineer through a letter request to which the brochure of the admixture's brand is attached before any use of concrete admixture will be done.
704)-Masonry Units	This includes concrete units such as bricks, hollow blocks, concrete blocks and decorative blocks. This may also include plastering and finishing as maybe indicated in the Plans and Specifications. Concrete hollow block (CHB) materials could be purchased or fabricated at site. Delivered CHB may be tested to ensure fabricated workmanship quality as may be required by the GEM Engineer. Physically, every piece must be of uniform dimensions. Upon delivery, it must be properly piled to avoid breakage.
714)-Water	This item covers criteria for acceptance of questionable water, either natural or wash water for use in concrete. The mixing water shall be clear and apparently clean. If it contains quantities or substances that discolor, make it smell or taste unusual, objectionable or cause suspicion, it shall not be used unless service records of concrete made with it (or other information) indicate that it is not injurious to the quality. Acceptance criteria of water shall be defined in the technical
GENERAL TECHNICAL REQUIREMENTS	
SPL) TEMPORARY FACILITIES and SIGNAGES	
	Check that all materials being used conforms to the plans and specifications of the project. Monitor workmanship according to the working guides listed above for each material type. Ensure that the tarpaulin material is plainly fastened to the plywood material.



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CONCRETE SAMPLING AND TESTING GUIDE

Project Name : _____
Project Location : _____
Contractor : _____

Concrete Class	Sample Label	Date of Sampling	Date of Testing	Age of Sample (Days)	Strength of Sample				Remarks
					Actual		Required		
					psi	%	psi	%	(Passed or Failed)
Class A concrete	Class A-01			7			2130	71	
	Class A-02			28			3000	100	
	Class A-03			28			3000	100	
Class B concrete	Class B-01			7			1750	71	
	Class B-02			28			2500	100	
	Class B-03			28			2500	100	

All concrete pouring must be supervised by the assigned GEM Field Inspector.

All concrete sampling must be supervised by the assigned GEM Field Inspector.

All compressive testing must be conducted only at the Materials Testing Laboratory designated by the GEM Materials Engineer

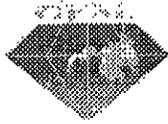
All compressive testing must be witnessed by the GEM Materials Engineer or his authorized representative

Prepared by:

Checked by:

Contractor's Project Engineer
(Signature over printed name))

GEM Construction Inspector
(Signature over printed name))



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List of QA/QC Requirements

Project Name : _____
Project Location : _____
Contractor : _____

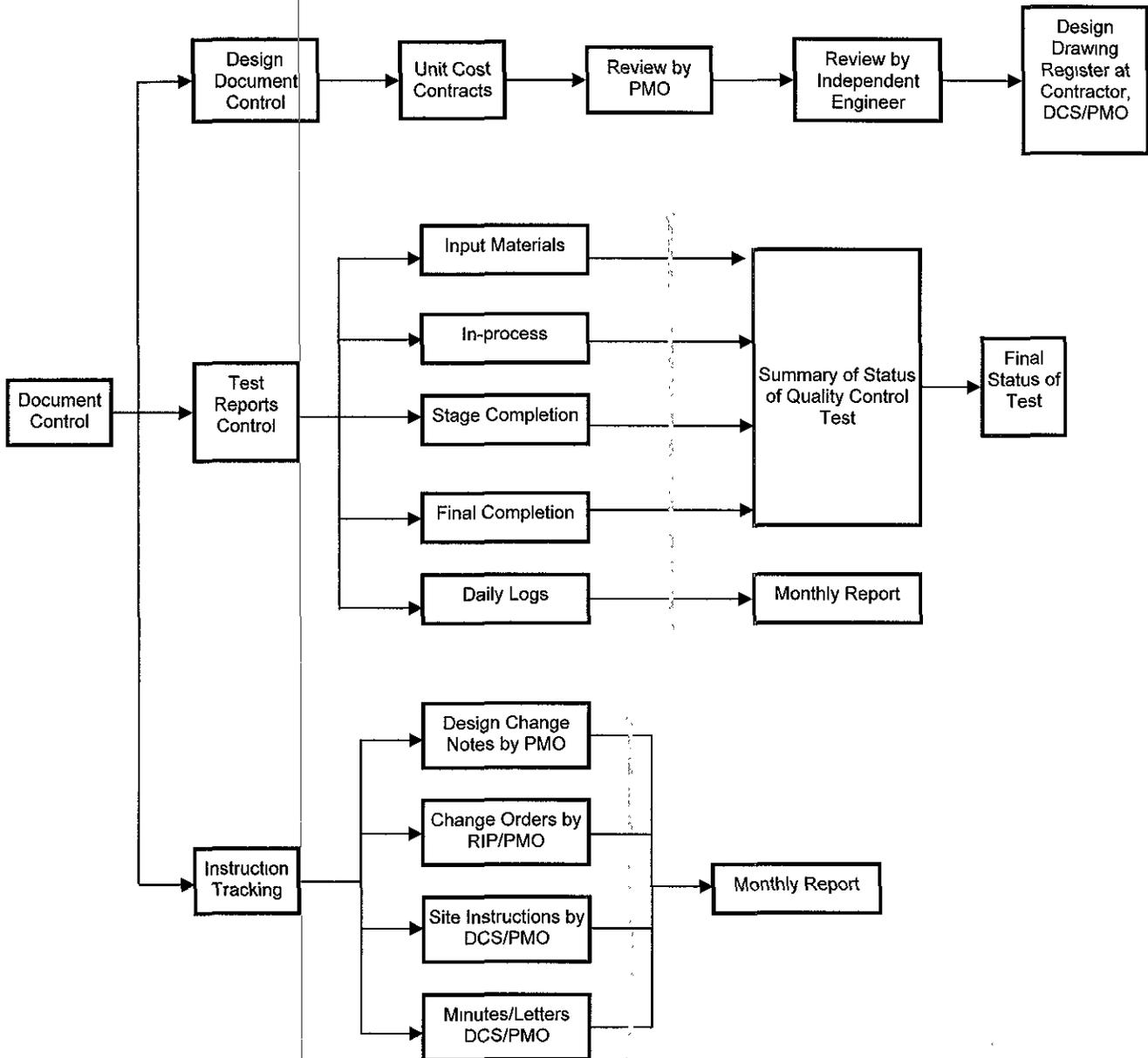
DESCRIPTION OF WORK	MOBILIZATION PAYMENT	PROGRESS BILLING
ALL MATERIALS DELIVERED ON SITE (Initial delivery)	Engineer's Certificate + Pictures	
101)-Removal of Structures and Obstructions		
101-1)Site Works		Engineer's Certificate + Pictures
101-2)Lay-out of lines and grades		Engineer's Certificate + Pictures
103)-Structure Excavation		Engineer's Certificate + Pictures
104)-Embankment		Quality Test Report and Field Density Test Report
300)-Aggregate Surface Course		Quality Test Report and Field Density Test Report
404)-Reinforcing Steel Bars (fy=230 Mpa) Grade 33		Quality Test Report for Grade 230 Mpa
405)-Structural Concrete		
Concrete Class "A" (1 : 2 : 3) Concrete Class " B " (1 : 2 . 4)		One set of samples consisting of four concrete cylinder of each class Concrete Compressive Strength Test Result for every 75 cu.m. of concrete or fraction thereof
Portland Cement		Mills/Engineer's Certificate + Pictures
Fine Aggregates		Quality Test Report will be required for sources of Fine and Coarse Aggregates not listed in the GEM Materials Map
Coarse Aggregates		Engineer's Certificate + Pictures
Water		Engineer's Certificate + Pictures
Concrete Mixing Admixtures		Engineer's Certificate + Pictures
704)-Masonry Units		Engineer's Certificate + Pictures
714)-Water		Engineer's Certificate + Pictures
GENERAL TECHNICAL REQUIREMENTS		
8.0) TEMPORARY FACILITY AND SIGNAGES		Engineer's Certificate + Pictures

Engineer's Certificate is to be issued by the assigned GEM Construction Inspector for every billing period

12. DOCUMENT CONTROL

Document control is intended to provide a consistent framework for transmittal, receipt, recording, processing, filing, and retrieval of documents as well as to ensure consistent formats. The most important documents for QA/QC are final design documents, test reports, and instructions. A flow chart for control of these documents is shown in Figure 10.1. Document control procedures, including guidelines for correspondence control, are described below.

Figure 12.1. FLOW CHART FOR DOCUMENT CONTROL



12.1 Design Document Control

As discussed in Section 3, the Regional Impact Program and Barangay Infrastructure Project Engineer shall generate final design documents (drawings, calculations, estimates, etc.). The Regional Impact Program and Barangay Infrastructure Project engineers and USAID will review

Quality Check

the documents at various stages. These factors have been considered in preparing the design document control system.

12.1.1 UNIT COST CONTRACTS

The design documents are prepared by the Regional Impact Program and Barangay Infrastructure Project Engineer. The flow of documents is summarized below.

1. Copies of design documents prepared by Regional Impact Program and Barangay Infrastructure Project Engineer shall be forwarded to the USAID independent checker for review and submit a copy to the DCOP-I for information.
2. Taking into account the comments of the independent checker for modification, if any, the Regional Impact Program and Barangay Infrastructure Project Engineer shall receive the Internal Design Transmittal Note (IDTN) from the USAID independent checker. Design documents shall be marked (or stamped) Recommended for approval as 'Noted' or 'Not Approved'.
3. For design documents marked 'Noted' or 'Not Approved', steps 1 to 2 above shall be repeated. For documents noted 'Approved', the Regional Impact Program and Barangay Infrastructure Project Engineer shall submit originals to the DCOP-I for affixing 'Approved' signatures.
4. After the design documents have been signed 'Approved' for construction, they shall be incorporated into the bidding documents. After the Subcontractor has been selected, the PM-CA&A shall transmit them to the Subcontractor.
5. The document details are to be recorded in the Subcontractor's Design/Drawing Register. (
6. If any additional construction drawings are required after the contract has been awarded, the new detailed construction drawings prepared by the Regional Impact Program and Barangay Infrastructure Project Engineer shall be approved by the PM-I. The PM-I may then refer, if he feels it necessary, to the USAID independent checker for review.

12.2 Test Report Controls

All the tests and field checks are to be carried out as per the applicable quality control requirements. The Subcontractor shall designate one of his engineers who is authorized to sign laboratory test reports for him. The witnessing officer will sign the reports and put his name and designation. The flow of test report documentation shall generally be as follows:

1. Test reports shall be submitted by the Subcontractor to the Regional Impact Program and Barangay Infrastructure Project Engineer.
2. The Regional Impact Program and Barangay Infrastructure Project Engineer will keep a copy of the test reports for his review in his monthly report along with the Subcontractor's monthly report.
3. The Regional Impact Program and Barangay Infrastructure Project Engineer shall record all test reports in the Summary of Status of Test.
4. Status of test shall be also included in the subcontractor's monthly progress report. The Subcontractor shall maintain all test records properly.

Other approvals given to the Subcontractor will be recorded in the daily logs of the Subcontractor. These should form part of the Subcontractor's monthly report. Similar

procedures shall be followed for transmitting and reviewing test reports for tests performed at outside laboratories, for manufacturers' certificates, and for third party inspection reports.

12.3 Tracking of Instructions

During the process of construction, different organizations are expected to conduct site visits and attempt to instruct the Subcontractor to ensure quality and timely construction within the costs to the extent possible. The multiplicity of organizations is a special feature of the GEM Program. Hence, there should be no ambiguity in the instruction flow if these are transmitted and recorded properly.

All the instructions to the Subcontractor shall originate from the Engineer. The instructions are of the following types.

1. All instructions related to the contract administration including approval of the contract variation orders, time extensions, notices related to rate of progress, etc.
2. The instructions regarding quality, testing, monitoring, and work scheduling may be issued by the Regional Impact Program and Barangay Infrastructure Project Engineer. In case of conflict of instructions of the DCOP-I and Regional Impact Program and Barangay Infrastructure Project Engineer in these matters, the instructions of the DCOP-I would prevail.
3. Instructions issued during site visits or inspections of the Regional Impact Program and Barangay Infrastructure Project engineers, which are normally recorded in the Subcontractor's Site Order Book, and
4. Instructions issued during review meetings in the form of minutes, letters, etc.

All instructions noted above are to be recorded by the Subcontractor. Instructions also include notices rejecting inspected work because it did not conform to the requirements and still had to be redone or rectified.

12.4 Site Order Book

The Subcontractor shall maintain a Site Order Book, in duplicate, at the works site at all times. This shall be open for inspection by authorized representatives of USAID and the Engineer.

The Site Order Book has two primary purposes--to record the day-to-day instructions to the Subcontractor and the Subcontractor's compliance with these instructions as well as to record the inspection and acceptance of work completion stages along with issuing approvals to the Subcontractor to proceed with the next construction stage.

As noted above, the status of the Subcontractor's compliance with issued instructions is to be summarized in the Instruction Log, and reviewed monthly by the Regional Impact Program and Barangay Infrastructure Project Engineer and during the periodic squad checks. In cases where the Subcontractor fails to comply with the instructions, the reasons shall be determined and necessary remedial actions taken.

The Regional Impact Program and Barangay Infrastructure Project Engineer will also maintain a parallel site Order Book to ensure compliance.

12.5 Correspondence Control

Out-going letters (including transmittal letters and notes) originating from various organizations involved in the subproject (Regional Impact Program and Barangay Infrastructure Project

engineers, Subcontractor, manufacturers, etc.) shall be signed only by the designated subproject executive of that organization (for example the DCOP-I or person authorized on his behalf, Subcontractor's authorized representative, etc.).

All letters should have a reference code and number, and should refer to a single subject only, which shall be clearly stated on top of the letter, after the recipient's address. All outgoing letters should be numbered sequentially. All replies should refer to the originator's reference code, number, and subject.

Incoming correspondence should be stamped and dated, and given an internal reference code and number. All incoming and outgoing correspondence should be logged chronologically, either in computer correspondence registers or in manual correspondence logs.

Copies of outgoing correspondence and originals of incoming should be filed in chronological files at the document center of each subproject organization. There should be only one chronological file for all outgoing correspondence. Regarding incoming correspondence, there could be more than one chronological file, based on the volume of correspondence expected to be received from subproject related organizations (for example, the Subcontractor can maintain separate incoming chronological files for each organization).

12.6 Inspection of Site Documentation

During site visits and inspections, the Regional Impact Program and Barangay Infrastructure Project engineers will check and follow up with the documentation maintained on site by the Subcontractor, as follows:

1. Check the Design/Drawing Register and ensure that the approved designs and drawings are being used during construction.
2. Check all the Test Results and ensure that it was check and reviewed by the Field Engineers.
3. Check the Site Order Book and ensure that the instructions, as recorded in these registers and issued through any letters or minutes of meeting, are being implemented by the Subcontractor.
4. Check the Site Order Book and ensure that the standard of works and documentation is of acceptable quality.
5. Deviations, if any, are to be recorded in the Site Order Book and a copy circulated by the Subcontractor to the Regional Impact Program and Barangay Infrastructure Project engineer.
6. The registers that are verified by the Regional Impact Program and Barangay Infrastructure Project engineer are being signed.

13. REPORTING

This section of the QA/QC Manual outlines Regional Impact Program and Barangay Infrastructure Project requirements for progress reporting and suggests formats for reports.

13.1 Types of Progress Reports

The Regional Impact Program and Barangay Infrastructure Project procedures provide for four main levels of reporting, as follows:

1. Subcontractors' Monthly Progress Reports;
2. Regional Infrastructure Project Engineer(Regional Impact Program and Barangay Infrastructure Project Engineer) Monthly Progress Reports;
3. Project Management Office (PMO) Monthly Progress Reports; and
4. Quarterly Progress Reports (prepared with assistance from the Regional Impact Program and Barangay Infrastructure Project Engineer)

13.2 Reporting Schedule and Distribution

The timetables for submission of progress reports and distribution requirements are summarized below.

13.2.1 SUBCONTRACTORS' PROGRESS REPORTS

The Subcontractor's Monthly Progress Report shall be submitted to the Regional Impact Program and Barangay Infrastructure Project Engineer by the 7th day of the month (original plus 3 copies). To facilitate timely payment, joint measurements shall be taken by the Subcontractor and the Regional Impact Program and Barangay Infrastructure Project Engineer by the 5th of each month. The Regional Impact Program and Barangay Infrastructure Project Engineer will enter the agreed measurements. The reporting period would be up to end of previous month.

13.2.2 MONTHLY CONTRACT REPORTS

The Regional Impact Program and Barangay Infrastructure Project Engineer shall prepare a Monthly Progress Report consolidating the results of all ongoing contracts, consisting of (i) a "Statement of Exceptions" commentary on the Subcontractors' progress report, and (ii) a discussion of the major problems and actions taken or proposed to be taken. This shall be distributed, together with a copy of the Subcontractors' report, by the 17th of the month, to the PMO.

The Regional Impact Program and Barangay Infrastructure Project Engineer will also submit the monthly progress payments, duly verified and entered as accepted in the measurement book, (Regional Impact Program and Barangay Infrastructure Project Engineer will make quality certification and 100% check of measurements) along with his monthly progress report to the PMO by the 17th of each month.

13.2.3 MONTHLY FINANCE REPORTS

The Engineer will send a monthly finance report to USAID by the end of every month to report the funds receipt and utilization, statement of expenditure pending liabilities, and expenditure forecasts.

The Engineer shall prepare the Monthly Financial Report for the works consisting of (i) a "Summary Statement of Fund Receipt and Utilization," and (ii) a "Statement of Expenditures Report" reporting the approved USAID format and submit to USAID with supporting documentation by the 25th of each month. Copies of "Summary Statement of Fund Utilization" are to be provided to the PMO.

13.2.4 REGIONAL IMPACT PROGRAM AND BARANGAY INFRASTRUCTURE PROJECT PROGRESS REPORTS

- PMO (3 copies)
- USAID (1 copy)
- Proponent (1 copy)

13.2.5 QUARTERLY PROGRESS REPORTS

Based on the monthly progress reports, the Regional Impact Program and Barangay Infrastructure Project Engineer shall assist GEM prepare and issue Quarterly Progress Reports by the 25th of the last month of the Quarter for submittal to USAID, the Steering Committee, and all involved agencies.

APPENDIX A
STANDARD MINIMUM TESTING REQUIREMENTS
(GENERAL)

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
DIVISION 1 - EARTHWORKS					
100	Clearing and Grubbing	None			
101	Removal of Structures and Obstruction	None			
102	Excavation	<i>If excavated materials are wasted</i>	Engineer's Certificate of wasted materials	After waste materials are properly disposed	RIP-TC-5
		<i>If excavated materials are incorporated into the work. (see test for Item 104-Embankment)</i>			
103	Structure Excavation	<i>If excavated materials are wasted</i>	Engineer's Certificate of wasted materials	After waste materials are properly disposed	RIP-TC-5
		<i>If excavated materials are incorporated into the work. (see test for Item 104-Embankment)</i>			

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
104	Embankment	For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - G, Grading Test	Before incorporation into the project/Before use	RIP-TC-1
			1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-2
			1 - C, Compaction Test (Moisture Density Relation of Soils as per AASHTO T 180)		RIP-TC-3
		For Every 100 meters in full width and not more than 200 mm in loose depth, or fraction thereof, or as directed by the engineer.	1-R, Rolling Operation	After the embankment materials has been spread out while rolling	Daily Log
For every 500 sq.m. compacted fill area and not more than 200 mm in loose depth, or fraction thereof, or as directed by the Engineer	One (1) group of three (3) in-situ Field Density Test by Sand Replacement Method as per AASHTO T 191	After the embankment materials has been spread out, prepared and properly compacted	RIP-TC-4		

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
105	Subgrade Preparation	For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - G, Grading Test	Before incorporation into the project/Before use	RIP-TC-1
			1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-2
			1 - C, Compaction Test (Moisture Density Relation of Soils as per AASHTO T 180)		RIP-TC-3
		For every 100 meters in full width.	1-R, Rolling Operation	After the embankment materials has been spread out and reach the subgrade elevation./ while rolling	Daily Log
		For every 500 sq.m. compacted fill area and not more than 200 mm in loose depth, or fraction thereof, or as directed by the Engineer	At least one (1) group of three (3) in-situ Field Density Test by Sand Replacement Method as per AASHTO T 191	After the subgrade elevation has been prepared and properly compacted	RIP-TC-4
DIVISION 2 -BASE AND SUBBASE COURSE					
200	Aggregate Subbase Course	For every 300 cu.m. or fraction thereof, or as directed by the Engineer	1 - G, Grading Test	Before incorporation into the project/Before use	RIP-TC-1
			1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-2
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - C, Compaction Test (Moisture Density Relation of Soils as per AASHTO T 180)		RIP-TC-3

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
			1 - Q, Quality Test for Abrasion, Grading and Plasticity Test	Before incorporation into the project/Before use	RIP-TC-9; RIP-TC-1; RIP-TC-2
		For every 2,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - CBR, California Bearing Ratio Test		RIP-TC-12
		For Every 100 meters in full width and not more than 200 mm in loose depth, or fraction thereof, or as directed by the engineer.	1-R, Rolling Operation	After the sub base materials has been spread out/ while rolling	Daily Log
		For every 500 sq.m. compacted fill area and not more than 150 mm in loose depth, or fraction thereof, or as directed by the Engineer	At least one (1) group of three (3) in-situ Field Density Test by Sand Replacement Method as per AASHTO T 191	After the subbase materials has been spread out, prepared and properly compacted	RIP-TC-4
201	Aggregate Base Course	For every 300 cu.m. or fraction thereof, or as directed by the Engineer	1 - G, Grading Test	Before incorporation into the project/Before use	RIP-TC-1
			1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-2
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - C, Compaction Test (Moisture Density Relation of Soils as per AASHTO T 180)		RIP-TC-3
			1 - Q, Quality Test for Abrasion, Grading and Plasticity Test		RIP-TC-9;RIP-TC-1;RIP-TC-2
For every 2,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - CBR, California Bearing Ratio Test	RIP-TC-12			

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		For Every 100 meters in full width and not more than 200 mm in loose depth, or fraction thereof, or as directed by the engineer.	1-R, Rolling Operation	After the base materials has been spread out/ while rolling	Daily Log
		For every 500 sq.m. compacted fill area and not more than 150 mm in loose depth, or fraction thereof, or as directed by the Engineer	At least one (1) group of three (3) in-situ Field Density Test by Sand Replacement Method as per AASHTO T 191	After the base materials has been spread out, prepared and properly compacted	RIP-TC-4
202	Crushed Agg Base Course	For every 300 cu.m. or fraction thereof, or as directed by the Engineer	1 - G, Grading Test	Before incorporation into the project/Before use	RIP-TC-1
			1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-2
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - C, Compaction Test (Moisture Density Relation of Soils as per AASHTO T 180)		RIP-TC-3
			1 - Q, Quality Test for Abrasion, Grading and Plasticity Test		RIP-TC-9;RIP-TC-1;RIP-TC-2
			1 - F, Fractured Test		RIP-TC-9
		For every 2,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - CBR, California Bearing Ratio Test		
		For Every 100 meters in full width and not more than 200 mm in loose depth, or fraction thereof, or as directed by the engineer.	1-R, Rolling Operation	After the base materials has been spread out/ while rolling	Daily Log

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.	
		For every 500 sq.m. compacted fill area and not more than 150 mm in loose depth, or fraction thereof, or as directed by the Engineer	At least one (1) group of three (3) in-situ Field Density Test by Sand Replacement Method as per AASHTO T 191	After the base materials has been spread out, prepared and properly compacted	RIP-TC-4	
203	Lime Stabilized Road Mix Base Course	Amount of Lime to be added: 3 to 12 mass percent of dry soil aggregate				
		A.) Soil Aggregate				
		For every 300 cu.m. or fraction thereof, or as directed by the Engineer	1 - G, Grading Test	Before incorporation into the project/Before use	RIP-TC-1	
			1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-2	
		For Every 100 meters in full width and not more than 200 mm in loose depth, or fraction thereof, or as directed by the engineer.	1-R, Rolling Operation	After the base materials has been spread out.	While Rolling	
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - C, Compaction Test (Moisture Density Relation of Soils as per AASHTO T 180)	Before incorporation into the project/Before use	RIP-TC-3	
			1 - Q, Quality Test for Abrasion, Grading and Plasticity Test		RIP-TC-9; RIP-TC-1; RIP-TC-2	
		B.) Mix				
For every 300 cu.m. or fraction thereof, or as directed by the Engineer	1 - C, Compaction Test		RIP-M-3			
	1 - UC, Unconfined Compression Test					
	1 - CBR, California Bearing Ratio Test		RIP-M-12			

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<u>C.) Compacted Base Course</u>			
		For every layer of 150mm compacted depth or fraction thereof, or as directed by the Engineer	1 - D, Density Test	After the base materials has been spread out, prepared and properly compacted	RIP-TC-4
			1 - T, Thickness Determination		
		<u>D.) Hydrated Lime</u>			
		For every 100 tons or fraction thereof, or as directed by the Engineer	1-Q, Quality Test	Before use	
204	Portland Cement Stabilized Road Mix Base Coarse <i>Amount of Cement to be added:</i> 6 to 10 mass percent of A.) <u>Soil Aggregate</u>				

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		For every 300 cu.m. or fraction thereof, or as directed by the Engineer	1 - G, Grading Test	Before incorporation into the project/Before use	RIP-TC-1
			1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-2
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - C, Compaction Test (Moisture Density Relation of Soils as per AASHTO T 180) 1 - Q, Quality Test for Abrasion, Grading and Plasticity Test		RIP-TC-3 RIP-TC-9; RIP-TC-1; RIP-TC-2
		<u>B.) Cement</u>		Before incorporation into the project/Before use	Forms from accredited laboratories
		For the 1st 2000 Bags or fraction thereof, or as directed by the Engineer	1-Q, Quality Test/brand of cement		
		In the excess of 2000 bags but not more than 10,000 bags	1-MC, Manufacturer/Mill Certificate per 2000 bags or as directed by the Engineer		
		<u>C.) Water</u>	1 - Certificate from Resident Engineer or;		RIP-M-5
			1 - Q, Quality Test for Alkalinity and Acidity as per AASHTO T 26, Solids and Chloride Contents		
		<u>D.) Mix</u>			RIP-M-3
		For every 300 cu.m. or fraction thereof, or as directed by the Engineer	1 - C, Compaction Test		
			1 - UC, Unconfined Compression Test		
			1 - CBR, California Bearing Ratio Test	RIP-TC-12	

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<u>E.) Compacted Base Course</u>			
		For every layer of 150mm compacted depth or fraction thereof, or as directed by the Engineer:	1 - D, Density Test	After the base materials has been spread out, prepared and properly compacted	RIP-TC-4
			1 - T, Thickness Determination		
205	Asphalt Stabilized Road Mixed Base Course	<i>Amount of Asphalt to be added:</i>			
	<i>Amount of Asphalt to be added: 4 to 7 mass percent of dry soil aggregate</i>			Before incorporation into the project/Before use	
		For every 300 cu.m or fraction thereof, or as directed by the Engineer	1 - G, Grading Test		RIP-TC-1
			1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-2
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - C, Compaction Test (Moisture Density Relation of Soils as per AASHTO T 180)		RIP-TC-3
			1 - Q, Quality Test for Abrasion, Grading and Plasticity Test		RIP-TC-9; RIP-TC-1; RIP-TC-2
		<u>B.) Emulsified Asphalt</u>			
		For every 40 tons or 200 drums or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before Use	

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Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		C.) Mix	<i>Same tests as of Item 203</i>	<i>Same as of Item 203</i>	
			1 - C, Compaction Test		RIP-M-3
			1 - UC, Unconfined Compression Test		
			1 - CBR, California Bearing Ratio Test		RIP-TC-12
		D.) Compacted Base Course			
		For every layer of 150mm compacted depth or fraction thereof, or as directed by the Engineer:	1 - D, Density Test	After the base materials has been spread out, prepared and properly compacted	RIP-TC-4
			1 - T, Thickness Determination		
206	Portland Cement Treated Plant Mixed Base Course				
	Amount of Cement to be added:	A.) Soil Aggregate		Before incorporation into the project/Before use	
	6 to 10 mass percent of dry soil aggregate	For every 300 cu.m. or fraction thereof, or as directed by the Engineer	1 - G, Grading Test		RIP-TC-1
			1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-2
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - C, Compaction Test (Moisture Density Relation of Soils as per AASHTO T 180)	Before incorporation into the project/Before use	RIP-TC-3
			1 - Q, Quality Test for Abrasion, Grading and Plasticity Test		RIP-M-9; RIP-M-1; RIP-M-2

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<u>B.) Cement</u>			
		For the 1st 2000 Bags or fraction thereof, or as directed by the Engineer	1-Q, Quality Test/brand of cement	Before incorporation into the project/Before use	Forms from accredited laboratories
		In the excess of 2000 bags but not more than 10,000 bags	1-MC, Manufacturer/Mill Certificate per 2000 bags or as directed by the Engineer		
		<u>C.) Water</u>	1 - Certificate from Resident Engineer or;	Before Use	RIP-M-5
			1 - Q, Quality Test for Alkalinity and Acidity as per AASHTO T 26, Solids and Chloride Contents		
		<u>D.) Mix</u>			
			1 - C, Compaction Test	Before spreading to the project site/Before use	RIP-M-3
			1 - UC, Unconfined Compression Test		
			1 - CBR, California Bearing Ratio Test		RIP-TC-12
		<u>E.) Compacted Base Course</u>			
		For every layer of 150mm compacted depth or fraction thereof, or as directed by the Engineer:	1 - D, Density Test	After the base materials has been spread out, prepared and properly compacted	RIP-TC-4
			1 - T, Thickness Determination		

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
DIVISION 3 - AGGREGATE SURFACE COURSE					
300	Aggregate Surface Coarse	For every 300 cu.m. or fraction thereof, or as directed by the Engineer	1 - G, Grading Test		RIP-TC-1
			1 - P, Plasticity Test (PL, LL & PI)	After the Identification of the Quarry/Before the materials are to be incorporated into the project	RIP-TC-2
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - C, Compaction Test (Moisture Density Relation of Soils as per AASHTO T 180)		RIP-TC-3
			1 - Q, Quality Test for Abrasion, Grading and Plasticity Test		RIP-TC-9; RIP-TC-1; RIP-TC-2
		For every 2,500 cu.m. or fraction thereof, or as directed by the Engineer	1 - CBR, California Bearing Ratio Test		RIP-TC-12
		For Every 100 meters in full width and not more than 200 mm in loose depth, or fraction thereof, or as directed by the engineer.	1-R, Rolling Operation	After the base materials has been spread out/ while rolling	Daily Log
		For every 500 sq.m. compacted fill area and not more than 150 mm in loose depth, or fraction thereof, or as directed by the Engineer	At least one (1) group of three (3) in-situ Field Density Test by Sand Replacement Method as per AASHTO T 191	After the Identification of the Quarry/Before the materials are to be incorporated into the project	RIP-TC-4
	For every 1500 cu.m. of crushed aggregates or fracture thereof, or as directed by the Engineer	1 - F, Fractured Face Test	Before Use	RIP-TC-9	

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Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
301	Bituminous Prime Coat	<i>Quantity: 1 to 2 liters per sq.m.</i>			
		For every 40 tons or 200 drums or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	
302	Bituminous Tack Coat	<i>Quantity: 0.2 to 0.7 liters per sqm.</i>			
		For every 40 tons or 200 drums or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories
303	Bituminous Seal Coat	A.) Bituminous Materials <i>Quantity: 0.2 to 1.5 liters per sq.m.</i> For every 40 tons or 200 drums or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories
		B.) Cover Aggregates <i>Quantity: 5 to 14 kgs per sq.m.</i> For every 75 cu.m./200 kg or fraction thereof, or as directed by the Engineer	1 - G, Grading Test		RIP-TC-1

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.	
304	Bituminous Surface Treatment	A.) Aggregates			Before incorporation into the project/Before use	
		<i>Quantity:</i>				
		1.) <i>Using Cut-Back Asphalt or Asphalt Cement - 13.6 to 38.0 kg per sq.m.</i>				
		2.) <i>Using Emulsified Asphalt - 13.6 to 19.04 kg per sq.m.</i>				
		For every 75 cu.m./200 kg or fraction thereof, or as directed by the Engineer	1 - G, Grading Test 1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-1	
					RIP-TC-2	
		For every 1500 cu.m. of crushed aggregates or fracture thereof, or as directed by the Engineer	1 - Q, Quality Test 1 - F, Fractured Face Test		RIP-TC-9	
		B.) Bituminous Materials				
		<i>Quantity:</i>				
		1. <i>Using Cut-Back Asphalt or Asphalt Cement - 1.58 to 2.04 liters per sq.m.</i>				
		2. <i>Using Emulsified Asphalt - 1.58 to 2.04 liters per sq.m.</i>				
		For every 40 tons or 200 drums or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories	
305	Bituminous Penetration Macadam Pavement	A.) Aggregates			Before incorporation into the project/Before use	
		<i>Quantity:</i>				
		1. <i>Using Asphalt Cement or Rapid Curing</i>				
		For every 75 cu.m./200 kg or fraction thereof, or as directed by the Engineer	1 - G, Grading Test 1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-1	
					RIP-TC-2	
		For every 1500 cu.m. of crushed aggregates or fracture thereof, or as directed by the Engineer	1 - Q, Quality Test 1 - F, Fractured Face Test		RIP-TC-9	

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		Coarsed (crushed) . . . 90 kg/sq.m. Key (crushed). (13-&-11) . . 24 kg/sq.m			
		Cover (crushed or screened) . . 8kg/sq.m. 2. Using Emulsified Asphalt Coarsed (crushed) 90 kg/sq.m Choker (crushed) 10 kg/sq.m Key (crushed) . . . (10-&-8) . . 18 kg/sq.m Cover (crushed or screened) . . 8 kg/sq.m			
		B.) Bituminous Materials			
		7.2 to 11 liters per sq.m.	1-Q, Quality test	Before delivery to the project site/before use	Forms from accredited laboratories
306	Portland Cement Concrete Pavement	A.) Cement			
		For the 1st 2000 Bags or fraction thereof, or as directed by the Engineer	1-Q, Quality Test/brand of cement	Before delivery to the project site/before use	Forms from accredited laboratories
		In the excess of 2000 bags but not more than 10,000 bags	1-MC, Manufacturer/Mill Certificate per 2000 bags or as directed by the Engineer	Before delivery to the project site/before use	Forms from accredited laboratories
		B.) Fine Aggregates			
		1.) 0.50 cu.m./cu.m.concrete (if rounded coarse aggregate is used)			
		2.) 0.54 cu.m./cu.m. concrete (if angular coarse aggregate is used)			

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<i>a. From a source not yet tested, or failed in previous quality test</i>			
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Elutriation (Wash), Bulk Specific Gravity, Absorption, Mortar Strength, Soundness, Organic Impurities, Unit Weight and % of Clay Lumps and Shake	After the Identification of the Quarry/Before the materials are to be incorporated into the project	RIP-TC-1; RIP-TC-11; RIP-TC-15; RIP-TC-10; RIP-TC-8
		<i>b. From a source previously tested and passed quality test</i>			
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Elutriation (Wash), Bulk Specific Gravity, Absorption and Mortar Strength.	Before incorporation into the project/Before use	RIP-TC-1; RIP-TC-11; RIP-TC-15
		For every 75 cu.m. or fraction thereof, or as directed by the Engineer	1-G, Grading Test		RIP-TC-1
		C.) <u>Coarse Aggregates</u>			
		1.) 0.77 cu.m./cu.m. of concrete (if rounded coarse aggregate is used)			
		2.) 0.68 cu.m./cu.m. of concrete (if angular coarse aggregate is used)			
		<i>a. From a source not yet tested, or failed in previous quality test</i>			
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Bulk Specific Gravity, Absorption, Abrasion, Soundness and Unit Weight.	Before incorporation into the project/Before use	RIP-TC-1; RIP-TC-11; RIP-TC-9; RIP-TC-10; RIP-TC-8

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<i>b. From a source previously tested and passed quality test</i>			
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Bulk Specific Gravity, Absorption and Unit Weight.	Before incorporation into the project/Before use	RIP-TC-1; RIP-TC-11; RIP-TC-9; RIP-TC-10; RIP-TC-8
		For every 75 cu.m. or fraction thereof, or as directed by the Engineer	1-G, Grading Test		RIP-TC-1
		<u>D.) Water</u>	1 - Certificate from Resident Engineer or; 1 - Q, Quality Test for Alkalinity and Acidity as per AASHTO T 26, Solids and Chloride Contents	Before use of water from specific source	RIP-TC-5
		<u>E.) Joint Filler</u>			
		1.) Poured Joint Filler	1-Q, Quality Test/Shipment	Before delivery to the project site/before use	Forms from accredited laboratories
		2.) Pre-molded Joint Filler	1-Q, Quality Test/Shipment		
		<u>F.) Special Curing Agents</u>	1-Q, Quality Test/Shipment		
		<u>G.) Steel Bars</u>			
		For every 10,000 kgs or fraction thereof each size, or as directed by the Engineer	1-Q, Quality Test		RIP-TC-22
		<u>H.) Concrete</u>			
		Concrete slump test	randum checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14

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Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<i>Flexural Strength Test on Concrete Beam Sample:</i>	1-Quality Test	At 14 days old of concrete beam sample	RIP-TC-13
		For every 330 sq.m. of pavement or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete beam test specimens (6"x6"x21") shall be taken		
		<u>I.) Completed Pavement</u> As directed by the Engineer, if the Engineer has any concerns in regards to pavement thickness despite of checking and witnessing formworks set up.	Thickness Determination by Concrete Core Drilling	In Process/as concreting in progress	RIP-TC-13
307	Bituminous Road-Mix Surface Course	<u>A.) Aggregates</u>			
		For every 75 cu.m./200 kg or fraction thereof, or as directed by the Engineer	1 - G, Grading Test 1 - P, Plasticity Test (PL, LL & PI)	Before incorporation into the project/Before use	RIP-TC-1 RIP-TC-2
		For every 1500 cu.m. of crushed aggregates or fracture thereof, or as directed by the Engineer	1 - Q, Quality Test 1 - F, Fractured Face Test		RIP-TC-9
		<u>B.) Bituminous Materials</u> Quantity: 1. Using Cut-Back Asphalt - 4.5 to 7.0 mass percent of total dry aggregates 2. Using Emulsified Asphalt - 6.0 to 10.0 mass percent of total dry aggregate			
		For every 40 tons or 200 drums or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories

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Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.	
		C.) Mix				
		For every 75 cu.m./200 kg or fraction thereof, or as directed by the Engineer	1 - G, Grading Test	Before use	RIP-TC-1	
			1 - Ext, Extraction Test	in process		
			1 - Sty, Stability Test	in process		
			1 - C, Compaction Test	in process	RIP-TC-3	
		D.) Hydrated Lime				
		For every 100 tons or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories	
		E.) Compacted Pavement		After full days operation		
		For each full day's operation:	At least one (1) D & T (Density and Thickness Test)but not more than three (3) samples shall			
308	Bituminous Plant-Mix Surface Course-General	A.) Aggregates				
		For every 75 cu.m./200 kg or fraction thereof, or as directed by the Engineer	1 - G, Grading Test	Before incorporation into the project/Before use	RIP-TC-1	
			1 - P, Plasticity Test (PL, LL & PI)		RIP-TC-2	
		For every 1500 cu.m. or fracture thereof, or as directed by the Engineer	1 - Q, Quality Test		RIP-TC-9	
			1 - F, Fractured Face Test			
			B.) Bituminous Materials			
		5.0 to 8.0 mass percent of total dry aggregate				
		For every 40 tons or 200 drums or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories	
		C.) Mix				
		For every 75 cu.m. per 130 tons or fraction thereof, or as directed by the Engineer	1 - G, Grading Test	Before use	RIP-TC-1	
			1 - Ext, Extraction Test	in process		
			1 - Sty, Stability Test	in process		

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
			1 - C, Compaction Test	in process	RIP-TC-3
		<u>D.) Hydrated Lime</u> For every 100 tons or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories
		<u>E.) Mineral Filler</u> For every 75 cu.m. or fraction thereof, or as dericted by the Engineer	1 - G, Grading Test 1 - P, Plasticity Test (PL, LL & PI)		
		<u>F.) Compacted Pavement</u> For each full day's operation:	At least one (1) D & T (Density and Thickness Test) but not more than three (3) samples shall be taken	After full days operation	RIP-TC-4
309	Bituminous Concete Surface Course, Hot Laid	<u>A.) Aggregates</u>	Same test as for item 308	Same as for item 308	
		<u>B.) Bituminous Materials</u> 5.0 to 8.0 mass percent of total dry aggregate			
		For every 40 tons or 200 drums or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories
		<u>C.) Mix</u>	Same test as for item 308	Same as for item 308	
		<u>D.) Hydrated Lime</u>	Same test as for item 308	Same as for item 308	
		<u>E.) Mineral Filler</u>	Same test as for item 308	Same as for item 308	
		<u>F.) Compacted Pavement</u>	Same test as for item 308	Same as for item 308	

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.	
DIVISION 4-BRIDGE CONSTRUCTION						
400	Piling	<u>A.) Timber Piles</u>				
		For each size and shipment of timber		Inspection Report		
		<u>B.) Concrete Piles</u>				
		1.) Concrete				
		Concrete slump test		random checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14
		<i>Compressive Strength Test on Concrete Cylinder</i>		1-Quality test		
		<i>Sample:</i>				
		For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer		One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13
		<i>Compressive Strength Test on Concrete Cylinder</i>				
		<i>Sample:</i>				
For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer		One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13		
2.) Reinforcing Steel						
For every 10,000 kgs or fraction thereof each size, or as directed by the Engineer		1 - Quality Test	Before delivery to the project site/before use	RIP-TC-22		
3.) Structural Piles		1 - Q, Quality Test/Mill Test Certificate or;	Before delivery to the project site/before use			
		1 - IR, Inspection Report				
401	Railing	<u>A.) Concrete</u>				
		Concrete slump test		random checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<i>Compressive Strength Test on Concrete Cylinder</i> 1-Quality test <i>Sample:</i>			
		For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13
		<u>B.) Reinforcing Steel</u>	<i>Same test as for Item 404</i>	<i>Same as for Item 404</i>	
		For every 10,000 kgs or fraction thereof each size, or as directed by the Engineer	1 - Quality Test	Before delivery to the project site/before use	RIP-TC-22
402	Timber Structure	For each type of materials used or as directed by the Engineer	1 - Q, Quality Test or 1 - MC, Manufacture's Certificate	Before use	
		For each size and shipment of timber used or as directed by the Engineer	1 - IR, Inspection Report	in process	
403	Metal Structures	For each type of materials used or as directed by the Engineer	1 - Q, Quality Test or 1 - MC, Manufacture's Certificate	Before delivery to the project site/before use	
		For each size and shipment of metal used or as directed by the Engineer	1 - IR, Inspection Report		
404	Reinforcing Steel	A.) Bar Reinforcement for Concrete.			
		For every 10,000 kgs or fraction thereof each size, or as directed by the Engineer	1 - Quality Test	Before delivery to the project site/before use	RIP-TC-22

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.	
405	Structural Concrete	<u>A.) Cement</u>				
		<i>Quantity:</i> Class "A" 9.0 bags/cu.m. of Concrete Class "B" 8.0 bags/cu.m. of Concrete Class "C" 9.5 bags/cu.m. of Concrete Class "P" 11.0 bags/cu.m. of Concrete				
		For the 1st 2000 Bags or fraction thereof, or as directed by the Engineer	1-Q, Quality Test/brand of cement	Before delivery to the project site/before use	Forms from accredited laboratories	
		In the excess of 2000 bags but not more than 10,000 bags	1-MC, Manufacturer/Mill Certificate per 2000 bags or as directed by the Engineer			
		<u>B.) Fine Aggregate</u>				
		<i>Quantity: cu.m. per cu.m. of concrete</i>				
			<i>For Rounded</i>	<i>For Angular</i>		
		Class "A"	0.50	0.54		
		Class "B"	0.45	0.52		
		Class "C"	0.53	0.59		
		Class "P"	0.44	0.47		
		<i>a. From a source not yet tested, or failed in previous quality test</i>				
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Elutriation (Wash), Bulk Specific Gravity, Absorption, Mortar Strength, Soundness, Organic Impurities, Unit Weight and % of Clay Lumps and Shake	After the Identification of the Quarry/Before the materials are to be incorporated into the project	RIP-TC-1; RIP-TC-11; RIP-TC-9; RIP-TC-10; RIP-TC-8	

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.	
		<i>b. From a source previously tested and passed quality test</i>				
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Elutriation (Wash), Bulk Specific Gravity, Absorption and Mortar Strength.	Before incorporation into the project/Before use	RIP-TC-1; RIP-TC-11; RIP-TC-15	
		For every 75 cu.m. or fraction thereof, or as directed by the Engineer	1-G, Grading Test			
	C.) <u>Coarse Aggregates</u>					
	<i>Quantity: cu.m. per cu.m. of concrete</i>					
		<i>For Rounded</i>	<i>For Angular</i>			
		<i>Class "A"</i>	<i>0.77</i>	<i>0.68</i>		
		<i>Class "B"</i>	<i>0.82</i>	<i>0.73</i>		
		<i>Class "C"</i>	<i>0.70</i>	<i>0.68</i>		
		<i>Class "P"</i>	<i>0.68</i>	<i>0.65</i>		
	<i>a. From a source not yet tested, or failed in previous quality test</i>					
		For every 1,500 cu m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Bulk Specific Gravity, Absorption, Abrasion, Soundness and Unit Weight.	After the Identification of the Quarry/Before the materials are to be incorporated into the project	RIP-TC-1; RIP-TC-11; RIP-TC-9; RIP-TC-10; RIP-TC-8	

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<i>b. From a source previously tested and passed quality test</i>			
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Bulk Specific Gravity, Absorption and Unit Weight.	Before incorporation into the project/Before use	RIP-TC-1; RIP-TC-11; RIP-TC-9; RIP-TC-10; RIP-TC-8
		For every 75 cu.m. or fraction thereof, or as directed by the Engineer	1-G, Grading Test		
		<u>D.) Water</u>	1 - Certificate from Resident Engineer or; 1 - Q, Quality Test for Alkalinity and Acidity as per AASHTO T 26, Solids and Chloride Contents	Before use of water from specific source	
		<u>E.) Pre-molded Filler for Expansion Joints</u>			
		Each thickness of filler for each shipment	1-Q, Quality Test	Before delivery to the project site/before use	
		<u>F.) Steel Reinforcement/Bars</u>			
		For every 10,000 kgs or fraction thereof each size, or as directed by the Engineer	1-Q, Quality Test	Before delivery to the project site/before use	RIP-TC-22

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<u>G.) Concrete</u>			
		Concrete slump test	random checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14
		<i>Compressive Strength Test on Concrete Cylinder</i> 1-Quality test <i>Sample:</i>			
		For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13
406	Pre-Stressed Concrete Structure	<u>A.) Concrete</u>			
		Concrete slump test	random checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14
		<i>Compressive Strength Test on Concrete Cylinder</i> <i>Sample:</i>			
		For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13
		<u>B.) Steel Reinforcement</u>			
		For every 10,000 kgs or fraction thereof each size, or as directed by the Engineer	1-Q, Quality Test	Before delivery to the project site/before use	RIP-TC-22
		<u>C.) Wire Strand</u>			
	For every twenty (20) tons or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before use	Forms from accredited laboratories	

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
407	Concrete Structure				
		<i>Compressive Strength Test on Concrete Cylinder Sample:</i>			
		For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13
408	Steel Bridges	For each type of materials used or as directed by the Engineer	1 - Q, Quality Test or 1 - MC, Manufacturer's Certificate	Before delivery to the project site/before use	
		For each size and shipment of metal used or as directed by the Engineer	1 - IR, Inspection Report		
		Painting			
		One 20 liter can for every 100 cans of fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories
		One 4 liter can for every 100 cans of fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories
409	Welded Structural Steel	For each type of materials used or as directed by the Engineer	1 - Q, Quality Test or 1 - MC, Manufacturer's Certificate	Before delivery to the project site/before use	
		For each size and shipment of metal used or as directed by the Engineer	1 - IR, Inspection Report		
			1 - IR, Inspection Report		in process
410	Treated and Untreated Timber		1 - IR, Inspection Report for Timber	in process	
			1 - Q, Quality Test for preservative		

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.	
411	Paint	One 20 liter can sample shall be obtained for every 100 cans of fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use		
		One 4 liter can sample shall be obtained for every 100 cans of fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratories	
DIVISION 5- DRAINAGE AND SLOPE PROTECTION						
500	Pipe Culverts and Storm Drains	A.) Pipes				
		For every 50 pcs casted or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test for strength, and dimension			
		Alternative Requirement:				
		For every 25 pcs pipe casted or fraction thereof, or as directed by the Engineer	1 set consisting of three (3) concrete cylinder sample for each sizes shall be undertaken for strength determination test.	After 7, 14 or 28 days curing	RIP-TC-13	
			1 - IR, Inspection Report for each size for not more than 25 pipes cast in the field	in process		
	Cement, Fine Aggregates and Water					
		B.) Mortar for Joint				
		Cement, Fine Aggregates and Water	1-Quality test			
		Mortar Strength Test	1-Q, Quality test consisting of 3 samples for every 2 cu.m. or fraction thereof for a day work.	in process	RIP-TC-15	

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
501	Underdrains	A.) Concrete Pipe (Non-Reinforced)			
		For every 0.5 % of the number of pipes each size but not less than two (2), or as directed by the Engineer	1 - Q, Quality Test for Strength, and Dimension		
		For every 25 pcs. pipe casted or fraction thereof, or as directed by the Engineer	1 set consisting of three (3) concrete cylinder sample for each shall be undertaken for strength determination test.	After 7, 14 or 28 days curing	RIP-TC-13
			1 - IR, Inspection Report for each size for not more than 25 pipes cast in the field		
		B.) Clay Pipe			
		For every 200 pcs each size, with a minimum of two (2) specimens, or as directed by the Engineer	1 - Q, Quality Test for Strength, Absorption, and Dimension		
502	Manhole, inlets and Catch Basins	A.) Concrete			
			<i>Same test as for Item 405, Class "A"</i>	<i>Same as for Item 405</i>	
		Concrete slump test	randum checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14
		<i>Compressive Strength Test on Concrete Cylinder Sample:</i>			
		For every 75 cu m. of each class of concrete or fraction thereof placed each day, or as directed	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm)	After 7, 14 or 28 days curing	RIP-TC-13
	B.) Lids, Cast Iron Frames and Grating	1 - IR, Inspection Report	in process		
503	Cleaning and Reconditioning Existing Drainage		1 - IR, Inspection Report	in process	

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
504	Riprap and Grouted Riprap	A.) Cement			
		Cement, Fine Aggregates and Water	1-Quality test		
		Mortar Strength Test	1-Q, Quality test consisting of 3 samples for every 2 cu.m. or fraction thereof for a day work.	in process	RIP-TC-15
		B.) Fine Aggregate			
		Quantity: cu.m. per cu.m. of concrete			
		<i>For Rounded</i>	<i>For Angular</i>		
		<i>Class "A"</i>	<i>0.50</i>	<i>0.54</i>	
		<i>Class "B"</i>	<i>0.45</i>	<i>0.52</i>	
		<i>Class "C"</i>	<i>0.53</i>	<i>0.59</i>	
		<i>Class "P"</i>	<i>0.44</i>	<i>0.47</i>	
		a. From a source not yet tested, or failed in previous quality test			
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Elutriation (Wash), Bulk Specific Gravity, Absorption, Mortar Strength, Soundness, Organic Impurities, Unit Weight and % of Clay Lumps and Shake	After the identification of the Quarry/Before the materials are to be incorporated into the project	RIP-TC-1; RIP-TC-11; RIP-TC-9; RIP-TC-10; RIP-TC-8

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<i>b. From a source previously tested and passed quality test</i>			
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Elutriation (Wash), Bulk Specific Gravity, Absorption and Mortar Strength.	Before incorporation into the project/Before use	RIP-TC-1; RIP-TC-11; RIP-TC-15
		For every 75 cu.m. or fraction thereof, or as directed by the Engineer	1-G, Grading Test		
		C.) Stone	1 - Q, Quality test for Unit Weight and absorption or as directed by the Engineer		RIP-TC-8; RIP-TC-9
		D.) Water	Same test as for Item 405		
505	Stone Masonry	A.) Cement			
		<i>One part cement to two parts sand by volume</i>			
		Cement, Fine Aggregates and Water	1-Quality test		
		Mortar Strength Test	1-Q, Quality test consisting of 3 samples for every 2 cu.m. or fraction thereof for a day work.	in process	RIP-TC-15
		For the 1st 2000 Bags or fraction thereof, or as directed by the Engineer	1-Q, Quality Test/brand of cement	Before delivery to the project site/before use	Forms from accredited laboratories
		In the excess of 2000 bags but not more than 10,000 bags	1-MC, Manufacturer/Mill Certificate per 2000 bags or as directed by the Engineer		

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<u>B.) Fine Aggregate</u>			
		<i>Quantity: cu.m. per cu.m. of concrete</i>			
		<i>For Rounded</i>	<i>For Angular</i>		
		<i>Class "A"</i>	<i>0.50</i>	<i>0.54</i>	
		<i>Class "B"</i>	<i>0.45</i>	<i>0.52</i>	
		<i>Class "C"</i>	<i>0.53</i>	<i>0.59</i>	
		<i>Class "P"</i>	<i>0.44</i>	<i>0.47</i>	
		<i>a. From a source not yet tested, or failed in previous quality test</i>			
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Elutriation (Wash), Bulk Specific Gravity, Absorption, Mortar Strength, Soundness, Organic Impurities, Unit Weight and % of Clay Lumps and Shake	After the Identification of the Quarry/Before the materials are to be incorporated into the project	RIP-TC-1; RIP-TC-11; RIP-TC-9; RIP-TC-10; RIP-TC-8
		<i>b. From a source previously tested and passed quality test</i>			
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	1-Q, Quality Test for Grading, Elutriation (Wash), Bulk Specific Gravity, Absorption and Mortar Strength.	Before incorporation into the project/Before use	RIP-TC-1; RIP-TC-11; RIP-TC-15
		For every 75 cu.m. or fraction thereof, or as directed by the Engineer	1-G, Grading Test		

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		C.) Stone <i>0.17 cu.m.per cu.m. of concrete</i>	1 - Q, Quality test for Unit Weight and absorption or as directed by the Engineer		RIP-TC-8; RIP-TC-9
		For every 1,500 cu.m. or fraction thereof, or as directed by the Engineer	<i>Same test as for Item 405</i>	<i>Same as for Item 405</i>	
		For every 75 cu.m. of fraction thereof, or as directed by the Engineer	1 - G, Grading Test		
		C.) Stone	1 - Q, Quality test for Unit Weight and absorption or as directed by the Engineer		
		D.) Water	<i>Same test as for Item 405</i>		
506	Handlaid Rock Embankment		1 - IR, Inspection Report	in process	
507	Sheet Piles	A.) Timber Piles	1 - IR, Inspection Report	in process	
		B.) Concrete Sheet Piles	<i>Same test as for Item 400</i>		
		C.) Steel Sheet Piles	<i>Same test as for Item 400, 403 and 411</i>		
508	Concrete Slope Protection	A.) Bed Course	<i>Same test as for Item 200, Grading "A"</i>		
		B.) Steel Reinforcement	<i>Same test as for Item 400</i>		
		For every 10,000 kgs or fraction thereof each size, or as directed by the Engineer	1 - Quality Test	Before delivery to the project site/before use	RIP-TC-22
		C.) Concrete			
		Concrete slump test	randum checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14
		<i>Compressive Strength Test on Concrete Cylinder Sample:</i>	1-Quality test		
		For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
509	Gabions and Mattresses		1 - Q, Quality Test		
		<u>Rock Fill</u>	1 - Snd, Soundness Test		
			1 - IR, Inspection Report	in process	
510	Drainage Steel Grating with Frame		Same test as for Item 403	Same as for Item 403	
		<u>Mortar for Joint</u>			
		Cement, Fine Aggregates and Water	1-Quality test		
		Mortar Strength Test	1-Q, Quality test consisting of 3 samples for every 2 cu.m. or fraction thereof for a day work.	in process	RIP-TC-15
511	Rubble Concrete	<u>A.) Concrete</u>			
		Concrete slump test	random checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14
		Compressive Strength Test on Concrete Cylinder	1-Quality test		
		Sample: For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13
		<u>B.) Stone</u>	1 - Q, Quality test for Unit Weight and absorption or as directed by the Engineer		
		<u>C.) Water</u>	Same test as for Item 405	Same as for Item 405	RIP-TC-5
DIVISION 6- MISCELLANEOUS STRUCTURES					
600	Curb and Gutter	<u>A.) Concrete</u>	Same test as for Item 405	Same as for Item 405	
		0.078 cu.m./ m (Curb only) 0.092 cu.m./m (Curb & Gutter, Type "A") 0.149 cu.m./m (Curb & Gutter, Type "B") 0.074 cu.m./m (Curb & Gutter, Type "C")			
		<u>B.) Joint Filler</u>	Same test as for Item 306		

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		C.) Cement Mortar			
		Cement, Fine Aggregates and Water	1-Quality test		
		Mortar Strength Test	1-Q, Quality test consisting of 3 samples for every 2 cu.m. or fraction thereof for a day work.	in process	RIP-TC-15
		One part cement to two parts of fine aggregates			
601	Sidewalk	A.) Concrete			
		Concrete slump test	random checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14
		<i>Compressive Strength Test on Concrete Cylinder</i> 1-Quality test <i>Sample:</i>			
		For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13
		B.) Expansion Joint Filler			
			Same test as for Item 306		
602	Monuments, Markers and Guide Posts	A.) Concrete		Same as for	
		Concrete slump test	random checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14
		<i>Compressive Strength Test on Concrete Cylinder</i> 1-Quality test <i>Sample:</i>			
		For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13
		B.) Reinforcing Steel			
		For every 10,000 kgs or fraction thereof each size, or as directed by the Engineer	1 - Quality Test	Before delivery to the project site/before use	RIP-TC-22

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		C.) Timber	Same test as for Item 410		
		D.) Paint	Same test as for Item 411		
603	Guardrail	A.) Steel Post	Same test as for Item 403		
		B.) Timber Post	Same test as for Item 410		
		C.) Concrete			
		Concrete slump test	random checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14
		<i>Compressive Strength Test on Concrete Cylinder</i> 1-Quality test Sample:			
		For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13
		D.) Reinforcing Steel	Same test as for Item 404		
		For every 10,000 kgs or fraction thereof each size, or as directed by the Engineer	1 - Quality Test	Before delivery to the project site/before use	RIP-TC-22
		E.) Rail	1 - IR, Inspection Report		Daily log
		F.) Paint	Same test as for Item 411		Forms from accredited laboratory
604	Fencing	A.) Barbed Wire	1 - Q, Quality Test		
		B.) Chain Link Fence Fabric	1 - Q, Quality Test		
		C.) Concrete Post			
		Concrete slump test	random checks through out concreting works as directed by the engineer	Before pouring of concrete on site/in process	RIP-TC-14

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
		<i>Compressive Strength Test on Concrete Cylinder</i>	1-Quality test		
		<i>Sample:</i>			
		For every 75 cu.m. of each class of concrete or fraction thereof placed each day, or as directed by the Engineer	One (1) set consisting of three (3) concrete cylinder test specimens (150mmx300mm) shall be taken	After 7, 14 or 28 days curing	RIP-TC-13
		D.) Steel Post	Same test as for Item 403		
		E.) Steel Reinforcement			
		For every 10,000 kgs or fraction thereof each size, or as directed by the Engineer	1 - Quality Test	Before delivery to the project site/before use	RIP-TC-22
605	Road Sign		1 - IR, Inspection Report		Daily log
		Post and Frames	Same test as for Item 403		
606	Pavement Marking		1 - Q, Quality Test for (Physical properties and Composition) 1 - IR, Inspection Report		Daily log
607	Reflective Pavement Marking		1 - IR, Inspection Report		Daily log
608	Topsoil		1 - IR, Inspection Report		Daily log
609	Sprigging		1 - IR, Inspection Report		Daily log
610	Sodding		1 - IR, Inspection Report		Daily log
611	Tree Planting		1 - IR, Inspection Report		Daily log
612	Reflective Thermoplastic Stripping Materials (Solid Form)	A minimum weight of 10 kg. of Reflectorized Thermoplastic paint shall be taken for every 100 bags or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test		Forms from accredited laboratory

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
DIVISION 7- MATERIALS DETAILS					
700	Hydraulic cement		Same test as for Item 405 & 306	Same as for Item 405	
701	Construction Lime (Hydrated)	For every 100 tons or fraction thereof, or as directed by the Engineer	1 - Q, Quality Test	Before delivery to the project site/before use	Forms from accredited laboratory
702	Bituminous Materials		Same test as for Item 301, 302, 303, 307, 308, 309 & 310	Same as for Item 301, 302, 303, 307, 308, 309 & 310	Forms from accredited laboratory
703	Aggregates		Same test as for Item of Work Specified in the Bill of Qtys.		
703(A)	Mineral Filler		Same test as for item 308		
704	Masonry Units	For every 10,000 units of fraction thereof, or as directed by the Engineer	1 - Q, Quality Test for compressive strength	Before delivery to the project site/before use	
705	Joint Materials		Same test as for Item 306 and 500		
706	Concrete, Clay, Plastic and Fiber Pipe	A.) <u>Concrete Pipe</u>	Same test as for Item 500 and 501		
		B.) <u>Clay and Other Types of Pipes</u>	Refer to the applicable requirements of AASHTO test and Specifications		
707	Metal Pipe		Refer to the applicable requirements of AASHTO test and Specifications		
708	Chemical Admixtures for Concrete		1 - Q, Quality Test	Before delivery to the project site/before use	

QUALITY CONTROL/QUALITY ASSURANCE PROGRAM

Item Number	Description	Frequency of Test	Type and Number of Test	Timing of Test/Inspection	Test Result Form No.
709	Paints		Same test as for Item 411	Same test as for Item 411	
710	Reinforcing Steel and Wire Rope	A.) <u>Reinforcing Steel</u>	Same test as for Item 404	Same test as for Item 404	
		B.) <u>Wire Rope</u>	Same test as for Item 406	Same test as for Item 406	
711	Fence and Guardrail	A.) <u>Fence</u>	Same test as for Item 604	Same test as for Item 604	
		B.) <u>Guardrail</u>	Same test as for Item 603	Same test as for Item 603	
712	Structural Metal		Same test as for Item 403 and 409	Same test as for Item 403 and 409	
713	Treated and Untreated Timber		Same test as for Item 410	Same test as for Item 410	
714	Water		Same test as for Item 306 and 405	Same test as for Item 306 and 405	
715	Geotextiles		1 - Q, Quality Test	Before delivery to the project site/before use	

APPENDIX B
MATERIAL TESTING FORMS
AND
SITE INSPECTION CHECKLIST



APPENDIX B

LISTS OF MATERIAL TESTING FORMS

No.	Descriptions	Specs Item No.	References	Forms No.
1	Gradation/Sieve Analysis	102,103,104,105,200, 201,300,306,405,505	AASHTO T 11 AASHTO T 27	RIP-TC-1
2	Plasticity test (Plastic and Liquid limit test)	102,103,104,105,200, 201,300	AASHTO T 89 AASHTO T 90	RIP-TC-2
3	Moisture-Density of Soil (Compaction test)	102,103,104,105,200, 201,300	AASHTO T 217	RIP-TC-3
4	Field Density Test	102,103,104,105,200, 201,300	AASHTO T 191	RIP-TC-4
5	Test/Mill Certificate	102,103,204,206,306 400,405,406,407,500, 502,504,505,508,510, 511,601,604	AASHTO T 26	RIP-TC-5
6	Moisture Content Test	102,103,104,105,200, 201,300,306,405,406, 407,500,502,504,505, 508,510,511,600,601, 602,602,604	AASHTO T 217	RIP-TC-6
7	Absorption Test	306, 400,401,405,406,407, 500,501,502,504,505, 508,510,511,600,601, 602,603,604	AASHTO T 84 AASHTO T 85	RIP-TC-7
8	Unit Weight	306, 400,401,405,406,407, 500,501,502,504,505, 508,510,511,600,601, 602,603,604	AASHTO T 191	RIP-TC-8
9	Los Angeles Abrasion Test	200,201,202,203,204, 205,206,300,304,305, 306,307,308,309,400, 401,405,406,407,500, 502,504,505,508,510, 511,600,601,602,602, 604	AASHTO T 96	RIP-TC-9
10	Soundness Test of Aggregates	306, 400,401,405,406,407, 500,502,504,505,508, 510,511,600,601,602, 602,604	AASHTO T 104	RIP-TC-10
11	Specific Gravity and	306,	AASHTO T 84	RIP-TC-11

	Absorption Test of Aggregates	400,401,405,406,407,500,502,504,505,508,510,511,600,601,602,602,604	AASHTO T 85	
12	California Bearing Ratio (CBR)	200,201,300	AASHTO T 193	RIP-TC-12
13	Compressive Strength Test	306,400,401,405,406,407,501,502,508,511,600,601,602,603,604	AASHTO T 22	RIP-TC-13
14	Concrete Slump Test	306,400,401,405,406,407,501,502,508,511,600,601,602,603,604	AASHTO T 119	RIP-TC-14
15	Mortar Strength Test	500,504,505,510,600		RIP-TC-15
16	Consistency of Mortar	500,504,505,510,600		RIP-TC-16
17	Hydrostatic Test for Non Pressure Pipes	706		RIP-TC-17
18	Hydrostatic Test for Non Pipes	707		RIP-TC-18
19	Leak Test for Underground RCC Structure	706		RIP-TC-19
20	Leak Test for Elevated RCC Structure	706		RIP-TC-20
21	Leak Test for Manhole	706		RIP-TC-21
22	Worksheet for Reinforcing Steel Bars	710	AASHTO M 31	RIP-TC-22
23	Ductility Test for Bitumen			RIP-TC-23
24	Penetration Test for Grading Bitumen			RIP-TC-24
25	Test Certificate for Cement			RIP-TC-25

WORKSHEET FOR SIEVE ANALYSIS

Project: _____
(Number) (Name) (City/Province)

Kind of Materials: _____
Spec's Item No.

Sampled at: _____
(Give as accurate location as possible)

Original Source: _____
(Pit, quarry, river etc. and location)

Sampled by: _____
(Name & Designation) (Office) (Date)

Tested by: _____
(Name & Designation) (Office) (Date)

Computed by: _____
(Name & Designation) (Office) (Date)

Laboratory No. _____

Moisture Content. % _____

Fineness Modulus _____

Weight of sample
 Original _____
 Oven dry _____
 Wash Oven dry _____

Sieve Size mm	Weight Retained grams	Percentage Retained %	Cumulative			Governing Spec's. % Passing	Remarks
			Weight Passing, g	Percent Passing	Percent Retained		
75.00							
63.00							
50.00							
37.50							
25.00							
19.00							
12.50							
9.50							
6.30							
No. 4.75							
No. 2.36							
No. 2.00							
No. 1.18							
No. 0.600							
No. 0.425							
No. 0.300							
No. 0.250							
No. 0.150							
No. 0.075							
Pan							
Wash Passing No. 0.075							
TOTAL							

RECOMMENDATIONS: _____

Prepared by: _____ Checked by: _____
Subcontractor's Material Technical GEM QA/QC Engineer

Submitted by: _____ Conformed by: _____
Subcontractor's Material Engineer GEM Material Engineer

WORKSHEET FOR LIQUID AND PLASTIC LIMIT TEST

Project _____
 (Number) (Name) (City/Province)

Sampled at _____
 (give as accurate a location as possible)

Original Source _____
 (Pit, quarry, river, etc. and location)

Proposed Used _____ Specification Item No. _____

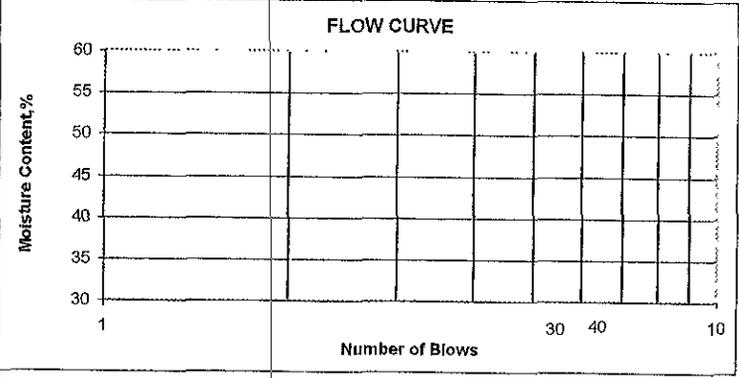
Sample by _____

Tested by _____ (Name and Designation) (Office) (Date)

Computed by _____ (Name and Designation) (Office) (Date)

Laboratory No. _____ (Name and Designation) (Office) (Date)

Determination Number	LIQUID LIMIT				PLASTIC LIMIT	
	1	2	3	4	1	2
Container Number						
Container & Wet Soil, grams						
Container & Dry Soil, grams						
Moisture Loss, grams						
Container, grams						
Dry Soil, grams						
Moisture Content, %						
Number of Blows					Average=	



SIEVE ANALYSIS	
Sieve Size	% Passing
No. 2.000	
No. 0.425	
No. 0.075	

Liquid limit	
Plastic limit	
Plasticity Index	
Group Index	
Group Classification	

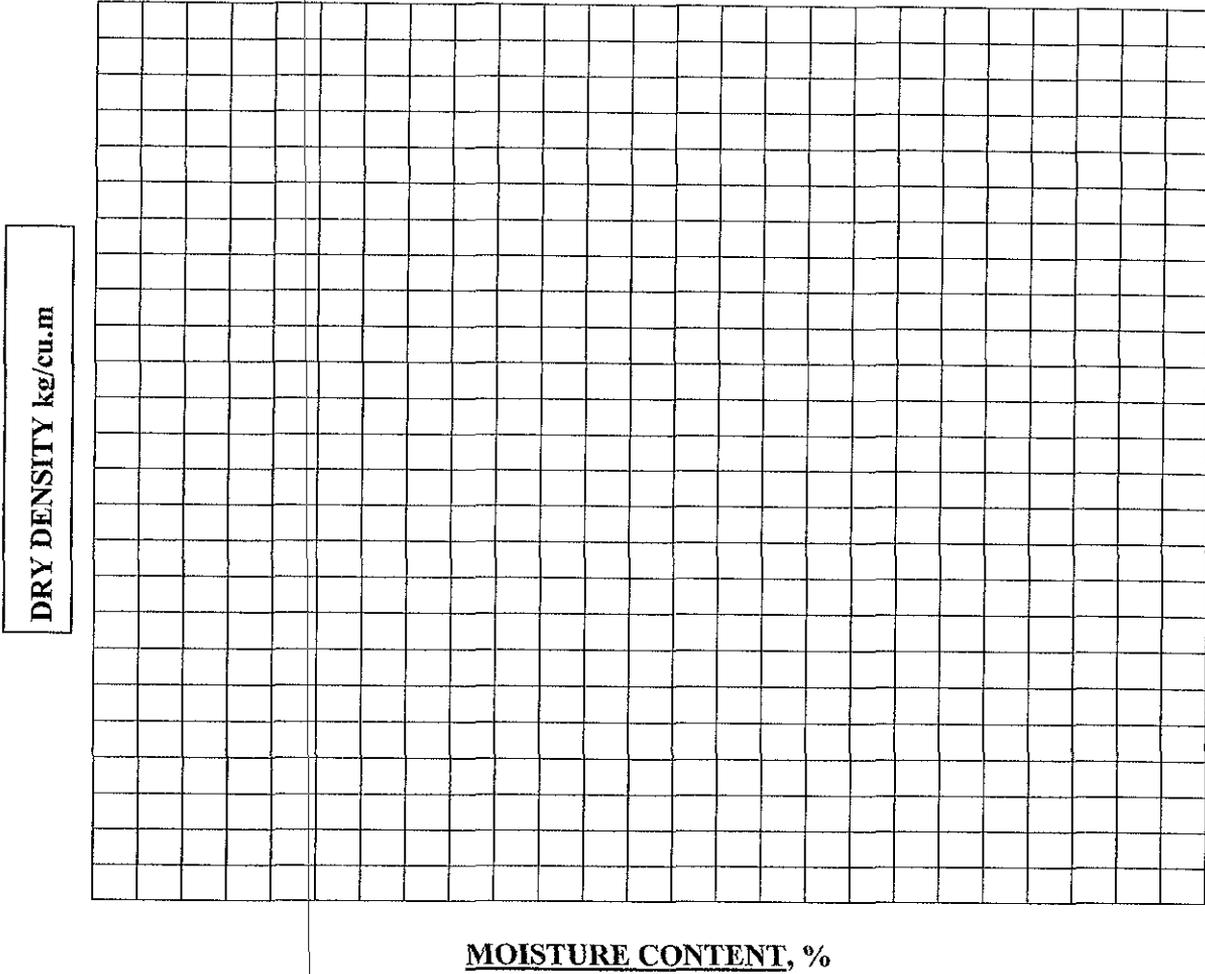
Remarks: _____

Prepared by: _____ Checked by: _____
 Subcontractor's Material Technician. GEM QA/QC Engineer

Submitted by: _____ Conformed by: _____
 Subcontractor's Material Engineer GEM Materials Engineer

Figure 2. MOISTURE DENSITY CURVE

MOISTURE DENSITY RELATIONS OF SOIL





**GROWTH WITH
EQUITY IN
MINDANAO
PROGRAM**

2/F, 1 Ladislawa Building
Ladislawa Avenue, Buhangin
Davao City, 8000 Philippines
Tel: (63-82) 225-1569 to 75
Fax: (63-82)225-1479
E-mail: GEM@mindanao.org

Unit 3, 12/F ExportBank Plaza
Sen. Gil Puyat cor Chino Roces Avenues
Makati City, 1200 Philippines
Tel: (632) 812-1647
Fax: (632) 818-8900
E-mail: gemakati@mozcom.com

(Date)

ENGINEER'S CERTIFICATE

Project Number : _____
Project Name : _____
Project Location : _____
Subcontractor : _____

This is to certify that the _____
for the Construction of Temporary Facilities for Engineers, **Item** _____,
has been inspected and found conforming with the Plans and GEM Specification and the
General and Technical Specifications.

Prepared by:

Verified by:

Conformed by:

Subcontractor's Mat'ls Engr.

Subcontractor's Project Engineer

Materials Engineer, GEM



WORKSHEET FOR MOISTURE CONTENT TEST (FIELD)			
Project	(Number)	(Name)	(City/Province)
Sampled at	(give as accurate a location as possible)		
Original Source	(Pit, quarry, river, etc. and location)		
Proposed Used	Specification Item No.		
Sample by	(Name and Designation)	(Office)	(Date)
Tested by	(Name and Designation)	(Office)	(Date)
Computed by	(Name and Designation)	(Office)	(Date)

Test No.	1	2	3	4	5
Container No.					
Weight of wet soil taken					
Weight of dry soil in pan					
Weight of water					
Moisture content					

Remarks/Recommendation : _____

Prepared by: _____
 Subcontractor's Material Technician

Submitted by: _____
 Subcontractor Materials Engineer

Checked by: _____
 GEM QA/QC Engineer

Conformed by: _____
 GEM Materials Engineer

WORKSHEET FOR WATER ABSORPTION TEST FOR STONE/BOULDER

Project	(Number)	(Name)	(City/Province)
Sampled at	(give as accurate a location as possible)		
Original Source	(Pit, quarry, river, etc. and location)		
Proposed Used Sample by	(Name and Designation)	Specification Item No.	(Office)
Tested by	(Name and Designation)	(Office)	(Date)
Computed by	(Name and Designation)	(Office)	(Date)

No.	Weight of Oven Dried Material(grams)	Weight of Wet Material	Weight of Water Absorbed	% of Water Absorbed	Remarks

Water Absorption of Materials : _____

Remarks/Recommendation : _____

Prepared by: _____ Checked by: _____

Submitted by: Subcontractor's Material Technician Conformed by: GEM QA/QC Engineer

Subcontractor Materials Engineer GEM Materials Engineer

WORKSHEET FOR UNIT WEIGHT DETERMINATION			
Project	(Number)	(Name)	(City/Province)
Sampled at	(give as accurate a location as possible)		
Original Source	(Pit, quarry, river, etc. and location)		
Proposed Used Sample by	Specification Item No. _____		
Tested by	(Name and Designation)	(Office)	(Date)
Computed by	(Name and Designation)	(Office)	(Date)
	(Name and Designation)	(Office)	(Date)

UNIT WEIGHT (LOOSE)			
TRIAL	1	2	3
Weight of sample and bucket			
Weight of bucket, g			
Weight of sample, g			
Volume of bucket, cu. Cm.			
Unit weight of sample, g/cc			
Average Unit weight, g/cc			
UNIT WEIGHT (RODDED)			
TRIAL	1	2	3
Weight of sample and bucket			
Weight of bucket, g			
Weight of sample, g			
Volume of bucket, cu. Cm.			
Unit weight of sample, g/cc			
Average Unit weight, g/cc			

Average Unit Weight (Loose) = _____ g/cc
 Average Unit Weight (Rodded) = _____ g/cc

Remarks/Recommendation : _____

Prepared by: _____ Checked by: _____
 Submitted by: Subcontractor's Material Technician Conformed by: GEM QA/QC Engineer
Subcontractor Materials Engineer GEM Materials Engineer

SOUNDNESS TEST OF AGGREGATE BY USE OF SODIUM SULFATE			
Project	(Number)	(Name)	(City/Province)
Sampled at	(give as accurate a location as possible)		
Original Source	(Pit, quarry, river, etc. and location)		
Proposed Used Sample by	Specification Item No.		
	(Name and Designation)	(Office)	(Date)
Tested by	(Name and Designation)	(Office)	(Date)
Computed by	(Name and Designation)	(Office)	(Date)

Sieve size, mm		1	2	3	4	5	6
Passing	Retained on	Grading of original sample, % retained	Mass of test fraction before test, (g)	Mass of test fraction after test, (g)	Loss in Mass	% passing sieve after test (actual %loss)	Mass average (corrected of loss)
FINE AGGREGATES							
0.150	-						
0.300	0.150						
0.600	0.300						
1.18	0.600						
2.36	1.18						
4.75	2.36						
9.5	4.75						
Totals							
COARSE AGGREGATES							
63	37.5						
37.5	19						
19	9.5						
9.5	4.75						

Remarks/Recommendation : _____

Prepared by: _____ Checked by: _____
 Submitted by: Subcontractor's Material Technician GEM QA/QC Engineer
 Subcontractor Materials Engineer GEM Materials Engineer

CALIFORNIA BEARING RATIO	
Project	_____ (Name) _____ (City/Province)
Sampled at	_____ (give as accurate a location as possible)
Original Source	_____ (Pit, quarry, river, etc. and location)
Proposed Used Sample by	_____ Specification Item No. _____
Tested by	_____ (Name and Designation) _____ (Office)
Computed by	_____ (Name and Designation) _____ (Office)

MOISTURE CONTENT

DRY DENSITY

Container No. _____	Total wet weight _____	_____
Total wet weight _____	Weight of Mold _____	_____
Total dry weight _____	Weight of wet soil _____	_____
Weight of container _____	Moisture content _____	_____
Weight of water _____	Dry unit weight of soil _____	_____
Weight of dry soil _____	Volume of mold _____	_____
Moisture content _____	_____	_____
Average _____	Dry Density, kg/cu.m. _____	_____

SWELL

Dial Reading at start _____	Difference _____	_____
Dial Reading at finish _____	%Swell _____	_____

Time	30"	1'	1'30"	2'	2'30"	3'	3'30"	4'	5'	6'
Penetration, mm	0.6	1.3	1.9	2.5	3.2	3.8	4.4	5.0	6.4	7.5
Dial Reading										
Load, kg										
Unit load, kg/sq.cm.										
Standard load										
CBR										
Corrected CBR										

Remarks/Recommendation : _____

Prepared by: _____
 Submitted by: _____
 _____ Subcontractor's Material Technician
 _____ Subcontractor Materials Engineer

Checked by: _____
 Conformed by: _____
 _____ GEM QA/QC Engineer
 _____ GEM Materials Engineer

WORKSHEET FOR CONCRETE COMPRESSIVE STRENGTH TEST		
Project	(Number)	(Name) (City/Province)
Sampled at	(give as accurate a location as possible)	
Original Source	(Pit, quarry, river, etc. and location)	
Proposed Used	Specification Item No.	
Sample by	(Name and Designation)	(Office) (Date)
Tested by	(Name and Designation)	(Office) (Date)
Computed by	(Name and Designation)	(Office) (Date)

No.	Particulars	Unit	Test No. (Age in days)		
			1	2	3
			7 days	14 days	28 days
1	Identification Mark/Sample No.				
2	Weight of specimen	cm			
3	Length of specimen	cm			
4	Breadth of specimen	cm			
5	Height of specimen	cm			
6	Cross sectional area of specimen	sq.cm			
7	Crushing load	kg			
8	Comprssive strength	kg/sq.cm			

Average compressive strength _____ kg/sq.cm.

Remarks/Recommenidation : _____

Prepared by: _____	Checked by: _____
Submitted by: _____ Subcontractor's Material Technician	_____ GEM QA/QC Engineer
_____ Subcontractor Materials Engineer	_____ GEM Materials Engineer

WORKSHEET FOR MORTAR STRENGTH TEST		
Project	(Number) _____ (Name) _____	(City/Province) _____
Sampled at	(give as accurate a location as possible) _____	
Original Source	(Pit, quarry, river, etc. and location) _____	
Proposed Used	Specification Item No. _____	
Sample by	(Name and Designation) _____	(Office) _____ (Date) _____
Tested by	(Name and Designation) _____	(Office) _____ (Date) _____
Computed by	(Name and Designation) _____	(Office) _____ (Date) _____

	Sample	Standard
Mass of cement, g	_____	_____
Mass of sand, g	_____	_____
Volume of water used, ml	_____	_____
Flow, %	_____	_____
Cross sectional area, sq.m.	_____	_____

Lab No.	Age in Days	Sample		Standard	
		Tons	kg/sq.m.	Tons	kg/sq.m.

Average : _____
 % of standard : _____

Remarks/Recommendation : _____

Prepared by: _____	Checked by: _____
Subcontractor's Material Technician	GEM QA/QC Engineer
Submitted by: _____	Conformed by: _____
Subcontractor Materials Engineer	GEM Materials Engineer

WORKSHEET FOR CONSISTENCY OF MORTAR TEST		
Project	_____ (Name)	_____ (City/Province)
Sampled at	_____ (give as accurate a location as possible)	
Original Source	_____ (Pit, quarry, river, etc. and location)	
Proposed Used	_____ Specification Item No.	
Sample by	_____ (Name and Designation) (Office)	_____ (Date)
Tested by	_____ (Name and Designation) (Office)	_____ (Date)
Computed by	_____ (Name and Designation) (Office)	_____ (Date)

No.	Particulars	Unit	Test No.	
			1	2
1	Weight of cement	kg		
2	Weight of sand	kg		
3	Water/Cement Ratio			
4	Weight of water	kg		
5	Dial gauge reading before penetration	mm		
6	Dial gauge after before penetration	mm		
7	Consistency of mortar	mm		

Average consistency of mortar : _____ mm

Remarks/Recommendation : _____

Prepared by: _____ Checked by: _____
 Submitted by: _____ Subcontractor's Material Technician GEM QA/QC Engineer
 _____ Subcontractor Materials Engineer GEM Materials Engineer

WORKSHEET FOR REINFORCING BAR		
Project	(Number) _____ (Name) _____	(City/Province) _____
Sampled at	(give as accurate a location as possible) _____	
Original Source	(Pit, quarry, river, etc. and location) _____	
Proposed Used	_____	Specification Item No. _____
Sample by	(Name and Designation) _____	(Office) _____ (Date) _____
Tested by	(Name and Designation) _____	(Office) _____ (Date) _____
Computed b	(Name and Designation) _____	(Office) _____ (Date) _____

DATA		
1. Class	() Plain () Deformed	
	() Round () Square	
2. Nominal Size	_____ mm	
3. Nominal area	_____ sq.mm	
4. Nominal mass	_____ kg/m	
5. Diameter (Plain)	_____ mm	
6. Length of specimen	_____ mm	
7. Mass of specimen	_____ kg	
8. Tensile load at:		
a. Yield point	_____ kg	
b. Maximum	_____ kg	
9. Elongation		
a. Final	_____ mm	
b. Gage Length	_____ mm	
c. Difference	_____ mm	
10. Deformation		
a. Average spacing	_____ mm	
b. Average height	_____ mm	
c. Gap	_____ mm	
11. Phosphorous content (Report content from chemical unit)	_____ %	
12. Bending:		
a. Pin diameter	_____ mm	
b. Degrees of bend	_____ mm	
c. Bend	_____ mm	
13. Area		
Plain	$0.7854 \times (5)^2$	_____
Deformed	$(7) \times (10)^6$ from table	_____
	$(6) \times 7850$	_____
14. Specimen Unit mass	$(7) \times 1000$	_____
	(6)	_____
15. Variation in mass	$(14) - (4)$	_____
	(4)	_____
16. Yield Point	$(8a) \times 9.8$	_____
	(13)	_____
17. Tensile strength	$(8b) \times 9.8$	_____
	(13)	_____
18. Elongation	$(9c) \times 100$	_____
	$(9b)$	_____

Remarks/Recommendation: _____

Prepared by: _____	Checked by: _____
Submitted by: _____	GEM QA/QC Engineer
Subcontractor's Material Technician	Conformed by:
Subcontractor Materials Engineer	GEM Materials Engineer

WORKSHEET FOR DUCTILITY TEST FOR BITUMEN		
Project	(Number) (Name)	(City/Province)
Sampled at	(give as accurate a location as possible)	
Original Source	(Pit, quarry, river, etc. and location)	
Proposed Used	Specification Item No.	
Sample by	(Name and Designation)	(Office) (Date)
Tested by	(Name and Designation)	(Office) (Date)
Computed by	(Name and Designation)	(Office) (Date)

- 1. Grade of Bitumen : _____
- 2. Pouring Temperature : _____
- 3. Test temperature : _____
- Periods of coding, minutes : _____
- a. In air : _____
- b. In water bath trimming : _____
- c. In water bath after trimming : _____

No	Particulars	Briquette No.		
		1	2	3
1	Ductility (cm)			

Mean Ductility, cm. _____

Remarks/Recommendation : _____

Prepared by: _____
 Subcontractor's Material Technician

Checked by: _____
 GEM QA/QC Engineer

Submitted by: _____
 Subcontractor Materials Engineer

Conformed by: _____
 GEM Materials Engineer

SITE INSPECTION CHECKLIST FOR PORT SUBPROJECTS



Growth with Equity in Mindanao (GEM) Program

A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
Tel. Nos.: (082) 225-1569 to 75 Fax No.: (082) 225-1479

SITE INSPECTION CHECKLIST FOR PORTS

Subproject Name :	_____	
Subcontractor :	_____	Contract No.: _____

Province: _____ Municipality: _____ Barangay: _____

Proponent: _____ Recipient: _____

Date and Time : _____ Weather : _____

Original Contract Cost : PhP Revised Contract Cost : PhP

Notice to Proceed Date : _____ Scheduled Completion Date : _____

Date Work Started : _____ Expected Completion Date : _____

Work Done: _____ % Schedule Work to Be Done: _____ % Slippage: _____ %

Cumulative Progress Payment: PhP , _____ %

Work in Progress: _____

.....
General Management Issues:

Labor : _____	Safety : _____	Guarantees and Insurance : _____
Plant and Equipment : _____	Site Facilities : _____	Community Relations : _____
Supervisors : _____	Quality Tests : _____	Right of Way : _____
Work Program : _____	Site Records : _____	Signs : _____
Security : _____	Inventory and Storage : _____	Contractual Issues : _____

Legend: S - Satisfactory U - Unsatisfactory

.....
General Instructions to Subcontractor:

Prepared by: _____
RIP or CIP Engineer

Acknowledged by: _____
Subcontractor

CONSTRUCTION SITE INSPECTION CHECKLIST GUIDE FOR PORTS**100 GENERAL**

- 101 Clearing:** Clearing, grubbing, removing, and disposing all vegetation and debris along the roadway, except those objects that are designated in the contract.
- 102 Demolition:** Removal of existing structures along the roadway e.g. damage cross drainage pipes, bridges, old pavements, asphalt, etc.
- 103 Material Source:** Construction materials shall come from approved source (e.g. sand, gravel, cement, subbase, base coarse materials, reinforcing bars, etc.).
- 104 Fencing:** Perimeter fence of Subcontractor's temporary field facilities, bunkhouse, and office.
- 105 Topsoil:** Removal and disposal of topsoil or unsuitable materials along the roadway.
- 106 Planting:** Planting of trees and/or vegetation within ROW of the road to serve as erosion control and for aesthetics.

400 BRIDGES AND PILING

- 401 Materials:** Materials are properly stockpiled at the subproject site and shall come from approved source (e.g. coarse and fine aggregates, cement, reinforcing bars, form lumbers).
- 402 Excavation:** Excavation of foundation or footing. This shall conform to the design elevation, dimensions as per plan.
- 403 Alignment:** Alignment in accordance with the approved plan. Horizontal control shall be properly marked, labeled, and free of obstruction.
- 404 Elevation:** Elevation in accordance with the approved plan. Vertical control shall be properly marked, labeled, and free of obstruction.
- 405 Square Hole:** Construction of square hole to serve as guide in the driving of R. C. piles. Alignment and location shall suit site condition.
- 406 Driving:** Driving of R.C. piles in accordance to their alignment and location as per plan. No damage on R.C. piles during driving. Hammer used for driving shall be of approved specification.
- 407 Shoring:** Properly done to avoid leakage. Construction method shall be approved by the Engineer.
- 408 Railings:** Railings shall be constructed to the lines and grades shown on the plan and shall not be uneven. Postholes shall be backfilled with acceptable materials and properly compacted.
- 409 Metal Works:** Constructed in conformity with the lines, grades, and dimensions as per plan. Subcontractor shall furnish copy of the certified mill report of the structural steel.
- 410 False-work:** Properly constructed to carry the dead and live load of the proposed structures. Materials to be incorporated shall be of good quality.
- 411 Water Management:** Diversion of waterway shall be properly done not to disturb any construction work (e. g. excavation, pouring of concrete).

412 Timber Works: Timber to be used as per specifications and shall conform to the dimensions, lines, and grade. The timber shall be treated or untreated as called for on the plans.

413 Paint: Paint shall meet the general requirements (e.g. no excessive setting, no caking or color separation, free from lumps and skins).

300 STONE MASONRY

301 Materials: The stone shall be clean, hard, and durable. Adobe stone shall not be used unless otherwise specified. Materials shall be stockpiled properly in the subproject site.

302 Size: Stones shall not be less than 150 mm thick, and not less than one and one-half times their respective thickness wide and not less than one and one half times their respective widths long.

303 Dimensions: Dimension of the masonry shall suit site condition (e.g. width, slope).

304 Mortar: Fine aggregates, cement, and water shall conform to the requirements. Placing of mortar shall be properly done. Re-tampering of mortar shall not be allowed.

305 Placement: Stones shall be laid with their longest faces horizontal in full beds of mortar, and the joints shall be flushed with mortar. The exposed faces of individual stones shall be parallel to the faces of the walls in which the stones are set.

400 PIPELINES

401 Materials: Materials shall be properly stockpiled at the subproject site and shall be in accordance with the specification. Mill certificate from the manufacturer shall be required. Visual inspection of pipes on any damage during transportation.

402 Alignment: Horizontal alignment of the pipelines shall conform to the approved plans.

403 Elevation: Vertical control elevation of the pipelines shall be in accordance with the plans during excavation and laying.

404 Bedding: Proper placing and thickness of bedding materials on the excavated section. Bedding materials shall be in accordance with the specifications and design elevation.

405 Dimensions: Dimensions of pipes and joints to be used shall conform to the plans and specification. Shall have mill certificate from the manufacturer.

406 Joints: Pipes joints shall be properly done and in accordance with the plans and specifications (e.g. size and grade)

407 Trench: Proper construction of trench along the pipelines and in accordance with the plans

408 Leaks: Visual checking of any leakage on the joints and fittings.

409 Backfill: Proper backfilling after laying the pipes. All excess materials shall be properly disposed.

500 ROADS

501 Staking: Staking to be done before any construction activities. Stationing to be properly indicated and labeled, including the vertical and horizontal control as per approved plan.

502 Materials: Materials shall be properly stockpiled at subproject site or quarry and shall conform to the specifications. All materials shall come from approved source.

- 503 Width:** Width of the roadway shall be as per plans and specification
- 504 Sub-grade:** Preparation of sub-grade in accordance to the vertical and horizontal control as per plan.
- 505 Sub-base Coarse:** The materials shall be placed as a uniform mixture on a prepared sub-grade in a quantity, which will provide the required compacted thickness. These shall conform to the horizontal and vertical control as per plan. The materials shall pass the minimum laboratory requirements.
- 506 Base Coarse:** The materials shall be placed as a uniform mixture on a prepared sub-base in a quantity, which will provide the required compacted thickness. The materials shall pass the minimum laboratory requirements.
- 507 Paving:** The materials shall be in proper proportions and in accordance with the lines, grades, and typical cross-sections as per plan.
- 508 Shoulder:** The width and thickness shall be in accordance with the plans. Materials to be incorporated shall pass the minimum laboratory requirements.
- 509 Super-elevation:** Super-elevation along curves shall conform to the plans and specification
- 510 Side Drain:** Proper construction of side drains and in accordance with the approved plans. Free from any obstruction.
- 511 Compaction:** Compaction on any item shall follow the correct construction method. Correct moisture content shall be checked and adjusted prior to compaction.
- 512 Elevation:** Elevation of every item shall conform to the design elevation.
- 513 Alignment:** Horizontal alignment of the roadway shall be as per plan
- 514 Slope:** Side slope on cut portion and back slope shall be as per plans and shall be properly done.
- 515 Traffic Management:** Proper traffic management on the construction equipment including private vehicle passing the road.
- 516 Railings:** Posts shall be set vertically in the position as per plan. The space around the posts shall be backfilled to the ground line with approved materials in layers.
- 517 Signs:** Placing of required signs on the designated place.
- 600 BUILDING**
- 601 Materials:** Materials shall be properly stockpiled at the subproject site and come from approved source and in accordance with the specification.
- 602 Soaking:** Proper soaking of construction materials (e.g. coarse and fine aggregates) before using.
- 603 Foundation:** Excavation for foundation shall be as per plan and specifications (e.g. depth, width).
- 604 Mortar:** Correct proportion of fine aggregates, cement, and water.
- 605 Placement:** Proper placement of concrete hollow block, reinforcing bars, etc.
- 606 Plaster:** Proper plastering of the concrete walling or any part of the building and shall conform to the required thickness and proportion.

- 607 Finish:** Concrete finish in accordance to the plans (e.g. ordinary, rubbed or floated finish). No voids on the surface of the concrete shall be visible after getting off the forms.
- 608 Curing:** All newly placed concrete shall be cured in accordance with the specifications (e.g. water method or by curing compound).
- 609 Flooring:** Concreting of flooring shall be in accordance to the required thickness. Foundation shall be properly compacted prior to placing of concrete.
- 610 Roofing:** Proper construction as per plan. Ridge roll and gutter properly installed, including down spout. Materials shall pass the specifications (e.g. G.I. sheet) as per plan.
- 611 Windows:** The size and dimensions, including the specifications shall be as per plan and to be installed properly.
- 612 Doors:** The size and dimensions shall be as per specifications and plans. Proper installation of the door panel, including door jambs and hinges.
- 613 Painting:** Shall meet the general requirements (e.g. no excessive setting, no cracking or color separation, free from lumps, and skins).
- 614 Electrical Works:** Electrical works shall be as per plans. All materials shall conform to the specifications (e.g. size, capacity).
- 615 Water Pipes:** Proper installation of the pipes for water supply as per plans and specifications (e.g. sizes, grade).
- 616 Water Pipes Fitting:** Proper installation of the water pipes fittings shall meet specifications.
- 617 Sanitary Fixtures:** Approved sizes as per plans. Properly installed with no leaks. All materials shall conform to the specifications.
- 618 Illumination:** Proper installation to suit site condition (e.g. location, capacity).
- 700 EARTHWORKS**
- 701 Materials:** All materials shall pass the minimum laboratory requirements and shall come from approved source.
- 702 Excavation:** Excavation section shall conform to the plan with correct elevation, alignment, and slope
- 703 Disposal:** Proper disposal of excess excavated materials from cut section.
- 704 Dewatering:** Dewatering of stagnant or unwanted water along the roadway.
- 705 Backfill:** Backfilling of materials after placing the foundation pipes, etc.
- 706 Embankment:** Placing, grading, and compacting of embankment materials as per plan and in conformity with the lines and elevations. Embankment materials shall pass the minimum laboratory requirements.
- 707 Erosion:** Some erosion control works along the works (e.g. side slope). Construction shall suit site condition.
- 708 Compaction:** Proper compaction of materials as per required thickness and shall conform to the required lines and grades as per plan.
- 709 Equipment:** Construction equipment used shall be sufficient in number as well as appropriate and in good running condition.

800 CONCRETE

- 801 Aggregate:** Aggregates shall be stockpiled properly and shall pass the minimum laboratory requirements
- 802 Water:** Water to be used in any concreting works, curing or other designated applications shall be clean and free from oil, acid, alkali, grass or other substances injurious to the concrete.
- 803 Cement:** Cement used shall pass its quality test and a mill certificate from the manufacturer. Brands from different mills shall not be mixed nor shall they be used alternately unless approved by the Engineer.
- 804 Formworks:** Formworks shall be properly constructed, water tight, free from any foreign substances, and all dimensions and sizes shall be as per plan.
- 805 Reinforcement:** Reinforcing bars shall be as per plans and specifications on the sizes, spacing, and grade. Needs quality test and a manufacturer mill certificate.
- 806 Dimensions:** Dimensions shall be as per plan.
- 807 Placement:** Placement of fresh concrete shall be properly done to avoid segregation. Concrete shall be deposited in such manner to require minimal re-handling.
- 808 Mix:** Mixture of concrete shall conform to the specification and design. Correct proportions of aggregates, water, and cement shall be followed.
- 809 Admixtures:** Correct proportion shall be followed. Approved brands shall only be used and shall conform to the requirements.
- 810 Vibration:** Proper vibration of concrete to avoid segregation.
- 811 Joints:** Construction joints shall be constructed of the type and dimensions, and at the locations required by the plans. All joints shall be protected from the intrusion of injurious foreign materials until sealed.
- 812 Finish:** All concrete surfaces shall be finished as per plan and specifications.
- 813 Curing:** All newly poured concrete shall be cured by approved method (e.g. water method or by using curing compound).
- 900 PORTS**
- 901 Materials:** Materials shall be properly stockpiled at subproject site and shall come from approved source and in accordance to the specification.
- 902 Reclamation:** Approved materials for the reclamation work shall be used. Width limits and thicknesses shall be as per plans.
- 903 Compaction:** Compaction of the reclamation area shall be properly done. Appropriate equipment shall be used and correct thickness of layers shall also be followed.
- 904 Boulders:** Sizes of boulders shall be as per specifications and shall be clean, hard and durable.
- 905 Square Hole:** Construction of square holes to serve as guide for the driving of R. C. piles shall be properly constructed. Location of square hole shall suit site condition.
- 906 Piles:** Sizes and length of R. C. piles shall be as per plans. Age of piles before driving shall also be considered including the method of pick up. Alignment and location shall conform to the approved plan.

- 907 **Elevation:** Elevation shall conform to the plans per item of works.
- 908 **Fenders:** Construction of fenders shall suit site conditions.
- 909 **Mooring Bitts:** Location and specifications shall suit site conditions, meet specifications and be properly installed.
- 910 **Fencing:** Perimeter fence shall be as per plan (e.g. construction limits; heights, size and spacing of post).
- 911 **Water Management:** Water shall be properly drained to suit site conditions.

**SITE INSPECTION CHECKLIST
FOR GENERAL CIVIL WORK SUBPROJECTS**



Growth with Equity in Mindanao (GEM) Program

A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
Tel. Nos.: (082) 225-1569 to 75 Fax No.: (082) 225-1479

SITE INSPECTION CHECKLIST FOR GENERAL CIVIL WORKS

Subproject Name :	_____	
Contractor :	_____	Contract No.: _____

Province: _____ Municipality: _____ Barangay: _____

Proponent: _____ Recipient: _____

Date and Time : _____ Weather : _____

Original Contract Cost : PhP _____ Revised Contract Cost : PhP _____

Notice to Proceed Date : _____ Scheduled Completion Date : _____

Date Work Started : _____ Expected Completion Date : _____

Work Done: _____ % Schedule Work to Be Done: _____ % Slippage: _____ %

Cumulative Progress Payment: PhP _____ , _____ %

Work in Progress: _____

General Management Issues:

Labor : _____	Safety : _____	Guarantees and Insurance : _____
Plant and Equipment : _____	Site Facilities : _____	Community Relations : _____
Supervisors : _____	Quality Tests : _____	Right of Way : _____
Work Program : _____	Site Records : _____	Signs : _____
Security : _____	Inventory and Storage : _____	Contractual Issues : _____

Legend: S - Satisfactory U - Unsatisfactory

General Instructions to Subcontractor:

Prepared by: _____
RIP Engineer

Acknowledged by: _____
Subcontractor

CONSTRUCTION SITE INSPECTION CHECKLIST GUIDE FOR GENERAL CIVIL WORKS

100 GENERAL

- 101 Clearing:** Clearing, grubbing, removing, and disposing all vegetation and debris along the roadway, except those objects that are designated in the contract.
- 102 Demolition:** Removal of existing structures along the roadway e.g. damage cross drainage pipes, bridges, old pavements, asphalt, etc.
- 103 Material Source:** Construction materials shall come from approved source (e.g. sand, gravel, cement, sub-base, base coarse materials, reinforcing bars, etc.).
- 104 Fencing:** Perimeter fence of contractor's temporary field facilities, bunkhouse, and office.
- 105 Topsoil:** Removal and disposal of topsoil or unsuitable materials along the roadway.
- 106 Planting:** Planting of trees and/or vegetation within ROW of the road to serve as erosion control and for aesthetics.

200 BRIDGES AND PILING

- 201 Materials:** Materials are properly stockpiled at the subproject site and shall come from approved source (e.g. coarse and fine aggregates, cement, reinforcing bars, form lumbers).
- 202 Excavation:** Excavation of foundation or footing. This shall conform to the design elevation, dimensions as per plan.
- 203 Alignment:** Alignment in accordance with the approved plan. Horizontal control shall be properly marked, labeled, and free of obstruction.
- 204 Elevation:** Elevation in accordance with the approved plan. Vertical control shall be properly marked, labeled, and free of obstruction.
- 205 Square Hole:** Construction of square hole to serve as guide in the driving of R. C. piles. Alignment and location shall suit site condition.
- 206 Driving:** Driving of R.C. piles in accordance to their alignment and location as per plan. No damage on R.C. piles during driving. Hammer used for driving shall be of approved specification.
- 207 Shoring:** Properly done to avoid leakage. Construction method shall be approved by the Engineer.
- 208 Railings:** Railings shall be constructed to the lines and grades shown on the plan and shall not be uneven. Postholes shall be backfilled with acceptable materials and properly compacted.
- 209 Metal Works:** Constructed in conformity with the lines, grades, and dimensions as per plan. Contractor shall furnish copy of the certified mill report of the structural steel.
- 210 False-work:** Properly constructed to carry the dead and live load of the proposed structures. Materials to be incorporated shall be of good quality.
- 211 Water Management:** Diversion of waterway shall be properly done not to disturb any construction work (e. g. excavation, pouring of concrete).

- 212 Timber Works:** Timber to be used as per specifications and shall conform to the dimensions, lines, and grade. The timber shall be treated or untreated as called for on the plans.
- 213 Paint:** Paint shall meet the general requirements (e.g. no excessive setting, no caking or color separation, free from lumps and skins).
- 300 STONE MASONRY**
- 301 Materials:** The stone shall be clean, hard, and durable. Adobe stone shall not be used unless otherwise specified. Materials shall be stockpiled properly in the subproject site.
- 302 Size:** Stones shall not be less than 150 mm thick, and not less than one and one-half times their respective thickness wide and not less than one and one half times their respective widths long.
- 303 Dimensions:** Dimension of the masonry shall suit site condition (e.g. width, slope).
- 304 Mortar:** Fine aggregates, cement, and water shall conform to the requirements. Placing of mortar shall be properly done. Re-tampering of mortar shall not be allowed.
- 305 Placement:** Stones shall be laid with their longest faces horizontal in full beds of mortar, and the joints shall be flushed with mortar. The exposed faces of individual stones shall be parallel to the faces of the walls in which the stones are set.
- 400 PIPELINES**
- 401 Materials:** Materials shall be properly stockpiled at the subproject site and shall be in accordance with the specification. Mill certificate from the manufacturer shall be required. Visual inspection of pipes on any damage during transportation.
- 402 Alignment:** Horizontal alignment of the pipelines shall conform to the approved plans.
- 403 Elevation:** Vertical control elevation of the pipelines shall be in accordance with the plans during excavation and laying.
- 404 Bedding:** Proper placing and thickness of bedding materials on the excavated section. Bedding materials shall be in accordance with the specifications and design elevation.
- 405 Dimensions:** Dimensions of pipes and joints to be used shall conform to the plans and specification. Shall have mill certificate from the manufacturer.
- 406 Joints:** Pipes joints shall be properly done and in accordance with the plans and specifications (e.g. size and grade)
- 407 Trench:** Proper construction of trench along the pipelines and in accordance with the plans
- 408 Leaks:** Visual checking of any leakage on the joints and fittings.
- 409 Backfill:** Proper backfilling after laying the pipes. All excess materials shall be properly disposed.
- 500 ROADS**
- 501 Staking:** Staking to be done before any construction activities. Stationing to be properly indicated and labeled, including the vertical and horizontal control as per approved plan.
- 502 Materials:** Materials shall be properly stockpiled at subproject site or quarry and shall conform to the specifications. All materials shall come from approved source.

- 503 Width:** Width of the roadway shall be as per plans and specification
- 504 Sub-grade:** Preparation of sub-grade in accordance to the vertical and horizontal control as per plan.
- 505 Sub-base Coarse:** The materials shall be placed as a uniform mixture on a prepared sub-grade in a quantity, which will provide the required compacted thickness. These shall conform to the horizontal and vertical control as per plan. The materials shall pass the minimum laboratory requirements.
- 506 Base Coarse:** The materials shall be placed as a uniform mixture on a prepared sub-base in a quantity, which will provide the required compacted thickness. The materials shall pass the minimum laboratory requirements.
- 507 Paving:** The materials shall be in proper proportions and in accordance with the lines, grades, and typical cross-sections as per plan.
- 508 Shoulder:** The width and thickness shall be in accordance with the plans. Materials to be incorporated shall pass the minimum laboratory requirements.
- 509 Super-elevation:** Super-elevation along curves shall conform to the plans and specification
- 510 Side Drain:** Proper construction of side drains and in accordance with the approved plans. Free from any obstruction.
- 511 Compaction:** Compaction on any item shall follow the correct construction method. Correct moisture content shall be checked and adjusted prior to compaction.
- 512 Elevation:** Elevation of every item shall conform to the design elevation.
- 513 Alignment:** Horizontal alignment of the roadway shall be as per plan
- 514 Slope:** Side slope on cut portion and back slope shall be as per plans and shall be properly done.
- 515 Traffic Management:** Proper traffic management on the construction equipment including private vehicle passing the road.
- 516 Railings:** Posts shall be set vertically in the position as per plan. The space around the posts shall be backfilled to the ground line with approved materials in layers.
- 517 Signs:** Placing of required signs on the designated place.
- 600 BUILDING**
- 601 Materials:** Materials shall be properly stockpiled at the subproject site and come from approved source and in accordance with the specification.
- 602 Soaking:** Proper soaking of construction materials (e.g. coarse and fine aggregates) before using.
- 603 Foundation:** Excavation for foundation shall be as per plan and specifications (e.g. depth, width).
- 604 Mortar:** Correct proportion of fine aggregates, cement, and water.
- 605 Placement:** Proper placement of concrete hollow block, reinforcing bars, etc.
- 606 Plaster:** Proper plastering of the concrete walling or any part of the building and shall conform to the required thickness and proportion.

- 607 Finish:** Concrete finish in accordance to the plans (e.g. ordinary, rubbed or floated finish). No voids on the surface of the concrete shall be visible after getting off the forms.
- 608 Curing:** All newly placed concrete shall be cured in accordance with the specifications (e.g. water method or by curing compound).
- 609 Flooring:** Concreting of flooring shall be in accordance to the required thickness. Foundation shall be properly compacted prior to placing of concrete.
- 610 Roofing:** Proper construction as per plan. Ridge roll and gutter properly installed, including down spout. Materials shall pass the specifications (e.g. G.I. sheet) as per plan.
- 611 Windows:** The size and dimensions, including the specifications shall be as per plan and to be installed properly.
- 612 Doors:** The size and dimensions shall be as per specifications and plans. Proper installation of the door panel, including door jambs and hinges.
- 613 Painting:** Shall meet the general requirements (e.g. no excessive setting, no cracking or color separation, free from lumps, and skins).
- 614 Electrical Works:** Electrical works shall be as per plans. All materials shall conform to the specifications (e.g. size, capacity).
- 615 Water Pipes:** Proper installation of the pipes for water supply as per plans and specifications (e.g. sizes, grade).
- 616 Water Pipes Fitting:** Proper installation of the water pipes fittings shall meet specifications.
- 617 Sanitary Fixtures:** Approved sizes as per plans. Properly installed with no leaks. All materials shall conform to the specifications.
- 618 Illumination:** Proper installation to suit site condition (e.g. location, capacity).
- 700 EARTHWORKS**
- 701 Materials:** All materials shall pass the minimum laboratory requirements and shall come from approved source.
- 702 Excavation:** Excavation section shall conform to the plan with correct elevation, alignment, and slope
- 703 Disposal:** Proper disposal of excess excavated materials from cut section.
- 704 Dewatering:** Dewatering of stagnant or unwanted water along the roadway.
- 705 Backfill:** Backfilling of materials after placing the foundation pipes, etc.
- 706 Embankment:** Placing, grading, and compacting of embankment materials as per plan and in conformity with the lines and elevations. Embankment materials shall pass the minimum laboratory requirements.
- 707 Erosion:** Some erosion control works along the works (e.g. side slope). Construction shall suit site condition.
- 708 Compaction:** Proper compaction of materials as per required thickness and shall conform to the required lines and grades as per plan.
- 709 Equipment:** Construction equipment used shall be sufficient in number as well as appropriate and in good running condition.

800 CONCRETE

- 801 Aggregate:** Aggregates shall be stockpiled properly and shall pass the minimum laboratory requirements
- 802 Water:** Water to be used in any concreting works, curing or other designated applications shall be clean and free from oil, acid, alkali, grass or other substances injurious to the concrete.
- 803 Cement:** Cement used shall pass its quality test and a mill certificate from the manufacturer. Brands from different mills shall not be mixed nor shall they be used alternately unless approved by the Engineer.
- 804 Formworks:** Formworks shall be properly constructed, water tight, free from any foreign substances, and all dimensions and sizes shall be as per plan.
- 805 Reinforcement:** Reinforcing bars shall be as per plans and specifications on the sizes, spacing, and grade. Needs quality test and a manufacturer mill certificate.
- 806 Dimensions:** Dimensions shall be as per plan.
- 807 Placement:** Placement of fresh concrete shall be properly done to avoid segregation. Concrete shall be deposited in such manner to require minimal re-handling.
- 808 Mix:** Mixture of concrete shall conform to the specification and design. Correct proportions of aggregates, water, and cement shall be followed.
- 809 Admixtures:** Correct proportion shall be followed. Approved brands shall only be used and shall conform to the requirements.
- 810 Vibration:** Proper vibration of concrete to avoid segregation.
- 811 Joints:** Construction joints shall be constructed of the type and dimensions, and at the locations required by the plans. All joints shall be protected from the intrusion of injurious foreign materials until sealed.
- 812 Finish:** All concrete surfaces shall be finished as per plan and specifications.
- 813 Curing:** All newly poured concrete shall be cured by approved method (e.g. water method or by using curing compound).
- 900 OPEN CHANNELS**
- 901 Alignment:** The alignment shall be in accordance with the approved plan. Horizontal control shall be properly marked, labeled, and free from obstructions.
- 902 Grade:** The grade shall conform to the requirements as per plan. Vertical control shall be properly marked, labeled, and free from obstruction.
- 903 Excavation:** Excavation shall conform to the plans on the required dimension, depth, and lines.
- 904 Bedding:** Proper placing of bedding materials on the excavated section (e.g. thickness). Bedding materials to be used shall be in accordance with the specifications.
- 905 Embankment:** Approved embankment materials shall be incorporated and their locations shall conform to the lines and grades. Proper compaction is required.
- 906 Structures:** The number of structures shall conform to the plans and specifications
- 907 Erosion:** Erosion control shall be provided with the field requirements.

- 908 Slope:** Slopes, alignment, and grade shall be as per plan.
- 909 Piles:** Sizes and length of R. C. piles shall be as per plan. Age of pile before driving shall be considered including the method of pick up.
- 910 Gabions:** Furnishing and placing rock and wire mesh basket and installed at the locations designated in accordance with the specifications and in conformity with the lines, grades, dimensions, and arrangements shown on the plans.
- 911 Weep holes:** Weep holes shall be in conformity on the plans (e.g. size of hole and spacing)
- 912 Debris:** All debris shall be removed and cleared and shall be disposed properly.

APPENDIX C
QUALITY ASSURANCE/QUALITY CONTROL
DOCUMENTS

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LISTS OF QUALITY ASSURANCE/QUALITY CONTROL DOCUMENTS

No.	Description	Responsibility	Form No.
1	Site Order Book	Field Engineer/Contractor	RIP-QC-1
2	Work Request	Prepared by Contractor	RIP-QC-2
3	Measurement Book	Field Engineer/Contractor	RIP-QC-3
4	Test Check	Field Engineer/Contractor	RIP-QC-4
5	Sample Card	Prepared by Contractor	RIP-QC-5
6	Pouring Permit	Prepared by Contractor	RIP-QC-6
7	Design Mix of Concrete	Prepared by Contractor	RIP-QC-7
8	Quality Control Program	Prepared by Contractor	RIP-QC-8
9	Status of Quality Control Test	Prepared by Contractor	RIP-QC-9
10	Summary Of Quality Control Test	Prepared by Contractor	RIP-QC-10
11	Weather Chart	Field Engineer/Contractor	RIP-QC-11
12	Suspension Order	Issued by PMO	RIP-QC-12
13	Resume Order	Issued by PMO	RIP-QC-13
14	Acceptance Certificate	Issued by PMO	RIP-BF-1
15	Completion Certificate	Issued by PMO	RIP-BF-2
16	Punchlist of Defects	Issued by Field Engineer	RIP-BF-3
17	Completion Certificate of Punchlist	Issued by Field Engineer	RIP-BF-4
18	Request for Progress Payment	Prepared by Contractor	RIP-BF-5
19	Request for Final Payment	Prepared by Contractor	RIP-BF-6
20	Final Payment Certificate	Issued by PMO	RIP-BF-7
21	Endorsement 10% Retention	Issued by PMO	RIP-BF-8
22	Request for Release of Retention	Prepared by Contractor	RIP-BF-9
23	Retention Payment Certificate	Issued by PMO	RIP-BF-10
24	Particulars of Contract	Prepared by Contractor	RIP-BF-11
25	Statement of Work Accomplish	Prepared by Contractor	RIP-BF-12
26	Withholding Tax	Prepared by Contractor	RIP-BF-13
27	Detailed Completion Reports	Issued by PMO	RIP-BF-14
28	Contractor's Evaluation Form	Issued by PMO	RIP-BF-15

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24	Particulars of Contract	Prepared by Contractor	RIP-BF-11
25	Statement of Work Accomplish	Prepared by Contractor	RIP-BF-12
26	Withholding Tax	Prepared by Contractor	RIP-BF-13
27	Detailed Completion Reports	Issued by PMO	RIP-BF-14
28	Contractor's Evaluation Form	Issued by PMO	RIP-BF-15

APPENDIX C

LISTS OF QUALITY ASSURANCE/QUALITY CONTROL DOCUMENTS

No.	Description	Responsibility	Form No.
1	Site Order Book	Field Engineer/Contractor	RIP-QC-1
2	Work Request	Prepared by Contractor	RIP-QC-2
3	Measurement Book	Field Engineer/Contractor	RIP-QC-3
4	Test Check	Field Engineer/Contractor	RIP-QC-4
5	Sample Card	Prepared by Contractor	RIP-QC-5
6	Pouring Permit	Prepared by Contractor	RIP-QC-6
7	Design Mix of Concrete	Prepared by Contractor	RIP-QC-7
8	Quality Control Program	Prepared by Contractor	RIP-QC-8
9	Status of Quality Control Test	Prepared by Contractor	RIP-QC-9
10	Summary Of Quality Control Test	Prepared by Contractor	RIP-QC-10
11	Weather Chart	Field Engineer/Contractor	RIP-QC-11
12	Suspension Order	Issued by PMO	RIP-QC-12
13	Resume Order	Issued by PMO	RIP-QC-13
14	Acceptance Certificate	Issued by PMO	RIP-BF-1
15	Completion Certificate	Issued by PMO	RIP-BF-2
16	Punchlist of Defects	Issued by Field Engineer	RIP-BF-3
17	Completion Certificate of Punchlist	Issued by Field Engineer	RIP-BF-4
18	Request for Progress Payment	Prepared by Contractor	RIP-BF-5
19	Request for Final Payment	Prepared by Contractor	RIP-BF-6
20	Final Payment Certificate	Issued by PMO	RIP-BF-7
21	Endorsement 10% Retention	Issued by PMO	RIP-BF-8
22	Request for Release of Retention	Prepared by Contractor	RIP-BF-9
23	Retention Payment Certificate	Issued by PMO	RIP-BF-10
24	Particulars of Contract	Prepared by Contractor	RIP-BF-11
25	Statement of Work Accomplish	Prepared by Contractor	RIP-BF-12
26	Withholding Tax	Prepared by Contractor	RIP-BF-13
27	Detailed Completion Reports	Issued by PMO	RIP-BF-14
28	Contractor's Evaluation Form	Issued by PMO	RIP-BF-15



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel. Nos : (82) 225-1569 to 75 Fax No.: (82) 225-1479

PROJECT TURN OVER/ACCEPTANCE CERTIFICATE

Date:

Contract No.

Revised Project
Duration

Subproject Name

Name of Subcontractor

Subcontractor's Address

Amount of Contract

Revised Contract
Amount

To

We are pleased to inform you that the work mentioned above was completed on (Date) and accepted by GEM on (Date). There were no material deviations from the authorized plans and specifications and the completed work was very satisfactory. We are therefore pleased to hand over the completed works to you in accordance with the terms of the Memorandum of Agreement No. _____ between _____ and **GEM Program**.

PM for Infrastructure

.....

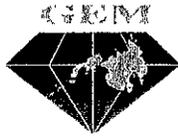
We accept to operate and maintain the work mentioned above in accordance with Memorandum of Agreement No. _____ between _____ and **GEM Program**.

Accepted by:

Witnessed by:

Provincial Governor - Maguindanao

RIP - Field Engineer



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
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 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel Nos : (82) 225-1569 to 75 Fax No.: (82) 225-1479

COMPLETION CERTIFICATE

Date:

Contract No. : _____ Project Duration: _____

Subproject Name : _____

Name of Subcontractor : _____

Subcontractor's Address : _____

Amount of Contract : _____

Revised Amount of Contract : _____

To Whom It May Concern:

We certify that the work mentioned above was completed on (Date) and accepted by GEM on (Date). The completed work was satisfactory.

RIP Project Manager

RIP Team Leader

Noted:

PM for Infrastructure

PM for Contracts and Administration

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RIP-BF-4



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
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 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel. Nos.: (82) 225-1569 to 75 Fax No.: (82) 225-1479

COMPLETION CERTIFICATE FOR PUNCHLIST

Date:

Contract No : _____ Project Duration : _____
 Subproject Name : _____
 Subproject Location : _____
 Name of : _____
 Subcontractor : _____
 Subcontractor's : _____
 Address : _____
 Amount of Contract : _____

To whom it may concern:

I hereby certify that the rectification works based on the punch list furnished to the contractor as a result of the joint final inspection was completed on (Date) and that the completed work was satisfactory.

Prepared by :

Noted By :

Project Manager

RIP Team Leader

(CONTRACTOR'S HEADIND)

General Engineering

General Building

Date

Mr.

Program Manager for Contracts, Accounting and Administration
Growth with Equity in Mindanao
2/F, 1 Ladiaw Building, Ladislawa Avenue
Buhangin, 8000 Davao City Philippines

Attention:

RIP – Team Leader

Subject: **REQUEST FOR RIP PROGRESS PAYMENT No.**

Ref: **Contract No.: Subproject Name**
Subproject location

Dear

:

As per the provisions of the contract mentioned above, contract no. (**Contract No.**), between **the Louis Berger Group, Inc. (LBGI)** and (**Contractor**), we submit this invoice for our claim for payment amounting to (**Amount in figure**), (**Amount in words**) only). This corresponds to (**%Accomplishment**) of the work done. The appropriate deductions for previous payments and retention are incorporated in this invoice.

Attached for your reference is the Statement of Work Accomplished covering the period up to June 30, 2006. This document was prepared jointly by the Engineer and the Subcontractor.

With this submission, we reaffirm our commitment to the terms and conditions of the contract.

Sincerely,

MR.

Owner/General Manager

Growth with Equity in Mindanao

(CONTRACTOR'S HEADING)

General Engineering

General Building

Date:

Mr.

Program Manager for Contracts, Accounting and Administration
Growth with Equity in Mindanao
2/F, 1 Ladiaw Building, Ladislawa Avenue
Buhangin, 8000 Davao City Philippines

Attention:

RIP -- Team Leader

Subject:

REQUEST FOR RIP FINAL PAYMENT

Ref:

Contract No.: Subproject Name
Subproject location

Dear Mr. Ruiz:

As per the provisions of the contract mentioned above, contract no. **Contract No.**, between **the Louis Berger Group, Inc. (LBGI)** and **(Contractor)**, we submit this invoice for our claim for payment amounting to **(Amount in figure), (Amount in Words)**. This corresponds to **(100%)** of the work done. The appropriate deductions for previous payments and retention are incorporated in this invoice.

Attached for your reference is the Statement of Work Accomplished covering the period up to September 20, 2007. This document was prepared jointly by the Engineer and the Subcontractor.

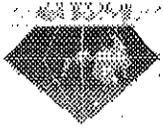
With this submission, we reaffirm our commitment to the terms and conditions of the contract.

Sincerely,

MR.

Owner/General Manager

Growth with Equity in Mindanao



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel. Nos.. (82) 225-1569 to 75 Fax : (82) 225-1479

REGIONAL INFRASTRUCTURE PROGRAM

Final Payment Certificate

Date: _____

Subproject Contract No : _____

Contract Amount :

Revised Contract Amount V.O.No.1 :

Revised Contract Amount V.O.No.2 :

Revised Contract Amount V.O.No.3 :

Subcontractor :

Period Covered _____

Subproject Name :

Location :

1 Total Value of Work Accomplished To Date : PhP _____

2 Total Value of Work Previously Accomplished : PhP _____

3 Total Value of Work Accomplished This Period(1-2 : PhP _____

4 LESS: (Deductions)

Recoupment of Advance Payment : PhP _____

Retention (10% of 3) PhP _____

5 Net Amount Due to Contractor (3-4) : PhP _____

I hereby certify that the attached payment of work is correct and does not include items and/or portions for which payment has already been received.

RIP Project Manager

RIP Team Leader

Approved for Payment:

PM for Infrastructure

PM for Contracts, Accounting and Administration



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
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THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel. Nos.: (82) 225-1569 to 75 Fax No.: (82) 225-1479

Date :
To : PM for Contracts, Accounting & Administration
From : Project Manager
Thru : RIP Team Leader
Subject : Release of 10% Retention Fee

Endorsing herewith is the letter of **(Subcontractor)** requesting for the release of the **10% Retention Fee** in the amount of (Amount in Words) **(PHP _____)** for the project of M-16: Masiu Road Concreting on Lake Lanao Circumferential Road.

Per our contract and acceptance during final billing, this project was completed on **(Date)**

Noted by:

RIP Team Leader

Recommending Approval:

Approved by:

PM- Infrastructure

PM – Contracts, Accounting & Admin.

Growth with Equity in Mindanao.

(CONTRACTOR'S HEADING)

Date:

Mr.

Program Manager for Contracts, Accounting and Administration
Growth with Equity in Mindanao
2/F, 1 Ladiaw Building, Ladiaw Avenue
Buhangin, 8000 Davao City Philippines

Attention:

RIP – Team Leader

Subject:

REQUEST FOR 10% RETENTION MONEY

Ref:

Dear

As per the provisions of the contract mentioned above, contract no. (Contract No), between GEM and (SUBCONTRACTOR), we hereby submit this letter-invoice for our claim for **10% Retention Payment** amounting to **(Amount in figure)**, (Amount in Words).

Attached for your reference are pertaining Documents required for 10% Retention Payment. This document was prepared jointly by the Engineer and the Subcontractor.

With this submission, we reaffirm our commitment to the terms and conditions of the Contract.

Sincerely,

(Name)

Subcontractor's Representative

Growth with Equity in Mindanao



**GROWTH WITH
EQUITY IN
MINDANAO 3
PROGRAM**

2/F, 1 Ladislawa Building
Ladislawa Avenue, Duhangin
Davao City, 8000 Philippines
Tel: (63-82) 225-1569 to 75 Fax:
(63-82)225-1479
E-mail: GEM@mindanao.org

Unit 3, 12/F ExportBank Plaza
Sen Gil Payat cor Chino Roces Avenues
Makati City, 1200 Philippines
Tel: (632) 812-1647
Fax: (632) 818-8900
E-mail: gemakati@mozcom.com

REGIONAL INFRASTRUCTURE PROGRAM

Retention Payment Certificate

Date: _____

Project Contract No : _____ Contract Amount : **PHP** _____

Subcontractor : _____ Revised Contract: **PHP** _____
Amount _____

Project Name : _____

Location : _____

1. 10% of Contract Cost : PhP _____
2. Less: (Pls. specify)
 - _____ : PhP _____
 - _____ : PhP _____
 - _____ : PhP _____
3. Total Amount Due to Suncontractor : PhP _____

I hereby certify that the payment claimed in Number 3, "Total Value of Work Due to Subcontractor" is correct and does not include items and/or portions for which payment has already been received.

Project manager

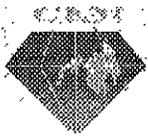
RIP Team Leader

Checked and recommended for payment:

Approved for payment:

PM for Infrastructure

PM for Contracts, Accounting and
Administration



GROWTH WITH EQUITY IN MINDANAO 3 PROGRAM

2/F, Ladislawa Building, Avenue, Buhangin, 8000 Philippines 225-1479 GBM@mmdanao.org
Ladislawa Davao City, Unit 3, 12/F ExportBank Plaza Sen Gil Puyat cor Chino Roces Avenues, Makati City, 1200 Philippines Tel (63-82) 225-1569 to 75 Fax (63-82) 225-1479 E-mail: GBM@mmdanao.org
Tel (63- Makati City, 1200 Philippines Tel (632) 812-1647 Fax (632) 818-8900 E-mail: gemekatu@mozcom.com

RIP-BF-11

PARTICULARS OF CONTRACT

Date: _____

Project Contract No. : _____ Contract Amount : Php
Rev. Contract Amount V. O. No.1 : Php
Project Name : _____
Subcontractor : _____
R. A. Bill No./Date : _____
Period Covered : _____ to _____

QUALITY CERTIFICATE

This is to certify that we have inspected the conduct of the works in accordance with the established Quality Control procedures and that the items included in this Interim Payment Certificate satisfy the required quality of works and are acceptable with regard to the specifications and standards as prescribed under the contract.

_____ Date _____ RIP Material Engineer

ACCEPTANCE NOTE

This is to certify that we accept the Quality Certificate

_____ Date _____ PM - Infrastructure

Note: This Quality Certificate and Acceptance Note shall be completed and attached to each Interim Payment Certificate before payment is made.

Copy Furnished: PM-Contracts, Accounting and Administration
PM-Infrastructure
File

(CONTRACTOR'S HEADING)

General Engineering

General Building

Date:

Mr.

Program Manager for Contracts, Accounting and Administration
Growth with Equity in Mindanao
2/F, 1 Ladiaw Building, Ladislawa Avenue
Buhangin, 8000 Davao City Philippines

Attention:

RIP – Team Leader

Subject:

WITHOLDING TAX

Ref:

Dear Mr. Ruiz:

As per the provisions of the contract referenced above, contract no.(Subcontract No.), between **the Louis Berger Group, Inc. (LBG)** and (Subcontractor), we hereby agree that LBGI, as the employer, shall not deduct any taxes from any payments due the contractor under this contract including mobilization advances, progress payments and the final payment.

We, (Subcontractor), shall be fully responsible for paying all taxes due to the national government or any local government unit.

With this submission, we reaffirm our commitment to the terms and conditions of the contract.

Sincerely,

Mr.

Owner/General Manager

Growth with Equity in Mindanao



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBGI)
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 Tel Nos. (82) 225-1569 to 75 Fax No : (82) 225-1479

SUBCONTRACTOR'S EVALUATION

Name of Subcontractor _____	
Subproject being evaluated _____	
Area office _____	Date of evaluation _____

I. Construction Implementation

1. Subproject construction as per plans and specifications
(Subcontractor always follow and does not deviate from the plans and specifications)
2. Cooperation with Resident Engineer and Field Engineer
(Maintains close coordination with the Resident Engineer and Field Engineers and complies with all Site Instructions issued and cooperates in the inspection and measurements of accomplishments)
3. Manpower and equipment supply
(Employs a full time Project Engineer, adequate number of skilled workers and provides all the scheduled construction equipment and necessary tools)
4. Construction Management
(Ensures that the subproject is ahead or on schedule and prepares catch-up plan if behind schedule, purchases materials ahead of time and provides enough manpower)

Rating	Weight
	15%
	15%
	10%
	10%

II. Quality Assurance/Quality Control (QA/QC) Implementation

1. Compliance to subproject plans and specifications
(Supply and use only the specified materials, properly handle and store them on site, and use or install them according to standard techniques and procedures)
2. Quality of works accomplished
(Shows a high degree of workmanship, complying to strict work quality standards and takes the appropriate measures to provide samples for testing of work accomplished)
3. Furnishing of the required QA/QC documents
(Provides the required QA/QC documents on time, openly submit supplied materials to inspections and prepare the necessary samples for testing as required)

Rating	Weight
	10%
	10%
	10%

III. Administrative and documentation

1. Signages and permits
(Provide and place on the appropriate locations the necessary billboards and process the required building or work permits ahead of time)
2. Safety and environment preservation
(Minimal or no damage to the environment, keeps the surrounding area free of debris and other pollutants, provides a safe working environment for the workers, visitors and the general public)
3. Reports and paperworks
(Prepare and submit the required paperworks necessary to document, evaluate and assess the subproject such as Site Order Book, Certificate of Work Accomplished, etc)
4. Maintenance of Engineer's Temporary Facilities
(Proper displaying of all subproject accomplishment monitoring charts, manpower and work schedules and regularly update them and available for inspection at any given time)

Rating	Weight
	5%
	5%
	5%
	5%

WEIGHTED AVERAGE = 0%

CONFORME/AGREED :

 Subcontractor's, Project Manager

EVALUATED BY :

 RIP Project Manager

NOTED BY

 RIP Team Leader

RIP-BF-16

**RELEASE AND QUIT CLAIM
FOR RIP SUBPROJECTS CONSTRUCTION CONTRACTS**

Date :

TO: Mr.
Program Manager for Contracts, Accounting and Administration

Subproject No. and Title:
Contract Agreement No.:

1. This is to certify that I, **(Name)** Operations Manager of **(Subcontractor)** have received the amount of **(Amount in Words)** representing the final payment due to our company as a result of the completion of our services under "The Agreement."
2. In consideration of the full payment of our services, **(Subcontractor)** does hereby release and acquit Louis Berger Group Inc. (LBGI), and its affiliates, employees, agents, successors and assignees, from any liability with respect to "The Agreement";
3. **(Subcontractor)** hereby agree to save, defend, and hold harmless LBGI against any third party claims, allegations and costs arising from **(Subcontractor)** performance under "The Agreement".

For **(Subcontractor)** Attest (LBGI)

(Subcontractor)
P. L. S. C Operations Manager

Mr
PM for Contracts & Admin

REPUBLIC OF THE PHILIPPINES(
City of Cotabato s.s.)

BEFORE ME, this ____ day of _____, 2007, in the City of _____
personally appeared _____ with CTC No. _____ issued at
_____ on _____ known to me and to be the same person who executed
the foregoing instrument, and he acknowledged to me the same is his free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand, the day, year and place above written.
Doc. No. ____
Page No. ____
Book No. ____
Series of 2007

SITE ORDER BOOK

Date: _____

Subproject Contract No : _____ Contract Amount : _____
 Subcontractor : _____ Date of Contract : _____
 Subproject Name : _____
 Location : _____

Notice to Proceed Date : _____	
Date Work Started : _____	
Scheduled Completion Date : _____	
Time Elapsed (%) : _____	

WORKFORCE	NO. OF PERSONS	EQUIPMENT ON SITE	NO. OF UNITS	STATUS
Include FOREMEN/ENGINEERS/SUPERVISORS		OI = Operational, Idle; OW = Operational, Working UMI = Under Minor Repair; UMA = Under Major Repair		

DELIVERED MATERIALS	QUANTITY/UNITS	DRAWINGS AND DATA RECEIVED (Describe)

WORK IN PROGRESS:

VISITOR'S NAME	POSITION	OFFICE	SIGNATURES	MEETING OR OTHER EVENT

INSTRUCTIONS TO THE SUBCONTRACTOR AND/OR APPROVALS GIVEN:

COMMENTS/OBSERVATION:

EXPLAIN ANY UNSATISFACTORY OBSERVATIONS:

Subcontractor

RIP Engineers



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
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Tel. Nos.: (82) 225-1569 to 75 Fax No.: (82) 225-1479

Subcontractor's Work Request

Date:

Contract No. : _____
Subproject Name : _____
Name of Subcontractor : _____
Subcontractor's Address : _____

Pay Item No.	Description	Stationing/ Location	Scheduled Date	Remarks	Action Code

The above schedule of activities is submitted for your review and approval

RIP Engineer's Action Code
A = Approved
AN = Approved as noted
D = Disapproved

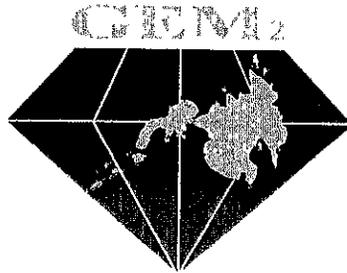
By: _____
Subcontractor's Engineer

By: _____
RIP Engineer

Date: _____

Growth with Equity in Mindanao 2 Program

(USAID Contract No. 492-C-00-02-00018-00)



MEASUREMENT BOOK NO. _____

Subproject Name : _____

Contract No : _____

Subcontractor : _____

Location : _____

Issued to : _____

Name and Signature

Date

Returned to : _____

Name and Signature

Date

_____ RIP Engineer	Page No. _____ to _____	_____ RIP Engineer	Page No. _____ to _____
_____ RIP Engineer	Page No. _____ to _____	_____ RIP Engineer	Page No. _____ to _____

Pages 1 to 50 : Measurement

51 to 60	Test Check
61	: Instruction

INSTRUCTION FOR THE USED AND UPKEEP OF MEASUREMENT BOOKS

1. No measurement for the preparation of a bill should be accepted from anybody other than RIP/PMO Engineers.
2. Each book should be carefully kept up to date and the inner title page in the Measurement Book showing the number of the book, name of the RIP Engineer, etc. must invariably be filled in.
3. On the front page of each book should be recorded the names of the RIP Engineer and their signature who have used the same and the numbers of the pages between which their measurements are recorded that the Measurement Book was with other RIP Engineers. When the RIP Engineer is transferred, he should make over his Measurement Book to his successor and take a receipt from him noting the fact after the last entry in each book. The relieving RIP Engineer should inscribe his name on each book below that of his predecessor, with a remark to the effect that the book was taken over on such and such a date and the pages were found on verification to be intact.
4. Entries should be recorded continuously and no lines should be left blank in the Measurement Book on the date it is being measured. Unused lines should be crossed under the dated initials of the RIP Engineer recording the measurements.
5. No page must be left blank or torn out on any accounts whatever. Any pages left blank inadvertently should be cancelled by diagonal lines, attested and dated.
6. Final and check measurements must made in the presence of the subcontractor or his legally authorized representative, who certify as follows against the measurement concerned.

These measurements are accepted by me.

Subcontractor/Authorized Representative

1. All measurements must bear the dated signature of the subcontractor or his authorized representative after each measurement.
2. In the case of measurements for monthly progress billing, it is not necessary to repeat the details of measurements of items operated on since the former measurements were taken. The total of "Contents" of such items, should, however, be brought forward.
3. The index should be posted as measurements are recorded in the book.
4. At the end of each set of measurements, there should be details of payment made recorded. Reference to the number and date of the monthly progress billing should also be given.
5. At the time of payment, all the pages of measurements, which relate to the monthly progress billing being paid, should be mark "Paid", indicating the number and date which the payment were being made.
6. The connection of each set of measurements with the voucher number in the cashbook should be shown as soon as the payment is entered in the cashbook of the Accounting Section.
7. For each large work, an additional Measurement Book will be issued, if needed, to admit one of being sent to PMO, in support of contract certificates submitted for check for payment.
8. The check should be carried out, under the supervision of the Head of the RIP group to see that:
 - a. no page has been torn out or missing;
 - b. corrections have been properly made and initialed by the person who made them;
 - c. pencil entries are not inked over;
 - d. the contents or areas are invariably entered in ink;
 - e. the number and date of each voucher in which the quantities have been entered for payment and noted;
 - f. the entries for which payment has been made have been mark "Paid" and no page has been left blank without recorded item;
 - g. the index is complete and the entries required on the outside table and inner title page have been given;
 - h. each set of measurements is signed by the RIP Engineer by whom they are made;
 - i. the subcontractor's signatures have been taken in token of his acceptance of the measurements in each case;
 - j. details of measurements have been recorded as far as possible;
 - k. there is evidence that adequate check measurement has been made as required;
 - l. when measurements have been cancelled the reasons for the cancellation have been recorded.
9. When a Measurement Book is completed, as order to record it, signed and dated by the PMO will be entered at the end of the book.

SAMPLE CARD

RIP-QC-5

Contract No. : _____

Subcontract Name : _____

Location : _____

Kind of Materials : _____

Specification Item No. : _____

Sample Identification : _____

Quantity Represented : _____

Sampled At : _____

Original Source : _____

Sampled/Casted By : _____
(Subcontractor's Rep.) (Name of Authorized Representative) (Signature)

(Designation) (Office) (Date)

Witnessed By : _____
(GEM Rep.) (Name of Authorized Representative) (Signature)

(Designation) (Office) (Date)

Proposed Use : _____

Test Desired : _____

Governing Spec's. : _____

Shipped By : _____
(Name and Designation) (Office) (Date)

Bill Charged To : _____

REMARKS : _____

Received By : _____ Lab. No. _____

Due Date: : _____



2/F, 1 Ladislawa Building
Ladislawa Avenue, Buhangin
Davao City, 8000 Philippines
Tel: (63-82) 225-1569 to 75
Fax: (63-82) 225-1479
E-mail: GEM@mindanao.org

Unit 3, 12/F ExportBank Plaza
Sen Gil Puyat cor Chino Roces Avenues
Makati City, 1200 Philippines
Tel: (632) 812-1647
Fax: (632) 818-8990
E-mail: gemakati@mozcom.com



CONCRETE POURING PERMIT

Subproject No. : _____
 Subproject Name : _____
 Subproject Location : _____
 Subcontractor : _____
 Part of Structure to be Poured : _____
 Station Limits/Section : _____ Estimated Volume : _____ cu.m.
 Date of Pouring : _____ Time of Pouring : _____

Requested by : _____

Subcontractor
(Name and Signature)

CHECKLIST

<input type="checkbox"/> Concrete Vibrator	<input type="checkbox"/> Field Density Test
<input type="checkbox"/> Protective Covering Materials	<input type="checkbox"/> Beam/Cylinder Molds
<input type="checkbox"/> Warning Signs/Barricades/Flagmen	<input type="checkbox"/> Curing Materials
<input type="checkbox"/> Concrete Saw	<input type="checkbox"/> Slump Cone
<input type="checkbox"/> Concrete Block Spacers	<input type="checkbox"/> Plumbness
<input type="checkbox"/> Line and Grade Alignment	<input type="checkbox"/> Quality of Materials Used
<input type="checkbox"/> [From Setting, Elevations etc.]	<input type="checkbox"/> [Result of Design/Trial mix, Test Reports, etc.]
<input type="checkbox"/> Finishing Tools/Equipment	<input type="checkbox"/> Lighting System
<input type="checkbox"/> Screeder, Broom, etc.	<input type="checkbox"/> Roughing-ins/Embedments
<input type="checkbox"/> Required Construction Equipment	<input type="checkbox"/> Plumbing Lay-out
<input type="checkbox"/> Rebars Sizes, Spacing and Number	<input type="checkbox"/> Others
<input type="checkbox"/> Rebars Installation Requirements	

Checked by:

RIP QA/QC Engineer: _____ Date: _____
 Name and Signature

Remarks/Recommendations: _____

RIP Field Engineer: _____ Date: _____
 Name and Signature

Remarks/Recommendations: _____

RIP Resident Engineer/Materials Engineer: _____ Date: _____
 Name and Signature

Request: Approved Disapproved
 Remarks/Recommendation: _____

WEATHER CHART



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM

A Project of the United States Agency for International Development

The general contractor is Louis Berger Group, Inc. (LBG)

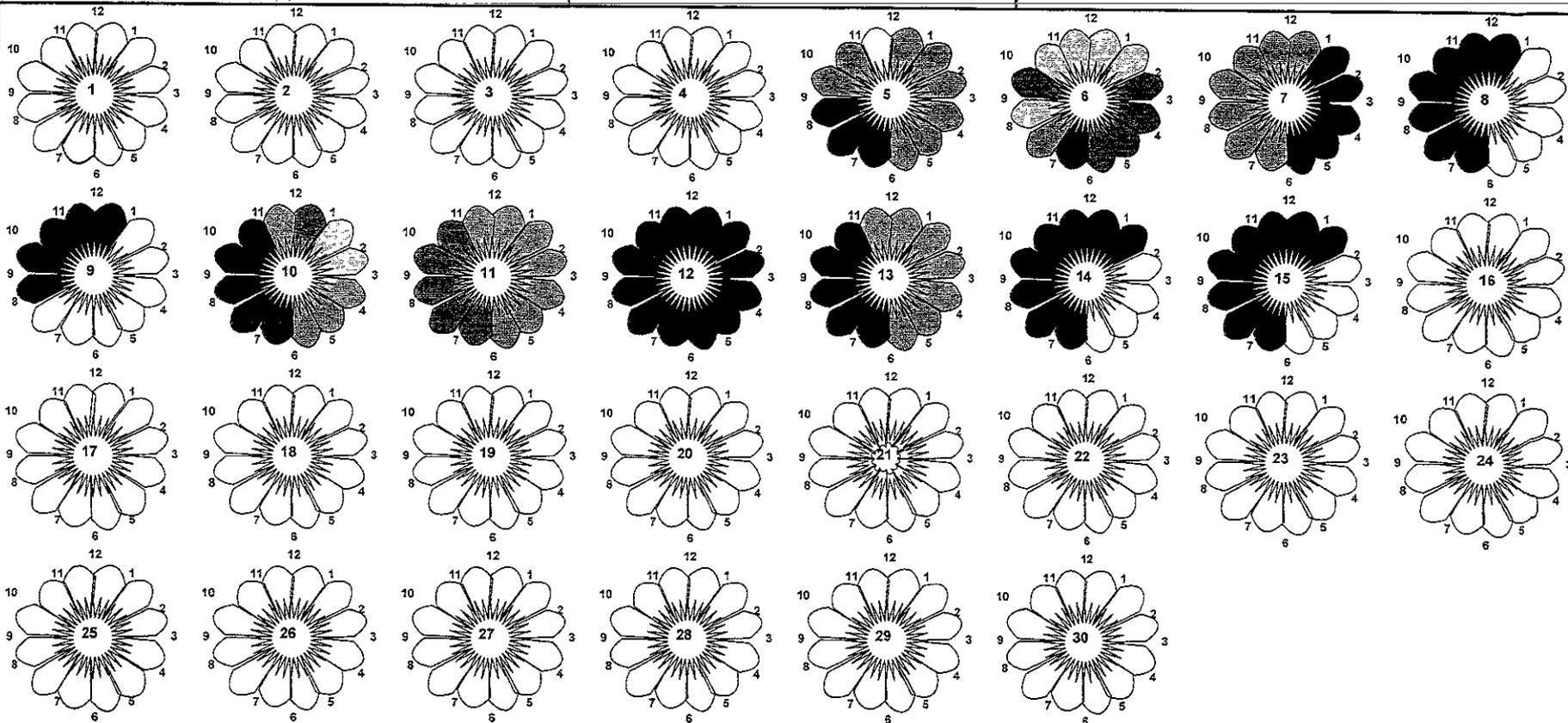
2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines

Tel. Nos: (82) 225-1569 to 75 Fax No. (82) 225-1479

Project :

Period Covered:

Location:



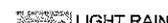
LEGEND



FAIR



CLOUDY



LIGHT RAIN



HEAVY RAIN

Prepared by:

RIP Field Engineer
Growth with Equity in Mindanao

Conformed by:

Subcontractor



**GROWTH WITH
EQUITY IN
MINDANAO
PROGRAM**

2/F, 1 Ladislawa Building
Ladislawa Avenue, Bulangin
Davao City, 8000 Philippines
Tel: (63-82) 225-1569 to 75
Fax: (63-82)225-1479
E-mail: GEM@mindanao.org

Unit 3, 12/F ExportBank Plaza
Sen. Gil Puyat cor Chino Roces Avenues
Makati City, 1200 Philippines
Tel: (632) 812-1647
Fax: (632) 818-8900
E-mail: gemakati@mozcom.com

SUSPENSION ORDER NO. :

Date: _____

Project Contract No. : _____
Project Name : _____
Project Location : _____
TO : _____

You are hereby directed to suspend all Construction Operations of the above-named project, effective _____ because of _____.

Original Contract Time : _____ C. D.
Extensions Granted Previously : _____ C. D.
Revised Contract Time including Extensions : _____ C. D.
Days Used to Date : _____ C. D.
Days Remaining : _____ C. D.

Please acknowledge receipt of this ORDER by signing, indicating the date received and returning the signed copy to the RIP Engineer.

Prepared by:

RIP Engineer

Approved by:

PM-1

I hereby acknowledge receipt of the above ORDER.

Date

Subcontractor

Copy furnished: PM-1
RIP Engineer
File



**GROWTH WITH
EQUITY IN
MINDANAO
PROGRAM**

2/F, 1 Ladislawa Building
Ladislawa Avenue, Buhangin
Davao City, 8000 Philippines
Tel: (63-82) 225-1569 to 75
Fax: (63-82)225-1479
E-mail: GEM@mindanao.org

Unit 3, 12/F ExportBank Plaza
Sen. Gil Puyat cor Chino Roces Avenues
Makati City, 1200 Philippines
Tel: (632) 812-1647
Fax: (632) 818-8900
E-mail: gemakati@mozcom.com

RESUME ORDER NO. :

Date: _____

Project Contract No. : _____
Project Name : _____
Project Location : _____

TO : _____

You are hereby directed to Resume all Construction Operations of the above-named project, on _____.

Please acknowledge receipt of this ORDER by signing, indicating the date received and returning the signed copy to the RIP Engineer.

Prepared by:

RIP Engineer

Approved by:

PM-1

I hereby acknowledge receipt of the above ORDER.

Date

Subcontractor

Copy furnished: PM-1
RIP Engineer
File

APPENDIX D
BILLING DOCUMENTS





**GROWTH WITH
EQUITY IN
MINDANAO 3
PROGRAM**

2/F, 1 Ladislawa Building
Ladislawa Avenue, Buhangin
Davao City, 8000 Philippines
Tel: (63-82) 225-1569 to 75 Fax:
(63-82)225-1479
E-mail: GEM@mindanao.org

Unit 3, 12/F ExportBank Plaza
Sen. Gil Puyat cor Chino Roces Avenues
Makati City, 1200 Philippines
Tel: (632) 812-1647
Fax: (632) 818-8900
E-mail: gemakati@mozcom.com

CHECKLIST OF REQUIRED DOCUMENTS (10% Retention Payment)

Project Name:	
Project No.	
Project Location:	

- 1. Endorsement Letter from the PM
- 2. Retention Payment Certificate
- 3. Request-Letter for Retention Payment
- 4. Completion Certificate for Punch list
- 5. Surety Bond
- 6. Latest Photographs

REMARKS: _____

ACTION : Release Payment Hold Payment*

Target Date for Check Release: _____

RIP Project Manager

RIP – Team Leader

* Please seek further advice from RIP Team Leader

ROUTING SLIP			
1. RIP Chief-QA/QC Engineer	Name	Date in:	Date out:
	Signature: _____	_____	_____
2. RIP Project Manager	Name:	Date in:	Date out:
	Signature: _____	_____	_____
3. RIP Team Leader	Name	Date in:	Date out:
	Signature: _____	_____	_____
4. PM-Infrastructure	Name:	Date in:	Date out:
	Signature: _____	_____	_____
5. PM-Contracts, Accounting and Admin	Name:	Date in:	Date out:
	Signature: _____	_____	_____
6. Accounting	Name	Date in:	Date out:
	Signature: _____	_____	_____
7. PM/DPM	Name:	Date in:	Date out:
	Signature: _____	_____	_____



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
Tel Nos : (82) 225-1569 to 75 Fax No.: (82) 225-1479

Date :
To : PM for Contracts, Accounting & Administration
From : Project Manager
Thru : RIP- Team Leader
Subject : **Release of 10% Retention Fee**

Endorsing herewith is the letter of **(Subcontractor)** requesting for the release of the **10% Retention Fee** in the amount of Four Million Ninety Five Thousand Seven Hundred Forty Seven Pesos and Eighty Nine Centavos (**PHP_____**) for the project of (Subproject No): (Subproject Name)

Per our contract and acceptance during final billing, this project was completed on (date)

Noted by:

RIP Team Leader

Recommending Approval:

Approved by:

PM- Infrastructure

PM – Contracts Accounting & Admin.



**GROWTH WITH
EQUITY IN
MINDANAO 3
PROGRAM**

2/F, 1 Ladislawa Building
Ladislawa Avenue, Buhangin
Davao City, 8000 Philippines
Tel: (63-82) 225-1569 to 75 Fax:
(63-82)225-1479
E-mail: GEM@mindanao.org

Unit 3, 12/F ExportBank Plaza
Sen. Gil Puyat cor Chino Roces Avenues
Makati City, 1200 Philippines
Tel: (632) 812-1647
Fax: (632) 818-8900
E-mail: gemakati@mozcom.com

REGIONAL INFRASTRUCTURE PROGRAM

Retention Payment Certificate

Date: _____

Project Contract No : _____ Contract Amount : _____

Subcontractor : _____ Revised Contract: _____
Amount _____

Project Name : _____

Location : _____

1. 10% of Contract Cost : PhP _____
2. Less: (Pls. specify)
 - _____ : PhP _____
 - _____ : PhP _____
 - _____ : PhP _____
3. Total Amount Due to Subcontractor : PhP _____

I hereby certify that the payment claimed in Number 3, "Total Value of Work Due to Subcontractor" is correct and does not include items and/or portions for which payment has already been received.

Project Manager

RIP Team Leader

Checked and recommended for payment:

Approved for payment:

PM for Infrastructure

PM for Contracts, Accounting and
Administration

(CONTRACTOR'S HEADING)

Date:

Mr.

Program Manager for Contracts, Accounting and Administration
Growth with Equity in Mindanao
2/F, 1 Ladiaw Building, Ladislawa Avenue
Buhangin, 8000 Davao City Philippines

Attention:

RIP – Team Leader

Subject:

REQUEST FOR 10% RETENTION MONEY

Ref: Contract No.: Subproject Name

Subproject location:

Dear:

As per the provisions of the contract mentioned above, contract no. **(Contract No.)**, between **GEM** and **(Subcontractor)**, we hereby submit this letter-invoice for our claim for **10% Retention Payment** amounting to **PHP 4,837,030.83 (Amount in Words)**.

Attached for your reference are pertaining Documents required for 10% Retention Payment. This document was prepared jointly by the Engineer and the Contractor.

With this submission, we reaffirm our commitment to the terms and conditions of the Contract.

Sincerely,

(Name)

Contractor's Representative



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM

A Project of the United States Agency for International Development

THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)

2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines

Tel. Nos.: (82) 225-1569 to 75 Fax No.: (82) 225-1479

COMPLETION CERTIFICATE FOR PUNCHLIST

Date:

Contract No : _____ Project Duration : _____

Subproject Name : _____

Subproject Location : _____

Name of Subcontractor : _____

Subcontractor's Address : _____

Amount of Contract : _____

To whom it may concern:

I hereby certify that the rectification works based on the punch list furnished to the subcontractor as a result of the joint final inspection was completed on (Date) and that the completed work was satisfactory.

Prepared by :

Noted By :

Project Manager

RIP Team Leader

(CONTRACTOR'S HEADING)

General Engineering

General Building

Date:

Mr.

Program Manager for Contracts, Accounting and Administration
Growth with Equity in Mindanao
2/F, 1 Ladiaw Building, Ladislawa Avenue
Buhangin, 8000 Davao City Philippines

Attention:

RIP – Team Leader

Subject:

REQUEST FOR 10% RETENTION MONEY

Ref:

Contract No.:/Subproject Name
Subproject location

Dear Mr. Ruiz:

As per the provisions of the contract mentioned above, contract no. **Contract No.:**, between **the Louis Berger Group, Inc. (LBGI)** and **(Contractor)**, we submit this letter-invoice for our claim for **10% Retention Payment** amounting to **(Amount in Words)**.

Attached for your reference is the pertaining documents required for 10% Retention Payment. This document was prepared jointly by the Engineer and the Subcontractor.

With this submission, we reaffirm our commitment to the terms and conditions of the contract.

Sincerely,

MR.

(Name)
Owner/General Manager

(CONTRACTOR'S HEADING)

General Engineering

General Building

Date:

Mr;

Program Manager for Contracts, Accounting and Administration
Growth with Equity in Mindanao
2/F, 1 Ladiaw Building, Ladiaw Avenue
Buhangin, 8000 Davao City Philippines

Attention:

RIP – Team Leader

Subject: **REQUEST FOR RIP PROGRESS PAYMENT**

Ref: **(Name of Project)
(Project location)**

Dear Mr.

As per the provisions of the contract mentioned above, contract no. **(Project No.)**, between **the Louis Berger Group, Inc. (LBGI)** and **(Contractor)** we submit this invoice for our claim for payment amounting to **Php _____, (AMOUNT IN WORDS)**. This corresponds to **(Partial Accomplishment)** of the work done. The appropriate deductions for previous payments and retention are incorporated in this invoice.

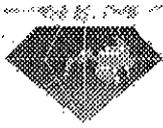
Attached for your reference is the Statement of Work Accomplished covering the period up to (Date). This document was prepared jointly by the Engineer and the Subcontractor.

With this submission, we reaffirm our commitment to the terms and conditions of the contract.

Sincerely,

MR.

Owner/General Manager



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel Nos.: (82) 225-1569 to 75 Fax.: (82) 225-1479

REGIONAL INFRASTRUCTURE PROGRAM

Payment Certificate

Date: _____

Subproject Contract No : _____

Contract Amount :

Revised Contract Amount V.O.No.1 :

Revised Contract Amount V.O.No.2 :

Revised Contract Amount V.O.No.3 :

Subcontractor :

Period Covered _____

Subproject Name :

Location :

1 Total Value of Work Accomplished To Date : PhP _____

2 Total Value of Work Previously Accomplished : PhP _____

3 Total Value of Work Accomplished This Period(1-2) PhP _____

4 LESS: (Deductions)

Recoupment of Advance Payment : PhP _____

Retention (10% of 3) PhP _____

5 Net Amount Due to Subcontractor (3-4) : PhP _____

I hereby certify that the attached payment of work is correct and does not include items and/or portions for which payment has already been received.

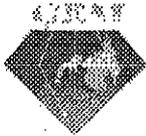
RIP Project Manager

RIP Team Leader

Approved for Payment:

PM for Infrastructure

PM for Contracts, Accounting and Administration



**GROWTH WITH
EQUITY IN
MINDANAO
PROGRAM**

2/F, Ladislawa Building, Ladislawa Unit 3, 12/F ExportBank Plaza
Avenue, Buhanin, Davao City, Sen. Gil Puyat cor Chino Roces Avenues,
8000 Philippines Tel: (63- 82) 225-1569 to 75 Makati City, 1200 Philippines
82) 225-1569 to 75 Fax: (63-82) 225-1479 Tel: (632) 812-1647
225-1479 E-mail: GEM@mindanao.org Fax (632) 818-8900
GEM@mindanao.org E-mail gemakati@mozcom.com

PARTICULARS OF CONTRACT

Date: _____

Project Contract No. : _____ Contract Amount : Php
Rev. Contract Amount V. O. No.1 : Php

Project Name : _____

Subcontractor : _____

R. A. Bill No./Date : _____

Period Covered : _____ to _____

QUALITY CERTIFICATE

This is to certify that we have inspected the conduct of the works in accordance with the established Quality Control procedures and that the items included in this Interim Payment Certificate satisfy the required quality of works and are acceptable with regard to the specifications and standards as prescribed under the contract.

_____ Date _____ RIP Material Engineer

ACCEPTANCE NOTE

This is to certify that we accept the Quality Certificate

_____ Date _____ PM - Infrastructure

Note: This Quality Certificate and Acceptance Note shall be completed and attached to each Interim Payment Payment Certificate before payment is made.

Copy Furnished: PM-Contracts, Accounting and Administration
PM-Infrastructure
File

(CONTRACTOR'S HEADING)

General Engineering

General Building

Date:

Mr.
Program Manager for Contracts, Accounting and Administration
Growth with Equity in Mindanao
2/F, 1 Ladiaw Building, Ladislawa Avenue
Buhangin, 8000 Davao City Philippines

Attention: RIP – Team Leader

Subject: **WITHOLDING TAX**

Ref: Subproject Name
Subproject location

Dear Mr.:

As per the provisions of the contract referenced above, contract no. M-17, between **the Louis Berger Group, Inc. (LBG)** and Subcontractor, we hereby agree that LBGI, as the employer, shall not deduct any taxes from any payments due the subcontractor under this contract including mobilization advances, progress payments and the final payment.

We, P. L. Sebastian Construction, shall be fully responsible for paying all taxes due to the national government or any local government unit.

With this submission, we reaffirm our commitment to the terms and conditions of the contract.

Sincerely,

Mr.
Owner/General Manager

Growth with Equity in Mindanao



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, Inc. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel. Nos.: (082) 225-1569 to 75 Fax No.: (082) 225-1479

CHECKLIST OF REQUIRED DOCUMENTS
 (100% Final Payment)

Name of Subproject: Location: Name of Subcontractor:

- 1. Final Payment (RIP-BF-7)
- 2. Completion Certificate (RIP-BF-2)
- 3. Acceptance Certificate (RIP-BF-1)
- 4. Detailed Completion Report (RIP-BF-14)
- 5. Interim Evaluation of Contractor's Performance (RIP-BF-15)
- 6. Request Letter for Final Payment (RIP-BF-5)
- 7. Request Letter for Withholding Tax (RIP-BF-13)
- 8. Progress Chart
- 9. Statement of Work Accomplished (SWA) (RIP-BF-12)
- 10. Particulars of Contract (RIP-BF-11)
- 11. Latest Photographs
- 12. Plate Marker Pedestal / Final Billboard Pictures
- 13. Notarized Quit Claim

REMARKS: _____

ACTION : Release Payment Hold Payment*

Target Date for Check Release: _____

Checked by: _____

Resident Engineer _____

Verified by: _____

Project Manager _____

Noted by: _____

RIP Team Leader _____

* Please seek further advice from RIP Team Leader

ROUTING SLIP			
1. RIP Resident Engineer			
Name: _____	_____	Date in: _____	_____
Signature: _____	_____	Date out: _____	_____
2. RIP QA/QC Engineer			
Name: _____	_____	Date in: _____	_____
Signature: _____	_____	Date out: _____	_____
3. RIP Project Manager			
Name: _____	_____	Date in: _____	_____
Signature: _____	_____	Date out: _____	_____
4. RIP Team Leader			
Name: _____	_____	Date in: _____	_____
Signature: _____	_____	Date out: _____	_____
5. PM - Infrastructure			
Name: _____	_____	Date in: _____	_____
Signature: _____	_____	Date out: _____	_____
6. PM - Contracts, Accounting and Admin			
Name: _____	_____	Date in: _____	_____
Signature: _____	_____	Date out: _____	_____
8. Accounting			
Name: _____	_____	Date in: _____	_____
Signature: _____	_____	Date out: _____	_____
9. PM			
Name: _____	_____	Date in: _____	_____
Signature: _____	_____	Date out: _____	_____



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel Nos.: (82) 225-1569 to 75 Fax No : (82) 225-1479

PROJECT TURN OVER/ACCEPTANCE CERTIFICATE

Date:

Contract No. : _____ Revised Project Duration : _____

Subproject Name : _____

Name of Subcontractor : _____

Subcontractor's Address : _____

Amount of Contract : _____

Revised Contract Amount : _____

To : _____

We are pleased to inform you that the work mentioned above was completed on **(Date)** and accepted by GEM on **(Date)**. There were no material deviations from the authorized plans and specifications and the completed work was very satisfactory. We are therefore pleased to hand over the completed works to you in accordance with the terms of the Memorandum of Agreement No. _____ between (_____) and **GEM Program**.

 PM for Infrastructure

.....

We accept to operate and maintain the work mentioned above in accordance with Memorandum of Agreement No. _____ between (_____) and **GEM Program**.

Accepted by:

Witnessed by:

 Provincial Governor - Maguindanao

 RIP - Field Engineer



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel. Nos.: (82) 225-1569 to 75 Fax No.: (82) 225-1479

COMPLETION CERTIFICATE

Date: _____

Contract No. : _____ Project Duration: _____

Subproject Name : _____

Name of Subcontractor : _____

Subcontractor's Address : _____

Amount of Contract : _____

Revised Amount of Contract : _____

To Whom It May Concern:

We certify that the work mentioned above was completed on (Date) and accepted by GEM on (Date). The completed work was satisfactory.

RIP Project Manager

RIP Team Leader

Noted:

PM for Infrastructure

PM for Contracts, Accounting and Administration



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBGI)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel Nos. (82) 225-1569 to 75 Fax No (82) 225-1479

SUBCONTRACTOR'S EVALUATION

Name of Subcontractor	_____	Date of evaluation
Subproject being evaluated	_____	
Area office	_____	

I. Construction Implementation

1. Subproject construction as per plans and specifications
(Subcontractor always follow and does not deviate from the plans and specifications)
2. Cooperation with Resident Engineer and Engineer
(Maintains close coordination with the Resident Engineer and Field Engineer and complies with all Site Instructions issued and cooperates in the inspection and measurements of accomplishments)
3. Manpower and equipment supply
(Employs a full time Project Engineer, adequate number of skilled workers and provides all the scheduled construction equipment and necessary tools)
4. Construction Management
(Ensures that the subproject is ahead or on schedule and prepares catch-up plan if behind schedule, purchases materials ahead of time and provides enough manpower)

Rating	Weight
	15%
	15%
	10%
	10%

II. Quality Assurance/Quality Control (QA/QC) Implementation

1. Compliance to subproject plans and specifications
(Supply and use only the specified materials, properly handle and store them on site, and use or install them according to standard techniques and procedures)
2. Quality of works accomplished
(Shows a high degree of workmanship, complying to strict work quality standards and takes the appropriate measures to provide samples for testing of work accomplished)
3. Furnishing of the required QA/QC documents
(Provides the required QA/QC documents on time, openly submit supplied materials to inspections and prepare the necessary samples for testing as required)

Rating	Weight
	10%
	10%
	10%

III. Administrative and documentation

1. Signages and permits
(Provide and place on the appropriate locations the necessary billboards and process the required building or work permits ahead of time)
2. Safety and environment preservation
(Minimal or no damage to the environment, keeps the surrounding area free of debris and other pollutants, provides a safe working environment for the workers, visitors and the general public)
3. Reports and paperworks
(Prepare and submit the required paperworks necessary to document, evaluate and assess the subproject such as Site Order Book, Certificate of Work Accomplished, etc)
4. Maintenance of Engineer's Temporary Facilities
(Proper displaying of all subproject accomplishment monitoring charts, manpower and work schedules and regularly update them and available for inspection at any given time)

Rating	Weight
	5%
	5%
	5%
	5%

WEIGHTED AVERAGE = _____

CONFORME/AGREED

Subcontractor's Project Manager

EVALUATED BY :

RIP Project Manager

NOTED BY :

RIP Team Leader

**RELEASE AND QUIT CLAIM
FOR RIP SUBPROJECTS CONSTRUCTION CONTRACTS**

Date :

TO: MR.
Program Manager for Contracts, Accounting and Administration

Subproject No. and Title: Contract No.: Subproject Name
Contract Agreement No.: Contract No.:

1. This is to certify that I, **(Name)** Operations Manager of **(Subcontractor)** have received the amount of **(AMOUNT IN WORDS)** representing the final payment due to our company as a result of the completion of our services under "The Agreement."
2. In consideration of the full payment of our services, **(Subcontractor)** does hereby release and acquit Louis Berger Group Inc. (LBGI), and its affiliates, employees, agents, successors and assignees, from any liability with respect to "The Agreement";
3. **(Subcontractor)** hereby agree to save, defend, and hold harmless LBGI against any third party claims, allegations and costs arising from **(Subcontractor)** performance under "The Agreement".

For **(Subcontractor)** Attest (LBGI)

(Name)
P. L. S. C Operations Manager

(Name)
PM for Contracts, Accounting &
Admin

REPUBLIC OF THE PHILIPPINES(
City of Cotabato s.s.)

BEFORE ME, this ____ day of _____, 2007, in the City of _____
personally appeared _____ with CTC No. _____ issued at
_____ on _____ known to me and to be the same person who executed
the foregoing instrument, and he acknowledged to me the same is his free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand, the day, year and place above written.

Doc. No. ____
Page No. ____
Book No. ____
Series of 2007

(CONTRACTOR'S HEADING)

General Engineering

General Building

Date:

Mr.

Program Manager for Contracts, Accounting and Administration
Growth with Equity in Mindanao
2/F, 1 Ladiaw Building, Ladiaw Avenue
Buhangin, 8000 Davao City Philippines

Attention:

RIP – Team Leader

Subject:

REQUEST FOR RIP FINAL PAYMENT

Ref:

(Name of Project)
Subproject Location

Dear Mr. Ruiz:

As per the provisions of the contract mentioned above, contract no. Subcontract No., between the **Louis Berger Group, Inc. (LBGI)** and **(Subcontractor)**, we submit this invoice for our claim for payment amounting to **Php _____, (Amount in Words)**. This corresponds to **(100%)** of the work done. The appropriate deductions for previous payments and retention are incorporated in this invoice.

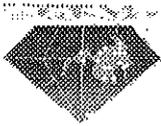
Attached for your reference is the Statement of Work Accomplished covering the period up to *September 20, 2007*. This document was prepared jointly by the Engineer and the Subcontractor.

With this submission, we reaffirm our commitment to the terms and conditions of the contract.

Sincerely,

MR.

Owner/General Manager



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel. Nos.: (82) 225-1569 to 75 Fax.: (82) 225-1479

REGIONAL INFRASTRUCTURE PROJECT

Final Payment Certificate

Date: _____

Subproject Contract No : _____ Contract Amount :
 Revised Contract Amount V.O.No.1 :
 Revised Contract Amount V.O.No.2 :
 Revised Contract Amount V.O.No.3 :

Subcontractor : _____ Period Covered _____

Subproject Name : _____

Location : _____

- 1 Total Value of Work Accomplished To Date : PhP _____
- 2 Total Value of Work Previously Accomplished : PhP _____
- 3 Total Value of Work Accomplished This Period(1-2) : PhP _____
- 4 LESS: (Deductions)
- Recoupment of Advance Payment : PhP _____
- Retention (10% of 3) : PhP _____
- 5 Net Amount Due to Contractor (3-4) : PhP _____

I hereby certify that the attached payment of work is correct and does not include items and/or portions for which payment has already been received.

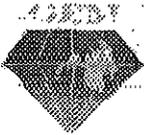
RIP Project Manager

RIP Team Leader

Approved for Payment:

PM for Infrastructure

PM for Contracts, Accounting and Administration



**GROWTH WITH
EQUITY IN
MINDANAO
PROGRAM**

2/F, Ladislawa Building, Ladislawa Unit 3, 12/F ExportBank Plaza
Avenue, Buhangin, Davao City, Sen Gil Puyat cor Chino Roces Avenues,
8000 Philippines Tel. (63-82) Makati City, 1200 Philippines
82) 225-1569 to 75 Fax. (63-82) Tel: (632) 812-1647
225-1479 E-mail Fax. (632) 818-8900
GEM@mindanao.org E-mail gemakati@mozcom.com

RIP-BF-11

PARTICULARS OF CONTRACT

Date: _____

Project Contract No. : _____ Contract Amount : Php
 Rev. Contract Amount V. O. No.1 : Php

Project Name : _____

Subcontractor : _____

R. A. Bill No./Date : _____

Period Covered : _____ to _____

QUALITY CERTIFICATE

This is to certify that we have inspected the conduct of the works in accordance with the established Quality Control procedures and that the items included in this Interim Payment Certificate satisfy the required quality of works and are acceptable with regard to the specifications and standards as prescribed under the contract.

_____ Date

_____ RIP Materials Engineer

ACCEPTANCE NOTE

This is to certify that we accept the Quality Certificate

_____ Date

_____ PM - Infrastructure

Note: This Quality Certificate and Acceptance Note shall be completed and attached to each Interim Payment Certificate before payment is made.

Copy Furnished: PM-Contracts, Accounting and Administration
PM-Infrastructure
File

(CONTRACTOR'S HEADING)

General Engineering

General Building

Date:

Mr.

Program Manager for Contracts, Accounting and Administration
Growth with Equity in Mindanao
2/F, 1 Ladiaw Building, Ladiaw Avenue
Buhangin, 8000 Davao City Philippines

Attention:

RIP – Team Leader

Subject: **WITHHOLDING TAX**

Ref: (Contract No.: Subproject Name)
(Subproject location)

Dear Mr. Ruiz:

As per the provisions of the contract referenced above, contract no. (**Contract No.**), between the **Louis Berger Group, Inc.** and (**Subcontractor**), we hereby agree that **LBGI**, as the employer, shall not deduct any taxes from any payments due the contractor under this contract including mobilization advances, progress payments and the final payment.

We, (**Subcontractor**), shall be fully responsible for paying all taxes due to the national government or any local government unit.

With this submission, we reaffirm our commitment to the terms and conditions of the contract.

Sincerely,

Mr.

Owner/General Manager

APPENDIX E
MONTHLY REPORT FORMATS

APPENDIX E.1
FORMAT FOR SUBCONTRACTOR'S
MONTHLY PROGRESS REPORTS

APPENDIX E.2
FORMAT FOR ENGINEER'S
MONTHLY FINANCIAL REPORTS

APPENDIX E
FORMAT FOR SUBCONTRACTOR'S
MONTHLY PROGRESS REPORTS

**GROWTH WITH EQUITY IN MINDANAO
REGIONAL INFRASTRUCTURE PROGRAM
(USAID Contract No. 492-C-00-18-00001-00)**

(SUBPROJECT NAME – PROVINCE, MUNICIPALITY, BARANGAY)

CONTRACT No. _____

MONTHLY PROGRESS REPORT NO. _____

(MONTH, YEAR)

(NAME OF SUBCONTRACTOR)

GROWTH WITH EQUITY IN MINDANAO**[SUBPROJECT NAME - PROVINCE]****CONTRACT No. _____****Name of Subcontractor _____****SUBCONTRACTOR'S MONTHLY PROGRESS REPORT****For [Month, Year]****(Due on every 7th day the month)****TABLE OF CONTENTS**

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- 1 Contract Scope and Data
 - 1.1 Contract Scope
 - 1.2 Contract Data
- 2 Progress Summary
- 3 Financial Status
 - 3.1 Interim Payment Certificate Summary
 - 3.2 Status of IPC Payments
- 4 Progress of Works
 - 4.1 Mobilization
 - 4.2 Civil Works
 - 4.3 Plant and Equipment Supply
 - 4.4 Work Program
- 5 Organization and Resources
- 6 Quality Assurance/Quality Control
- 7 Engineer's Instructions and Site Orders
- 8 Variation Orders
 - 8.1 Variation Orders Issued
 - 8.2 Variation Orders Proposed
- 9 Quarterly Cash Flow Forecast
- 10 Other Activities and Events

APPENDICES

Appendix A.4.2.1	Progress Photographs – Civil Works
Appendix A.4.3.1	Progress Photographs – Plant and Equipment Supply
Appendix A.6.1	Status of Quality Control Tests
Appendix A.6.2	Materials Certificates
Appendix A.7.1	Engineer’s Instructions and Site Orders
Appendix A.8.1.1	Variation Orders Issued
Appendix A.8.2.1	Variation Orders Proposed

1 CONTRACT SCOPE AND DATA

1.1 Contract Scope

(Provide package name, reference number, and location, and give a brief description of the works.)

1.2 Contract Data

Contract Number	
Project Name	
Project Location	
Subcontractor	
Project Manager	
Resident Engineer	
Field Engineer	
QA/QC Engineer	
Original Contract Amount	
Notice to Proceed/Effectivity of Contract	
Original Completion Date	
Contract Duration	
Revised Contract Amount	
Revised Completion Date	

1.3 Contact Data

Contact Data	Subcontractor's Home Office	Subcontractor's Site Office	Employer	Engineer
Representative				
Street Address				
Town/City				
Post Code				
Country				
Telephone No.				
Fax No.				
E-mail				

2 PROGRESS SUMMARY

	Item	Cumulative up to Previous Month	This Month	Cumulative to Date
	Scheduled Progress (%)			
	Actual Progress (%)			
	Slippage (%)			
	Contract Time Lapsed (months)			
	Contract Time Lapsed (%)			
	Interim Payment Certificate Amount (PHP)			
	Interim Payment Certificate Amount (% Contract)			

Notes:

1. "Progress" is the ratio, expressed as a percentage, of the Value of completed Permanent Works and approved Variation Orders / Contract amount for Permanent Works and approved Variation Orders
2. The "Interim Payment Certificate (IPC) Amount" consists of the value of permanent works and approved variation orders, plus amounts for advances, price variation and other items, minus deductions for retention, repayment of mobilization advance, damages, etc. The value of statutory deductions for taxes, royalties, etc., which are deducted from the RIP's payments and paid by the Employer on behalf of the RIP, are not considered in determining the "IPC Amount".

3 FINANCIAL STATUS

3.1 Interim Payment Certificate Summary

IPC No.:	IPC Date:	Period: [Month Year] (All Amounts in PHP)			
	Component	Contract Amount	Total Amount Certified Previously (Actual)	Amount Submitted this Period	Total Amount to Date
1.	Mobilization Advance				
2.	Permanent Works 2.1 Part A 2.2 Part B 2.3 Part C etc.				
3.	Approved Variation Orders Nos. ____ to ____				
4.	Extra for Changes in Cost and Legislation				
5.	Other Items 5.1 (Describe) 5.2 etc.				
6.	Total Value of Works (Total of items 1 through 5)				
7.	Contract Deductions 7.1 Retention (@10% up to 5% of Contract Value) 7.2 Recovery of Mobilization Advance 7.3 Other Items (Describe) 7.4 etc.				
8.	Total Amount of Contract Deductions				
9.	Interim Payment Certificate Amount (Item 6 minus Item 8)				

3.2 Status of IPC Payments

IPC No.	Date Submitted	Amount Submitted (PHP)	Date Paid	Amount Paid (PHP)
Advance 1 2 etc.				
Total to Date				

Note:

1. "Amount Paid" is the amount paid for the Interim Payment Certificate or Advance, before the statutory deductions for taxes, royalties, etc., which are deducted from the Subcontractor's payments and paid by the Employer on behalf of the Subcontractor.

4 PROGRESS OF WORKS

4.1 Mobilization

(Describe mobilization activities and status during report period and compare with planned activities.)

4.2 Civil Works

(Describe civil works completed in report period, and total completed to date; describe civil works in progress during report period and % completed to date; and compare actual and planned achievements. Refer to photographs in Appendix A.4.2.1.)

4.3 Plant and Equipment Supply

(Describe plant and equipment supply activities during report period, and total to date; and compare actual and planned achievements. Follow the format shown below and repeat for each major equipment item to be supplied. Refer to photographs in Appendix A.4.3.1.)

[Equipment Item]	
Activity	Description of Activities During Month / Status / % Complete
Design	
Purchase Order	
Manufacturing	
Factory Inspection and Testing	
Shipping	
Delivery	
On-Site Inspection	
Erection	
Testing	
Commissioning	
Trial Runs	

4.4 Work Program

The scheduled and actual progress of each category of works is shown in the Bar Chart and S-Curves in the following page.

5 ORGANIZATION AND RESOURCES

(Discuss Subcontractor's organization, personnel, and equipment employed on the subproject.)

6 QUALITY ASSURANCE/QUALITY CONTROL

(Discuss quality related issues, particularly failures. Refer to status of quality control tests and material test results.) Attach Status of Quality Control Test and Summary of Status of Test.

7 ENGINEER'S INSTRUCTIONS AND SITE ORDERS

(Discuss instructions and site orders issued during the month and actions taken to comply with them. Refer to copies of instructions and site orders in Appendix A.7.1.)

8 VARIATION ORDERS

8.1 Variation Orders Issued

(Maintain a running account of all Variation Orders issued since the start of the contract. Attach copies of Variation Orders issued during the month in Appendix A.8.1.1.)

V.O. No.	Date Issued	Description	Additional Amount (PHP)	Additional Time (month)	Remarks
		Total			

8.2 Variation Orders Proposed

(Maintain a running account of proposed variation orders that have not yet been acted upon by the Engineer or the Employer. Attach copies of variation orders proposed during the month in Appendix A.8.2.1.)

Ref. No.	Date Submitted	Description	Additional Amount (PHP)	Additional Time (month)	Remarks

9 QUARTERLY CASH FLOW FORECAST

Forecast Revision No.: _____

Date Prepared: _____

Calendar Year								
Quarter (Month-Month)	J-F-M	A-M-J	J-A-S	O-N-D	J-F-M	A-M-J	J-A-S	O-N-D
Forecast Amount (Million PHP)								
Actual Amount (Million PHP)								

10 OTHER ACTIVITIES AND EVENTS

(Discuss other significant activities and events during the report month, such as force majeure circumstances, accidents, etc.)

APPENDICES

Appendix A.4.2.1 Progress Photographs – Civil Works

(Insert photographs of milestones and important stages of civil works.)

Appendix A.4.3.1 Progress Photographs – Plant and Equipment Supply

(Insert photographs of milestones and important stages of equipment manufacturing and erection.)

Appendix A.7.1 Engineer's Instructions and Site Orders

(Attach copies of Engineer's Instructions and Site Orders issued during the report month.)

Appendix A.8.1.1 Variation Orders Issued

(Attach copies of Variation Orders issued during the report month.)

Appendix A.8.2.1 Variation Orders Proposed

(Attach copies of Variation Orders first proposed during the report month.)

APPENDIX E.3
FORMAT FOR INFRASTRUCTURE TEAM'S
MONTHLY FINANCIAL REPORT

**GROWTH WITH EQUITY IN MINDANAO
REGIONAL INFRASTRUCTURE PROGRAM
(USAID Contract No. 492-C-00-18-00001-00)**

**INFRASTRUCTURE TEAM'S
MONTHLY FINANCIAL REPORT NO. _____
*(MONTH, YEAR)***

FORMAT FOR INFRASTRUCTURE TEAM'S MONTHLY FINANCIAL REPORT

Memo No: _____

Date: _____

**Subject: Fund Utilization for the Month of: (Month/Year)
Statement No.:****To:** Deputy Chief of Party for Contracts
GROWTH WITH EQUITY IN MINDANAO
2nd Floor, 1 Ladislawa Building, Ladislawa Avenue
Buhangin, Davao City, Philippines

Dear Sir,

1. Fund Receipt and Utilization

The attached "Summary Statement of Fund Receipt and Utilization" summarizes the funds *received and utilized during the month of (Month/Year) against the works of (Describe works category).*

2. Statement of Expenditures

We are pleased to herewith submit the "Statement of Expenditures" report in the required format, along with all supporting receipts and documentation, for review and approval by GEM and onward submittal for reimbursement by USAID.

3. List of Pending Payments

The list of bills already presented in the office of the PMO and not paid is enclosed for information.

4. Expenditure Forecast

Based on the Subcontractor's scheduled progress, we expect that the amount of PHP Million will be required to be advanced to meet the payments during this current month.

Signed:

(Engineer)

Attachments: Summary Statement of Fund Receipt and Utilization
Statement of Expenditures Report with supporting receipts & documentation
Statement of expenditure forecast
Statement of pending payments

cc: Program Manager for Infrastructure / RIP

SUMMARY STATEMENT OF FUND RECEIPT AND UTILIZATION

Location : _____

Type of Works : _____

Statement No: _____

As of _____

No.	Description	Opening Balance as on 1st of this month	Amount Received up to the current date (PhP)	Total	Amount Disbursed up to the current date (PhP)	Balance as on current date (PhP)
	GEM account					
	Bank Account					
	Total					

Notes:

1. All subproject expenditures to be reported, including land acquisition, civil works, equipment, incremental administration and O&M, etc.
2. Copy of bank statements to be attached.

Signed:

PM-I

STATEMENT OF EXPENDITURES REPORT

(Engineer to prepare Statements of Expenditure report in the required format, and submit to GEM along with supporting receipts and documentation.)

APPENDIX F
UPDATED MATERIALS SOURCES OF
AGGREGATES
(UPDATED YEAR 2006)





GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel Nos.: (82) 225-1569 to 75 Fax No.: (82) 225-1479

LIST OF AGGREGATE SOURCES

AREA : Sulu
 ARMM

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Buka-Buka	At the side of Provincial Road	Boulders	6,000	Recommended for riprap, stone masonry and rubble concrete. (Item 505, 506 & 507)
Bagsak	1 km from the National Road	Fine Aggregate and Coral Finger	5,000	
Maimbung Kunnalum	300 m from National Road	Embankment Materials	1,500	Recommended for selected/borrow fill. (Item 104)
Lower Binuang	Both side of Provincial Rd.	Volcanic Rock	15,000	Recommended for aggregate subbase course. (Item 200)
Kabatuhan Tiis	Both side of Provincial Rd.	Volcanic Rock	17,000	Recommended for aggregate subbase course. (Item 200)
Mahala	Near the proposed road	Boulders	5,000	Recommended for riprap, stone masonry and rubble concrete. (Item 505, 506 & 507)
Buntod Bilaan	1.5 km from Nat'l. Rd.	Embankment Materials	5,000	Recommended for selected/borrow fill. (Item 104)
Sara Bunuan	Near the proposed road	Embankment Materials	6,000	Recommended for selected/borrow fill. (Item 104)
Opang	5.0 km from Nat'l. Rd.	Embankment Materials	5,000	Recommended for selected/borrow fill. (Item 104)
Likubong	5.0 km from Nat'l. Rd.	Embankment Materials	5,000	Recommended for selected/borrow fill. (Item 104)
Agilan Niyangkaan	500 m from Provincial Rd.	Embankment Materials	5,000	Recommended for selected/borrow fill. (Item 104)
Lahing	100 m from Provincial Rd.	Embankment Materials	2,000	Recommended for selected/borrow fill. (Item 104)
Patotoi	100 m from Provincial Rd.	Embankment Materials	2,000	Recommended for selected/borrow fill. (Item 104)
Babus Salam	100 m from Provincial Rd.	Embankment Materials	2,000	Recommended for selected/borrow fill (Item 104)
Kabbun Dakuta	100 m from Provincial Rd.	Embankment Materials	4,000	Recommended for selected/borrow fill. (Item 104)
Kansipot	At the side of Provincial Road	Embankment Materials	2,000	Recommended for selected/borrow fill (Item 104)
TanduhTanduh	At the side of Provincial Road	Boulders/Cobbles	2,500	Recommended for riprap, stone masonry and rubble concrete. (Item 505, 506 & 507)
Taglibi	500 m from Nat'l. Rd.	Fine Aggregate	2,000	Recommended for concrete aggregate. (Item 311 & 405)



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LIST OF AGGREGATE SOURCES

AREA : Sulu

ARMM

Kaunayan	200 m from Provincial Rd.	Fine Aggregate	10,000	Recommended for concrete aggregate. (Item 311 & 405)
Capitol	Located at the side of Provincial Rd.	Selected Borrow	2,000	Recommended for selected/borrow fill. (Item 104)



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LIST OF AGGREGATE SOURCES

AREA : LDS 2
 ARMM

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Salipongan Creek (Balindong)	Balindong	Fine and Coarse Aggregate (mixed sand & gravel)	6,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Pantarabato Quarry (Tugaya)		Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for subbase, base and surface course and concrete aggregate. (Item 200, 201, 300, 311 & 405)
Kalawi Creek (Bacolod)	Bacolod, Kalawi	Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Madamba Quarry (Madalum)	Madalum	Fine and Coarse Aggregate (mixed sand & gravel), Boulders	12,000	Recommended for subbase, base, surface course, riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 505, 506 & 507)
Ganassi Creek	Ganassi	Fine and Coarse Aggregate (mixed sand & gravel)	9,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Cabayogan Creek (Pualas)	Pualas	Fine and Coarse Aggregate (mixed sand & gravel)	4,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Irapas Creek (Pagayawan)	Pagayawan	Fine and Coarse Aggregate (mixed sand & gravel)	4,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Maito Bauyan Creek		Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Piraka River		Fine and Coarse Aggregate (mixed sand & gravel)	15,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Mikolabo Creek		Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Maganding River		Fine and Coarse Aggregate (mixed sand & gravel)	20,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Danori River		Fine and Coarse Aggregate (mixed sand & gravel)	20,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Liangan River		Fine and Coarse Aggregate (mixed sand & gravel)	15,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Sambuyawan River		Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for subbase, base and surface course and concrete aggregate. (Item 200, 201, 300, 311 & 405)
Maladug River		Fine and Coarse Aggregate (mixed sand & gravel)	15,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)



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LIST OF AGGREGATE SOURCES

AREA : LDS 2

ARMM

Malico River		Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Ramitan River		Fine and Coarse Aggregate (mixed sand & gravel)	20,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Bara-as River		Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Matling River		Fine and Coarse Aggregate (mixed sand & gravel)	40,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)
Montian River Quarry		Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300)



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LIST OF AGGREGATE SOURCES

AREA : LDS 1
ARMM

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Mountain River Quarry	Bubong, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Kapai Creek Quarry	Kapai, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Ramain River Quarry	Ramain, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Sabang River Quarry	Sabang, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Maguing River Quarry	Maguing, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Taraka River Quarry	Taraka, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Kirabatan Hill Quarry		Crushed rock with silts	20,000	Recommended for selected/borrow fill, aggregate subbase course (Item 104, 200)
Talaguan Quarry	Masiu, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	1,000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Rugnan River Quarry	Poona-Bayabao, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	10,000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Bogaran Quarry		Fine and Coarse Aggregate (mixed sand & gravel)	10000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)



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LIST OF AGGREGATE SOURCES

**AREA : LDS 1
ARMM**

Dimabara Quarry	Masiu, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	1000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Malabang Airport Quarry		Fine and Coarse Aggregate (mixed sand & gravel)	10000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Maradugao Creek Quarry	Bumbaran, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	10000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Kalauig River Quarry	Wao, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	10000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Kili-kili River Quarry	Bumbaran, LDS	Fine and Coarse Aggregate (mixed sand & gravel)	10000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Pagalongan Creek Quarry	Bumbaran, LDS	Coarse Aggregate and Boulders	10000	Recommended for riprap, stone masonry and rubble concrete. (Item 505, 506 & 507)
Daga-ok River Quarry		Fine and Coarse Aggregate (mixed sand & gravel)	4000	Recommended for aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)



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 Tel. Nos.: (82) 225-1589 to 75 Fax No.: (82) 225-1479

LIST OF AGGREGATE SOURCES

**AREA : Maguindanao
 ARMM**

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Bugasan Creek Quarry	Bubong, LDS	Fine and Coarse Aggregate (mixed sand & gravel)		Recommended for selected/borrow fill, aggregate subbase and aggregate base course. (Item 104, 200 & 201)
Oring Quarry		Fine and Coarse Aggregate (mixed sand & gravel)		Recommended for selected/borrow fill, aggregate subbase and aggregate base course. (Item 104, 200 & 201)
Nituan Hill Quarry		Crush rock and Soil		Recommended for selected/borrow fill and aggregate subbase course. (Item 104 & 200)
Polloc Hill Quarry		Limestone (white & gray stone)		Recommended for selected/borrow fill and aggregate subbase course. (Item 104 & 200)
Libunan Hill Quarry		Coarser with sandy soil		Recommended for selected/borrow fill and aggregate subbase course. (Item 104 & 200)
Simuay River Quarry	Simuay, Sultan Kudarat	Fine Aggregate	unlimited	Recommended for concrete aggregate. (Item 311 & 405)
Darapanan River Quarry		Fine and Coarse Aggregate (mixed sand & gravel)	20,000	Recommended for selected/borrow fill, aggregate subbase and concrete aggregate (FA only). Item 104, 200, 311 & 405.
Matengen Quarry		Fine and Coarse Aggregate (mixed sand & gravel), Boulders		Recommended for selected/borrow fill, aggregate subbase, riprap, stone masonry and rubble concrete. (Item 104, 200, 505, 506 & 507)
Dimapatoy Hill Quarry		Limestone and Gray sand silt		Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)
Pagagawan Quarry		Fine and Coarse Aggregate (mixed sand & gravel), Boulders		Recommended for selected/borrow fill, aggregate subbase, riprap, stone masonry and rubble concrete (Item 104, 200, 505, 506 & 507)
Kinaric Hill Quarry	Km. 18 Awang-Upi-Lebak Rd., Km. 1888+911, Teman South Upi, Maguindanao	Crush Rock with Soil	unlimited	Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)
Bialong Creek Quarry	Km 1816+000, Makilala-Ala Nat'l. Rd.,	Fine and Coarse Aggregate (mixed sand & gravel), Boulders	4,000	Recommended for selected/borrow fill, aggregate subbase, riprap, stone masonry and rubble concrete. (Item 104, 200, 505, 506 & 507)



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel. Nos.: (82) 225-1569 to 75 Fax No.: (82) 225-1479

LIST OF AGGREGATE SOURCES

AREA : Maguindanao
ARMM

Hill Quarry		Fine and Coarse Aggregate (mixed sand & gravel), Boulders	80,000	Recommended for selected/borrow fill, aggregate subbase, riprap, stone masonry and rubble concrete (Item 104, 200, 505, 506 & 507)
Borongotan Creek Quarry		Fine and Coarse Aggregate (stone fragments)		Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)
Maitumaig Hill Quarry	Km. 1805+000, 100 m from Cotabato-Ala Marbel Rd., Datu Piang, Maguindanao	Fine and Coarse Aggregate (white stone w/ gray soil)	170,000	Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)
Kabulnan River Quarry		Fine and Coarse Aggregate (mixed sand & gravel), Boulders	160,000	Recommended for selected/borrow fill, aggregate subbase, riprap, stone masonry and rubble concrete. (Item 104, 200, 505, 506 & 507)
Decalungan River Quarry	650 m upstream of Decalungan Bridge, Cotabato-Ala Marbel Rd., Ampatuan, Maguindanao	Gravel & Stone Fragment		Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)
Lomoyon River Quarry	1.0 km from Junction Makilala-Ala Rd., Datu Paglas, Maguindanao	Fine and Coarse Aggregate (mixed sand and gravel)	unlimited	Recommended for selected/borrow fill, aggregate subbase, aggregate base, aggregate surface course and concrete aggregate. (Item 104, 200, 201, 300, 311 & 405)
Bunawan Creek Quarry	1.2 km from Junction Makilala-Ala Rd., Datu Paglas, Maguindanao	Stone fragment and Sand		Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)
Orlandano Abandameo River Quarry		Fine and Coarse Aggregate (mixed sand and gravel)		Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)
Libuan Hill Quarry		Fine and Coarse Aggregate (mixed sand and gravel)		Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)
Liabu-Liabu Quarry	Km. 1796+ 037, down and upstream of Kabulnan Bridge, Cotabato-Ala-Marbel Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	unlimited	Recommended for aggregate subbase, aggregate base, aggregate surface course, concrete aggregate, asphalt aggregate, riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507)



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ARMM

Damawato Hill Quarry	6.0 km from Nat'l. Highway, Sultan Sa Barongis, Maguindanao	Limestone	unlimited	Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)
Sibuto Hill Quarry	1.5 km from Cotabato-Ala-Marbel Nat'l. Rd. Km. 1823+000	Fine and Coarse Aggregate (white stone w/ gray soil)	unlimited	Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)
Darugao Hill Quarry	Km. 1901+400, Temanán, South Upi, Maguindanao	Limestone	unlimited	Recommended for selected/borrow fill, aggregate subbase course. (Item 104 & 200)

**REGION IX LIST OF UPDATED
MATERIAL SOURCES**





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LIST OF AGGREGATE SOURCES

AREA : DPWH Region IX

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Layawan River	Along Dipolog Punta-Dansullan-S. Osmena National Rd. (Sta. 1874+505, De Venta, Polanco, ZDN.	Fine & Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Senai River	Along Dipolog Punta-Dansullan-S. Osmena National Rd. (Sta. 1884+823, Sergio Osmena, ZDN.	Fine and Coarse Aggregates, Boulders	20,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Salug Dacu River	Along Dipolog Punta-Dansullan-S. Osmena National Rd. (Sta. 1893+500, San Juan, Polanco, ZDN.	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Lawayan River	Along Dipolog Punta-Dansullan-S. Osmena National Rd. (Sta. 1882+120, Biayon, Osmena, ZDN.	Fine and Coarse Aggregates, Boulders	15,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Singaran River	Along Dipolog-Polanco-Pinan Junct. Oroquieta National Road, (Sta. 1811+250)	Fine and Coarse Aggregates, Boulders	12,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing



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AREA : DPWH Region IX

Dapitan River	Along Dipolog-Qroquieta National Rd., Sta. 1885+900, El Paraiso, La Libertad, ZDN	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Disoy River	Along Dipolog-Polanco-Pinan Junct. Oroquieta National Road, Sta. 1815+700, Sta. Fe, Pinan, ZDN	Fine and Coarse Aggregates, Boulders	10,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Dipolog River	Along Dipolog-Polanco-Pinan Junct. Oroquieta National Road, Sta. 1815+100, Dionum, Pinan, ZDN	Fine and Coarse Aggregates, Boulders	10,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Del Pilar River	Along Dipolog-Polanco-Macleodes Sergio Osmena National Rd., Sta. 1846+400, Del Pilar, Pinan, ZDN	Fine and Coarse Aggregates, Boulders	20,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Dipolog River	Along Dipolog-Polanco-Pinan Junct. Oroquieta National RD., Sta. 1815+100, Lower Gumay, Pinan, ZDN	Fine and Coarse Aggregates, Boulders	10,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507)
Opao River	Along Dipolog-Oroquieta National Rd., Sta. 1808+220, Barcelona, Dapitan City	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing



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AREA : DPWH Region IX

La Union River	Along Dipolog-Oroquieta National Rd., Sta. 1881+950, La Union-La Libertad, ZDN	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Dapitan River	Along Dipolog-Oroquieta National Rd., Sta. 1806+600, Dampalan, Dapitan City	Fine and Coarse Aggregates, Boulders	12,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Layawan River	Along Dipolog-Polanco-Macleodes Sergio Osmena National Rd., Sta. 1830+030, Pinan, Polanco, ZDN	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507) Needs Processing
Layawan River	Along Dipolog-Polanco-Macleodes Sergio Osmena National Rd., Sta 1831+900, Labrador, Polanco, ZDN	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Layawan River	Along Dipolog-Polanco-Macleodes Sergio Osmena National Rd., Sta. 1835+100, Lapayan Baja, Polanco, ZDN	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Layawan River	Along Dipolog-Punta-Dansullan- Sergio Osmena National Rd., Sta. 1858+800, Dansullan, Polanco, ZDN	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing



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Layawan River	Along Dipolog-Polanco-Macleodes-Sergio Osmena National Rd., Sta. 1833+800, Silawe, Polanco, ZDN	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Layawan River	Along Dipolog-Punta-Dansullan- Sergio Osmena National Rd., Sta. 1862+140, Malala, Polanco, ZDN	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Layawan River	Along Dapdap-Sianib-Macleodes Rd., Dapdap-Polanco, 10 kms from Dipolog City	Fine and Coarse Aggregates	110,000	Recommended for subbase, base, surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Layawan River	Along Dipolg-S. Osmena Brgy Rd., De Venta, Perla, Polanco. 23 kms from Dipolog City	Fine and Coarse Aggregates	85,000	Recommended for subbase, base, surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Layawan River	Malala, Polanco, 15 kms from Dipolog City	Fine and Coarse Aggregates	44,000	Recommended for subbase, base, surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Limbonga River	Gulayon, Dipolog City, 4 kms from Junction Dipolog-Polanco Provincial Rd.	Fine and Coarse Aggregates	23000	Recommended for subbase, base, surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Turno River	Turno, Dipolog City, 3 kms from Dipolog City	Fine and Coarse Aggregates	25,000	Recommended for subbase, base, surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Layawan River	Sangkol, Dipolog City, 2 kms from Dipolog City	Fine and Coarse Aggregates	45000	Recommended for subbase, base, surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Pinalan River	7 kms from National Road, Roxas, ZDN	Fine and Coarse Aggregates	95,000	Recommended for subbase, base, surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)



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Dicayo River	Along Dipolog-Sindangan National Rd., Sta. 1847+636 , Katipunan, ZDN	Fine and Coarse Aggregates	395,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Piao River	Along Dipolog-Sindangan National Rd., Sta. 1854+101 , Roxas, ZDN	Fine and Coarse Aggregates	170,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Tangian River	Along Dipolog-Sindangan National Rd., Sta. 1855+912, Roxas, ZDN	Fine and Coarse Aggregates	13000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Dohinob Diut River	Along Dipolog-Sindangan National Rd., Sta. 1859+573, Roxas, ZDN	Fine and Coarse Aggregates	37,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Dohinob Dacu River	Along Dipolog-Sindangan National Rd., Sta. 1861+295, 50 meters downstream, Manukan, ZDN	Fine and Coarse Aggregates	50,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Dapatan River	Along Dipolog-Sindangan National Rd., Sta. 1867+766	Coarse Aggregates	14,000	Recommended for subbase, base and surface course, (Item 200, 201, 300)
Disakan River	Along Dipolog-Sindangan National Rd., Sta. 1881+006, 200 meters upstream, Manukan, ZDN	Coarse Aggregates	45,000	Recommended for subbase, base , & surface course aggregate (Item 200, 201, & 300)
Ponot Dacu River	Along Dipolog-Sindangan Nat'l. Rd., Station 1891+996, Jose Dalman ZDN	Coarse Aggregates	21,500	Recommended for subbase, base , & surface course aggregate (Item 200, 201, & 300)
Ponot Diut River	Along Dipolog-Sindangan Nat'l. Rd., Station 1888+481, Jose Dalman ZDN	Coarse Aggregates	3,000	Recommended for subbase, base , & surface course aggregate (Item 200, 201, & 300)
Piao River	Along Litolit Siayan Rd., ZDN	Fine and Coarse Aggregates	55,000	Recommended for subbase, base , & surface course aggregate (Item 200, 201, & 300)



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Piao River	Along Sindangan-Siayan Prov'l. Rd., 2 kms from Sindangan, ZDN	Fine and Coarse Aggregates	75,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Dinoyan River	Lower Siayan, 30 Kms from Sindangan, ZDN	Fine and Coarse Aggregates	16,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Piao River	Along Sindangan-Liloy Nat'l Rd., Station 1920+698, Siayan, ZDN	Fine and Coarse Aggregates	125,500	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Sindangan River	Along Dipolog-Sindangan Nat'l. Rd., Station 1921+087, Sindangan, ZDN	Fine and Coarse Aggregates	112,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Lingawan River	Along Sindangan-Liloy Nat'l Rd., Station 1922+347, Sindangan, ZDN	Fine and Coarse Aggregates	40,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Ingin River	Along Sindangan-Liloy Nat'l Rd, Km. 1925+840, Ingin, ZDN	Fine and Coarse Aggregates	18,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Balok River	Along Sindangan-Siayan Prov'l. Rd., 20 kms from Sindangan, ZDN	Fine and Coarse Aggregates	23,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Talinga River	Bacungan, ZDN	Fine and Coarse Aggregates	17,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Polandoc River	Salud, ZDN	Coarse Aggregates	20,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Sioran Quarry	Godod, ZDN	Loose Rock	5,000	Recommended for subbase (Item 200)
Lumbayao Quarry	Liloy, ZDN	Loose Rock	10,000	Recommended for subbase (Item 200)
New Dapitan Quarry	Tampilisan, ZDN	Loose Rock	3,000	Recommended for subbase (Item 200)



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Zanac Quarry	Tampilisan, ZDN	Loose Rock	50,000	Recommended for subbase (Item 200)
Gatas Quarry	Kalawit, ZDN	Loose Rock	5,000	Recommended for subbase (Item 200)
Diay Quarry	Labason, ZDN	Loose Rock	5,000	Recommended for subbase (Item 200)
Lux Quarry	Gutalac, ZDN	Loose Rock	25,000	Recommended for subbase (Item 200)
Sibalic River	Gutalac, ZDN	Fine and Course Aggregates	40,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Dicutium River	Baliguian, ZDN	Fine and Course Aggregates	20,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Mamad River	Baliguian, ZDN	Fine and Course Aggregates	25,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Pisawak River	Siocon, ZDN	Fine and Course Aggregates	50,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Dona Cecilia River	Sirawal, ZDN	Coarse Aggregates	2,500	Recommended for concrete and asphalt aggregate (to be crushed). Item 310, 311 & 405)
Poliran River	Sibuco, ZDN	Fine and Course Aggregates	5,000	Recommended for subbase, base , surface course, concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Limpapa River	Along Zamboanga City-Labuan Nat'l Rd., Upstream of Limpapa River, Km 1978+900, Brgy. Limpapa	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base , surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing



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Labuan River	Along Zamboanga City-Labuan Nat'l Rd., 250m Upstream of Labuan Spillway, Km 1971+285, Brgy. Labuan	Fine and Coarse Aggregates, Boulders	20,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Patalon River	Labuan Nat'l Rd., Km. 1960+852, Upstream & downstream of Patalon Bridge, Brgy Patalon, Zambo City	Fine and Coarse Aggregates, Boulders	30,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Tulungatong River	Labuan Nat'l Rd., Km. 1954+936, 1.5 km junction of Tulungatong Brgy Rd., Zambo City	Fine and Coarse Aggregates, Boulders	8,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
San Roque Quarry	8 kms from Zambo City, Brgy. San Roque, Zambo City	Fine and Coarse Aggregates, Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Maligue Aggregate Plant	1.0 km from Main Rd., Isabela City	Crushed Aggregates & Boulders	7,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Lanote Aggregate Plant	1.0 km from Main Rd., Isabela City	Crushed Aggregates & Boulders	10,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing



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Upper Banas Aggregate Plant	12 kms from Main Road, Lantawan	Crushed Aggregates & Boulders	6,500	Recommended for subbase, base , surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Matarling Aggregate Plant	2.0 kms from Main Road, Lantawan	Crushed Aggregates	7,500	Recommended for subbase, base and surface course. (Item 200, 201, 202, 300,)
Camangaan Aggregate Plant	4.0 kms from Main Road, Maluso	Crushed Aggregates & Boulders	8,500	Recommended for subbase, base , surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Abong-Abong Aggregate Plant	9.0 kms from Main Road, Maluso	Crushed Aggregates & Boulders	8,000	Recommended for subbase, base , surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Manaul Aggregate Plant	33 kms. From Main Road, Sumisip	Crushed Aggregates & Boulders	5,000	Recommended for subbase, base , surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Bohelebong Aggregate Plant	5.0 kms from Main Road, Tipo-Tipo	Crushed Aggregates & Boulders	7,000	Recommended for subbase, base , surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing



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AREA : DPWH Region IX

Lagayas Aggregate Plant	1.0 km from Main Road, Tipo-Tipo	Crushed Aggregates & Boulders	8,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Buahan Aggregate Plant	6.0 kms from main Road, Lamitan	Crushed Aggregates & Boulders	9,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Tablas Aggregate Plant	3.0 kms. Fron Main Road, Tuburan	Crushed Aggregates & Boulders	6,800	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Lahi-Lahi Aggregate Plant	7 0 kms from Main Road, Tuburan	Crushed Aggregates & Boulders	7,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Lugakit Quarry	Km 1927+500, Brgy. Salaan, Zambo City	Fine and Course Aggregates with silts	40,000	Recommended for Borrow/Selected Fill and subbase course (Item 104 & 200)
Bungiao River	Km. 1909+950, Ipil-Zambo City National Rd., 5.0 kms from junction Brgy. Bungiao.	Fine and Coarse Aggregates, Boulders	5,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing



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AREA : DPWH Region IX

Upper Curuan River	Km. 1890+050, Zambo-Ipil Nat'l Road, 5.0 kms from sitio Mina, Brgy. Curuan.	Fine and Coarse Aggregates, Boulders	40,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507) Needs Processing
Lapakan Curuan River	Km. 1819+700, 1.0 km from National Rd., Zambo City		50,000	Recommended for Borrow/Selected Fill and subbase course (Item 104 & 200)
Vitali River	Km. 1894+649, 1.0 km from Ipil-Zambo Nat'l Rd., Brgy Vitai.	Fine and Course Aggregates	2,000	Recommended for selected borrow fill, subbase, base and concrete aggregate (to be washed). Item 104, 200, 201, 311 & 405.
Muti Quarry	Km. 1880+950, 5.0 kms from Pagadian-Zambo City Nat'l Road.	Fine and Course Aggregates with silts	70,000	Recommended for selected borrow fill, subbase and base course. (Item 104, 200, 201)
Sibulao River	Km. 1875+550, 5.0 kms from Ipil-Zambo Nat'l Road, Brgy. Sibulao	Fine and Course Aggregates	5,000	Recommended for selected borrow fill, subbase, base, surface course and concrete aggregate. (Item 200, 201, 300, 311 & 405)
Tungawan River	Along Ipil-Tungawan Nat'l Road	Fine and Course Aggregates	10,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Batangan River	5.0 kms from Junction Ipil-Tungawan-Zambo City Nat'l Road	Fine and Course Aggregates	30,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Upper Tungawan River	Along Ipil-Tungawan Nat'l Road	Fine and Course Aggregates	30,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Buluan River	Along Ipil-Zambo Nat'l Road, ZDS	Coarse Aggregates & Boulders	7,000	Recommended for concrete aggregate (coarse only). (Item 405, 311, 505, 506 & 507)
Surabay River	100 meters from R.T. Lim Nat'l Road, R.T. Lim, ZDS	Fine and Coarse Aggregate & Boulders	10,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507)
Palomoc Quarry	20 m. from Ipil-Liloy Nat'l Road, ZDS	Fine & Coarse Aggregates with silts	10,000	Recommended for Subbase Course (Item 200)



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AREA : DPWH Region IX

Caparan River	Along Ipil-Zambo Nat'l Road, ZDS	Aggregate Subbase and Base Course	10,000	Recommended for aggregate subbase and base course. (Item 200 & 201)
Kabasilan River	4.0 kms from junction Ipil-Pagadian Nat'l Road	Fine and Coarse Aggregates	40,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Buayan River	200 m from junction Ipil-Pagadian Nat'l Road	Fine Aggregate and Aggregate Surface Course	5,000	Recommended for aggregate surface course and concrete aggregate.(fine aggregate only). Item 300, 311, & 405.
Bato River	200 m from junction Kabasilan-Pagadian Nat'l Road	Fine and Course Aggregates	10,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Olutanga Quarry	Within the island of Olutanga	Aggregate Subbase Course	5,000	Recommended for Subbase Course (Item 200)
Sibugay River (Imelda)	Along Imelda-Pagadian National Road	Fine Aggregates	5,000	Recommended for Concrete Aggregates (Item 311 & 405)
Paruk Quarry	8 kms from junction along Imelda-Luup Road	Aggregate Subbase and Base Course	20,000	Recommended for aggregate subbase and base course. (Item 200 & 201)
Lutiman Quarry	100 meters from Imelda-Alicia National Road	Aggregate Subbase and Base Course	10,000	Recommended for aggregate subbase and base course. (Item 200 & 201)
Mt. View Quarry	3.5 kms from junction Imelda-Alicia National Road	Aggregate Subbase and Base Course	7,000	Recommended for aggregate subbase and base course. (Item 200 & 201)
Silal Quarry	3.0 kms from Poblacion Payao, ZDS	Aggregate Subbase and Base Course	10,000	Recommended for aggregate subbase and base course. (Item 200 & 201)
Lipacan Quarry	3.0 kms from Poblacion Malangas, ZDS	Aggregate Subbase and Base Course	7,000	Recommended for aggregate subbase and base course. (Item 200 & 201)
Bayog River Quarry	800 meters from Bayog proper, ZDS	Fine and Coarse Aggregate and Boulders	50,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing



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AREA : DPWH Region IX

Dipili River Quarry	Bayog proper after NIA compound	Fine and Coarse Aggregate and Boulders	40,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Kumalarang River Quarry	2.0 kms from junction National Road, Kumalarang	Fine and Coarse Aggregate and Boulders	35,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Lacupayan Mountain Quarry	Km. 1690+000, right side from Nat'l Highway	Silty Loam, Plunic Stone	40,000	Recommended for selected borrow fill, subbase and base course. (Item 104, 200, 201)
Lacarayan River	80 kms from junction Tigbao	Fine and Coarse Aggregate and Boulders	60,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Gapo River Quarry	42 kms from Tigbao	Fine and Coarse Aggregate and Boulders	3,000	Recommended for borrow/selected fill, subbase, base, riprap, stone masonry and rubble concrete. (Item 104, 200, 201, 505, 506 & 507)
Guinicolalay River Quarry	Dinas, ZDS	Fine and Coarse Aggregates w/ silts	6,000	Recommended for selected borrow fill, subbase and base course. (Item 104, 200, 201)
Balongating River Quarry	Along Dumaliniao-Guipos National Road	Fine and Coarse Aggregates w/ silts and Boulders	5,000	Recommended for borrow/selected fill, subbase, base, riprap, stone masonry and rubble concrete. (Item 104, 200, 201, 505, 506 & 507)
Payag River Quarry	San Pablo	Fine and Coarse Aggregates w/ silts and Boulders	2,000	Recommended for borrow/selected fill, subbase, base, riprap, stone masonry and rubble concrete. (Item 104, 200, 201, 505, 506 & 507)
Timbaboy River	4.5 kms from town proper along Brgy. Timbaboy-Midsalip Road, ZDS	Fine and Coarse Aggregates w/ silts	20,000	Recommended for aggregate subbase and base course. (Item 200 & 201)



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Ecuan River	6.5 kms from Timbaboy-Midsalip Road, ZDS	Fine and Coarse Aggregates w/ silts	25,000	Recommended for aggregate subbase and base course. (Item 200 & 201)
Bokong River	18 kms from junction Labangan-Monte-Alegre Road, Labangan, ZDS	Fine and Coarse Aggregates	40,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Bagalupa River	Along Dao Rd. leading to Brgy. Tulangan, 18 kms from Pagadian City	Fine and Coarse Aggregate, Boulders	70,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Tinotungan River	Km. 1646+230, 18 kms from bridge site along old Nat'l Rd., Tukuran, ZDS	Fine and Coarse Aggregates	20,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Lantungan White Stone	Km. 1639+000, Along Molave-Tukuran Nat'l. Road, Aurora, ZDS	Silty Limestone	7,000	Recommended for selected borrow fill, (Item 104)
Baclay River	Km. 1641+000, 300 m from Nat'l. Road (old Rd.), Brgy. Baclay, Tukuran, ZDS	Fine and Coarse Aggregates	10,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Serpentine Quarry	80 m from Provincial Rd. going to Midsalip, Brgy. Barobuhan, Sominot, ZDS	Serpentine w/ silty soil	7,000	Recommended for embankment. (Item 104)
Boloron Quarry	5.0 kms from Prov'l. Rd. along Bibilop Rd., ZDS	Fine and Coarse Aggregates		Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Usugan River	Km. 1657+100, 1.2 kms from Tambulig-Pagadian Nat'l. Rd., Tambulig, Sominot, ZDS	Boulders	2,000	Recommended for riprap, stone masonry and rubble concrete. (Item 505, 506 & 507)
Red Cinder Quarry	Km. 1648+850, 350 meters from Padap Nat'l. Road, Brgy Switch, Ramon Magsaysay, ZDS	Cinder, Volcanic Rock	40,000	Recommended for selected borrow fill, (Item 104)



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Black Cinder Quarry	Km. 1648+850, 350 meters from Padap Nat'l. Road, Brgy Switch, Ramon Magsaysay, ZDS	Black Cinder and Volcanic Rock	45,000	Recommended for selected borrow fill, (Item 104)
Manguilles River	Km. 1668+333, 3.0 kms from Molave-Dumingag Nat'l. Road, Mahayag, ZDS	Fine and Coarse Aggregates	5,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Salug Dacu River	Km. 1660+401, 1.0 km from Molave-Dumingag Nat'l. Rd, Mahayag, ZDS	Fine and Coarse Aggregate, Boulders	60,000	Recommended for subbase, base, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Timonan River	4.0 kms along Timonan Brgy. Road, Dumingag, ZDS	Fine and Coarse Aggregates	30,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Ditulan Mt. Quarry	Km. 1680+500, Along Brgy. Dilulan Rd. going to Siayan Boundary, Dumingag, ZDS	Serpentine w/ silty soil	20,000	Recommended for selected borrow fill, (Item 104)
Dipolo River	Km. 1680+500, 450 meters from Nat'l. Rd. along Brgy Ditulan Rd., Dumingag, ZDS	Fine and Coarse Aggregates	35,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Guitran River	Km. 1670+330, Along Molave-Dumingag Nat'l. Road, Dumingag, ZDS	Fine and Coarse Aggregates	40,000	Recommended for subbase, base, surface course, concrete and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)

**REGION X LIST OF UPDATED
MATERIAL SOURCES**





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LIST OF AGGREGATE SOURCES

AREA : Bukidnon 2nd District Engineering Office
REGION X

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
MM Crushing Plant	900 m from Sayre Highway, Km. 1531, Sitio Patag, Valencia city	Fine and Coarse Aggregate	60 tonnes/hr.	Recommended for Concrete Aggregate (Item 311 & 405)
MM Crushing Plant Sugod	3.5 km from Sayre Highway, Km. 1531, Sitio Patag, Valencia City	Fine, Coarse and crushed aggregate		Recommended for Aggregate Subbase, Aggregate Base, Agg. Surface Course, Concrete Aggregate. (Item 200, 201, 202, 300, 311, & 405)
Camp 1 Quarry	500 m from Sayre Highway, Camp 1, Maramag, Bukidnon	Fine and Coarse Aggregate (mixed sand & gravel),	Limited	Recommended for Selected Borrow Fill, Aggregate Subbase, Aggregate Base Course and Concrete aggregate. (Item 104, 200, 201, 311 & 405). Needs Processing.
Conception Quarry	0.5 km from Don Carlos-Kadingilan Road, Conception, New Nongnongan, Don Carlos	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	Unlimited	Recommended for Aggregate Subbase, Aggregate Base Course, Concrete Aggregate, Riprap. Stone Masonry and Rubble Concrete). (Item 200, 201, 311, 405, 505, 506 & 507). Needs Processing.
Muleta Quarry	Along KKK Road, Km. 1589, Brgy. Malinao, Kadilingan, Bukidnon	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	Unlimited	Recommended for Aggregate Subbase, Aggregate Base Course, Concrete Aggregate, Riprap. Stone Masonry and Rubble Concrete). (Item 200, 201, 311, 405, 505, 506 & 507). Needs Processing.
Payad Quarry	Brgy Payad, Kadilingan, Bukidnon	Fine and Coarse Aggregates (mixed sand and gravel)	Unlimited	Recommended for Selected Borrow Fill, and Aggregate Subbase Course. (Item 104 & 200)
San Andres Quarry	4.0 kms from National Highway, Km. 1593, San Andres, Kadilingan, Bukidnon	Limestone	40,000	Recommended for Selected Borrow Fill and Aggregate Subbase Course. (Item 104 & 200)
Balaoro Quarry	12.0 km from National Highway, Km. 1593, Balaoro, Kadingilan, Bukidnon	Limestone	Unlimited	Recommended for Selected Borrow Fill and Aggregate Subbase Course. (Item 104 & 200). Weathered limestone can be use as binder materials.
Omonay Quarry	Along Sayre Highway, Km. 1607, Omonay, Damulog, Bukidnon	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	100,000	Recommended for Aggregate Subbase, Aggregate Base Course, Aggregate Surface Course and Concrete Aggregate. (Item 200, 201, 300, 311 & 405). Needs Processing.
Poco-Poco Quarry	Along Sayre Highway, Km. 1597, Poco-Poco, Damulog, Bukidnon	Limestone	Unlimited	Recommended for Selected Borrow Fill and Aggregate Subbase Course. (Item 104 & 200)



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Sampagar Quarry	250m from Sayre Highway, Km. 1589, Sampagar, Damulog, Bukidnon	Limestone	Unlimited	Recommended for Selected Borrow Fill and Aggregate Subbase Course. (Item 104 & 200)
Manimayag Quarry	3.0 km from Sayre Highway, Km 1572, Manimayag Pob., Kitaotao, Bukidnon	Limestone	Unlimited	Recommended for Selected Borrow Fill and Aggregate Subbase Course. (Item 104 & 200)
Salumay Quarry	Along Bukidnon-Davao Rd., Brgy. Salumay, Kitaotao, Bukidnon	Sedimentary Rock	Unlimited	Recommended for Selected Borrow Fill and Aggregate Subbase Course. (Item 104 & 200)
Palacapao Quarry	Along Bukidnon-Davao Rd. Km. 1594, Palacapao, Quezon, Bukidnon	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	75,000	Recommended for Aggregate Subbase, Aggregate Base Course, Aggregate Surface Course and Concrete Aggregate. (Item 200, 201, 300, 311 & 405). Needs Processing.
Malaomao Quarry	5.0 km from Bukidnon-Davao Rd., Brgy. Salawagan, Quezon, Bukidnon	Fine and Coarse Aggregates (mixed sand and gravel)	60,000	Recommended for Aggregate Subbase and Aggregate Base Course (Item 200 & 201)
Dilapa Quarry	5.0 km from Bukidnon-Davao Rd., Brgy. Dilapa, Quezon, Bukidnon	Fine and Coarse Aggregates (mixed sand and gravel)	Unlimited	Recommended for Aggregate Subbase and Aggregate Base Course. (Item 200 & 201)
Manuto Quarry	7.0 km from Bukidnon-Davao Rd., Manuto, Quezon, Bukidnon	Fine and Coarse Aggregates (mixed sand and gravel)	Unlimited	Recommended for Aggregate Subbase and Aggregate Base Course. (Item 200 & 201)
Sta. Rita Quarry	500 m from Bukidnon-Davao Rd., Brgy. Sta. Rita, Quezon, Bukidnon	Limestone	Unlimited	Recommended for Selected Borrow Fill and Aggregate Subbase Course. (Item 104 & 200)
Musuan Quarry	5.0 km from Sayre Highway, Km. 1543, Musuan, Maramag, Bukidnon	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	Unlimited	Recommended for Subbase, Base, Surface Course, Concrete aggregate, Asphalt Aggregate, riprap, Stone Masonry and Rubble Concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing
Generalao Limestone Quarry	4.2 km from Kitaotao-Sayre Highway, Vito, San Isidro, Kitaotao, Bukidnon	Limestone	Unlimited	Recommended for Selected Borrow Fill and Aggregate Subbase Course. (Item 104 & 200)
Abregana Limestone Quarry	9.0 km from Don Carlos-Sayre Highway, Pagang, San Antonio East, Don Carlos, Bukidnon	Limestone	Unlimited	Recommended for Selected Borrow Fill and Aggregate Subbase Course. (Item 104 & 200)



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Lazanto Quarry	5.0 km from junction Conception-Sayre Rd., Old Nongnongan, Don Carlos Bukidnon	Fine and Coarse Aggregates (mixed sand and gravel)	Limited	Recommende for Aggregate Subbase and Aggregate Base Course. (Item 200 & 201)
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LIST OF AGGREGATE SOURCES

AREA : Camiguin District Engineering Office
REGION X

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Maac River	100 m east of km. 19+800, Brgy. Maac, Guinsiliban	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	60,000	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 311, 405, 505 506 & 507). Needs Processing.
Dinangasan River	200 m upstream and downstream of Km. 39+700, Brgy. Poblacion, Catarman	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	400,000	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 311, 405, 505 506 & 507) Needs Processing.
Timayog Creek	100 m west of Km. 44+720, Brgy. Panghiawan, Catarman	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	16,000 (FA & CA); 900,000 (boulders)	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Concrete Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 311, 405, 505 506 & 507). Needs Processing
Tagdo Quarry	2.5 km southwest of Km. 61+250, Tagdo, Mambajao	Fine and Coarse Aggregate (mixed sand & gravel)	2,300	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base course, Concrete Aggregate, (Item 104, 200, 201, 311, 405,). Needs Processing.
Guinsiliban River	200 m north of Km. 24+250, Brgy Poblacion, Guinsiliban	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	20,000	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base Course, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 505 506 & 507). Needs Processing.
Foot of Old Volcano	Along Camiguin Circumferential Road. Km. 54+040, Sitio Tongatoc, Bonbon, Catarman	Boulders/Cobbles (Andesite Boulders), Cinders	10,000	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base Course (Item 104, 200, 201,). Needs Crushing/Processing.



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LIST OF AGGREGATE SOURCES

AREA : Misamis Occidental 1st District Engineering Office
REGION X

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Langaran Riverbed	1.0 km from Oroquieta-Dipolog Nat'l. Rd., Km. 1778+150, Brgy. Solinog, Calamba, Misamis Occidental	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	unlimited	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Asphalt Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505 506 & 507). Needs Processing.
Layawan River	500 m. from Toliyok-Bunga-Tuburan-Villaflor Provl. Rd., Km. 1745+200, Tuburan, Oroquieta City	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	unlimited	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Asphalt Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505 506 & 507). Needs Processing.
Aloran Riverbed	1.6 km from Ozamis-Oroquieta Nat'l. Rd., Km. 1734+000, Brgy. Tubod, Aloran, Misamis Occidental	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	32,000	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate (fine aggregate only), Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 311, 405, 505 506 & 507). Needs Processing.
Palilan Riverbed	17.3 km from Ozamis-Oroquieta Nat'l. Rd., Km. 1724+500, Brgy. Mialem, Jimenez, Misamis Occ.	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	unlimited	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Asphalt Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505 506 & 507). Needs Processing.
Langaran Riverbed	10.0 kms from Solipat Daku Bridge, Calamba-Oroquieta Nat'l. Rd., Km. 1772+285, Brgy. Bonifacio, Calamba, Misamis Occ.	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	unlimited	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Asphalt Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505 506 & 507). Needs Processing.
Palilan Riverbed	1.5 km from Ozamis-Oroquieta Nat'l. Rd., Km. 1724+500	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	100,000	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Asphalt Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505 506 & 507). Needs Processing.



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REGION X

Philip Tan Construction (Crushing Plant)	50 m from Oroquieta City, Villaflor-Calamba Nat'l. Rd., Km. 1745+800, Villaflor, Oroquieta City	Fine and Coarse Aggregate. (Source of aggregate is from Layawan River)	30 cu.m./8 hrs. operation	Recommended for Concrete and Asphalt Aggregate. (Item 311 & 405)
Grace Construction Corporation (Crusher and Asphalt Plant)	250 m from Oroquieta City-Villaflor-Calamba Nat'l. Rd., Km. 1745+535, Brgy. Villaflor, Oroquieta City	Fine and Coarse Aggregate. (Source of aggregate is from Layawan River)	100 m ³ /day (FA & CA); 30 tons/hr. (asphalt)	Recommended for Concrete and Asphalt Aggregate. (Item 311 & 405)
MBD General Construction (Crusher and Asphalt Plant)	60 m. from Calamba-Balingao Nat'l. Rd., Km.1785+494, Landing, Balingao	Fine and Coarse Aggregate. (Source of aggregate is from Langaran River)	50 tons/hr.	Recommended for Concrete and Asphalt Aggregate. (Item 311 & 405)



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LIST OF AGGREGATE SOURCES

AREA : LDN 2nd District Engineering Office
REGION X

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Paka River (Doiores Section)	4.4 kms from Ozamis-Oroquieta Rd. Km. 1710+375, Brgy. Doiores, Clarin, Misamis Occ.	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	24,500	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Asphalt Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505 506 & 507). Needs Processing.
Clarin River (Tinaclan Section)	2.4 kms from Clarin Old Route, Km. 1707+026, Brgy. Tinaclan, Clarin, Misamis Occ.	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	37,000	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Asphalt Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505 506 & 507). Needs Processing.
Usugan River (Usugan Section)	3.30 kms from Pagadian-Ozamiz Rd., Km. 1660+224, Brgy. Usugan, Bonifacio, Misamis Occ.	Fine Aggregate	25,000	Recommended for Concrete Aggregate. (Item 311 & 405)
Clarin River (Segatic Section)	5.4 kms from Clarin Old Route, Km. 1707+026, Brgy. Segatic, Clarin, Misamis Occ.	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	65,000	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Asphalt Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505 506 & 507). Needs Processing.
Labo River (Viray Section)	4.60 kms from Ozamis by pass Road, Km. 1699+847, Brgy. Viray, Molacay, Ozamiz City	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	110,000	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Asphalt Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505 506 & 507). Needs Processing.
Paka River (Pan-ay Section)	3.20 kms from Ozamis-Oroquieta Rd., Km. 1710+375, Brgy. Pan-ay, Clarin, Misamis Occ.	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	25,000	Recommended for Selected Borrow Fill, Agg. Subbase, Agg. Base, Agg. Surface Course, Concrete Aggregate, Asphalt Aggregate, Riprap, Stone Masonry and Rubble Concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505 506 & 507). Needs Processing.



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LIST OF AGGREGATE SOURCES

AREA : Misamis Oriental 1st District Engineering Office
REGION X

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Odiongan River (Upstream/Downstream)	1.5 km. from Odiongan Bridge along Agusan-Misamis Oriental Road. Km. 1307+500, Sitio Pandacdacan, Gingoog City	Fine and Coarse Aggregate (Mixed Sand and Gravel)	7,000	Recommended for subbase, base, surface course. concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507)
Tagpako River (Upstream & Downstream)	0.50 km from Tagpako Bridge along Gingoog-Anakan-Kalabugao Rd. Km. 1306+330, Tagpako, Gingoog City	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	3,000	Recommended for aggregate subbase course (Item 200)
Mangiskis River (Upstream)	1.0 km from Mangiskis Bridge along Agusan-Misamis Oriental Rd., Km. 1316+551, Gingoog city	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	2,000	Recommended for aggregate subbase course (Item 200)
Catuan River	0.50 km from Catuan Bridge along Agusan-Misamis Oriental Rd. Km. 1321+250, Brgy Lunao, Gingoog City	Fine and Coarse Aggregates (mixed sand & gravel with silts), Boulders	5,000	Recommended for subbase, base course, riprap and grouted riprap. (Item 200, 201, & 505)
Lunao River (Downstream)	0.50 km from Lunao Bridge along Agusan-Misamis Oriental Rd. KM. 1322+400, Lunao, Gingoog City	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	2,000	Recommended for subbase, base and surface course. (Item 200, 201 & 300.)
Lunao River (Upstream)	0.50 km from Lunao Bridge along Agusan-Misamis Oriental Rd. KM. 1322+400, Lunao, Gingoog City	Fine and Coarse Aggregates (Mixed sand & gravel)	4,000	Recommended for subbase, base and surface course. concrete aggregate and asphalt aggregate (to be crushed) (Item 200, 201, 300, 310, 311 & 405)
Agay-Ayan River	0.50 km from Agay-Ayan Bridge along Agusan-Misamis Oriental Rd. KM 1323+550	Fine and Coarse Aggregates (Mixed sand & gravel) and Boulders	3,000	Recommended for subbase, base, surface course, riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 505, 506 & 507.)



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Minlagas River (Upstream & Downstream)	1.0 km from Minlagas Bridge along Agusan-Misamis Oriental Rd. KM. 1324+880, San Luis, Gingoog City	Fine and Coarse Aggregates (Mixed sand & gravel) and Boulders	3,000	Recommended for aggregate subbase course, riprap, stone masonry and rubble concrete (Item 200, 505, 506 & 507)
Mandangoa River (Downstream)	1.0 km from Mandangoa Bridge along Agusan- Misamis Oriental Rd., KM. 1387+583, Mandangoa, Balingasag, Misamis Or.	Fine and Coarse Aggregate (Mixed Sand and Gravel)	5,000	Recommended for subbase , base and surface course. (Item 200, 201 & 300)
Portulin River (Upstream)	1.0 km from Portulin Bridge along Agusan-Misamis Oriental Rd. KM. 1334+891, Portulin, Medina, Misamis Oriental	Fine and Coarse Aggregate (Mixed Sand and Gravel)	2,000	Recommended for subbase , base and surface course (Item 200, 201 & 300)
Linugos River (Upstream)	9.0 km along Kibungsod- Mindulao Rd., KM 1292+090, Upper Kabalawan, Mindulao, Magsaysay, Misamis Or.	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	30,000	Recommended for selected borrow fill, subbase , base and surface course. (Item 104, 200, 201 & 300.)
San Vicente River (Upstream)	3.5 km from Kibungsod Bridge along Agusan- Misamis Oriental Rd. KM 1284+169, Magsaysay, Misamis Oriental	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	1,000	Recommended for selected borrow fill, subbase , base and surface course. (Item 104, 200 and 201)
San Alonzo River (Upstream)	0.5 km from San alonzo Bridge along Agusan- Misamis Oriental Rd. KM. 1355+157, Brgy. San Alonzo, Balingoan, Misamis Oriental	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	1,000	Recommended for selected borrow fill, subbase , base and surface course. (Item 104, 200, 201 & 300)
San Ines River	0.50 km from Sta. Ines Bridge along agusan- Misamis Oriental Rd., KM. 1342+328, Sta. Ines, Talisayan, Misamis Oriental	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	10,000	Recommended for selected borrow fill, subbase , base and surface course. (Item 104, 200, 201 & 300.)



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REGION X

Dangoan River (Upstream)	1.0 Km from Dangoan Bridge along Gingoog-Claveria- Villanueva Rd., Km. 1331+321, Medina, Misamis Oriental	Fine and Coarse Aggregates (Mixed sand & gravel) and Boulders	3,000	Recommended for selected borrow fill, subbase, base course, riprap, stone masonry and rubble concrete. (Item 104, 200, 201, 505, 506 & 507)
Kahulugan River	1.0 km from Kahulugan Bridge along Gingoog- Claveria-Villanueva Rd., Km. 1317+819, Palapay, Gingoog City	Fine and Coarse Aggregate (mixed sand and gravel)	5,000	Recommended for selected borrow fill, subbase and base course. (Item 104, 200 & 201)
Kasingpitan River	2.5 km from Malubog Bridge along Agusan-Misamis Oriental Rd., Km. 1312+650, Kasingpitan, Santiago, Gingoog City	Fine and Coarse Aggregate (mixed sand and gravel)	6,000	Recommended for selected borrow fill, subbase and base course. (Item 104, 200 & 201)



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LIST OF AGGREGATE SOURCES

AREA : LDN 2nd District Engineering Office
REGION X

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Mandulog River Quarry (Taparak Section)	3.0 km from Iligan-Cagayan Nat'l. Rd., Km. 1522+000, Sitio Taparak Brgy. Mandulog, Iligan City	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	300,000	Recommended for selected borrow fill, subbase, base, surface course, concrete aggregates, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Mandulog River Quarry (Barinaut Section)	2.0 km from Iligan-Cagayan Nat'l. Rd. Km. 1522+000, Brgy. Barinaut, Iligan City	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	110,000	Recommended for selected borrow fill, subbase, base, surface course, concrete aggregates, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Taparak Mountain Quarry	3.0 km from Iligan-Cagayan Nat'l. Rd., Km. 1522+000, Sitio Taparak Brgy. Mandulog, Iligan City	Limestone	50,000	Recommended for selected borrow fill. (Item 104)
Puga-an Limestone Quarry	2.0 km from Iligan-Cagayan Nat'l Rd. Km. 1525+000, Iligan City	Limestone	50,000	Recommended for selected borrow fill. (Item 104)
Puga-an River Quarry	2.0 km from Iligan-Cagayan Nat'l. Rd. Km. 1525+000, Iligan City	Fine and Coarse Aggregate (mixed sand & gravel), Boulders/Cobbles	4,000	Recommended for selected borrow fill, subbase, base, surface course, concrete aggregates, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 104, 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Pindugangan Hill Quarry	4.0 km from Iligan-Cagayan Nat'l. Rd. Km. 1526+000, Sitio Pindugangan, Brgy. Tipanoy, Iligan City	Fine and Coarse Aggregate, Boulders/Cobbles (Metavolcanic)	4,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)



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Gaite Enterprises	1.5 km from Iligan-Cagayan Nat'l. Rd., Km. 1526+300, Brgy. San Roque, Barinaut, Iligan City	Processed Fine and Coarse Aggregate; Mixed FA & CA; Boulders/Cobbles and RCCP		Recommended for subbase, base, surface course, concrete aggregates, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507)
JJ Horizon Co., Inc.	800 m from Iligan-Cagayan Nat'l. Rd., Km 1526+369, Brgy. San Roque, Barinaut, Iligan City	Ready Mix Concrete; Processed Fine and Coarse Aggregate; Mixed FA & CA; Boulders/Cobbles and RCCP		Recommended for subbase, base, surface course, concrete aggregates, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507).
Patayon Industries	100 m from Iligan-Cagayan Nat'l. Rd. Km. 1520+000, Brgy. San Roque, Iligan City	Processed Fine and Coarse Aggregate; Mixed FA & CA, Boulders/Cobbles and RCCP		Recommended for subbase, base, surface course, concrete aggregates, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507).
Gage Enterprises	2.0 km from Iligan-Cagayan Nat'l Rd. Sta. 1522+000, Brgy. Hinaplanon, Iligan City	Processed Fine and Coarse Aggregate; Mixed FA & CA, Boulders/Cobbles	100,000	Recommended for subbase, base, surface course, concrete aggregates, asphalt aggregate, riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507)
Mindanao Gulf Eco Builders	300 m from Iligan-Cagayan Nat'l. Rd., Km 1517+000, Brgy. Kiwalan, Iligan City	Ready Mix Concrete	5 cu.m./20 min. interval	Recommended for concreting. (Item 311 & 405)
Sudlon Salvador River Quarry	84 km from Iligan-Cagayan Nat'l. Rd., Brgy Sudlon, Salvador, LDN. 10 km from Sta. 1603+570, Brgy. Maranding Lala, LDN-Iligan Nat'l. Rd.	Fine and Coarse Aggregate (mixed sand and gravel)	100,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)



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LIST OF AGGREGATE SOURCES

AREA : Misamis Oriental 2nd DEO

REGION : X

SOURCES	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Socor Asphalt Plant	1 km from National Highway, km 1420 + 000, Brgy. Natumulan, Tagoloan, Misamis Oriental	Bituminous Hot Mix	-	Materials processing for the Item needed; Recommended to be used for Bituminous Conc. Surface Course Item 310.
Kimwa Crushing Plant	1 km from National Highway, km 1420 + 000, Brgy. Natumulan, Tagoloan, Misamis Oriental	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	-	Materials needs screening and processing for the Item needed; Recommended to be used for Item 200, 201 and Item 504, Concrete Aggregates Item 311, 405
Tagoloan River Quarry	3 km from CDO - Butuan Road National Highway, km 1424 + 000, Tagoloan, Misamis Oriental	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	Unlimited	Materials needs screening and processing, Recommended to be used for Concrete aggregates Item 311, 405, Item 201 and Item 504, 505, Embankment Material Item 104



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REGION : X

Jagnaya River Quarry	6 km from Cagayan - Iligan National Road, km 1496 + 500, Brgy Jagnaya, Naawan, Misamis Oriental	Surface Aggregates Course	12,000	Materials needs screening and processing, Recommended to be used for Item 200,201
Tuod River Quarry	10 km from Cagayan - Iligan National Road, km 1500 + 300, Brgy. Tuad, Manticao, Misamis Oriental	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel);	10,000	Materials needs screening and processing for the Item needed; Recommended to be used for Item Concrete Aggregates Item 311, 405
Patag River Quarry	5 km from Cagayan - Iligan Road National Highway, km 1496 + 100, Naawa, Misamis Oriental	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	8,000	Materials needs screening and processing, Recommended to be used for Concrete aggregates Item 311, 405, Item 200,201,504, 505 and Embankment Material Item 104



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LIST OF AGGREGATE SOURCES

AREA : Cagayan de Oro City DEO

REGION : X

SOURCES	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Cabuta Mountain Quarry	Right side of the National Highway going Talakag, km 1451 +000, Sitio Cabula, Brgy. Lumbia Cagayan de Oro City	Boulders, Limestone	Unlimited	Materials processing for the Item needed; Recommended to be used for Item 504,505, and Embankment Material Item 104
Iponan River	1.5-0 km from the National Highway, km 1442 + 200, Sitio Anhawon, Brgy. Bula Cagayan de Oro City	Common Soil	Unlimited	Materials needs screening and processing for the Item needed; Recommended to be used for Embankment Material Item 104
Iponan River Quarry	40 km from the National Highway km, 1450 + 000, Brgy. Tumpagon, Cagayan de Oro City	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	Unlimited	Materials needs screening and processing, Recommended to be used for Concrete and Asphalt aggregates Item 311, 405, 310 Item 200, 201



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AREA : Cagayan de Oro City DEO

REGION : X

Batinay River Quarry	18 km from the National Highway going Talakag Bukidnon, km 1450 + 000, Brgy. Tagpangi, Cagayan de Oro City	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	Unlimited	Materials needs screening and processing, Recommended to be used for Concrete aggregates Item 311, 405, Item 200, 201, Item 505
Iponan River Quarry	8 km from the National Highway, km 1447 + 300, Brgy Pagatpat SanSimon, Cagayan de Oro City	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel);	Unlimited	Materials needs screening and processing for the Item needed; Recommended to be used for Item Concrete Aggregates Item 311, 405 Asphalt Aggregate Item 310, Item 200, 201
Pamalahi Mountain Quarry	12 km from the National Highway going to Iligan City, km 1442 + 000, Brgy. Pagatpat, Cagayan de Oro City	Filling Materials	Unlimited	Materials needs screening and processing, Recommended to be used for Concrete aggregates Item 311, 405, Item 201, Asphalt Aggregates Item 310
Kiam-is Mountain Quarry	6 km from the National Highway going to Talakag, km 1450 + 000, Brgy. Lumbia, Cagayan de Oro City	Limnestone and Lime Soil	Unlimited	Materials needs screening and processing for Item needed; Recommended to used for Embankment Material Item 104



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM

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LIST OF AGGREGATE SOURCES

AREA : Cagayan de Oro City DEO

REGION : X

Taglimao Mountain Quarry	25 km from of the National Highway, km 1450 + 000, Cagayan de Oro City	Filling Materials	Unlimited	Materials needs processing for Item needed; Recommended to be used for Embankment Mateial Item 104



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LIST OF AGGREGATE SOURCES

AREA : Bukidnon 1st deo

REGION : X

SOURCES	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Simpitan River Quarry	20 km from Halapitan, 40 km from Valencia City, Brgy. Namnam, San Fernando Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	20,000	Materials processing for the Item needed; Recommended to be used for Concrete Aggregates Item 311, 405, and Item 300
Tigwa River Quarry	1 km from Halapitan, Sanfernando, 40 km from Valencia City, Brgy. Halapitan, San Fernando Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	40,000	Materials needs Screening and Processing for the Item needed: Recommended to be used for Embankment Material Item 104, Item 200, 201, 300, 504, 505 and Concrete Aggregates Item 310, 405
Kulaman River Quarry	15 km from Valencia City, upstream of Provincial Irrigation km 1537 + 000 along SH Alae - Lumbo Road, Brgy Dagat Kidavao, Valencia City	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	10,000	Materials needs Screening and Processing for the Item needed: Recommended to be used for Embankment Material Item 104, Item 200, 201, 300, 504, 505
Pulangi River Quarry	15 km from Valencia City, km 1537 + 000 along SH Alae- Lumbo Road, Brgy. Catumbalon, Valencia City	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	20,000	Material needs Screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104, Item 200, 201, 300, and Concrete aggregates Item 311, 405



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LIST OF AGGREGATE SOURCES

AREA : Bukidnon 1st deo

REGION : X

Pulangi River Quarry	1.5 km from Hagkol, Valencia City, 10 km from bangcud, km 1524 + 000 along SH Alae-Lumbo Road, Brgy. Hagkol, Valencia City Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel);	30,000	Material needs Screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104, Item 200, 201, 300, and Concrete aggregates Item 311, 405
Pulangi River Quarry	1.5 km from Hagkol, Valencia City, 10 km from bangcud, km 1533 + 000 along SH Alea-Lumbo Road, Brgy. Hagkol, Valencia City Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel);	30,000	Material needs Screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104, Item 200, 201, 300, and Concrete aggregates Item 311, 405
Pulangi River Quarry	6 km from junction Silae, km 1537 + 000, along SH Alae-Lumbo, Brgy. Pinatilan, Valencia City Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel);	40,000	Material needs Screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104, Item 200, 201, 300, and Concrete aggregates Item 311, 405
Pulangi River Quarry	1 km from junction SH Lumbo, Valencia City, km 1538 + 000, along SH Alae-Lumbo Road, Brgy. Lumbo, Valencia City Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel);	40,000	Material needs Screening and Processing for the Item needed; Recommended to be used for Item 200, 201, 300, and Concrete Aggregate Item 311, 405



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LIST OF AGGREGATE SOURCES

AREA : Bukidnon 1st deo

REGION : X

Pulangi River Quarry	6km from junction SH Bagontaas, Valencia City, km 1531 +020, along SH Alae-Lumbo Road, Sugod , Valencia City Bukidnon	Fine Aggregates;Coarse Aggregates; (Mix Sand and Gravel);	40,000	Materials needs Screening and Processing for the Item needed; Recommended to be used for Item 200, 201, 300, and Concrete Aggregate Item 311,405 and Asphalt Aggregate Item 310
Tagonloan River Quarry	3 km from Crossing Damay, km 1467 + 100, along SH Alae-Lumbo Road, Brgy. San Vicente, Sumilao, Bukidnon	Fine Aggregates;Coarse Aggregates; (Mix Sand and Gravel);	10,500	Materials needs Screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104, Item 200,201, 300
Pulangi River Quarry	40 km from Stockfarm, Impalutao, km 1467 + 500, along sh Alae-Lumbo Road, Brgy. Kalabugao, Impasug-ong Bukidnon	Fine Aggregates;Coarse Aggregates; (Mix Sand and Gravel); Boulders	60,000	Materials needs Screening and Processing for the Item needed; Recommended to be used for Embankment Materials Item 104, Item 200, 201, 300,504,505 and Concrete Aggregate Item 311, 405
Kibuwa Mountain Quarry	3 km from Stockfarm, Impalutao, km 1493 + 000 along SH Alae-Lumbo Road, Brgy. Kibuwa, Impulatao, Impasug-ong Bukidnon	Embankment and Surface Course Materials	10,000	Material,s needs screening and Procesing for the Item needed; Recommended to be used for Embankment Material Item 104 and Item 200



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LIST OF AGGREGATE SOURCES

AREA : Bukidnon 1st deo

REGION : X

Atugan Mountain Quarry	100 m from Atugan Road, km 1485 + 000 along By Pas Road, Impasug-ong - Patulangan, Brgy. Capitan Bayong, Impasug-ong Bukidnon	Embankment and Surface Course Materials	10,000	Material,s needs screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104 and Item 200
Can-ayan River Quarry	8 km from Malaybalay City, km 1505 + 000 along Junction of SH Alae-Lumbo Road, Brgy. Can-ayan , Malaybalay, Bukidnon	Surface Course Material	15,000	Materials needs Screening and Processing for the Item needed; Recommended to be used for Item 200
Upper Pulangi River Quarry	1 km from Zamboaguita, km 1562 + 500 Junction of SH Agalayan-Zamboaguita Road, Brgy. Zamboaguita, Malaybalay, Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	12,000	Materials needs Screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104, Surface Course Item 200, 201, 300, and Item 504, 505, and Concrete Aggregates Item 311, 405



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LIST OF AGGREGATE SOURCES

AREA : Bukidnon 1st deo

REGION : X

Silae River Quarry	3 km from Junction of Silae, km 1557 + 000 along Junction of SH Aglayan-Zamboaguita Road, Brgy. Silae, Malaybalay, Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	5,000	Materials needs Screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104, Surface Course Item 200, 201, 300, and Item 504, 505, and Concrete Aggregates Item 311, 405
Sawaga River Quarry	2.5 km from Linabo, km 1521 + 000 along Junction of SH Aglayan-Zamboaguita Road, Brgy. Linabo, Malaybalay, Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	20,000	Materials needs Screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104, Surface Course Item 200, 201, 300, and Item 504, 505
Bobonawan River Quarry	6 km from Miglamin, km 1533 + 500 along Junction of Aglayan-Zamboaguita Road, Brgy. Valdedrama, Cabanglasan, Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	10,000	Materials needs Screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104, Surface Course Item 200, 201, 300



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LIST OF AGGREGATE SOURCES

AREA : Bukidnon 1st deo

REGION : X

Upper Pulangi River Quarry	2 km from Iba, km 1549 + 500 along junction SH Aglayan-Zamboaguita Road, Brgy. Iba, Cabanglasan, Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	40,000	Materials needs Screening and Processing for the Item needed; Recommended to be used for Embankment Material Item 104, Surface Course Item 200, 201, 300, and Item 504, 505, and Concrete Aggregates Item 311, 405
Salug River Quarry	1 km from Kalagangan, San Fernando, 80 km from Valencia City, km 1537 + 000 along SH Alea-Lumbo Road, Brgy. Salug, San Fernando, Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	30,000	Materials needs Screening and Processing for the Item needed; Recommended to be used for Surface Course Item 200, 201, 300, and Concrete Aggregates Item 311, 405



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LIST OF AGGREGATE SOURCES

AREA : Bukidnon 3rd DEO

REGION : X

SOURCES	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Field 16 Quarry	Junction of Manolo Fortich-Indahag Road, 8 km from km 1462 + 400, Brgy. Palabucan, Libona, Bukidnon	Embankment and Surface Course Materials	50,000	Material needs Screening and Processing for the Item needed; Recommended to be used for Embankment Item 104 and Surface Course Item 200
Lunocan Quarry	2 km left of Alae-Libona Provincial Road 4 km from 1437 + 754 Alae-Kiolon Road, Brgy. Lunocan, Manolo Fortich Bukidnon	Embankment and Surface Course Materials	50,000	Material needs Screening and Processing for the Item needed; Recommended to be used for Embankment Item 104 and Surface Course Item 200
Kiabo Mountain Quarry	At Misamis Oriental-Bukidnon-Agusan Road, 12 km from km 1446 + 200, Brgy. Kiabo, Maltbog, Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	1,500	Material needs Screening and Processing for the Item needed; Recommended to be used for Embankment Item 104 and Surface Course Item 200
Lingion Limestone Quarry	along SH-Alae-Kiolon Road 4 km left of km 1449 + 600, Brgy. Lingion, Manolo Fortich, Bukidnon	Limestone	100,000	Material needs Processing for the Item needed; Recommended to be used for Embankment Item 104



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LIST OF AGGREGATE SOURCES

AREA : Bukidnon 3rd DEO

REGION : X

Maradagao River Quarry	along Kalilangan-Lampanusan Road, 1 km from km 1601+ 500, Brgy. Bagontaas, Valencia City Bukidnon	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel);	10,000	Materials needs Screening and Processing for the Item needed; Recommended to be used for Embankment Item 104, Surface Course Item 200, 201, 300 and Item 504, 505, and Concrete aggregate Item 311, 405, Asphalt Aggregate Oitem 310

**REGION XI LIST OF UPDATED
MATERIAL SOURCES**





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LIST OF AGGREGATE SOURCES

AREA : DPWH, Davao Oriental 2nd DEO
REGION XI

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Pitugan River	206 m from Km. 1511+239	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	20,000	Recommended for selected/borrow fill, aggregate subbase, base course surface course, riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 505, 506 & 507). Needs Processing.
Sumlog River	200 m from Km. 1703+050	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	100,000	Recommended for selected/borrow fill, aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Bitaugan River	300 m from Km. 1758+125	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for selected/borrow fill, aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Tambo River	500 m from Km. 1542+011	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	30,000	Recommended for selected/borrow fill, aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
La Union River	Km. 1769+493, San Isidro, Davao Oriental	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	unlimited	Recommended for selected/borrow fill, aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.



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LIST OF AGGREGATE SOURCES

AREA : DPWH, Davao Oriental 2nd DEO

REGION XI

Catogna River	Km. 1775+181, Gov. Generoso, Davao Oriental	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	unlimited	Recommended for selected/borrow fill, aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Sigaboy River	400 m from Km. 1547+042	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	30,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Kibanban River	600 m. from Km. 1547+048	Fine and Coarse Aggregate (mixed sand and gravel)	30,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405). Needs Processing.
Macangaw River	500 m from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel), Boulders/Cobbles	50,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Tube-Tube River	200 m from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	25,000	Recommended for aggregate subbase, base course surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Magdug River	200 m from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	25,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.



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LIST OF AGGREGATE SOURCES

AREA : DPWH, Davao Oriental 2nd DEO

REGION XI

Luzon River	300 m from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel)	25,000	Recommended for aggregate subbase, base course, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405). Needs Processing.
Tiblawan River	300 m from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for aggregate subbase, aggregate base, riprap and stone masonry. (Item 200, 201, 505, 506)
Surop River	300 m from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for aggregate subbase, aggregate base, riprap and stone masonry. (Item 200, 201, 505, 506)
Tagabebe River	200 m from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	20,000	Recommended for aggregate subbase, base course, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507) Needs Processing.
Pundaguitan River	200 m from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel)	30,000	Recommended for aggregate subbase, base course, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405). Needs Processing.
Tagunao Quarry	100 m from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel)	20,000	Recommended for aggregate subbase course. (Item 200)
Kambal Creek	200 m from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel)	20,000	Recommended for aggregate subbase, aggregate base and aggregate surface course (Item 200, 201 & 300)



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LIST OF AGGREGATE SOURCES

AREA : DPWH, Davao Oriental 1st DEO
 REGION XI

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Dakong Banwa River	2.8 km from the National Road	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	30,000	Recommended for selected/borrow fill, aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Cabasagan River	1.0 km from the National Road	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	8,000	Recommended for selected/borrow fill, aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Cateel River	2 0 km from the National Road	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	20,000	Recommended for selected/borrow fill, aggregate subbase, base course surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Don Alfonso River	4.8 km from the National Road	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for selected/borrow fill, aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Baganga River	4.0 km from the National Road	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for selected/borrow fill, aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.



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LIST OF AGGREGATE SOURCES

AREA : DPWH, Davao Oriental 1st DEO

REGION XI

San Ignacio River	2.2 km from the National Road	Boulders/Cobbles	6,000	Recommended for riprap, stone masonry and rubble concrete. (Item 505, 506 & 507)
Caraga River	1.0 km from the National Road	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	30,000	Recommended for aggregate subbase, base course, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507) Needs Processing.
Poyapoy River	2.3 km from the National Road	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	20,000	Recommended for aggregate subbase, base course, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.



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LIST OF AGGREGATE SOURCES

AREA : DPWH, Davao del Sur 1st DEO
REGION XI

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Balatakan River	2.5 km from Mun. of Magsaysay	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	20,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Siocon River	2.0 km from Davao-Cotabato Nat'l. Rd.	Fine and Course Aggregate (mixed sand and gravel)	5,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, & 405). Needs Processing.
Magallanes River	10 km from Davao-Cotabato Nat'l. Road	Fine and Course Aggregate (mixed sand and gravel)	10,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, & 405). Needs Processing.
Kapok River	6.5 km from Davao-Cotabato nat'l. Rd.	Fine and Course Aggregate (mixed sand and gravel)	10,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, & 405). Needs Processing.
Malabang River	17.0 km from Digos-Makar Nat'l. Rd.	Fine and Course Aggregate (mixed sand and gravel)	200,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, & 405). Needs Processing.



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Sta. Cruz River	100 m. from Sta. Cruz-Davao Nat'l. Rd.	Fine and Course Aggregate (mixed sand and gravel)	5,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, & 405). Needs Processing.
Tres de Mayo River	3.5 km from Davao-Cotabato Nat'l. Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Digos River	250 m from Digos-Makar Nat'l. Rd.	Fine and Course Aggregate (mixed sand and gravel)	20,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete (Item 200 , 201, 300, 310, 311, & 405). Needs Processing.
Kiagot Quarry	300 m. from Davao-Cotabato Nat'l. Rd.	Embankment Materials	50,000	Recommended for selected borrow fill. (Item 104)
Guihing River	3.5 km from Digos-Makar Nat'l. Rd.	Fine and Coarse Aggregate (mixed sand & gravel)	50,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405). Needs Processing.



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SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Mamacao River Quarry	8.0 km from Tak St. Circumferential Rd., Brgy Libertad, Sto. Tomas	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	35,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Libertad River Quarry	3.2 km from Tak St. Circumferential Rd., Brgy. Libertad, Sto. Tomas	Fine and Course Aggregate (mixed sand and gravel)	30,000	Recommended for selected borrow fill, aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300)
Mabuhay River Quarry	5.0 km from Davao-Agusan Rd., Brgy Mabuhay, Panabo City	Fine and Course Aggregate (mixed sand and gravel)	50,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, & 405). Needs Processing.
New Malitbog River Quarry	2.8 km from Tak St., Brgy Malitbog, Panabo City	Fine and Course Aggregate (mixed sand and gravel)	40,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, & 405). Needs Processing.
Nanyo River Quarry	4.0 km from Tak St. Circum. Rd., Brgy Nanyo, Panabo City	Fine and Course Aggregate (mixed sand and gravel)	10,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, & 405). Needs Processing.
Apokon River Quarry (Hijo River)	700 m. junction of Surigao-Davao Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	70,000	Recommended for selected borrow fill, aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.



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Tagum City Government Asphalt Mixing Plant	1.0 km from Agusan-Davao Rd., Brgy. Tipaz, Tagum City	Asphalt Mix		Recommended for Concrete Asphalt. (Item 310)
Tipaz Quarry (Hijo River)	1.5 km of Junction Agusan-Davao Road	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	70,000	Recommended for aggregate subbase, base course. surface course. concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Magdum Quarry (Hijo River)	1.10 km from Agusan-Davao Road. Km. 1452+000	Fine and Coarse Aggregate (mixed sand & gravel)	80,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405). Needs Processing.
Pantapan Quarry (Hijo River)	3.2 km from Agusan-Davao Rd., Km. 1449+700	Fine and Coarse Aggregate (mixed sand & gravel)	80,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405) Needs Processing.
Menzie Quarry	4.0 km from Tak St. Circum. Rd., Km. 1495+000	Fine and Coarse Aggregate (mixed sand & gravel)	8,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405). Needs Processing.
Sampao Quarry (Sampao River)	5.0 km from Tak St. Circum. Rd., Km. 1485+800	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	8,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200 , 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.



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SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Sabud River Quarry	22 km from Poblacion Laak, Brgy. Sabud, Mun. of Laak	Fine and Course Aggregate (mixed sand & gravel with binder)	8,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)
Kiokmay Quarry	15 km from Poblacion Laak, Brgy. Kiokmay, Mun. of Laak	Fine and Course Aggregate (mixed sand & gravel with binder)	8,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)
San Miguel Quarry	28 km from Poblacion Laakj, Brgy. Kidawa, San Miguel, Laak	Fine and Course Aggregate (mixed sand & gravel with binder)	8,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)
Logom Quarry	19 km from Poblacion Laak, Brgy. Aguinaldo, Mun. Of Laak	Fine and Course Aggregate (mixed sand & gravel with binder)	4,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)
Imelda Inakayan Quarry	6.0 km from Laak Poblacion, Brgy. Imelda-Inapakan boundary, Mun. of Laak	Fine and Course Aggregate (mixed sand & gravel with binder)	5,000	Recommended for selected borrow fill and aggregate subbase course (Item 104 & 200)
Binasbas Quarry	12 km from Poblacion Laak, Brgy. Binasbas, Laak	Fine and Course Aggregate (mixed sand & gravel with binder)	10,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)
Bagong Silang Quarry	17 km from Poblacion Laak, Brgy. Bagong Silang, Laak	Fine and Course Aggregate (mixed sand & gravel with binder)	10,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)
Barobo Quarry	2.5 km from Poblacion Laak, Brgy. Barobo, Laak	Fine and Course Aggregate (mixed sand & gravel with binder)	10,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)
Soop Quarry	19 km. from Laak-Soop Prov'l. Rd., Brgy. Soop, Mun. of Laak	Fine and Course Aggregate (mixed sand & gravel with binder)	20,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)
Tawin-Tawin Quarry	28 km from Poblacion Montevista, Brgy. Baluare, Mun. of Laak	Fine and Course Aggregate (mixed sand & gravel with binder)	10,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)
Alson Devco Quarry	Poblacion Nabunturan	Fine and Course Aggregate (mixed sand & gravel with binder)	15,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)



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New Sibonga River Quarry	7.0 km from Poblacion Nabunuran, Brgy. New Sibonga, Nabunturan	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Manat River Quarry	3.0 km from Nabunturan-Mainit Nat'l. Rd., Brgy. Manat, Nabunturan	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Poblacion Mawab River Quarry	Upstream of Sawangan Bridge along Agusan-Davao Road, Mawab	Fine and Coarse Aggregate (mixed sand and gravel)	100,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Sawangan River Quarry	4.5 km from Poblacion Mawab, Brgy. Sawangan, Mawab	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Dumlan River Quarry	7.0 km from Poblacion Maco, Brgy. Dumlan, Maco, DN	Fine and Coarse Aggregate (mixed sand and gravel)	30,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Hijo River Quarry	9.0 km from Poblacion Maco, Brgy. Hijo, Maco, DN	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.



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Cadunan Quarry	1.0 km from Surigao-Davao Nat'l. Rd., Sitio Lapinigan, Brgy. Cadunan, Mun. of Mabini, DN	Fine and Course Aggregate (mixed sand & gravel with binder)	10,000	Recommended for selected borrow fill and aggregate subbase course. (Item 104 & 200)
Magangit River Quarry	1.0 km from Agusan-Davao Nat'l. Rd., Brgy. Magangit, Mun. of Maco	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Tagmanan River Quarry	6.0 km from Poblacion Mabini, Brgy. Tagnanan, Mun. of Mabini	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Kingking River Quarry	Old Pantukan along Surigao-Davao nat'l. Rd., Mun. of Pantukan	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405) Needs Processing.
Matiao River Quarry	2.5 km from Pantukan-Lupon Nat'l. Rd., Brgy. Matiao, Mun. of Pantukan	Fine and Coarse Aggregate (mixed sand and gravel)	30,000	Recommended for selected borrow fill, aggregate subbase, aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405) Needs Processing.
Fuentes River Quarry	2.5 km from Surigao-Davao Nat'l. Rd., Brgy. Fuentes, Mun. of Pantukan	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.



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Bongbong River Quarry	1.0 km from Matiao, Brgy. Bongbong, Mun. of Pantukan	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
New Albay River Quarry	9.5 km from Pob. Maragusan along New Bataan-Maragusan Nat'l. Rd., Brgy. New Albay, Mun. of New Bataan	Fine Aggregate	10,000	Recommended for Asphalt and Concrete Aggregate. (Item 310, 311 & 405). Needs Processing.
Bangoy River Quarry	Upstream and downstream of Bangoy Bridge along Compostela-New Bataan Nat'l. Rd., Brgy. San Roque, Mun. of New Bataan	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	50,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate, asphalt aggregate (to be crushed) , riprap, stone masonry and rubble concrete. (Item 200, 201 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Magsaysay River Quarry	7.0 km from Compostela-New Bataan Nat'l. Rd., Brgy. Magsaysay, Mun. of Bataan	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate, asphalt aggregate (to be crushed) , riprap, stone masonry and rubble concrete. (Item 200, 201 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Bantacan River Quarry	2.0 km from Compostela-New Bataan Nat'l. Rd., Brgy. Bantacan, Mun. of New Bataan	Fine and Coarse Aggregate (mixed sand & gravel)	20,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
San Miguel River Quarry	400 m from Compostela-New Bataan Nat'l. Rd., Brgy. San Miguel, Mun. of Compostela	Fine and Coarse Aggregate (mixed sand & gravel)	20,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.



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Batoto River Quarry	Upstream of Batoto Bridge, 8.0 km from Poblacion Compostela, Brgy. San Jose, Mun. of Compostela	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	20,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate, asphalt aggregate (to be crushed) , riprap, stone masonry and rubble concrete. (Item 200, 201 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Noboc River Quarry	12 km from Poblacion Monkayo, Brgy. Naboc, Mun. of Monkayo	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	20,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate, asphalt aggregate (to be crushed) , riprap, stone masonry and rubble concrete. (Item 200, 201 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Poblacion Monkayo River Quarry	Poblacion Monkayo	Fine Aggregate	50,000	Recommended for Asphalt and Concrete Aggregate. (Item 310, 311 & 405). Needs Processing.
Baylo River Quarry	Upstream of Baylo Bridge along Agusan-Davao Nat'l. Rd., Brgy. Baylo, Mun. of Monkayo	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate, asphalt aggregate (to be crushed) , riprap, stone masonry and rubble concrete. (Item 200, 201 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Pasian River Quarry	Upstream and downstream of Pasian Bridge along Davao-Agusan Nat'l. Rd., Brgy. Pasian, Mun. of Monkayo	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate, asphalt aggregate (to be crushed) , riprap, stone masonry and rubble concrete. (Item 200, 201 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Liboton River Quarry	Downstream of Liboton Bridge along Agusan-Davao Nat'l. Rd.	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.



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Upper Ulip River Quarry	6.0 km from Poblacion Monkayo, Brgy. Liboton	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base course, aggregate surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Olaycon River Quarry	Downstream of Olaycon Bridge along Agusan-Davao Nat'l. Rd.	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Tapia River quarry	7.0 km from Pob. Montevista	Fine and Course Aggregate (mixed sand & gravel with binder)	4,000	Recommended for selected borrow fill, aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300).
Katipunang Quarry	6.0 km from Poblacion Compostela, Brgy. Katipunan	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Taragu River Quarry	1.0 km upstream of Taragu Bridge, Maragusan	Fine and Course Aggregate (mixed sand & gravel with binder)	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base and aggregate surface course (Item 200, 201 & 300).
Bagong Silang Quarry	2.0 km from Maragusan Poblacion	Fine and Course Aggregate (mixed sand & gravel with binder)	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300).
Tigbao River Quarry	7.0 km from Pob. Maragusan	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	20,000	Recommended for selected borrow fill, aggregate subbase, aggregate base, aggregate surface course, riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 505, 506 & 507)
Santa Josefa River Quarry	Upstream of Santa Josefa Bridge, Brgy. Santa Josefa	Fine Aggregate	50,000	Recommended for concrete aggregate (Item 311 & 405)



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Taamanak	45 km from Poblacion Mawab, Comval	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Conception River Quarry	10 km from Pob. Mawab, Brgy. Andili, Mawab, Comval	Fine and Coarse Aggregate (mixed sand and gravel)	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201 300, 310, 311 & 405). Needs Processing.
Libaylibay River Quarry	15 km from Pob. Maco, Brgy. Libay, Maco, Comval	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate, asphalt aggregate (to be crushed) , riprap, stone masonry and rubble concrete. (Item 200, 201 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Tubo-tubo River Quarry	3.0 km from brgy. Tubo-tubo, Monkayo, Comval	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	30,000	Recommended for selected borrow fill, aggregate subbase , aggregate base course, aggregate surface course, concrete aggregate, asphalt aggregate (to be crushed) , riprap, stone masonry and rubble concrete. (Item 200, 201 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Pagakpak River Quarry	1.0 km from Pagakpak Bridge, Brgy. Lapinigan	Fine and Course Aggregate (mixed sand & gravel with binder)	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300).
Lahi River Quarry	12 km from Pob. Pantukan, Brgy. Lahi, Pantukan, Comval	Fine and Course Aggregate (mixed sand & gravel with binder)	10,000	Recommended for selected borrow fill, aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300).
Pintatagan River Quarry	1.0 km upstream and downstream of Pintatagan Bridge, Pintatagan, Banay-banay	Fine and Course Aggregate (mixed sand & gravel with binder)	15,000	Recommended for selected borrow fill, aggregate subbase, aggregate base and aggregate surface course. (Item 200, 201 & 300).



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Lanipao River Quarry	12 km from Pob. Maragusan, Comval	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	20,000	Recommended for selected borrow fill, aggregate subbase, aggregate base, aggregate surface course, riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 505, 506 & 507)
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GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM
 A Project of the United States Agency for International Development
THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)
 2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines
 Tel. Nos.: (82) 225-1569 to 75 Fax No.: (82) 225-1479

LIST OF AGGREGATE SOURCES

AREA : DPWH, Davao del Sur 2nd DEO
REGION XI

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Maraga-a River	17 km from Padada-Digos Rd., Brgy. Maraga-a, Kiblawan, Davao del Sur	Fine and Course Aggregate (mixed sand & gravel)	20,000	Recommended for aggregate subbase and aggregate base course. (Item 200 & 201)
Latian River	25 km from Padada-Digos Rd., Brgy. Lati-an, Kiblawan, Davao del Sur	Fine and Course Aggregate (mixed sand & gravel)	15,000	Recommended for aggregate subbase and aggregate base course. (Item 200 & 201)
Pamulawan River	4.0 km from Sta. Maria-Pamulawan Rd., Km. 1603+000, Brgy. San Isidro, Sta. Maria, DS	Fine and Course Aggregate (mixed sand & gravel)	8,000	Recommended for aggregate subbase and aggregate base course. (Item 200 & 201)
Pongpong River	7.0 km from junction Pongpong Provincial Rd., Km. 1603+000, Brgy. Buca, Sta. Maria, DS	Fine and Course Aggregate (mixed sand & gravel)	30,000	Recommended for aggregate subbase and aggregate base course. (Item 200 & 201)
Macol River	26 km from Km. 1636+700 along Malita-Sangay Prov'l. Rd., Brgy. Macol, DS	Boulders/Cobbles	40,000	Recommended for riprap, stone masonry and rubble concrete. (Item 505, 506 & 507)
Banate River	21 km from Km. 1603+000 Sta. Maria-Pongpong Prov'l. Rd., Brgy. Banate, Sta. Maria, DS	Fine and Course Aggregate (mixed sand & gravel)	20,000	Recommended for aggregate subbase and aggregate base course. (Item 200 & 201)
San Roque River	5.5 km from Km 1603+000, Sta. Maria-pongpong Prov'l. Rd, Brgy. San Roque, Sta. Maria, DS	Fine and Course Aggregate (mixed sand & gravel)	25,000	Recommended for aggregate subbase and aggregate base course. (Item 200 & 201)
Culaman River	2.0 km from Km. 1637+039 Upstream of Culaman Bridge, Brgy. Culaman, Malita, DS	Fine and Course Aggregate (mixed sand & gravel)	50,000	Recommended for aggregate subbase, aggregate base, aggregate surface course and concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405) Needs Processing.
Lais River	300 m from Talucanga-Mana-Ticulon-Little Baguio Rd., Brgy. Mana, Malita, DS	Fine and Course Aggregate (mixed sand & gravel)	30,000	Recommended for aggregate subbase, aggregate base, aggregate surface course and concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405). Needs Processing.



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AREA : DPWH, Davao del Sur 2nd DEO

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Talagutong River	500 m (upstream & downstream) along Don Marcelino-JAS Rd., Brgy. Talagutong, Don Marcelino, DS	Fine and Course Aggregate (mixed sand & gravel)	10,000	Recommended for aggregate subbase and aggregate base course. (Item 200 & 201)
Nueva Villa River	Along Malita-Don Marcelino Rd. (upstream & downstream), Km. 1668+052, Brgy Kinanga, Don Marcelino, DS	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for aggregate subbase, base course, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Lapuan River	Upstream & downstream of Lapuan Bridge along Don Marcelino-JAS Rd., Km. 1617+436, Brgy. Lapuan, Don Marcelino, DS	Fine and Coarse Aggregate (mixed sand and gravel)	15,000	Recommended for aggregate subbase, aggregate base course and aggregate surface course (Item 200, 201 & 300)
Calian River	Upstream & downstream of Calian Bridge along Don Marcelino-JAS Rd., Km. 1680+834, Brgy. Calian, Don Marcelino, DS	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for aggregate subbase, aggregate base course, riprap, stone masonry and rubble concrete (Item 200, 201, 300, 311, 405, 505, 506 & 507). Needs Processing.
Luayon River	Km. 1703+000, Along Don Marcelino-JAS Rd., Brgy. Luayon, Don Marcelino, DS	Fine and Coarse Aggregate (mixed sand and gravel)	20,000	Recommended for aggregate subbase, aggregate base course and aggregate surface course. (Item 200, 201 & 300)
Caburan River	Km. 1720+800, Along Don Marcelino-JAS Rd., Brgy. Caburan, JAS, DS	Fine and Coarse Aggregate (mixed sand and gravel)	60,000	Recommended for aggregate subbase, aggregate base, aggregate surface course and concrete aggregate. (Item 200, 201, 300, 311 & 405)



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LIST OF AGGREGATE SOURCES

AREA : DPWH, Davao City DEO
REGION XI

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Safecon Industries	1.2 km. from Ma-a Bridge and 600 m from Davao City Slaughter House, Purok 6, Maa Riverside, Davao City	Ready Mix Concrete, Fine & Coarse Aggregate (Crushed & Rounded), RCCP & CHB		Recommended for Concreting Works, Asphalt Aggregate and Concrete Aggregate. (Item 310, 311 & 405)
Solidmix Concrete Batching Plant	1.2 km. from Ma-a Bridge and 605 m from Davao City Slaughter House, Purok 6, Maa Riverside, Davao City	Ready Mix Concrete, Fine & Coarse Aggregate (Crushed & Rounded)		Recommended for Concreting Works, Asphalt Aggregate and Concrete Aggregate. (Item 310, 311 & 405)
Darwin Concrete Batching Plant	400 m along Panacan-Buhangin Diversion Rd., Panacan Relocation, Davao City	Ready Mix Concrete, Fine & Coarse Aggregate (Crushed & Rounded)		Recommended for Concreting Works, Asphalt Aggregate and Concrete Aggregate (Item 310, 311 & 405)
Goldstar Rivermount	1.5 km from Damosa Overpass, Lanang, Davao City	Ready Mix Concrete, Fine & Coarse Aggregate (Crushed & Rounded)		Recommended for Concreting Works, Asphalt Aggregate and Concrete Aggregate. (Item 310, 311 & 405)
Hernandez Crushing Plant	1.5 km from Ma-a City Jail	Fine and Coarse Aggregate (crushed and rounded)		Recommended for Asphalt and Concrete Aggregate. (Item 310, 311 & 405)
Legaspi asphalt	Corner Ma-a-Magtuod, Ma-a Diversion Road, Davao City	Asphalt Bituminous Mix		Recommended for Concrete Asphalt. (Item 310)
Alzam Enterprises	Along Buhangin Diversion Road	Ready Mix Concrete, Mixed FA & CA		Recommended for Concreting Works, Aggregate Subbase and Aggregate Base Course. (Item 200, 201, 311 & 405)
Jameetrix Construction	1.2 km along Ulas-Calinan Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles		Recommended for Concreting Works, Aggregate Subbase and Aggregate Base Course. (Item 200, 201, 311 & 405)
Buen Yap Quarry	3.2 km from Buhangin Underpass, Brgy. Tigatto, Buhangin, Davao City	Embankment Materials	40,000	Recommended for Embankment and selected Borrow Fill. (Item 104)



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AREA : DPWH, Davao City DEO

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Tigatto 8 River Quarry (Davao River)	2.6 km from Buhangin-Callawa Nat'l. Rd., Brgy. Tigatto, Buhangin, Davao City	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for selected borrow fill, aggregate subbase, base course, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Tigatto 10 River Quarry	4.0 km from Buhangin Underpass, Upstream of Waan Bridge, Brgy. Tigatto, Buhangin, Davao City	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	8,000	Recommended for selected borrow fill, aggregate subbase, base course, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Algabre/Velarde Quarry	12.2 km from Buhangin Underpass, Brgy. Indangan, Sitio Conception, Buhangin, Davao City	Fine and Coarse Aggregate (mixed sand and gravel)	50,000	Recommended for selected borrow fill, aggregate subbase, base course, surface course. (Item 104, 200, 201, & 300). Needs Processing.
R.T. Lapena Quarry	Besides Lonbisco-Davao Diversion Road, Bangkal, Davao City	Embankment Materials	15,000	Recommended for selected borrow fill. (Item 104)
Lasang River Quarry	200 m from Lasang Fly Over	Fine and Coarse Aggregate (mixed sand and gravel)	30,000	Recommended for aggregate subbase, aggregate base, aggregate surface course and concrete aggregate. (Item 200, 201, 300, 311 & 405)
Bacaca River Quarry	300 m from Main Rd., Garcia Heights, Davao City	Fine and Coarse Aggregate (mixed sand and gravel)	30,000	Recommended for aggregate subbase, aggregate base, aggregate surface course and concrete aggregate. (Item 200, 201, 300, 311 & 405)
Bankerohan River Quarry	100 m fro Gravahan, Davao City	Fine and Coarse Aggregate (mixed sand and gravel)	20,000	Recommended for aggregate subbase, aggregate base, aggregate surface course and concrete aggregate. (Item 200, 201, 300, 311 & 405)



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LIST OF AGGREGATE SOURCES

AREA : DPWH, Davao City Sub-DEO
REGION XI

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Kutato River	3.0 km from Davao-Bukidnon Rd., Brgy. Kimasog, Davao City	Fine and Coarse Aggregate (mixed sand and gravel)	25,000	Recommended for aggregate subbase and base course. (Item 200 & 201). Needs Processing.
Malamba (Davao River)	8.0 km from Davao-Bukidnon Road	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	100,000	Recommended for aggregate subbase, base course, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Suawan River	1.0 km upstream of Suawan Bridge along Davao-Bukidnon Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	12,000	Recommended for aggregate subbase, base course, surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Lacson Mountain Quarry	4.5 km from Davao-Bukidnon Rd., (Lacson-Lamanan Rd.)	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	50,000	Recommended for aggregate subbase, aggregate base course, riprap, stone masonry and rubble concrete. (Item 200, 201, 505, 506 & 507). Needs Processing.
Lipadas River	1.0 km from the National Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for aggregate subbase, aggregate base course, riprap, stone masonry and rubble concrete. (Item 200, 201, 505, 506 & 507). Needs Processing.
Lubogan River	100 m. from Davao-Cotabato Old Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	20,000	Recommended for aggregate subbase, aggregate base course, riprap, stone masonry and rubble concrete. (Item 200, 201, 505, 506 & 507). Needs Processing.
Queen City Asphalt Batching Plant	200 m from Davao-Bukidnon Rd., Brgy. Ula, Tugbok District, Davao City	Asphalt Mix		Recommended for Concrete Asphalt. (Item 310)



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AREA : DPWH, Davao City Sub-DEO

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Lacson River Quarry	4.3 km from Davao-Bukidnon Rd, (Upstream of Lacson Bridge)	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	50,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Dacudao Mountain Quarry	3.0 km from Davao-Bukidnon Rd., Brgy. Kimasog, Davao City	Fine and Coarse Aggregate (mixed sand & gravel)	25,000	Recommended for aggregate subbase and base course. (Item 200 & 201). Needs Processing.
Dominga River Quarry	1.0 km from Davao-Bukidnon Rd. (Calinan proper)	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	5,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Tamugan River	300 m downstream of Tamugan Bridge along Davao-Bukidnon Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	50,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.
Pagan River	2.0 km from Davao-Bukidnon Rd.	Fine and Coarse Aggregate (mixed sand and gravel); Boulders/Cobbles	10,000	Recommended for aggregate subbase, base course. surface course, concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507). Needs Processing.

**REGION XII LIST OF UPDATED
MATERIAL SOURCES**





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LIST OF AGGREGATE SOURCES

AREA : DPWH Sarangani District Engineering Office, Alabel, Sarangani Provinc
REGION XII

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Big Margus River Quarry	1.0 Km. From National Highway, Brgy Big Margus, Glan, Sarangani. (Km. 1735+337.5)	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	15,000	Recommended for selected borrow fill, subbase, base and surface course. (Item 104, 200, 201 & 300.)
Pangyan River Quarry	1.0 km from National Highway, Brgy. Pangyan, Glan, Sarangani. (Km. 1724+341.5)	Fine and Coarse Aggregate, Boulders. (Mixed Sand and Gravel with Silts)	35,000	Recommended for selected borrow fill, subbase, base, surface course, riprap, stone masonry and grouted riprap. (Item 104, 200, 201, 300, 505, 506 & 507)
Small Margus River Quarry	1.0 km from National Highway, Brgy. Small Margus, Glan, Sarangani. (Km. 1733+875)	Fine and Coarse Aggregate, Boulders. (Mixed Sand and Gravel with Silts)	30,000	Recommended for selected borrow fill, subbase, base, surface course, riprap, stone masonry and grouted riprap. (Item 104, 200, 201, 300, 505, 506 & 507)
Kalaong River Quarry	1.0 km from National Highway, Brgy. Kalaong, Maitum, Sarangani. (Km. 1766+666)	Fine and Coarse Aggregates (mixed sand & gravel with silts), Boulders	40,000	Recommended for subbase, base, surface course concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507.)
Luan River Quarry	1.0 km from National Highway, Brgy. Luan, Maitum, Sarangani. (Km.1780+000)	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	10,000	Recommended for selected borrow fill, subbase, base and surface course. (Item 104, 200, 201 & 300.)
Saub River Quarry	1.0 km from National Highway, Brgy. Saub, Maitum, Sarangani. (Km. 1761+472.30)	Fine and Coarse Aggregates (Mixed sand & gravel)	45,000	Recommended for subbase, base and surface course concrete aggregate and asphalt aggregate (to be crushed). (Item 200, 201, 300, 310, 311 & 405)
Pangi River Quarry	1.0 km from National Highway, Brgy. Pangi, Maitum, Sarangani. (Km. 1764+053.7)	Fine and Coarse Aggregates (Mixed sand & gravel), Boulders	20,000	Recommended for subbase, base, surface course. concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507.)
Malbang Quarry	100 m from the National Highway, Brgy. Malbang, Maasim, Sarangani. (Km. 1694+100)	Limestone	10,000	Recommended for Selected Borrow Fill (Item 104)



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LIST OF AGGREGATE SOURCES

AREA : DPWH Sarangani District Engineering Office, Alabel, Sarangani Provinc
REGION XII

Tual River Quarry	1.0 km from the National Road, Brgy. Tual, Kiamba, Sarangani. (Km. 1752+030)	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	20,000	Recommended for selected borrow fill, subbase, base and surface course. (Item 104, 200, 201 & 300.)
Upper Buayan River Quarry	1.0 km from the National Road, Brgy. Malandag, Malungon, Sarangani. (Km. 1767+053.7)	Fine and Coarse Aggregates (Mixed sand & gravel), Boulders	75,000	Recommended for subbase, base, surface course concrete aggregate, asphalt aggregate (to be crushed), riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507)
Lun Padidu River Quarry	1.0 km from the National Highway, Brgy. Lun Padidu, Malapatan, Sarangani. (Km. 1664+444.6)	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	30,000	Recommended for selected borrow fill, subbase, base and surface course. (Item 104, 200, 201 & 300.)
Lun Masia River Quarry	1.0 km from the National Highway, Brgy. Lun Masia, Malapatan, Sarangani. (Km. 1666+482.7)	Fine and Coarse Aggregate (Mixed Sand and Gravel with Silts)	120,000	Recommended for selected borrow fill, subbase, base and surface course. (Item 104, 200, 201 & 300.)



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LIST OF AGGREGATE SOURCES

AREA : DPWH Sub-District Engineering Office, General Santos City
REGION XII

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Silway River	0.50 Km. From Makar-Digos Rd., Brgy Apopong, GSC. (Km. 1653+765)	Fine Aggregates	100,000	Recommended for concrete aggregate and asphalt aggregate. (Item 310, 311 & 405)
Darwin Concrete Products	0.02 km. from Makar-Kiamba Rd., Brgy. Tambler, GSC. (Km. 1664+000)	Fine and Coarse Aggregates (mixed sand and gravel), Boulders	20,000	Recommended for subbase, base, surface course. concrete aggregate, asphalt aggregate (to be crushed) , riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507.)
Limestone Deposit	0.50 km from Makar-Kiamba Rd., Brgy. Bawing, GSC, (Sta. 1670+000)	Limestone	20,000	Recommended for selected borrow, subbase and base course. The materials can be mixed with coarse / cement in a given percentage for asphalt and concrete aggregates. (Item 104, 200, 201)
Sarangani Rockmixer Pre-Mix Concrete / Asphalt Crusher Plant	6.0 km from Makar-Digos Rd., Brgy. Mabuhay, GSC (Sta. 1653+250)	Coarse Aggregatel, Boulders and Cobbles	10,000	Recommended for asphalt and concrete aggregate, riprap, stone masonry and rubble concrete. (Item 310, 311, 405, 505, 506 & 507)
Sarangani Rockmixer Asphalt Batching Plant	5.0 kms from Makar-Digos Rd., Brgy. Ligaya, GSC. (Sta. 1644+0750)	Fine and Coarse Aggregates and Pre-Mix Asphalt	15,000	Recommended for concrete and asphalt aggregate. (Item 310, 311 & 405)
Klinan River	9.0 kms from Makar-Digos Rd., Brgy. Mabuhay, GSC. (Sta. 1653+250)	Fine Aggregates, Boulders and Cobbles	5,000	Recommended for concrete and asphalt aggregates, riprap, stone masonry and rubble concrete. (Item 310, 311, 405, 505, 506 & 507)
Ligaya Quarry	3.0 kms. From Makar-Digos Rd., Brgy Ligaya, GSC. (Sta. 1653+570)	Fine and Coarse Aggregates (Mixed sand & gravel) , Boulders	20,000	Recommended for subbase, base, surface course. concrete aggregate, asphalt aggregate (to be crushed) , riprap, stone masonry and rubble concrete. (Item 200, 201, 300, 310, 311, 405, 505, 506 & 507)
Buayan River	0.50 km from Buayan-Glan Road, Brgy. Buayan, GSC. (Sta. 1653+570)	Fine and Coarse Aggregates (Mixed sand and gravel)	30,000	Recommended for subbase, base, surface course. concrete aggregate, asphalt aggregate (to be crushed) , (Item 200, 201, 300, 310, 311, & 405)



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Tinagakan River	5.0 kms. From Makar-Digos Rd., Brgy. Tinagakan, GSC. (Sta. 1639+550)	Fine and Coarse Aggregates (Mixed sand and gravel)	20,000	Recommended for aggregate subbase, aggregate base and surface course (Item 200, 201 & 300).
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LIST OF AGGREGATE SOURCES

AREA : Cotabato 1st Engineering District, Kidapawan City DPWH

REGION XII

SOURCE	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Glowing Rock Crushing Plant	Right of Kidapawan-Magpet-Pangao-an road; km. 1631 + 480 right side; Brgy. Gubatan Magpet N. Cotabato	Fine Aggregate; Coarse Aggregates 3/4, 1 1/2	150 cu.m./day	Fine Aggregates; Coarse Aggregates (crush), Recommended to be used for Asphalt (Item 310) and Concrete Aggregates (Item 311,405)
North Cotabato Agro-Industrial Development Corporation	Right of Paco-Pres. Roxas-Arakan Valley road after Kabacan Bridge; km. 1637 + 400 right side; Pres. Roxas N. Cotabato	Fine Aggregate; Coarse Aggregates 3/4, 1 1/2	90 cu.m./day	Fine Aggregates; Coarse Aggregates (crush), Recommended to be used for Asphalt (Item 310) and Concrete Aggregates (Item 311,405)
Sinkatulan Hill Quarry	2 km., from junction to quarry site; along Makilala-Allah Road; km. 1620 + 000 left side; Brgy. Sinkatulan Makilala N. Cotabato	Limestone	100,000	Materials need to be screened/processed and to be used for Embankment (Item 104) for the projects



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AREA : Cotabato 1st Engineering District, Kidapawan City DPWH

REGION XII

Marbel River Quarry (San Roque Section)	7.5 km. from junction San Isidro-San Roque Brgy. Road Paco Pres. Roxas-Arakan Valley Road; km. 1630 + 220 left side; Brgy San Roque Kidapawan City	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand)	20,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300,504 and 505
Marbel River Quarry (Marbel-Matalam Section)	300 meters from the right side of Matalam-Lampayan-Antipas Road; km. 1646 + 734; Brgy. Marbel Matalam, N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand)	10,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300
Upper Kabacan River (Pangao-an Section)	800 meters upstream of Pangao-an Bridge along Kidapawan-Magpet-ppangao-an Road; km. 1629 + 460; Magpet N. Cotabato	Fine Aggregates; Coarse Aggregates; 20% (Mix Gravel and sand), 80% Boulders	20,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300,504 and 505



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LIST OF AGGREGATE SOURCES

AREA : Cotabato 1st Engineering District, Kidapawan City DPWH

REGION XII

Upper Kabacan River (Dolis-Binay Section)	500 meters from downstream of Kabacan Bridge along Magpet-Dolis-Binay Road; km. 1629 + 417; Brgy. Dolis Magpet N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand)	100,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300
Marbel River (New Cebu Section)	100 meters upstream and downstream of Marbol Bridge along Paco Pres. Roxas-Arakan Valley Road; km 1632 + 997; Brgy. New Cebu Pres. Roxas N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand)	40,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300,504 and 505
Lower Kabacan River (Matalam Section)	Upstream and downstream of Kabacan Bridge along Matalam -Antipas Road; km. 1649 + 887; Matalam N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand); Boulders	20,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300,504 and 505



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LIST OF AGGREGATE SOURCES

AREA : Cotabato 1st Engineering District, Kidapawan City DPWH

REGION XII

Bulakanon River	Left of Makilala-Allah Road 3 km. from junction of San Vicente-Banayan Road; km 1616 + 000; Brgy Bulakanon Makilala N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand); Boulders	40,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300,504 and 505
Bual Creek Quarry (Minapan Tulunan Section)	750 meters from Bual-Kanibong Brgy. Road and 1.5 km from junction Makilala-Allah Road; km. 1642 + 700 left side; Brgy Minapan Tulunan N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand)	10,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300
Mateo River	1 km. from junction to quarry site along left of Matalam-Antipas Road; km. 1643 + 599; Brgy. Mateo Matalam N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand); Boulders	10,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300,504 and 505



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LIST OF AGGREGATE SOURCES

AREA : Cotabato 1st Engineering District, Kidapawan City DPWH

REGION XII

Upper M'lang River (Ugpay Quarry Section)	7.70 km. from junction Biolog-ugpay NIA Road along Matalam-M'lang-Bagontapay Road; km. 1655 + 062; Brgy. Ugpay M'lang N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand); Boulders	10,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300,504 and 505
Bialong River (Tawan-Tawan Quarry Section)	4 km. junction Sangat-Tawan-Tawan Brgy. Road along Matalam-M'lang-Bagontapay Road; km. 1658 + 650; Brgy. Tawan-Tawan M'lang N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand); Boulders	10,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300,504 and 505
Lower Malasila River (HR Lopez Section)	5 km. from junction of Makilala-Allah Road New Barbasa-La Fortuna Brgy. Road; km. 1633 + 000 left side; Brgy. La Fortuna M'lang N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand)	30,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310), Concrete Aggregates (Item 311, 405) and also Item 200,201,300



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LIST OF AGGREGATE SOURCES

AREA : Cotabato 1st Engineering District, Kidapawan City DPWH

REGION XII

Lower Malasila River (Tulunán Section)	500 meters from La Esperanza- Banayal Prov'l Road and 2 km. from junction Makilala-Allah Road; km. 1637 + 750 left side; Brgy La Esperanza Tulunan N. Cotabato	Fine Aggregates; Coarse Aggregates;(Mix Gravel and sand)	10,000	Materials need screening and processing,Recommended to be used for Asphalt (Item 310 , Concrete Aggregates (Item 311, 405) and also Item 200,201,300



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LIST OF AGGREGATE SOURCES

AREA : Cotabato 2nd Engineering District DPWH

REGION XII

SOURCES	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Libungan River Quarry (Barongis Section)	8.8 km. right from junction along Davao-Cotabato Road National Road; km 1695 + 070; Brgy. Barongis Municipality of Libungan N. Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	35,000	Materials needs screening and processing, Recommended to be used for Item 200,201 and 300
Libungan River Quarry (Kapayawi Section)	200 meters from junction along Banisilan-Guiling-Alamada Libungan, Nation Road; km. 1994 + 034; Brgy. Kalayawi Municipality of Libungan N. Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	35,000	Materials needs screening and processing, Recommended to be used for Item 200,201, 300, 504 and 505
Lower Balogo River Quarry	500 meters upstream along Davao-Cotabato National Road; km. 1706 + 130; Brgy. Balogo; Municipality of Pigkawayan N. Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	10,000	Materials needs screening and processing, Recommended to be used for Item 200,201, 300, 504 and 505



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AREA : Cotabato 2nd Engineering District DPWH
REGION XII

Upper Balogo River Quarry (Tigbawan Section)	1.8 km. upstream of Balogo Bridge along Davao-Cotabato Road; km. 1706 + 130; Brgy. Tigbawan Municipality og Pigkawayan N. Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	14,000	Materials needs screening and processing, Recommended to be used for Item 200,201, 300, 504 and 505
Kimarayag River Quarry	3 km. right along Davao-Cotabato Road National Road; km. 1704 + 800; Brgy. Kimarayag Municipality of Pigkawayan N. Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	13,000	Materials needs screening and processing, Recommended to be used for Item 200,201, 300, 504 and 505
Tawagon Hill Quarry	9 km. left from junction of Carmen Bukidnon National Road; km. 1631 + 400; Brgy. Kibudtungan Municipality of Carmen N. Cotabato	Terrace Gravel Deposit	450,000	Materials Needs Screening and processing; Recommended to be blended for the Item needed
Dalangaeon Hill Quarry	100 meters from junction along Davao-Cotabato National Road; km. 1674 + 000; Brgy. Dalangaeon Municipality of Pikit N. Cotabato	Weathered Limestone	45,000	Materials Needs Screening and processing; Recommended to be blended for the Item needed



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LIST OF AGGREGATE SOURCES

AREA : Cotabato 2nd Engineering District DPWH

REGION XII

Sadaan Hill Quarry(Brgy. Bulanan Midsayap Section)	Right side along Davao-Cotabato National Road; km. 1689 + 100; Brgy. Sadaan Municipality of Midsayap N.Cotabato	Weathered Limestone	35,000	Materials Needs Screening and processing; Recommended to be blended for the Item needed
Midpapa Hill Quarry	5.1 km. right from unction Davao-Cotabato National Road; km. 1708 + 050; Brgy. Midpapan Municipality of Pigkawayan N. Cotabato	Weathered Limestone	45,000	Materials Needs Screening and processing; Recommended to be blended for the Item needed; Embankment (Item 104)
Ago-o Hill Quarry (Maracabac-Guiling-Alamada Section)	5 meters from junction along Banisilan-Guiling-Alamada-Libungan National Road; km. 1664 + 700; Brgy. Guiling Municipality of Alamada N. Cotabato	Weathered Limestone	250,000	Materials Needs Screening and processing; Recommended to be blended for the Item needed; Embankment (Item 104)



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LIST OF AGGREGATE SOURCES

AREA : Sultan Kudarat Engineering District DPWH

REGION XII

SOURCES	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Numo Quarry (Senator Ninoy Aquino Section)	5 km. from Isulan-Dukay-Bagumbayan-Sen. Ninoy Aquino Lebak National Road; Brgy. Numo Municipality of Esperanza Sultan Kudarat	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	70,000	Materials needs screening and processing, Recommended to be used for Item 200,201, 300, 504, 505, and Embankment Item 104
Tran River	5 km. from Awang-Upi-Lebak-Kalamansig National Road; km 246 + 000; Brgy Tran Municipality of Lebak Sultan Kudarat	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	110,000	Materials needs screening and processing, Recommended to be used for Concrete Item 311,405 Aggregates and Item 200,201, 300, 504 and 505, Embankment Item 104
Balili Poloy-Poloy River Quarry	6 km. from Awang-Upi-Lebak-Kalmansig National Road; km. 249 + 000; Brgy. Balili Poloy-Poloy Municipality of Lebak Sultan Kudarat	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	150,000	Materials needs screening and processing, Recommended to be used for Concrete Item 311,405 Aggregates and Item 200,201, 300, 504 and 505, Embankment Item 104



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AREA : Sultan Kudarat Engineering District DPWH

REGION XII

Limunan River Quarry	1.5 km. from Awang-Upi-Lebak-Kalamansig National Road; km 240 + 000; Municipality of Limunan Kalamansig Sultan Kudarat	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	160,000	Materials needs screening and processing, Recommended to be used for Concrete Item 311,405 and Asphalt Item 310 Aggregates and Item 200,201, 300, 504 and 505, Embankment Item 104
Alip River Quarry	12 km. from Awang-Upi-Lebak-Kalamansig National Road; km 290 + 830; Brgy. Alip Municipality of Columbio Sultan Kudarat	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	140,000	Materials needs screening and processing, Recommended to be used for Concrete Item 311,405 Aggregates and Item 200,201, 300, 504 and 505, Embankment Item 104
Kraan River Quarry	1.5 km. from Awang-Upi-Lebak-Kalamansig National Road; km 313 + 180; Brgy. Kraan Municipality of Palimbang Sultan Kudarat	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	75,000	Materials needs screening and processing, Recommended to be used for Concrete Item 311,405 Aggregates and Item 200,201, 300, 504 and 505, Embankment Item 104
Kulaman River Quarry	1.10 km. from Cotabato-Marbel National Road; km 230 + 630; Municipality of Kulaman Sultan Kudarat	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	105,000	Materials needs screening and processing, Recommended to be used for Concrete Item 311,405 Aggregates and Item 200,201, 300, 504 and 505, Embankment Item 104



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AREA : Sultan Kudarat Engineering District DPWH

REGION XII

Kilagal Quarry	165 km. from Cotabato-Marbel National Road; km 230 + 630; Municipality of Kulaman Sultan Kudarat	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	105,000	Materials needs screening and processing, Recommended to be used for Concrete Item 311,405 Aggregates and Item 200,201, 300, 504 and 505, Embankment Item 104
Bilumin Quarry	2 km. from Dulawan-Marbel National Road; km. 1757 + 265.95; Brgy. Bilumin Municipality of Lambayong Sultan Kudarat	Embankment Materials	Limited	Materials Needs Screening and processing; Recommended to be blended for the Item needed; Embankment Item 104
Muno Quarry	18 km. from Marbel-Allah Valley Cotabato National Road; Brgy Muno Municipality of Bagumbayan Sultan Kudarat	Coarse Aggregates; (Gravel); Boulders	100,000	Materials needs screening and processing, Recommended to be used for Item 200,201, 300, 504, 505, and Embankment Item 104
Bai-Sarifinang/South Sepaka River (Bagumbayan river Section)	5 km. from Marbel-Allah Valley-Cotabato National Road; km. 1764 + 000; Brgy. South South Sepaka Municipality of Bagumbayan Sultan Kudarat	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	220,000	Materials needs screening and processing, Recommended to be used for Concrete Item 311,405 Aggregates and Item 200,201, 300, 504 and 505, Embankment Item 104



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AREA : Sultan Kudarat Engineering District DPWH

REGION XII

Bo. 4 Koronadal City	10 km. from National Road General Santos Drive; Brgy. Bo 4; Municipality of Koronadal South Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	Unlimited	Materials needs screening and processing, Recommended to be used for Concrete Item 311,405 and Asphalt Item 310 Aggregates and Item 200,201, 300, 504 and 505, Embankment Item 104
Katungal Quarry	5 km. from Kidapawan-Allah Junction National Road; km. 174 + 555.25; Brgy. Katungal Municipality of Tacurong Sultan Kudarat	Embankment Materials	100,000	Materials Needs Screening and processing; Recommended to be blended for the Item needed; Embankment Item 104
Kolambog River Quarry	500 meters from Marbel-Allah Valle-Cotabato National Road; km. 1762 + 263; Brgy. Kolambog Municipality Isulan Sultan Kudarat	Fine Aggregates and Masonry	100,000	Materials needs Screening and processing; Recommended to be used for Concrete Aggregates Item 311,405 and Masonry



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LIST OF AGGREGATE SOURCES

**AREA : South Cotabato Engineering District DPWH
REGION XII**

SOURCES	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Maria Rosa Creek River Quarry	500 meters upstream of Maria Rosa Bridge/5 km. left of National Highway Marbel-tupi-Makar Road;km 1669 + 596;Brgy Pob. Polomolok Municipality of Polomolok South Cotabato	Fine Aggregates;Coarse Aggregates; (Mix Sand and Gravel);	100,000	Materials needs screening and processing for the Item needed; Recommended to be used for Embankment Item 1024,Item 200 and 201
Matinao River Quarry	Upstream and downstream of Matinao Bridge along National Highway Marbel-Tupi-Makar Road; km. 1663 + 811.90; Brgy. Glamang Polomolok South Cotabato	Fine Aggregates;Coarse Aggregates; (Mix Sand and Gravel); Boulders	180,000	Materials needs screening and processing for the Item needed; Recommended to be used for Embankment Item 104, Item 200,201,504,505 and Concrete Aggregates Item 311,405
Allah River Quarry (Colongolo-Buenavista Section)	Upstream of Colongolo Bridge/5 km. from junction of National Highway Surallah-Lake Sebu-Maitum Road; km. 1736 + 060; Brgy. Colongolo	Fine Aggregates;Coarse Aggregates; (Mix Sand and Gravel); Boulders	100,000	Materials needs screening and processing, Recommended to be used for Embankment Item 104, Item 200,201,300, and Item 504



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LIST OF AGGREGATE SOURCES

**AREA : South Cotabato Engineering District DPWH
REGION XII**

Trunkini River Quarry (Lake Sebu Outlet Section)	21 km. from the junction of National Highway Surallah-Lake Sebu-Maitum Road; km. 1755 + 000; Purok Pag-Asa, Lake Sebu Outlet South Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	10,000	Materials needs screening and processing for the item needed; Recommended to be used for Embankment Item 104, Item 200, 201, 504, 505 and Concrete Aggregates Item 311, 405
Allah River Quarry (san Andres Teresita Section)	3 km. from junction National Highway Cotabato-Allah Valley-Marbel Road; km. 1735 + 060 Brgy, Dajay Suralah South Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel);	100,000	Materials needs screening and processing for the item needed; Recommended to be used for Embankment Utem 104, Item 200, 201, 300, and Concrete Aggregates Item 311, 405
Bugtong Bukid Quarry	2 km. from National Highway Cotabato-Allah Valley-Marbel Road; km. 1745 + 000 - km. 1746 + 000; Brgy. Panay Sto. Nino South Cotabato	Clayey Material	50,000	Materials needs to be processed; Recommended to be Soil Blender for Item 104
Cassava River Quarry	8 km. from junction Dole Canary along Marbel-Tupi-Makar Road; km. 1669 + 100; Sitto Cassava, Brgy. Maligo Polomolok South Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel);	Unlimited	Materials needs screening and processing; Recommended to be used for Embankment Item 104, Item 200, and 300



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AREA : South Cotabato Engineering District DPWH

REGION XII

Lampitak River Quarry	16 km. from junction Provincial Road along Marbel-Tupi-Makar Road; km. 1692 + 566; Brgy. Lampitak Tampak South Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	50,000	Materials needs Screening and processing; Recommended to be used for Item 200,201, and 300
Bo. 2 River Quarry	2.5 km. from junction National Highway along Marbel-Tupi-Makar Road; km. 1707 + 265; Brgy Sto Nino (Bo. 2) Koronadal City South Cotabato	Fine Aggregates	Unlimited	Materials needs Screening and processing; Recommended to be used for Concrete Aggregates Item 311,405
Banga River Quarry	1 km. upstream and downstream Banga Bridge along Cotabato-Allah Valley-Marbel Road; km 1723 + 025.40 Purok Paraiso Reyes Banga South Cotabato	Fine Aggregates	Unlimited	Materials needs Screening and processing; Recommended to be used for Concrete Aggregates Item 311,405
Bo. 7 River Quarry	8 km. from junction National Highway Marbel-Tupi-Makar Road; km. 1707 + 265; Brgy. Top Land Koronadal City South Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	Unlimited	Materials needs screening and processing, Recommended to be used for Concrete Aggregates Item 311,405 and Item 200,201, 300, 504 and 505, Embankment Item 104



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AREA : South Cotabato Engineering District DPWH

REGION XII

Bo. 4 River Quarry	10 km. from National Road General Santos Drive; km. 1707 + 265; Brgy. Bo 4; Koronadal City South Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	Unlimited	Materials needs screening and processing, Recommended to be used for Concrete Aggregates Item 311,405 and Item 200,201, 300
San Vicente Quarry	500 meters from National Highway along Cotabato-Allah Valley-Marbel Road; km. 1719 + 000; Brgy. San Vicente Banga South Cotabato	Silty Sand	Unlimited	Materials Needs Screening and processing; Recommended to be blended for the Item needed; Embankment Item 104
Lambingi River Quarry	25 km. from junction Banga Poblacion along Cotabato-Allah Valley-Marbel Road; km. 1723 + 944.50; Brgy. Lambingi Banga South Cotabato	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	70,000	Materials needs Screening and processing; Recommended to be used for Item 200,201, and 300



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LIST OF AGGREGATE SOURCES

AREA : Cotabato City Sub -Eng'g. District

REGION : ARMM

SOURCES	LOCATION	MATERIALS	APPROXIMATE QUANTITY (cu.m.)	REMARKS and RECOMMENDATIONS
Dimapatoy Hill Quarry	3 km, right side of national highway, km 1845 + 232, Awang - Upi - Lebak Road. Brgy. Awang, Datu Odin Sinsuat, Shariff Kabunsuan	Embankment	unlimited	Materials needs screening and processing for the Item needed; Recommended to be used for Embankment Item 104.
Dimapatoy River Quarry	2 km, left side, Junction of Cotabato - Allah - Marbel Road, km 1847 + 050, Brgy. Awang, Datu Odin Sinsuat, Shariff Kabunsuan	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel)	40,000	Materials needs screening and processing for the Item needed; Recommended to be used for Item 200, 201
Kabunlan River Quarry	Along Cotabato - Allah - Marbel Road, Municipality of Ampatuan, Maguindanao	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	45,000	Materials needs screening and processing, Recommended to be used for Concrete aggregates Item 311, 405, Item 201 and Item 504,505



GROWTH WITH EQUITY IN MINDANAO (GEM) PROGRAM

A Project of the United States Agency for International Development

THE GENERAL CONTRACTOR IS LOUIS BERGER GROUP, INC. (LBG)

2nd Floor, 1 Ladislawa, Ladislawa Avenue, Buhangin, 8000 Davao City, Philippines

Tel. Nos.: (82) 225-1569 to 75 Fax No.: (82) 225-1479

LIST OF AGGREGATE SOURCES

AREA : Cotabato City Sub -Eng'g. District

REGION : ARMM

Decalungan River Quarry	Along Cotabato - Allah - Marbel Road, Municipality of Ampatuan, Maguindanao	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	35,000	Materials needs screening and processing, Recommended to be used for Concrete aggregates Item 311, 405, Item 201 and Item 504,505
Simuay River Quarry	Down stream of Simuay Bridge km. 1865 + 227.68, along Cotabato - Lanao Road, Municipality of Sultan Kudarat, Province of Shariff Kabunsuan	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel);	180,000	Materials needs screening and processing for the Item needed; Recommended to be used for Item 201 and Concrete Aggregates Item 311,405
Bialong Creek Quarry	Along Cotabato - Allah - Marbel Road, Municipality of Ampatuan, Maguindanao	Fine Aggregates; Coarse Aggregates; (Mix Sand and Gravel); Boulders	30,000	Materials needs screening and processing, Recommended to be used for Concrete aggregates Item 311, 405, Item 200,201