



**Government of the People's Republic of Bangladesh
Ministry of Communications
Roads & Highways Department**

**Quality Assurance Plan
for
Roadworks**

April 2005



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FOREWORD

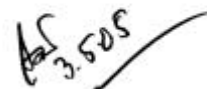
During the last 30 years a rapid expansion of the road network has taken place in Bangladesh and now many of the roads and bridges that make up this network are in need of rehabilitation, major maintenance or improvements. Given that there are, and always will be, limited financial resources to undertake these works it is essential that they are carried out to the correct standards and thereby achieve their required design life before remedial works are again needed.

In recent years the quality of work by some of the contractors retained by RHD for road and bridge contracts has failed to meet the standards required by the RHD Specifications, and in many cases this has resulted in the premature failure of these works. This in turn has meant that part of the limited annual budget available to RHD has had to be allocated to repeating these works at the expense of other projects.

If this is allowed to continue, within a few years a significant amount of the existing RHD road network will deteriorate to the point whereby it is unusable due to insufficient funds being available to maintain it. Although the allocation of funds for works on RHD roads and bridges may increase over time, clearly every effort must be made to obtain the best value for money from whatever funds that are made available.

The quality of works undertaken by contractors must be improved and amongst other things this will require improved supervision of their works by RHD personnel. Although under their Contracts with RHD all contractors are responsible for achieving the standards required by the RHD Specification, it is nevertheless the responsibility of the RHD supervision staff to check their compliance with those standards and to reject any sub-standard work. In particular the designated Engineer for each contract is ultimately responsible for ensuring that contractors comply with the requirements of their Contracts.

To assist in achieving this goal the following basic Quality Assurance Plan has been developed and should be adopted for all future RHD road contracts. Compliance with this Quality Assurance Plan will go a long way towards improving the quality of works currently obtained from RHD contractors, and thereby enable RHD to maintain or improve more of the roads under their control with the limited funds available to them.



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1. INTRODUCTION

This Quality Assurance Plan has been prepared to assist the Divisions in achieving the required quality in RHD contracts for roadworks and minor structures. A parallel QA Plan is to be developed for bridge structures. The QA Plan is for general application to all RHD roadwork contracts that are funded by GoB and supervised solely by RHD staff. For foreign aided projects that are to be supervised by consultants, a project specific QA Plan should be prepared by those consultants.

The QA Plan covers the major issues that affect the quality of works achieved within RHD contracts, namely the preparation of contract documents and quality control during the works. Responsibility for checking and approving all designs, tender documents and quality control tests on site rests with the Engineer for the Contract and through him the Engineer's Representative. Within this QA Plan, **quality control** procedures are needed at each stage as follows:

During Contract Preparation

- All proposed works are to be confirmed on site as being necessary, appropriate and adequate by the Engineer for the Contract
- New road pavements must be designed, with such designs being checked and approved by the Engineer for the Contract
- Where new surface water drainage is to be provided channel profiles are to be designed with such designs incorporated in the Contract Documents
- Where appropriate BQ items must be supported by field measurements and calculations
- Tender Documents are to be prepared adopting the CPTU Standard Tender Documents (as modified by RHD)

During Works Contracts

- The Contractor is required to perform quality control tests on all materials and workmanship of the type and frequency called for under his Contract
- These are to be undertaken in accordance with the RHD Standard Test Procedures, such tests being witnessed and countersigned by an RHD representative
- Off-site laboratory tests are to be undertaken by the Contractor on site samples where appropriate testing equipment is not available at his on-site laboratory (e.g. bitumen extraction, Marshall tests, etc)
- Site samples are to be tested in an independent off-site laboratory to confirm (or otherwise) tests undertaken by the Contractor
- The Contractor may only proceed with successive road pavement layers subject to authorization by the Engineer following satisfactory and certified quality control tests on the underlying layer
- Interim Payment Applications from the Contractor must be supported by relevant quality control test reports certified correct by the Engineer's Representative
- Road contracts will be subject to post construction tests on a sampling basis to check compliance with the specification and Contract Documents

This QA Plan defines the roles and responsibilities of the key RHD staff involved in road contracts, and outlines the procedures that should be adopted by them to achieve the required quality control in these contracts.

2. MANAGEMENT AND ORGANISATION

2.1 General

Many of the problems relating to poor quality control on site stem from inadequate, or inappropriate, supervision of contractors by RHD staff. Frequently the more junior staff are unclear about their specific roles and responsibilities, and the actions they should take in the event that problems arise.

It is the responsibility of the Engineer for the contract to ensure that an appropriate level of supervision staff are assigned to the contract and that they are both aware of and trained in the specific duties they are to carry out. Clear lines of communication and reporting procedures must be established, and the Engineer must encourage a team approach to supervision by his supporting staff.

To this end the Engineer should hold a team meeting with his staff prior to the commencement of the works and ensure that they all fully understand their roles and responsibilities, and periodically check with them on any difficulties they may have in performing their duties during the course of the works.

Given that much of the supervision may be carried out by more junior RHD staff that have neither the experience nor power under the Contract to control a Contractor (e.g. rejecting materials or workmanship), the Engineer should ensure that all of his staff are equipped with mobile phones for the duration of the Contract - if necessary provided as part of the contract by the Contractor.

By this means, the Engineer can be immediately notified of problems that may occur on site e.g. failed quality control tests, inadequate traffic control measures, disregard of the Health & Safety requirements, etc. It will then be a matter for the Engineer to take the matter up with the Contractor.

It is the responsibility of the Engineer to ensure that a contractor complies with the requirements of his Contract.

2.2 Key Roles and Responsibilities

In accordance with the Public Procurement Regulations 2003, the Central Procurement Technical Unit (CPTU) of the Ministry of Planning have issued Standard Tender Documents that are to be adopted by all Government Departments. These Standard Tender Documents are to be used for all RHD contracts and replace all previous forms of contract - namely Form 2911 and the RHD Standard Tender Documents.

Under the CPTU Standard Tender Documents (STDs) there are only three (3) entities defined in the Contract, namely:

The Employer (name, address and name of authorized representative)

The Contractor (name, address and name of authorized representative)

The Engineer (name, address and name of authorized representative)

Within RHD it has been the practice to use a number of other titles for various officers involved in works contracts (e.g. Project Director, Project Manager, Superintending Officer, Authorized Officer, Executive Engineer, etc). Unless these positions are defined in the STDs, together with their powers and responsibilities, they should not be referred to either within the Contract or any correspondence with the Contractor.

Employer

For all RHD contracts the *Employer* will be:

Government of the People's Republic of Bangladesh
Ministry of Communications
Roads and Highways Department

The *Employer's Authorized Representative* will be the RHD officer that signs the Contract with the Contractor on behalf of the Employer. Depending on the size, type and value of a contract this may be the Chief Engineer, an ACE, SE, or EE.

Although in practice it is likely the *Employer's Authorized Representative* will delegate some or most of his duties to subordinate staff it nevertheless remains his **responsibility** to ensure that those duties are correctly carried out. Accordingly a job description is only required for the Employer's Authorized Representative in this Quality Assurance Plan.

Engineer

In a similar manner the *Engineer* named in an RHD contract may be an ACE, SE or EE depending on the size, type and value of the contract. Acting for the Employer the Engineer is responsible for the administration of the Contract, and in particular the supervision of the Works to ensure that the Contractor fulfils the requirements of the Contract. In practice the Engineer will usually delegate some or most of his duties to the *Engineer's Representative* named in the Contract. However, the responsibility under the Contract remains with the Engineer.

Engineer's Representative

On many projects the Engineer's Representative (ER) may be supported by a number of staff engaged on specific activities (e.g. setting out, measurements, quality control tests, etc). These support staff are there only to assist the Engineer's Representative and contractually they cannot give instructions to the Contractor nor either accept or reject his work.

The number, type and seniority of RHD staff supporting the ER in the supervision of a Contract will vary according to the size and type of contract and the particular works being undertaken at any given point in time. Accordingly it is not feasible to prepare a detailed job description for each category of staff that might be engaged on the supervision of a Contract since their duties could vary from Contract to Contract. Guidance on the required level of supervision for different types of RHD road contracts is contained in the RHD Management Manual for Zonal Operations.

Irrespective of who fulfils the role, on every contract there must be an RHD representative who monitors the quality of the works (the 'Materials Engineer') and, where appropriate, an RHD representative who oversees any structures that are constructed (the 'Structural Engineer'). A schedule of duties and responsibilities for these two positions has been prepared and included in the job descriptions for key RHD staff at Appendix 1.

It will be the responsibility of the Engineer to allocate these duties to his field support staff for specific contracts. Where such staff are not present their role, and the duties they would have performed, become the duty of the Engineer's Representative.

3. QUALITY CONTROL IN CONTRACT PREPARATION

3.1 General

The quality of completed works is dependent on the quality of the design and on the quality of the works (materials used and workmanship) carried out. If the design of the works is defective then even if the works are carried out to a high standard they will prematurely fail.

In recent years RHD have developed design standards, manuals, specifications, standard drawings and design advice notes. If followed by the Divisions they will result in designs and contract documents for works that are appropriate.

If complied with during construction they will result in works of a high standard that will perform well for their full design life and will be cost effective. It is essential that the works are correctly designed and specified during the contract preparation, and it is the responsibility of the Engineer for the contract to check and approve these prior to the Employer's Representative floating tenders for the Works.

3.2 Design of the Works

For routine or minor maintenance works (e.g drainage of water, crack sealing, pothole repairs, pallsiding, etc) RHD standard designs have been prepared and these should be adopted. Although minor in nature it is essential that these works are carried out to the required standards to avoid premature failure.

For example, if potholes are properly repaired to the required standard then the more expensive periodic maintenance of a road can be deferred for many years. On the other hand if cracks or potholes are not repaired effectively they will prematurely and progressively fail, making periodic maintenance impractical and require early and costly rehabilitation works to the road.

With respect to the periodic maintenance of roads an initial assessment of the treatment they require will have been made by HDM4 in the RHD Annual Roads Needs Assessment Report. This Report, in effect, prioritises the roads for periodic maintenance within the available budget for this type of maintenance. **This does not relieve the Engineer for the works from his responsibility to check and approve the actual works that should be carried out.**

If, in the opinion of the Engineer, the HDM4 proposals are incorrect (e.g. significant deterioration of the road since the condition surveys upon which HDM4 is based has occurred resulting in the HDM4 proposals being inappropriate) then the correct form of treatment should be proposed by the Engineer to ACE Planning & Maintenance Wing. In the event that partial reconstruction of the road is required, RHD standard designs should be adopted according to the type of road and volume of traffic using it.

Where full reconstruction is required, and for all new road construction (including widening), road pavements must be designed, with the design calculations being checked and approved by the Engineer and subsequently filed by him as part of the document control system. In particular, the new road pavements must be designed to be above the relevant Highest Flood Level (HFL) as defined in the RHD Pavement Design Guide.

For all road contracts where a new surface is to be laid a design must be undertaken for the required new carriageway markings and traffic signs. These must be **designed** in accordance with the BRTA Traffic Signs Manual.

3.3 Drawings

Divisions have limited capacity for the production of engineering drawings. For this reason RHD Standard Drawings have been prepared, and these should be referred to and be included as part of every road Contract.

The Divisions have available to them GIS mapping on request from HDM Circle. These maps should be used to create a location drawing for each contract showing, for example, the start and end point of road contracts or the location of a new structure. This location drawing must be included in every contract.

In addition, in the absence of topographical mapping and plan layouts, every road contract must include the location and extent of the major work items showing the start and end chainages (in bar chart form).

Where surface water drainage is required (see RHD Design Advice Notes) and is to be included in a works contract, a longitudinal plan showing the gradients and outfalls must be included within the contract documents. This can be in diagrammatic form but must show the relevant information required by the Contractor for the drainage to be constructed by him

Where special minor structures are to be included in road contracts for which standard drawings are not available (e.g. large retaining walls) then design drawings approved by the Engineer must be included within the contract documents.

3.4 Bills of Quantities

For every item of work within a Contract where an estimate has to be made of the quantities involved, calculations must be made that are checked and approved by the Engineer and filed in the document control system. Where appropriate such calculations must be supported by field measurements, in particular with respect to earthworks, pothole repairs and bituminous basecourse regulating course. Where a nominal thickness of bituminous surfacing forms part of the Works, then the corresponding item in the BQ must specify the compacted thickness that the Contractor is to provide.

All BQ items must correspond to the relevant pay items in the RHD Specification or the Particular Specification for the Contract. Under no circumstances should a BQ item include any form of specification for either materials or workmanship. All BQs must be prepared using the Field Module of the Central Monitoring System.

3.5 General and Particular Specification

In May 2001 RHD Standard Tender Documents were issued that included Volume 3: Technical Specifications. In due course this will be revised and re-issued as the RHD General Specification. In the meantime all RHD Contracts must include a statement that Volume 3: Technical Specifications is deemed to be the RHD General Specification.

This General Specification must form the basis of all RHD road contracts supplemented where necessary by a Particular Specification for an individual contract. Due to the time that has elapsed since publication of the RHD Standard Tender Documents various amendments to the Technical Specifications have been proposed. Where approved by CE/RHD these standard amendments must be included in the Particular Specification of all RHD Contracts.

It is now mandatory that within the Particular Specification the attention of the Contractor is drawn to the quality control tests that must be carried out by him on both his materials and workmanship as part of the Contract. In addition to this it is necessary to specify that the site laboratory is to be located within the limits of the Works contract or at such other location as agreed by the Engineer in writing.

3.6 Tender Documents

In due course the CPTU Standard Tender Documents that are to be used by RHD are to be supplied to the Divisions in an electronic format that will be compatible and integral with the RHD Central Monitoring System.

These standard documents will incorporate the standard clauses and conditions required by RHD in every contract and will simply require the Engineer to insert the contract specific details for the works contract for which tenders are to be invited. The standard clauses required by RHD will cover such issues as the employment of females on contracts, health and safety requirements, environmental controls and other contracts requirements approved by CE/RHD from time to time.

Accordingly, it is essential that in the preparation of Tender Documents the Divisions use the latest and current version of the Standard Tender Documents for the type of contract to be undertaken. These Standard Tender Documents and the contract specific details are to be checked and approved by the Employer's Representative prior to the floating of tenders.

4. QUALITY CONTROL IN CONSTRUCTION

4.1 General

Unless strict quality control is maintained during construction or maintenance contracts, premature failure of the works will inevitably occur. In this respect quality control includes the quality of the materials that are used and the standard of workmanship provided by the Contractor in undertaking the Works.

The requirements for these are clearly stated in the RHD General Specification. Whilst it is the responsibility of the Contractor to achieve the specified standards, it is the responsibility of the Engineer to ensure that the Contractor meets these requirements.

The overall procedures for quality control testing are contained in flowcharts at Figs 4.1 and 4.2. The main principles are that:

- The Contractor may only bring materials onto the site after obtaining approval to the use of those materials from the Engineer in writing. Approval will be based on samples of the materials meeting the requirements of the specification and a production process that assures consistent quality
- Throughout the Contract all materials brought onto the site must be tested for compliance with the specification. Materials that fail to meet the specification requirements must be rejected by the Engineer and removed from the site by the Contractor
- The Contractor must obtain the approval of the Engineer in writing before commencing each stage of the Works. Approval will be based on satisfactory quality control tests on the preceding stage and / or other requirements of the specification.

The RHD Specification requires quality control tests to be undertaken by the Contractor at every stage and on all aspects of the Works. These tests are listed at Appendix 2 together with the frequency at which they should be undertaken and the results that should be achieved.

Many of the quality control tests can be undertaken on site using fairly basic testing equipment. Others will need to be carried out in an off-site laboratory that has been approved by the Engineer and that contains more advanced testing equipment. In either case the quality control tests required by the RHD Specification are to be undertaken by the Contractor at his own expense, the cost of such testing being deemed to be included in his rates for the relevant work items.

Additional tests, including checks on the calibration of the testing equipment used by the Contractor, should be carried out as directed by the Engineer at Zonal or other independent laboratories for quality control audit purposes. A Provisional Sum should be included in the BQ for the Contract to cover the cost of these tests, with a requirement for these tests being included in Clause 1.3.3 of the Particular Specification.

A detailed description of each test procedure and how it should be undertaken is contained in the RHD Standard Test Procedures (available in hard copy and on the RHD website) and blank forms for recording test results can be downloaded from the website.

The results from all tests carried out both on-site and at off-site laboratories should be submitted to the Engineer's Representative using the standard forms at Appendix 3 at the end of each week or more frequently if required by the ER. Where any test result fails to meet the requirements of the Specification the ER must be notified immediately by telephone with a copy of the failed test report despatched to him without delay.

In order that no works are undertaken where the underlying layer, or preparatory works, do not meet the requirements of the Specification, the Contractor must seek written authority from the ER to carry them out. Standard forms that are to be used by the Contractor are included at Appendix 4. The ER will require satisfactory laboratory tests reports on the underlying layer or other requirements before such authority will be given.

4.2 Quality Control Tests

The quality control tests listed at Appendix 2 are the tests required by the RHD General Specification. Where works are to be undertaken that are not covered by the RHD General Specification then the Contract must include a Particular Specification for such works, including the tests, frequencies and required results for those tests, both for the materials and workmanship for these works.

In addition to these tests, where the Contract requires particular materials to be used but the specification does not require tests to be carried out on those materials, then it will be the responsibility of the Engineer (through his support staff) to ensure that the Contractor provides those materials to the requirements of the specification. For example, where the Contract requires thermoplastic paint to be used the contractor must use a proprietary brand of thermoplastic paint and not simply road paint.

Quality control tests fall into three categories:

- Tests on materials prior to and during construction
- Tests on the quality of workmanship during construction
- Tests on the finished works after construction

In the event that the quality control tests demonstrate that the materials or workmanship do not meet the requirements of the specification, the Engineer's Representative has no alternative but to reject them and instruct the Contractor to replace them at his own cost. All quality control tests must be carried out at the earliest opportunity both to avoid delays to the Contractor and to minimise any abortive works.

4.3 Quality control tests on material samples

Prior to the commencement of the Works, tests must be carried out by the Zonal laboratory on material samples (or mix designs) submitted to the Engineer for his approval by the Contractor in advance of them being taken on to the site. Given that the Zonal laboratory may be testing samples from a number of different contracts at the same time, it follows that within the laboratory itself there must be a management system to ensure that samples are correctly registered, tagged, tested and recorded for the separate contracts.

Similar tests must be carried out by the Contractor on all such materials subsequently delivered to site in the site laboratory (supervised by the Materials Engineer) with additional tests on those materials carried out on a sampling basis at the Zonal laboratory as a quality control check.

4.4 Quality Control Tests on Workmanship

To a large extent these tests are required to ensure that the approved construction materials are correctly mixed, placed and compacted during the works. With respect to road pavements it is essential that each layer is tested and approved before the Contractor is allowed to place the next layer, since failure of an underlying layer will inevitably result in failure of the layers above it.

Accordingly, the Contractor may only be permitted to commence work on a particular layer when the underlying layer has been approved in writing by the Engineer's Representative. Standard forms for this are included at Appendix 4.

4.4.1 Mixing of Materials

Where on-site mixing is employed by the Contractor, the grading and proportioning of the materials must be strictly controlled so that at all times the final mix complies with the design mix that has been approved by the Engineer. To this end careful batching of the materials must be employed by the Contractor prior to placing them in the mixer. **Under no circumstances should the proportioning of mixes be undertaken by labourers taking materials from stockpiles on a random basis.**

Where granular materials are mixed on site to form sub-base or base material, and prior to the addition of bitumen or cement to granular mixes to form bituminous surfacing or concrete, samples of the granular mix should be taken in the presence of the ER's support staff for grading and other tests in the site laboratory.

Whether mixed on-site or off-site, the ER's support staff must take samples of all bituminous and concrete mixes for testing at the Zonal laboratory in accordance with the requirements of the Specification. Inevitably the results of these tests will not be known until a considerable period of time has elapsed after the materials have been placed and compacted. Where the results of these tests demonstrate that the materials do not comply with the Specification further intrusive and /or non-destructive tests must be carried out on the completed works for the Engineer to decide whether or not to reject the works.

Concrete target strengths are to be calculated using the statistical approach set out in the Contract.

4.4.2 Placing and Compacting of Materials

Premature failure of the works will occur unless the materials are correctly placed and compacted (where appropriate) in accordance with the specifications. In the case of road widening work, premature failure will also occur if required cross drainage structures or drainage layers are not provided.

With respect to road pavements, this essentially means the compaction of each layer to the required density (typically 98% of MDD) to achieve the necessary CBR to support the next layer. **In the case of Dense Bituminous Surfacing or carpeting the required degree of compaction can only be achieved when rolling takes place while the material is still hot and within the specified temperature range for compaction.**

Accordingly the ER must ensure that field density measurements are taken by the Contractor at the appropriate times to demonstrate that the underlying layers are properly compacted (or corrective measures taken if not), and that rolling of the bituminous surfacing is undertaken within the correct temperature range.

4.4.3 Quality Control Audit of Completed Works

The RHD General Specification requires cores to be taken from completed bituminous surfacing work and for laboratory tests to be undertaken on these samples to determine whether or not they comply with the requirements of the specification. Amongst other things these tests will include Marshall stability, determination of bitumen content and the grading of aggregates in each sample. In addition to this the laboratory will measure the compacted thickness of the bituminous layer for compliance with the design or relevant BQ item in the Contract. The taking of cores is to be undertaken by the Contractor and all tests on those cores are to be undertaken by an off-site laboratory approved by the Engineer, with all costs associated with this testing being borne by the Contractor.

Where cores have been taken from road pavements Dynamic Cone Penetration (DCP) tests are to be undertaken for the underlying layers through to the sub-grade to determine both the thickness of these layers and their respective CBR values. These tests are to be undertaken by the ER or his support staff.

In the event that the DCP tests show that the underlying pavement layers do not have the required thickness or CBR or if the bituminous cores do not meet the requirements of the specification or thickness required by the Contract, the Engineer will immediately notify CE/RHD requesting that an inquiry be held to determine what course of action should be taken.

5. DOCUMENT CONTROL

5.1 General

For every Contract it is essential that a document control system be established that includes all documents relating to the Contract. This is important both for the quality control of the Works and to comply with Public Procurement Regulations. Amongst other things the Regulations require full documentation relating to all contracts to be maintained for review by independent consultants and CPTU. Specifically, the Regulations require that documentation relating to a particular contract must be properly filed, maintained and readily accessible for a period of five (5) years or more beyond completion of the contract. A comprehensive checklist of records to be maintained is contained in Appendix B of the Regulations

The document control system for a Contract must be a 'stand-alone' comprehensive system. Inevitably this may mean that some documents, in particular correspondence, may need to be duplicated between the Employer's Representative and the Engineer and possibly copied to or from other document control systems within RHD.

Frequently the Employer's Representative and the Engineer are one and the same for a Contract (e.g. the Executive Engineer for a Division). However this is not always the case, an example being the Periodic Maintenance Programme where the Employer's Representative is ACE Planning & Maintenance Wing, the Engineer is the ACE Zone and the Engineer's Representative is the EE for a Division.

Accordingly, from the inception to completion of a project the documents relating to it may be split between the offices of the Employer's Representative, the Engineer, the Engineer's Representative and the Contractor's site laboratory (which should maintain a record of all quality control tests that are carried out by him).

The following paragraphs summarize the principal documents that should be maintained at each location prior to and during a contract. At the completion of the contract it will be the responsibility of the Employer's Representative to ensure that all such documents are brought together at one location, and properly filed and stored as a comprehensive record of the contract from start to finish.

5.2 The Employer's Representative

The Employer's Representative for any contract will be the RHD officer who floats a tender for the contract and subsequently signs the Award of the Contract on behalf of RHD. This same officer will represent RHD in any dispute with the Contractor that arises during the course of the Contract. Accordingly, the following documents should be maintained in this office:

- Invitation notice for contractors to pre-qualify, if appropriate
- pre-qualification criteria, if appropriate
- results of any pre-qualification
- The Tender Notice
- The Tender Documents
- The Tender Evaluation Report
- The Notice of Award (NOA) for the Contract
- The Contract Documents (an original copy signed by the Contractor)
- The Notice to Proceed (NTP) given to the Contractor
- Copies of all correspondence with the Contractor during the Contract

Prior to issuing the NTP the Employer's Representative must liaise with the Engineer to effectively 'hand over' the day-to-day administration and control of the Contract with effect from that date.

The Employer's Representative must be kept informed (by the Engineer) of matters that could give rise to any delay to the Works or contractual dispute. He should therefore be copied into any correspondence between the Contractor and the Engineer relating to these issues.

5.3 The Engineer

Although the Engineer (who may or may not be the Employer's Representative) will be responsible for the administration and control of the Contract, some of the Employer's powers may not have been delegated to the Engineer. Such restrictions should be specified in the Contract documents. Examples of these could include:

- certifying additional cost
- issuing orders for executing items of work not specified in the Contract
- issuing an order for the variation of any item of work in the BQ by more than 10%

In the same way the Engineer may, or may not, delegate all of his powers under the Contract to his representative on site. Accordingly, the Engineer must formally notify the Contractor in

writing of the powers that he is delegating to his ER prior to commencement of the Works, although responsibility for those powers remains with the Engineer.

For the duration of the Contract, including the maintenance period and up to Final Certification, the Engineer should maintain the following documents within his office:

- a copy of the signed Contract
- file(s) containing, at a minimum, the following:
 - copies of design calculations, site measurements and calculations to support the BQ in the Tender
 - the Notice of Award
 - the Notice to Proceed
 - correspondence with the Contractor
 - correspondence with the Employer' Representative
 - correspondence with other parties
 - the Contractor's programme and monthly updates
 - copies of Variation Orders to the Contractor
 - copies of Site Instructions to the Contractor from the ER
 - copies of interim payment applications from the Contractor certified correct by the ER.

The Engineer is responsible for checking and approving payment applications from the Contractor and for forwarding payment certificates to the Employer's Representative for payment (or authorization for payment). This process is to be undertaken by utilizing the RHD Central Monitoring System.

5.4 The Engineer's Representative

In the absence of a site office provided for under the contract, the Engineer's Representative (ER) must maintain a separate filing system within his normal RHD office for every contract under his control.

This system must be maintained within the office (i.e. documents must not be removed for any reason) and must be accessible to other authorized personnel in the absence of the ER. In the event that the ER changes during the course of a Contract, the outgoing ER must prepare and place on file comprehensive handing-over notes to the incoming ER to ensure a seamless transfer of responsibilities.

The ER's filing system must contain, at a minimum, the following:

- a copy of the signed Contract
- separate files containing:
 - the site diary
 - copies of Site Instructions
 - register of Site Instructions
 - contractor's programme and updates
 - contractor's progress reports
 - the ER's progress reports
 - copies of site test result forms (plus monthly summary sheets)
 - copies of off-site test result forms
 - copies of Approval to Commence forms

- monthly measurement calculations (in measurement book)
- copies of interim payment applications (IPAs) from the Contractor
- copies of the Interim Payment Certificates (IPC) generated on the CMS Field Module signed by all relevant parties

All IPAs certified correct by the ER should be forwarded to the Engineer together with a draft IPC generated on the CMS Field Module. These must be supported by the relevant quality control test result forms (both on-site and off-site) together with supporting calculations for the quantities involved.

Once the Engineer is satisfied with the IPC he should authorize it and the CMS Field Module should be updated to reflect this signed authorization.

5.5 Site Laboratory

Under all RHD contracts a site laboratory is to be established by the Contractor who is responsible for carrying out quality control tests on his materials and workmanship to demonstrate compliance with the specifications for the Contract. This laboratory should be established before the Works commence and within the limits of the Works area. Subject to the approval of the Engineer some of the tests may be carried out at an alternative laboratory containing more advanced testing equipment.

All tests must be witnessed by the ER or someone appointed by him for the purpose (the 'Materials Engineer'). The tests required and their frequency are contained in Appendix 2. Appropriate test forms must be used and both these and the test result forms at Appendix 3 must be signed by the person carrying out the test and representatives of both the Contractor and the Engineer.

The ER must check on a weekly basis that the required tests on all materials delivered to site and the Contractor's workmanship have been carried out and that the results of such testing are correctly recorded and filed within the site laboratory.

Fig 4.1 Flowchart for earthworks, sub-base and base

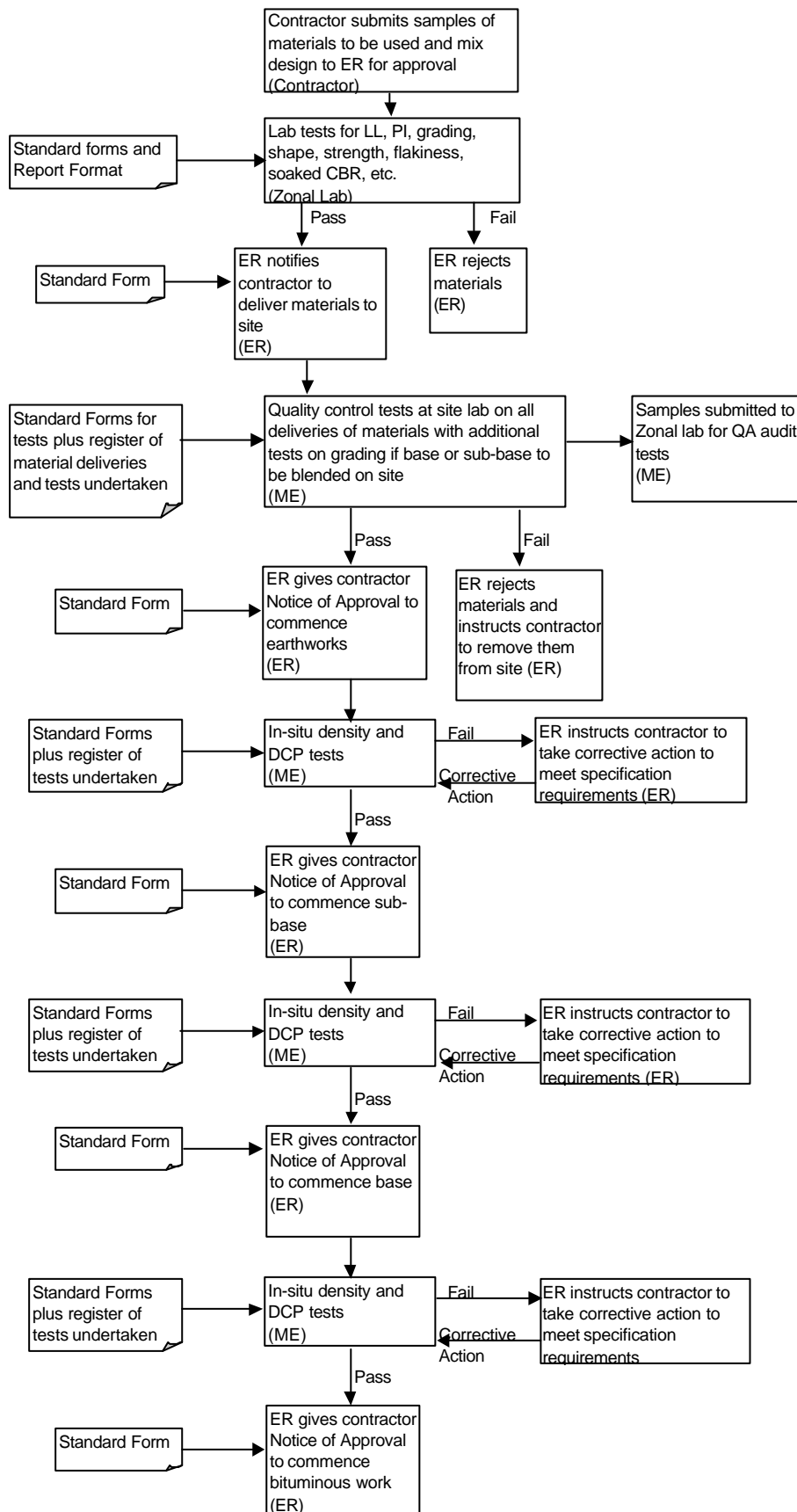


Fig 4.2 Flowchart for bituminous surfacing

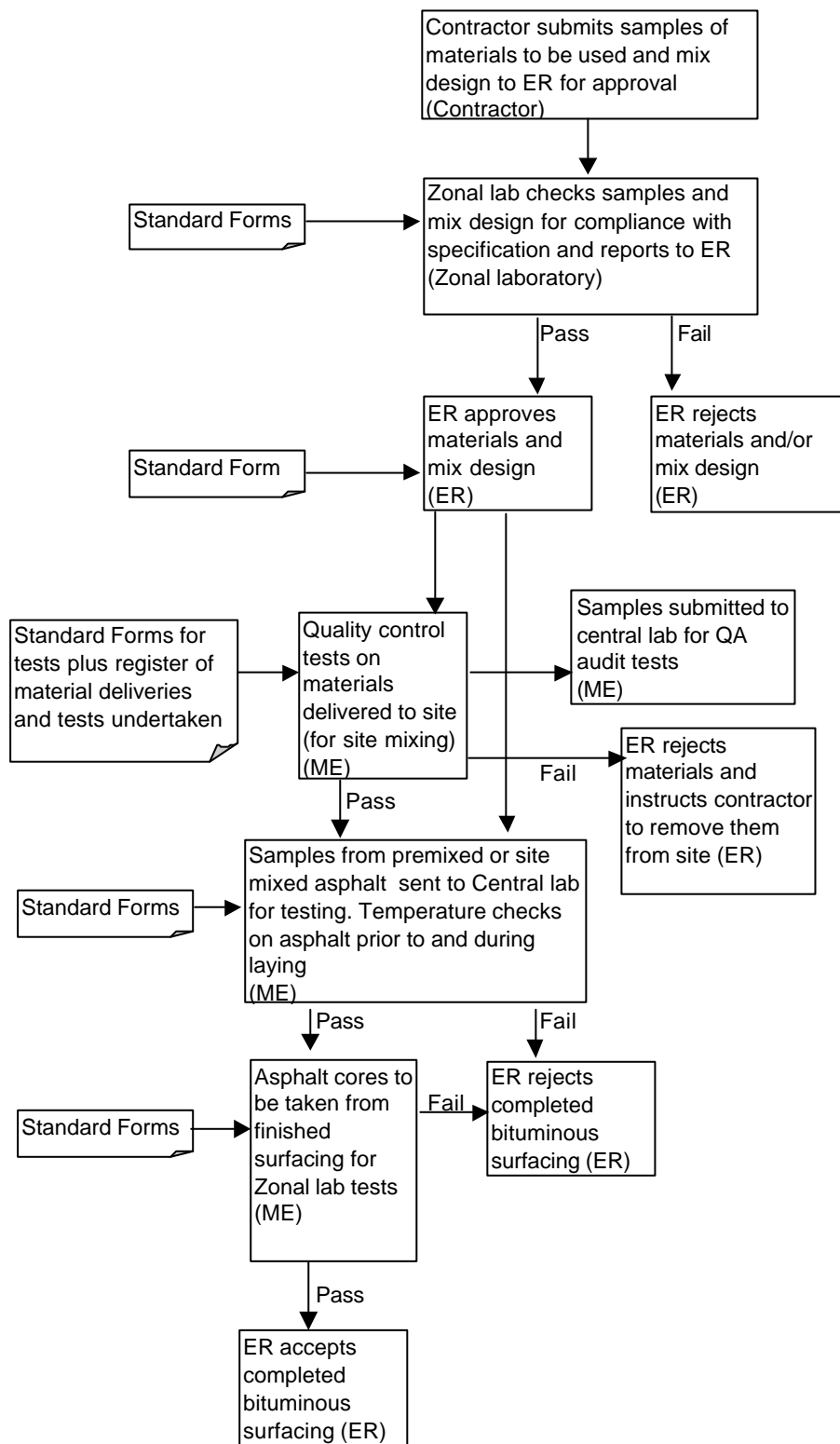
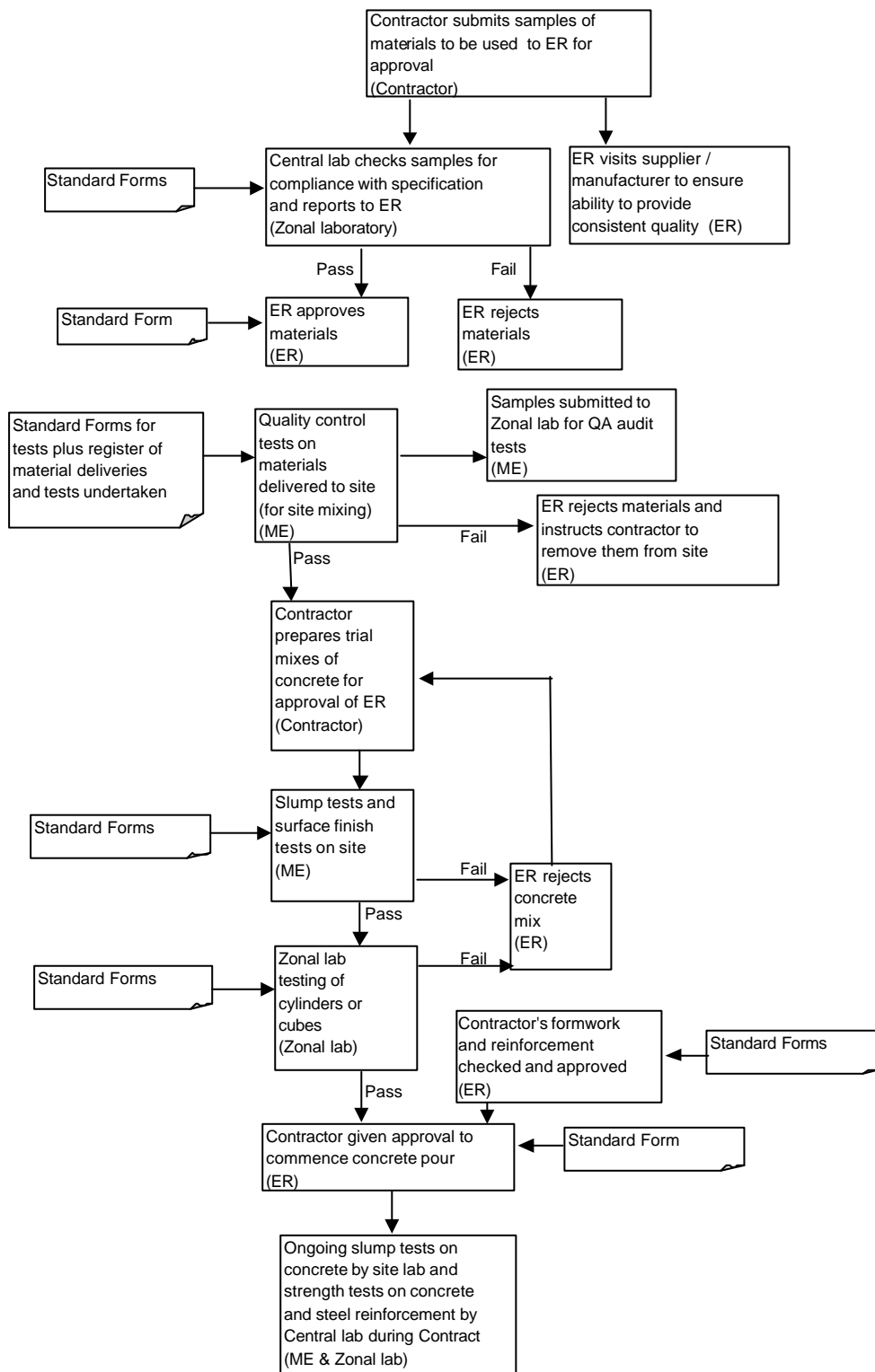


Fig 4.3 Flowchart for structures



APPENDIX 1: Job Descriptions

RHD Specific Job Description			
EMPLOYER'S REPRESENTATIVE			
Issue	Date		Approved:

GENERAL REQUIREMENTS:

The Post Holder must obtain formal approval from CE/RHD to act as the Employer's Representative and to be named as such the Contract. In the event that the Post Holder ceases to act as the Employer's Representative and is replaced by another RHD Officer during the term of the Contract, the Contractor must be formally notified of this in writing by either the Post Holder or his immediate superior.

DUTIES & RESPONSIBILITIES:

In addition to the general responsibilities of the Post Holder, as specified in the RHD Management Manuals, the specific duties relating to this position are detailed below:

1. To check and confirm that no other construction activities are proposed under any other RHD programme that would conflict with or undermine the economic justification for the Works.
2. To check and approve tender documents prepared for the Works and in particular their compliance with the current Public Procurement Regulation, Procedures, Standard Tender Documents and Specifications adopted by RHD.
3. To check and ensure that a budget allocation has been made for the proposed works that corresponds to the Engineer's Estimate and that any land acquisition or removal of encroachments has been completed prior to floating a tender for the Works.
4. To check and ensure that the information contained in any advertisement for an Invitation to Tender corresponds exactly with the Instructions to Tenderers within the Tender Documents, that the tender period is not less than the minimum period required under the Procurement Regulations for the type of tender, and to then authorize the floating of the Tender.
5. In conjunction with the Engineer for the Contract to attend any pre-tender meeting with Tenderers and to ensure that all tenderers are formally notified in writing of any queries raised, either at the meeting or separately, and responses given.
6. To ensure that both the opening and evaluation of tenders are undertaken in accordance with the Public Procurement Regulations, and that the Tender Evaluation Report with a recommendation for the award of the Contract is submitted to the approving authority having the delegated financial power to award the contract.
7. To issue the Notice of Award to the successful tenderer and subsequently to sign the Contract on behalf of RHD
8. Upon signing of the Contract Agreement to formally notify CPTU via their website of the award of any contract of Tk 1 crore or above.
9. Throughout the Contract to undertake the duties and responsibilities assigned to the Employer under the Conditions of Contract.

RHD Specific Job Description
THE ENGINEER

	Approved:	
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GENERAL REQUIREMENTS:

The Post Holder must have formal approval from the Employer’s Representative to act as the Engineer and be named as such the Contract. In the event that the Post Holder ceases to act as the Engineer and is replaced by another RHD Officer during the term of the Contract, the Contractor must be formally notified of this in writing by either the Post Holder or the Employer’s Representative.

DUTIES & RESPONSIBILITIES:

The overall duties and responsibilities of the Engineer are defined in the Contract. The Engineer usually delegates some or all of his duties and responsibilities to his representative (‘The Engineer’s Representative’) named in the Contract. On the assumption that there is an Engineer’s Representative the following duties and responsibilities should not be delegated and should be retained by the Engineer:

1. Issuing the formal notice to the Contractor to commence with the Works
2. Notifying the Contractor of the duties and responsibilities that he is delegating to his Representative (or conversely the duties and responsibilities that he is not delegating)
3. Notifying the Contractor of any replacement Engineer’s Representative
4. Approving Variation Orders that have financial implications
5. Approving significant variations in the quantities
6. Approving sub- contracting any part of the Works
7. Approving extensions of time
8. Approval to the use of dayworks, provisional sums and contingencies
9. Withdrawing approval to the Contractor’s Representative
10. Issuing Taking -Over Certificates for the whole or parts of the Works
11. Authorization of payment certificates
12. Issuance of Defects Liability Certificate
13. Issuance of Completion Certificate
14. Providing decisions in relation to Contractual matters between the Employer and the Contractor
15. The full duties of the Engineer under the Contract in the event of disputes, frustration, termination, adjudication and arbitration.

In the event that there is no Engineer’s Representative for the Contract, in addition to the foregoing the Engineer will be responsible for the duties and responsibilities of the Engineer’s Representative.

RHD Specific Job Description

THE ENGINEER'S REPRESENTATIVE

	Approved:	
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GENERAL REQUIREMENTS:

The Engineer's Representative must be named as such the Contract. In the event that the Engineer's Representative is replaced by another RHD Officer during the term of the Contract, the Contractor must be formally notified of this in writing by the Engineer for the Contract.

DUTIES & RESPONSIBILITIES:

In addition to the general responsibilities of the Engineer under the Contract that have been delegated by the Engineer to the Engineer's Representative, the specific duties relating to this position are detailed below:

1. Prepare a Quality Assurance Plan for the Works incorporating, amongst other things, procedures for document control and quality control
2. Review the Contractor's work programme and method statements, and instruct the Contractor to make necessary adjustments if delays occur in particular work items that could result in an overall delay to the completion of the Works
3. Ensure that the quality of materials brought to the works site and quality of construction by the Contractor comply with the requirements of the Contract
4. Where required by the Contract, ensure that the Contractor establishes a site laboratory for the Works with correctly calibrated testing equipment and qualified staff to undertake the specified quality control tests on his materials and workmanship at the required frequency
5. Ensure that all such tests are witnessed and certified by himself or support staff who are assisting him, and that proper records of these tests are maintained by the Contractor in the site laboratory in accordance with the Quality Assurance Plan
6. Reject any materials or workmanship by the Contractor that do not meet the requirements of the Contract
7. Issue instructions, directions and orders to the Contractor on behalf of the Engineer
8. Prepare Variation Orders to the Contract for issue by the Engineer or the Employer
9. Advise the Engineer on all issues affecting the Contractor's approved programme, rate of progress and performance during construction
10. Prepare evaluations and recommendations to the Engineer with respect to any Claims or requests for extension of time submitted by the Contractor
11. Ensure that the Contractor complies with the requirements of the Contract in relation to the health and safety of his workforce and the public, together with mitigation of social and environmental impacts caused by the Works
12. Undertake monthly measurement of the value of the Works completed by the Contractor and to prepare Interim and Final payment certificates for payment by the Employer
13. Check and approve the setting out of the Works by the Contractor, including survey stations and bench marks
14. Supervise, monitor and direct supervision staff under his control in the inspection and quality control of the Works carried out by the Contractor.

RHD Specific Job Description
THE ENGINEER'S REPRESENTATIVE

	Approved:	
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- 15. Maintain an up-to-date daily Contract Diary and daily records of plant, labour and equipment provided by the Contractor.
- 16. Maintain an up-to date filing system for drawings, correspondence, instructions, reports, statements, measurements, variations, claims and any other Contract documentation in accordance with the Quality Assurance Plan.
- 17. Receive, check, approve and forward to the Engineer the Contractor's monthly statement for payment.
- 18. Organise, supervise and monitor the preparation of 'as-built' drawings of the completed sections of the Works and agree the completed record drawings with the Contractor

On almost every Contract the Engineer's Representative will be supported by more junior RHD staff who will be responsible for assisting the Engineer's Representative in carrying out his duties and responsibilities. Where such staff are not assigned, and in any event, the Engineer's Representative assumes full responsibility for the activities undertaken by them as detailed in their Job Descriptions.

**RHD Specific Job Description
SITE SUPPORT STAFF - MATERIALS ENGINEER**

Issue	Date		Approved:
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GENERAL REQUIREMENTS:

The Post Holder(s) will be assigned on a full or part time basis to assist the Engineer’s Representative (ER) in the supervision of the quality control testing of materials and workmanship by the Contractor. The Post Holder(s) should have adequate previous relevant experience in laboratory and field quality control tests

DUTIES & RESPONSIBILITIES:

1. If required by the Contract, check that the Contractor has provided a site laboratory in accordance with the Specification, and that it is equipped with adequate materials testing equipment that is correctly calibrated
2. Check that the Contractor has appropriate test forms for each test procedure required under the Contract and that the Contractor has appropriate record keeping procedures that comply with the Quality Assurance Plan
3. Throughout the Contract ensure that the Contractor uses the correct test procedure forms and complies with the document control procedures required under the Quality Assurance Plan.
4. Ensure that all materials delivered to site, or manufactured on site, comply with the quality standards required by the Contract, through inspection of manufacturers certificates supported by supervision of on-site testing or organisation of specialist testing in an approved laboratory.
5. Ensure that all tests undertaken by the Contractor are carried out in accordance with the RHD Standard Test Procedures and to the required frequency called for in Contract Specifications
6. Witness and certify all laboratory and field tests undertaken by the Contractor and immediately notify the ER of any test results that fail to meet the requirements of the Contract.
7. Ensure that the properties of pavement and embankment materials after placement are in accordance with the quality standards required by the Contract through supervision of laboratory testing and insitu testing programmes.
8. Ensure that all concrete materials are tested in accordance with the requirements of the Contract.
9. Maintain a daily record of materials delivered to site and both laboratory and insitu tests carried out together with the results (pass/fail) obtained.
10. Prepare and maintain a monthly summary of the quality control tests (based on the daily records) with the action taken in respect of those tests that failed to meet the requirements of the Contract

RHD Specific Job Description

SITE SUPPORT STAFF - STRUCTURAL ENGINEER

Issue	Date		Approved:
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GENERAL REQUIREMENTS:

The Post Holder may be assigned on a full or part time basis to assist the Engineer’s Representative on an RHD contract that includes bridges or culverts. The Post Holder should have sufficient previous relevant experience in the design and construction of similar structures to be able to perform his duties with only limited direction and supervision from the Engineer’s Representative (ER).

DUTIES & RESPONSIBILITIES:

1. To assist the ER in the supervision of construction of structures and to immediately notify the ER of any departures by the Contractor from the requirements of the Contract.
2. Review proposed designs and layouts for culverts and bridges and advise the ER on the need for any changes or additional detailing
3. Review and recommend for approval by the ER the Contractor’s proposals for borehole ground investigations at the site of new bridges
4. Work with the Contractor to finalise the detailed design of bridges, including the design of sub-structures based on the findings of the site investigation
5. Check and recommend for approval by the ER the Contractor’s shop drawings for culvert and bridge construction
6. Check and recommend for approval by the ER the Contractor’s proposals for concrete mix designs
7. Review the Contractor’s proposals for pile testing and monitor the supervision of field trials
8. Check and verify for compliance with the Contract the Contractor’s field and off-site laboratory test records on cement, aggregate, sand, rebar, and any other materials to be used by the Contractor for the construction of structures.
9. Check and verify the Contractor’s setting out for structures including formwork, spacers, box outs, ducts, chamfers, etc
10. Check and verify the Contractor’s placement of reinforcement including bar sizes, type, spacing, lap lengths, ties, cover and rigidity.
11. Check and verify that the Contractor mixes concrete in accordance with the approved mix design and that slump tests are taken at the correct frequency and that these meet the requirements of the Contract.
12. Ensure that cube / cylinder samples are taken at the correct frequency and that off-site laboratory tests demonstrate that these meet the requirements of the Contract.
13. Ensure that the placing, vibration and surface finish of concrete, together with all ducts, pipes, parapets, drains, joints or any other works forming part of the finished structure meet the requirements of the Contract
14. Review and recommend for approval by the ER the ‘as-built’ drawings of completed structures prepared by the Contractor



**Government of the People's Republic of Bangladesh
Ministry of Communications
Roads & Highways Department**

**Quality Assurance Plan
for
Roadworks**

**Volume 2 - Quality Control Tests &
Standard Forms**

April 2005

APPENDIX 2: Quality Control Tests

Table 1: Testing Requirements for Materials and Underlying Layers

Layer	Standard Test Procedure		Required Result	Frequency
Earthworks	Liquid Limit	3.2	LL of material passing 0.425 sieve not to exceed 50%	1/2000m ³
	Plasticity Index	3.2	PI of material passing 0.425 sieve not to exceed 25%	1/2000m ³
	Moisture Content	4.3	MC to be within ± 2% of optimum	1/2000m ³
	Lab CBR	5.1	Minimum 3% CBR (soaked) at 95% MDD	1/2000m ³
	Compacted density	4.3	95% of MDD verified by STP 6.2	1/1000m ²
	(DCP Test)		Not greater than 45mm / blow	1/500m ²
Subgrade	Liquid Limit	3.2	LL of material passing 0.425 sieve not to exceed 50%	3/1000m ³
	Plasticity Index	3.2	PI of material passing 0.425 sieve not to exceed 15%	3/1000m ³
	Moisture Content	4.3	MC to be within ± 2% of optimum	3/1000m ³
	Lab CBR	5.1	Minimum of 5% CBR (soaked) at 98% MDD	3/1000m ³
	Compacted density	4.3	98% of MDD verified by STP 6.2	3/1000m ²
	(DCP Test)		Not greater than 30mm / blow	1/500m ²
Improved Subgrade	Grading	3.3	Particle size distribution to comply with specified grading envelope	1/1000m ³
	Liquid Limit	3.2	LL of material passing 0.425 sieve not to exceed 30%	1/1000m ³
	Plasticity Index	3.2	PI of material passing 0.425 sieve not to exceed 9%	1/1000m ³
	Moisture Content		Material is to be free draining	3/1000m ²
	Lab CBR	5.1	Minimum of 8% CBR (soaked) at 95% MDD	1/1000m ³
	Compacted density	4.5	95% of MDD verified by STP 6.2	3/1000m ²
(DCP Test)		Not greater than 22mm / blow	1/500m ²	
Subbase	Grading	3.3	Particle size distribution to comply with specified grading envelope	1/750m ³
	Liquid Limit	3.2	LL of material passing 0.425 sieve not to exceed 25%	1/750m ³
	Plasticity Index	3.2	PI of material passing 0.425 sieve not to exceed 9%	1/750m ³
	ACV	7.7.1	Not greater than 38% for material retained on 10mm sieve	1/2000m ³
	!0% Fines	7.7.2	Not less than 75kN for material retained on 10mm sieve	1/2000m ³
	Lab CBR	5.1	Minimum of 25% CBR (soaked) at 98% MDD	1/750m ³
	Compacted density	4.5	98% of MDD verified by STP 6.2	3/1000m ²
	(DCP Test)		Not greater than 9mm / blow	1/500m ²
Base (Type 1)	Grading	3.3	Particle size distribution to comply with specified grading envelope	1/500m ³
	Liquid Limit	3.2	LL of material passing 0.425 sieve not to exceed 20%	1/500m ³
	Plasticity Index	3.2	PI of material passing 0.425 sieve not to exceed 5%	1/500m ³
	ACV	7.7.1	Not greater than 30% for material retained on 10mm sieve	1/1000m ³
	!0% Fines	7.7.2	Not less than 125kN for material retained on 10mm sieve	1/1000m ³
	Lab CBR	5.1	Minimum of 80% CBR (soaked) at 98% MDD	1/500m ³
	Compacted density	4.5	98% of MDD verified by STP 6.2	3/1000m ²
	(DCP test)		Not more than 3.5mm / blow	1/500m ²
Base (Type 2)	Grading	3.3	Particle size distribution to comply with specified grading envelope	1/500m ³
	Liquid Limit	3.2	LL of material passing 0.425 sieve not to exceed 20%	1/500m ³
	Plasticity Index	3.2	PI of material passing 0.425 sieve not to exceed 5%	1/500m ³
	ACV	7.7.1	Not greater than 35% for material retained on 10mm sieve	1/1000m ³
	!0% Fines	7.7.2	Not less than 90kN for material retained on 10mm sieve	1/1000m ³
	Lab CBR	5.1	Minimum of 50% CBR (soaked) at 98% MDD	1/500m ³
	Compacted density	4.5	98% of MDD verified by STP 6.2	3/1000m ²
	(DCP test)		Not more than 5.0mm / blow	1/500m ²

Table 2: Testing Requirements for Cement Stabilized Base

Item	Standard Test Procedure		Required Result		Frequency
			Type 1	Type 2	
Aggregate	grading	3.3	As per spec	As per spec	1/100m ³
	Liquid Limit	3.2	< 25% passing 0.425 sieve	< 25% passing 0.425 sieve	1/100m ³
	Plasticity Index	3.2	< 10% passing 0.425 sieve	< 10% passing 0.425 sieve	1/100m ³
	ACV	7.7.1	Less than 30%	Less than 35%	1/100m ³
	10% Fines	7.7.2	Greater than 125 kN	Greater than 90 kN	1/100m ³
	Min. 1 Fracture Face		>50% by weight if gravel	>50% by weight if gravel	continuous
cement	Fineness /strength	8.1/2/3	To comply with AASHTO M85		every batch
water	AASHTO Test T26				As directed
CS base	Compacted Density	4.5 / 6.2	98% of MDD	98% of MDD	3/1000m ³
	UCS	As spec	Min. 10MPa at 7 days	Min. 5 MPa at 7 days	3/day
	Durability	As spec	90% after 7 days	90% after 7 days	3/day

(Note: Site trials on cement stabilized base to be undertaken in accordance with the Specification)

Table 3: Testing Requirements for DBST

Item	Standard Test Procedure		Required Result	Frequency
bitumen	penetration	10.1	80 / 100 pen	As directed by the Engineer
	temperature		Spec. Table 3.4.6	continuous
	spray rate	10.12	Spec. Table 3.9.2	2 / day
aggregate	Flakiness	7.3.1	<25%	1 / 100m ³
	ACV	7.7.1	>28	1 / 100m ³
	10% fines	7.7.2	>175kN	1 / 100m ³
	Grading	3.3	Spec Table 3.9.1	1 / 100m ³
	Fracture face		90% > 5mm	As directed by the Engineer
	Spray rate	10.12	Spec Table 3.9.2	2 / day

Table 4: Testing Requirements for DBS and Bituminous Carpeting

Item	Standard Test Procedure		Required Result	Frequency
Materials				
Coarse aggregate	Grading flakiness ACV 10% fines	7.2.1	As per Spec.	Every 100m ³ of aggregate
		7.3.1	Not to exceed 30%	
		7.7.1	Not greater than 30%	
		7.7.2	Not less than 150 kN	
Fine aggregate	Plasticity Index	3.2	To be less than 4	Every 100m ³ of aggregate
Mineral Filler	Particle Size Distribution	3.3	0.600mm - 100% 0.150mm - 95-100% 0.075mm - 65-100%	As directed by the Engineer
Asphalt				
Asphalt (Design)	Marshall Stability & Flow	10.9	Stability of 350kg at 60° C Flow between 2mm - 4mm Ratio of stability/flow of 140 - 200 Air voids 3 - 7 % (base course) Air voids 3 - 5% (wearing course) As per specification requirements	Prior to commencement of Works and upon any changes to the job mix formula
Asphalt (Mixing)	Marshall Tests Bitumen extraction	10.9 10.4	Stability of 350kg at 60° C Flow between 2mm - 4mm Ratio of stability/flow of 140 - 200 Air voids 3 - 7 % (base course) Air voids 3 - 5% (wearing course) As per specification requirements	Three samples for Marshall testing plus two samples for bitumen extraction and aggregate grading per day
	Aggregate grading	7.2.1		
Asphalt (Laying & Compaction)	Marshall Tests and thickness measurements on 100/150mm cores. Monitoring of mix temperature	10.9	To comply with specification and design requirements	Two cores for every 100 tonnes of DBS or every 50m of carpeting laid.

Table 5: Testing Requirements for Structures

Item	Standard Test Procedure		Required Result	Frequency
Cement	Fineness	8.1	To comply with AASHTO M 85	On every batch of cement before being incorporated into the Works
	Setting Time	8.2		
	Compressive Strength	8.3		
Coarse Aggregates	Flakiness Index	7.3.1	Less than 30	Daily or as directed by the Engineer
	ACV	7.7.1	Less than 30%	
	10% Fines	7.7.2	Greater than 150kN	
Fine aggregates	Grading	7.2.1	As per specification	
	Organic Content	3.4	As per specification	
Water	Grading	7.2.1		
	AASHTO Test T 26			
Concrete	Slump Test	9.1	True slump	One test per 25m ³ of concrete
	Cube / cylinder tests	9.2	As per specification for concrete class	Three tests for each day's casting or for every 15m ³ of concrete poured
Steel reinforcement	General Requirements	11.1	As per specification and Standard Test Procedure	Two samples from each batch of a particular size delivered to site
	Tension test	11.2		
	Bend Test	11.3		

APPENDIX 3: Test Result Forms

CONTRACT NAME:

CONTRACT NUMBER:

TEST REPORT: EMBANKMENT FILL

Sample No.					
Location Sampled					
Date Sampled					

	Specification Requirements	STP
Liquid Limit	< 50% passing 0.425 sieve	3.2
Plasticity Index	< 25% passing 0.425 sieve	3.2
Optimum MC	%	4.3
MDD	Mg/m3	4.3
Lab CBR	Min 3% at 95% MDD	5.1
In situ MC	within \pm 2% of optimum	3.1
Compacted Density	95% of MDD	4.3 / 6.2
DCP	< 45mm / blow	5.2
PASS / FAIL		

TEST REPORT: SUB-GRADE

Sample No.					
Location Sampled					
Date Sampled					

	Specification Requirements	STP
Liquid Limit	< 50% passing 0.425 sieve	3.2
Plasticity Index	< 15% passing 0.425 sieve	3.2
Optimum MC	%	4.3
MDD	Mg/m3	4.3
Lab CBR	Min 5% at 98% MDD	5.1
In situ MC	within \pm 2% of optimum	3.1
Compacted Density	98% of MDD	4.3 / 6.2
DCP	< 30mm / blow	5.2
PASS / FAIL		

TEST LOCATION:

On Site	In Site laboratory	In Contractor's main laboratory
RHD Zonal laboratory	Other laboratory (state where)	

CERTIFICATION: The above tests were carried out in accordance with the RHD Standard Test Procedures and represent a true record of the results obtained.

Test Performed By

Contractor's Representative

RHD Representative

Signature
Name
Position
Organization.....

Signature
Name
Position
Contractor.....

Signature
Name
Position
Division

CONTRACT NAME:

CONTRACT NUMBER:

TEST REPORT: IMPROVED SUB-GRADE

Sample No.					
Location Sampled					
Date Sampled					

	Specification Requirements	STP
Liquid Limit	< 30% passing 0.425 sieve	3.2
Plasticity Index	< 9% passing 0.425 sieve	3.2
Optimum MC	Material to be free draining	
MDD	Mg/m3	4.3
Lab CBR	Min 8% at 95% MDD	5.1
In situ MC	Material to be free draining	
Compacted Density	95% of MDD	4.5 / 6.2
DCP	< 22mm / blow	5.2
PASS / FAIL		

Sieve Size (mm)	Specification Requirements				
	Nominal Fineness Modulus				
	> 2.8	1.5 - 2.8	1.0 - 1.5	0.8 - 1.0	0.5 - 0.8
	% passing by weight				
10.0	100	100	100	100	100
5.0	90 - 95	95 - 100	100	100	100
2.4	70 - 90	90 - 100	100	100	100
1.2	45 - 70	70 - 05	95 - 100	100	100
0.6	25 - 45	40 - 80	85 - 100	95 - 100	100
0.3	10 - 20	15 - 50	50 - 80	70 - 90	80 - 95
0.15	0 - 2	0 - 20	5 - 25	15 - 40	30 - 60
PASS / FAIL					

TEST REPORT: SUB-BASE

Sample No.					
Location Sampled					
Date Sampled					

	Specification Requirements	STP
Liquid Limit	< 25% passing 0.425 sieve	3.2
Plasticity Index	< 6% passing 0.425 sieve	3.2
ACV	Not greater than 38%	7.7.1
10% Fines	Not less than 75 kN	7.7.2
Optimum MC	%	4.3
MDD	Mg/m3	4.3
Lab CBR	Min 25% at 98% MDD	5.1
In situ MC	within ± 3% of optimum	3.1
Compacted Density	98% of MDD	4.5 / 6.2
DCP	< 9mm / blow	5.2
PASS / FAIL		

Sieve Size (mm)	Specification Req.	
	Grading A	Grading B
	% passing by weight	
50	100	-
38	85 - 100	-
20	55 - 95	100
10	35 - 75	70 - 100
5	25 - 60	45 - 85
2.4	15 - 50	30 - 70
1.2		
0.6	7 - 35	10 - 45
0.3	6 - 27	7 - 30
0.075	3 - 15	4 - 20
PASS / FAIL		

TEST LOCATION:	On Site	In Site laboratory	In Contractor's main laboratory
	RHD Zonal laboratory	Other laboratory (state where)	

CERTIFICATION: The above tests were carried out in accordance with the RHD Standard Test Procedures and represent a true record of the results obtained.

Test Performed By

Contractor's Representative

RHD Representative

Signature
Name
Position
Organization.....

Signature
Name
Position
Contractor.....

Signature
Name
Position
Division

CONTRACT NAME:

CONTRACT NUMBER:

TEST REPORT: GRANULAR BASE TYPE 1

Sample No.					
Location Sampled					
Date Sampled					

	Specification Requirements	STP
Min.1 Fracture Face	>50% by weight if gravel	
Liquid Limit	< 20% passing 0.425 sieve	3.2
Plasticity Index	< 5% passing 0.425 sieve	3.2
ACV	Not greater than 30%	7.7.1
10% Fines	Not less than 125 kN	7.7.2
MDD	Mg/m3	4.3
Lab CBR	Min 80% at 98% MDD	5.1
Compacted Density	98% of MDD	4.5 / 6.2
DCP	< 3.5mm / blow	5.2
PASS / FAIL		

Sieve Size (mm)	% passing by weight	Spec.
50		100
38		90 - 100
20		60 - 90
10		40 - 70
5		30 - 55
2.4		20 - 45
0.6		10 - 30
0.3		7 - 25
0.075		5 - 15
PASS / FAIL		

TEST REPORT: GRANULAR BASE TYPE 2

Sample No.					
Location Sampled					
Date Sampled					

	Specification Requirements	STP
Min.1 Fracture Face	>50% by weight if gravel	
Liquid Limit	< 20% passing 0.425 sieve	3.2
Plasticity Index	< 5% passing 0.425 sieve	3.2
ACV	Not greater than 35%	7.7.1
10% Fines	Not less than 90 kN	7.7.2
Optimum MC	%	4.3
MDD	Mg/m3	4.3
Lab CBR	Min 50% at 98% MDD	5.1
In situ MC	within ± 3% of optimum	3.1
Compacted Density	98% of MDD	4.5 / 6.2
DCP	< 5mm / blow	5.2
PASS / FAIL		

Sieve Size (mm)	% passing by weight	Spec.
50		-
38		-
20		100
10		80 - 100
5		50 - 80
2.4		35 - 65
1.2		
0.6		15 - 40
0.3		10 - 30
0.075		5 - 15
PASS / FAIL		

TEST LOCATION:	On Site	In Site laboratory	In Contractor's main laboratory
	RHD Zonal laboratory	Other laboratory (state where)	

CERTIFICATION: The above tests were carried out in accordance with the RHD Standard Test Procedures and represent a true record of the results obtained.

Test Performed By

Contractor's Representative

RHD Representative

Signature

Name

Position

Organization.....

Signature

Name

Position

Contractor.....

Signature

Name

Position

Division

CONTRACT NAME:

CONTRACT NUMBER:

TEST REPORT: CEMENT STABILISED BASE TYPE 1

Sample No.					
Location Sampled					
Date Sampled					

	Specification Requirements	STP
Min.1 Fracture Face	>50% by weight if gravel	
Liquid Limit	< 25% passing 0.425 sieve	3.2
Plasticity Index	< 10% passing 0.425 sieve	3.2
ACV	Less than 30%	7.7.1
10% Fines	Greater than 125 kN	7.7.2
OMC	%	4.3
MDD	Mg/m3	4.5
Compacted Density	98% of MDD	4.5 / 6.2
UCS	Minimum 10MPa at 7 days	As spec.
Durability	90% after 7 days	As spec.
PASS / FAIL		

Sieve Size (mm)	% passing by weight	Spec.
50		100
38		95 - 100
20		60 - 90
10		40 - 65
5		30 - 55
2.4		20 - 40
0.6		10 - 30
0.3		5 - 20
0.075		2 - 8
PASS / FAIL		

TEST REPORT: CEMENT STABILISED BASE TYPE 2

Sample No.					
Location Sampled					
Date Sampled					

	Specification Requirements	STP
Min.1 Fracture Face	>50% by weight if gravel	
Liquid Limit	< 25% passing 0.425 sieve	3.2
Plasticity Index	< 10% passing 0.425 sieve	3.2
ACV	Less than 35%	7.7.1
10% Fines	Greater than 90 kN	7.7.2
Optimum MC	%	4.3
OMC	%	4.3
MDD	Mg/m3	4.5
Lab CBR	Min 80% at 98% MDD	5.1
In situ MC	within ± 3% of optimum	3.1
Compacted Density	98% of MDD	4.5 / 6.2
DCP	< 3.5mm / blow	5.2
UCS	Minimum 5 MPa at 7 days	As spec.
Durability	90% after 7 days	As spec.
PASS / FAIL		

Sieve Size (mm)	% passing by weight	Spec.
50		100
38		90 - 100
20		55 - 90
10		35 - 70
5		25 - 60
2.4		15 - 45
1.2		
0.6		8 - 35
0.3		3 - 25
0.075		0 - 10
PASS / FAIL		

TEST LOCATION:	On Site	In Site laboratory	In Contractor's main laboratory
	RHD Zonal laboratory	Other laboratory (state where)	

CERTIFICATION: The above tests were carried out in accordance with the RHD Standard Test Procedures and represent a true record of the results obtained.

Test Performed By

Contractor's Representative

RHD Representative

Signature
Name
Position
Organization.....

Signature
Name
Position
Contractor.....

Signature
Name
Position
Division

CONTRACT NAME:

CONTRACT NUMBER:

TEST REPORT: TESTS FOR DENSE BITUMINOUS SURFACING / CARPETING

Sample No.					
Location Sampled					
Date Sampled					

Aggregate:	Specification Requirements	STP
2 Fracture Faces	>75% by weight for gravel >5mm	
Liquid Limit	< 25% passing 0.425 sieve	3.2
Plasticity Index	< 4% for material passing 0.425	3.2
ACV	< 30%	7.7.1
10% Fines	Greater than 150 kN	7.7.2
Optimum MC	%	4.3
Mineral Filler	As per Specification	3.2
Bitumen	60 / 70 or 80 / 100 penetration	10.1
PASS / FAIL		

Aggregate Grading for Bituminous Carpeting		Thickness (mm)	Specification	
Sieve Size (mm)	% passing by weight		25	38 or 50
25			100	100
20			100	75 - 100
12.5			75 - 100	60 - 80
10			60 - 80	-
5			40 - 60	40 - 60
2.4			20 - 35	20 - 38
0.6			10 - 20	6 - 18
0.075			2 - 8	2 - 8
PASS / FAIL				

Aggregate Grading for DBS		Thickness (mm)	Specification	
Sieve Size (mm)	% passing by weight		Base Course	Wearing Course
25			30 - 75	30 - 50
20			90 - 100	100
10				60 - 90
5			35 - 57	45 - 65
2.4			20 - 40	25 - 45
1.2			15 - 33	15 - 35
0.6			10 - 26	12 - 30
0.3			6 - 20	9 - 20
0.15			5 - 13	5 - 15
0.075			3 - 7	3 - 7
PASS / FAIL				

	Specification Requirements	STP
Marshall Tests		10.9
Stability	350 kg at 60 C	
flow	from 2mm to 4mm	
ratio of stability:flow	from 140 to 200	
air voids	3 - 7%	
bitumen extraction	% bitumen as specification	
core thickness	as per BQ	
PASS / FAIL		

TEST LOCATION:	On Site	In Site laboratory	In Contractor's main laboratory
	RHD Zonal laboratory	Other laboratory (state where)	

CERTIFICATION: The above tests were carried out in accordance with the RHD Standard Test Procedures and represent a true record of the results obtained.

Test Performed By

Contractor's Representative

RHD Representative

Signature

Name

Position

Organization.....

Signature

Name

Position

Contractor.....

Signature

Name

Position

Division

CONTRACT NAME:

CONTRACT NUMBER:

TEST REPORT: DYNAMIC CONE PENETROMETER

Sample No.					
Location Sampled					
Date Sampled					

					Specification Requirements	STP
Base (Type 1)						
Thickness					As per Contract	
CBR					80%	5.2
Base (Type 2)						
Thickness					As per Contract	
CBR					50%	5.2
Sub-base						
Thickness					As per Contract	
CBR					25%	5.2
Improved sub-grade						
Thickness					As per Contract	
CBR					8%	5.2
Subgrade						
CBR					5%	5.2
Embankment						
CBR					3%	5.2
PASS / FAIL						

TEST LOCATION:

On Site		In Site laboratory		In Contractor's main laboratory	
RHD Zonal laboratory		Other laboratory (state where)			

CERTIFICATION: The above tests were carried out in accordance with the RHD Standard Test Procedures and represent a true record of the results obtained.

Test Performed By

Contractor's Representative

RHD Representative

Signature

Name

Position

Organization.....

Signature

Name

Position

Contractor.....

Signature

Name

Position

Division

CONTRACT NAME:

CONTRACT NUMBER:

TEST REPORT: BITUMINOUS SURFACE TREATMENT

Sample No.					
Location Sampled					
Aggregate Size					
Date Sampled					

	Specification Requirements	STP
bitumen	80 / 100 pen	10.1
cut back bitumen	RC 800 and Rc 3000	10.7
spray rate of bitumen	as per spec for nominal agg.size	10.12
bitumen temperature	as per spec. Table 3.4.6	
Aggregate:		
1 fracture face	not less than 90% >5mm	
ACV	28	7.7.1
10% fines	175 kN	7.7.2
flakiness index	not to exceed 25%	7.3.1
PASS / FAIL		

Aggregate Grading	Aggregate Nominal Size (mm)	Specification Requirements		
		20	14	10
Sieve Size (mm)	% passing by weight	% passing square mesh sieves		
25		100	100	100
20		85 - 100	100	100
14.0		0 - 45	85 - 100	100
10		0 - 7	0 - 45	85 - 100
6.3		0 - 2	0 - 7	0 - 45
2.4		-	0 - 2	0 - 7
0.075		0 - 1	0 - 1.5	0 - 2
PASS / FAIL				

TEST LOCATION:

On Site	In Site laboratory	In Contractor's main laboratory
RHD Zonal laboratory	Other laboratory (state where)	

CERTIFICATION: The above tests were carried out in accordance with the RHD Standard Test Procedures and represent a true record of the results obtained.

Test Performed By

Contractor's Representative

RHD Representative

Signature

Name

Position

Organization.....

Signature

Name

Position

Contractor.....

Signature

Name

Position

Division

CONTRACT NAME:

CONTRACT NUMBER:

TEST REPORT: TESTS ON CONCRETE

Sample No.					
Location Sampled					
Date Sampled					

Cement					Specification
Fineness					To comply with AASHTO M85
Setting Time					
Compressive Strength					
PASS / FAIL					

Coarse Aggregate Grading					Specification
Sieve Size (mm)	% passing by weight				% passing
25					100
20					90 - 100
12.5					20 - 55
10					5 - 20
5					0 - 5
2.4					-
1.2					-
PASS / FAIL					

Fine Aggregate Grading					Specification
Sieve Size (mm)	% passing by weight				% passing
10.0					5 - 20
5.0					95 - 100
1.2					45 - 80
0.3					10 - 30
0.15					2 - 10
PASS / FAIL					

Slump Test

PASS / FAIL					
--------------------	--	--	--	--	--

Concrete Strength (N/mm2 @ 28 days)					Specification	
Concrete Class					Cylinder	Cube
7					7	9
10					10	13
15					15	19
20					20	25
25					25	31
30					30	37
35					35	44
PASS / FAIL						

TEST LOCATION:

On Site		In Site laboratory		In Contractor's main laboratory
RHD Zonal laboratory		Other laboratory (state where)		

CERTIFICATION: The above tests were carried out in accordance with the RHD Standard Test Procedures and represent a true record of the results obtained.

Test Performed By

Contractor's Representative

RHD Representative

Signature

Name

Position

Organization.....

Signature

Name

Position

Contractor.....

Signature

Name

Position

Division

APPENDIX 4: Approval To Commence Forms

CONTRACT NAME:

CONTRACT NUMBER:

APPROVAL TO COMMENCE: PAVEMENT WORKS

REQUEST TO COMMENCE: PAVEMENT WORKS			
(To be completed and submitted by the Contractor for each stage)			
Location (Chainage): From <input style="width: 100px;" type="text"/> To: <input style="width: 100px;" type="text"/>		Improved subgrade Sub-base Base Prime Coat Tack Coat DBST Bituminous Surfacing	Tick Box <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Will be available for inspection on: Date: <input style="width: 100px;" type="text"/> Time: <input style="width: 100px;" type="text"/>			
Requested by: <input style="width: 150px;" type="text"/> CR (Contractor)		Received by: <input style="width: 150px;" type="text"/> ER (Engineer)	
Time: <input style="width: 100px;" type="text"/> Date: <input style="width: 100px;" type="text"/>		Time: <input style="width: 100px;" type="text"/> Date: <input style="width: 100px;" type="text"/>	
INSPECTION CHECKLIST			
(To be completed by the Contractor and verified by the Engineer)			
	CR	ER	
Surface tolerances satisfactory	yes	no	N/A
Levels checked	yes	no	N/A
Traffic control satisfactory	yes	no	N/A
Underlying layer tested and approved	yes	no	N/A
Material source tested and approved	yes	no	N/A
Necessary plant and labour available	yes	no	N/A
Materials Engineer notified	yes	no	N/A
	CR	ER	
Details of Corrective Action Required:			
.....			
REQUEST - APPROVED / REJECTED (Delete as appropriate)			
Rejection of any items will result in rejection of this request - a new submission is then required			
Issued on behalf of the Engineer:		Received by the Contractor:	
Signed:		Signed:	
Name:		Name:	
Position:		Position:	
Time: Date:		Time: Date:	

CONTRACT NAME:

CONTRACT NUMBER:

FORMWORK INSPECTION CHECKLIST (Sheet 1 of 2)

REQUEST FOR INSPECTION (To be completed and submitted by the Contractor)					
Structure No:	<input style="width: 150px;" type="text"/>	Structure Element:	<input style="width: 150px;" type="text"/>		
Location:	<input style="width: 150px;" type="text"/>	Drawing Ref. No:	<input style="width: 150px;" type="text"/>		
Will be ready for inspection on:	Date	<input style="width: 100px;" type="text"/>	Time	<input style="width: 100px;" type="text"/>	
Requested by:	<input style="width: 100px;" type="text"/>	CR	Received by:	<input style="width: 100px;" type="text"/>	ER
	(Contractor)			(Engineer)	
Time:	<input style="width: 100px;" type="text"/>	Date:	<input style="width: 100px;" type="text"/>	Time:	<input style="width: 100px;" type="text"/>
	<input style="width: 100px;" type="text"/>		<input style="width: 100px;" type="text"/>		<input style="width: 100px;" type="text"/>

INSPECTION CHECKLIST (To be completed by the Contractor and verified by the Engineer)						
	yes	CR	ER	no	CR	ER
Formwork design / drawing / sketch approved including de-shuttering arrangements	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Trial panel approved (if required)	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Formwork alignment and dimensions correct, including screed bars and screeds	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Falsework member material quality acceptable	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Falsework member sizes correct	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Gaps between primary & secondary members closed / wedged	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Face boarding / Plywood / Metal thickness correct	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Joints between panels flush (no steps / lips)	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Panel flatness acceptable	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Gaps between secondary members and facepanels closed	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Tie rod material and sizes correct	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Tie rod spacing correct	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Tie rod tight & face cones flush	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>

FORMWORK INSPECTION CHECKLIST (Sheet 2 of 2)
(To be completed by the Contractor and verified by the Engineer)

	yes	CR	ER	no	CR	ER	N/A	CR	ER
Spacers between shutter surface tightly fitting	yes			no			N/A		
Box outs, cast-in items, ducts fixed correctly	yes			no			N/A		
Chamfers / fillets sizes, straightness & fixing acceptable	yes			no			N/A		
Formwork clean	yes			no			N/A		
Formwork release oil approved & applied correctly	yes			no			N/A		
Construction joint preparation satisfactory	yes			no			N/A		
Safe access constructed	yes			no			N/A		
Adequate work space provided for labour & equipment	yes			no			N/A		
Shutter vibrators (if required) location & fixing arrangements OK	yes			no			N/A		

Details of Corrective Action Required:

.....

REQUEST - APPROVED / REJECTED (Delete as appropriate)

Rejection of any items will result in rejection of this request - a new submission is then required

An "Approval to Commence - Concrete Pour" shall be approved before any new pour starts.

Issued on behalf of the Engineer:

Received by the Contractor:

Signed:

Signed:

Name:

Name:

Position:

Position:

Time: **Date:**

Time: **Date:**

CONTRACT NAME:

CONTRACT NUMBER:

REINFORCEMENT INSPECTION CHECKLIST

REQUEST FOR INSPECTION (To be completed and submitted by the Contractor)			
Structure No:	<input style="width: 150px;" type="text"/>	Structure Element:	<input style="width: 150px;" type="text"/>
Location:	<input style="width: 200px;" type="text"/>	Drawing Ref. No:	<input style="width: 150px;" type="text"/>
Will be ready for inspection on:	Date <input style="width: 80px;" type="text"/>	Time	<input style="width: 80px;" type="text"/>
Requested by:	<input style="width: 150px;" type="text"/> CR	Received by:	<input style="width: 150px;" type="text"/> ER
	(Contractor)		(Engineer)
Time:	<input style="width: 80px;" type="text"/>	Date:	<input style="width: 80px;" type="text"/>
	<input style="width: 80px;" type="text"/>	Time:	<input style="width: 80px;" type="text"/>
	<input style="width: 80px;" type="text"/>	Date:	<input style="width: 80px;" type="text"/>

INSPECTION CHECKLIST (To be completed by the Contractor and verified by the Engineer)						
		CR	ER		CR	ER
Latest approved drawing and bar schedule being used	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Reinforcement steel material approved	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Bar bending and cutting satisfactory	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Falsework member material quality acceptable	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Corrosion treatment of bars satisfactory	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Bar sizes and spacing correct	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Bar lap lengths correct & at correct locations	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Bar tied as specified	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Bar assembly rigid and adequately supported	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>
Cover to bars correct (at top, bottom and sides)	yes	<input type="checkbox"/>	<input type="checkbox"/>	no	<input type="checkbox"/>	<input type="checkbox"/>

Details of Corrective Action Required:

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REQUEST - APPROVED / REJECTED (Delete as appropriate)	
Rejection of any items will result in rejection of this request - a new submission is then required	
An "Approval to Commence - Concrete Pour" shall be approved before any pour starts	
Issued on behalf of the Engineer:	Received by the Contractor:
Signed:	Signed:
Name:	Name:
Position:	Position:
Time: Date:	Time: Date:

CONTRACT NAME:

CONTRACT NUMBER:

APPROVAL TO COMMENCE - CONCRETE POUR

REQUEST TO POUR (To be completed and submitted by the Contractor)			
Structure No:	<input style="width: 100px;" type="text"/>	Structure Element:	<input style="width: 100px;" type="text"/>
Location:	<input style="width: 150px;" type="text"/>	Concrete Class:	<input style="width: 100px;" type="text"/>
Will be ready for inspection on:	Proposed Concrete Pour:		
Date:	<input style="width: 100px;" type="text"/>	Volume	Time and Date
Time:	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>	<input style="width: 100px;" type="text"/>
Requested by:	<input style="width: 100px;" type="text"/> CR	Received by:	<input style="width: 100px;" type="text"/> ER
	(Contractor)		(Engineer)
Time:	<input style="width: 100px;" type="text"/>	Date:	<input style="width: 100px;" type="text"/>
		Time:	<input style="width: 100px;" type="text"/>
		Date:	<input style="width: 100px;" type="text"/>

INSPECTION CHECKLIST (To be completed by the Contractor and verified by the Engineer)						
	CR	ER	CR	ER	CR	ER
Method Statement Approved	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
All necessary plant & equipment on site and in good working order	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
All necessary (approved) materials available	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Sufficient labour organised	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Laboratory notified	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Cleanliness OK	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Joints OK	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Waterbars OK	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Formwork Approved	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Reinforcement Approved	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Cover OK	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Inserts & cutouts OK	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>
Line & level OK	yes	<input type="checkbox"/>	no	<input type="checkbox"/>	N/A	<input type="checkbox"/>

Details of Corrective Action Required:

.....
.....
.....

REQUEST - APPROVED / REJECTED (Delete as appropriate)

Rejection of any items will result in rejection of this request - a new submission is then required

Issued on behalf of the Engineer:

Received by the Contractor:

Signed:

Signed:

Name:

Name:

Position:

Position:

Time: Date:

Time: Date:

APPENDIX 5: Other Forms

CONTRACT NAME:

CONTRACT NUMBER:

SITE DIARY

Date

Name

Designation

Weather

Location	Work Executed (Tests taken /Approvals Given, etc)

Signature:.....

Date:.....

CONTRACT NAME:

CONTRACT NUMBER:

SITE INSTRUCTION TO CONTRACTOR	SI Ref No:
Issued on behalf of the Engineer: Signed: Name: Position: Time: Date:	Received by the Contractor: Signed: Name: Position: Time: Date:

