

**QUALITY ASSURANCE DRAFT  
FRAMEWORK DOCUMENT**

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## **1. INTRODUCTION**

Quality problems in housing construction have been an ongoing concern in all spheres of government. The Department is answerable to the public for its expenditure on housing initiatives. South African legislation compels all spheres of government to ensure proper spending of public funds, in a cost effective, transparent and equitable manner, as stated in the Municipal Finance Management Act, 1999 sections 2 and 38; and Municipal Finance Management Act No. 56 of 2003, section 2.

The housing backlog is still very large and resources are extremely limited. Proper planning and efficient use of resources is, thus, critical if housing goals are to be achieved. Rework on poor quality construction depletes scarce resources even further.

## **2. QUALITY : DEFINITION IN THE CONTEXT OF LOW INCOME HOUSING**

Definitions of quality found in literature are perception based. The common thread in most definitions is that quality means to meet customer requirements thus achieving customer satisfaction and fitness for use. The customer, therefore, determines the extent to which quality is achieved in its totality.

**Quality in the context of this policy framework will mean the following:**

- 2.1 Customer satisfaction and fitness for use of houses delivered through the conditional grant; and
- 2.2 Adherence to all the industry norms and standards (including but not limited to the National Building Regulations (SANS10400; National Department Norms and Standards, including environmental efficiency; and use of SABS/SANS materials)
- 2.3 Compliance with the terms, conditions and specifications in the agreement between the Department and its contractors; and
- 2.4 Compliance with the terms, conditions and specifications in the agreement between the contractors and prospective home-owner/s.

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### **3. POLICY FRAMEWORK AIMS AND OBJECTIVES**

To ensure effective quality management in the building of sustainable human settlements through the application of appropriate tools and guidelines.

### **4. KEY PRINCIPLES**

- 4.1 Quality management requires a holistic approach in which quality is to be ensured through the value chain. This can be achieved through the application of quality management tools.
- 4.2 Quality management is thus to be part of the Department's strategy for building sustainable human settlements.
- 4.3 There are many existing organisations such as the National Home Builders Registration Council (NHBRC) and construction Industry Development Board (CIDB) that are mandated in law to ensure proper quality management in house construction and construction procurement, and hence these are key stakeholders in the process.
- 4.4 In addition to this, norms and standards have been set for house construction and inputs materials by the South African National Standards (SANS) and these inform Departmental Norms and Standards and application of a quality assurance framework in general.
- 4.5 Whereas quality management is part of the entire value chain, a proactive approach needs to be adopted to prevent unnecessary costs associated with rework.

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## **5. QUALITY ASSURANCE TOOLS AND GUIDELINES**

### **5.1. Strategy**

5.1.1 The Department's approach to delivery is critical in quality assurance. It Human Settlements needs to take the lead in the drive for quality, through its vision, policies and strategies and work together with all stakeholders to form quality partnerships. This should be part of its strategic plans, which should include all staff so that they can take ownership and responsibility, and provide inputs to quality improvement initiatives. This should be applicable to all activities as such an approach would enhance service delivery perceptions both internally and externally.

5.1.2 The status and extent of the department as the developer needs to be finalised urgently. This should be informed by the prescripts contained in the Constitution of South Africa (as amended) and housing legislation.

5.1.3 A phased approach coupled with suitable and properly planned change management systems is required. Such initiatives could be guided by quality improvement task team to be established and to meet at least quarterly. All managers should be accountable across activities, including support functions, and quality improvement targets should be incorporated in their performance agreements. In the case of new quality improvement initiatives, a facilitator may be appointed for guidance, if required.

5.1.4 Some quality management initiatives need to be identified that would produce tangible results quickly to facilitate commitment and faith in quality improvement efforts (Pike and Barnes, 1996:43). Some proposals include the following need to be adopted with immediate effect :

- Ensure detailed risk management as per the Housing Code, including compliance with information needs regarding land, EIA's, Geotechnical

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Assessments, Availability of Bulks, social amenities, socio-political dimensions. In practical terms, these guidelines (developed in 2003, need to be updated urgently).

- NHBRC project enrolment and involvement in all housing programmes.
- All materials to be SABS approved with the visible marking
- Adherence to minimum norms and standards (including environmental efficiency)
- Confirmation and monitoring of all professional registration and indemnities
- Registration of contractors with both CIDB and NHBRC, where possible, noting current constraints regarding CIDB exemption in the context of low income housing.
- Application of CIDB procurement process, as required in terms of legislation, coupled with the standard procurement documents for service providers for all activities involved in the built environment
- Adopting a zero-tolerance for defects by all stakeholders
- Agreements terms and conditions to be clear and consistent
- Assertive monitoring of contracts
- Restricting suppliers with proven poor service delivery records
- Monitoring defect and correction rates on site
- Moving towards ISO 9000 certification
- Confirmation of customer satisfaction

## **5.2 Proactive Quality Management**

### **5.2.1 Risk Management Process in Project Packaging**

Proper risk assessment is a prerequisite to ensure pro-active quality management. Proper risk assessment should be guided by the Department's *Guideline for Project approval and NHBRC Enrolment Procedure* (copy attached).

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5.2.2 NHBRC Enrolment and Involvement

5.2.2.1 The NHBRC is a regulatory authority established by the Department as a quality assurance mechanism. Its involvement is a legal requirement. NHBRC enrolment has now been extended to all subsidy instruments (including rural, PHP, institutional (including social housing and other rental schemes) where new units are being constructed. Furthermore, in terms of Section 2 of the Housing Consumer Protection Measures Amendment Act, Act 17 of 2007, all home builders must be registered with the NHBRC with the exception of a person who uses his or her own labour to build a home for his or her occupation if the home is part of an approved PHP Project. According to Section 4 of Housing Consumer Protection Measures Amendment Act, an owner builder may, in terms of Section 29, apply to the NHBRC for exemption from Sections 10 (registration) or 14 (enrolment). These amendments necessitated a review of current approval processes to include NHBRC enrolment and risk assessment requirements.

5.2.2.2 Documents relating to these processes, including the recommended procurement documents, can be found on the NHBRC website. At [www.nhbrc.org.za](http://www.nhbrc.org.za) under the tab “subsidy sector” then “technical documents”. This toolkit must be revised in consultation with the Department and relevant stakeholders.

5.2.2.3 The enrolment process is described in the Department’s *Guideline for Project approval and NHBRC Enrolment Procedure* (copy attached).

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5.2.3 Procurement of Service Providers and/or Suppliers

*5.2.3.1 Procurement principles*

5.2.3.1.1 Procurement will be done in terms of the relevant treasury and CIDB prescripts. Work orders must contain a proper scope of work, outlining full details of what needs to be done, where, when, and the type of materials to be used; a clear terms of reference and indicate any special conditions.

5.2.3.1.2 The composition of the project team must indicate the experience requirements. The approach and methodology submitted in response to tenders must indicate appropriate and relevant solutions to the set criteria dealing with key issues; and a Gantt Chart with clear milestones and realistic time frames.

5.2.3.1.3 Details required in terms of financial capabilities should include details of similar contracts successfully completed incorporating; client details, contract amount, duration of contract, and bank credit rating.

*5.2.3.2 ISO 9000*

The adoption of a quality assurance management system should be undertaken on a progressive basis by all stakeholders. Whereas ISO 9000 is an internationally recognized quality management system, its application would benefit all role players. Developers are likely to benefit the most as it can provide them with a competitive advantage in the market. It could also inform departmental and municipal procurement processes as ISO certification could provide quality assurance in procurement processes. Whereas it appears that the Department does not have a formalized quality management system, the ISO 9000 standards should be used to guide the development of such a system. The quality assurance document prepared by the Cuban Officials in

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2009/10 recommend the use of ISO 9000 to inform quality assurance checks to inform procurement processes.

*5.2.3.3 Database development and accreditation*

5.2.3.3.1 The Department must ensure the proper establishment and maintenance of a database of professionals and service providers relating to housing construction and maintenance matters, and ensure that these are categorized according to targeted groups where applicable.

5.2.3.3.2 Cognisance must be taken of databases established by relevant entities such as the NHBRC, CIDB and Master Builder's Association.

5.2.3.3.3 The registration requirements must be communicated clearly and should incorporate all the relevant requirements such as CIDB and/or NHBRC, Professional bodies, BBEEE compliance, CIPRO/SARS certification, experience, financial stability etc. These will be used for credibility checks.

*5.2.3.4 Accreditation*

5.2.3.4.1 The Department should consider the accreditation of key service providers, in terms of the relevant procurement prescripts. Such accreditation process should be linked to regular auditing of output and performance of the service provider. Examples include (but is not limited to) beneficiary administrators, inspectors, contractor mentors, and built environment professional services etc.

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5.2.3.4.2 Performance requirements, auditing- and reporting procedures must be clearly defined in contracts with such accredited entities.

*5.2.3.5 Professional Bodies and Registration*

The Department will ensure that service providers are registered with the relevant professional bodies and ensure that appropriate channels are followed for the reporting of unethical conduct.

5.2.4 Norms and Standards and Standardisation

*5.2.4.1 National and Provincial Norms and Standards*

5.2.4.1.1 The Department's minimum standards will be based on *The National Home Builder's Registration Council Home Building Manual, Parts 1,2, and 3*; read in conjunction with the *National Department of Housing Minimum Norms and Standards* (as may be amended from time to time); and the agreed provincial standards (copy of draft attached). These documents will guide the technical specifications for all housing delivery subsidized through the conditional grant.

5.2.4.1.2 The CSIR Red Book will be used to ensure the creation of sustainable and vibrant human settlements as it guides best practice in the design, planning and servicing of settlements .

5.2.4.1.3 The materials, methods and product will be guided by the South African National Standards (SANS- previously South African Bureau of Standards – SAMS). The South African National Standards (SANS) provides certification of products that are used in the commercial and building industry therefore

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materials used in housing products must comply with SANS standards. Where designs and materials are not based on South African Standards, these will only be used where Agreement certification is in place. Agreement South Africa is responsible for the testing of such materials and products that are used in the construction field. It also takes into consideration the National Home Builders Registration Council's manual, which effectively means that NHBRC standards are adhered to.

*5.2.4.2 Adherence to Minimum Norms and Standards*

5.2.4.2.1 Stakeholders should be required to adhere to all industry minimum norms and standards, noting the following:

5.2.4.2.1.1 In the context of low income housing, this policy should take into consideration the differences between communities, external environmental impacts and associated matters that impact on the viability of the projects, and inform the general housing subsidy policies. It should also consider the minimum levels of finishes and component parts used in house construction, (such as doors, window frames and floor area/size), and guide decisions on size versus durability type improvement. This would inform beneficiaries of what they can expect and guide suppliers in conforming to acceptable quality standards.

5.2.4.2.1.2 It is noted that the Cuban staff had prepared a document regarding quality assurance and, read in conjunction with their guidelines for environmental house designs; basic parameters to improve the housing product; design criteria for reducing the effects of wind on building in KZN; and Costing schedule (2009/10); the National Home Builders

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Registration Building Manuals; the application of National Norms and standards (including the revisions for environmental friendly design) could be used as the basis for quality assurance guidelines.

**5.3 Process Management**

**5.3.1 Project Execution**

5.3.1.1 Delivery rates (at each stage of the inspection) need to be programmed and monitored, and communicated to all stakeholders to enhance supply chain management activities, including “just in time” principles to curb theft and/or waste. This should also apply to the Department.

5.3.1.2 Joint planning and cross functional teams optimize the knowledge base for quality improvement systems and facilitate the incorporation of quality into all processes. The Department should develop and communicate the expected timeframes for its internal processes to assist stakeholders in their planning activities and ensure that such stakeholders are involved in the process, e.g. standard operating procedure manuals. The nature of housing projects involve different professional services, thus there is a source for the development of cross-functional teams.

5.3.1.3 The developer and/or contractor needs to ensure that quality is managed throughout the delivery cycle, from the procurement of services and materials, and throughout the construction cycle. This should include the correct sample tests, recording and reporting requirements are met. This also needs to be addressed through the site supervisor, but should also be enforced as a standard practice as the responsibility of all site staff.

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## **5.4 Quality control**

### 5.4.1 Quality assurance system

All role players should adopt a suitable audit and quality assurance system. ISO 9000 standards could be used to guide the development of an efficient system.

### 5.4.2 Standardised documents, processes and checklists

5.4.2.1 Project application packs, approval processes and inspection procedures and checklists need to be standardized. Clear guidelines need to be developed by the Department of Human Settlements, in consultation with all stakeholders regarding inspection criteria, and quality expectations, including a description of what customers can expect in terms of level of quality. The tolerances, conditions, frequency of inspections and sample size criteria also need to be defined. Documents drafted by the Eastern Cape Provincial Government, the National Association of Home Builders (NAHB), and the Construction Industry Development Board (CIDB), as listed in the references attached to this document, could facilitate this process.

5.4.2.2 Amendments to the documents will be coordinated through the departmental unit responsible for policy and will be effected through the appropriate approval process to ensure uniformity is maintained throughout the Department, as far as possible.

5.4.2.3 Elements identified as critical in the proposed inspection guide should be part of a well defined inspection score card. On site control charts should be available to inform decision makers on quality improvement initiatives, and this would also clarify whether pre-inspections were done, and action taken to resolve issues.

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5.4.3 Record keeping

5.4.3.1 A formal scope change control system should be in place, based on sound project management principles. The change management system should provide for variations to be informed by the implications of changes to the project scope (time, cost and quality trade-off), acceptance by the customer/client and appropriate approval processes. Variations need to be properly recorded and communicated to all stakeholders, including inspection staff to ensure a common understanding of revised requirements and its implications on subsequent processes.

5.4.3.2 Control charts and score cards should be maintained on all sites to assist in performance management and problem solving abilities, whilst also serving as a quality audit. The format of this should be agreed by all parties so as to understand the interpretation of results.

5.4.3.3 Poor materials generally increase the cost of quality. Sample tests should, therefore, be undertaken regularly on critical materials. Although very few defects in critical materials were found in this sample, sample tests should be undertaken on critical materials such as cement mixtures, block strength and roofing material, as guided by the best practice guide for construction, SABS0400 (now referred to as SANS10400), to ensure the continued use of sound quality materials. This should be the responsibility of staff on site, supported by a proper system for recording data.

**5.5 Other operational matters**

5.5.1 Recruitment and selection of resources

Whereas a project management approach is typically used to coordinate and implement quality improvement initiatives, quality improvement in the Province

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needs to be led by an experienced project manager, supported by an appropriate multi-disciplinary team. The identification and recruitment of suitably qualified staff within the department is critical in ensuring quality assurance.

5.5.2 Benchmarking

5.5.2.1 Benchmarking is a means of improving quality based on best practice, and as such it is an essential tool in comparing performance in the market. It may be difficult for the Department to identify a benchmarking partner locally, but it could explore alternatives such as non-governmental organizations (NGO's), the eThekweni Municipality (Durban) and/or other government departments, or housing departments in other provinces. The department should endeavor to identify a suitable benchmarking partner to facilitate quality improvement.

5.5.2.2 This should include accepted defect rates in low income housing projects and/or standards. The NHBRC is able to assist in this regard. Targets need to be set to improve the number of defects. A Pareto analysis indicates how a significant impact can be made by prioritizing those aspects that cause the larger majority of the problems (80:20 rule). The prioritization of areas needing improvement, in accordance with the findings of the Pareto analysis, will greatly reduce the defect rate. This will require a detailed quality improvement plan including actions, task allocation, resource requirements and timeframes. Many challenges are being experienced in determining defect rates. It is suggested that sample projects be identified in which defects are recorded on standardised document to assist in setting a benchmark.

5.5.2.3 Statistical methods are critical in informing improvement measures and for evaluation purposes. This should be informed by more quantitative measures being explored in recording the occurrence of

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problems through well defined, and mutually agreed check sheets, and or control charts that should be kept and maintained on site. The content, measurements and analysis techniques must be agreed between all stakeholders to facilitate a mutual understanding of uniform data recording, processing and analysis systems and to ensure effective implementation.

**5.5.3 Information Management**

5.5.3.1 Inadequate information systems impair quality management. Both the Department and the municipality need to urgently address their information management systems to include these activities to enhance quality management in terms of supplier management, project management, delivery and defect rates, and variations to contract. The system needs to include organizational goals; key performance indicators; actions plan for improvement; progress measurement; evaluation and feedback mechanisms; customer requirements and satisfaction data; product design, specification and standards; and material, equipment and supplier test results; delivery cycle timeframe projections, actual delivery timeframe and timeframe variation; and other variation data and problem solving process management data. These factors are required for effective project management.

5.5.3.2 All role players need to ensure proper records of inspections, supported by a database. These should include the project visited, site numbers, stage of the inspection, results on pre-agreed aspects and standards for inspection, as informed by the inspection guide to be developed. This will reduce duplications as well as serving as a record for statistical analysis and future research.

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5.5.4 Customer Focus and Market Intelligence

5.5.4.1 The developer's system should also be improved to include action plans and progress to enable proper evaluation and feedback in performance reviews. Leadership needs to create a customer focused vision with clear quality goals which should be incorporated in strategies. The lack of shared views on customer needs awareness may point to a need to ensure a common understanding of quality in terms of the customer. This should be incorporated in strategic reviews and involve all staff, as quality is defined by both internal and external customers.

5.5.4.2 Market surveys and customer satisfaction surveys would contribute towards a sustained competitive advantage for developers, whilst improving perceptions of service delivery by organs of state.

5.5.4.3 Market surveys and customer satisfaction surveys could assist the government in planning future policies regarding housing, and should be explored in the interest of effective service delivery. Organs of state need to ensure a proper customer orientation and recognition of a range of quality needs to be incorporated in a quality policy. This should incorporate housing allocation. It should also consider matters such as how additional funding should be applied to units (bigger size versus durability). This needs to be based on research and local needs, through customer satisfaction surveys, as it is the customer that defines the extent to which quality is achieved.

5.5.5 Performance Management Plans

5.5.5.1 Performance management systems within all institutions should include measures on quality performance initiatives, as defined by the organization, and including all staff. Measures to monitor adherence

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to ethical standards should be explored, and this may also be an area for further research.

5.5.5.2 Employee and team appraisal need to be pursued to facilitate a conducive environment for quality improvement. Quality circles tend to focus on problems related to personal well being of staff and their frustrations, thus this tool may assist in communicating concerns based on punitive approaches to management, where these are perceived to exist. Likewise, quality teams could assist in identifying quality related problems in project implementation and find solutions to address these.

5.5.6 Training

5.5.6.1 Change management training in the context of quality management, and training on quality improvement through human resources (including performance appraisal systems) needs to be developed and implemented. This could be measured by the extent to which improvement targets are achieved by the Department of Human Settlements.

5.5.6.2 Human resource management training is required in the context of “the learning organization and quality management approach” to encourage an environment where staff are able to learn from mistakes.

5.5.6.3 Exposure to a variety of statistical tools could assist in improving quality management approaches, such as the use of Pareto analysis to prioritize quality concerns.

5.5.6.4 Quality management should involve the entire organization, thus training needs to be customized to the needs of each level within the organization, and across functions. Departmental and municipal staff

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need to undergo quality management training at all levels which should include training on problem solving techniques in the context of low income housing. It should include the basics of quality management philosophy, cause and effect analysis and basic statistical techniques, as well as interpersonal relations, basic supply chain management and quality management in the context of projects in general.

5.5.6.5 Practical hands on training on how to undertake housing projects in all aspects, especially relating to the municipality and the community needs to be pursued by the department. This should also include modules on controls required to ensure compliance with specifications. Training on the latter should only be done once the Department has completed its guide on inspections, which ideally, should involve all stake holders.

5.5.6.6 Inspection staff and monitors within the department can facilitate hands on training by assisting with corrective action on site during inspections and/or site visits. This could be further enhanced through the use of the control charts, as recommended, as these could guide areas of concerns, and with analysis on a Pareto, could highlight where training impetus is required. Based on the findings of this study, the correct mixing of cement and application of screeding techniques (topping of the slab) should be the first priority within this particular municipal area, followed by the fitting of window and door frames and block work on walls.

## **6. CONCLUDING REMARKS**

Reference is often made to the costs associated to quality control on site. Literature, however, has indicated that “quality does not cost, it pays” (NAHB, 2005d, and Evans

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and Lindsay, 2002:107, to quote a few). The “perceived” costs could also be reduced by adopting a “100%, zero defects” approach (NAHB, 2997a), as doing things right the first time will always be cheaper (Crosby in Evans and Lindsay, 2002:106). The optimum level of quality management must be determined through proper cost benefit analysis, taking cognisance of failure costs, inspection costs and prevention costs.

**7. REFERENCES**

**APPENDIX : SUGGESTED INTERVENTION FRAMEWORK**