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….man leaves a resistant sediment on the earth: a mixture of objects and signs that bear witness to his passage, to his role as an agent of change on the surface of the earth and in more recent years, on what is above and below its crust. Certainly, the most significant of this sediment is architecture... It is necessary to build, to consolidate, to protect the constructed object as a part of nature, man's ally, by creating conditions that continually evolve and correspond to different (and contradictory) levels of understanding in the relationship between nature and architecture. (Portogeseshi & Young, 2000: 9)

PREFACE

The current minimum standards applicable to the South African building industry (as defined by the *South African National Standard (SANS) 10400:1990 The application of the National Building Regulations*, May 2010) are slow to incorporate sustainability aspects, despite a worldwide trend towards sustainable design principles and 'green' construction methods. Although a new draft standard on *Part XA: ENERGY USAGE IN BUILDINGS* was published for public comment, the current standards do not mention sustainability.

Development in the built environment of the Republic of South Africa (South Africa) shows little progress in becoming more sustainable, although current literature describes the building industry as one of the major consumers of resources.

It is the author's opinion that the origin, goals and implementation methods of the existing regulatory structures of the South African built environment should be investigated in an attempt to align the building industry with the goals of key environmental and development milestones.

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LIST OF ACRONYMS AND ABBREVIATIONS

10400	See SANS 10400:1990
0400	See SABS 0400-1990 and SANS 10400:1990
Act 103 of 1977	National Building Regulations and Building Standards Act, 1977 (Act 103 of 1977)
Act 5 of 2008	National Regulator for Compulsory Specifications Act, 2008 (Act 5 of 2008)
BCO(s)	Building Control Officer(s)
Code	Code of Practice, see SANS 10400:1990
CIB	*Conseil International du Bâtiment*
CHPE	Centre for Housing Performance Excellence
CSIR	Council for Scientific and Industrial Research
DSS	Draft South African Standard
DME	Department of Minerals and Energy (since 2009 functioning as two separate departments: the Department of Energy and the Department of Mineral Resources)
DTI	Department of Trade and Industry
GBC	Green Building Council
HVAC	Heating, Ventilation and Air Conditioning
LA(s)	Local Authority (Local Authorities)
MDGs	Millennium Development Goals
NBR	National Building Regulations, see SANS 10400:1990
NFRC	National Fenestration Rating Council
NHBRC	National Home Builders Registration Council
NRCS	National Regulator for Compulsory Specifications
SANS 10400-XA: 2010 (Part XA)	SANS 10400-XA: 2010 The Application of the National Building Regulations Part X: Environmental Sustainability Section A: Energy Usage in Buildings
Republic of South Africa	South Africa
SA	South Africa
SABS	South African Bureau of Standards
SANS	South African National Standard(s)
SANS 10400:1990	South African Standard, Code of Practice for the application of the National Building Regulations, previously known as SABS 0400-1990
SABS 0400-1990	South African Standard, Code of Practice for the application of the National Building Regulations
SANS 204	South African standard for energy efficiency in buildings, consisting of the following three documents: ● SANS 204-1 Part 1: General requirements ● SANS 204-2 Part 2: Naturally ventilated buildings (with natural environmental control) ● SANS 204-3 Part 3: Artificially ventilated buildings (with artificial environmental control)
SALGA	South African Local Government Association
SBR	Standard Building Regulations
Stats SA	Statistics South Africa
UNCHS	United Nations Centre for Human Settlements
UNEP	United Nations Environment Programme
UNEP SBCI	United Nations Environment programme, Sustainable Buildings & Climate Initiative
UNFCCC	United Nations Framework Convention on Climate Change
WISOPS	Weather Intelligence Systems (Pty) Ltd
WorldGBC	World Green Building Council
WTO	World Trade Organization
Z of S	Zone of Space

LIST OF SELECTED TERMS

Building regulation	For the purposes of this study a building regulation is acknowledged as *a) a regulating instrument that* *b) describes a minimum standard, that* *c) should be implemented during the building process (that initiates with design, and continues through construction, maintenance, alteration and repair to demolition of buildings and/or structures), with the aim of* *d) protecting public health and safety during* *e) the construction, occupation and/or post-occupation phases of buildings and/or structures.* (see pp. 27-28)
Built environment	"[A]n urban or [a] rural milieu, structured or produced by built form, that is part of the surroundings relating to buildings, structures and civil engineering works." (Davies & Jokiniemi, 2008: 53) "The built environment includes all structures that are planned and/or erected above or under ground, as well as the land utilised for this purpose and the supporting infrastructure." ([Sigcau], 1999: 2)
He	The pronoun 'he' will be used throughout the document in an attempt at brevity, because the English language has no alternative gender-neutral pronoun in the singular.
Man	Man/woman sexless society.
National Building Regulations	The set of building regulations as applicable in South Africa.
Plan approval	In the current study, this term refers to the whole process of plan approval that is initiated with the submission to the LA, unless otherwise stated.

SYNOPSIS

At present, the National Building Regulations (NBR) represent the minimum statutory requirements for most buildings erected in the formal built environment of the Republic of South Africa (South Africa). Although attempts have recently been made to include requirements on energy efficiency, the current version of the NBR does not mention sustainability. Local authorities (LAs) in South Africa do not use a standardised method to implement the existing requirements of the NBR uniformly.

The purpose of this study is to determine the origin, and examine the goals and implementation methods of the current minimum regulations and standards applicable to the built environment of South Africa, as defined in the *National Building Regulations and Building Standards Act, 1977 (Act 103 of 1977)* and the associated *Regulations,* together with the *Code of Practice for the Application of the NBR (SANS 10400:1990).*

This thesis asks the following questions:

1. What are the goals and methods of implementation of the NBR, which represents the minimum regulations and standards applicable to the built environment of South Africa?
2. Are the current regulations and standards as defined by the NBR implemented uniformly by the respective LAs?
3. Are the most significant role-players in plan approval process, namely the Building Control Officers (BCOs),

    aware of the goals and methods of implementation of the NBR?

    willing to support the uniform implementation of the NBR?

    aware of recent developmental changes to the NBR?

2. Are BCOs willing to implement new regulations that focus on sustainability within the existing administration system of the NBR?

The study recognises the current administrative procedures used to implement the NBR as vehicle to initiate sustainability ideals in the South African built environment. The BCO plays a pivotal role in advising the LA on a submission for building plan approval. The BCO uses a plan submission checklist to scrutinise all applications. The researcher argues that this instrument (the plan submission checklist) could be

used to achieve certain ideals on passive environmental design and at the same time adhere to the goals of the NBR.

The study identifies specific passive environmental design aspects for possible inclusion in the checklist. It is argued that the inclusion and active implementation of the aforementioned by the BCO (in the existing administrative system of the NBR) should contribute significantly to making the South African built environment more sustainable, without resulting in excessive additional cost to the building project.

The study comprises of the following elements:

1. The problem and its setting are described as part of the **introduction**.
2. The **literature review** focuses on building regulations with specific reference to the development of the NBR in South Africa.
3. The research is initiated by means of a **pilot study** in order to determine whether the requirements of the NBR are implemented uniformly in South Africa.
4. The focus of the chapter dealing with **research and data interpretation** is a questionnaire to the BCO that aims to determine the opinion and judgement of the BCO as the most significant role-player in the plan approval process.
5. The thesis concludes with a **summary, recommendations and conclusions** in which the findings are presented against the background of the particular problem statements and consequential hypothesis.
6. **References**
7. The **addenda** contain inter alia a proposed new plan submission checklist (Addendum N). This pro forma attempts to incorporate certain passive design criteria while ensuring the uniform application of the NBR. The plan submission pro forma will require further investigation and testing before possible implementation.

ABSTRACT

Full title:	**An investigation of the National Building Regulations to promote uniformity and sustainability in the South African built environment**
Submitted by:	Jacques Laubscher (Mr)
Supervisor:	Pieter Tobias Vosloo (Prof.)
For the degree of:	Philosophiae Doctor in Architecture
Department:	Department of Architecture
Faculty:	Faculty of Engineering, Built Environment and Information Technology
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The study investigates two aspects that arise when an application is made for building plan approval to the Building Control Officer (BCO) in the Department of Building Control at a local authority (LA). Firstly, the uniform application of the minimum requirements for building plan approval is studied. Secondly, while keeping the original goal of the National Building Regulations (NBR) in mind, the inclusion of passive design requirements is considered as part of the minimum requirements.

In the Republic of South Africa (South Africa), the National Building Regulations and Building Standards Act, 1977 (Act 103 of 1977) determines the minimum requirements of any building. Although the NBR are in the process of being re-written, the amended 1990 version is still being used. On 15 June 2010, the South African National Standard (*SANS*) *10400-XA: The Application of the National Building Regulations Part X: Environmental Sustainability Section A: Energy Usage in Buildings*, was published for public comment. However, the current version of the NBR does not address sustainability. Therefore, it is argued that the planning and erection of structures within the South African built environment do not currently conform to any minimum sustainability requirements.

A series of 'Deemed-to-Satisfy Rules' constitutes an integral part of the NBR. Should a development in the built environment comply with these prerequisites, it is observing the statutory requirements of Act 103 of 1977. The regulations are implemented by the Department of Building Control of the different LAs (or

municipalities). Act 103 of 1977 also prescribes the appointment, qualifications and functions of the BCO who should head the department. However, it is the LA's responsibility to appoint the BCO.

An LA's Department of Building Control uses guidelines (as determined by Act 103 of 1977) to approve applications for new buildings and alterations to existing ones. A series of prescribed inspections should be conducted during the construction phase of a building. Before a building can be used for its intended purpose, the BCO has to sign a Certificate of Occupancy. Although the NBR provide prescriptions, the requirements are implemented in different ways by the various LAs.

After determining the origin and examining the goals and implementation methods of Act 103 of 1977 and its Regulations (together with the Code of Application (SANS 10400:1990)), this study demonstrates that the current edition of the NBR is not uniformly implemented in the Republic of South Africa. Additionally, the study links the original goal of the NBR to limit inflationary tendencies with current practice to use passive design principles to combat building operation costs.

Lastly, a pro forma application form is included as an addendum (although it is not officially part of the study). This proposed pro forma could assist in the uniform implementation of NBR, while at the same time promoting sustainability.

Keywords:
Act 103 of 1977, National Building Regulations (SABS 0400/SANS 10400), local authority, municipality, department of building control, building control officer, building plan approval, sustainability, built environment, building standards, and passive design.

EKSERP

Volle titel:	**'n Ondersoek na die Nasionale Bouregulasies om eenvormigheid en volhoubaarheid in die bou-omgewing van Suid-Afrika te bevorder**
Voorgelê deur:	Jacques Laubscher (Mnr.)
Promotor:	Pieter Tobias Vosloo (Prof.)
Vir die graad van:	Philosophiae Doctor in Argitektuur
Departement:	Departement van Argitektuur
Fakulteit:	Fakulteit Ingenieurswese, Bou-omgewing en Inligtingtegnologie
Universiteit:	Universiteit van Pretoria

Die studie ondersoek twee aspekte wat ter sake is wanneer 'n aansoek om bouplangoedkeuring by die Boubeheerbeampte in die Boubeheerafdeling van 'n plaaslike owerheid ingedien word. Eerstens word die eenvormige toepassing van die minimum vereistes vir bouplangoedkeuring bestudeer. Tweedens word die insluiting oorweeg van passiewe ontwerpmaatreëls (as deel van die minimum vereistes) wat steeds aan die oorspronklike doel van die Nasionale Bouregulasies voldoen.

In Suid-Afrika bepaal die Wet op Nasionale Bouregulasies en Boustandaarde, 1977 (Wet No. 103 van 1977) die minimum vereistes waaraan enige gebou moet voldoen. Die Bouregulasies word tans herskryf, maar die gewysigde 1990-weergawe word steeds gebruik. Alhoewel die Suid-Afrikaanse Nasionale Standaard (*SANS*) *10400-XA: The Application of the National Building Regulations Part X: Environmental Sustainability Section A: Energy Usage in Buildings* op 15 Junie 2010 vir publieke kommentaar gepubliseer is, spreek die huidige weergawe van die Nasionale Bouregulasies steeds nie volhoubaarheid aan nie. Derhalwe word die beplanning en oprigting van strukture binne die bou-omgewing nie aan enige minimum vereistes rakende volhoubaarheid onderwerp nie.

'n Reeks voldoeningsvereistes of sogenaamde 'Geag-te-Voldoen Reëls' maak 'n integrale deel van die Nasionale Bouregulasies uit. Indien 'n ontwikkeling in die bou-omgewing aan hierdie reëls sou voldoen, word dit as voldoende beskou ingevolge die statutêre vereistes gestel deur Wet No. 103 van 1977. Die Regulasies word

Africa, where the "…ancient Egyptians used the familiar grid pattern to house workers on the pyramids in the third millennium BC." (2000: 230)

When Herodotus of Halicarnassus visited Giza in *circa* 450 BCE, he was informed that it had taken 400 000 men 20 years to finish the pyramid of Cheops. In contrast, "…the British archaeologist Petrie estimated that 100 000 men would have sufficed" (York, 1997: 4). Notwithstanding the difference in estimates, a *laissez faire* approach to the built environment would have inhibited development. It could therefore be argued that in order to manage the man-made environment, building works and associated processes, specific regulations were introduced. According to David it was necessary to organise the sites that housed the royal workmen, craftsmen and labourers (2003: 56-59). Often the sites "…were chosen because they were near to the worksite … even the proximity of a good water supply was not considered essential to these town sites, the requirements of isolation and security being greater" (David, 2003: 59). However, these built environment regulations mostly focused on the man-made, while negating the possible symbiotic relationship between architecture and nature.

Advances in medicine impacted on the built environment in terms of additional health requirements. Descriptive examples can be found in for instance the Roman system for sewerage removal and the aqueducts constructed for the provision of fresh water. Population estimates indicate that at its peak Rome had approximately one million inhabitants. According to Cowan, "…the AD 300 census of Rome listed 1 797 *domus* (houses) and 46 602 *insulae* (blocks of flats)…" (1985: 68). With the development of civilisation, man increasingly exerted his influence on the natural habitat, using its resources to support his endeavours.

Unfortunately, events of catastrophic proportions usually necessitated the refinement of the rudimentary requirements employed to provide order within the built environment. After the great fire of AD 64, Emperor Nero issued a decree limiting the height of buildings, banning mid-walls between *insulae,* requiring accessible roofs for fire fighting at porticoes, and restricting the use of timber. Additionally, he cut straight wide roads through the burnt-out areas of the city to act as fire breaks and provide access for fire fighters (Cowan, 1985: 68-70). In more recent history, the Fire of

toegepas deur die verskillende plaaslike owerhede (of munisipaliteite) se onderskeie afdelings vir boubeheer. Die Wet bepaal ook die aanstelling, kwalifikasies en funksies van die Boubeheerbeampte wat aan die hoof van die afdeling staan. Die plaaslike owerheid is egter verantwoordelik vir die aanstelling van die Boubeheerbeampte.

Die Boubeheerafdeling maak van sekere riglyne gebruik (soos bepaal deur Wet No. 103 van 1977) wanneer planne vir nuwe geboue asook vir veranderings aan bestaande geboue goedgekeur word. Verder word sekere inspeksies voorgeskryf wat tydens die oprigting van die gebou uitgevoer moet word. Alvorens ’n gebou in gebruik geneem mag word, moet daar ’n okkupasiesertifikaat deur die Boubeheerbeampte uitgereik word. Hoewel bogenoemde voorskrifte in die Nasionale Bouregulasies vervat word, word dit op verskillende wyses deur die onderskeie plaaslike owerhede toegepas.

Die oorsprong, doelwitte en toepassingsmetodes van Wet 103 van 1977 en die gepaardgaande Regulasies asook Toepassingskodes (SANS 10400:1990)) word bestudeer. Hierdie studie bevestig dat die huidige weergawe van die Nasionale Bouregulasies nie eenvormig in Suid-Afrika toegepas word nie. Bykomend word die oorspronklike doel van die NBR (om inflasie teen te werk) verbind met die huidige gebruik van passiewe ontwerp (ten einde die operasionele koste van geboue te beperk).

Laastens word ’n pro forma-aansoekvorm as ’n addendum ingesluit (hoewel dit streng gesproke nie deel van die studie vorm nie). Die aansoekvorm kan moontlik gebruik word vir die eenvormige toepassing van die Nasionale Bouregulasies, terwyl volhoubaarheidsaspekte terselfdertyd aangespreek word.

Sleutelwoorde:
Wet No. 103 van 1977, Nasionale Bouregulasies (SABS 0400/SANS10400), plaaslike owerheid, boubeheerafdeling, boubeheerbeampte, bouplangoedkeuring, volhoubaarheid, bou-omgewing, boustandaarde en passiewe ontwerp.

1. INTRODUCTION

The shelter employed by man to protect himself (and his possessions) has shown significant development since the earliest attempts at enclosure. The cultural anthropologist Melville Herskovits states that "[m]an cannot exist unless he meets the challenge of his habitat" (1960: 154). From its earliest days, architecture has been in a relationship with nature. On a functional level, the built environment requires the natural environment to remain operational, and the latter should therefore be protected.

De architectura (the 1st century BCE publication edited by Vitruvius) presents an argument concerning architecture as an imitation of nature (Rowland & Howe, 2001: 47, 76). Vitruvius compares man's construction of a house (from natural materials) to birds and bees building their nests (Rowland & Howe, 2001: 34). This view was supported by Abbé Marc-Antoine Laugier who attempted to define the essence of architecture in his *Essai sur l'architecture* (1753) (Curtis, 2010). In this publication, Laugier illustrates *The Primitive Hut*, thereby defining "…the fundamental characteristics of a building constructed from local natural resources" (Groák, 1992: 153). Curtis states that the ideal of *The Primitive Hut* has a functional or structural basis, while having its origin in nature (2010).

According to Kenneth Frampton, Gottfried Semper presented a fundamental break with the Vitruvian triad of *utilitas, firmitas,* and *venustas* in *Die vier Elemente der Baukunst* (Ballantyne, 2002: 142). Semper described viewing a Caribbean hut in the Crystal Palace Exhibition, and this shelter prompted "…a counter thesis to Laugier's Primitive hut..." (Ballantyne, 2002: 154). Semper proposed an articulated model comprising a hearth, earthwork, a framework roof and an enclosing membrane. He referred to a stereotomic base with a tectonic frame, and thus established the idea of a climatic response (Ballantyne, 2002: 154). Architecture was now utilised to react to and diminish the forces of nature.

In early settlements, development associated with population growth continued to widen the gap between natural and man-made; thereby further distancing man from his habitat. Glazewski argues that the origin of planning could be traced to North

London in 1666 is perhaps the most widely recognised such event (Tricker & Algar, 2006: xiii). In 1667 the British Parliament passed the London Building Act, which restricted the use of timber, specified a minimum thickness for external walls, and banned inflammable roof coverings (Cowan, 1985: 205, 209). The origin of building regulations in Southern Africa displays similar characteristics, and is discussed later in more detail.

Since the Industrial Revolution, development within the built environment has continued unabated with associated control measures being introduced. However, the relationship between architecture and nature has changed to one of master and servant. Glazewski states that "…virtually all environmental problems stem from the way we decide how to use and manage land" (2000: 11). He further elaborates on this by claiming that "…the form of tenure on specific land invariably has environmental consequences…" (Glazewski, 2000: 11).

The authors of the publication *The Science and Politics of Global Climate Change, A guide to the Debate,* argue that present knowledge and available evidence of the risks of climate change demand strong action, although various uncertainties remain (Dessler & Parson, 2006: 154). They reviewed six possible causes[1] of climate change, and concluded that human activities are responsible for the recent global warming (Dessler & Parson, 2006: 66-67). They also criticise the reliance on voluntary programmes of existing climate change policy as "…woefully inadequate in view of the challenge…", suggesting that "[o]nly binding, authoritative policies that carry real incentives can provide the structure, clarity, planning environment, stability, incentives and leadership" are necessary (Dessler & Parson, 2006: 159). Despite requesting a formalised climate change policy for every country, Dessler and Parson propose that the national policies should allow for flexibility in implementation, suggesting that environmental goals and regulations could be phased in over time, thereby limiting costs and allowing for planning stability (2006:160).

According to the *2009 Sustainable Cities Report* (De Lilly, 2009: 26), "[t]here is a direct link between buildings and climate change due to the high rate of carbon

[1] Apart from human activities, the natural processes that have been proposed as responsible for twentieth century warming are orbital variations, tectonic activity, volcanoes, solar variability and internal variability.

emissions from the construction and ongoing use of buildings. Building resources take up to 40 per cent of energy use and 17 per cent of fresh water use. Twenty-five per cent of wood harvested and 40 per cent of material produced are attributed to the built environment."

On 26 May 2010, the General Secretariat of the *Conseil International du Bâtiment*[2] (CIB) announced the introduction of a new CIB Task Group (TG). TG79 will focus on the *Building Regulations and Control in the Face of Climate Change* (CIB, 2011). According to Chan and Visscher (the joint coordinators of TG79), "[t]he last twenty years have seen dramatic changes in the approach taken to building regulation and control... [and there is an] …increasing role that building regulation and control must perform in achieving significant reductions of CO_2 emissions from buildings".

Among others, the objectives of TG79 are to "…provide an overview of the state of building regulations and building control and the related policies to address climate change…" (CIB, 2011).

1.1 THE PROBLEM AND ITS SETTING

"The home of man is one of the oldest building types. In its construction man reveals something about his inherent biological nature, and in its modification through time, his cultural evolution." (Fisher, 1992: 86) This view by Fisher is similar to that of Frank Lloyd Wright when he declared in 1894 that "[t]he more true culture a man has, the more significant his environment becomes to him" (Gutheim, 1941: 3).

The process of erecting and occupying the built environment (*home*) represents a pattern of ever-increasing resource consumption. This is evident during the construction phase, occupancy phase, and post-occupancy phase. In the *Green Building Handbook*, Llewellyn van Wyk argues that the built environment is one of the primary consumers of resources (Van Wyk, 2009: 51). EarthTrends[3] corroborates

[2] International Council for Research and Innovation in Building and Construction (CIB, 2011).
[3] *EarthTrends* was initiated by the *World Resources Institute* (www.wri.org) in 2000 as an accessible source of world resource data that is continually updated as new information emerges. It is recognised as an authoritative source for statistics and unbiased analysis of environmental issues. The online collection is available at www.earthtrends.wri.org. It is sponsored by inter alia the *United Nations Development Programme, United Nations Environment Programme, World Bank Group, Dutch Ministry of Foreign Affairs, Swedish International Development Cooperation Agency, United States Agency for International Development*, and the *Danish Ministry of Foreign Affairs*.

this claim, although different figures are listed (2010). The information available for the Republic of South Africa (South Africa) is provided in Addendum A.

Richard Holden, who was the Building Control Officer (BCO) for the City of Johannesburg in 2006, argues that the primary focus of Act 103 of 1977 (and therefore the NBR) is "…ensuring that buildings would be designed and constructed in such a way that people could live, work and play in a healthy and safe environment" (Holden, 2006: [1]).

As a regulatory instrument the NBR lack an appropriate platform from which the current minimum standards can be implemented in a uniform manner. The inclusion of regulations on sustainability remains limited; therefore the ideal of a healthy built environment remains unattainable. As long as this is the case, the bulk of new construction (and alterations to existing buildings) will continue, oblivious to their impact on the environment.

The current official version of the NBR does not include any sustainability aspects. The first edition of the South African National Standard (SANS) 204-1[4] (sub-titled *Energy efficiency in buildings*) was published in 2008, but has remained a voluntary standard. Public comment on its successor, *SANS 10400-XA: 2010 The Application of the National Building Regulations Part X: Environmental Sustainability Section A: Energy Usage in Buildings,* was invited on 15 June 2010. However, this proposed standard relies heavily on SANS 204, which was written from a climatic perspective that differs from that of South Africa.

In 2008/9 the Green Star SA rating system (for office occupation) was launched. This system was adapted from the Green Building Council of Australia's Green Star rating system, which in turn originated from the American rating system, namely Leadership in Energy Efficient Design (LEED). At this stage, Green Star SA is a voluntary system that only offers official rating tools for offices and retail centres, and a multi unit residential pilot tool (Green Building Council of SA, 2011).

[4] The SA standard for energy efficiency in buildings consists of three documents: Part 1: General requirements (SANS 204-1:2008); Part 2: The application of the energy efficiency requirements for buildings with natural environmental control (SANS 204-2:2008); Part 3: The application of the energy efficiency requirements for buildings with artificial ventilation or air conditioning (SANS 204-3:2008).

Even though a number of local authorities (LAs) have initiated 'green' building guidelines, any implementation of or compliance with these guidelines is still voluntary. These 'green' initiatives currently have limited or no legal standing within the built environment.

1.2 STATEMENT OF THE MAIN PROBLEM

The researcher observed that although titled the 'National' Building Regulations, the statutory requirements of Act 103 of 1977 and NBR are not implemented uniformly in South Africa. In addition, it is the researcher's opinion that the current mandatory built environment regulating instruments (and implementation methods) do not address sustainability challenges, except on a voluntary basis.

The main problem could therefore be delineated as follows:

The purpose of this study is to determine the origin of the current minimum regulations and standards applicable to the built environment of South Africa, and to examine the goals and implementation methods of Act 103 of 1977 and its Regulations (together with the Code of Application (SANS 10400:1990)), in an attempt to achieve uniform implementation of the requirements and align the aforementioned with accepted passive design principles to promote a more sustainable built environment in South Africa.

The aspects contained in the main problem are divided in a number of sub-problems and related hypotheses (Table 1):

Table 1: List of the sub-problems and the corresponding hypotheses

1.3 SUB-PROBLEMS 1-4 (Posed as questions)	1.4 HYPOTHESES 1-4
Sub-problem 1 What is the origin of the NBR, and have the goals and methods of implementation of the current edition of the NBR (which represents the minimum regulations and standards applicable to the built environment of South Africa) evolved since the origin of the NBR?	**Hypothesis 1** The goals and implementation methods of the NBR (which represents the minimum regulations and standards applicable to the built environment of South Africa) have evolved since the origin of the NBR.
Sub-problem 2 Are the current regulations and standards, as defined by the NBR, implemented uniformly by the respective LAs?	**Hypothesis 2** The various LAs do not implement the requirements of the NBR in a uniform manner.
Sub-problem 3 Are the most significant NBR role-players, i.e. the BCOs, 3.1 aware of the origin, methods of implementation and goals of the NBR? 3.2 willing to support the uniform implementation of the NBR? 3.3 aware of recent developmental changes to the NBR?	**Hypothesis 3** The most significant role-players, i.e. the BCOs, are not 3.1 aware of the origin, methods of implementation, and goals of the NBR; 3.2 willing to support the uniform implementation of the NBR; 3.3 aware of recent developmental changes to the NBR.
Sub-problem 4 Are BCOs willing to implement new regulations that focus on sustainability in the existing administration system of the NBR?	**Hypothesis 4** BCOs are willing to implement new regulations that focus on sustainability in the existing administration system of the NBR.

1.5 DELIMITATIONS

1.6.1 The focus of the study is the existing regulatory structure of the South African built environment, but the study is limited to the current edition and form of Act 103 of 1977.

1.6.2 The study accepts the NBR as the minimum official regulations and standards applicable to the built environment of South Africa.

1.6.3 The basis of determining the target population to be researched in this study is the extent of the contribution of LAs towards the national value of recorded building plans passed, and buildings completed. For this purpose the 2008 information was used as provided by Statistics South Africa (Stats SA) in the *Building Statistics Report No. P5041.3* (Stats SA, 2009b). This report was used for the pilot study (Phase 2).

1.6.4 A subsequent report was released, entitled *Building Statistics Report Number P5041.1* (Stats SA, 2010). Since it was based on similar statistical patterns as the previous report, it was used for the remainder of the study.

1.6.5 Although a concerted effort was made to ensure representation of all provinces in the initial phases of the study, the unavailability of existing policy documents (during the desk survey) forced the researcher to concentrate on the larger metropolitan areas (metros). However, the BCOs who participated in the questionnaire were from all the provinces of South Africa.

1.6.6 The provincial delineation as determined by the South African Local Government Association (SALGA) was used as is to determine the existing provincial status of the various LAs.

1.6.7 The proposed national standardised submission and approval pro forma (included as Addendum N) has not been tested. It is presented for information purposes only and copyright is held by the author.

1.6 ASSUMPTIONS

1.7.1 Although the title, format and/or definitions might change, the study assumes that the regulatory role of the NBR will remain as such within the South African built environment.

1.7.2 The study accepts the existing relationship between Act 103 of 1977 (South Africa, 2011: 1-33), the Regulations (South Africa, 2011: 201-266) and the Application of the NBR through the Code of Practice of the South African Bureau of Standards (SABS), namely the Deemed-to-Satisfy Rules (South Africa, 2011: 301-460).

1.7.3 A direct result of the above status quo is that the respective LAs are responsible for the implementation of the NBR. Therefore, the implementation of Act 103 of 1977 by the different LAs in accordance with the current approval procedure constitutes the basis of this study and its recommendations. **It is important to note that the study is not investigating an alternative system of regulation.**

1.7.4 The study further acknowledges the administrative requirements (as determined by the NBR) that have to be implemented by the respective LAs through

- the guidelines for plan submission,

- the plan submission process,
- the notice of plan approval, and
- the listed inspections, to be conducted on site by the LA or its representative.

1.7.5 The 1968 *Intergovernmental Conference for Rational Use and Conservation of the Biosphere* of the United Nations Educational, Scientific and Cultural Organization (UNESCO) is recognised by this study as the first multinational assembly where ecologically sustainable development was debated (Fuad-Luke, 2004: 8).

1.7.6 The study accepts the validity of the goals (and subsequent deadlines) as determined by the following multilateral agreements that have been signed by South Africa (Sustainable Energy Africa, 2006: 129) (CIDB & UNEP SBCI, [2008]: 24):

- The 1992 *United Nations Framework Convention on Climate Change* (UNFCCC or FCCC)[5]
- The 1997 *Kyoto Protocol to the UNFCCC* (ratified by South Africa in 2002)[6]
- The 2000 *Millennium Declaration and Millennium Development Goals* (MDGs)[7]
- The 2002 *Johannesburg Plan of Implementation* (JPOI) (2002)[8]

1.7.7 Lastly, the study recommends that the above goals and deadlines should be implemented in the South African built environment as a matter of urgency.

1.8 PURPOSE OF THE STUDY

The purpose of this study is to determine the origin of the current minimum regulations and standards applicable to the built environment of South Africa, and to examine the goals and implementation methods of the National Building Regulations and Building Standards Act, 1977 (Act 103 of 1977) and its Regulations (together

[5] The UNFCCC is an intergovernmental treaty developed to address the problem of climate change that "…sets out an agreed framework for dealing with the issue…" (CIDB & UNEP SBCI, [2008]: 24).
[6] The Kyoto Protocol "…does not commit developing countries like South Africa to any quantified emissions targets in the first commitment period…" (2008-2012) (Sustainable Energy Africa, 2006: 129) (CIDB & UNEP SBCI, [2008]: 24).
[7] The eight MDGs constitute a blueprint to meet the needs of the world's poorest by the target date of 2015 (Sustainable Energy Africa, 2006: 129).
[8] The JPOI was the outcome of the World Summit on Sustainable Development and highlights areas of key importance for ensuring sustainable development (i.e. economic and social development and environmental protection) (Sustainable Energy Africa, 2006: 129) (CIDB & UNEP SBCI, [2008]: 24).

with the Code of Application[9] (SANS 10400:1990[10])), in an attempt to achieve uniform implementation of the requirements and align the aforementioned with accepted passive design principles to promote a more sustainable built environment in South Africa.

1.7 OBJECTIVES

The specific objectives that the study sets out to accomplish are the following:

1.7.1 To determine the origin and goals of the current edition of the NBR, which represents the minimum regulations and standards applicable to the built environment of South Africa.

1.7.2 To determine how various LAs implement the requirements of the NBR, and whether this is done uniformly across South Africa.

1.7.3 To determine whether the relevant role-players (BCOs) are aware of recent developmental changes to the NBR.

1.7.4 To determine if BCOs are willing to implement new regulations that focus on sustainability in the existing administration system of the NBR.

1.7.5 To identify specific passive design criteria that would have a limited impact on developmental costs for possible inclusion in the NBR and the administrative processes thereof.

1.7.6 To propose (within the existing administrative system of the NBR) a new standardised format for plan approval to assist the BCO in implementing the requirements of the NBR and possible passive design criteria.

1.8 THE RESEARCH CONTEXT

The research design was formulated within a particular milieu. The purpose of the following section is to provide the research context and specifically the researcher's paradigm. Paul Leedy equates research to architectural planning, starting at the conceptual level and progressing through various stages to detail planning (1985: 81).

In the discipline of architecture, "*[c]ontext* refers to the fact that most buildings are designed and made for a specific place; the characteristics of which represent many of the constraints and opportunities in which a design is determined … However,

[9] This refers to the Code of Practice for the application of the National Building Regulations.
[10] SANS 10400 was previously known as SABS 0400-1990.

respect for context does not necessarily mean that a design has to conform" (Porter, 2004: 37). The research presented in this document was approached in a similar manner.

Research is frequently undertaken in the built environment, although the results of such exercises are not evident and often do not contribute to a larger body of knowledge. In Groák's *The idea of building* (1992), it is argued that the architect in practice employs research aids in decision making, especially when designing and documenting a building project. Groák (1992: 67) states that practitioners in the built environment tend "…not to publish the full richness of their knowledge and experience, their know-how, relying instead on oral traditions and the examples available in existing buildings". He advocates a greater need for research literacy on the part of the practitioner, because "…all building projects will have to be treated as innovative*, whether or not those concerned intend them to be so*" (Groák, 1992: 180).

Fellows and Liu (2003: x) state that "…construction is of major importance to all societies and economies, it is essential that the discipline advances as rapidly and as rigorously as possible". An essential component in the development of any discipline or profession is establishing a unique body of knowledge. "Construction draws on a wide variety of established subjects ... and applies them to its particular context and requirements" (Fellows & Liu, 2003: ix). However, Fellows and Liu (2003: 6) remind the researcher of possible bias, stating that "[t]he fact that research is being carried out will itself influence the results…" In the opinion of the researcher, a research project is executed within a particular context, and the process requires a well-defined method that allows for adaptability.

1.9 THE RESEARCH PARADIGM

The research paradigm refers to the researcher's point of reference. It highlights views adopted by the researcher and his approach to questioning and discovery. This is required because the research subject is not studied in an isolated environment (such as a chemical laboratory). In this study, the researcher acknowledges both the positivist ideal and the interpretivist paradigm (as proposed by the structuralist).

According to Weber (2004: x), the difference between Positivism and Interpretivism is located in the choice of research methods, rather than in any substantive differences at a meta-theoretical level (Table 2). However, Weber argues that the quality of the research is dependant on the research method (2004: xi). Weber also warns against "…obfuscation in the rhetoric… [and proposes the use of] …simple language…" when engaging in discourse (Weber, 2004: xi).

Table 2: The differences between positivist and interpretive research approaches as characterised by Sandberg (Weber, 2004: iv)

Meta-theoretical assumptions	Positivism	Interpretivism
Ontology	Person (researcher) and reality are separate.	Person (researcher) and reality are inseparable (life-world).
Epistemology	Objective reality exists beyond the human mind.	Knowledge of the world is intentionally constituted through a person's lived experience.
Research object	The research object has inherent qualities that exist independently of the researcher.	The research object is interpreted in the light of the meaning structure of the person's (researcher's) lived experience.
Method	Statistics, content analysis.	Hermeneutics, phenomenology, etc.
Theory of truth	Correspondence theory of truth: one-to-one mapping between research statements and reality.	Truth as intentional fulfilment: the interpretations of the research object match the lived experience of the object.
Validity	Certainty: data truly measures reality.	Defensible knowledge claims.
Reliability	Replicability: research results can be reproduced.	Interpretive awareness: researchers recognise and address the implications of their subjectivity.

The above model (Table 2) proposed by Sandberg (in Weber, 2004: iv) was adapted (Table 3) to communicate the researcher's normative position regarding the positivist – and interpretivist – research paradigms.

- A list of alternative terms commonly used to describe the paradigms was compiled for the sake of clarity.
- A continuum scale was inserted between the two research approaches, and the researcher's extent of endorsement of each was communicated. It should be noted that the scale is balanced, with three assumptions indicated as neutral and two each in support of positivism and interpretivism respectively.
- The normative position of the researcher is defined at the hand of the listed seven meta-theoretical assumptions.

Although objectivity remains an ideal, Fellows and Liu state that "…research has both cultural and moral contents and so a contextual perspective ... is important to appreciate the validity of the study" (Fellows & Liu, 2003: 17).

Positivism recognises non-metaphysical facts and observable phenomena. It indicates that certain observable facts remain uninfluenced by observation or measurement. According to scientific positivism, the Cartesian duality is maintained when the same input provides the same result under similar circumstances (Fellows & Liu, 2003: 18). It could be argued that there is a strong relation between positivism and the quantitative approach.

The interpretivist paradigm refers to the perceived reality of those involved in the research process. This paradigm is based on the argument that a person's reality is defined by observations and modifications through socialisation, which include upbringing, education and training (Fellows & Liu, 2003: 17-18). Within the interpretive paradigm, further distinction is made when the impact of the social structure is considered, and the perspective of structuralism is included. Culler, as cited in Rosen (1984: 2), states that "…structuralism is based … on the realization that if human actions or productions have a meaning, there must be an underlying system of convention which makes this meaning possible".

According to Fellows and Liu (2003: 19), the structuralist "… argue[s] that structure is fundamental to how society operates and to the determination of its value, customs, etc."

Fellows and Liu further distinguish between pure and applied research in the second edition of *Research Methods for Construction* (Fellows & Liu, 2003: 7-8). "Research is never a completely closed system ... [it is] of necessity, an open system which allows for adaptability" (Fellows & Liu, 2003: 6). Pure research aims to contribute to the body of theory that exists, thereby developing knowledge in the search for the 'truth'. Applied research attempts to solve a practical problem, whereas the addition of knowledge is more incidental. "…[P]ure research develops scientific knowledge and so asks 'is it true?' whilst applied research uses scientific knowledge and so asks 'does it work?'" (Fellows & Liu, 2003: 8).

The research conducted in this study could be classified as applied research with an open-ended approach to the problem. The researcher acknowledges the description of applied research and accepts certain principles of sustainability (as defined in the realm of scientific knowledge) in the built environment. A major concern that arises from the research is the integration of different forms of research to aid informed application in the construction arena.

Table 3: The differences between positivist and interpretive research approaches as characterised by Sandberg (Weber, 2004: iv)

RESEARCHER'S PARADIGM								
	Positivism Sandberg and Weber	+	**Pre-disposition of the researcher on continuum scale**				~	**Interpretivism** Sandberg and Weber
Meta-theoretical assumptions	**Alternative terms:** Quantitative, scientific, experimental, hard, reductionist, prescriptive, psychometric, etc.		Strongly agree	Agree	Neutral	Agree	Strongly agree	**Alternative terms:** Qualitative, soft, non-traditional, holistic, descriptive, phenomenological, anthro-pological, naturalistic, illuminative, etc.
Ontology	**Detached experience** Person (researcher) and reality are separate.					▨		**Integrated experience** Person (researcher) and reality are inseparable (life-world).
Epistemology	**Objectivity** Objective reality exists beyond the human mind.				▨			**Subjectivity** Knowledge of the world is intentionally constituted through a person's lived experience.
Research object	**Separate** The research object has inherent qualities that exist independently of the researcher.				▨			**Incorporated** The research object is interpreted in the light of the meaning structure of the person's (researcher's) lived experience.
Research method	**Content analysis through statistics** Preferred research methods include laboratory experiments, field experiments, surveys, etc.			▨				**Content analysis through interpretation** Preferred research methods include case studies, ethnographic studies, phenomeno-graphic studies, ethno-methodological studies, etc.
Theory of truth	**Statement = Truth→ Objective Reality** Establishing a direct relationship between the research statements and reality.					▨		**Initial interpretation = Truth → confirms a meaning** *(from researcher's experience)* Truth as intentional fulfilment: interpretations of research object match lived experience of subject.
Validity	**Certainty: The data truly measures reality.** A direct relationship exists between measurements + phenomena.				▨			**The knowledge (claim) is defensible** Evaluation criteria include credibility, transferability, dependability, and ability to confirm.
Reliability	**Replicability** Research results can be reproduced by the researcher or other researchers to achieve a consistent result.			▨				**Interpretive awareness** Researchers recognise and address the implications of their subjectivity.

Normative Position of Researcher
i. The researcher believes it difficult to separate a reality from the individual who observes it. In this study the subject (the researcher) is linked with the object (the phenomenon in the world that is focused upon) through previous experiences, history, culture, future expectations, etc.
ii. Although the researcher attempts to construct an objective independent reality, the social construction of knowledge is simultaneously accepted.
iii. The research activity requires of the researcher to measure and interpret the object. This activity is influenced by a pre-disposition, thereby affecting the observed phenomena.
iv. Although a survey provides the main body of data for the study, the researcher accepts a bias in the selection and composition of the questions that are used in the questionnaire.
v. The artefacts (theories, frameworks, constructs, etc.) used by the researcher to understand the world are based on a pre-conception that is influenced by a wide range of socio-cultural factors.
vi. The researcher supports a legitimacy concept that is intimately linked to specific research methods and subsequent forms of data analysis.
vii. The idea of replicability forms the focus of the respective research paradigms. The methods implemented as part of the study align closely with the Positivist approach.

Fellows and Liu (2003: 11) categorise the research question according to its purpose. The current study employs characteristics of both the Exploratory and Interpretive categories, as listed below. In addition, the study is based on the Heuristic model, "…in which variables are grouped according to (assumed) relationships…" (Fellows & Liu, 2003: 12).

The applicable research methods could briefly be described as follows (Fellows & Liu, 2003: 11):

- **Exploratory**

  The hypothesis is formulated within a pre-defined context; the theory is then tested via a process of data collection, analysis and interpretation.

- **Explanatory**

  A specific phenomenon of the hypothesis is tested. This question represents an extension of the aforementioned exploratory phase.

- **Interpretive**

  A heuristic model is employed here, where the variables are grouped together according to assumed relationships.

The research approach finds its origin in the dialectic approach, following the writings of Georg Wilhelm Friedrich Hegel who argues that a theory develops through thesis, antithesis and synthesis – the dialectic triad. Debate forms an inherent part of this process and the cycle of dialectic triad is continuously regenerated (Fellows & Liu, 2003: 13).

The historian William Shirer (1990: 144) quotes Hegel as follows in *The rise and fall of the Third Reich:* "…the State has the supreme right against the individual, whose supreme duty is to be a member of the State…" In studying the NBR, it becomes evident that in matters concerning the regulation of the South African built environment, the Republic exerts a similar right (as the aforementioned State), while the citizens (of South Africa) are dutifully obliged when erecting a structure to honour the Government.

The research paradigm applicable to this study is summarised in Table 4.

Table 4: Summary of the research paradigm

RESEARCH PARADIGM
1. RESEARCH CONTEXT: A balance between Positivism and Interpretivism
2. RESEARCH CLASSIFICATION: Applied research with an open-ended problem
3. RESEARCH CATEGORY: A mixture of Exploratory and Interpretive research, based on the Heuristic model
4. RESEARCH APPROACH: Originating in the Dialectic model, following Hegel and Rosen through the implementation of the Dialectic triad

1.10 THE RESEARCH DESIGN

According to Fellows and Liu (2003: 5), "[r]esearch is a learning process ... perhaps the only learning process". The relationship between the research question, data required and data analysis constitutes the basis of the research design. Fellows and Liu argue that the definition of different research styles varies to such an extent that the boundaries between different styles are not well defined (2003: 21). However, in *Research Methods for Construction,* Fellows and Liu (2003: 21-28) discuss different research styles and strategies according to the respective authors (Table 5).

Table 5: Summary of research styles

Research styles/strategies			
Research styles as termed by **Bell** (1993) (as cited in Fellows & Liu, 2003: 21-28)	**Research strategies** as termed by **Yin** (1994) (as cited in Fellows & Liu, 2003: 21-28)	**Shortened description** as defined by **Fellows and Liu** (1997) (as cited in Fellows & Liu, 2003: 21-28)	Implementation in **proposed study**
Action		Research intentionally attempts to affect change in the social system.	Not applicable
Ethnographic		A scientific study of races and cultures, involving the hermeneutic circle.	Not applicable
	Histories	The past is studied on the basis of the research questions 'How?' and 'Why?'	Yes
	Archival analysis	Present or past is studied; little control over independent variables is required.	Yes
Surveys	**Surveys**	Statistical sampling that represents a population and often employs question-naires and interviews.	Yes
Case studies	**Case studies**	An in-depth investigation of certain aspects through interviews with key 'actors'.	Partially
Experimental	**Experiments (including quasi-experiments)**	This is usually conducted in laboratories to determine the relationship between variables.	Not applicable

The desk study is initiated from a chronological (or historical) perspective and selected information is presented within the context of the study. The relevant theoretical approaches are identified and studied as part of the literature review to formulate the research questions and hypotheses during Phase 1.

Phase 2 of the study progresses to an archival analysis aimed at defining the operational framework of the South African built environment and refer to the relevant voluntary and compulsory standards and norms. In addition, the size and impact of the built environment is investigated based on available statistics on the number of plans approved, after which statistical comparisons are made to identify certain relationships (should there be any). This phase concludes by defining the population, selecting a target group, and determining the sample size for Phase 3.

During Phase 3 of the study a questionnaire is designed (and tested before implementation) to obtain data from specific role-players with reference to aspects surrounding the NBR and sustainability. Statistical analysis is employed to test the original hypotheses and to determine resulting patterns, should there be any.

The finalisation of the study consists of two parts. Phase 4 lists the phenomena observed and leads to deductions based on evidence and reasoning. The study is completed during Phase 5 with a series of conclusions and recommendations in Table 6.

Table 6: Summary of the research design

RESEARCH DESIGN:TOWARDS AN APPLIED RESEARCH MODEL BY IMPLEMENTING TRIANGULATION

PHASE 1: A REVIEW OF PERTINENT LITERATURE AND THE EXISTING PRACTICE MODEL

PHASE 1.1 (Refer to Chapter 2)

Theme:	**Building Regulations**
Focus area:	**The history and development of the National Building Regulations in South Africa**
Data source:	**Selected literature**

1.1 Briefly note the origin of building regulations.
1.2 Determine the first official building regulation in Southern Africa.
1.3 Shortly describe the history and development of the National Building Regulations (NBR) as regulating instrument of the South African built environment.
1.4 Determine the original goal and *raison d'être* for the NBR.
1.5 Determine the prescribed structure for implementation of the NBR:
- **1.5.1** Guidelines and procedures for application
- **1.5.2** Application for plan approval
- **1.5.3** Notice of approval or rejection
- **1.5.4** Five inspections
- **1.5.5** Certificate of Occupancy

PHASE 1.2 (Refer to Chapter 2)

Theme:	**Sustainability**
Focus area:	**Identifying specific sustainability aspects for possible incorporation into the NBR**
Data source:	**Archival analysis**

1.2.1 Interpret sustainability within the context of the South African built environment.
1.2.2 Evaluate the proposed SANS 10400-XA: 2010 (2010-06-15) Part X: Environmental sustainability Section A: Energy usage in buildings.
1.2.3 Identify sustainability aspects aligned with the original goal of the NBR for incorporation into the NBR.

PHASE 2: PILOT STUDY

PHASE 2.1 (Refer to Chapter 3)

Theme:	**Implementation of the NBR**
Focus area:	**Determine whether the LAs in South Africa implement the NBR uniformly**
Data source:	**Archival analysis**

2.1.1 Determine the uniformity of NBR implementation by LAs in South Africa through a comparative analysis.

PROGRESS REVIEW (See Note 1)

PHASE 2.2 (Refer to Chapter 3)

Theme:	**Implementation of the NBR**
Focus area:	**Determine the precise NBR implementation methods of specific LAs**
Data source:	**Archival analysis** + **Case study**

2.2.1 Identify the largest role-players (LAs) in the South African built environment.
2.2.2 Compare the implementation methods of the NBR by the designated LAs using the implementation methods/ structure earlier identified.

PROGRESS REVIEW (See Note 1)

NOTE 1: When conducting a progress review, the researcher should decide whether further investigation into the implementation of the NBR is necessary. If not, the reason for the study is negated. If yes, the researcher can continue with the following phase.

PHASE 3: EXPLORATORY STUDY (Chapter 4)

Theme:	**Interpretation of the NBR**
Focus area:	**Determine the knowledge and perception of BCOs on the NBR**
Data source:	**Analytical survey (Questionnaire)**

3.1 Investigate the knowledge of and interpretation by BCOs regarding the origin, implementation methods and goals of the NBR.
3.2 Investigate the uniform implementation of the NBR by the BCOs.
3.3 Investigate the awareness of the BCOs of recent developmental changes to the NBR.
3.4 Investigate the willingness of the BCOs to incorporate new regulations that focus on sustainability into the existing administration system of the NBR.

PHASE 4: RATIONALISATION (Chapter 4)

4.1 Graphic presentation of the data
4.2 Statistical description and analysis of the data
4.3 Interpretation of the data

PHASE 5: FINDINGS based on the data (Refer to Chapter 5)

Recommendations and conclusions

PHASE 6: PROPOSAL (Addendum N)

Proposed pro forma submission form to assist the BCOs appointed by the LAs with the uniform implementation of the requirements of the NBR in South Africa.

1.11 THE TRIANGULATION RESEARCH APPROACH

The primary classification of research methodology is based on the particular method employed to conduct the research. The available methods could be placed on a continuum, with the quantitative or 'scientific' method representing one extreme and the qualitative method representing the other. The qualitative method describes an exploration without prior formulations. Fellows and Liu (2003: 9) propose a method of triangulation, using both methods simultaneously, to study a topic. This would result in powerful insight that could assist the drawing of conclusions. Similarly, the research design for this study is based on a method that triangulates the quantitative and qualitative data, although these are grouped in different phases.

Fellows and Liu (2003: 106) equate the collection of data to a process of communication where the aim is to maximise convergence between provider and researcher in an attempt to achieve the most accurate transfer of meaning.

1.12 THE IMPORTANCE AND BENEFITS OF THE STUDY

It could be argued that although the NBR define the current minimum regulations and standards applicable to the built environment of South Africa, it fails to provide an instrument for its uniform application.

This study not only discovers the need for an implementation instrument, but enters into discussion with the BCOs as the operational officers tasked with enforcing the NBR. This dialogue clarifies specific areas of uncertainty surrounding the NBR.

The study continues to identify certain passive environmental design criteria for possible inclusion as an additional requirement to the NBR so as to promote sustainability without incurring substantial additional cost. The introduction and application of passive environmental design criteria should result in buildings that consume less energy during their operation without significantly increasing the construction cost.

Finally, the study proposes a pro forma application form for building plan approval that should assist the BCOs during the process of implementing of the NBR.

1.13 THE RESEARCHER'S EXPERTISE TO COMMENT ON THE TOPIC

The author holds formal qualifications in architecture as well as urban and regional planning, and has been practising as a Professional Architect for the last 10 years. Moreover, he has been actively involved in tertiary education in the built environment for the same number of years.

The Law of Building and Engineering Contracts and Arbitration requires from the author as a practising architect to be "…cognizant of the requirements of building by-laws and statutes relating to building and of the town-planning restrictions in the area where a building is to be erected … where there has been a failure on the part of the architect to observe a clear statutory enactment relating to building or town-planning which is obligatory, he would not be entitled to remuneration, on the basis that he has failed to exercise proper professional skill" (McKenzie & McKenzie, 1988: 76-77).

Hence, the researcher's vocational training, the statutory requirements of his profession and his experience in practice and education have adequately equipped and qualified him to research the topic.

1.14 SUMMARY OF CHAPTER 1

Chapter 1 defines the problem and its setting, and the statement of the main problem is provided along with the sub-problems. Different hypotheses are formulated for testing. Reference is made to selected terms and their respective definitions. The assumptions on which the study is based are listed together with the possible benefits of the study, and its objectives.

The research context and paradigm are stated to provide insight into the nuanced normative position of the author. The proposed research design is discussed based on a diagram to illustrate the employment of a triangulated research approach. The chapter concludes with a brief justification of the researcher's expertise to comment on the specific research topic.

2. LITERATURE REVIEW OF PERTINENT ASPECTS

2.1 INTRODUCTION

The purpose of this chapter is to

- note the origin of building regulations;
- determine the South African origin, development, goals and methods of implementation of the current edition of the NBR, and
- evaluate recent changes to the NBR in the light of its set goals.

The literature review focuses on the regulatory framework of the built environment and is presented from a historic perspective (in chronological order). The first section of this chapter serves as an introduction that provides a brief overview of the origin of building regulations. The second part of the chapter traces the origin and development of the primary legislative instrument governing the erection of buildings in the South African built environment.

This chapter focuses on sub-problem 1, namely:

> *What is the origin of the NBR, and did the goals and the methods of implementation of the current edition of the NBR (which represents the minimum regulations and standards applicable to the built environment in SA) evolve since its origin?*

It is hypothesised that a study of the origin, implementation methods and goals of the NBR is necessary to emphasise the importance of the NBR within the South African built environment.

2.2 THE ORIGIN OF BUILDING REGULATIONS

2.2.1 The Code of Hammurabi

Watermeyer (2003:25) claims that "…building standards have been in place since man was able to capture his thoughts in writing". According to Cowan the oldest surviving building code can be traced back to the reign of King Hammurabi in Mesopotamia (1985: 27). However, the first translator of the code, Charles F. Horne argued in 1915 that Hammurabi's code implied the existence of an earlier set of laws

(King & Horne, 2006). This claim is corroborated by researchers at the Louvre who maintain the source of the Hammurabi Code as "…two Sumerian legal documents drawn up by Ur-Namma, King of Ur (c. 2100 BC) and Lipit-Ishtar of Isin (c. 1930 BC)" (Iselin, 2011).

Hammurabi's Code of Laws is inscribed on a basalt stele (Figure 1) that is on display in the Louvre. The code dates back to circa 1780 BCE, and was originally translated by L.W. King in 1910 and edited by Richard Hooker in 1996 (Hooker & King, 1999).

Figure 1: The 2.25 m high basalt stele erected by King Hammurabi of Babylon (Iselin, 2011)

The Hammurabi Code is considered "…the most important legal compendium of the ancient Near East" (King & Horne, 2006), and it represents the earliest-known example of a ruler proclaiming publicly to his people an entire body of laws. "The laws are arranged in orderly groups, for all men to read and know what was required of them." (Hooker & King, 1999) It was displayed publicly, and comprised 282 different Codes of Laws. Cuneiform script was used, and Stockdale (2005) notes its efficiency in "…the expansion of literacy, and subsequent governmental regulation and authority over an increasingly literate public".

The code is grouped into different chapters that focus on family law, slavery, and professional, commercial, agricultural and administrative law (Iselin, 2011). The following six codes refer to the built environment:

- Code of Law No. 228:

"If a builder build[s] a house for some one and complete it, he shall give him a fee of two shekels (sic) in money for each sar (sic) of surface." (Hooker & King, 1999)

- Code of Law No. 229:
  "If a builder build[s] a house for some one, and does not construct it properly, and the house which he built fall[s] in (sic) and kill[s] its owner, then that builder shall be put to death." (Hooker & King, 1999)
- Code of Law No. 230:
  "If it kill[s] the son of the owner the son of that builder shall be put to death." (Hooker & King, 1999)
- Code of Law No. 231:
  "If it kill[s] a slave of the owner, then he shall pay slave for slave to the owner of the house." (Hooker & King, 1999)
- Code of Law No. 232:
  "If it ruin[s] goods, he shall make compensation for all that has been ruined, and inasmuch as he did not construct properly this house which he built and it fell, he shall re-erect the house from his own means." (Hooker & King, 1999)
- Code of Law No. 233:
  "If a builder build[s] a house for some one, even though he has not yet completed it; if then the walls seem toppling (sic), the builder must make the walls solid from his own means." (Hooker & King, 1999)

The first code deals with payment after the completion of a successful building project, while the remaining five codes list different manners of recourse, should a structure prove unsafe. It could be argued that this set of six official codes represents the origin of contemporary building regulations (Table 7). It is noteworthy that the largest part of the code refers to a minimum standard – requiring the builder to guarantee the safety of the construction. These objectives remain relevant to this day, and they echo the primary purpose of architecture; to safely house man and his possessions.

Table 7: A synopsis of Hammurabi's Code of Laws according to the various requirements, subsequent events and the relevant obligations or recourses

Hammurabi's Code of Laws:							
No.	**Requirement**	▶	**Event**	**+**	**Post-event**	**=**	**Obligation** or **Recourse**
Objective 1: Erection of the structure and its associated cost:							
228	If a builder builds a house, and	▶	the builder completes it	+	none	=	Payment (fee/surface)
Objective 2: Should a structure prove unsafe during its occupation, the following recourses are available (it is presumed that the house was paid for in accordance with Code 228):							
229	If a builder, builds a house, and it is not properly constructed, and it	▶	collapses (*fall in*), and	+	kills the owner, then	=	a. Death to the builder b. See 232.b that is implied, although it might be difficult to achieve c. See 232.c that is implied, although it might be difficult to achieve
230	If a builder, builds a house, and it is not properly constructed, and it	▶	collapses (*fall in)*, and	+	kills the son of the owner, then	=	a. Death to the builder's son b. See 232.b that is implied, but not expressly stated c. See 232.c that is implied, but not expressly stated
231	If a builder, builds a house, and it is not properly constructed, and it	▶	collapses (*fall in*), and	+	kills a slave of the owner, then	=	a. The builder has to pay slave for slave b. See 232.b that is implied, but not expressly stated c. See 232.c that is implied, but not expressly stated
232	If a builder, builds a house, and it is not properly constructed, and it	▶	collapses (*fall in)*, and	+	damages the owner's goods, then	=	a. The builder has to compensate the owner for the ruined goods b. and re-build the house c. at his own cost (*own means)*
233	If a builder, builds a house, and it is not properly constructed, and the	▶	walls fail (*seem toppling*)	+	none	=	a. The builder has to re-build the walls b. at his own cost (*own means)*

The Hammurabian codes focus on the relationship between owner and builder, while the interests of a larger settlement (and by implication the interests of the neighbours) are not addressed explicitly. It could be argued that the stratification of society according to class and community structure implied settlement patterns and associated rules of engagement. However, as the number of inhabitants in a particular settlement increased, it inevitably led to an increased number of risks.

2.2.2 The growth of settlements

Klitzke (2011) states that "…ever since man began to use fire as his servant, he discovered … that it frequently could not be controlled. When man congregated in cities, the servant turned master even more often". Watermeyer (2007:26) supports this point of view, and argues that settlement growth brought "…the scourge of fire and health risks associated with poor sanitation". Larger communities therefore necessitated a form of orderly settlement planning through regulation.

Arguably the best known assimilation of these regulations could be found during the reign of the Roman Empire. *The Encyclopedic Dictionary of Roman Law* provides the following definition for the construction of a house (Berger, 1991: 353):

> "***Aedificatio*:** Building a house. The construction of houses is governed by building regulations (statutes, senastusconsulta, imperial enactments) and is subject to the supervision of magistrates (aediles, censores for public buildings, under the Empire the praefectus urbi and his staff). Among the imperial enactments the building regulation by Emperor Zeno is the most important. The interests of the neighbors are protected by *OPERIS NOVI NUNTLATIO*, a kind of protestation against a new construction which may be detrimental to the owners of adjacent buildings or lands. On the other hand, the house builder who gives sufficient guaranty is protected by a special interdict no vis fiat aedificanti (= that force should not be used against the builder of a house) against disturbance. Unless special permission is granted, building on public places is prohibited. Demolition of constructions already erected may be enforced by an *INTERDICTUM DE LOCIS PUBLICIS*."

From the above it is evident that the Roman Empire introduced a hierarchical structure to govern the construction of buildings within the Empire. Emphasis was placed on a larger environment, with specific rights and obligations assigned to neighbouring properties. In addition, the construction process was supervised by a governing authority.

Similar laws that fall within the ambit of building regulations in *The Encyclopedic Dictionary of Roman Law* are:

- ***Ambitus:*** Describes the open space between neighbouring houses (Berger, 1991: 360).
- ***Lex municipalis tarentina:*** A municipal charter that contains provisions about the building regulations, among others (Berger, 1991: 557).
- ***Lex Iulia de modo aedificiorum:*** A building regulation that determined the maximum height of houses and the thickness of walls (Berger, 1991: 554).
- ***Lex Iula municipalis:*** Although Caesar's authorship and the date of the law are debatable, some of the topics dealt with in the *Tabula Heracleensis* are building and traffic regulations (Berger, 1991: 554).
- ***Servitus altius non tollendi (sc. aedes):*** This "urban servitude imposed on the owner of a building the duty not to build higher over a certain limit. A counterpart was a servitude *ius altius tollendi* which gave the beneficiary the right to build higher" (Berger, 1991: 703).
- ***Servitus ne prospectui officiator:*** According to this servitude, the owner of an immovable property has the "right to prevent his neighbour from building a house or planting trees which might impede the beneficiary's pleasant view" (Berger, 1991: 703).
- ***Servitus oneris ferendi:*** This urban servitude involved the right of a beneficiary to have his building supported by a neighbour's wall. "The latter was bound to keep his wall in good condition" (Berger, 1991: 703).

Cowan finds that fire damage and structural failure have featured in safety regulations from a very early time, and specific building regulations in this regard in the City of London go back as far as the 12th century (1979: 90).

2.3 DEFINITIONS OF BUILDING REGULATIONS

The *Dictionary of Architecture and Building Construction* (Davies & Jokiniemi, 2008: 52-53) does not differentiate between building codes and building regulations, and provides the following overall definition:

> "A statutory code which regulates the construction, alteration, maintenance, repair, and demolition of buildings and structures."

In a similar manner, Watermeyer (2003:6) does not distinguish between the two terms, and defines a building code or regulation as follows:

> "A document used by [a] local, state or national government body to control building practice through a set of statements of 'acceptable' minimum requirements of building performance. This is usually a legal document. Acceptable requirements are typically established on the basis of socio-political and/or community considerations."

The book entitled the *Building Regulations in brief* (Tricker & Algar, 2006: [i]) provides the most concise description of a building regulation:

> "A statutory instrument, which sets out the minimum requirements and performance standards for the design and construction of buildings, and extensions to buildings."

For the purposes of this study, a **building regulation** is acknowledged as

- a regulating instrument, that
- describes a minimum standard, that
- should be implemented during the building process (that initiates with design, and continues through construction, maintenance, alteration and repair to demolition of buildings and/or structures), with the aim of
- protecting public health and safety during
- the construction, occupation and post-occupation phases of
- buildings and/or structures.

2.3.1 The relationship between building regulations and building standards

In the construction industry, a building regulation often makes reference to a building standard, and it is important to note the distinction between the directive and the yardstick with which its implementation is measured. Watermeyer (2003: 6) presents a standard as a benchmark, claiming that essentially it is "a series of technical documents that standardise … some activity in relation to building and construction)".

In the 2008 edition of the *Dictionary of Architecture and Building Construction*, Davies and Jokiniemi (2008: 360) do not specifically include the term building standard, but

provide the following definition for a **standard**: "any product, method, process or procedure which has been established as an exemplar … or otherwise represents the norm". A **norm**, on the other hand, is described as a "standard, an officially recognised exemplary standard of measurement, quality, regulative legislation or classification" (Davies & Jokiniemi, 2008: 251).

A **building standard** could thus be defined as

- an official technical point of reference, that
- standardises building and construction activity,
    - (generally) in terms of
        - 'quality', or
        - 'performance,' and
    - (occasionally) in terms of
        - size, or
        - procedure
- thus providing measurement criteria.

According to the *Dictionary of Architecture and Building Construction* (Davies & Jokiniemi, 2008: 52) **building codes of practice** are described as

> "legal documentation setting out the requirements to protect public health and safety, and outlining standards of good practice with regard to the construction and occupation of buildings."

2.3.2 Approaches to the formulation of building standards

Both Groák (1992: 140) and Watermeyer (2003:6) distinguish between different viewpoints from which the formulation of building standards can be approached, specifically:

- The performance approach [11]
- The functional approach
- The specific design solution (the prescriptive approach)

[11] For more information on the *performance approach*, see the 2005 report entitled *Performance based design: Bringing Vitruvius up to date* (Spekkink & Jasuja, 2005).

For example, a building's thermal performance could be defined in terms of the minimum energy loss during a prescribed period, as compared to a functional requirement stating that the building should achieve *energy efficiency*, or compared to a specific design solution where a particular insulation product is specified (Groák, 1992: 140).

2.3.2.1 The functional approach

The functional approach relies on qualitative functional statements, while no quantitative user or technical performance requirements are provided (Watermeyer, 2007: 26). However, Groák warns against merely using function as "…a measure of usefulness at the time" (1992: 140). He states that "[t]he term itself changes meaning and use" (Groák, 1992: 140). Groák further argues that the functional approach led to the origin of the performance concept, thereby linking the building industry with the building material industry (1992: 140).

2.3.2.2 The performance approach

According to Watermeyer (2003:6), the performance concept is driven by nominated requirements that are intended to satisfy particular needs and expectations. Groák defines the performance approach as a framework that defines "…buildings and their constituent parts in terms of what performance-in-use they should achieve over time" (1992:140). Davies and Jokiniemi (2008: 272) elaborate on this notion by providing the following definition: "[p]erformance [refers to] the specified, expected or actual behaviour of a building material, component or building while in use". The performance specification is thus defined as a technical document that outlines, lists and documents the behaviour or use of a product, process, installation or service (Davies & Jokiniemi, 2008: 272).

2.3.2.3 The prescriptive approach

Watermeyer (2007: 26) describes the prescriptive approach as a collection of standards that depicts how buildings should be designed, built, protected and maintained with regard to the public's health and safety. The constituent

> building components are described, specified and procured, resulting in a distinctive building with a particular set of characteristics (Watermeyer, 2003: 6).

Groák highlights the performance approach as "[o]ne of the most important developments in building research" (1992: 140). This approach (with its origins in mechanical engineering), defines a building and its constituent parts in terms of its 'performance-in-use', which should be achieved over time. It defines requirements, rather than focusing on a general function, or prescribing a known solution.

It is evident that a particular approach would result in a different type of standard. It is therefore important to trace the origin of the NBR locally, and to determine the approach that was adopted in the formulation of these standards.

2.4 THE ORIGIN OF BUILDING REGULATIONS IN SOUTHERN AFRICA

In 1650 the United East Indian Company decided to occupy the Cape of Good Hope as a refreshment station, and tasked Governor Jan van Riebeeck to build a fort in Table Bay (Figure 2). Just over two weeks after arriving in 1652, Van Riebeeck (and his party) managed to mount a canon on 3.75 metre high earthen ramparts. These walls tapered from six metres at ground level to five metres at their highest point (Hartdegen, 1988: 6-7).

Figure 2: **Map of the fort erected under the guidance of Jan van Riebeeck** (Castle of Good Hope, 2010)

Unfortunately the earth was barely workable and because the "Company instruction did not specify alternative solutions … the ramparts were a leaky crumbly structure[s]" (Hartdegen, 1988: 7). The imminent failure of the walls required immediate maintenance. Ras (1959: 23) notes that heavy rain caused the collapse of one side of the *Walvis Bastion* and the partial collapse of the curtain walls in August 1654.

The Company instruction above is most probably the first prescriptive specification implemented in Southern Africa. However, the failure of the ramparts of the fort could also be described as the first failure of a prescriptive standard imposed on the South African built environment.

According to the publication *Our Building Heritage* (Hartdegen, 1988: 7) "… much of South Africa's building heritage rests on a building system derived almost exclusively from mud, stone, shells, reed, thatch and timber, developed and refined by the European pioneers of the seventeenth century". Hartdegen (1988: 7) also describes the experimentation with various building methods and materials by a hundred men (*including eight masons*) to construct stores, sheds and living quarters within the fort.

In his diary, Van Riebeeck noted*:* "Although we have found reeds for thatch, we want people who know how to lay them on, for what has already been done, has been done in such a slovenly and insufficient manner that it must be taken off again" (Hartdegen, 1988: 9).

The third volume of H.B. Thom's translation of Van Riebeeck's diaries includes the following inscription entered on Wednesday, 7 January 1660 (1952: 173):

	Line no.:
…after mature	i.
deliberation, and in the interests of the Hon. Company and for the security of the	ii.
said buildings and the goods stored in them, it has been considered essential, and	iii.
has also been decided that the thatch should be removed from the roofs of all	iv.
the Company's buildings and replaced by baked tiles. Furthermore it has been	v.
decided that we should try and sell the thatch to the free burghers so as to defray	vi.
the additional costs as far as possible. To this end an agreement has been reached	vii.
with the free brick and tile maker, Wouter Cornelissen Mostert, who is also the	viii.
free miller, whereby he shall forthwith make as many tiles for the Hon. Company	ix.
as are required for the said purpose at a rate of 40 guilders a thousand, counted	x.
whole on the roof, each tile being in Rhineland measure, 6 inches wide and 12	xi.
inches long. The Hon. Company shall at its own cost convey the tiles by cart or	xii.
wagon from the oven.	xiii.
And as straight laths must be sawn for such a tiled roof, an agreement has also	xiv.
been made with the free sawyer, Leendert Cornelissen of Seevenhuijsen, to deliver	xv.
the required laths (each to be sawn not less than one inch square) at a rate of 13	xvi.
guilders per hundred foot of plank from which they are cut.	xvii.
***Resolved and affirmed** in the fort of Good Hope on the above date.*	xviii.
(Signed) Jan van Riebeecq,	xix.
Roeloff de Man,	xx.
Abraham Gabbema,	xxi.
Pieter Evrards and	xxii.
Gijsbert van Campen (Secretary)	xxiii.

If the earlier definition of building regulations is applied to the journal entry (Table 8), this inscription could be interpreted as the first official transcribed building regulation for Southern Africa.

Table 8: A comparison of the diary entry by Jan van Riebeeck with the requirements of a building regulation

The first building regulation in Southern Africa		
Definition: building regulation	**Selected key words from the Journal of Jan van Riebeeck: 7 January 1660** (Thom, 1952: 173)	Line no:
a) a regulating instrument, that	*…in the interests of the Hon. Company…*	ii
	…considered essential…	ii
	…Resolved and affirmed…	xviii
b) describes a minimum standard, that	*…decided that the thatch should be removed from the roofs…*	iv
	…and replaced by baked tiles…	v

c) should be implemented during the building process (that initiates with design, and continues through construction, maintenance, alteration and repair to demolition of buildings and/or structures), with the aim of	It is implied that the changing of the roofing materials should take place during the alteration/replacement/maintenance phase of the buildings lifespan	n/a
d) protecting public health and safety during	*…security of the said buildings and the goods stored in them…*	ii-iii
e) the construction, occupation and post-occupation phases of	See c	
f) buildings and/or structures.	*…all the Company's buildings…*	iv-v

The journal entry proposed a standard in addition to the regulation. When the regulation is further investigated it becomes evident that the specification for the roof tiles and battens follows a performance approach. An agreement is reached with a free burgher to manufacture as many baked tiles as necessary for the purpose of providing a fire-resistant roofing material. A price per 1000 units (counted per whole tile on the roof) is agreed on, as well as the size of the tiles and the standard of measure (Rhineland)[12].

In a similar agreement with carpenter Seevenhuijsen, he is to provide laths that are cut in straight lengths of a minimum size. The rate of payment is determined per length of timber from which the battens are cut. It could be presumed that the Company was responsible for the supply of the timber and the carpenter was only required to saw it to the correct size, while the actual batten lengths were of less importance.

This building regulation was formulated in accordance with a contextual approach. The danger of fire necessitated the change of a particular roofing material, while cost dictated that an indigenous solution be sought. This regulation was only applicable to certain Company buildings inside the fort, although the settlement continued to expand.

Outside the walls of the fort, in the village of *De Kaap*, the first homes consisted of single-storey rectangular wooden frameworks with wattle-and-daub walls. Where thatch was used as a roofing material, the reeded ceiling was usually smeared over

[12] To accept these terms, Mostert must have had adequate faith in the strength of the fired tiles, their loading and transport from the oven to the buildings, their possible storage, and finally their installation on the roof, because Mostert's involvement in the process after manufacture is not entirely clear.

with a coating of clay to form a "… *brandzolder*, or fire ceiling in the event of fire. In later years, thatched roofs were prohibited because of the fire hazard and a tax of two shillings a month was levied on each chimney" (Hartdegen, 1988: 11).

It could be argued that the risk of fire necessitated the development of the first official building regulations for Southern Africa. This is in accordance with the arguments presented by Klitzke and Watermeyer in par. 2.2.2. The community and authorities shared an interest, and the introduction of a tax levy on each chimney is possibly the first time that building regulations in the European tradition were enforced locally. Nevertheless, the associated cost of exchanging one roofing material for another remained excessively high, and it was only once the risk grew too great that alternatives were implemented.

De Bosdari (1953: 47) indicates that in 1712 the thatched village of De Kaap had grown to 170 private dwellings and this required a form of settlement planning, which is described by Bierman (1955: 13) as follows:

> *Reeds vroeg in die bestaan van die dorpie in die Tafelvallei gryp die owerheid in om sindelikheid en orde te bewaar. Die Valsrivier kry gemesselde walle en sluise en 'n deftige naam, die Heerengracht; strate wat mekaar reghoekig oorkruis word uitgelê, en die boupersele weerskante raak aan streng bou-ordonnansies onderhewig. Om brand in die rietdak te voorkom, mag die dak nie te na aan die grond sak nie; om brandverspreiding deur die rietdakke te verhoed, mag geboue nie teenmekaar staan nie. Onder dié toestande raak die tradisionele boerehuise uit die Tafelvallei weg – hy trek binneland toe – en sy plek word deur die stadshuis ingeneem, want korte jare na die stigting, is ,,de Caabse uithoek" reeds 'n stad.*[13]

[13] Very early on in the existence of the Table Valley village, the authorities stepped in to preserve cleanliness and order. The Vals River received built embankments and sluices, and a dignified name, the Heerengracht; streets that intersected at right angles were laid out, and the adjacent building sites became subject to strict building regulations. To prevent fire in the thatched roofs, they were not to descend too close to the ground; to prevent fire spreading through the thatched roofs; buildings were not allowed to stand too close to each other. Under these circumstances the traditional farmhouse of the Table Valley disappeared – it migrated inland – and its place was taken by the townhouse, because a few short years after its establishment, the remote Cape hamlet had already become a town. (Translated by author, 2011)

According to Bierman (1955: 34-35), traders in the Kaap often built double-storey houses, with the bottom storey used to store products, and the living quarters situated above. Frequent conflagrations resulted in the abandonment of thatch after the 1717 instruction by the Council of Policy (De Bosdari, 1953: 47). Within the built-up area, flat roofs were proposed as an alternative. However, the resulting problem of water tightness was difficult to overcome.

The Council of Seventeen of the United East Indian Company issued the following recommendation on how to construct a new flat roof (Hartdegen, 1988: 11):

> "The walls of the building being finished and the beams laid thereon, laths or ribs are to be laid upon them, each three or four inches, the broadest (sic) side resting on the beams. No planks are to be used; otherwise the defects of the roof will not be visible from below. Over these ribs, grey or other burnt bricks which are made here, eight by four inches, are laid with the heads meeting each other on the laths. The floor having been thus laid, the builder is to take four parts of stamped lime shells taken out of the oven (kiln) and two parts ordinary mason lime and two parts finely powdered bricks. All these materials are to be well mixed whilst dry, and gradually cocoa-nut oil is to be thrown until the whole is thoroughly prepared like dough. It is then at once to be laid on one and a half inches thick, and rubbed in with the trowel and steadily beaten together as much as possible with wooden mallets. The mallets are not to be too heavy and the beating must be gentle or moderate lest the bricks are broken. Whilst busy with this, the second layer is to be prepared, viz, ten parts finely sifted lime, three parts finely sifted gravel of baked bricks and one part of Bengal Gor or sediment of sugar (draf zuker = molasses). This composition is to be treated in the same way as the first and to be put on when ready, about one inch thick, and carefully beaten down on the other layer. Finally a liquid composed of lime, oil and Gor is made with a strong hand and a smooth trowel well rubbed on the last coat."

In 1736, five houses were gutted by a fire fanned by a Southeaster. One of the houses was rebuilt with a flat roof, and "…many other people followed … [t]his example… At the beginning of the 18th century Cape Town was a thatched village: by

the end of it, the fear of fire has changed it into a flat-roofed town" (De Bosdari, 1953: 47).

The establishment of a settlement and its associated growth necessitated the development of some form of regulation. The different municipalities performed this regulatory function and individually developed their own sets of municipal by-laws that addressed the built environment, among others. Holden states that "…every town council in South Africa had its own set of building by-laws, many of which were archaic and convoluted" (2006: [1]). According to Watermeyer the 19th century law makers developed building laws to ensure proper sanitation and to diminish possible conflagrations, while 20th century law makers "developed minimum standards for the construction and maintenance of buildings, designed to protect public health, safety and general welfare" (2007: 26).

2.5 ACT 103 OF 1977

The full title of the current edition of Act 103 of 1977 is as follows (South Africa, 2011: 3):

"**NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT**
NO. 103 OF 1977
[ASSENTED TO: 22 JUNE, 1977]
[DATE OF COMMENCEMENT: 1 SEPTEMBER, 1985]
(ENGLISH TEXT SIGNED BY THE STATE PRESIDENT)
as amended by
National Building Regulations and Building Standards Amendment Act, No. 36 of 1984
National Building Regulations and Building Standards Amendment Act, No. 62 of 1989
National Building Regulations and Building Standards Amendment Act, No. 36 of 1995
Mine Health and Safety Act, No. 29 of 1996
[with effect from 15 January 1997]"

The full description of the current edition of Act 103 of 1977 is the following (South Africa, 2011: 4):

> "**To provide for the promotion of uniformity in the law relating to the erection of buildings in the areas of jurisdiction of local authorities; for the prescribing of building standards; and for matters connected therewith**."

The shortened title of the current edition of Act 103 of 1977 is as follows (South Africa, 2011: 33):

> *National Building Regulations and Building Standards Act, 1977*.

The current version of the NBR consists of three parts:

- Act 103 of 1977 (South Africa, 2011: 1-33)
- The Regulations (South Africa, 2011: 201-266)
- The Application of the NBR, through the Deemed-to-Satisfy Rules (also known as SANS 10400, previously SABS 0400) (South Africa, 2011: 301-460)

The applicable documents are for reference purposes included in Addenda C and D.

2.5.1 Background

The first set of Standard Building Regulations (SBR) was published by the Department of Civil Engineering and Packaging Services of the SABS in 1970. This standard was voluntary, and it was followed by a metric version in 1972. However, the majority of LAs continued to use their own building by-laws. In 1974 the SABS started preparing a new set of building regulations based on a more flexible approach.

In 1977, the then Minister of Economic Affairs chaired an *Anti-inflation Committee* that investigated ways to reduce medium and long-term inflation. Part of the recommendations by the committee was for the formulation of a national set of building regulations. “It was the Minister’s anti-inflation committee which instigated (the) promulgation of the Act, its primary objective being to reduce building costs in the medium to long term” (Bevis & Misselbrook, 1997: 4).

Act 103 of 1977 was passed by Parliament on 22 June 1977.

The first draft of the NBR was published in the *Government Gazette* in 1981 and solicited a response of nearly 1100 pages. After restructuring the regulations through various evaluation committees, the first workable set of regulations in the NBR was published on 1 March 1985, with an effective implementation date of 1 September 1985 (Bevis & Misselbrook, 1997: 1).

2.5.2 The development and evolvement of NBR legislation

Already during the first year of implementation a number of shortcomings were identified. An administrative decision was taken to remove the Deemed-to-Satisfy Rules from future gazetted NBRs, with only the functional requirements remaining. This resulted in all the Deemed-to-Satisfy Rules being published as part of a separate (and new) SABS Code of Practice (Code). In response to objections received, the *Mark II* version of the NBR was published on 10 June 1988, defining the aforementioned functional requirements. At the same time, the SABS released the new *SABS 0400: The Application of the National Building Regulations,* which contained the updated Deemed-to-Satisfy Rules (Bevis & Misselbrook, 1997: 2-3). This Code for *The Application of the National Building Regulations (First Revision)*

was approved by the Council of the SABS on 23 August 1990 (SABS, 2010a: 2). The amended version of the NBR was published in *Gazette* Notice No. R.2378 on 12 October 1990, and the SABS shortly afterwards issued the accompanying 0400 Code.

In the preface to this code it was envisaged that revised versions of the code and, if necessary, the regulations would be published at 5-yearly intervals (SABS, 2010a: 4). However, the first revised version was published sooner, on 8 March 1991, in Government Notice No. R.432. It incorporated further objections to and proposals for the 1990 code.

Three technical corrections were published on 22 May 1996, and on 30 July 1999 the only amendment to the NBR addressed *Regulation A13 (1)(b): Building Materials and Tests* (SABS, 2010a: 2). Despite the original intention, no revisions were published in either 2000 or 2005. On 30 May 2008, Notice No. R.574 was published in the *Government Gazette* No. 31084, on recommendation of the Council of the SABS, and

> "….the honourable Minister of Trade and Industry, Minister M Mpahlwa, declared that … under Section 17(3) of the National Building Regulations and Building Standards Act (Act 103 of 1977), particular … regulations … [will] come into operation on … 1 October 2008" (Government Gazette, No. 31084, 30 May, 2008: 45-68).

Table 9 summarises the development and evolvement of the NBR as a legislative instrument that governs the erection of buildings in South Africa (Bevis & Misselbrook, 1997: 2-3), (personal communication with Opperman, 3 March 2011):

Table 9: Summary of legislative development and amendment of the NBR and the direct influences thereof

Gazette		Act No./ Government Notice No.	Title/Description	Date of operation
Date	**No.**			
30 May 1945	[?]	*A.24 of 1945*	The SABS established as a statutory body	1 Sept 1945
22 June 1977 (assented)	n/a	*A.103 of 1977*	*NBR and Building Standards Act, 1977*	See ***R.441***
[6 Jul 1977]	*564*	*A.103 of 1977*	*NBR and Building Standards Act, 1977*	[?]
[1981]	[?]	[?]	NBR First draft published in *Gazette* (soliciting a response of 1100 pp)	[?]
17 Mar 1982	*8082*	*A.30 of 1982*	Standards Act, 1982 (30 of 1982)	*1 May 1982*
4 Apr 1984	*9513*	*A.36 of 1984*	*NBR and Building Standards Amendment Act, 1984 (36 of 1984)*	*1 Sep 1985* (commencing)
1 Mar 1985	*9613*	***R.441***	First workable set of NBR published	*1 Sep 1985*
13 Sep 1985	*9927*	*2074*	Review Board Regulations	*13 Sep 1985*
13 Sep 1985	*9927*	*2075*	Report to the Minister (regulations regarding adequacy of certain LA measures)	*13 Sep 1985*
13 Sep 1985	*9927*	*2076*	Servitudes or Restrictive Conditions Over Land (regulations regarding the Minister's power to remove such restrictions or servitudes)	*13 Sep 1985*
25 Apr 1986	*10205*	*798*	*NBR and Building Standards Act, 1977* (Rectification Notice)	*1 May 1986*
25 Jun 1986	*10304*	*A.58 of 1986*	*Black Local Authorities Amendment Act, 1986 (58 of 1986)*	*15 Aug 1986*
10 Jun 1988	*11333*	*R.1081*	*NBR and Building Standards Act, 1977 (103 of 1977)* NBR (Mark II)	*1 Oct 1988*
19 Aug 1987	[?]	[?]	SABS releases *SABS 0400*	[?]
26 Aug 1988	*11474*	*R.1726*	*NBR and Building Standards Act, 1977 (103 of 1977)*	*1 Oct 1988*
30 May 1989	*11901*	*A.62 of 1989*	*NBR and Building Standards Amendment Act, 1989 (62 of 1989)*	*30 May 1989*
23 Aug 1990	n/a	n/a	*SABS 0400 (1st revision)* approved by SABS Council	See ***R.432***
12 Oct 1990	*12780*	*R.2378*	*SABS 0400 (1st revision)* promulgated under *Section 17(1)*	See ***R.432***
28 Aug1990	[?]	[?]	0400 is issued by SABS	[?]
8 Mar 1991	*13054*	***R.432***	Commencement of Regulations in terms of *Section 17(3)(b)*	*8 Mar 1991*
4 Oct 1995	*16717*	*A.49 of 1995*	*NBR and Building Standards Amendment Act, 1995*	*4 Oct 1995*
22 May 1996	[?]	[?]	*SABS 0400: 1990 Technical Corrigendum* 1 (pp. 13, 45, 135)	[?]
14 Jun 1996	*17242*	*A.29 of 1996*	*Mine Health and Safety Act, 1996*	*15 Jan 1997*
[?]	n/a	n/a	*SABS 0400 (2nd revision)* approved by SABS Council	[?]
30 July 1999	*20314*	*R.919*	Regulations in terms of *Section 17(1)* of Act 103 of 1977 are amended	[?]
30 July1999	*20314*	*R.919*	*SABS 0400: 1990 Amendment of Regulations A13(1)(b)*	[?]
30 May 2008	*31084*	*R.574*	Regulations in terms of *Section 17(3)* of Act 103 of 1977 are amended	*1 Oct 2008*
4 July 2008	*31216*	*A.5 of 2008*	*National Regulator of Compulsory Regulations Act, 2008 (5 of 2008)* (regulatory functions transferred from	*1 Sept 2008*

			SABS to NRCS)	
Following the formation of the NRCS, as a separate entity from SABS, the *SABS 0400* (old blue file) becomes *SANS 10400* consisting of 22 stand-alone chapters A to W that are published individually.				
n/a			*SANS 10400: The application of the NBR* *SANS 10400-F:* *Part F: Site operations*	Published on *13 May 2010*
n/a			*SANS 10400: The application of the NBR* *SANS 10400-N:* *Part N: Glazing*	Published on *26 Feb 2010*
Circulated on: 1 June 2010 *Public comment until: 30 July 2010*			*SANS 10400: The application of the NBR* *SANS 10400-A:* *Part A: General principles and requirements*	Published on *17 Nov 2010*
Circulated on: 15June 2010 *Public comment until: 13 Aug 2010* and again from 1 March 2011 to 3 May 2011			*SANS 10400: The application of the NBR* *SANS 10400-XA:2010* *Part X: Environmental sustainability* *Section A: Energy usage in buildings*	n/a

2.5.3 Act 103 of 1977

Act 103 of 1977 consists of the following 34 sections (South Africa, 2011: 11-33):

1. Definitions
2. Application of Act
3. Duties of draftspersons of plans, specifications, documents and diagrams
4. Approval by LAs of applications in respect of erection of buildings
5. Appointment of BCO by LA
6. Functions of building control officers
7. Approval by LAs in respect of erection of buildings
8. Power of court in respect of approval by LAs
9. Appeal against decision of LA
10. Erection of buildings in certain circumstances subject to prohibition or conditions
11. Erection of buildings subject to time limit
12. Demolition or alteration of certain buildings
13. Exception of buildings from the NBR and the authorisation for erection thereof
14. Certificates of occupancy in respect of buildings
15. Entry by BCOs and certain other persons of certain buildings and land
16. Report on adequacy of certain measures and on certain building projects
17. The NBR and directives
18. Deviation and exemption from the NBR
19. Prohibition on use of certain methods or materials

20. Regulations
21. Order in respect of erection and demolition of buildings
22. Power of LAs relating to rates, taxes, fees and other moneys
23. Exemption from liability
24. General penalty clause
25. Presumption
26. Payment of certain moneys to LAs
27. Powers of Minister in respect of certain LAs
28. Delegations of powers
29. Repeal of laws
30. Repeal of section 30 by section 1 of Act 62 of 1989
31. Repeal of section 14 of Act 33 of 1962, as inserted by section 4 of Act 72 of 1964
32. Repeal of section 32 by section 40(1) of Act 30 of 1982
33. Repeal of section 33 repealed by section 6 of Act 36 of 1984
34. Short title and commencement

The full documents are included in Addenda C and D for reference purposes. The different sections are next discussed briefly (in order of appearance).

2.5.3.1 Section 1: Definitions

Act 103 of 1977 provides broad meanings to particular words (Bevis & Misselbrook, 1997: 5). For instance, the term 'building' is described as follows:

> "**"building"** includes -
>
> (a) any other structure, whether of a temporary or permanent nature and irrespective of the materials used in the erection thereof, erected or used for or in connection with –
>
> (i) the accommodation or convenience of human beings or animals;
>
> (ii) the manufacture, processing, storage, display or sale of any goods; [Sub-para. (ii) substituted by s. 1 (b) of Act 62 of 1989.]
>
> (iii) the rendering of any service;
>
> (iv) the destruction or treatment of refuse or other waste materials;
>
> (v) the cultivation or growing of any plant or crop;
>
> (b) any wall, swimming bath, swimming pool, reservoir or bridge or any other structure connected therewith;
>
> (c) any fuel pump or any tank used in connection therewith;
>
> (d) any part of a building, including a building as defined in paragraph (a), (b) or (c);
>
> (e) any facilities or system, or part or portion thereof, within or outside but incidental to a building, for the provision of a water supply, drainage, sewerage, stormwater disposal, electricity supply or other similar service in respect of the building." (South Africa, 2011: 11-12)

2.5.3.2 Section 2: Application of Act 103 of 1977

Act 103 of 1977 is applicable in the area of jurisdiction of any LA, but the Minister may exempt an area through a notice in the Gazette. Sections 2(3) and 2(4) explicitly state that the Government is not obliged to submit plans for approval, but must only make a submission for information purposes before the commencement of building (South Africa, 2011: 14-15).

2.5.3.3 Section 3: Duties of draughtsmen of plans, specifications, documents and diagrams

This section requires the person who prepared the plan to provide his name and address, and to communicate a relevant registration number, etc. (South Africa, 2011: 15). The name and address of the owner and/or applicant have to be communicated (South Africa, 2011: 15).

2.5.3.4 Section 4: Approval by LAs of applications in respect of erection of buildings

Section 4(1) prohibits anyone from erecting a building without prior approval from the LA, while section 4(4) states that a person who contravenes this requirement shall be guilty of an offence and liable to a fine on conviction (South Africa, 2011: 16). Section 4(2) requires an application for approval to be made in writing on the form provided by the particular LA (South Africa, 2011: 16). According to section 4(3)(a) an application should contain the name and address of the applicant and/or owner of the land on which the proposed building is to be erected, and section 4(3)(b) states that the application should be accompanied by the plans, specifications, documents and information required under Act 103 of 1977 and any other particulars that may be required by the LA (South Africa, 2011: 16).

2.5.3.5 Section 5: Appointment of a BCO by the LA

This section of Act 103 of 1977 deals with the appointment of the BCO by the LA. It also refers to the qualifications of a BCO, the possible sharing of a BCO between two LAs, and the temporary appointment of a BCO. Under section 5(1) it specifically states that "… a local authority shall appoint a person as building control officer in order to exercise and perform the powers, duties or activities granted or assigned to a building control officer by or under this Act" (South Africa, 2011: 16).

In order to apply the requirements of Act 103 of 1977 (and the corresponding regulations), Act 103 of 1977 accordingly obliges the LA to appoint a BCO. With this appointment certain powers of the LA are delegated to the BCO.

2.5.3.6 Section 6: Functions of the BCO

Act 103 of 1977 describes the functions of a BCO in sections 6(1)(a) to (d). These include making recommendations to the LA on applications brought before the LA, and ensuring that instructions made in terms of Act 103 of 1977 are carried out (South Africa, 2011: 17). The BCO is required to conduct inspections during the erection of a building and should report any non-compliance to the LA.

According to section 6(2), recommendations by the chief fire officer (or his appointee) should be taken into account when a fire protection plan is required. Lastly, section (6)4 allows for the delegation of powers transferred to the BCO (from the LA) to be transferred to an officer under his control (South Africa, 2011: 17). This however, should be done with the written approval of the LA.

2.5.3.7 Section 7: Approval by LAs in respect of erection of buildings

If the LA is satisfied that the application complies with Act 103 of 1977 and other applicable law, it shall grant approval according to section 7(1)(a). The LA can refuse to grant approval in certain instances (South Africa, 2011: 17). Nonetheless, a time limit is imposed on the LA to make known its decision, namely 30 days after receipt of an application less than 500 m², and 60 days after receipt of an application larger than 500 m² (South Africa, 2011: 18). The approved plans have a currency of 12 months according to section 7(5) (South Africa, 2011: 18). Upon written request, the LA may provide provisional authorisation to an applicant to commence with the erection of a building (South Africa, 2011: 18-19). Sections 7(7)(a) and (b) respectively address an application or approval granted before the date of commencement of Act 103 of 1977 (South Africa, 2011: 18-19).

2.5.3.8 Section 8: Power of court in respect of approval by LAs

An applicant may approach a court to direct the LA to perform its duties timeously (South Africa, 2011: 18).

2.5.3.9 Section 9: Appeal against decision of LA

An applicant who feels aggrieved by the refusal of an LA, or by a notice of prohibition, and wishes to dispute the interpretation of the application, may appeal to the review board in terms of sections 9(1)(a) to (c) (South Africa, 2011: 19).

2.5.3.10 Section 10: Erection of buildings in certain circumstances subject to prohibition or conditions

According to sections 10(1)(a) to (b), the LA may prohibit a person from erecting a building (or earthwork) if, in the opinion of the LA, it is not in the interest of good health; it is unsightly; it may become a nuisance to the neighbouring properties; or it will diminish the value of adjoining properties (South Africa, 2011: 20).

2.5.3.11 Section 11: Erection of buildings subject to time limit

The LA may order an owner to resume construction (and to complete the building within a specified period) if more than 3 months pass without any construction activity in terms of s11(1) (South Africa, 2011: 20). The remaining four sections deal with the recourse of an LA, should the owner of such a building fail to resume or complete the specified works.

2.5.3.12 Section 12: Demolition or alteration of certain buildings

If an LA is of the opinion that a building, or the land on which it is situated, or earthwork is dangerous to life or property, it may order the owner to take make remedies (South Africa, 2011: 21-22). Unless the LA gives written permission, the occupation or use of the aforementioned building is not allowed according to section 12(5).

2.5.3.13 Section 13: Exception of buildings from NBR and the authorisation for erection thereof

Sections 13(1)(a) and (b) declare that buildings resorting under the definition of ‘minor building work’ may be exempt from plan submission by the BCO, or may be granted authorisation in accordance with certain conditions (South Africa, 2011: 22-23). Section 13(2) determines the currency of the approval, whereas section 13(3) addresses the method of recourse should an applicant feel aggrieved (South Africa, 2011: 22-23).

2.5.3.14 Section 14: Certificates of occupancy in respect of buildings

Section 14(1) of Act 103 of 1977 states that the LA shall issue a certificate of occupancy (within 14 days after the certificate has been requested) if the LA is of the opinion that a building has been erected in accordance with the requirements of Act 103 of 1977 and other relevant conditions (South Africa, 2011: 23). However, section 14(1A) determines that a building may be used for a certain period subject to particular conditions before the certificate of occupancy is issued (South Africa, 2011: 22-23). According to section 14(2), the registered electrician responsible for the installation has to issue a certificate stating that the electrical wiring and installation is in accordance with the provisions of all applicable laws (South Africa, 2011: 23).

Section 14(2A) requires the submission of a certificate to the LA upon completion of the structural system, the fire protection system, and the fire installation system (South Africa, 2011: 24). Sections 14(3) and (4) deal with any contraventions of the above requirements, while section 14(5) addresses Ministerial exemptions (South Africa, 2011: 24).

2.5.3.15 Section 15: Entry by BCOs and certain other persons of certain buildings and land

Sections 15(1) to (3) address access to a building or land at a reasonable time by the LA to conduct an inspection (South Africa, 2011: 24-24(1)).

2.5.3.16 Section 16: Report on adequacy of certain measures and building projects

The Minister may request the LA to report on the adequacy of measures against fire, floods or other disasters and request recommendations to mitigate the aforementioned (South Africa, 2011: 24(1)-25).

2.5.3.17 Section 17: NBR and directives

Mulholland and Matshe (2010) state that section 17(1) of the NBR and Building Standards Act (103 of 1977) does not only regulate building standards but take cognisance of environmental issues. Examples listed by Mulholland and Matshe (2010) are the handling of waste material on site and provisions relating to contaminated land. “The NBR empowers a local authority to order a site owner to

remove waste which accumulates beyond the normal levels. Failure on the part of the site owner to comply with such an order is a statutory offence. The local authority may also require that the soil in all areas within the site be treated in accordance with the recommendations of SANS 10124" (Mulholland & Matshe, 2010).

2.5.3.18 Section 18: Deviation and exemption from NBR

Upon written request, an LA may permit a deviation from (or grant an exemption of) a national building regulation, except where it relates to the strength and stability of buildings (South Africa, 2011: 28).

2.5.3.19 Section 19: Prohibition on use of certain methods or materials

The Minister may prohibit the use of any method or material that is not in the public interest or dangerous to property or life (South Africa, 2011: 28).

2.5.3.20 Section 20: Regulations

This section focuses on the review board by determining the hearing procedure, the powers, duties and functions of a review board, possible costs involved, etc. (South Africa, 2011: 28-29).

2.5.3.21 Section 21: Order in respect of erection and demolition of buildings

According to the requirements of this section, a magistrate's court has jurisdiction to halt construction works or order a structure to be demolished (when an application to do so is made by the LA or Minister) (South Africa, 2011: 29).

2.5.3.22 Section 22: Power of LAs relating to rates, taxes, fees and other moneys

The LA may charge moneys when executing any duties in terms of this Act (South Africa, 2011: 29).

2.5.3.23 Section 23: Exemption from liability

Section 23(b) states that the owner of a building has to ensure compliance with Act 103 of 1977 or any other applicable law, and exonerates the LA by stating that:

> "[n]o approval, permission, report, certificate or act granted, issued or performed in terms of this Act by or on behalf of any local authority … shall have the effect that (a) such local authority … be liable to any person for any loss, damage, injury or death … resulting from or arising out of or in any way connected with the manner in which such building was designed, erected, demolished or altered … or the material used in the erection … or the quality of workmanship …" (South Africa, 2011: 29).

2.5.3.24 Section 24: General penalty clause

Where the penalty requirements are not expressly stated, a convicted offender under this Act shall be liable to a maximum fine of R4000 or to maximum imprisonment for a period of 12 months (South Africa, 2011: 30).

2.5.3.25 Section 25: Presumption

Section 25 of Act 103 of 1977 is entitled 'Presumption' and states the following:

> "If in any prosecution for an offence in terms of this Act it is necessary, in order to establish the charge against the accused, to prove that he failed to comply with the requirements of this Act … an allegation in the charge sheet that such accused so failed, shall be sufficient proof thereof unless the contrary is proved." (South Africa, 2011: 31)

Bevis and Misselbrook's (1997: 13) interpretation of the above is that "…where an offence relating to the standard or quality of materials, design or workmanship has been committed, the accused is AUTOMATICALLY guilty of the allegations on the charge sheet unless the contrary is proved". The aforementioned stipulation is reiterated by Bevis and Misselbrook, stating that the property owner "…should be aware of the provisions of the guilt presumption incorporated in s 25 of the Act, which basically states that the defendant is automatically guilty of the offences listed on a charge sheet unless he can prove the contrary…" (1997: 36). It could therefore concluded that the NBR require the accused to prove his/her innocence, placing the *onus probandi* on the respondent.

2.5.3.26 Section 26: Payment of certain moneys to LAs

Except for certain exclusions, "…all moneys recovered by way of fines or estreated bail in connection with any offence in terms of this Act … shall be paid to the local authority concerned" (South Africa, 2011: 30).

2.5.3.27 Section 27: Powers of Minister in Respect of Certain LAs

If the Minister "is satisfied that a local authority fails to apply any relevant provision of this Act properly", he may instruct the LA to do forthwith, and if the LA continues to fail in this respect, the Minister may revoke the LA's power in terms of Act 103 of 1977 (South Africa, 2011: 30).

2.5.3.28 Section 28: Delegations of powers

In terms of section 28(1) to (3) the Minister, council and director-general of the bureau (SABS) may delegate any conferred power to specific persons or organisations in writing (South Africa, 2011: 30-31). The LA may delegate any power conferred upon it to any appointed committee or employee (South Africa, 2011: 31).

2.5.3.29 Section 29: Repeal of laws

This Section of Act 103 of 1977 removed the power of the LAs to make any building by-laws. Section 29 specifically states:

> "**Repeal of Laws.** –(1) …the provisions of any law applicable to any local authority are hereby repealed in so far as they confer a power to make building regulations or by-laws regarding any matter provided for in this Act…" (South Africa, 2011: 31).

According to Bevis and Misselbrook (1997: 9-11), the legislators' intention with Amendment Act 62 of 1989 was to remove any municipal by-laws for building elements that are covered by the NBR. Glazewski supports this viewpoint by stating that "[t]he purpose of this Act [103 of 1977] is to provide uniformity in the law relating to the erection of buildings … and to prescribe building standards" (2000: 253).

Provisions were made where a building regulation, or by-law, or standard building regulation is not covered by the NBR, or alternatively where the building regulation, or the by-law, or the standard building regulation is 'repugnant' (in conflict) with the

NBR (South Africa, 2011: 31). These provisions include, among others, sections 29(2), 29(8)(a) and 31 of Act 103 of 1977. They are subject to the approval of the Minister of Trade and Industry, should be submitted within a particular time frame, and require a notice to be published in the *Government Gazette* (South Africa, 2011: 31-33).

2.5.3.30 Section 30

Section 30 was repealed by section 40(1) of Act 30 of 1982 (South Africa, 2011: 33).

2.5.3.31 Section 31: Repeal of Section 14*bis* of Act 33 of 1962, as inserted by section 4 of Act 72 of 1964

"Section 14*bis* of the Standards Act is hereby repealed…" (South Africa, 2011: 33).

2.5.3.32 Section 32

Section 32 was repealed by section 40 (1) of Act 30 of 1982 (South Africa, 2011: 33).

2.5.3.33 Section 33

Section 33 repealed by section 6 of Act 36 of 1984 (South Africa, 2011: 33).

2.5.3.34 Section 34: Short Title and Commencement

The shortened title for this Act is "the National Building Regulations and Building Standards Act, 1977, and shall come into operation on a date fixed by the State President by proclamation in the *Gazette*" (South Africa, 2011: 33).

2.5.4 The integration of the NBR with other laws applicable to the built environment

In the publication entitled *The Home Builder's Handbook on the NBR*, Bevis and Misselbrook (1997: 4) warn against reading and interpreting Act 103 of 1977, the Regulations and the Deemed-to-Satisfy Rules in isolation, referring to the interrelated and complementing nature of the documents. These aspects are only discussed briefly, as they are not the focus of this study.

According to Bevis and Misselbrook (1997: 8), any conflict between the NBR and town planning requirements should be resolved by assuming that the "… more restrictive requirement will prevail".

The necessity of an integrated approach towards built environment legislation is further emphasised by Holden (2006) when he discusses the stipulation in Act 103 of 1977 that determines the approval parameters of a building plan application (submitted to an LA) in terms of section 7(1)(a) of Act 103 of 1977:

> "If a local authority having considered a recommendation referred to Section (6)(a)… is satisfied that the application in question complies with the requirements of this Act and any other applicable law [author's underlining], it shall grant its approval in respect thereof."

It could be argued that the reference to 'any other applicable law' obliges an LA (and therefore the applicant) to operate in accordance with the relevant municipal by-laws, relevant Provincial Ordinances, and other relevant laws that govern the South African built environment. At the same time, the SABS warns that the Code is a complex document that cannot be incorporated with existing municipal by-laws without proper consideration. The following statement is made by the SABS:

> "Authorities who wish to incorporate this Code of Practice into legislation in the manner intended by Section 33 of the Act should consult the South African Bureau of Standards regarding the implications concerned. The code includes provisions intended for information and guidance only. These provisions may not be suitable for direct incorporation." (SABS, 2010a: 2)

Addendum B provides a comprehensive list of the regulations applicable to the South African built environment.

2.5.5 Interpretation of Act 103 of 1977, NBR and SABS 0400

Act 103 of 1977 supplies definitions under section 1 (South Africa, 2011: 11-14) and the Regulations provide definitions under Part AZ2 (South Africa, 2011: 206-217), while definitions for the application of the NBR through the Deemed-to-Satisfy Rules are listed under section 2 (South Africa, 2011: 309-325).

"The importance of reading the 'definitions' sections of the Act, NBR and 0400 [10400] cannot be overstressed. Certain words are given meanings which extend beyond their common usage meanings." (Bevis & Misselbrook, 1997: 7) For example, the term 'habitable room' is given a meaning that extends beyond common usage, and includes not only bedrooms and living rooms, but also a kitchen, laundry, office, shop, etc. (Bevis & Misselbrook, 1997: 7).

2.5.6 Organisation of the NBR, Deemed-to-Satisfy Rules, and SABS 0400

Each part of the NBR states its non-prescriptive functional requirements at the onset. This is followed by a reference to a relevant Code of Specification which, if adhered to, will 'deem to satisfy' the stated functional requirements:

> "[t]he NBR are organised in a logical sequence, starting with Parts A to F which cover administrative, health, strength and stability and site related aspects. Then follow Parts G to W, most of which deal with particular building elements, roughly in the order in which one would expect a …. building to be constructed" (Bevis & Misselbrook, 1997: 5).

The SABS 0400 is organised in a similar fashion, with the different parts listed in the same alphabetical order. The Deemed-to-Satisfy Rules (most of which are empirical) are stated under each part of Code 0400, or another SABS code or specification is referred to (Bevis & Misselbrook, 1997: 5).

2.5.7 SABS 0400 as regulating instrument

S 4(1) of Act 103 of 1977 states that:

> "[n]o person shall without the prior approval in writing of the local authority in question, erect any building in respect of which plans and specifications are to be drawn and submitted in terms of this Act" (South Africa, 2011: 16).

During the application process, the LA issues a 'notice of approval' in terms of building plans and specifications to the applicant. It is argued that the application and subsequent notice serve as controlling instruments ensuring compliance with the Deemed-to-Satisfy Rules of the NBR.

This notice of approval represents Act 103 of 1977 and all its relevant requirements and, should the applicant conform to the materials and methods as described in the application, the structure should be fit for its purpose. However, the owner of the property (or his agent) remains the legally responsible person, because section 23 of Act 103 of 1977 exonerates the LA from any liability should any associated damage, injury or death occur.

The implementation and regulation of the current version of the NBR take place through the following stages and inspections:

- Stage 1: An application is lodged at the relevant LA.
- Stage 2: A 'notice of plan approval' is issued to the applicant.
- Stage 3: The following site inspections take place after the LA is requested to be in attendance (a specific number of working days' notice to the LA are required for each inspection):
    - Inspection 1: Commencement and/or demolition
    - Inspection 2: Fire installation connection
    - Inspection 3: Foundation trenches/excavations
    - Inspection 4: Drainage
    - Inspection 5: Occupation certificate

2.5.8 The changing objectives of Act 103 of 1977 and the NBR

According to Bevis and Misselbrook (1997: 1), the objective in establishing Act 103 of 1977 represented an attempt to curb the inflation cycle at a time when construction costs were spiralling upwards, and these standards were a direct result of the 1977 recommendations of an 'Anti-Inflation Committee' under the auspices of the then Minister of Economic Affairs. It could thus be argued that the goal of the NBR (and also the Code) is to stem inflationary tendencies in the built environment. Bevis and Misselbrook (1997: 2-3) further state that the current South African building regulations contain no regulations on thermal insulation or sound insulation, because "such regulations were considered to be inflationary and therefore only the minimum acceptable levels of comfort, to ensure reasonable health and safety standards, have been taken into consideration in the NBR and 0400". The aforementioned argument could however be challenged by citing rising electricity costs and current tariffs together with the spiralling environmental cost of supplying electricity.

The original objective in establishing Act 103 of 1977 required the NBR to be less restrictive than most municipal building by-laws, "…without sacrificing safety, health, strength and stability criteria" (Bevis & Misselbrook, 1997: 1-4). A high degree of flexibility in building design, material selection and construction methods was achieved by "…employing a 'performance' concept, rather than imposing 'prescriptive' requirements" (Bevis & Misselbrook, 1997: 4).

Unfortunately, the non-prescriptive performance approach made universal application difficult. This led to the formulation of the so-called Deemed-to-Satisfy Rules through which a benchmark was defined that suggested type, size, etc., for different materials and methods.

The definition of a 'deemed-to-satisfy rule' as listed under section 2 of the Application of the NBR (South Africa, 2011: 312) provides the following guidance:

> "**"deemed-to-satisfy rule"** (or rule) means a **non-mandatory provision** which describes a method of design or construction that is deemed to comply with a particular functional regulation."

Bevis and Misselbrook state that the Deemed-to-Satisfy Rules are not mandatory, "IT IS IMPORTANT TO NOTE, HOWEVER, THAT THE 'DEEMED TO SATISFY' RULES ARE NOT OBLIGATORY. They are merely there for the convenience of the user who, in employing the rules, will be assured that his plans will be acceptable to any LA in this country." (1997: 5) [14] This interpretation is supported by the National Home Builders Registration Council (NHBRC) in the publication on the *Assessment of Housing Products* (under the auspices of the Centre for Housing Performance Excellence (CHPE)) where it is assumed that "[c]ompliance with the Deemed-to-Satisfy Rules is a straightforward means of ensuring that the Regulations have been applied" (NHBRC, 2005: 2). However, Deemed-to-Satisfy Rules are not Regulations and therefore not mandatory" (NHBRC, 2005: 2).

Bevis and Misselbrook (1997:5) come to the following conclusion concerning the requirements of the NBR:

[14] Author's note: The sentence case is unaltered and appears as such in the source document.

> "THE NBR ARE [the] MINIMUM REQUIREMENTS AS FAR AS THE USER IS CONCERNED, WHEREAS THEY ARE MAXIMUM REQUIREMENTS AS FAR AS THE LAs ARE CONCERNED."[15]

The CHPE of the NHBRC states that the role of the Act is to "form a basis on how the development of buildings and their surroundings are to be done in order to suit human habitation" (2005: 1). This statement does not mention its original objective, i.e. to limit inflation in the construction industry, whereas the building, its surrounding environment and human habitation are given significant importance.

2.6 TRANSFERRED FUNCTIONS FROM THE SABS TO THE NRCS

The (SABS) was established as a statutory body under Act 24 of 1945, and continues to function as the national standards organisation under the Standards Act, 2008 (Act 29 of 2008). Historically the SABS was responsible for certain regulatory functions, and in the case of SABS 0400, for the writing of the NBR and the Deemed-to-Satisfy Rules. It also made recommendations to the Minister concerning Act 103 of 1977. The SABS was tasked with amending the regulations and codes, and with implementing the interpretation thereof through the Review Board. However, this was perceived as a conflict of interest and it was argued that a distinction should be made between the writers of the regulations (to comply with Act 103 of 1977), and the writers of the codes (the so-called Deemed-to-Satisfy Rules) (personal communication with Opperman, 13 May 2010).

The promulgation of the National Regulator for Compulsory Specifications Act (Act 5 of 2008) in the *Government Gazette* 31216 on 4 July 2008 brought about a number of changes. In keeping with international best practice, and to meet the requirements of the World Trade Organization (WTO) agreement on *Technical Barriers to Trade* (WTO TBT Agreement), Act 5 of 2008 transferred the Regulatory Division of the SABS and all its regulatory functions to a new statutory body. Resorting under the Ministry of Trade and Industry, the newly formed National Regulator for Compulsory Specifications (NRCS) took over the regulatory responsibility of the SABS on

[15] Author's note: The sentence case is unaltered and appears as such in the source document.

1 September 2008 (Marais, 2009: [1]). According to Marais (2009: [1]), the objectives of the NRCS can be summarised as follows:

- Make recommendations to the Minister with regard to compulsory specifications
- Administer and maintain compulsory specifications
- Undertake market surveillance through inspection in order to monitor compliance with compulsory specifications
- Enforce compliance with compulsory specifications

2.7 SANS 10400

The new legislation required a number of changes; and in the future the standards would not be known as SABS standards, but rather as South African National Standards (SANS). Accordingly, the name of the code of application of the NBR through the Deemed-to-Satisfy Rules was changed to the following:

> "SANS 10400:1990 SOUTH AFRICAN STANDARD Code of Practice for the application of the National Building Regulations [National Amendment 1990-08-01, National Amendment 1996-05-22]." (SABS, 2008c)[16]

According to Watermeyer ([2008]: [6]), the following additional amendments were made to the NBR:

- The text was cleaned up and updated.
- Greater clarity and efficacy was introduced regarding the performance-based regulatory framework.
- The procedures surrounding the appointment of competent persons were described in detail.
- Transitional measures were defined.
- New issues that were addressed included contaminated land, dolomite land and geotechnical site investigations.

Universal accessibility and environmental sustainability remain the shortcomings of the amended regulations that were published in the *Government Gazette* on 30 May 2008. Although the new regulations took effect on 1 October 2008 (Watermeyer,

[16] Author's note: The sentence case is unaltered and appears as such in the source document.

2008: 7), the second edition of the SABS 0400-1990 is still used for the most part (albeit under a new name) and the third edition is yet to be published.

2.7.1 Organisation of the NBR, Deemed-to-Satisfy Rules and SANS 10400

SANS 10400 consists of Parts A to D and F to W. SANS 10400-A is labelled *General principles and requirements*, and provides the overall framework for the application of the NBR. Each consecutive section is written separately and only deals with one specific part of the regulations, although each particular section should be applied within the framework of the whole, as established in SANS 10400-A (SABS, 2010a: [Part N, ii]).

As a change from the previous format, each part of SANS 10400 is now organised according to the following headings (SABS, 2010a: [Part N, ii][17]):

- Acknowledgement
- Foreword
- Introduction
  1. Scope
  2. Normative references
  3. Definitions
  4. Requirements
- Annexures

According to Watermeyer ([2008]: [6]), a substantial number of the existing SABS 0400 standards have been re-written, while the remainder were updated or informed with new content ([2008]: [14]): Regulation A2(6) was included as an amendment to the NBR and SANS 10400 to address works executed during the transitional phase.

Regulation A2(6) (South Africa, 2011: 222) states that:

> "Where design work has commenced before an amendment in regulation or an amendment to SANS 10400 and an application has not been made, an owner may within 6 months…

[17] Author's note: Part N is included as a separate leaflet to SANS 10400, and is therefore numbered as such in the references.

- notify the local authority accordingly; and…
- continue with the current regulations and version of SANS 10400…

provided that the application is made within 12 months of the local authority accepting that work has commenced".

However, the May 2010 edition of SANS 10400:1990 indicates that the second edition is currently still in use, and a number of the changes envisioned have not been implemented (see 2.7).

Although Act 103 of 1977 (read with its successive amendments) still regulates the South African built environment, it should be noted that the legislative context of South Africa has changed since the first democratic elections in 1994. The subsequent promulgation of the Constitution of South Africa in 1996 established the right of the South African citizen to a particular environment (and access to housing), among other things. Table 10 provides a summary of the tiered outline of the legislative level (number one), the regulatory level (number two), and the interpretation and application level (number three). Level 2 lists the components that comprise a particular part, while Level 3 communicates the part and which particular version (SABS 0400 or SANS 10400) is currently in use (South Africa, 2011; SABS, 2010a; personal communication with Opperman, 13 May 2010 and 3 March 2011). The different levels are positioned under the umbrella of the Constitution, which makes specific reference to sustainable development.

Table 10: The organisational structure of the NBR within the context of the South African Constitution

CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA, ACT 108 OF 1996
Chapter 2, Section 24, Environment

Everyone has the right

a. to an environment that is not harmful to their health or well-being; and
b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that
   i. prevent pollution and ecological degradation;
   ii. promote conservation; and
   iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

Level 1
The NBR and Building Standards Act (103 of 1977)

Statutory requirements			
	Definitions	Section:	1
	Scope	Sections:	2, 29-34
	Duties and tasks of the LA	Sections:	4 -8, 11, 14, 15, 21- 23, 27, 28
	Duties and tasks of draughtsmen	Section:	3
	Duties and recourses of applicant	Sections:	9, 13, 18, 24-26
	Safety and Security	Sections:	10, 12
	Requests by (and duties of) the Minister	Sections:	16, 17, 19, 20

Level 2
The National Building Regulations

Level 3
The SANS Code of Practice for **The application of the NBR** through the Deemed-to-Satisfy Rules of **SANS 10400**

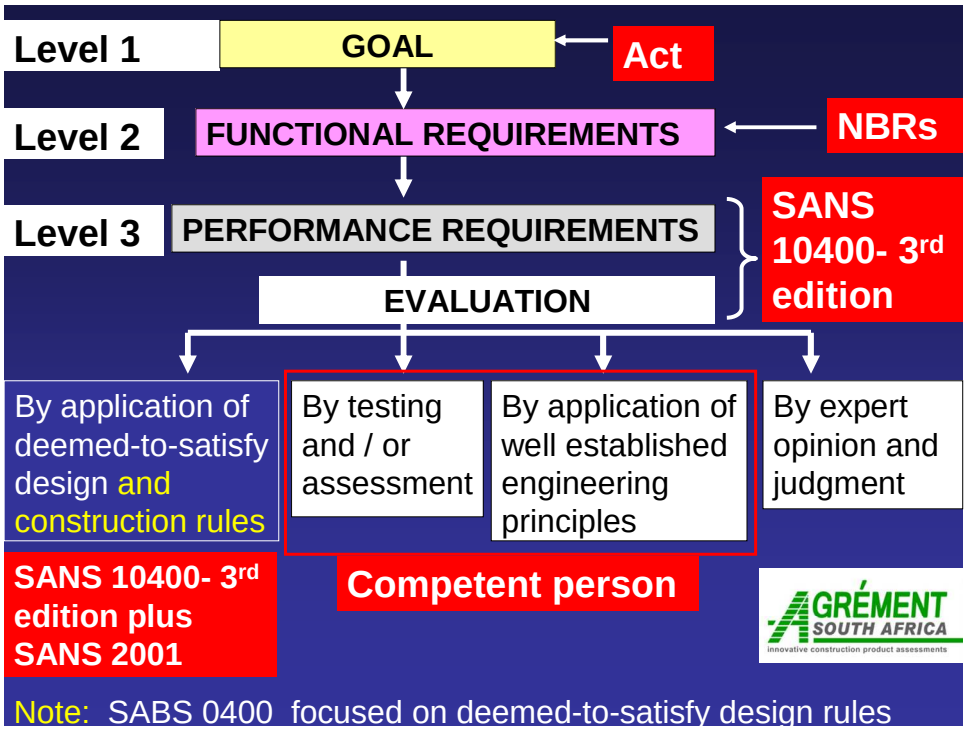
		Responsible entity	**SABS** (Standards)	**NRCS** (Regulations)		
Focus area	**Description**	**Part:**	Sub-part	**Part**	**Origin** SABS	SANS
Introduction	Coming into operation	**AZ 1**		nil	n/a	n/a
	Definitions	**AZ 2**		No 2 (11 pp)	●	
	Standards	**AZ 3**		nil	n/a	n/a
	Scope	nil		No 1 (¼ p)	●	
	Compliance with Regulations	nil		No 3 (½ p)	●	
Administrative, health, strength and stability, and site-related aspects.	Administration	**A**	A1-A25	nil	●	
	Structural Design	**B**	B1	BB 1- BB4	●	
	Dimensions	**C**	C1	CC1-CC4	●	
	Public Safety	**D**	D1-D5	DD1-DD4	●	
	Demolition Work	**E**	E1-E4	nil	●	
	Site Operations	**F**	F1-F11	F1-F11		●
Specific building elements in the approximate order of erection.	Excavations	**G**	G1-G2	GG1-GG2	●	
	Foundations	**H**	H1	HH1-HH2	●	
	Floors	**J**	J1	JJ1-JJ3	●	
	Walls	**K**	K1-K5	KK1-KK17	●	
	Roofs	**L**	L1-L3	LL1-LL5	●	
	Stairways	**M**	M1-M3	MM1-MM4	●	
	Glazing	**N**	N1	N1		●
Services 1	Lighting and Ventilation	**O**	O1-O7	OO1-OO7	●	
	Drainage	**P**	P1-P7	PP1-PP28	●	
	Non-Water-Borne Means of Sanitary Disposal	**Q**	Q1-Q3	QQ1-QQ3	●	
	Stormwater Disposal	**R**	R1-R2	RR1-RR6	●	
Accessibility	Facilities for Disabled Persons	**S**	S1-S3	SS1-SS9	●	
Services 2	Fire Protection	**T**	T1-T2	TT1-TT57	●	
	Refuse Disposal	**U**	U1-U3	nil	●	
	Space Heating	**V**	V1	VV1-VV4	●	
	Fire Installation	**W**	W1-W4	WW1- WW 5	●	
Administrative	Repeal of Regulations	**X**		nil	n/a	n/a
Sustainability	Environmental Sustainability	**X**	XA	nil	n/a	n/a
	Energy Efficiency and Energy Usage in Buildings (circulated on 2010-06-15)		**XA**	XA1-XA3		●

2.7.2 A changing approach

Watermeyer (2003: 8) states that the SABS 0400 focused on the Deemed-to-Satisfy Rules, whereas the SANS 10400 will emphasise performance-based regulations. Despite the different goals of the two documents, the organisational structure of the original SABS 0400 remains largely intact in the new SANS 10400. The statutory application of Act 103 of 1977 still takes place through a tiered structure, and an integrated approach to its interpretation should remain the aim of the built environment practitioner.

Watermeyer (2008: 8) illustrates the performance base of SANS 10400 (Figure 3), while the associated statutory levels are indicated.

Figure 3: The Performance-based approach of SANS 10400 (Watermeyer, [2008]: [slide 8])

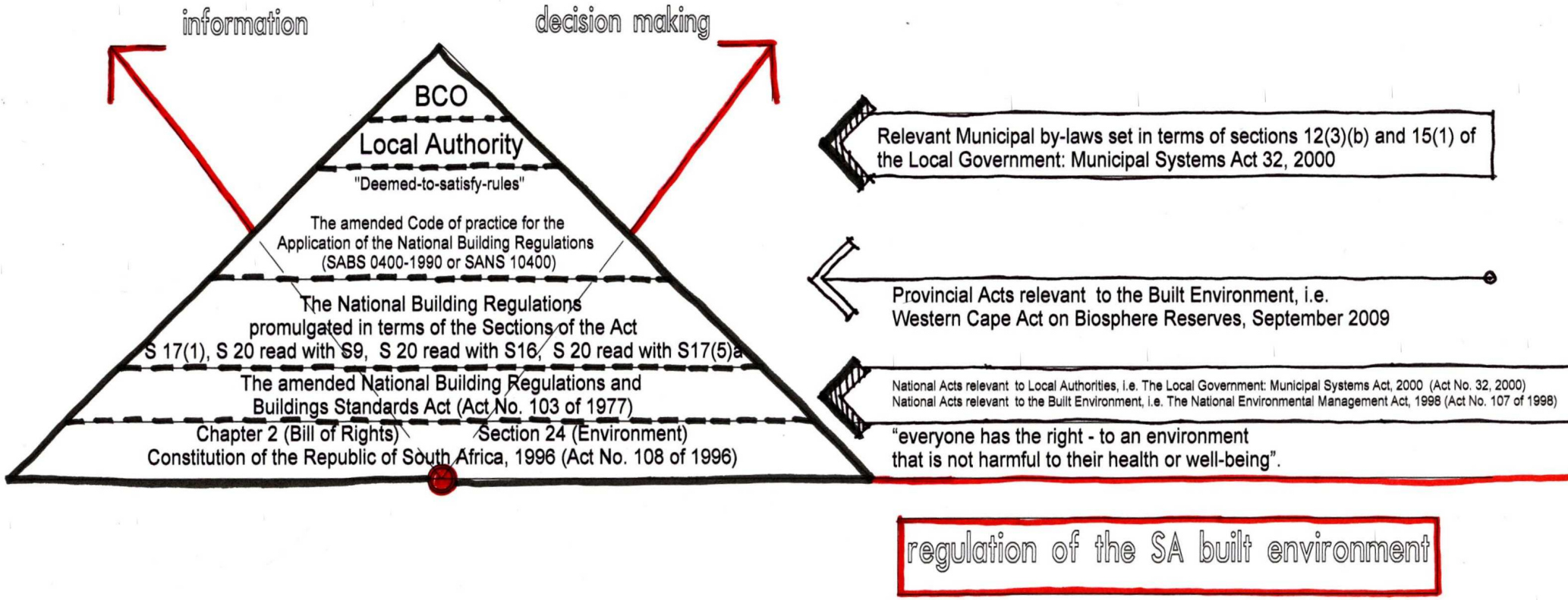


2.7.3 Implementation

In terms of the relevant sections of Act 103 of 1977, the LA should appoint the BCO to ensure the implementation of Act 103 of 1977 and the associated NBR through the code. Based on the requirements of Act 103 of 1977 and the NBR, the BCO should perform the duties associated with the regulation of the built environment. As discussed earlier (under the NBR as regulating instrument), the BCO has three stages and five inspections in which to complete his required duties.

On the other hand, the complexities in existing statutory requirements influencing the South African building industry should be acknowledged. The BCO (as officer responsible for implementing the regulations) is influenced directly and indirectly by a number of legislative instruments, and this multifaceted relationship is illustrated in Figure 4.

Figure 4: The implementation of statutory regulations in the South African built environment



It should be kept in mind that the Code is not the only option for the implementation of Act 103 of 1977 and its regulations. As stated earlier, the Deemed-to-Satisfy Rules are not compulsory and there are other avenues available to implement particular requirements. These routes include the following options:

- The use of other SANS codes
- Innovative design by a competent person
    - The design is either tested or assessed by the competent person.
    - Well-established engineering principles are applied by a competent person.
    - A third party (i.e. Agrément SA) provides an independent assessment of the design.

The SANS 10400-A: 2010, Edition 3 provides the following definition for a competent person (SABS, 2010a: 8):

> "[A] person who is qualified by virtue of his education, training, experience, and contextual knowledge to make a determination regarding the performance of a building or part thereof in relation to a functional regulation or to undertake such duties as may be assigned to him in terms of the National Building Regulations."

2.8 THE WORLD GREEN BUILDING COUNCIL

It is necessary to position current compulsory requirements against the development of voluntary requirements within the industry. The development of Green Building Councils and Green Star SA is therefore touched upon briefly.

In 2002 the World Green Building Council (WorldGBC) was constituted in an attempt to accelerate the transformation of the built environment towards sustainability. According to the WorldGBC, buildings and communities are responsible for over 40% of greenhouse gas emissions (World GBC, 2010).

The goals of the WorldGBC include the following (World GBC, 2010):

- Developing and adopting scientific and market-based environmental rating systems

- Supporting and encouraging teaching and research programmes that raise the knowledge and skills base of 'green' building practitioners
- Promoting the construction and use of buildings and other infrastructure that are environmentally responsible, sustainable, efficient, profitable and healthy
- Campaigning for the recognition of environmentally responsible buildings

The WorldGBC argues that the need to reduce environmental degradation is driving the formation of Green Building Councils (GBC) around the world. The current member nations of the WorldGBC represent 50% of global construction activity (World GBC, 2010).

On the African continent, South Africa is the only full member of the Council. The status of Africa, according to data published on the website of the WorldGBC, is depicted in Table 11 (World GBC, 2010):

Table 11: The current status of the GBC in Africa

Country	GBC status	Council title	Website
Mauritius	**Prospective GBC**	Mauritius (sic)	Not available
Morocco	**Prospective GBC**	Morocco GBC	http://www.moroccogbc.org/
Egypt	**Associated group**	Egypt GBC	http://egypt-gbc.org/
South Africa	**Established GBC**	GBC of SA	http://www.gbcsa.org.za/

To date, Green Star SA has only developed two rating tools, and one piloted tool (see p. 5). As a planning instrument, the success of Green Star SA can only be measured after project completion. Although its aims could be incorporated in the planning stages of projects, it remains a voluntary rating tool. This is in contrast with the NBR, which is used as a controlling instrument to enforce minimum requirements. If the current status quo on regulating and implementation methods remains, the larger part of the formal built environment will not address sustainability challenges, except on a voluntary basis.

During the 2010 UN Habitat Conference on *Green Building Rating Systems in Africa* in Nairobi, Kenya, a declaration was made by decision makers from twenty African countries. This declaration serves as a commitment to promote and foster 'green' building practices in Africa. Although the full declaration is included as Addendum J,

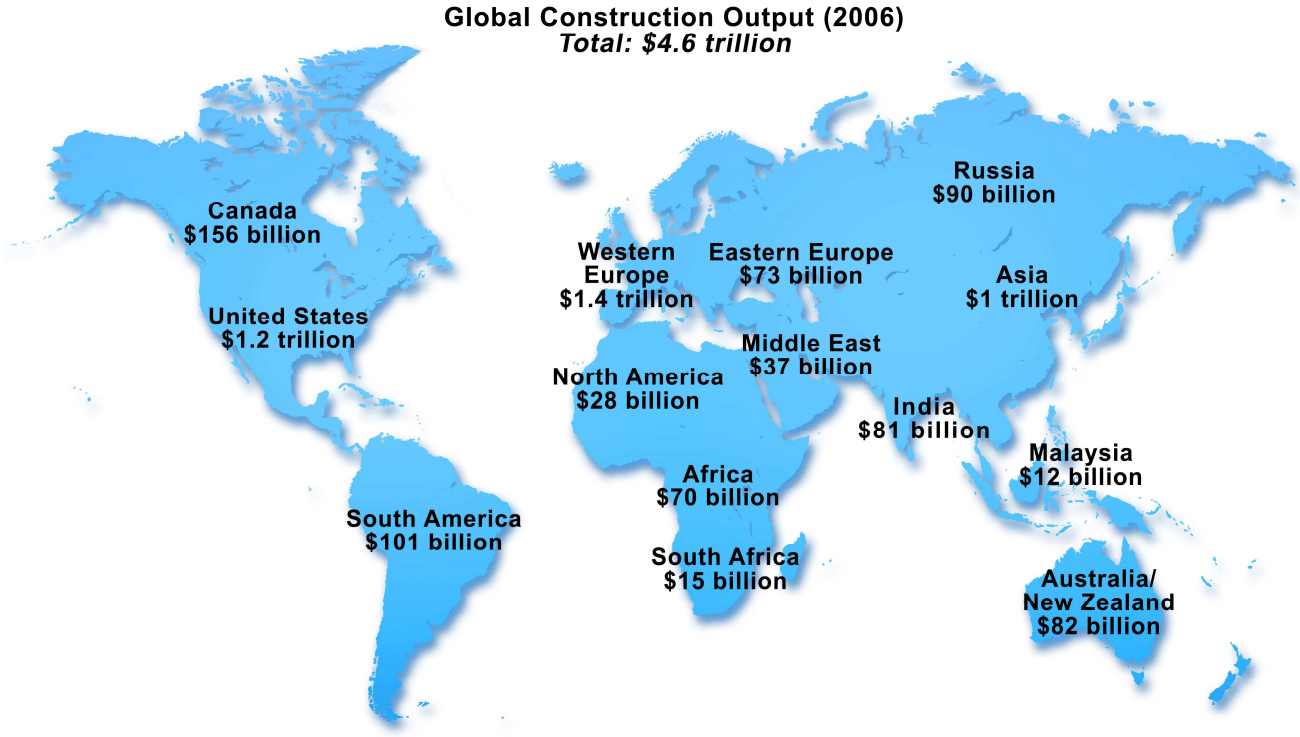
the following selected quotes serve to highlight the importance of this study (UN-Habitat, 2010):

> "…In a continent of rapid urbanization the volume of building operation continues to grow very rapidly and requires close monitoring in terms of its environmental impact.
>
> Africa's intense development pressure, the resulting rapid urbanization and generally carbon intensive mediums of energy generation, leaves (sic) the built environment under particular pressure to thoroughly embrace the sustainability imperative.
>
> Considering that building operations are estimated to be responsible for 56% of energy used in Sub-Saharan Africa…, this is an urgent matter that can no longer be underestimated by decision makers, the building industry and building professionals.
>
> We are committed to being the promoters of green practices, from planning, design, construction and operation of the built environment, as well as to the use of appropriate building materials, technologies, services and processes that minimize CO2 (sic) emissions in our Continent (sic).
>
> We underline the importance of taking into account social and cultural specificities of Africa in particular:
>
> - Exploring traditional practices that have been proved to be environmentally beneficial while addressing the need for mass housing constructions in Africa given the fact of rapidly increasing urban population growth;
> - Addressing the needs of populations at the bottom of the social and economic pyramid that require affordable housing and simple solutions to face economic challenges…"

2.9 THE EXTENT OF THE SOUTH AFRICAN BUILT ENVIRONMENT

According to Malanca (2010: 15), South Africa contributed US $15 billion to the global construction output of US $4.6 trillion in 2006. The values contributed by the various regional markets are indicated in Figure 5.

Figure 5: The 2006 value in US $ of the regional construction markets (Malanca, 2010: 15)



The recorded building plans passed by South African municipalities from 2007 to 2009 for residential buildings, non-residential buildings and additions totalled 61,939,720 m^2 and with a value of R 231,250,619,000 (Stats SA, 2010a)[18], or approximately US $33,8 billion (using January 2011 exchange rates). These amounts indicate the extent of formal growth in the South African built environment, and the enlarging contribution thereof to building activity on the African content. However, the author is concerned that no (or only limited) statutory regulations exist that can direct built environment development towards sustainability ideals.

In *The Architecture of the Well-tempered Environment*, Reyner Banham (1984: 13) declares a "…growing concern about the apparently irreversible depletion of the

[18] This figure excludes government expenditure for which no accurate figures are available at present.

Earth's energy resources and the pollution of its biosphere…" and draws attention to the "…waning confidence of architects in their own ability to deal with energy problems (or opportunities)".

Sir Stuart Lipton (2003: 9) states that "[t]here is a lot of rhetoric around the concept of sustainable development but there are some very practical considerations that you cannot ignore. … [E]nergy efficiency is a function of the services design as well as the overall building concept, which includes orientation, whether windows open … where surface water will go and what users are likely to do about lighting, ventilation and recycling waste; all need to be incorporated into the design approach". Lipton (2003: 3-12) presents the following aspects that should inter alia be considered in building design:

- The location of the building
- The approach to design and construction
- The future use of the building
- The long-term costs of the operation and maintenance of the building

Alaric Napier argues that the majority of buildings in South Africa are conceived without consideration of environmental issues. Napier (2000: [1]) specifically mentions large buildings, which absorb enormous quantities of heat and subsequently require "…re-conditioned interiors…" [19] to render them habitable:

> "... frequently there are very comfortable conditions outside such buildings, but the interiors become overheated, [and] then need cooling again. The same could be said for cold regions where heating has to be applied quite unnecessarily".

The South African Report on Greenhouse Gas Emission Reduction by the CIDB, under the auspices of the United Nations Environment Programme (UNEP) Sustainable Buildings & Construction Initiative (SBCI), makes the following recommendations (CIDB & UNEP SBCI, 2008: 43):

[19] Author's note: Napier (2000: [1]) uses the term 're-conditioned' deliberately. This refers to the frequent need to alter existing environmental conditions of a building in an attempt to render it habitable, thus highlighting the importance of designing for optimal environmental comfort from the onset (Napier 2000: [1]).

- The building sector should be prioritised in terms of opportunities for energy-efficiency and emission-reduction potential.
- The building sector needs a national public/private co-ordinating partnership to address climate change because of the large number of current stakeholders from different spheres.
- Accelerated and focused attention should be given to translate existing policy into action. SANS 204, specifically, has to be made mandatory.
- Energy-efficiency requirements should also focus on retrofitting existing buildings.
- The government should lead by example by setting best practice standards for new government buildings within existing resource constraints.

In the author's opinion, issues surrounding sustainability and 'green building' are becoming a growing concern within the different spheres of the South African built environment. However, under the requirements of Act 103 of 1977, the BCO is obliged to scrutinise each plan (except where it falls in an exempted category) and make a recommendation on its approval (or not). This compulsory obligation positions the NBR as ideal vehicle to implement additional statutory requirements focusing on sustainability and 'green building'. The value of formal growth in the built environment of South Africa alludes to the possible impact that the proposed introduction of these additional statutory requirements may have on the South African built environment.

2.10 INTRODUCING NEW STANDARDS

2.10.1 SANS 204

According to Lisa Reynolds (2009: 58), the 2004 publication by the Department of Minerals and Energy (DME) on their strategy for energy efficiency warranted a response from the building sector. A direct result was the formulation of three voluntary standards for improving energy efficiency in buildings, namely:

- SANS 204-1: The general requirements for achieving energy efficiency in all types of buildings
- SANS 204-2: The energy efficiency of buildings implementing natural environmental control

- SANS 204-3: The energy efficiency of buildings employing artificial environmental control

In the interest of brevity, the essence of these standards is discussed below, with the relevant complete documents for Parts 1 and 2 (as they have relevance for the study) included as Addenda E and F.

SANS 204-1 provides the general requirements for achieving energy efficiency in all types of buildings. Part 1 is largely based on the following two tables according to Reynolds (2009: 58):

- Table 3, defining the maximum energy demand per building classification for each climatic zone
- Table 4, providing the suggested maximum annual consumption per building classification for each climatic zone

A compliance certificate (that should be completed by the owner or developer) is included as an annexure thereto, and this should be submitted along with the building plans for LA approval. The certificate requires the completion of an energy audit (one year later) to prove compliance.

SANS 204-2 focuses on the energy efficiency of buildings with natural environmental control, but it also deals with artificial ventilation provided by individual units.

SANS 204-3 covers energy efficiency in buildings with artificial environmental control making use of a central HVAC system.

Reynolds lists the following key sections that occur in both Part 2 and Part 3 of the SANS 204 (2009: 59):

- Site and siting – orientation and shading devices to face north
- Building design – foundation, floor, walls, fenestration, roof, and ceiling
- Building sealing – envelope, air infiltration, leakage
- Services – lighting and power, hot water services, appliances

Reynolds (2009: 59) states that the efficient use of renewable energy is stipulated in this standard and in her view the performance requirements of the SANS 204 are based on the following argument:

> "If thermal ceiling insulation and high-performance window systems were introduced today into all new residential and commercial buildings, an estimated 3,500MW in electricity could be saved by 2020. This is almost twice the electricity currently produced by our only nuclear plant, Koeberg (1800 MW)."

To date, SANS 204 remains voluntary, with cost being the most prohibitive factor hampering its mandatory incorporation in the building sector. Another problem is the climatic origin of the international standards that are referred to in SANS 204. According to Opperman (personal communication, 13 May 2010), a concerted attempt was made by the NRCS to define the specific aspects of SANS 204 that could be incorporated in the NBR, and for this purpose *Part XA: Energy usage in buildings* was drafted. (See Addendum I for the full version of the document.)

2.10.2 Part XA: Energy usage in buildings

According to Opperman (personal communication, 13 May 2010), SANS 204 suggests best practice, but does not state the minimum standards (as is the case with SANS 10400). Approximately one year ago, the Department of Trade and Industry (DTI) commissioned the NRCS to compile a specification that will result in energy saving in buildings.

2.10.2.1 Background

Once a designated task group has drafted a standard, the NRCS forwards the particular standard to the SABS. The SABS then initiates the public enquiry stage by publishing a Draft South African Standard (DSS). The DSS on environmental sustainability was circulated on 15 June 2010, with the following title:

> *SANS 10400-XA: 2010 The Application of the National Building Regulations Part X: Environmental Sustainability Section A: Energy Usage in Buildings* (SABS, 2010b). The closing date for comments was 13 August 2010.

The following contents are listed on page 2 of *SANS 10400-XA:2010*, Edition 1 (SABS, 2010b):

Foreword

1. Scope (p. 3)
2. Normative references (p. 3)
3. Definitions (pp. 4-5)
4. Requirements (pp. 5-9)

Annex (sic) A (p. 10)

Annex (sic) B (pp. 11-12)

The foreword of the DSS provides some insight into the standardisation process, specifically:

> "This South African standard was approved by National Committee SABS SC 59G, Construction standards – Energy efficiency and energy use in the built environment, in accordance with procedures of the SABS Standards Division, in compliance with annex (sic) 3 of the WTO/TBT agreement." (SABS, 2010b: [ii]).

2.10.2.2 THE NBR

Annexure A of Part XA (SABS, 2010b: 10) provides the requirements in terms of the NBR, namely:

> "**XA1** Buildings having A1, A2, A3, A4, C1, C2, E1, E2, E3, E4, F1, F2, F3, G1, H1, H2, H3, H4 and H5 occupancy or building classifications in accordance with regulation A20, excluding garage and storage areas contained within such occupancies shall be designed and constructed so that buildings
>
> a) are capable of using energy efficiently while fulfilling user needs in relation to vertical transport, if any, thermal comfort, lighting and hot water; or
>
> b) have features and services which facilitate the efficient use of energy appropriate to their function and use, internal environment and geographical location, and

XA2 Buildings shall have at least 50% by volume of their annual average hot water heating requirement provided by means other than electrical resistance heating including but not limited to solar heating, heat pumps, heat recovery from other systems or processes and renewable combustible fuel.

XA3 The requirements of sub-regulations XA1 shall be deemed to be satisfied when such building is designed and constructed in accordance with the following requirements:

a) [The building] is the subject of a rational design by a competent person which demonstrates that the energy usage of such building is in accordance with SANS 10400-XA, or

b) [The building] has an orientation, shading, services and building envelope in accordance with SANS 10400-XA; or

c) [The building] has a theoretical energy usage performance determined by a competent person using certified thermal calculation software, less than or equal to that of a reference building in accordance with SANS 10400-XA."

2.10.2.3 Critical evaluation

A comparative evaluation of Part XA together with SANS 204 (to which Part XA regularly refers) highlights some inconsistencies. The relevant documents are included for reference and information purposes as Addenda E, G, and H.

Minor discrepancies (Table 12) in Part XA are noted, although they are mostly of an administrative nature (SABS, 2010b: 5-6):

Table 12: Administrative discrepancies in *SANS 10400-XA:2010*: Edition 1

4.2 Energy usage and building envelope		
Building occupancy classified in terms of Regulation **A20**	**E4 Health care**	**H5 Hospitality**
Requirement 4.2.1 a) A competent person certifies the theoretical annual energy consumption and demand.		See Note 1
Requirement 4.2.1 b) The orientation, shading, roof/ceiling construction, fenestration and insulation of in-slab heating, external walls and services of the building are in accordance with requirements.	See Note 2	See Note 3
Requirement 4.2.1 c) A competent person certifies that the building has a theoretical annual energy consumption and demand equal to or less than a reference building.	See Note 4	
Requirement 4.2.2 Table 1 (Maximum energy demand per building classification for each climatic zone)	No information provided	No information provided
Requirement 4.2.2 Table 2 (Maximum annual consumption per building classification for each climatic zone)	No information provided	No information provided
Explanatory notes: • **Note 1:** ● Required information is not provided in Table 1 or 2 ● Occupancy is not listed in SANS 10400 (dated 30 May 2008), yet it is published for comment in the DSS SANS 10400-A (circulated 1 June 2010 until 30 July 2010) • **Note 2:** ● Occupancy is not listed in SANS 10400 (dated 30 May 2008), yet it is published for comment in the DSS SANS 10400-A (circulated 1 June 2010 until 30 July 2010) • **Note 3:** ● Required information is not provided in Table 1 or 2 ● Occupancy is not listed in SANS 10400 (dated 30 May 2008), yet it is published for comment in the DSS SANS 10400-A (circulated 1 June 2010 until 30 July 2010) • **Note 4:** ● Occupancy is not listed in SANS 10400 (dated 30 May 2008), yet it is published for comment in the DSS SANS 10400-A (circulated 1 June 2010 until 30 July 2010)		

The following aspects need further consideration before the DSS of SANS 204 Part XA can be implemented as a SANS, thereby defining the minimum statutory requirement:

- Although requirements for glazing are stated in Part XA under 4.4.2.3 (Building envelope requirements), glazing is not listed under 4.2.1(b) where the components of the building envelope are listed. This could probably be attributed to an administrative oversight.
- The specific method for achieving proper orientation of a building (or room) is not stated in the document. The only reference made to orientation is under the definitions, namely:

  "3.9: **orientation.** Direction a building envelope element faces, i.e. the direction of a vector perpendicular to and pointing away from the surface outside of the element." (SABS, 2010b: 4)

  Correct orientation is also stated as a requirement of the building envelope (see 4.2.1(b) of the DSS and the NBR requirement listed under XA 3(b)). This

will render the requirement impossible to implement because the orientation in which the building envelope should face (with possible variances) is not defined.

- Similarly, the specific method for achieving proper shading is not defined within the document. Only the requirement is stated under the heading *Energy usage and building envelope*, in Part XA (see specifically 4.2.1(b) (SABS, 2010b: 6), and its regulatory requirement under XA 3b (SABS, 2010b: 10)).
- According to item 4.4.3 of Part XA, fenestration and glazing should be installed according to the energy performance requirements of SANS 204 (SABS, 2010b: 9). In turn, SANS 204-2:2008 refers extensively to the National Fenestration Rating Council (NFRC). However, the NFRC is an American non-profit organisation with a mission statement that reads:

  > "We're changing the way America shops for windows, doors and skylights, stating that their main function is to:
  > [A]dminister an independent rating and labeling system for the energy performance of windows, doors, skylights, and attachment products." (NFRC, 2010).

It is the opinion of the author that the availability of materials and climatic conditions in South Africa and the United States of America differ considerably. Inevitably, the relevance of this component of the DSS can be questioned in a developing country with a temperate climate that mainly implements an 'architecture of ventilation'[20]. The validity of the inclusion of this aspect (especially its rating system) is therefore doubtful.

[20] 'Architecture of ventilation' is a term developed by the author in response to the European (and partially American) tradition where buildings are well insulated because of extreme temperature exposure, requiring 'architecture of insulation' and thereby limiting any thermal bridging. This approach is further supported when interpreting the term 'energy efficiency' in the European tradition. According to the Sustainable Buildings & Climate Initiative of the United Nations Environment programme (UNEP SBCI) "the energy efficiency of a building is determined by the rate at which energy is lost through the physical structure of the building (the building envelope), and the rate at which energy is used to meet the energy needs and physical comfort of the occupant" (UNEP SBCI, 2009: 23). The authors of this publication also state that "the physical structure and design of a building, interacting with the local climate, strongly influence the choice of energy system and the associated efficiency of that system" (UNEP SBCI, 2009: 23).
The average climatic conditions in South Africa in the winter period do not require excessive energy to achieve comfort levels. In the words of the Pritzker laureate Glenn Murcutt ([Thorne], 2011: 2):

> *I also say that we should, as architects, observe how we dress according to our different climates. We layer our clothing, put more on when its cold, take more off when its hot – and I think our buildings should equally respond to their climates. Very few of my buildings have air conditioning. To my very good Finnish friends, I point out that they tend to put on more*

- According to item 4.4.4 of Part XA, roofs and ceilings should be constructed in accordance with the requirements of SANS 204 (SABS, 2010b: 9). However, item 4.5.4.1(b) of SANS 204-2 refers to a metal deck roof with "metal purlins or metal battens" (SABS, 2008b: 19). In South Africa, on the other hand, the conventional (and indeed the most cost-effective) construction material for supporting a roof is timber, specifically South African Pine, used as purlins for roof sheeting or battens for roof tiles. In this instance, the standard is prejudicial towards a particular material.
- Under item 4.5.4.1(b) of SANS 204-2 (SABS, 2008b: 19), a ceiling lining (ceiling insulation) is required, in addition to the ceiling. However, studies conducted at the Built Environment Unit of the Council for Scientific and Industrial Research (CSIR) illustrates the reduction in thermal transfer when introducing a ceiling, making it a viable option to insulation (and/or a ceiling lining (Osburn, 2010: [5]).
- In SANS 204-2 the "[m]inimum levels of insulation for energy efficiency in an unventilated roof and ceiling construction" are listed in Table 10 under item 4.5.4.2 (SABS, 2008b: 19). However, the requirements for the ventilated roof (as defined and listed in SANS 204-2 under C.1.1, C.1.2 and C.1.4 (SABS, 2008b: 40)) are not provided in a similar fashion.
- In Part XA, item 4.4.2.3 states that "[t]he requirements for glazing shall be in accordance with the fenestration requirements in SANS 204", and three subsequent notes are provided (SABS, 2010b: 9).

  Note 3 states that, should thermal resistance[21] be added to external walling with high thermal capacity, it should be placed in between layers. However, in South Africa masonry cavity walls are predominantly used in areas with driving rain to prevent moisture penetrating through to the interior. In the event that a cavity wall is filled with a thermally resistant material, the objective of the cavity (i.e. two separate skins) is ignored. Depending on the type of material selected for insulation; a bridge for water from the outside could be formed or the material could become moist (among other possible problems).

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clothes, and we in Australia think more about taking them off – that's of course what most of my buildings do.

[21] Thermal resistance implies that a form of insulation is added to the cavity wall.

From the above discussion it could be concluded that SANS 204 does not adequately distinguish between the normative requirements of the standard and the associated performance levels. In addition, the possible methods to achieve a particular performance (as discussed earlier in the section on the Deemed-to-Satisfy Rules) are not clearly stated, thereby confusing both the reader (builder) and the interpreter responsible for its implementation (BCO).

Lastly, SANS 204-1 states the general requirements of the standard. Its scope excludes government-subsidised housing.

> *This part of SANS 204 specifies the requirements for the design and operation of energy efficient buildings with artificial or natural environmental control and their sub-systems. This standard does not cover government subsidized housing* (SABS, 2008a: 3).

On 21 April 2010 the Minister of Human Settlements, Tokyo Sexwale MP, addressed the National Assembly on the occasion of the Human Settlements Budget, and stated that since 1994 the South African government had constructed approximately 2.3 million housing units (accommodating nearly 11 million people), but the backlog in 2010 was still estimated to be 2.1 million units. Nevertheless, the DSS of *SANS 10400-XA:2010*, Edition 1 does not explicitly state whether government-subsidised housing is included as part of this draft standard. It could however be assumed that it is excluded (from the DSS of *SANS 10400-XA:2010*, Edition 1), thereby affecting the largest portion of the South African population adversely.

The division of the South African built environment into formal and informal segments presents its own challenges. Further division of the formal segment (i.e. government buildings and other buildings, or government-subsidised housing and other forms of housing) will eventually lead to a form of stigmatisation. This could possibly reinforce the idea that implementing sustainable design principles represents an unnecessary additional expense, that it is only the imperative of the privileged and that it is only applicable in a developed environment. This opinion will however require further study and it falls outside the ambit of the current research. It is necessary to identify the commonalities between SANS 10400, SANS 204 and the DSS Part XA in an attempt to align their relevant objectives.

2.11 PASSIVE DESIGN: A COMMON GOAL

According to the Department of Minerals and Energy (DME), houses and other buildings in South Africa are seldom designed from the perspective of energy consumption or energy efficiency (DME, 2010). Specific mention is made of the energy characteristics of low-cost housing and the associated high levels of energy consumption for space heating during the winter. The DME indicates that low-cost housing could be rendered 'energy smart' through the utilisation of elementary passive solar building design practices, resulting in fuel savings of up to 65% (DME, 2010).

In an article on *The Greening of Construction – SA*, Mulholland and Matshe (2010) say that South Africa has "…recognised the risk of climate change in its 'National Climate Change Response Policy' launched at the National Climate Change Summit in March 2009". They list the design and construction of 'green' buildings as a possible method to reduce greenhouse gas emissions. According to Mulholland and Matshe (2010) "…it has been estimated that commercial buildings account for approximately 20% of greenhouse gas emissions, both during the construction phase and the ultimate use of the building".

On 29 July 2005, Report No. 2.34-33 entitled *Energy Efficiency: Energy and Demand Efficiency for Commercial Buildings* was published by the DME. In this draft final report, Asamoah, Lindsey and Robilland (2005: 15) point out the typical definition of an energy-efficient building, namely:

> "An energy efficient building provides the intended service, while at the same time minimizing/reducing the building's lifetime operating costs."

This characterisation is based on the definition supplied by the *American Society for Heating, Refrigeration and Air-conditioning Engineers* (ASHRAE) stating that "[a]n energy efficient building is one that uses less energy than new buildings that are being built according to 'current construction practice'" (Asamoah et al., 2005: 15).

Asamoah et al. list the following passive solar design criteria for commercial buildings (2005: 47-48):

- Orientation
- Overhangs and shading
- Insulation
- Windows
- Thermal mass
- Layout and configuration
- Day lighting

The following active solar design criteria for commercial buildings are listed by Asamoah et al. (2005: 49-51):

- Photovoltaic arrays
- Solar thermal collectors for water heating
- Solar thermal collectors for air heating
- Other technologies

It is evident that the above criteria could also be applied to the residential sector. Nonetheless, should these criteria be included in the NBR, it is essential that their original goal of limiting inflation be taken into account.

It is necessary to emphasise once again that the NBR represent the minimum obligation for the owner of a building, but maximum requirement on behalf of the LA. In other words, the LA cannot expect more from the building owner than what is stated in the NBR.

In view of these objectives, the different requirements of SANS 10400, SANS 204 and Part XA were compared in Table 13 to identify possible aspects for inclusion in the NBR.

Table 13: Passive design criteria for possible inclusion in the NBR

	Identifying passive design criteria for possible inclusion in the NBR, to achieve a more sustainable South African built environment				
No.	Description	**SANS 10400** Edition 2 Revision date: 2010-06-15	**SANS 204** Edition 1* Publication date: 2008	**Part XA** Edition 1 Circulation date: 2010-06-15	**Proposal**
1.	NFRC Orientation (North)	nil	●	●selected occupations 1	●
2.	Shading of openings in walls: Exposed glass surfaces	nil	●	●selected occupations 1	●
3.	Natural light	●	●	nil	●
4.	Ventilation	●	●	●	●
5.	Zone of Space (Z of S)	●	nil	nil	●
6.	Cross ventilation	nil	nil	nil	●
7.	Roof/ceiling construction	nil	●	as per SANS 204	●
8.	In-slab heating	nil	●	nil	●partially
9.	Water harvesting	nil	nil	nil	●
10.	Fenestration	nil	●	as per SANS 204	nil
11.	Glazing	nil	●	as per SANS 204	nil
12.	External walls	nil	●	●selected occupations 1	nil
13.	Services that use energy/control the use of energy	nil	●	●hot water heating ●exposed hot water pipes	●exposed hot water pipes
14.	Maximum energy demand/ building classification for each climatic zone/net floor area (monthly average determined over a year period)	nil	●	●selected occupations 2	nil
15.	Maximum annual energy consumption/ building classification for each climatic zone	nil	●	●selected occupations 2	nil
16.	Certification by competent person that theoretical annual energy consumption and demand of the building is equal/ less than that of the reference building	nil		●selected occupations 3	nil
			*This standard does not cover government-subsidised housing		
Classification and designation of occupancies as specified in the NBR:					
Occupations 1 =	A1, A2, A3, A4, C1, C2, E1, E2, E3, E4, F1, F2, F3, G1, H1, H2, H3, H4, and H5				
Occupations 2 =	A1, A2, A3, A4, F1, G1, and H1 (excluding garages and storage areas)				
Occupations 3 =	A1, A2, A3, A4, C1, C2, E1, E2, E3, E4, F1, F2, F3, G1, H1, H2, H3, H4, and H5 (excluding garages and storage areas)				

The effective implementation of some of the above aspects could be controlled by the BCO, should he be willing and able, as part of an existing administrative process required by the NBR. It will be necessary to furnish the BCO will a specific checklist to allow for the possible implementation of the aforementioned criteria (see Table 14).

Table 14: BCO checklist to assist in implementation of passive design criteria

Sustainability/Passive design/'Green' building

1. Orientation (North[22])

1.1. Did the draughtsman provide the following schedule :[23]

Room	**Habitable**	North facing?	Within 14˚ East of North	Within 14˚ West of North
	Yes/No			

1.2. Do the majority[24] of habitable rooms face North, within 14˚ East of North, or within 14˚ West of North?

1.3. If not, what mitigating passive measures (i.e. heat reflective glass, laminated glazing, screens, etc.) were taken to reduce possible heat gain within habitable rooms?

1.4. Do these correspond with the window and door schedule?

2. Shading of openings in northern walls: Exposed glass surfaces

2.1. Do exposed glass surfaces in north-facing walls have a protective roof overhang and/or shading device (i.e. shutters or screens)?

2.2. If not, what mitigating passive measures (i.e. heat reflective glass, laminated glazing etc.) were taken to reduce possible heat gain within habitable rooms?

2.3. Do these correspond with the window and door schedule?

2.4. Do these correspond with the detail section?

2.5. What is the relationship between the total area of wall openings and floor area of an individual room (especially important when the room has to be heated)?

3. Natural light [25]

3.1. Does each habitable room have a total window area of at least 10% of the floor area (or 0,2m²) for natural lighting?

3.2. Does this correspond with the window and door schedule?

4. Ventilation[26]

4.1. Is the habitable room mechanically ventilated?

4.2. If yes, see SANS 204.

4.3. If not, does each habitable room have openable windows of at least 5% of the floor area (or 0,2m²) for ventilation?

4.4. Does this correspond with the window and door schedule?

5. Zone of Space (Z of S)[27]

5.1. Is the Z of S outside the opening not less than 0,5m in length to the boundary line, or

[22] "True north/south orientation… is generally considered best for all buildings, particularly in warm climates because the windows can then be protected almost completely by relatively simple fixed exterior shading devices in the form of horizontal projections." (Van Straaten, 1967: 123)

[23] "The perfect orientation in SA for all habitable rooms in a house is 10 degrees east of north to minimize the heat in summer and in the cold winter months when the sun is lower it create less shadows and more heat radiation in the habitable rooms" (Botes, 2007). (KZN Department of Housing, 2011)

[24] For the purposes of this study (specifically the BCO checklist), a majority will be achieved if 75% or more adhere to the stated requirement.

[25] These are existing regulations that are not implemented by the existing approval documents; see Part O of the NBR (SABS, 2010a).

[26] These are existing regulations that are not implemented by the existing approval documents; see Part O of the NBR (SABS, 2010a).

1,0m to the building line to a maximum requirement of 8m?

6. Cross ventilation (Van Straaten, 1967: 228-283)

6.1. Does the section indicate cross ventilation?
6.2. Does the plan indicate cross ventilation?
6.3. Does this correspond with the dominant wind direction for the area?
6.4. Does this correspond with the window and door schedule?

7. Roof (Bevis & Misselbrook, 1997: 70-71) /**ceiling construction** (Van Straaten, 1967: 133-172)[28]

7.1. What class roof covering will be installed?
7.2. Will a ceiling be installed in all habitable rooms?
7.3. If not, will the roofing material and insulation installed achieve a total minimum R-value = 3,67[29]?

8. In-slab heating

8.1. Will under floor heating be installed?
8.2. If yes, will under floor insulation material be installed?

9. Stormwater harvesting[30]

9.1. What is the roofing material?
- If thatch, no further action is required
- If other roofing material, see items below:

9.2. Residential ([Taylor], 2011) (Rain harvesting systems, 2010):
- Roof harvesting
  - When the floor area = 200 m² or more with the roof area = 100 m² or more, the minimum requirement is a gravity fed rain water harvesting system with a 2500 litre (above or under ground) tank
  - When the floor area = 400 m² or more with the roof area = 200 m² or more, the minimum requirement is a gravity fed system with a 5000 litre (above or under ground) tank complete with pump

9.3. Commercial ([Taylor], 2011) (Rain harvesting systems, 2010):
- Roof harvesting as above
- Stormwater attenuation solutions with heavy duty underground harvesting tanks
- Drainage and stormwater management for turf areas with in-field harvesting tanks
- Permeable paving to dissipate stormwater runoff

9.4. Grey water
- No requirement

10. Solar energy

10.1. What is the total size of the water cylinder(s) powered by electrical heating?
10.2. If 200 litres or larger, at least 30% of the capacity has to be heated using alternative energy methods.
10.3. If larger than 300 litres, at least 40% of the capacity has to be heated using alternative energy methods.
10.4. If larger than 400 litres, at least 50% of the capacity has to be heated using alternative energy methods.

11. Services

11.1. Is the hot water cylinder fitted with a blanket?
11.2. If not, see SANS 204.
11.3. Are any hot water pipes exposed (either inside the structure, i.e. in the ceiling void, or outside (i.e. in the walls)?
11.4. If yes, see SANS 204.

[27] These are existing regulations that are not implemented by the existing approval documents; see Part O of the NBR (SABS, 2010a).
[28] (Osburn, 2010: [2])
[29] The units of measurement for R-value is m²·K/W (or equivalently to m²·℃/W).
[30] Against a global rainfall average of 962.7 mm per year, South Africa receives a mean annual precipitation (MAP) of 500 mm, making it the worlds 30th driest country ([Taylor], 2011) (personal communication with De Jager, 22 March 2011).

2.12 EXISTING PASSIVE DESIGN REQUIREMENTS OF THE NBR AND ADDITIONAL PROPOSALS TO BE IMPLEMENTED VIA THE CHECKLIST

Existing NBR requirements that are not, but should be, included in the building plan checklist are the following:

1. ***Natural lighting***

   The Deemed-to-Satisfy Rules of SANS 10400-1990: **002.1** state that:
   Where for the purposes of natural lighting a room is provided with one or more openings, such opening or openings shall be situated in an external wall, or in a suitable position in the roof of the building (SABS, 2010a: 102).

   The Deemed-to-Satisfy Rules of SANS 10400-1990: 002.1-002.3 also require that:
   The area of such opening, or total area of such openings, inclusive of frames and glazing bars, shall be not less than 10% of the floor area of the room or rooms served by it, or 0,2 m^2, whichever is the greater (SABS, 2010a: 102).

2. ***Natural ventilation***

   The Deemed-to-Satisfy Rules of SANS 10400-1990: 004.3 state that:
   The total area of any opening, door or openable glazed window contemplated in subrule 004.2(a) or (b) shall be not less than 5% of the floor area of the room, or 0,2 m^2, whichever is the greater (SABS, 2010a: 108).

   The Deemed-to-Satisfy Rules of SANS 10400-1990: 004.4 require that:
   The total area of any opening contemplated in subrule 004.2(c) shall be not less than 2% of the floor area of the room (SABS, 2010a: 108).

Proposed additional requirements of the NBR to be implemented via the checklist are the following:

3. ***Cross ventilation*** *should be provided for the majority of* ***habitable rooms***.

4. *Where applicable,* ***water storage tanks*** *should be used* ***to harvest stormwater*** *from roofs for later use in cisterns, irrigation, etc.*
5. *All* ***electric water heating*** *should be* ***supported by a renewable energy source*** *to limit electricity consumption for heating.*
6. *All* ***electric water-heating cylinders*** *should be fitted with an* ***automatic timer*** *to limit electricity consumption for heating*.
7. *Except where the* ***roofing material*** *conforms to a* ***minimum thermal resistance level*** *(R-value), a ceiling should be installed for all habitable rooms to avoid unnecessary heat gain/loss*.
8. *Where applicable, all building* ***entrances/exits*** *should be* ***shielded from prevailing winds***.
9. *The* ***majority of habitable rooms*** *should* ***face*** *in a* ***northerly direction*** *to avoid unnecessary heating/cooling loads*.
10. *If* ***under-floor heating*** *is installed,* ***under-floor insulation material*** *should also be provided to avoid unnecessary heat loss*.

2.13 CONCLUSION

After the great fire of Rome the Emperor had to implement decisions regarding the growth and expansion of the Empire. Nero's decisions impacted the domus (house), the insulae (blocks of flats) and even the forum. In a similar fashion, contemporary society has to adjust to a changing environment.

Today, the environmental needs of a future generation are widely acknowledged, and there exists general agreement about the idea of sustainability. However, these ideals have to be implemented and monitored by an authority like the Senate, and the individual has to adapt to changing requirements (just like the Roman citizen had to do, see pp. 2-3).

Once the relationship between ideals has been defined, the instrument used to implement the objectives, a controlling authority, and the person composing a proposal all have to be demarcated clearly. Simultaneously, a degree of flexibility is required to allow for development. The introduction of much-needed built environment sustainability criteria as part of the NBR should however be aligned with the original goals of the building regulations (limiting building inflation).

As controlling instrument, the NBR have to incorporate ideals on sustainability. It is also necessary for built environment professionals to be adequately trained to submit development proposals in accordance with these ideals. Finally, the BCO has to be able and willing to evaluate these proposals in terms of a set of guidelines that promote certain sustainability ideals.

2.14 SUMMARY OF CHAPTER 2

Chapter 2 starts off with a literature review of pertinent aspects that have relevance for the study. The introduction lists the origin of building regulations by referring to the Code of Hammurabi, and touches on the subsequent development of building regulations.

The term ‘building regulation’ and the different approaches to the formulation thereof are defined.

The next section of the chapter identifies the origin of building regulations in Southern Africa and discusses the NBR and the Building Standards Act in more detail. Act 103 of 1977, its requirements as stated in the NBR, and the subsequent Code of application through the Deemed-to-Satisfy Rules of SABS 0400 are presented. Specific references are made to the changing objectives of Act 103 of 1977 and the introduction of a new regulating authority, resulting in the SANS 10400. The voluntary standard SANS 204 is critically discussed and the envisioned DSS of SANS 204:XA is evaluated. This results in a proposed checklist on passive design for implementation by the BCO in an attempt to render the built environment of South Africa more sustainable and adhere to the original objectives of the NBR.

This concludes the first phase of the study, and the following aspects were stated or addressed according to the research design presented in Chapter 1:

1.1 The origin of building regulations
1.2 Description of the first official building regulation in Southern Africa
1.3 Discussion of the history and development of the NBR as regulating instrument of the South African built environment
1.4 The original goal of the NBR

1.5 Interpretation of sustainability, with the focus on passive design (within the context of the South African built environment)

1.6 Discussion of the prescribed structure for implementation of the NBR, specifically the following items:

1.6.1 Application for plan approval

1.6.2 Notice of approval/ rejection

1.6.3 Five inspections

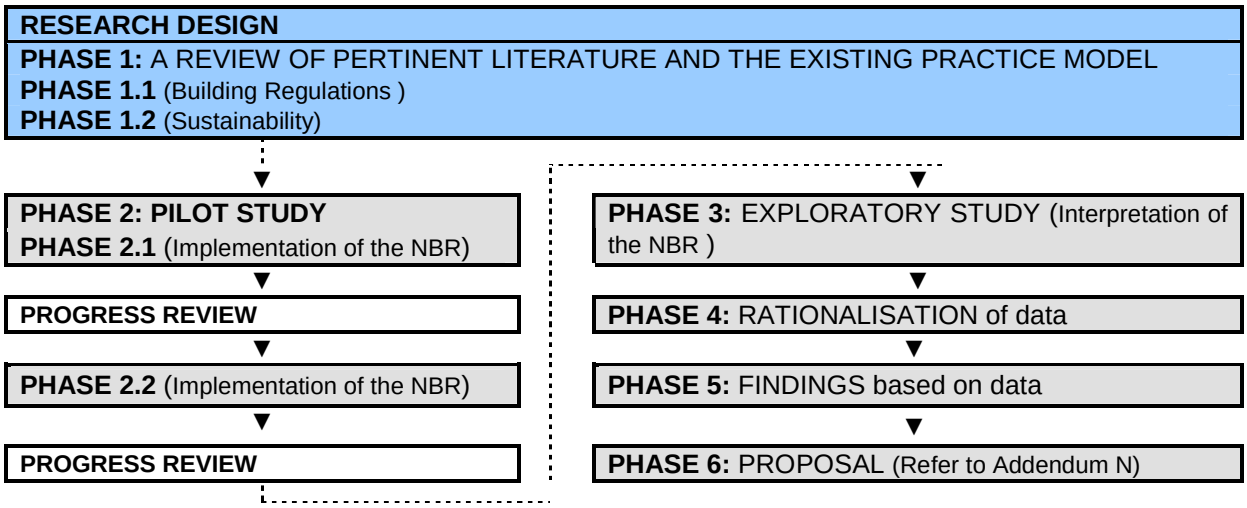
1.6.4 Certificate of Occupancy

1.7 Critical evaluation of the DSS of SANS 10400-XA: 2010 (15 June 2010) Part X: Environmental sustainability Section A: Energy usage in buildings

1.8 Identification of possible aspects that could be incorporated in the NBR, and a proposed checklist for the implementation of these by the BCO

To assist the reader, a summary of the research design as provided in Table 15 highlights the aspects that were addressed in this Chapter.

Table 15: A summary of the research design, highlighting the completed phases



3. PILOT STUDY

3.1 INTRODUCTION

It is the purpose of this chapter to determine whether the current regulations and standards (as defined by the NBR), are implemented uniformly by the respective LAs.

This chapter initiates Phase 2 of the study proposal and utilises existing sources for the desk review. It starts with a review of the main problem and goals. The specific treatments of these are communicated in brief, followed by a concise description of the pilot study (Phase 2.1), and the presentation of the extension of the pilot study (Phase 2.2).

The focus of the chapter is Sub-problem 2:

> *Are the current regulations and standards, as defined by the NBR, implemented uniformly by the respective Local Authorities?*

It is hypothesised that the various LAs do not implement the NBR in a uniform manner.

3.2 SPECIFIC TREATMENT OF THE MAIN PROBLEM AND SUB-PROBLEMS

In Chapter 1 the researcher speculated that the statutory requirements of the NBR were not being implemented uniformly in South Africa. It could be argued that this situation might limit the effectiveness of future changes introduced to Act 103 of 1977 and its relevant Regulations and Codes of application.

Although this is not its principal focus, the study also argues that the South African built environment has to become more sustainable, yet at the same time restrict rising building costs.

Table 16 states the main problem, lists its associated goals (aligned with the particular sub-problems), and indicates the manner in which the study attempts to address these:

Table 16: Statement of the main problem, its underlying goals and the proposed actions to be taken

<table>
<tr><th colspan="4">MAIN PROBLEM</th></tr>
<tr><td colspan="4">The purpose of this study is to determine the origin of the current minimum regulations and standards applicable to the built environment of South Africa, and to examine the goals and implementation methods of Act 103 of 1977 and its Regulations (together with the Code of Application (SANS 10400:1990)), in an attempt to achieve uniform implementation of the requirements and align the aforementioned with accepted passive design principles to promote a more sustainable built environment in South Africa.</td></tr>
<tr><td rowspan="5">Goal 1
1. To note the origin of building regulations.
2. To determine the origin, development, goals and methods of implementation of the current edition of the NBR in South Africa.
3. To evaluate recent changes to the NBR in the light of the set goals thereof.</td><td>Phase 1</td><td colspan="2">A review of pertinent literature and the existing practice model</td></tr>
<tr><td>Research method</td><td colspan="2">DESK REVIEW</td></tr>
<tr><td>Themes</td><td>1.1 Building Regulations</td><td>1.2 Sustainability</td></tr>
<tr><td>Focus areas</td><td>The history and development of the NBR in South Africa</td><td>Identifying specific sustainability aspects for possible incorporation into the NBR</td></tr>
<tr><td>Chapter</td><td colspan="2">2</td></tr>
<tr><td rowspan="5">Goal 2
To determine whether the current regulations and standards (as defined by the NBR) are implemented uniformly by the respective LAs.</td><td>Phase 2</td><td>2.1 Pilot study</td><td>2.2 Pilot study</td></tr>
<tr><td>Research method</td><td>DESK REVIEW</td><td>DESK REVIEW</td></tr>
<tr><td>Theme</td><td colspan="2">Implementation of the NBR</td></tr>
<tr><td>Focus areas</td><td>Determine whether the LAs in South Africa implement the NBR uniformly</td><td>Determine the precise methods used to enforce the requirements of the NBR by specific LAs</td></tr>
<tr><td>Chapter</td><td colspan="2">3</td></tr>
<tr><td rowspan="4">Goal 3
To determine whether the most significant role-players, i.e. the BCOs, are
1. aware of the origin, methods of implementation and goals of the NBR;
2. willing to support the uniform implementation of the NBR;
3. aware of recent developmental changes to the NBR.</td><td>Phase 3</td><td colspan="2">Exploratory study</td></tr>
<tr><td>Research method</td><td colspan="2">QUESTIONNARE</td></tr>
<tr><td>Theme</td><td colspan="2">Interpretation of the NBR</td></tr>
<tr><td rowspan="2">Focus area</td><td colspan="2" rowspan="2">Determine the knowledge and perception of BCOs on the NBR</td></tr>
<tr><td rowspan="2">Goal 4
To determine whether the BCOs are willing to implement new regulations on sustainability in the existing administration system of the NBR.</td></tr>
<tr><td>Chapter</td><td colspan="2">4</td></tr>
</table>

The Chapter 2 literature review serves as background to the study, and the pilot study (Phase 2.1) supports the researcher's initial speculation that minimum built environment regulations are not implemented uniformly in South Africa. The

implementation methods of the largest LAs are scrutinised in more detail in Phase 2.2, providing more substantial evidence for the aforementioned conjecture.

During the third phase of the study a questionnaire is introduced to address Sub-problems 3 and 4. A full description of this process follows in Chapter 4, together with a statistical analysis. The study is completed by a rationalisation and a proposed pro-forma application form that is included as Addendum N.

3.3 PHASE 2.1: BACKGROUND

The information reported in the June 2009 release by Stats SA on *Selected building statistics of the private sector as reported by local government institutions, 2008* (Statistical release No. P5041.3) is used to identify the target population of the proposed study.

The data published in this statistical release reflected a monthly survey of metropolitan municipalities and large local municipalities of building plans passed, and buildings completed for the private sector. The information is released monthly on a national and provincial level, while the annual release contains the aggregated data for the twelve months of 2008 by province, municipality and building typology (Stats SA, 2009b: ii).

The particular sequence of the different South African provinces in Table F of Report P5041.3 (Stats SA, 2009b: viii) determined the provincial order for this (the first) phase of the pilot study. Therefore the order is as follows:

1. Gauteng
2. Western Cape
3. KwaZulu-Natal
4. Mpumalanga
5. Eastern Cape
6. North West
7. Free State
8. Limpopo
9. Northern Cape

The municipal demarcation, as listed in Tables 141 to 149 of Report P5041.3, was accepted as provided (Stats SA, 2009b: 177-184). The following discussion and lists were adapted from the aforementioned report.

3.4 PHASE 2.1: PILOT STUDY

The province of Gauteng contributed 41.3% or R32 828,6 million to the total of R79 474,8 million of the value of plans approved in South Africa (Stats SA, 2009b: iii). The province consists of six district municipalities and ten municipalities (Stats SA, 2009b: 182). The largest contributors to the province are listed in Table 17 (Stats SA, 2009b: v):

Table 17: Principal contributors in the provincial built environment of Gauteng

Gauteng	% contribution to value of building plans passed			
District municipality	**Municipality**		Provincial contribution	National contribution
City of Tshwane	1	City of Tshwane[31]	39.6%	16.3%
Ekurhuleni Metropolitan Municipality	2	Ekurhuleni Metropolitan Municipality[32]	30.0%	12.4%
City of Johannesburg	3	City of Johannesburg[33]	16.8%	6.9%
Metsweding District Municipality	4	Kungwini Local Municipality[34]	3.6%	1.5%
Sedibeng District Municipality	5	Emfuleni Local Municipality[35]	3.4%	1.4%
Sub-total			**93.4%**	**38.6%**

[31] The main towns within the municipal boundaries of the City of Tshwane are Akasia, Atteridgeville, Babelegie (sic), Bon Accord, Centurion, Dilopye, Doornrandjies, Erasmia, Ga-Mokone, Ga-Rankuwa, Garsfontein, Hammanskraal, Irene, Klippan, Mabopane, Mamelodi, Onderstepoort, Pinedene, Pretoria, Pretoria North, Soshanguve, Temba, Tswaiing, Valhalla and Winterveld (Stats SA, 2009b: 182).

[32] The main towns within the municipal boundaries of the Ekurhuleni Metropolitan Municipality are Alberton, Bedfordview, Benoni, Boksburg, Brakpan, Daveyton, Duduza, Edenvale, Germiston, Katlehong, Kempton Park, KwaThema, Nigel, Springs, Tembisa, Thokoza, Tsakane and Vosloorus (Stats SA, 2009b: 182).

[33] The main towns within the municipal boundaries of the City of Johannesburg are Alexandra, Eikenhof, Eldorado Park, Ennerdale, Fourways, Florida, Grasmere, Halfway House, Honeydew, Johannesburg, Kyalami, Lawley Estate, Lenasia, Midrand, Modderfontein, Randburg, Randjiesfontein, Rivonia, Roodepoort, Sandton, Soweto and Van Wyksrust (Stats SA, 2009b: 182).

[34] The main towns within the municipal boundaries of the Kungwini Local Municipality are Bronkhorstspruit, Ekangala, Tierpoort and Welbekend (Stats SA, 2009b: 182).

[35] The main towns within the municipal boundaries of the Emfuleni Local Municipality are Boipatong, Bophelong, Evaton, Sebokeng, Sharpeville, Vanderbijlpark and Vereeniging (Stats SA, 2009b: 182).

The Western Cape contributed 21.0% or R16 693,7 million to the total of R79 474,8 million of the value of plans approved in South Africa (Stats SA, 2009b: iii). The province consists of five district municipalities and twelve municipalities (Stats SA, 2009b: 177). The main contributors to the province are listed in Table 18 (Stats SA, 2009b: v):

Table 18: Principal contributors in the provincial built environment of the Western Cape

Western Cape	% contribution to value of building plans passed			
District municipality	**Municipality**		Provincial contribution	National contribution
City of Cape Town	6	City of Cape Town[36]	74.1%	15.6%
Eden District Municipality	7	Mossel Bay Municipality[37]	4.5%	0.9%
Overberg District Municipality	8	Overstrand Municipality[38]	4.1%	0.9%
Eden District Municipality	9	George Municipality[39]	3.5%	0.7%
Cape Winelands District Municipality	10	Drakenstein Municipality[40]	2.8%	0.6%
Eden District Municipality	11	Knysna Municipality[41]	2.5%	0.5%
Sub-total			**91.5%**	**19.2%**

[36] The main towns within the municipal boundaries of the City of Cape Town are Bellville, Blue Downs, Brackenfell, Cape Town City Centre, Durbanville, Eersterivier, Fish Hoek, Goodwood, Gordon's Bay, Gugulethu, Khayalitsha, Kraaifontein, Kuilsrivier, Langa, Mfuleni, Milnerton, Mitchells Plain, Nyanga, Parow, Plumstead, Simon's Town, Somerset West and Strand (Stats SA, 2009b: 177).
[37] The main towns within the municipal boundaries of the Mossel Bay Municipality are Groot Brakrivier, Herbertsdale, Klein Brakrivier and Mossel Bay (Stats SA, 2009b: 177).
[38] The main towns within the municipal boundaries of the Overstrand Municipality are Betty's Bay, Fisherhaven, Gansbaai, Hangklip, Hawston, Hermanus, Kleinmond, Onrus, Rooiels Bay, Stanford and Vermont (Stats SA, 2009b: 177).
[39] The main towns within the municipal boundaries of the George Municipality are George, Herolds Bay, Pacaltsdorp and Wilderness (Stats SA, 2009b: 177).
[40] The main towns within the municipal boundaries of the Drakenstein Municipality are Paarl, Gouda and Wellington (Stats SA, 2009b: 177).
[41] The main towns within the municipal boundaries of the Knysna Municipality are Knysna and Sedgefield (Stats SA, 2009b: 177).

The Kingdom of KwaZulu-Natal contributed 19.1% or R15 211,8 million to the total of R79 474,8 million of the value of plans approved in South Africa (Stats SA, 2009b: iii). The province consists of eight district municipalities and ten municipalities (Stats SA, 2009b: 180). The main contributors to the province are listed in Table 19 (Stats SA, 2009b: v):

Table 19: Principal contributors in the provincial built environment of KwaZulu-Natal

KwaZulu-Natal	% contribution to value of building plans passed			
District municipality	**Municipality**		Provincial contribution	National contribution
Ethekwini Municipality	12	Ethekwini Municipality[42]	60.6%	11.6%
Ilembe District Municipality	13	KwaDukuza Municipality[43]	14.9%	2.8%
Umgungundlovu District Municipality	14	Msunduzi Municipality[44]	7.6%	1.5%
Ugu District Municipality	15	Hibiscus Coast Municipality[45]	5.3%	1.0%
Uthungulu District Municipality	16	City of uMhlathuze[46]	3.3%	0.6%
Umgungundlovu District Municipality	17	Umngeni Municipality[47]	3.0%	0.6%
Sub-total			**94.7%**	**18.1%**

[42] The main towns within the municipal boundaries of the Ethekwini Municipality are Amanzimtoti, Botha's Hill, Cato Ridge, Clermont, Drummond, Durban, Hillcrest, Inchanga, Kingsburgh, Kloof, KwaDabeka, KwaMakhutha, KwaMashu, Mount Edgecombe, Mpumalanga, New Germany, Pinetown, Queensburgh, Tongaat, Umdloti, Umhlanga, Umlazi, Verulam and Westville (Stats SA, 2009b: 180).
[43] The main towns within the municipal boundaries of the KwaDukuza Municipality are Ballito, Blythedale Beach, Shakaskraal, Stanger, Tinley Manor Beach and Zinkwazi Beach (Stats SA, 2009b: 180).
[44] The main towns within the municipal boundaries of the Msunduzi Municipality are Edendale and Pietermaritzburg (including Ashburton) (Stats SA, 2009b: 180).
[45] The main towns within the municipal boundaries of the Hibiscus Coast Municipality are Hibberdene, Margate, Marina Beach, Munster, Port Edward, Port Shepstone, Ramsgate, Shelly Beach, Southbroom, St Michael's-on-Sea, Trafalgar and Uvongo (Stats SA, 2009b: 180).
[46] The main towns within the municipal boundaries of the City of uMhlathuze are Empangeni and Richards Bay (Stats SA, 2009b: 180).
[47] The main towns within the municipal boundaries of the Umngeni Municipality are Hilton, Howick and Nottingham Road (Stats SA, 2009b: 180).

Mpumalanga contributed 4.8% or R 3 814,79 million (Stats SA, 2009b: v) to the total of R79 474,8 million of the value of plans approved in South Africa (Stats SA, 2009b: iii) . The province consists of three district municipalities and seven municipalities (Stats SA, 2009b: 183). The main contributor to the province is indicated in Table 20 (Stats SA, 2009b: v):

Table 20: Principal contributor in the provincial built environment of Mpumalanga

Mpumalanga	% contribution to value of building plans passed			
District municipality	**Municipality**		Provincial contribution	National contribution
Ehlanzeni District Municipality	18	Mbombela Local Municipality[48]	33.0%	1.6%
Sub-total			**33.0%**	**1.6%**

The province of the Eastern Cape contributed 4.1% or R 3 258,47 million (Stats SA, 2009b: v) to the total of R79 474,8 million of the value of plans approved in South Africa (Stats SA, 2009b: iii). The province consists of five district municipalities and seven municipalities (Stats SA, 2009b: 178). The main contributors to the province are listed in Table 21 (Stats SA, 2009b: v):

Table 21: Principal contributors in the provincial built environment of the Eastern Cape

Eastern Cape	% contribution to value of building plans passed			
District municipality	**Municipality**		Provincial contribution	National contribution
Amathole District Municipality	19	Buffalo City Municipality[49]	38.5%	1.6%
Nelson Mandela Bay Municipality	20	Nelson Mandela Bay Municipality[50]	30.1%	1.2%
Sub-total			**68.6%**	**2.8%**

[48] The main towns within the municipal boundaries of the Mbombela Local Municipality are Hazyview, KaNyamazane, Nelspruit and White River (Stats SA, 2009b: 183).
[49] The main towns within the municipal boundaries of the Buffalo City Municipality are Beacon Bay, Bhisho, East London, Gonubie, King William's Town, Mdantsane and Zwelitsha (Stats SA, 2009b: 178).
[50] The main towns within the municipal boundaries of the Nelson Mandela Bay Municipality are Despatch, Port Elizabeth and Uitenhage (Stats SA, 2009b: 178).

The North West province contributed 3.9% or R 3 099,52 million to the total of R79 474,8 million of the value of plans approved in South Africa. The province consists of five district municipalities and nine municipalities (Stats SA, 2009b: 181). The main contributor to the province is indicated in Table 22 (Stats SA, 2009b: v):

Table 22: Principal contributor in the provincial built environment of the North West

North West	% contribution to value of building plans passed			
District municipality	**Municipality**		Provincial contribution	National contribution
Bojanala Platinum District Municipality	21	Madibeng Local Municipality[51]	29.8%	1.2%
Sub-total			**29.8%**	**1.2%**

The province of the Free State contributed 3% or R32 828,6 million (Stats SA, 2009b: v) to the total of R79 474,8 million of the value of plans approved in South Africa. The province consists of four district municipalities and eight municipalities (Stats SA, 2009b: 179). The main contributor to the province is indicated in Table 23 (Stats SA, 2009b: v):

Table 23: Principal contributor in the provincial built environment of the Free State

Free State	% contribution to value of building plans passed			
District municipality	**Municipality**		Provincial contribution	National contribution
Motheo District Municipality	22	Mangaung Local Municipality[52]	58.4%	1.8%
Sub-total			**58.4%**	**1.8%**

[51] The main towns within the municipal boundaries of the Madibeng Local Municipality are Brits, De Wildt, Hartbeespoort and Letlhabile (Stats SA, 2009b: 181).
[52] The main towns within the municipal boundaries of the Mangaung Local Municipality are Bloemfontein, Botshabelo and Thaba Nchu (Stats SA, 2009b: 179).

The Limpopo Province (known as the Northern Province until 2003) contributed 2.2% or R 1 748,45 million to the total of R79 474,8 million of the value of plans approved in South Africa. The province consists of four district municipalities and seven municipalities (Stats SA, 2009b: 184). The main contributor to the province is indicated in Table 24 (Stats SA, 2009b: v):

Table 24: Principal contributor in the provincial built environment of Limpopo (Stats SA, 2009b: v)

Limpopo	% contribution to value of building plans passed			
District municipality	**Municipality**		Provincial contribution	National contribution
Capricorn District Municipality	23	Polokwane Municipality[53]	63.1%	1.4%
Sub-total			**63.1%**	**1.4%**

The Northern Cape contributed 0.3% or R 476,85 million to the total of R79 474,8 million of the value of plans approved in South Africa. The province consists of three district municipalities and four municipalities (Stats SA, 2009b: 178). The main contributor to the province is indicated in Table 25 (Stats SA, 2009b: v):

Table 25: Principal contributor in the provincial built environment of the Northern Cape (Stats SA, 2009b: v)

Northern Cape	% contribution to value of building plans passed			
District municipality	**Municipality**		Provincial contribution	National contribution
Frances Baard District Municipality	24	Sol Plaatje Municipality[54]	46.5%	0.3%
Sub-total			**46.5%**	**0.3%**

According to Stats SA Report P5041.3 that provided the 2008 figures (Stats SA, 2009b), the municipalities listed above represented 84.9% of all plans approved in South Africa for the period. The researcher decided to use these 24 municipalities as focus area for the pilot project. The main aim of the pilot project was to determine the relevance of the study. The desk review indicated specific aspects that form part of the plan approval process and ensure the uniform implementation of the NBR. The

[53] The main towns within the municipal boundaries of the Polokwane Municipality are Polokwane (formerly Pietersburg) and Seshego (Stats SA, 2009b: 184).
[54] The main towns within the municipal boundaries of the Sol Plaatje Municipality are Kenilworth, Kimberley, Modderrivier, Ritchie, Riverton and Spytfontein (Stats SA, 2009b: 178).

selected municipalities were all approached to obtain the information listed in Table 26.

Table 26: Required information to be obtained from the identified LAs

Background	Required information to be obtained from the LA
It was assumed that most LAs provide some form of submission guidance.	1. Guideline for the preparation of building plans
According to Part A (Administration) of the NBR it is necessary to provide the LA with particular information when a plan application is made (SABS, 2010a: 27-31).	2. Reg. A2: Plans and particulars to be furnished 3. Reg. A3: Preliminary plans and enquiries 4. Reg. A4: The LA may require additional documents and information 5. Reg. A5: Application forms and materials, scales and sizes of plans 6. Reg. A6: Site plans 7. Reg. A7: Layout drawing 8. Reg. A8: Plumbing installation drawings and particulars 9. Reg. A9: Fire protection plan 10. Reg. A10: Symbols on fire protection plans 11. Reg. A11: Pointing out of boundary beacons 12. Reg. A12: Street levels 13. Reg. A13: Building materials and tests 14. Reg. A14: Construction 15. Reg. A15: Installations maintenance and operation
According to section 7(1) of Act 103 of 1977, the LA has to communicate the approval or rejection of the application after the drawings have been scrutinised (South Africa, 2011: 17-18).	16. Notice of plan approval
Bevis and Misselbrook (1997: 37-39) list five occasions before and during the construction process on which the owner (or his authorised agent) is obliged to communicate with the LA concerned.	17. Commencement notice (with 4 working days' notice required) and/or demolition notice (with 10 working days' notice required) 18. Fire installation (with 2 working days' notice required) 19. Trench inspection (with 2 working days' notice required) 20. Drainage inspection (with 2 working days' notice required) 21. Occupation certificate (with 14 working days' notice required) with the accompanying electrical certificate

The following method was devised to obtain the required information:

- Locate the appropriate website for the LA
- Download all documents pertaining to the built environment from these websites
- Organise the information in similar categories
- Present the above information at the scheduled meetings (to be held weekly with the supervisor)
- Re-evaluate the effectiveness of the above approach after the first month

After the first month a number of problems were evident:

- Not all LAs had operational websites
- Not all LAs included the relevant information on their websites

The method of obtaining the information was altered to include the following:

- Make contact via the telephone with the LA, and obtain the contact details of the appropriate person
- Contact the person identified and request the information telephonically
- Follow up with an e-mail request
- If this mode of communication is not available, follow up with a faxed request
- As a last resort, pay a personal visit to the establishment to obtain the required information

During the three-month period, it became evident that the different LAs utilised a range of tools to implement the requirements of the NBR. Although communication remained the largest obstacle in obtaining the information required, it was possible to compile the following list of requirements from information collected (Table 27):

Table 27: Checklist and implementation instruments employed by the participating LAs to enforce the requirements of the NBR

Level	Information required
• **Planning level**	
	1) Urban planning or zoning scheme
	2) 'Green' building guidelines or by-laws
	3) Sustainable housing policy
	4) Guideline for architectural design manuals
	5) Heritage and conservation
• **Municipal by-laws/policies**	
	6) Municipal by-laws supplementing the NBR
• **Zoning application form**	
	7) Regulations for the departure from a zoning scheme
	8) Application form for the departure from a zoning scheme
	9) Application form for relaxing a building line/height restriction
• **Building control**	
a) **Building plans policy**	
	10) Tariff of fees
	11) Preparation of building plans/checklist
	12) Plan submission application form
b) **Application form and/or notice**	
	13) Provisional authorisation
	14) Notice of approval
c) **Competent person**	
	15) Appointment of approved competent and/or registered person
	16) Appointment of engineer
d) **Other**	
	17) Protection of trees and shrubs

	18) Swimming pools 19) Stormwater 20) Fire installation 21) Letter of consent from adjoining property owner, allowing relaxing of building line or erection of a second dwelling
e)	**Communication with LA or notice of inspection**
	22) Guideline for demolition application 23) Application for erection of temporary structure 24) Demolition notice (10 working days' notice required) 25) Site inspection 26) Trench inspection (two working days' notice required) 27) Foundation trenches to boundary walls/frontage works/driveway 28) Sub-floor compaction/floor height inspection 29) Reinforced concrete slabs 30) Roofs 31) Stairs 32) Glazing 33) Ventilation 34) Stormwater 35) Drainage/plumbing inspection (two working days' notice required) 36) Fire installation (two working days' notice required) 37) Occupation certificate (14 working days' notice required) 38) Electrical certificate 39) Engineer's compliance/completion certificate 40) Cleaning of site
	Items highlighted refer to aspects identified in the original list; see Table 26

Towards the end of this stage, the original target of obtaining the required information from the 24 identified municipalities proved too ambitious. It was therefore necessary to question the extent of the study area – specifically the required number of participants.

After consultation with the supervisor and statisticians, the researcher decided that the careful selection of a smaller number of LAs would probably still ensure a representative data set. Discussions on the selection criteria for the reduced number of LAs dominated the onset of the next phase of the study.

3.5 PHASE 2.2: PILOT STUDY

The first step of this part of the study was to re-visit the information provided by Stats SA on selected building statistics concerning the private sector, as reported by the various local government institutions. This was necessary in order to ensure that the selected LAs (although reduced in number) remain representative of the built environment in South Africa.

3.5.1 Study area

From the available Stats SA data, it was evident that the six metropolitan municipalities were responsible for the largest number of building plans approved, totalling 64% of plans approved in South Africa (Stats SA, 2009b: iv).

After deliberation, it was decided that the relevance of the research would not be compromised if the study were to focus only on the largest role-players. On the other hand, the available data points to an anomaly in the Eastern Cape. Although the Nelson Mandela Bay Municipality is recognised as a metropolitan municipality, its contribution to the value of building plans passed was smaller than that of the Buffalo City Municipality (Stats SA, 2009b: xi). It was therefore decided to include Nelson Mandela Bay and Buffalo City (although not a metropolitan municipality) as possible subjects representing the Eastern Cape.

The main contributors to activity in the building sector of South Africa (in terms of the number of plans approved) are identified and listed in Table 28 (Stats SA, 2009b: iv, viii):

Table 28: Principal contributors to the South African built environment

South Africa: % contribution to value of building plans passed				
Province	**District municipality**	**Municipality** (listed in order as per above report)		**National contribution**
Gauteng	City of Tshwane	1	City of Tshwane	16.3%
Gauteng	Ekurhuleni Metropolitan Municipality	2	Ekurhuleni Metropolitan Municipality	12.4%
Gauteng	City of Johannesburg	3	City of Johannesburg	6.9%
Western Cape	City of Cape Town	6	City of Cape Town	15.6%
KwaZulu-Natal	Uthungulu District Municipality	12	Ethekwini Municipality	11.6%
Eastern Cape	Amathole District Municipality	19	Buffalo City Municipality	1.6%
Eastern Cape	O R Tambo District Municipality	20	Nelson Mandela Bay Municipality	1.2%
Sub-total				**65.6%**

According to Stats SA (2009b: 185), no direct comparison should be made between building plans passed and buildings completed, and the following reasons are cited:

- “an unknown number of building plans are passed and afterwards not executed;

- if building operations have not commenced within the first year after approval, building plans are resubmitted;
- the time-lag between the date of passing of a building plan and the date of completion of the building varies considerably; and
- according to municipalities, final inspections of completed buildings are not always executed and therefore not recorded as completed."

Unfortunately the reasons stated above do not provide clear guidance as to the most relevant data for the built environment. The researcher consequently decided to look at both data sets to ensure appropriate selection. The 2008 period was also expanded to include the available data for 2007 and 2009. There were some concerns about the building activities surrounding the 2010 Soccer World Cup stadia and their influence on the statistics. However, in Report No. P5041.1, Stats SA (2010b: 41) issued a note on government expenditure (specifically regarding the 2010 Soccer World Cup) stating that:

> "[i]nformation relating to the 2010 Soccer World Cup new stadia and renovations, as well as other public sector infrastructure spending e.g. Eskom expansions and the Gautrain project, will not be included in the private sector building data series, as these are partially public sector funded".

3.5.1.1 Building plans passed

A number of building statistics reports by Stats SA were compared to determine the largest municipal contributors. Building Statistics Report No. 50-11-01 (2007) did not supply any information on the recorded value of building plans passed by the respective municipalities (Stats SA, 2009a). The available information for the years 2007 to 2009 is summarised in Table 29 (Stats SA, 2009a; Stats SA, 2009b; Stats SA, 2010a):

Table 29: Recorded value of building plans passed by the listed municipalities for the period as indicated

Calendar year	2007	2008	2009
Statistician-General	Pali J Lehohla	Pali J Lehohla	Pali J Lehohla
Statistical release	Report No. 50-11-01 (2007)	Report No. P5041.3	Report No. P5041.3
Embargo date	Not provided	29 June 2009	30 June 2010
Expected release date	Not provided	June 2010	June 2011
Copyright date	2009		
Reference pages	xvii, 2	vii, viii	x, xi

Municipality	Value	Contribution	Value	Contribution	Value	Contribution
	R 000	**% of total**	**R 000**	**% of total**	**R 000**	**% of total**
City of Tshwane	No information available		12 990,3	16.3%	10 350,4	16.1%
Ekurhuleni Metropolitan Municipality			9 840,2	12.4%	8 569,6	13.3%
City of Johannesburg			5 523,4	6.9%	5 682,2	8.8%
City of Cape Town			12 377,1	15.6%	8 219,1	12.8%
Ethekwini Municipality			9 223,0	11.6%	7 674,9	11.9%
Buffalo City Municipality			1 259,1	1.6%	818,1	1.3%
Nelson Mandela Bay Municipality			984,0	1.2%	1 930,1	3%
Total (for the above municipalities)	No information available		**52197.1**	**65.6%**	**43244.4**	**67.2%**
Total (for South Africa)			**79 474,8**	**100.0%**	**64 244,2**	**100.0%**

From the above information it is evident that the larger municipalities made the biggest contribution to activity in the built environment, and that this pattern remained constant for 2008 and 2009. It could thus be concluded that the selected municipalities (to be included in the study area) reflect the larger portion of building activities in South Africa with specific reference to building plans passed (65.6% and 67.2% for 2008 and 2009 respectively).

3.5.1.2 Buildings completed

Building Statistics Report Number P5041.1 (2010), which was made available by Stats SA (2010b) on 15 September 2010, provides information on building activity for the period January 2010 to July 2010. However, only provincial summaries for the larger municipalities were provided and specific information (regarding plans approved and buildings completed) for particular municipalities was not included in this statistical release.

The recorded value of buildings completed from 2007 to 2009 is summarised in Table 30 (Stats SA, 2009a: xvii, 2; Stats SA, 2009b: vii, viii; Stats SA, 2010a: x, xi):

Table 30: Recorded value of buildings completed in the listed municipalities for the period as indicated

Calendar year	**2007**		**2008**		**2009**	
Statistical release	Report No. 50-11-01 (2007)		Report No. P5041.3		Report No. P5041.3	
Reference pages	xvii, 2		vii, viii		x, xi	
Municipality	Value	Contribution	Value	Contribution	Value	Contribution
	R 000	**% of total**	**R 000**	**% of total**	**R 000**	**% of total**
City of Tshwane	6 216,5	12.8%	7 775,0	14.2%	7 262,5	13.5%
Ekurhuleni Metropolitan Municipality	3 997,4	8.2%	4 721,1	8.6%	4 601,3	8.5%
City of Johannesburg	9 380,9	19.3%	10 730,7	19.7%	8 373,1	15.5%
City of Cape Town	8 825,1	18.2%	10 015,3	18.3%	9 762,6	18.1%
Ethekwini Municipality	5 292,0	10.9%	5 521,6	10.1%	7 240,7	13.4%
Buffalo City Municipality	343,9	0.7%	567,6	1.0%	881,2	1.6%
Nelson Mandela Bay Municipality	861,5	1.8%	806,9	1.5%	992,3	1.8%
Total (for the above municipalities)	**34 917,3**	**71.9%**	**39 570,6**	**73.4%**	**39 113,7**	**72.4%**
Total (for South Africa)	**48 571,6**	**100,0%**	**54 582,6**	**100,0%**	**53 974,2**	**100,0%**

The larger municipalities evidently made the biggest contribution to activity in the built environment, and this pattern remained constant for the three years from 2007 to 2009. The larger portion of building activities in South Africa – with specific reference to buildings completed (71.9%, 72.5% and 72.4% for 2007, 2008 and 2009 respectively) – is therefore assumed to have taken place in the selected municipalities.

3.5.2 Revised study area

The revised study area now consisted of six metropolitan municipalities and one municipality. The information obtained from these municipalities was arranged to reflect the extent to which municipalities contribute to the built environment in South Africa. This was achieved by consolidating and summarising the available information obtained from Stats SA on *buildings completed* and *building plans passed* (Stats SA, 2009a; Stats SA, 2009b; Stats SA, 2010a). The municipal contribution to building activity in South Africa (for both completed buildings and passed building plans) is summarised in Table 31. The selected municipalities are listed in order of importance according to their total contribution. This particular order was used during the second phase of the pilot study. When comparing the administration tools used by the respective municipalities, the City of Cape Town represents the biggest role player (83.0%), while the Buffalo City Municipality is presented on the other side of the continuum with a contribution of 6.2%.

Table 31: Municipalities included in the revised study area (arranged according to the extent of the contribution of each to the built environment of South Africa)

Municipality	Municipal contribution as% of total built environment activity in South Africa									
	Buildings completed				Building plans passed			Total	Classification	Category
	2007	2008	2009	Sub-total	2008	2009	Sub-total			
1. City of Cape Town	18.2%	18.3%	18.1%	54.6%	15.6%	12.8%	28.4%	**83.0%**	Metropolitan municipality	A
2. City of Tshwane	12.8%	14.2%	13.5%	40.5%	16.3%	16.1%	32.4%	**72.9%**	Metropolitan municipality	A
3. City of Johannesburg	19.3%	19.7%	15.5%	54.5%	6.9%	8.8%	15.7%	**70.2%**	Metropolitan municipality	A
4. Ethekwini Municipality	10.9%	10.1%	13.4%	34.4%	11.6%	11.9%	23.5%	**57.9%**	Metropolitan municipality	A
5. Ekurhuleni Metropolitan Municipality	8.2%	8.6%	8.5%	25.3%	12.4%	13.3%	25.7%	**51.0%**	Metropolitan municipality	A
6. Nelson Mandela Bay Municipality	1.8%	1.5%	1.8%	5.1%	1.2%	3.0%	4.2%	**9.3%**	Metropolitan municipality	A
7. Buffalo City Municipality	0.7%	1.0%	1.6%	3.3%	1.6%	1.3%	2.9%	**6.2%**	Municipality	**B**

Building Statistics, Report No. P5041.3 provides the following definitions of the different municipal classifications used (Stats SA, 2009b: 187):

"**Municipality**

A generic term describing the unit of government in the third sphere responsible for local government in a geographically demarcated area. It includes district, metropolitan and local municipalities.

Metropolitan municipality

A municipality that has municipal executive and legislative authority in an area that includes more than one municipality, and which is described in Section 155(1) of the Constitution as a category A municipality (refer to Local Government: Municipal Structure Act, 1998 (Act No. 117 of 1998)).

Local municipality

A municipality that shares municipal executive and legislative authority in its area with a district municipality within whose area it falls, and which is described in Section 155(1) of the Constitution as a category B municipality (refer to Local Government: Municipal Structure Act, 1998 (Act No. 117 of 1998)).

District municipality

A municipality that has municipal executive and legislative authority in an area that includes more than one municipality, and which is described in Section 155(1) of the Constitution as a category C municipality (refer to Local Government: Municipal Structure Act, 1998 (Act No. 117 of 1998))."

3.5.3 Implementation tools

All available documentation was requested from the aforementioned municipalities to identify the exact administration tools used to implement the requirements of the NBR.

The existing records and administrative processes indicate that a prospective applicant for building plan approval has to address the following aspects:

1. General information required on an application (see Table 33)
2. Property information required on an application (see Tables 34 and 35)
3. Site development information required on an application (see Table 36)
4. Area information required on an application (see Table 37)

5. Details of applicant required on an application (see Table 38)
6. Details of registered property owner(s) required on an application (see Table 39)
7. Information required on the author on an application (see Table 40)
8. Details of agent or representative required on an application (see Table 41)
9. Fees assessment (see Tables 42 and 43)
10. Information on colouring of plans (see Table 44)
11. Information on additional specification schedule required (see Table 45)
12. Information on required plan scales (see Table 46)
13. Plan checklist or other information required (see Table 47)

In order to determine the prevalence (or not) of a particular implementation tool, the individual documents obtained from the respective municipalities were compared. A summary of this process is presented in table format on the following pages. No statistical analysis was done, because the selective application of different implementation methods is evident from the presentation. It will also be evident from the data presented in the different tables (Tables 32-46) that the requirements vary significantly from one municipality to the next.

3.5.3.1 General information required on an application

Table 32 compares the general information that the different LAs require when an application is completed.

Table 32: Comparison – Application information required by the selected LAs

			Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	Nelson Mandela Bay	Buffalo City
Application in terms of Section 4(2) of Act 103 of 1977									
I, the undersigned, hereby apply, in terms of Section 4(2) of Act 103 of 1977, for approval to undertake building work, as depicted on the plan(s) submitted herewith, on the under mentioned site.			●			●		●	
Plan category									
Normal			●						
Courtesy			●						
I, the undersigned, declare this building to be a									
non-smoke free			●		½				
smoke free			●		½				
building, in terms of Act 12 of 1999 read together with government Notice R975 of 29 September 2000.									
Is the building older than 60 years?	*Yes*	*No*	●			●		●	
Are any electricity or telephone poles affected?	*Yes*	*No*	●		½				
Are any trees affected by the proposed work?	*Yes*	*No*	●						
Sewer connection to LA sewer	*Yes*	*No*			½	●			
Size required	*100 dia*	*150 dia*	●			●			
Connection is	*1st* *2nd*	*connection to sewer*				●			
Connected by	*LA plumber*	*Privately registered plumber*				●			

3.5.3.2 Property information required on an application (Part 1)

Table 33 compares the first set of requirements with regard to property information of the listed LAs.

Table 33: Comparison – Property information required by the selected LAs (Part 1 of 2)

Property Information (Part 1 of 2)	Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	Nelson Mandela Bay	Buffalo City
Portion number/sub-division number		●				●	
Erf number (cadastral description)	●	●	●	●	●	●	●
Erf size	●	●					●
Suburb/township	●	●	●	●	●		●
Extension		●					
Street name + number	●	●	●	●	●	●	●
Road upon which building fronts	●			●		●	
Description/type of work to be executed	●	●		●	●	●	●
New		●	●	●			
Addition		●	●	●			
Alteration		●	●	●			
Amendment		●		●			
Renewal		●					
New proposal		●					
Preliminary sketch		●					
Swimming pool *(plans, site plan, sections, pump and filter location)*	●	●					●
Minor building		●		●			
Re-roofing		●					
Fuel pump/ Gas installation		●					
Walls *(for walls > 1.8m high)*		●					●
Other		●					
Tents for events		●					
Antenna/mast		●					
NBR category			●				
Type of building		●				●	●

3.5.3.3 Property information required on an application (Part 2)

Table 34 compares the second set of property information requirements of the listed LAs.

Table 34: Comparison: Property information required by the selected LAs (Part 2 of 2)

Property Information (Part 2 of 2)	Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	N. M. Bay	Buffalo City
Residential:							
Dwelling/Duet		●	●	●			
Dwelling - house smaller than 30 m²		●					
Dwelling - house 30 m² - 80 m²		●					
Dwelling - house larger than 80 m²		●					
Townhouses		●		●			
Cluster housing		●					
Full title / *Sectional title*		●					
Block of flats		●		●			
Number of units		●		●		●	
Other habitable		●					
Other residential buildings (specify)		●		●			
Tourism accommodation and casinos		●		●			
Non-Residential:							
Offices and banking space		●	●	●			
Industrial and warehouse space and workshops		●	●	●			
Sport/church or worship/recreation		●		●			
Private schools/libraries/crèches		●					
Public schools/libraries/crèches/universities		●		●			
Shopping space		●	●	●			
Hospitals and clinics		●		●			
Subdivisions/consolidation		●					
Other non-residential (specify)		●	●	●			
Temporary structures		●	●				
Private – all other space (garages)		●					
Public – all other space		●	●				
I, _____ being the registered owner/authorised agent of the above mentioned property hereby undertake to comply with the building plans submitted with this application; NBR and Building Standards Act 103 of 1977; conditions of sale; conditions of title as per township establishment; conditions of subdivision and requirements of Occupational Health and Safety Act 85 of 1993. I further understand that no refund, except for the street refundable fees will be made by the Council once this application has been submitted. I/We further acknowledge that the Council will not be held liable, in terms of Section 23 of Act 103 of 1977, to any person for any loss, damage, injury or death resulting or arising out of or in any way connected with the manner in which the proposed building is designed, erected, demolished, altered or the material used in the erection of the proposed building or the quality of workmanship in the erection, demolition or alteration of the proposed building.	●						●
Within:							
Ethekwini				●			
Former township/R293[55] areas				●			
Council strategic project				●			
Government courtesy application				●			
Proposal contains:							
Encroachment(s) into/ over/ under Council property or servitude area in favour of the LA — *Yes* / *No*				●			

[55] The term R293 Township refers to homelands that were established to house black people who were forcibly removed during the Apartheid era. During the local government restructuring of the mid-1990s, these areas were incorporated into the nearest existing municipal structure. For instance, KwaMashu is a former township situated 25km north of the Durban city centre. It is located on state-owned land devolved to the eThekwini Municipality (National Treasury, 2007).

3.5.3.4 Site development information required on an application

Table 35 compares the requirements of the listed LAs in respect of site development information.

Table 35: Comparison – Site development information required by the selected LAs

	Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	Nelson Mandela Bay	Buffalo City
Site development plan *(if applicable)*							
Site development plan number		●					
Date approved		●					

3.5.3.5 Area information required on an application

Table 36 compares the requirements of the listed LAs in respect of area information.

Table 36: Comparison – Area information required by the selected LAs

				Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	Nelson Mandela Bay	Buffalo City
Areas										
Existing		m^2					●	●		●
New main building(s)		m^2			●		●	●		●
New out-building(s)		m^2			●					
Area of additions		m^2			●		●			
Area of alterations		m^2			●			●		
Units townhouses					●					
Units block of flats					●					
Area of new work		m^2		●					●	●
Area of car port		m^2	*(fully dimensioned parking bays)*	●			●			
Swimming pool area		m^2		●						
Wall	*height*	*m*		●						
	length	*m*		●						
Height of all structures		*m*					●			
For official use only										
Tariff					●			●		
Receipt number					●		●	●		
Vote number					●			●		
Date		*/ /20….*			●		●			

3.5.3.6 Details of applicant required on an application

Table 37 compares the requirements of the listed LAs in respect of the details of the applicant.

Table 37: Comparison – Details of applicant required by the selected LAs

	Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	N. Mandela Bay	Buffalo City
Details of applicant *(handed in by)* *Contact person for decision notices*							
Owner	●		●				
Authorised agent			●				
Architect			●				
Title		●	●				
Full first name(s)		●	●	●	●	●	
Surname		●	●	●	●	●	
Initials		●					
ID number		●	●				
Preferred name		●					
Gender		●					
or							
Company name/ Trust name		●					
Co./Trust registration number		●					
Co./ Trust representative		●					
Address details							
Postal address + code		●	●	●	●	●	
Work address + code		●					
Home address + code		●					
Communication details							
E-mail		●	●	●	●		
Telephone number (work)		●	●		●		
Telephone number (home)		●	●				
Fax number (work)		●	●	●			
Fax number (home)		●					
Cell number		●	●				
Preferred communication type		●					
Signature							
Signature		●	●		●		
Date		●	●				
As a customer courtesy we will contact you as soon as the plan is approved or referred. How would you like to be contacted? *E-mail* ☐ *Post* ☐ *SMS* ☐ *Telephone* ☐			●				
Person to be contacted? *Owner of Property* ☐ *Author of Plan/Applicant*			●				
Note: *Any decision will be directed to both the Owner and Correspondent with confirmation of receipt being on proof of sending. Reasons for the refusal, where applicable, will be provided at the time of collection.* *One of the following methods of communication will be used to communicate the Council's decision. The reasons for refusal will not be read out over the phone.* *E-mail* ☐ *Post* ☐ *SMS* ☐ *Telephone* ☐				●			

3.5.3.7 Details of registered property owner(s) required on an application

Table 38 compares the requirements of the listed LAs in respect of the details of the registered property owner(s).

Table 38: Comparison – Details of registered property owner(s) required by the selected LAs

	Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	N. M. Bay	Buffalo City
Registered owner(s) of property							
Title		●	●	●			
Full first name(s)	●	●	●	●	●	●	●
Surname	●	●	●	●	●	●	●
Initials		●					
ID number	●	●	●				
Preferred name		●					
Gender		●					
or							
Company name/ Trust name	●	●					
Co./ Trust registration number	●	●					
Co./ Trust representative		●					
VAT number	●						
Address details							
Postal address + code	●	●		●	●		●
Work address + code		●					
Residential address + code		●	●				●
Domicilium Citandi et Executandi (Physical address)				●			
Communication details							
E-mail		●	●	●	●		●
Telephone number (work)	●	●	●	●	●	●	●
Telephone number (home)	●	●	●	●		●	
Fax number (work)		●	●	●			●
Fax number (home)		●					
Cell number	●	●	●	●			●
Preferred communication type		●					
Signature							
Signature(s) of registered owner(s)	●	●	●	●	●	●	●
Date	●	●	●	●		●	●
I declare that I have personally checked the Title Deeds or any other documents for the property concerned and declare that the proposed work is not contrary to any restrictive conditions or servitudes applicable thereto, and in the event of such contraventions will bear the sole responsibility to rectify aforesaid contraventions. *I/We declare that the boundary beacon pegs conform with (sic) positions as per applicable approved SG Diagram.* *The author of the plans is authorised to make amendments to the application drawings as deemed necessary by the Council.*	●		●	●			
I declare that I am *the registered owner*			●				
the sectional title holder (POA)			●				
tenant (POA)			●				
legal representative			●				
other, state designation (POA)			●				
I hereby undertake to complete the building work in accordance with the approved building plans including all endorsements and attachments and the NBR. I am fully aware of the fact that a Certificate of Occupancy must be obtained from the Municipality, prior to the premises being occupied.	●						

3.5.3.8 Information required on the Author on an application

Table 39 compares the requirements of the listed LAs in respect of the author, architect, draughtsperson or registered person.

Table 39: Comparison – Information required in respect of the Author/ Architect/ Draughtsperson/ Registered person by the selected LAs

	Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	N. Mandela Bay	Buffalo City
Author/ Architect/ Draughtsperson/ Registered person							
Title		●					
Full first name(s)	●	●	●	●		●	
Surname	●	●	●	●		●	
Initials		●					
ID number		●	●				
Preferred name		●					
Gender		●					
SACAP registration number	●	●	●	●		●	●
SACAP category of registration	●	●		●			●
QS's name	●						
QS's registration number	●						
Architectural practice/firm							●
or							
Company name/ Trust name		●					
Co./ Trust registration number		●					
Co./ Trust representative		●					
Address details							
Postal address + code	●	●				●	●
Work address + code		●					●
Home address + code		●					
Communication details							
E-mail		●					●
Telephone number (work)	●	●		●		●	●
Telephone number (home)		●				●	
Fax number (work)	●	●					●
Fax number (home)		●					
Cell number	●	●		●			●
Preferred communication type		●					
Signature							
Signature(s)	●	●	●	●		●	●
Date	●	●	●	●		●	●
I certify that (where applicable) the correct level of entry into operational municipal sewers, drains, and/or stormwater drains/channels and connections to municipal water supply mains has been shown on the drawings.				●			
Note: *Plans for work over 500sq meters reserved for REGISTERED ARCHITECT (sic)*							●

3.5.3.9 Details of Agent or representative required on an application

Table 40 compares the requirements of the listed LAs in respect of the details of the agent or representative.

Table 40: Comparison – Information required in respect of the Agent/Person holding special power of attorney by the selected LAs

Agent/ Special power of attorney	Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	N. M.Bay	Buffalo City
Title		●					
Full first name(s)		●	●		●		
Surname		●	●		●		
Initials		●					
ID number		●	●				
Preferred name		●					
Gender		●					
Address details							
Postal address + code		●			●		
Work address + code		●					
Home address + code		●					
Communication details							
E-mail		●			●		
Telephone number (work)		●			●		
Telephone number (home)		●					
Fax number (work)		●					
Fax number (home)		●					
Cell number		●					
Preferred communication type		●					
Signature		●	●	●	●		●
Date		●	●	●			●
Declaration							
I/ We (owner/ representative)	●	●		●			
ID number		●					
the undersigned, nominate, constitute and appoint		●		●			
I/ we (agent)	●	●		●			
ID number		●		●			
with the power of substitution to be my/ our legal attorney(s)/ agent(s) in my/ our name, place and stead to apply for:		●		½			
Erf No.		●					
Suburb		●					
and in general to effect the application and to do whatever I/ we would do if I/ we were present in person and acting in the matter. I/ We hereby ratify, allow and confirm, amend promise and agree to ratify, allow and confirm everything my/ our attorney(s) and agent(s) may do or may permit to be done legally in terms of this power of attorney.		●		½			
Signature(s) of registered owner(s)	●	●		●			
Date		●		●			
I nominate _____ to be my lawful representative and to act on my behalf in this submission application, in terms of Section 4(2) of Act 103 of 1977, and to do all things lawfully required by the LA to ensure that this application complies with the provisions of the National Building Regulations and Building Standards Act 103 of 1977 and any other applicable law.	●						

3.5.3.10 Fees assessment

Tables 41 and 42 compare the fees assessment requirements of the listed LAs.

Table 41: Comparison – Fees assessments made by the selected LAs

								Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	Nelson Mandela Bay	Buffalo City
Fees assessment *(for office use only)*														
Area		*x*	*Rate*	*/ m²*	*=*	*Fees payable*				●			●	
m²		*x*		*/ m²*	*=*					●			●	
m²		*x*		*/ m²*	*=*					●			●	
m²		*x*		*/ m²*	*=*					●			●	
m²		*x*		*/ m²*	*=*					●			●	
Reproduction cost					*=*					●				
Total fees payable					*=*					●			●	
Estimated Value/Cost								●			●	●	●	●
New work					*=*					●		●		
Additions					*=*					●				
Alterations					*=*					●		●		
Assessed by										●				
Date			*//20….*							●				
Masts												●		
Swimming pool												●		
Tanks												●		
Boundary walls												●		
Minor building work												●		

Table 42: Comparison – Fees assessments made by the selected LAs

								Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	N. Mandela Bay	Buffalo City
Assessment														
Building fee										●				
Reproduction										●				
Fee										●				
Hoarding fee										●				
Total fees payable										●				
Application received										●				
Fees paid										●			●	
Receipt number										●			●	

3.5.3.11 Information on colouring of plans

Table 43 compares the requirements of the listed LAs in respect of the colouring used on building plans.

Table 43: Comparison – Information on colouring of plans provided by the selected LAs

		Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	N. Mandela Bay	Buffalo City
Colouring of plans *One copy of the plans and drawings shall be coloured as indicated below:*								
Plans and sections *(building plans)*								
New masonry	*Red*	●	●	●				●
New concrete	*Green*	●	●	●				●
New iron or steel	*Blue*	●	●	●				●
New wood	*Yellow*	Brown	●	Brown				●
New glass	*Black*	●	●					
Existing materials	*Grey*	●	●					
Other materials	*Any other colour than the above*	●	●					
Partitioning	*Yellow*			●				
Existing work	*Black*			●				and neutral
Demolitions	*Black dotted lines*		●	●				in skeleton
Site plan *(block plans)*								
Proposed work	*Red*	●	●	●				
Existing work	*No colour*	●	●	Black				
Demolitions	*Black dotted lines*	●	●	●				
Drainage work								
Drain and soil pipes	*Brown*	●	●	●				●
Waste pipes	*Green*	●	●					
Soil and combined vents	*Red*	●	●	●				●
Stormwater drains	*Black*	not coloured	●					
Existing drains	*Black*	●		●				●
Waste vents (fittings)	*Blue*	●						
Pipes for the conveyance of industrial effluent	*Orange*	●						
Fire protection plan								
Emergency route	*Green*	●						
Direction of travel to a safe area	*Black arrows at short intervals along planned route*	●						

3.5.3.12 Information on additional specification schedule required

Table 44 compares the requirements of the listed LAs in respect of an additional specification schedule.

Table 44: Comparison – Specification schedule relative to building regulations as required by the selected LAs

Schedule relative to building regulations		Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	Nelson Mandela Bay	Buffalo City
Foundations	*materials*						●	
Foundations	*sizes*							●
Walls	*materials*						●	
Walls	*thicknesses*						●	●
Damp proof course	*materials*						●	●
Ventilation	*window space of each room*						●	●
Roofs covered with							●	●
Stairs							●	
Stair dimensions, risers, treads								●

3.5.3.13 Information on required plan scales

Table 45 compares the requirements of the listed LAs in respect of plan scales.

Table 45: Comparison – Information in respect of plan scales provided by the selected LAs

Plan scales *Plans, drawings and diagrams shall be drawn to a suitable scale selected from one of the scales, as indicated below:*	Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	Nelson Mandela Bay	Buffalo City
Site plans (Block plans) 1:1000 | 1:500 | 1:300 | 1:200 | 1:100	●	●*	●			1:200***	1:200****
Drainage/ Plumbing installation drawings 1:200 | 1:100 | 1:50	●	●					
Layout drawings 1:100 | 1:50 | 1:20	●	●	**			1:100***	1:100****
Layout drawings (Elevations) 1:200 | 1:100 | 1:50 | 1:20	●	●	**			1:100***	1:100****
Structural details 1:100 | 1:50 | 1:20 | 1:10 | 1:5 | 1:2 | 1:1	●	●					
Fire protection plans 1:200 | 1:100 | 1:50 | 1:20	●	●					
Sections of verandas, pavement openings, etc., on public street 1:25			●				
General requirements and information in connection with the preparation and submission of plans	●		●				●

*1:300 is an additional scale allowed by Tshwane

**Only the above scales are allowed by Johannesburg

***The above scales are indicated as a minimum by Nelson Mandela Bay

****Only the above scales are allowed by Buffalo City

3.5.3.14 Plan checklist or other information required

Table 46 compares the requirements of the listed LAs in respect of a plan checklist.

Table 46: Comparison – Plan checklist/ other information required by the selected LAs

Information required for submission		Cape Town	Tshwane	Johannesburg	Ethekwini	Ekurhuleni	N. Mandela Bay	Buffalo City
Requirement	***Source***							
Zoning certificate	*Land Use Legislation Administration (LULA)*		●	●				½
SG diagram	*Cartographic Services/ Offices of the Surveyor General*		●	●	●			
Drainage diagram	*Sewage division*		●					
Consent letter in group housing/sectional title	*Board of trustees/co-owner*		●					
Approval from home owners' association	*Home owners' association*		●					
Title deed/letter of ownership (tribal property)/lease hold	*Owner*		●	●	●			
Latest service statement	*Owner*		●			●		½
Power of attorney	*Owner*		●		●			
3x sets of drawings (black print on white background with one set coloured as per NBR)	*Owner* *(2 copies + extra set of fire protection drawings if required)* *(5 copies + 1 in colour for additions)*	●	●		●	●	●	●
Power of attorney	*Schedule: Architectural compliance certificate*		●					
SDP required	*LULA*			●				
Engineer's certificate	*Engineer*			●		●		
Building line relaxation	*LULA*			●				
Neighbour's consent	*Neighbour*			●				
Engineering service contribution – letter/receipt	*Municipal accounts department*			●				
SACAP registration form	*Registered person*			●				
Engineer: Letter of appointment	*Engineer*						●	

3.6 DATA ANALYSIS AND INTERPRETATION

Chapter 3 addresses the second sub-problem, namely:

To determine whether the current regulations and standards (as defined by the NBR) are implemented uniformly by the respective Local Authorities.

This chapter presents three different data sets in an attempt to

- identify the significant role-players who contribute to the built environment of South Africa in order to define the study area (for this purpose, information from Stats SA was interpreted and seven municipalities were identified to constitute the study area);
- determine which mechanisms are used within the study area to implement the requirements set by the NBR; and
- define the specific tools used by the municipalities to enforce the NBR.

By comparing the requirements set, it becomes apparent that the seven listed municipalities use different instruments and tools to enforce the requirements of the NBR. This supports the second hypothesis that

… the various Local Authorities do not implement the NBR in a uniform manner.

The current status quo on NBR implementation warrants further investigation and, as part of the review of the research design in Chapter 4, the proposed process will be discussed.

3.7 SUMMARY OF CHAPTER 3

This chapter introduces the second sub-problem as its focus, namely:

To determine whether the current regulations and standards (as defined by the NBR) are implemented uniformly by the respective Local Authorities.

This is followed by reviewing the specific treatment of the main problem and its associated sub-problems.

A description is given of the pilot study (Phase 2.1), which is initiated by listing the required information to be obtained from the identified LAs. At the end of this phase it

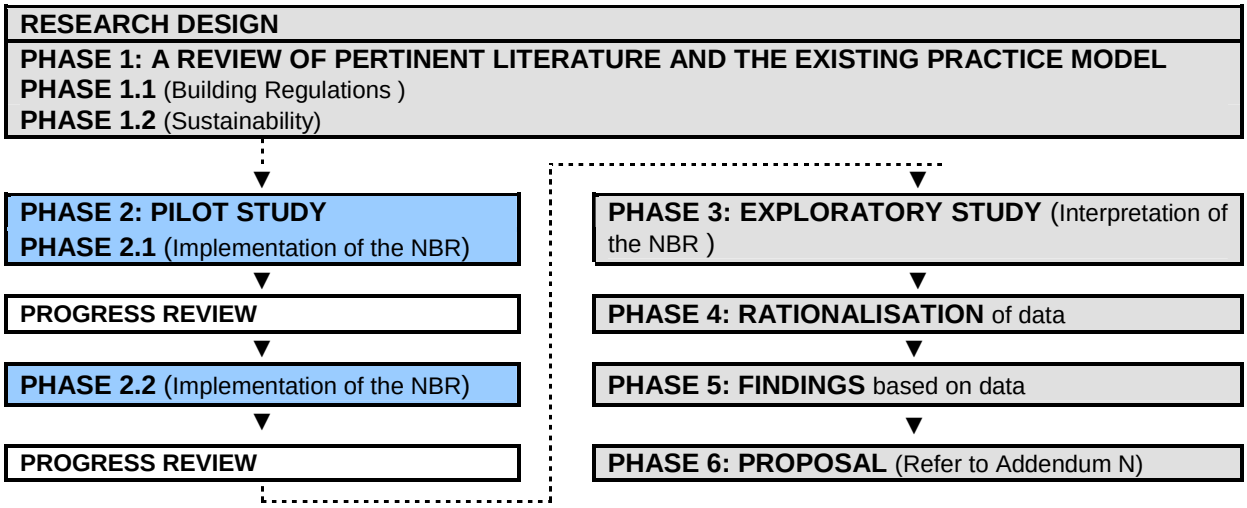
is possible to list the implementation instruments employed by the LAs to enforce the relevant requirements of the NBR.

This is followed by Phase 2.2, which involves a more in-depth investigation of the study area according to information provided by Stats SA on building plans passed and buildings completed. The revised study area is identified and a comparison is made of the tools used by the subjects to enforce the NBR.

Chapter 3 serves as preparation for Chapter 4, in which the questionnaire will form the centre of discussion.

To assist the reader, a summary of the research design is provided (Table 47) and it highlights the aspects that were addressed in this Chapter.

Table 47: A summary of the research design highlighting the completed phases



4. RESEARCH AND DATA INTERPRETATION

4.1 INTRODUCTION

The focus of this chapter is Sub-problem 3, specifically:

Are the most significant NBR role-players, i.e. the BCOs,

- *aware of the goals and implementation methods of the NBR?*
- *willing to support the uniform implementation of the NBR?*
- *aware of recent developmental changes to the NBR?*

The above focus points are extended to also address Sub-problem 4 and determine whether BCOs are willing to implement new regulations on sustainability in the existing administration system of the NBR.

This chapter initiates Phase 3 of the study proposal, namely the exploratory study. It starts with a progress review of the main problem and associated sub-problems, after which the implemented questionnaire is discussed.

It is hypothesised that the most significant role-players (i.e. the BCOs) are not aware of the origin, methods of implementation, and goals of the NBR, and hence they are not willing to support the uniform implementation of the NBR. Neither are they aware of recent developmental changes to the NBR.

It is also hypothesised that BCOs are willing to implement new regulations on sustainability in the existing administration system of the NBR.

4.2 REVIEW OF THE RESEARCH DESIGN

The research design is reviewed in Table 48.

Table 48: List of the main problem and sub-problems, and the proposed actions to be taken

MAIN PROBLEM			
The purpose of this study is to determine the origin of the current minimum regulations and standards applicable to the built environment of South Africa, and to examine the goals and implementation methods of Act 103 of 1977 and its Regulations (together with the Code of Application (SANS 10400:1990)), in an attempt to achieve uniform implementation of the requirements and align the aforementioned with accepted passive design principles to promote a more sustainable built environment in South Africa.			
Background	**Sub-problem 1** (posed as question)	**Progress**	
The literature study determined the origin and goals of the NBR. The requirements of Act 103 of 1977 and the NBR and implementation methods have been identified. The latest changes to the NBR have also been described briefly.	What is the origin of the NBR, and did the goals and the methods of implementation of the current edition of the NBR (which represents the minimum regulations and standards applicable to the built environment of South Africa) evolve since the origin of the NBR?	**Hypothesis**	**It is hypothesised that** the goals and implementation methods of the current edition of the NBR (which represents the minimum regulations and standards applicable to the built environment of South Africa) have evolved since the origin of the NBR.
		Action required	**Identify the existing literature on subject** (completed)
		Method	**Desk review** (completed)
		Theme(s)	**Act 103 of 1977 and the NBR**
		Questions	**Not applicable**
Background	**Sub-problem 2** (posed as question)	**Progress**	
The desk review indicates that since its inception, the goals of the NBR have evolved and currently conflicting views exist on the purpose of the NBR. This duality becomes evident when comparing the instruments and tools used by the LAs to implement the requirements of the NBR. Currently the applicant has to meet different requirements at different LAs during the plan approval process.	Are the current regulations and standards, as defined by the NBR, implemented uniformly by the respective LAs?	**Hypothesis**	**It is hypothesised that** the various LAs do not implement the requirements of the NBR in a uniform manner.
		Action required	**Identify the existing NBR instruments and implementation tools** used by the LAs (completed) **Test the hypothesis**
		Method	**Desk review** (completed) **Questionnaire to BCOs**
		Theme(s)	**1. Existing NBR** **2. Implementation of the NBR**
		Questions	Background + Introduction = 1 – 5 Theme 1 = Question **6** Theme 2 = Questions **7 – 11**
Background	**Sub-problem 3** (posed as question)	**Progress**	
A number of changes have been made to the NBR since November 2002. Although the BCOs should be aware of these changes since they impact directly on their vocation, the communication thereof has remained within existing formalised channels (i.e. the Government *Gazette*). This part of the study determines the level of awareness of the BCOs, and their participation in the process of formulating the new regulations.	Are the most significant NBR role-players, i.e. the BCOs, 3.1 aware of the goals and implementation methods of the NBR, 3.2 willing to support the uniform implementation of the NBR, and 3.3 aware of recent developmental changes to the NBR?	**Hypothesis**	**It is hypothesised that** the most significant role-players (i.e. the BCOs), are 3.1 not aware of the goals and implementation methods of the NBR, and 3.2 not willing to support the uniform implementation of the NBR, and 3.3 not aware of recent developmental changes to the NBR.
		Action required	**Test the hypothesis**
		Method	**Questionnaire to BCOs**

		Theme(s)	**3. Changes to the NBR**
		Questions	Theme 3 = Questions **12, 13**
Background	**Sub-problem 4** (posed as question)	**Progress**	
Should certain passive design principles be included in the NBR, the BCOs would be responsible for the implementation of these envisioned 'sustainability regulations'. It is therefore important to determine the approach of the BCOs towards sustainability. Should the BCOs be unwilling to implement the regulations, it could lead to requirements not being effectively implemented.	Are BCOs willing to implement new sustainability regulations in the existing administration system of the NBR?	**Hypothesis**	**It is hypothesised that** BCOs are willing to implement new sustainability regulations in the existing administration system of the NBR.
		Action required	**Test the hypothesis**
		Method	**Questionnaire for the BCOs**
		Theme(s)	**4. Impact of built environment** **5. Passive design criteria**
		Questions	Theme 4 + 5 = Questions **14,15**

4.3 THE SURVEY

This chapter discusses a questionnaire to be completed by the BCOs. The questionnaire investigates the following:

- The origin, methods of implementation, and goals of the NBR
- The uniform implementation of the NBR by the LAs
- The awareness of the BCOs of recent developmental changes to the NBR
- The willingness of the BCOs to incorporate new regulations on sustainability into the existing administration system of the NBR

The initial section of the questionnaire deals to some extent also with Sub-problem 2. Although the latter was addressed in the preceding chapter, it is important to determine the perspective of the BCOs, as they take primary responsibility for implementing the requirements of the NBR.

The complete questionnaire is presented as Addendum L for information purposes.

4.3.1 Background

The Department of Statistics (DoS) at the University of Pretoria (UP) provides an internal consultation service to researchers. Based on availability, the DoS assigns a statistician and research consultant from the pool of departmental staff to a particular

research project. This is followed by the first project meeting, where the attendance of the supervisor, researcher, statistician and research consultant is required. During this meeting the aims of the research project are discussed, as well as possible methods to achieve these aims.

The researcher followed the required protocol during subsequent liaisons with the DoS regarding the study. In addition, an independent statistical consultant was appointed by the researcher to provide further verification and clarification of the research concept, its implementation method, and the design of the questionnaire.

4.3.2 The design of the survey

The questionnaire was structured in accordance with the various sub-problems. Various draft surveys were prepared during the design process. The different draft designs were continuously discussed with the research consultant, internal and external statisticians, and the supervisor. Each discussion served to pre-test the survey. Lastly, the questionnaire was submitted to the UP Ethics Committee for approval.

4.3.3 The Ethics Committee

The research was conducted in accordance with the official UP document on *Policy and Procedures for Responsible Research* (Committee for Research Ethics and Integrity, 2007). After approval by the departmental research committee, the research project was submitted to the Engineering, Built Environment and Information Technology (EBIT) faculty committee for Research Ethics and Integrity. The application consisted of the following documents:

1. Background to the study
2. Application form for clearance by the Ethics Committee
3. Proposed questionnaire
4. Informed consent form
5. Statement by the researcher regarding confidentiality and possible conflicts of interest

The background to the study, the request to the ethics committee, and the subsequent approval of the proposal and questionnaire are attached for information purposes as Addenda K and L.

4.3.4 The one-day conference of NRCS

Prior to its implementation, the final questionnaire was presented to two representatives of the NRCS (personal communication with Opperman & Cohen, 7 September 2010).

The NRCS extended an invitation to all the BCOs in South Africa to attend a one-day conference entitled *Sharing indigenous Wisdom* (Opperman, 2010). The conference was held on 21 September 2010, and was attended by 89 BCOs. At this event, the researcher was given the opportunity to present a lecture on *Challenges of uniformity* (Laubscher, 2010). The following aspects were covered in the presentation:

- *The origin of building regulations in ancient times and in Southern Africa.*
- *The definition of a building regulation.*
- *The current Act and NBR in South Africa.*
- *The role of the BCO.*
- *The various NBR implementation tools available to the BCO.*
- *The major role-players in the South African built environment as well as the methods they use to implement the NBR.* In essence, this was a short discussion of Phase 2.2 of the study (the second part of the pilot study) that was completed as part of the desk review.
- Finally, the attendees were asked to assist in the research by completing the survey.

It is the opinion of the researcher that the formal presentation and subsequent completion of the questionnaire at the NRCS-organised event provided a large measure of underwriting to and endorsement of the questionnaire. It should be noted that the distribution and completion of the questionnaires at this event ensured a high rate of participation (100%).

4.3.5 Determining the population size

Before the scheduled NRCS conference, the actual size of the population (the precise number of BCOs countrywide) was unknown to both the researcher and the NRCS.

According to the South African Local Government Association (SALGA), there are 283 LAs (municipalities) in South Africa (Hartley, 2010). Section 5 of Act 103 of 1977 requires each LA to appoint a BCO (South Africa, 2011: 16). However, it is possible to share a BCO between two smaller LAs, or some LAs might require more than one BCO, such as the City of Johannesburg that employs 154 BCOs (personal communication with Opperman, 13 May 2010).

In March 2010 the NRCS appointed an intern to contact all the LAs listed on the official website of SALGA. The assigned intern dedicated three months to contacting the 283 listed LAs via telephone or e-mail. The aim of this exercise was to establish the contact details of the BCOs of the respective LAs (personal communication with Opperman, 13 May 2010). During the aforementioned period, 54% of the contacted LAs either did not respond, or responded negatively to the enquiry (personal communication with Opperman, 10 March 2011). Nonetheless, the invitation to the one-day NRCS conference was extended to 277 BCOs (personal communication with Mathebula, 3 March 2011), which implies that the population size for this study was the 277 invited BCOs.

No further restrictions or filters were placed on the 277 invitees, and the target population was defined as all the BCOs who eventually attended the scheduled conference. As stated earlier, the conference was attended by 89 BCOs, and everyone participated in the study by completing a questionnaire.

4.3.6 The remaining population

The possibility of contacting the remainder of the population was discussed with the supervisor. However, concerns about the replicability of the controlled environment within which the questionnaire was completed ruled out this possibility.

It is suggested that the lecture that preceded the completion of the survey provided context and assistance to the respondents.

4.3.7 Implementation of the questionnaire

The questionnaire was distributed to the target group, and the individual questions were projected onto a screen. In this controlled environment the researcher read the questions separately, clarified any uncertainty and allowed the audience to complete each of the 15 questions individually. The duration of this stage was longer than initially anticipated, and it lasted approximately 45 minutes. This could be attributed to the clarification process. The researcher made an effort not to influence the participants in any manner regarding the projected outcome of the survey.

4.3.8 Anonymity

The survey was conducted in the manner described to the Ethics Committee, with one exception. The participants were not asked to complete an informed consent form, because this would have compromised their anonymity. The instructions and descriptions of purpose that preceded the survey allowed the researcher to make all the respondents aware of the voluntary nature of their participation and their anonymous status. The cover letter of each questionnaire (included as Addendum L) expressly stated the following:

> *All information will be treated as confidential. However, after it has been processed, the results of the study will be publicly available* (Laubscher, 2010).

The completion of the survey confirms the participants' acceptance of the said conditions.

4.3.9 Data processing

The UP DoS processed the raw data using the Statistical Package for the Social Sciences version 17.0 (SPSS). Once the researcher had completed the individual coding of the questionnaires, the data was captured by the DoS.

4.3.10 The target group and its level of representation of the population

As mentioned earlier, the attendees of the one-day NRCS conference for BCOs constituted the target population for this study. However, the actual number of participants who would attend the conference and complete the questionnaire remained uncertain until the event was hosted.

Large similarities were found between the profile of provincial representation at the conference and the provincial value of building plans passed and recorded. The respective profiles were compared to establish the validity of the study (see par.4.5.1 for the data and subsequent discussion). Although the questionnaire was completed by only 89 people or 32% of the study population (all the invitees), the provincial representation of the participants was comparable with the provincial contribution to South African built environment. (For a more detailed discussion on this aspect see Figure 6 on p. 128 and Figures 86 and 87 on pp. 179-180.)

4.3.11 The rating of the target group

The appointment of a BCO by an LA takes place in accordance with the minimum requirements as set out in Act 103 of 1977 and the NBR. Act 103 of 1977 requires the BCO to have a minimum qualification, and assumes that the respondents have daily contact with the subject matter. The response (on the NBR) obtained from this target group was therefore rated as informed by the researcher.

4.4 GRAPHIC PRESENTATION OF DATA

The statistically processed data received from the University of Pretoria's Department of Statistics is graphically presented next. This is done in chronological order of the questions, using the following structure:

- The particular question (extracted from the questionnaire)
- A graphic summary of valid statistical occurrences for the question
- A graphic summary of responses to the question

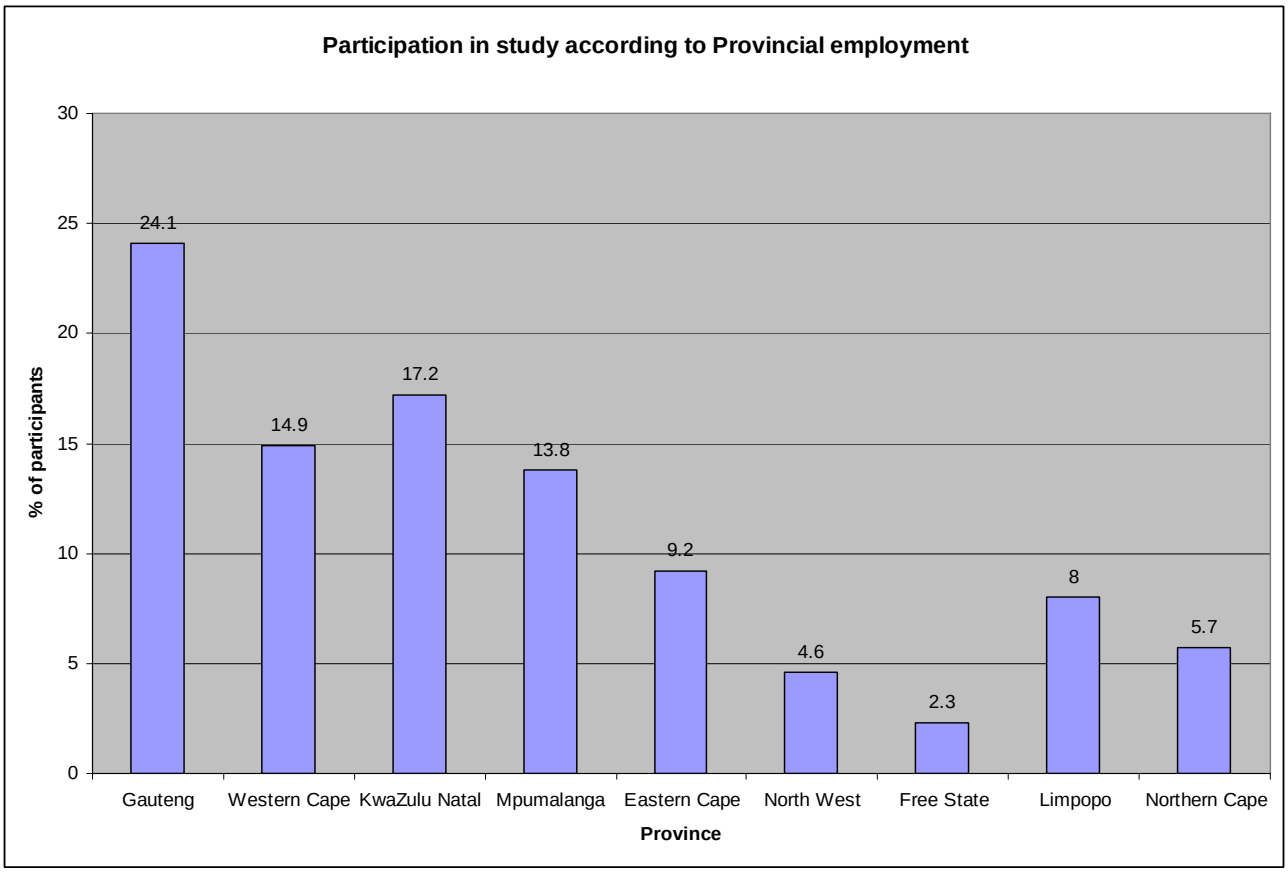
Note that the original statistical frequencies are listed in Addendum M for reference purposes.

4.4.1 Question 1

4.4.1.1 Discussion of Question 1

Question 1 asked the respondents to indicate the **province** in which they are currently working. This question was completed by 87 of the possible 89 respondents. This provided a 98% valid response rate, and the results are summarised in Figure 6. (Note that the sequence in which the provinces are listed relates to the explanation on p. 90.)

Figure 6: Graphic summary of responses to Question 1



4.4.2 Question 2

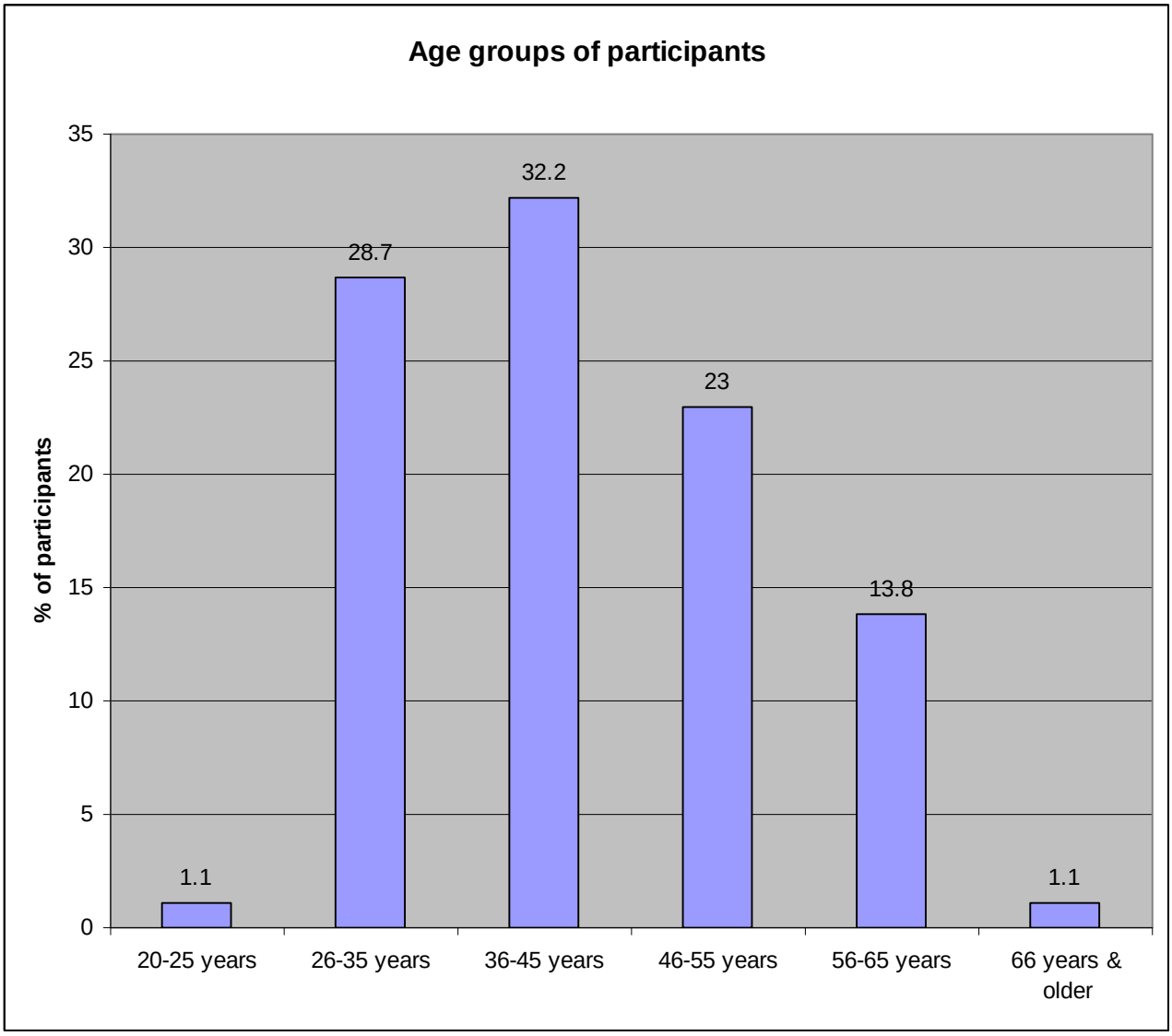
4.4.2.1 Discussion of Question 2.1

Question 2.1 asked the respondents to indicate their gender. This question was completed by 89 of the possible 89 respondents. The gender composition of the participants was 88% male and 12% female.

4.4.2.2 Discussion of Question 2.2

Question 2.2 asked the respondents to indicate their age. This question was completed by 87 of the possible 89 respondents, thus providing a 98% valid response rate. The results are summarised in Figure 7.

Figure 7: Graphic summary of responses to Question 2.2



4.4.2.3 Comparison of data obtained in Questions 2.1 and 2.2

The process of statistical inference was used to compare the data obtained in Questions 2.1 and 2.2. The results indicate the median age composition of the participants and the number of years' experience that they have of working in the built environment. These are summarised in Figures 8 and 9.

Figure 8: Graphic summary of statistical inference of Questions 2.1 and 2.2

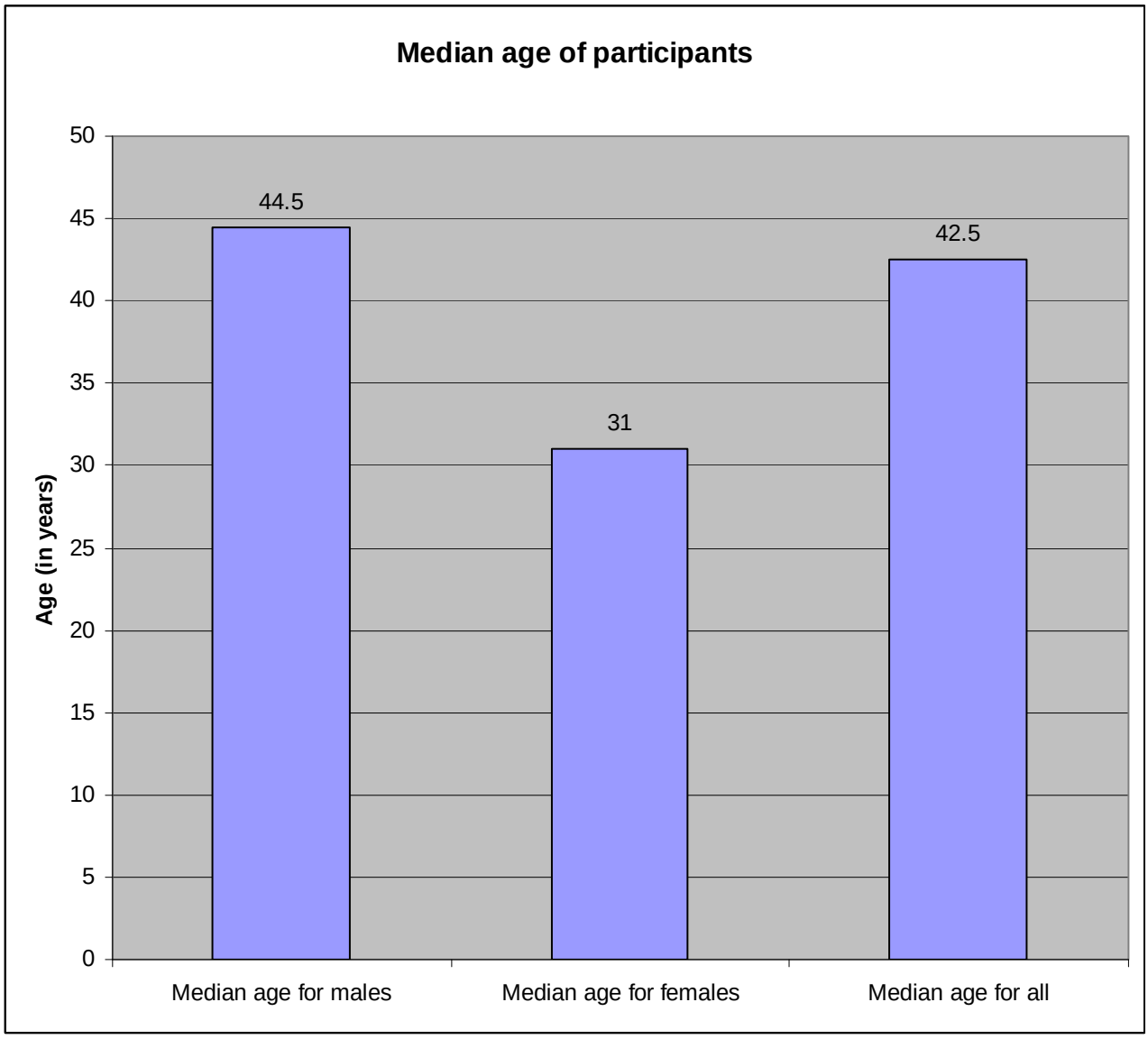
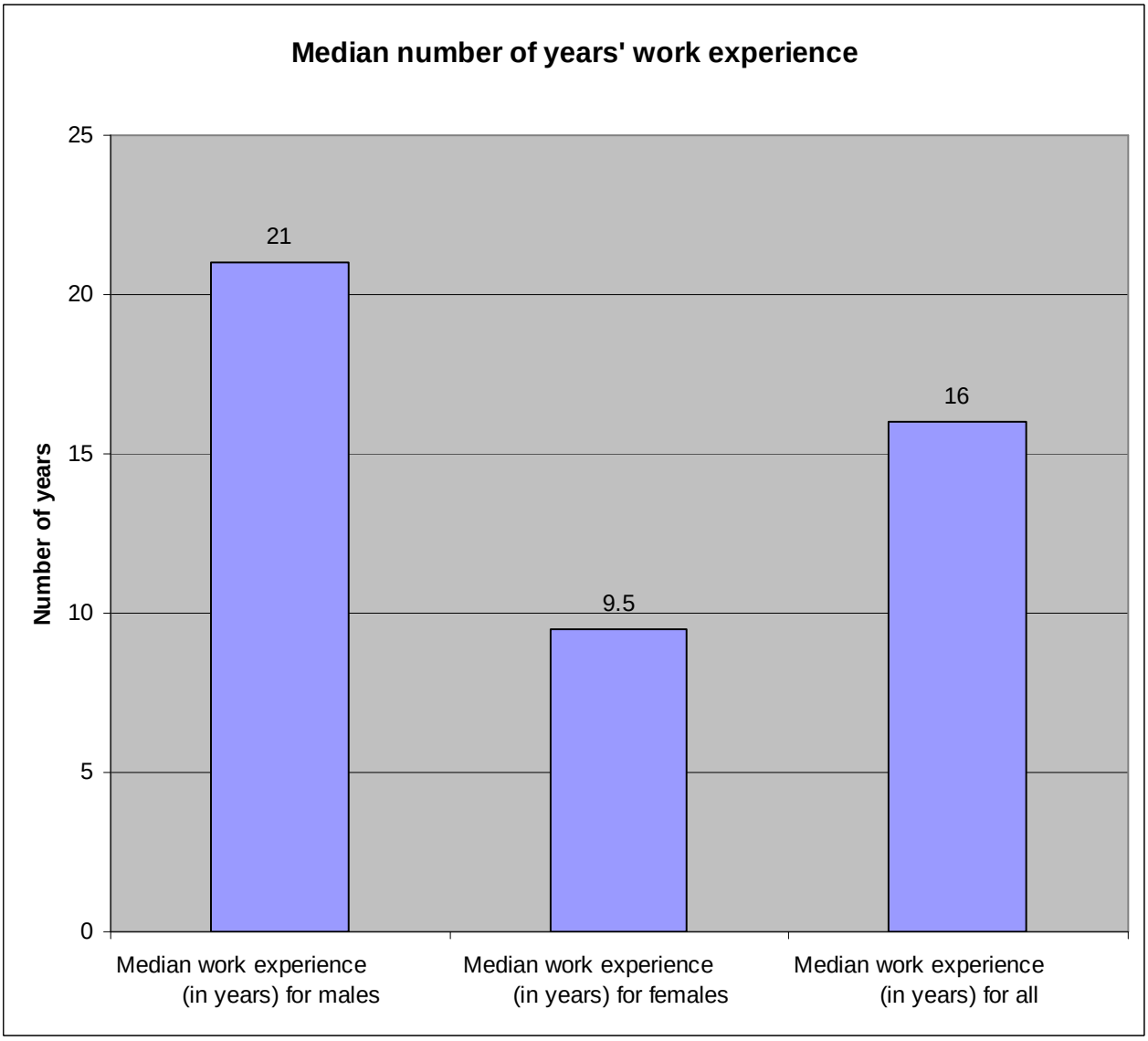


Figure 9: Graphic summary of statistical inference of Questions 2.1 and 2.2



4.4.3 Question 3

4.4.3.1 Discussion of Question 3

Question 3 asked the respondents to indicate their current occupation. This question was answered by 77 respondents, thus providing an 86.5% valid response rate. The researcher allowed for multiple careers by providing the following occupation classes for possible selection:

- Administrator
- Architect
- BCO
- Specifications writer
- Planner

- Other (please describe briefly)

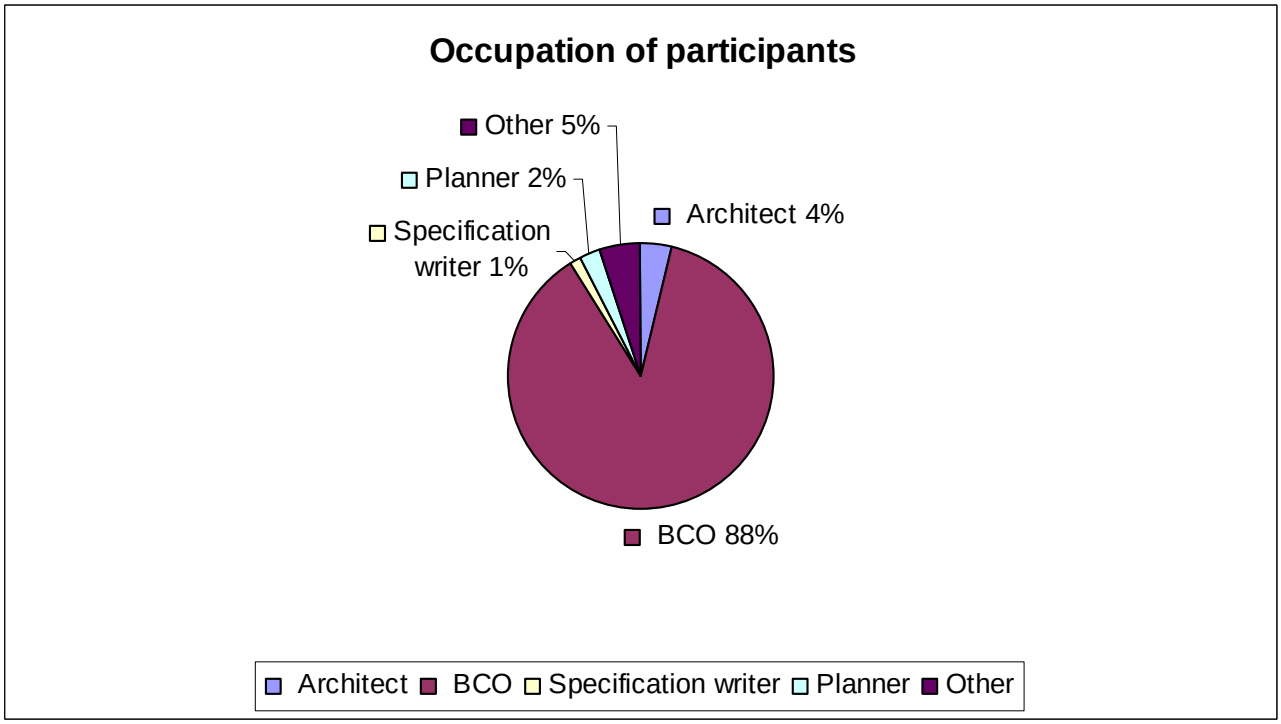
Under the option *Other* the respondents indicated the following additional descriptions:

- Architectural technologist
- Management
- Technician
- Engineering
- Assistant
- Project Officer
- Technical Consultant
- Other (no description)

The BCOs from the target population were found to come from the disciplines listed in Figure 10.

4.4.3.2 Graphic summary of responses to Question 3

Figure 10: Graphic summary of responses to Question 3



4.4.4 Question 4

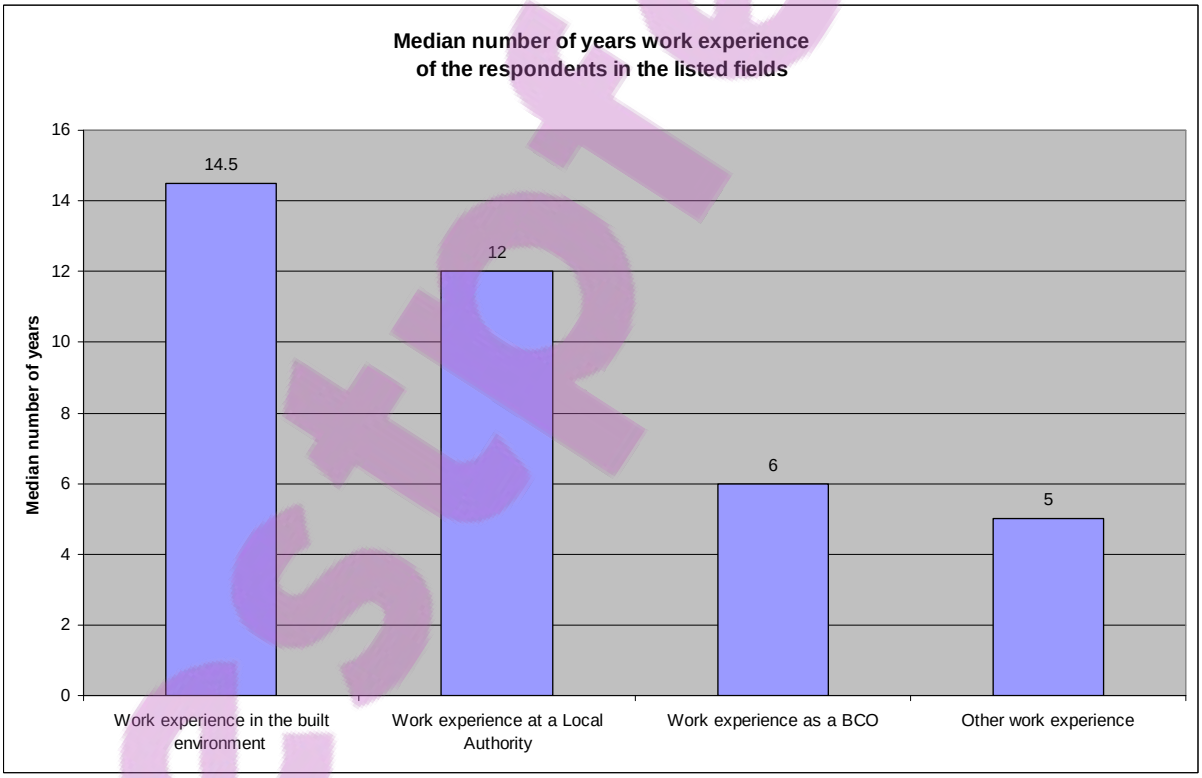
4.4.4.1 Question 4 extracted from questionnaire

Table 49: Question 4

		Number of valid responses	% of total population
4	*Please provide the following information on your **work experience:***		
4.1	***Total duration** of work experience (in years)*	84	**94%**
4.2	***Duration** of work experience **in** the **built environment** (in years)*	84	**94%**
4.3	***Duration** of work experience **at** a **Local Authority** (in years)*	83	**93%**
4.4	***Duration** of work experience **as** a **BCO** (in years)*	68	**76%**
4.5	***Other** work experience (please describe briefly)*	39	**44%**

4.4.4.2 Graphic summary of responses to Question 4

Figure 11: Graphic summary of responses to Question 4

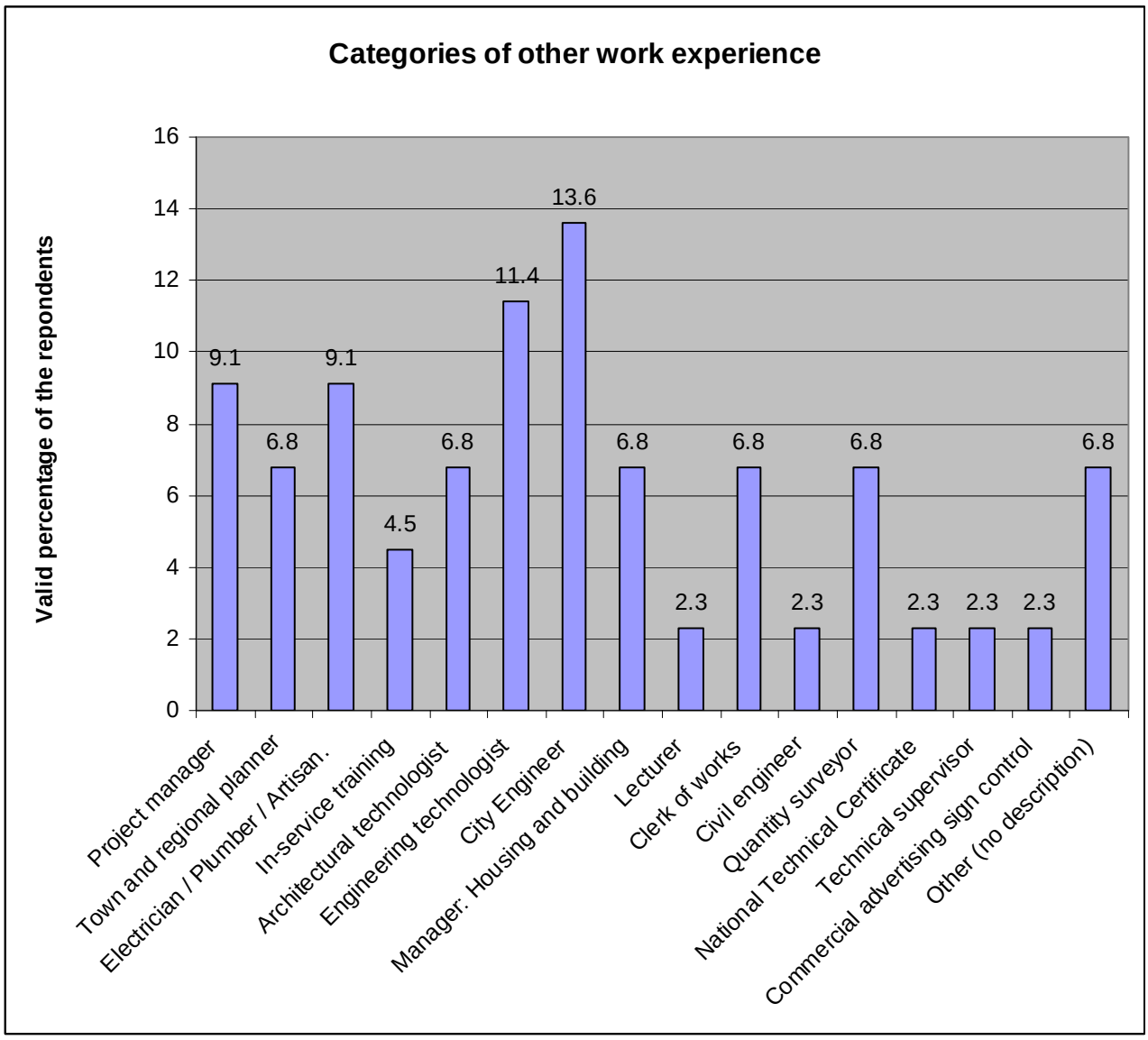


4.4.4.3 Graphic summary of responses to Question 4

It should be noted that Question 4.5 generated multiple responses. Of the respondents, 39 (43.8%) selected this option and 44 other career possibilities were

listed. Furthermore, a number of the respondents did not indicate the duration of their experience in a particular field. The results for the different categories of work experience are summarised in Figure 12:

Figure 12: Graphic summary of responses to Question 4.5



4.4.5 Question 5

4.4.5.1 Discussion of Question 5

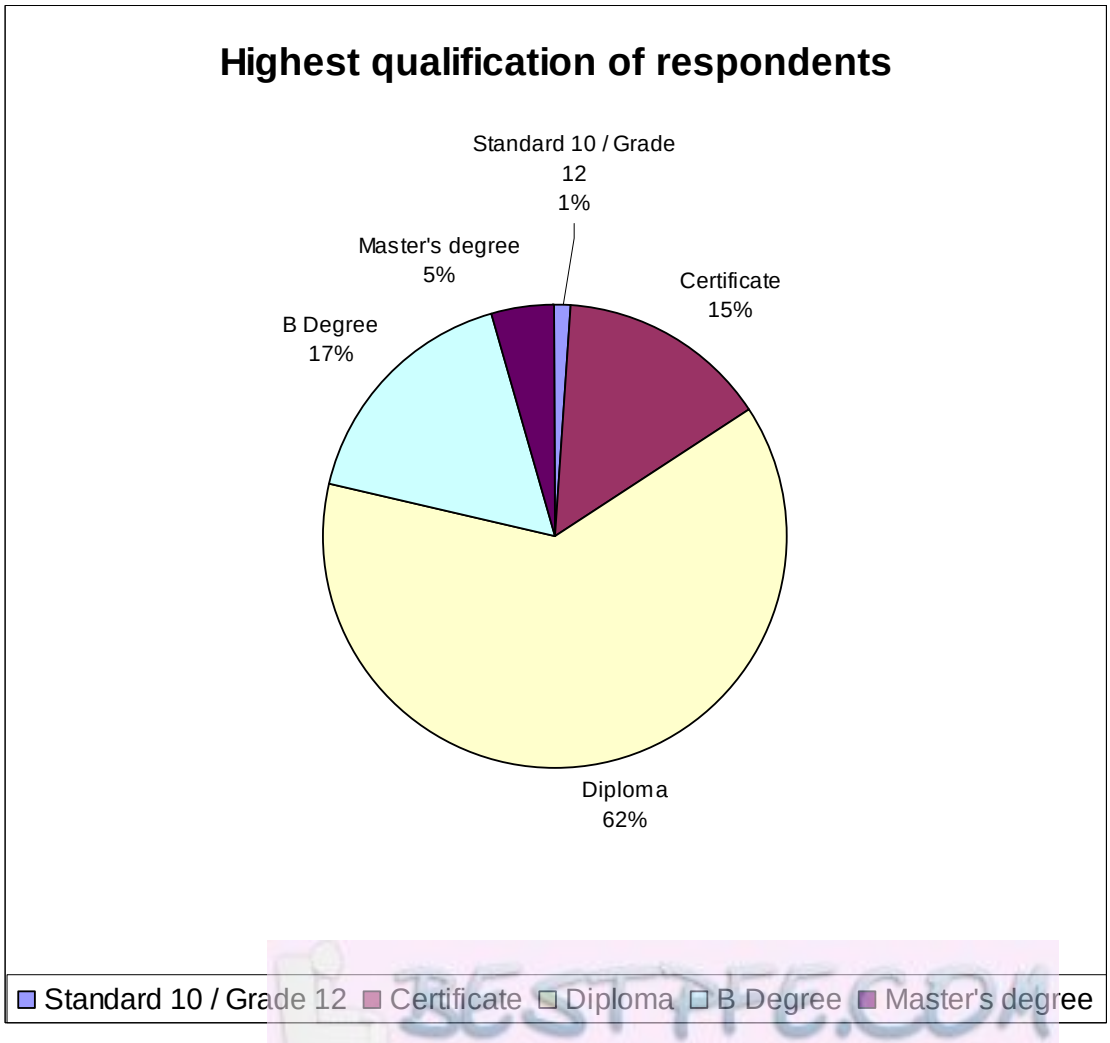
In Question 5, the participants were asked to indicate their qualifications. All 89 respondents completed this question. The following possibilities were provided to choose from:

- Standard 10/Grade 12
- Certificate

- Diploma
- Bachelor's degree
- Master's degree
- Other (please describe briefly)

The information obtained from this question involved multiple responses, since the respondents had to answer *Yes/No* to each option. Some of the respondents did not mark all their qualifications, but only the highest one. With the assistance of the statistician from the UP DoS, each recorded response was revisited to ensure whether the last category contained the highest qualification of the respondent. After careful deliberation (and consultation with the statistician) it was decided not to include the *other* category, since it proved not to represent the highest qualification of the participants. The distribution of qualifications is listed in Figure 13.

Figure 13: Graphic summary of responses to Question 5



4.4.6 Question 6

4.4.6.1 Question 6 extracted from questionnaire (with corresponding number of respondents

Table 50: Question 6

		Number of valid responses	% of total population
6	*There are different views regarding **the primary focus** of the amended **National Building Regulations and Building Standards Act** (Act 103 of 1977).*		
	*Please rate the **importance** of the following possible focus areas:*		
6.1	*To **limit inflation** in the built environment*	82	**92%**
6.2	*To ensure **uniform regulation** in the built environment*	87	**98%**
6.3	*To ensure a **healthy built environment***	88	**99%**
6.4	*To ensure a **safe built environment***	88	**99%**
6.5	*To **promote sustainability** in the built environment*	88	**99%**
6.6	*To form a **basis for future development** of the built environment*	87	**98%**
6.7	***Other** (please describe briefly)*	9	**10%**

4.4.6.2 Graphic summary of responses to Question 6

Figure 14: Graphic summary of responses to Question 6.1

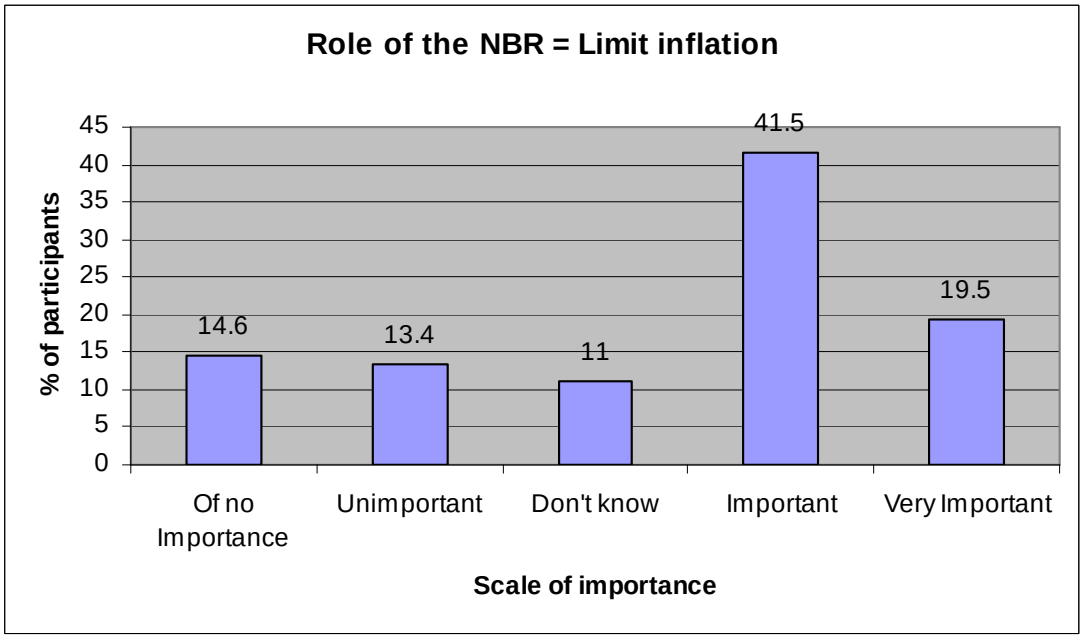


Figure 15: Graphic summary of responses to Question 6.2

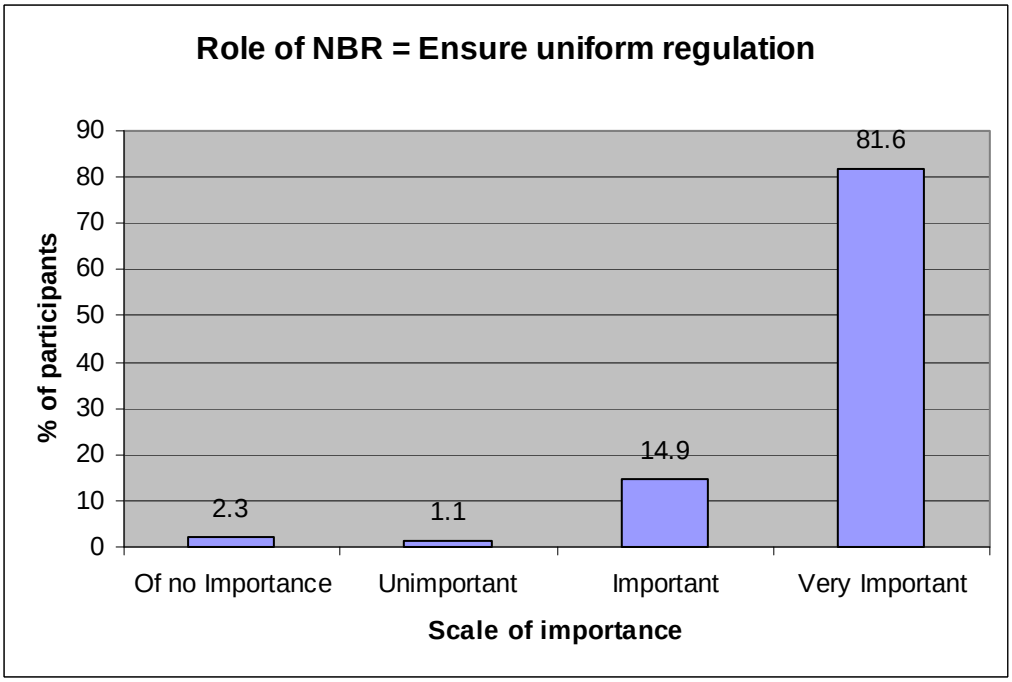


Figure 16: Graphic summary of responses to Question 6.3

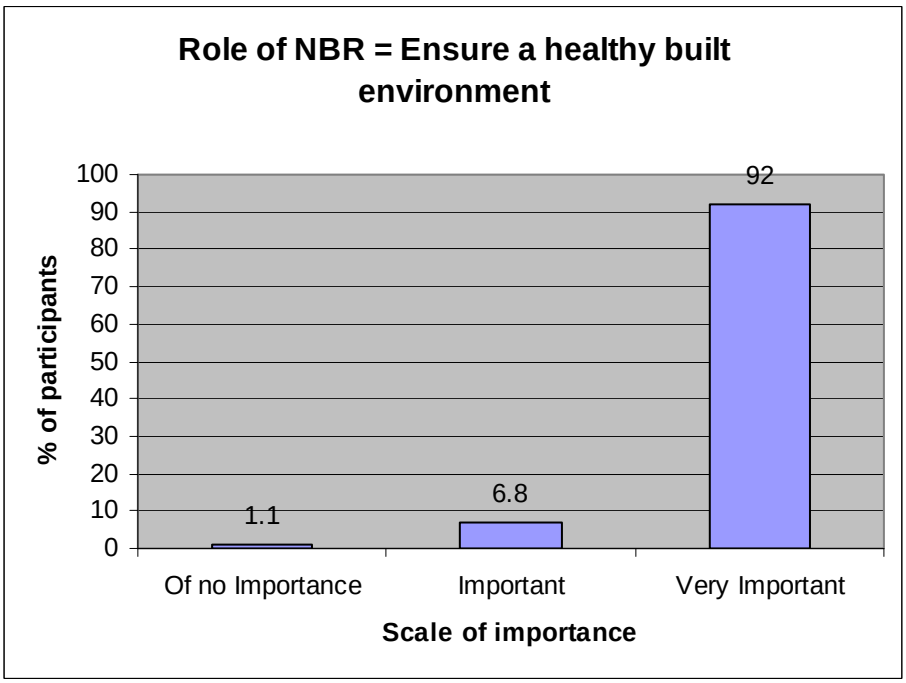


Figure 17: Graphic summary of responses to Question 6.4

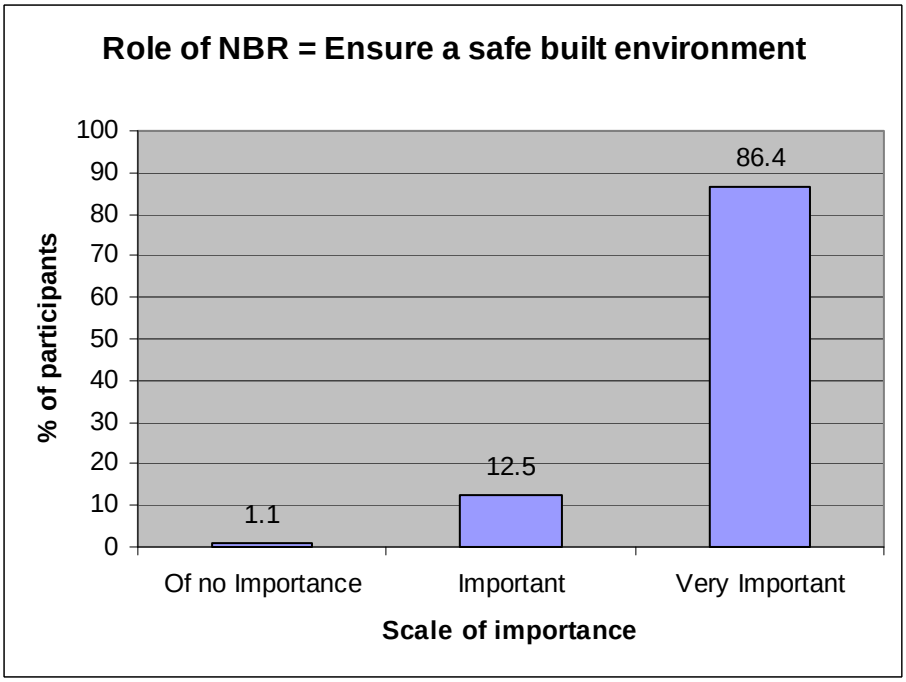


Figure 18: Graphic summary of responses to Question 6.5

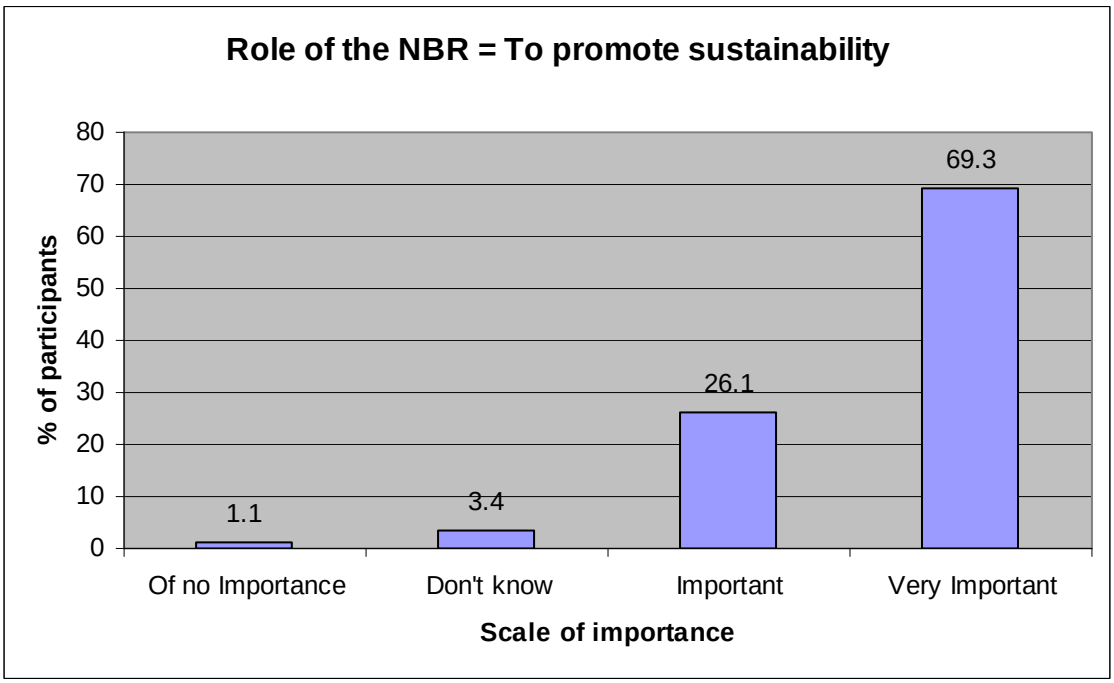
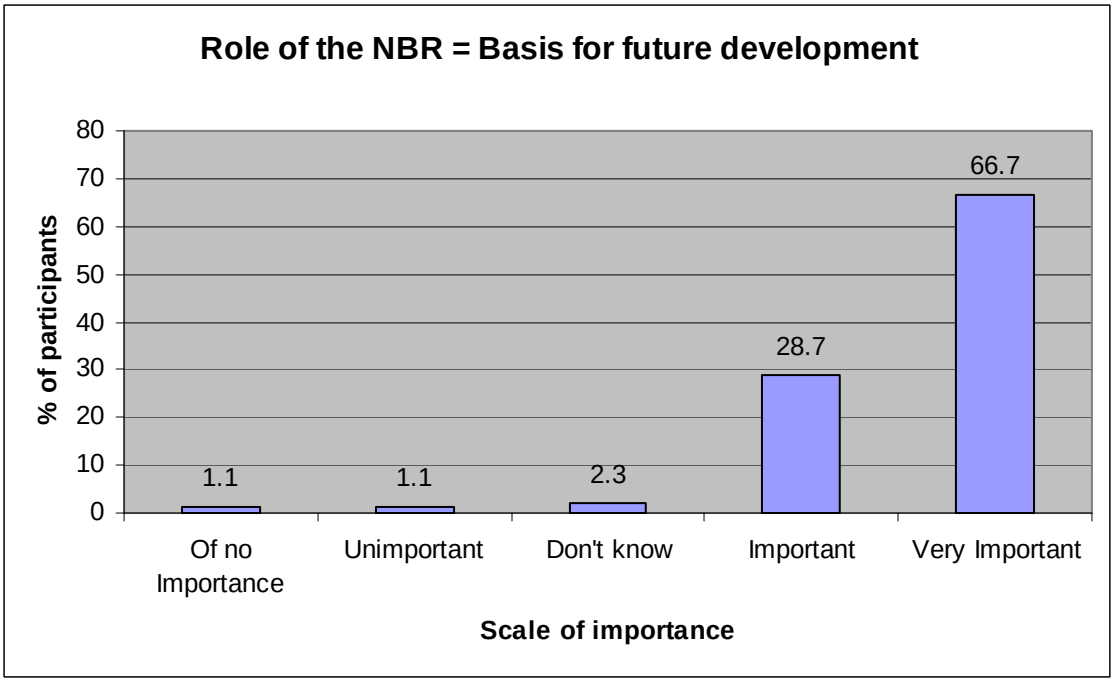


Figure 19: Graphic summary of responses to Question 6.6



4.4.6.3 Reponses to Question 6.7 (*Other*)

Nine of the respondents (slightly over 10%) identified other possible focus areas for the amended Act 103 of 1977. These included the following:

- Energy efficiency (identified by one respondent, thus resulting in a valid frequency of 11.1%)
- Quality control (two respondents; valid frequency 22.2%)
- Enforcement of contraventions (one respondent; valid frequency 11.1%)
- Conservation of the natural environment (one respondent; valid frequency 11.1%)
- Long-term impact of decisions should be taken into account (one respondent; valid frequency 11.1%)
- Remuneration of the BCO (one respondent; valid frequency 11.1%)
- Enforcement of the Act/addressing of compliance (one respondent; valid frequency 11.1%)
- Consideration of neighbours to avoid buildings becoming a nuisance to them (one respondent; valid frequency 11.1%)

4.4.6.4 Ranking of responses to Question 6

The mean[56] averages of the responses to Question 6 were calculated to rate the responses from high to low, or most important to least important. According to these averages, the order of importance was as follows:

- Ensure a healthy built environment (Question 6.3)
- Ensure a safe built environment (Question 6.4)
- Ensure uniform regulations in the built environment (Question 6.2)
- Other (Question 6.7)
- Promote sustainability in the built environment (Question 6.5)
- Form a basis for future development of the built environment (Question 6.6)
- Limit inflation in the built environment (Question 6.1)

4.4.7 Question 7

4.4.7.1 Question 7 (Part 1) extracted from questionnaire (with corresponding number of respondents)

Table 51: Question 7 (Part 1)

		Number of valid responses	% of total population
7	*Legislative control of the built environment is a complex issue. A number of LAs have drafted **documents to supplement the NBR**. **How often does the BCO make use of these** during the execution of his daily tasks, and which documents are consulted?*		
	***How often do you refer to** (or consult) the following documents?*		
7.1	*The amended National Building Regulations and Building Standards **Act** (Act 103 of 1977)*	88	**99%**
7.2	*The **National Building Regulations** promulgated in terms of the relevant sections of Act 103 of 1977 (i.e. section 17(1), section 20 read with section 9, section 20 read with section 16, and section 20 read with section 17(5)a)*	87	**98%**
7.3	*The amended **Code of Practice** for the Application of the National Building Regulations (SABS 0400-1990 or SANS 10400)*	87	**98%**
7.4	*The **Deemed-to-Satisfy Rules** as included in The Code of Practice for the Application of the National Building Regulations (SABS 0400-1990 or SANS 10400)*	89	**100%**
7.5	*Guidelines for the **preparation of building plans***	87	**98%**
7.6	*Plan submission **application form***	88	**99%**
7.7	***Checklist** for plan approval*	89	**100%**
7.8	***Notice of approval***	87	**98%**
7.9	*Regulations for **relaxing a building line***	89	**100%**

[56] The mean is the measure of central tendency and could be defined as *a simple statistical model of the centre of a distribution of scores* (Field, 2009: 20, 789).

4.4.7.2 Graphic summary of valid statistical occurrences

Figure 20: Graphic summary of valid statistical occurrences for Question 7 (Part 1)

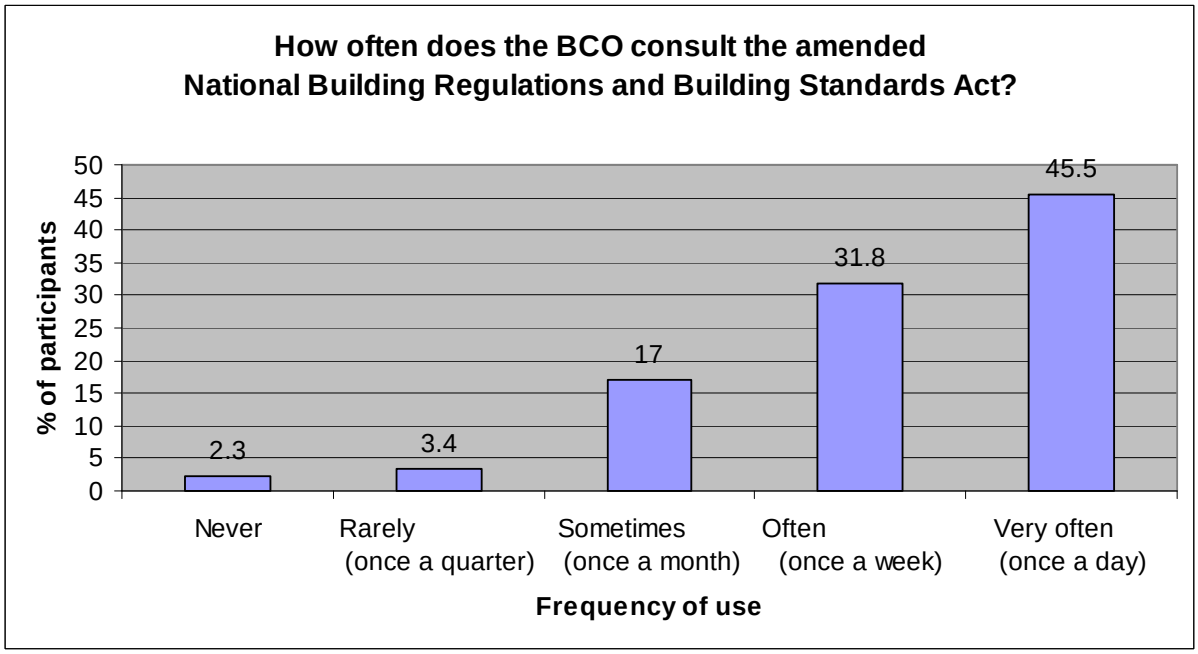


Figure 21: Graphic summary of responses to Question 7.2

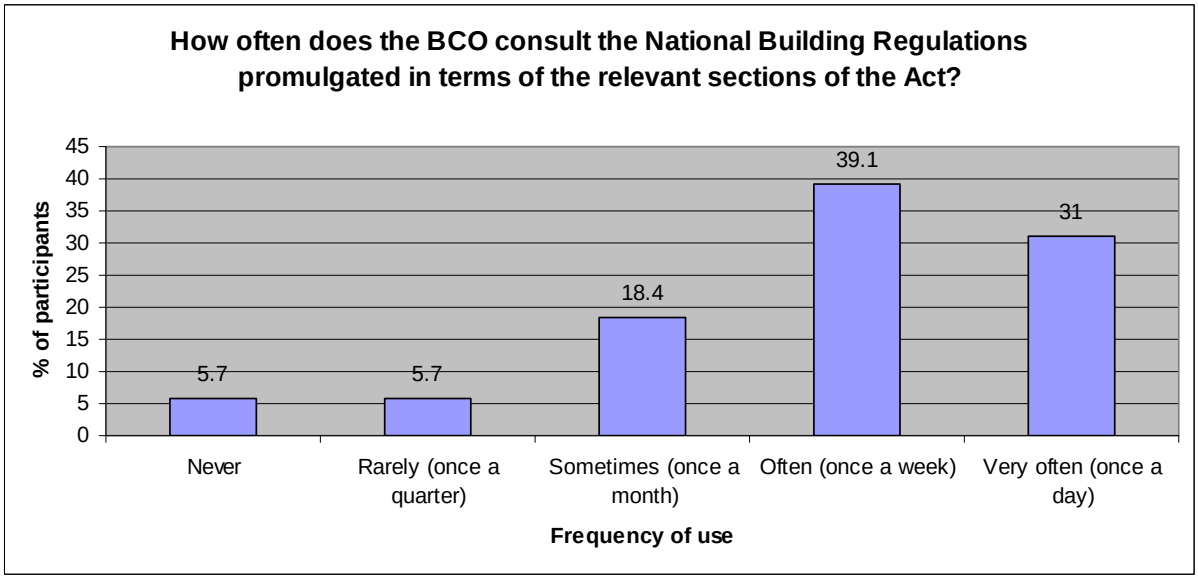


Figure 22: Graphic summary of responses to Question 7.3

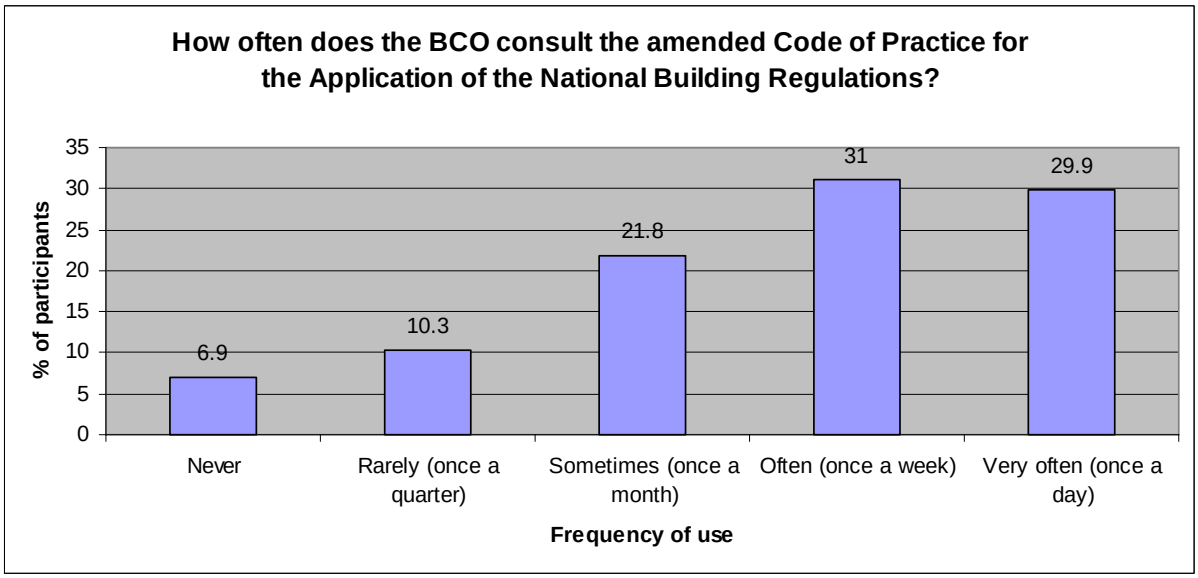


Figure 23: Graphic summary of responses to Question 7.4

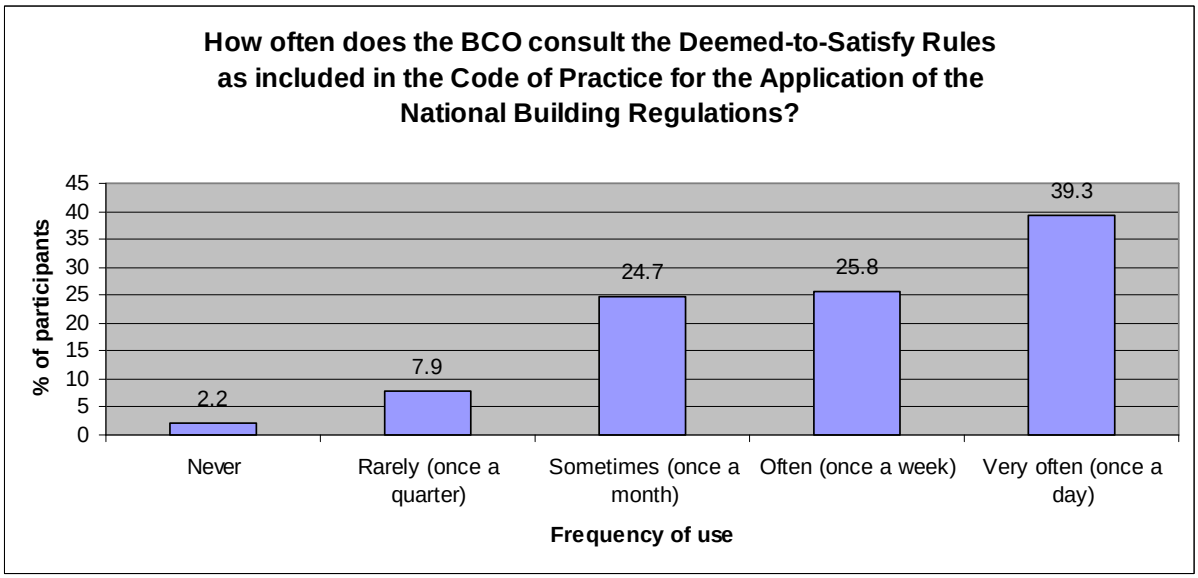


Figure 24: Graphic summary of responses to Question 7.5

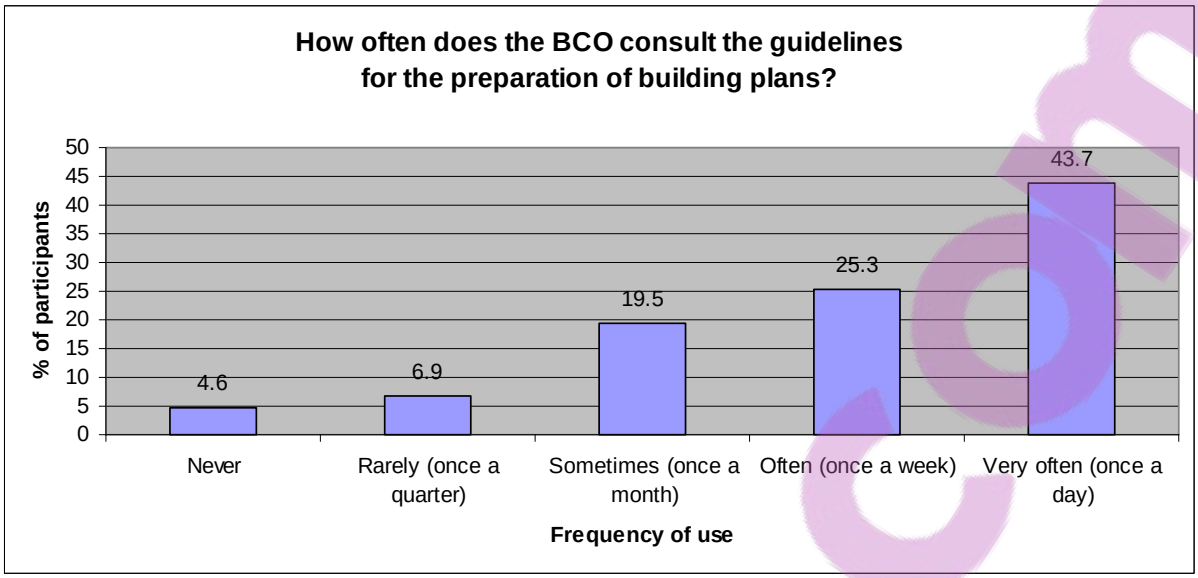


Figure 25: Graphic summary of responses to Question 7.6

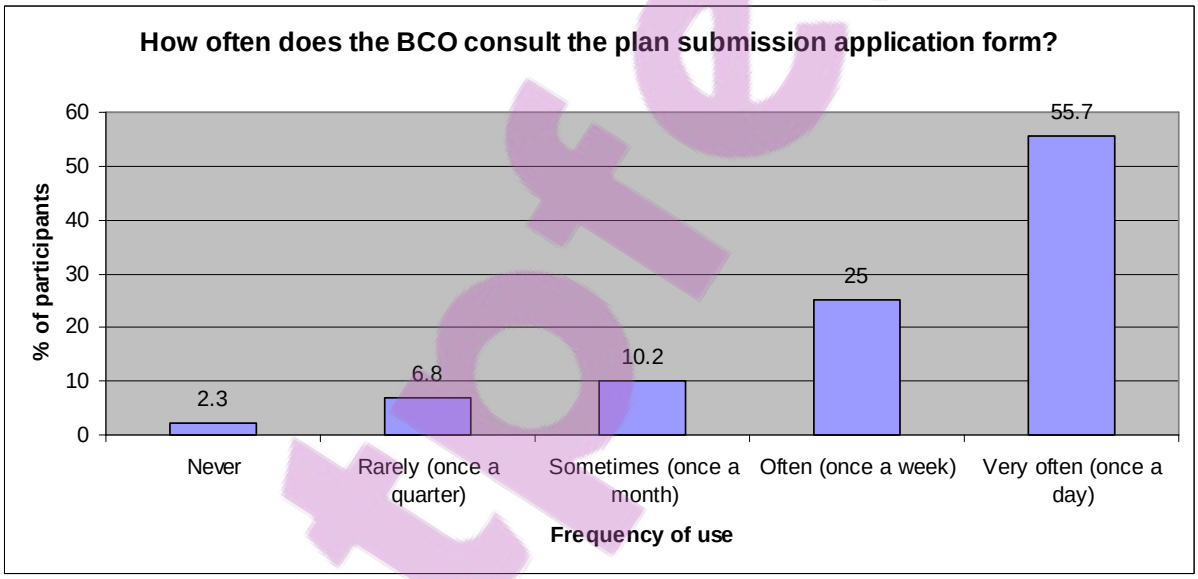


Figure 26: Graphic summary of responses to Question 7.7

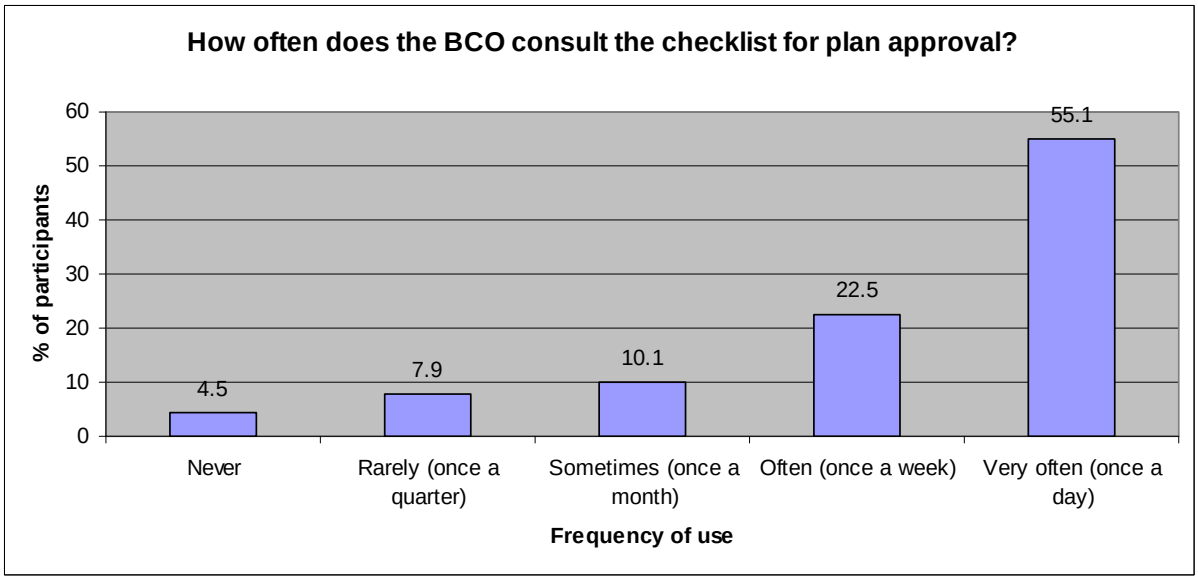


Figure 27: Graphic summary of responses to Question 7.8

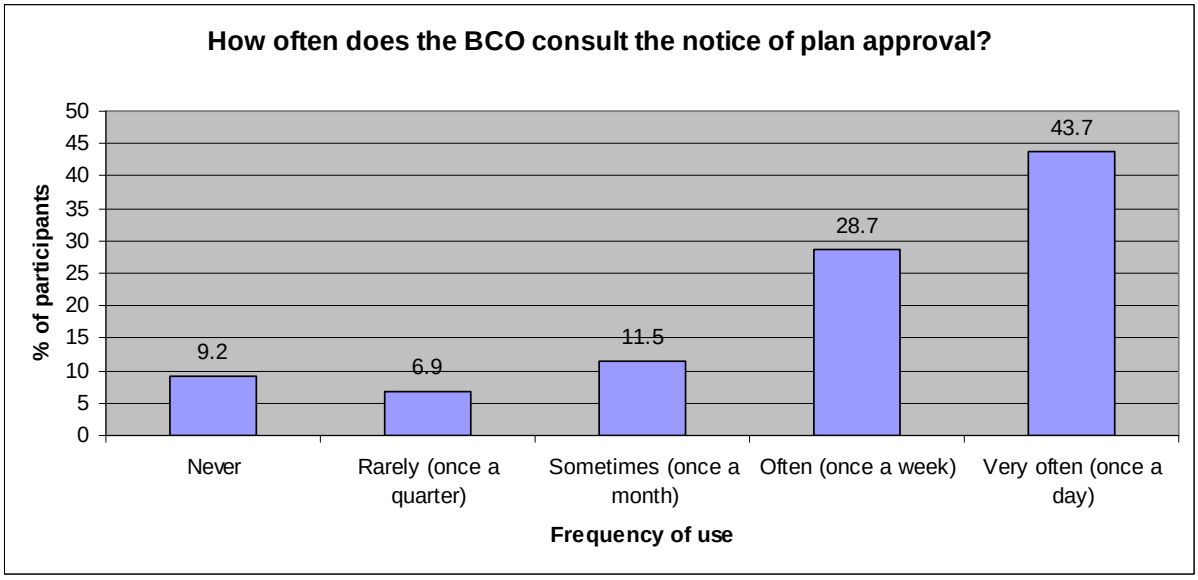
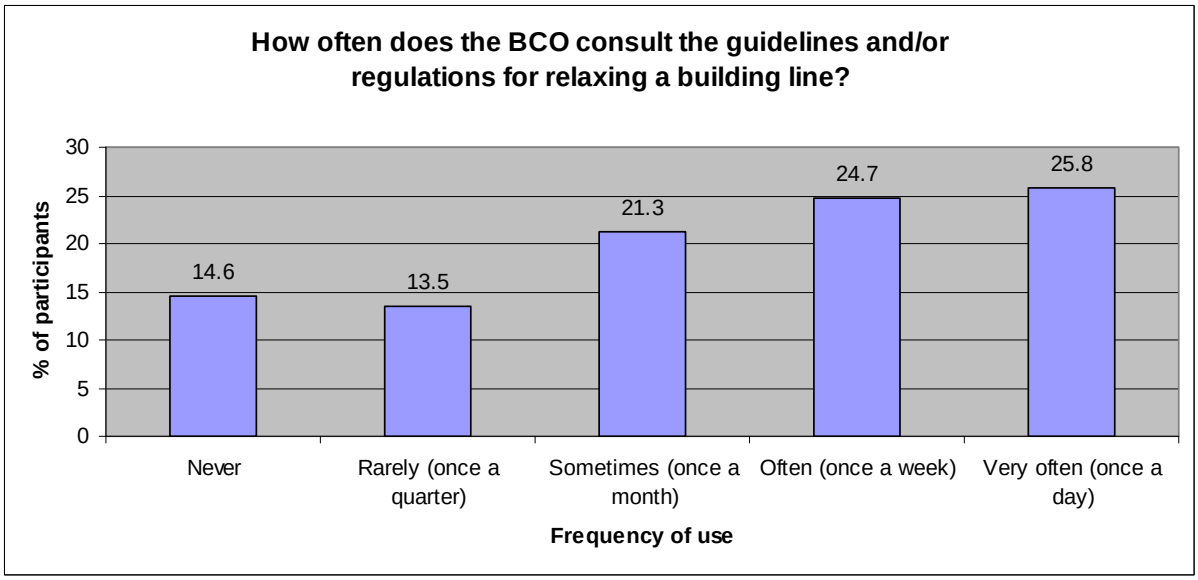


Figure 28: Graphic summary of responses to Question 7.9



4.4.7.3 Question 7 (Part 2) extracted from questionnaire (with corresponding number of respondents)

Table 52: Question 7 (Part 2)

		Number of valid responses	% of total population
7	*Legislative control of the built environment is a complex issue. A number of LAs have drafted **documents to supplement the NBR**. **How often does the BCO make use of these** during the execution of his daily tasks, and which documents are consulted?*		
	***How often do you refer to** (or consult) the following documents?*		
7.10	*Regulations for **reducing** (or relaxing) a **height restriction***	87	**98%**
7.11	***Planning Ordinances***	87	**98%**
7.12	***Urban planning/zoning schemes***	89	**100%**
7.13	*Regulations for the **departure from urban planning**/zoning schemes*	89	**100%**
7.14	*'**Green' building** guidelines/by-laws*	89	**100%**
7.15	***Sustainable housing policy***	89	**100%**
7.16	*Guidelines for **architectural design manuals***	87	**98%**
7.17	*Guidelines for **Heritage and Conservation***	89	**100%**
7.18	***Other** (please describe briefly)*	15	**16%**

4.4.8 Graphic summary of responses to Question 7 (Part 2)

Figure 29: Graphic summary of responses to Question 7.10

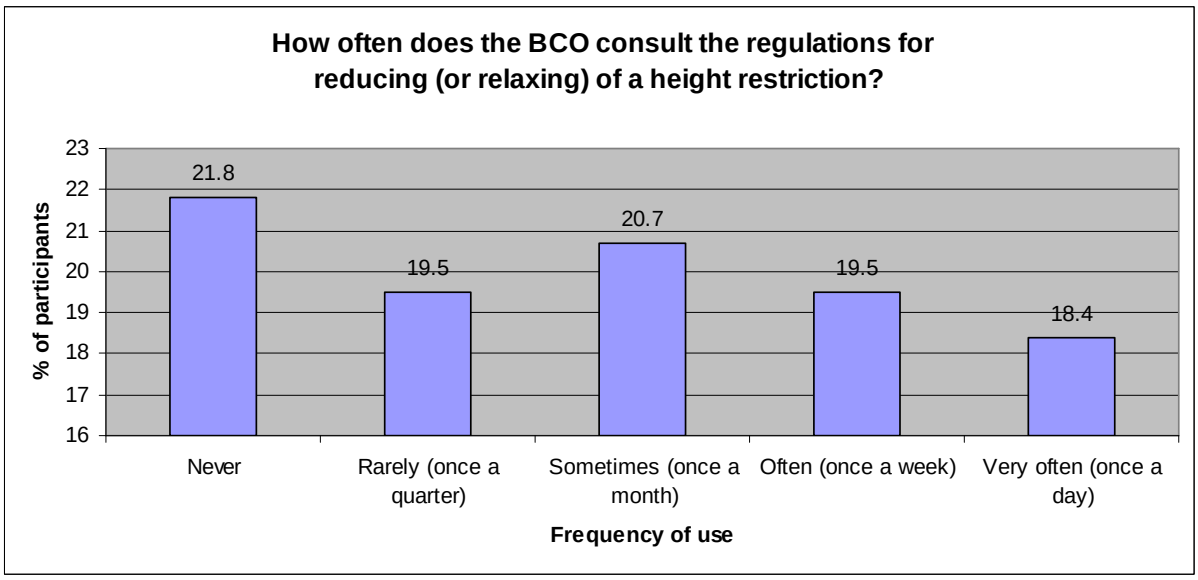


Figure 30: Graphic summary of responses to Question 7.11

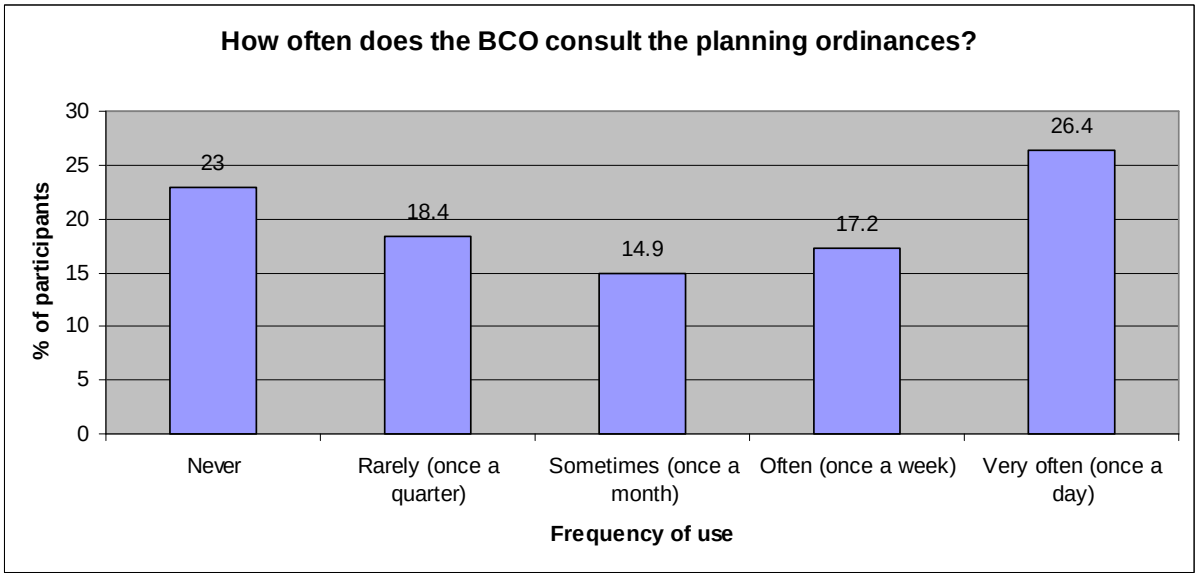


Figure 31: Graphic summary of responses to Question 7.12

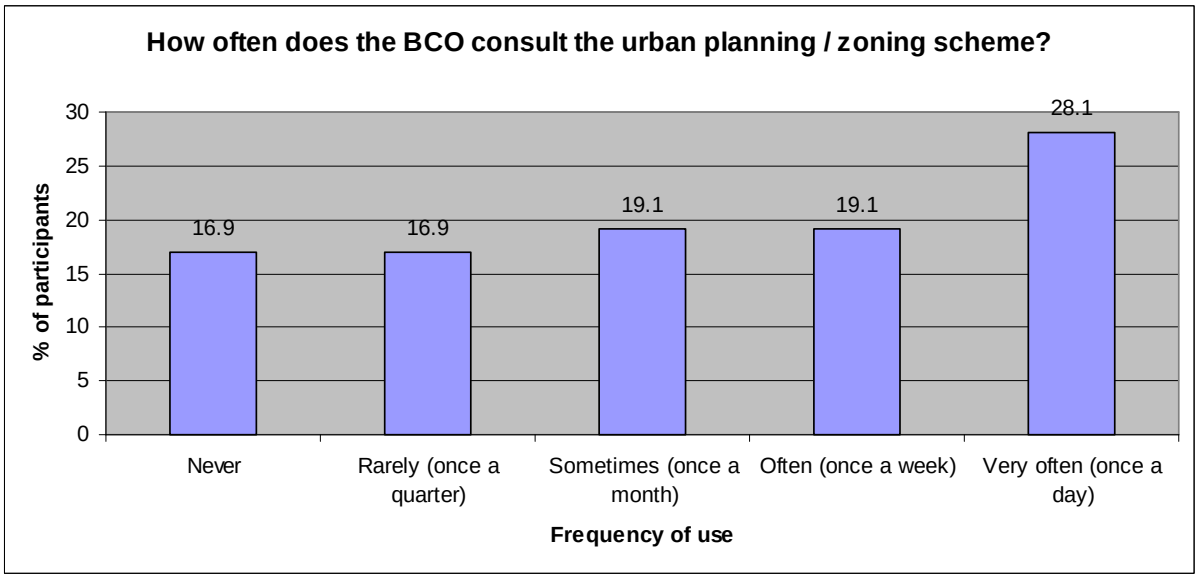


Figure 32: Graphic summary of responses to Question 7.13

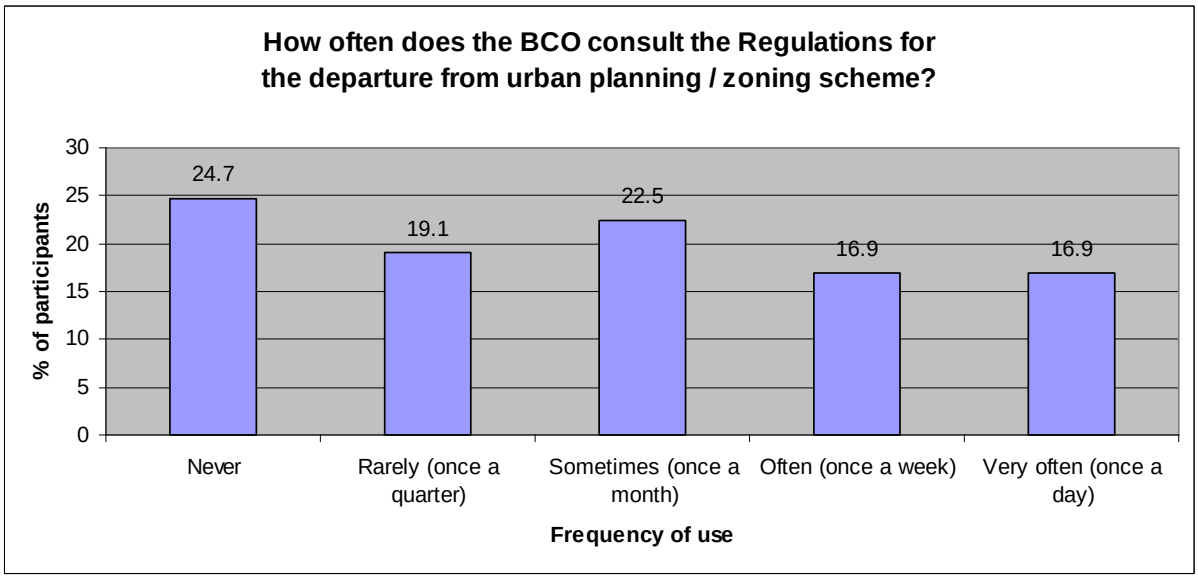


Figure 33: Graphic summary of responses to Question 7.14

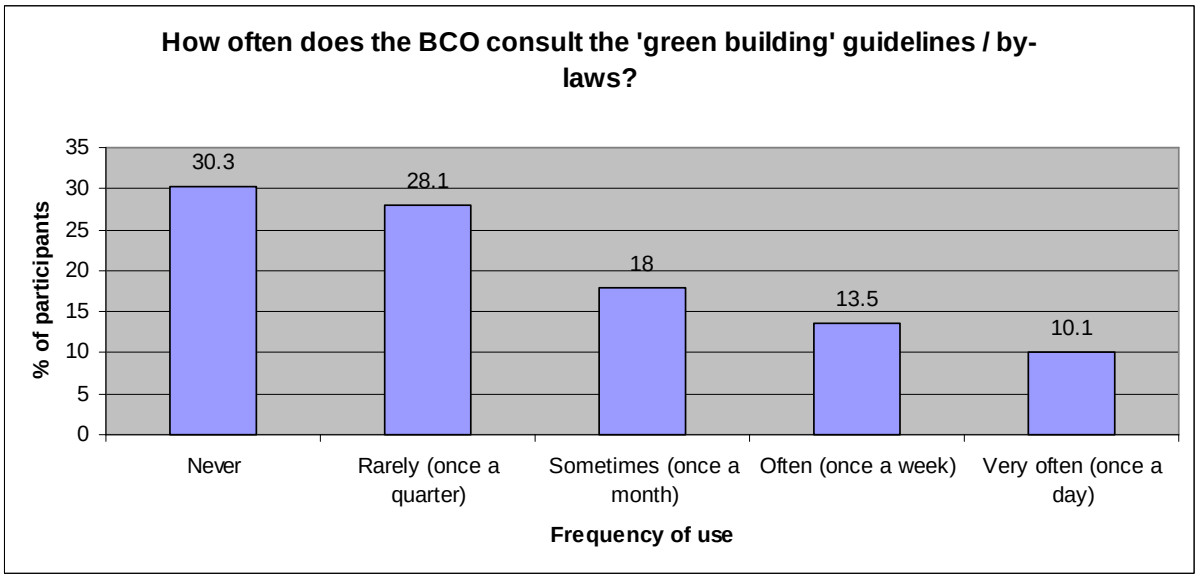


Figure 34: Graphic summary of responses to Question 7.15

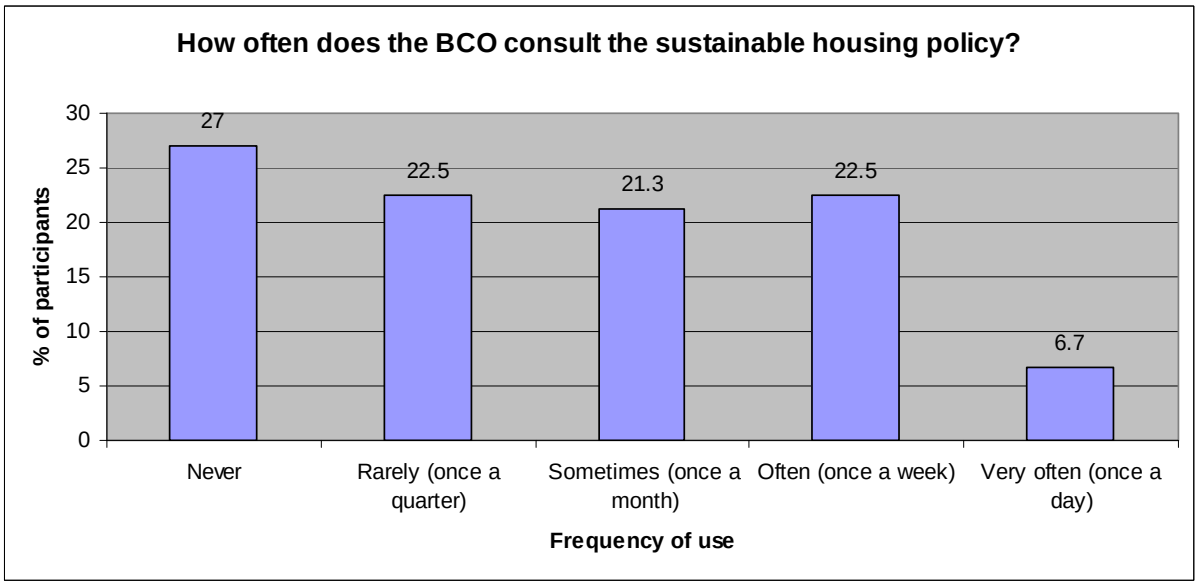


Figure 35: Graphic summary of responses to Question 7.16

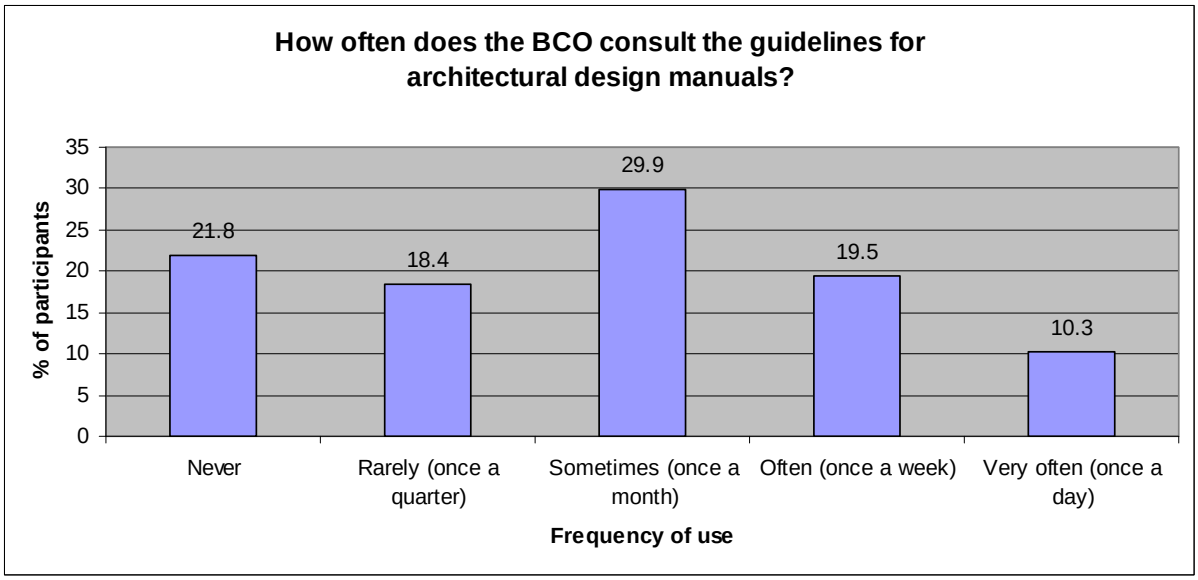
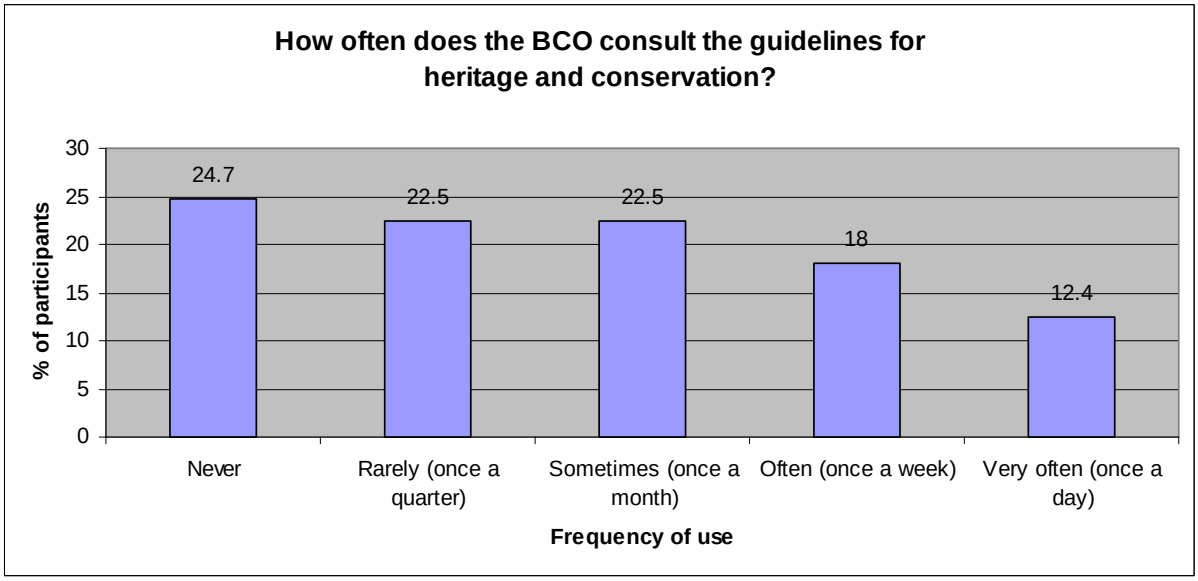


Figure 36: Graphic summary of responses to Question 7.17



4.4.8.1 Response to Question 7.18.1 (Other)

The respondents identified *other* documents for possible use by the BCO to supplement the NBR, such as the following:

- Spatial Development Frameworks (SDFs), especially concerning densification
- Problem building by-laws (sic)

- Human Settlement Guidelines (popularly known as the 'Red Book'[57])
- Reviews of court cases
- Other local by-laws and policy documents
- Other SANS/SABS codes
- Other (no description)
- Comments from other departments in the LA
- Applications for advertisements in terms of local by-laws
- *Specifile*[58] (although no rating is provided)
- Building by-law (although no rating is provided)

4.4.9 Question 8

4.4.9.1 Question 8 extracted from questionnaire (with corresponding number of respondents)

Table 53: Question 8

8	*The various **role-players** in the built environment **interpret the requirements** of the amended Code of Practice for the Application of the National Building Regulations (**SABS 0400-1990** or **SANS 10400**) in different ways.*	Number of valid responses	**% of total population**
	*Please indicate your **level of agreement** with each of the following statements:*		
8.1	*As far as the **applicant** is concerned, SABS 0400-1990 (or SANS 10400) represents the **minimum requirement** for a **building** project.*	85	**96%**
8.2	*SABS 0400-1990 (or SANS 10400) represents the **maximum requirement** that the **Local Authority** (LA), and therefore the **Building Control Officer** (BCO), could expect from a building project.*	87	**98%**

[57] The 'Red Book' consists of two volumes and it was developed over two years by the CSIR under the patronage of the National Department of Housing. Volume 1 focuses primarily on planning issues, while volume 2 deals with engineering services (Van Rooyen, 2009).

[58] The *Specifile Building Library* (referred to as *Specifile* in the South African building industry) was launched in 1959 and comprises of a 12-volume set of loose-leaf binders. These contain technical brochures on building products available in South Africa, which are updated on a quarterly basis (Coetzee, 2011).

4.4.9.2 Graphic summary of responses to Question 8

Figure 37: Graphic summary of responses to Question 8.1

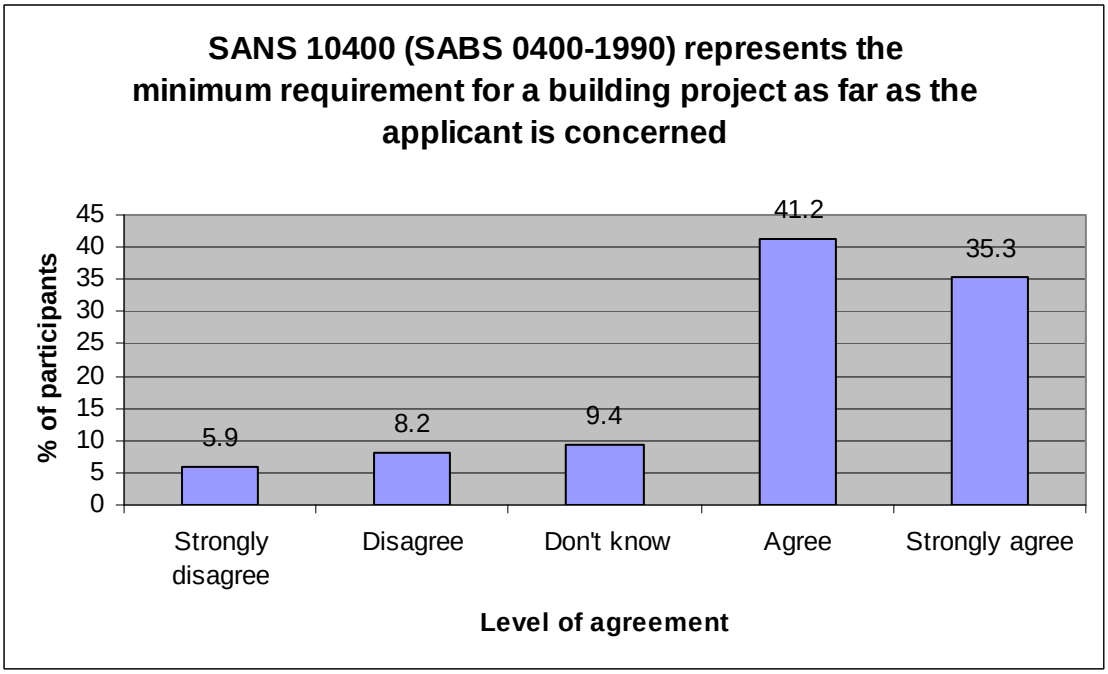
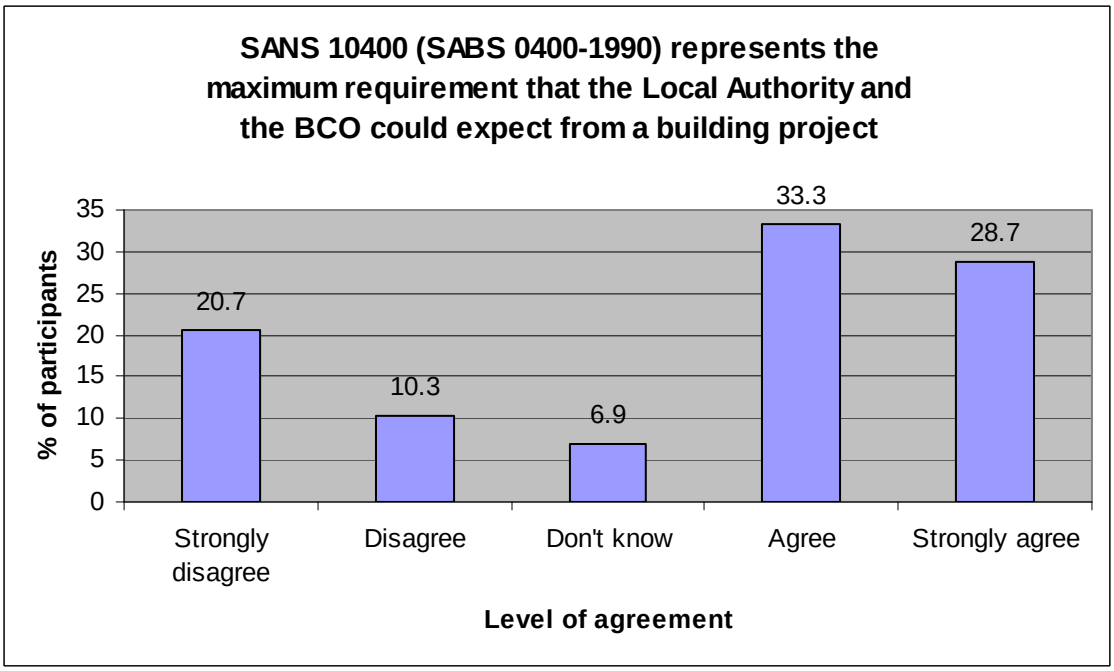


Figure 38: Graphic summary of responses to Question 8.2



4.4.10 Question 9

4.4.10.1 Question 9 extracted from questionnaire (with corresponding number of respondents)

Table 54: Question 9

		Number of valid responses	% of total population
9	*The **Building Control Officer** (BCO) of a Local Authority (LA) is **responsible for the implementation of** the latest version of **The Code of Practice for the Application of the National Building Regulations** (SABS 0400-1990 or SANS 10400). Therefore it is important to obtain the opinion of the BCO on this Code and its implementation.*		
	*Please indicate your **level of agreement** with each of the following statements:*		
9.1	*The Code (SABS 0400-1990 or SANS 10400) is **an accessible document** that is easily understandable.*	89	**100%**
9.2	*The Code (SABS 0400-1990 or SANS 10400) **provides answers to all the questions**/issues that **a BCO** has to **address daily**.*	89	**100%**
9.3	*The Code (SABS 0400-1990 or SANS 10400) is **structured logically** in accordance with all the necessary **stages of a construction** project.*	87	**98%**
9.4	*The Code (SABS 0400-1990 or SANS 10400) is **an appropriate administrative instrument**.*	89	**100%**
9.5	*The Code (SABS 0400-1990 or SANS 10400) **ensures uniform regulation** of the built environment.*	89	**100%**

4.4.10.2 Graphic summary of responses to Question 9

Figure 39: Graphic summary of responses to Question 9.1

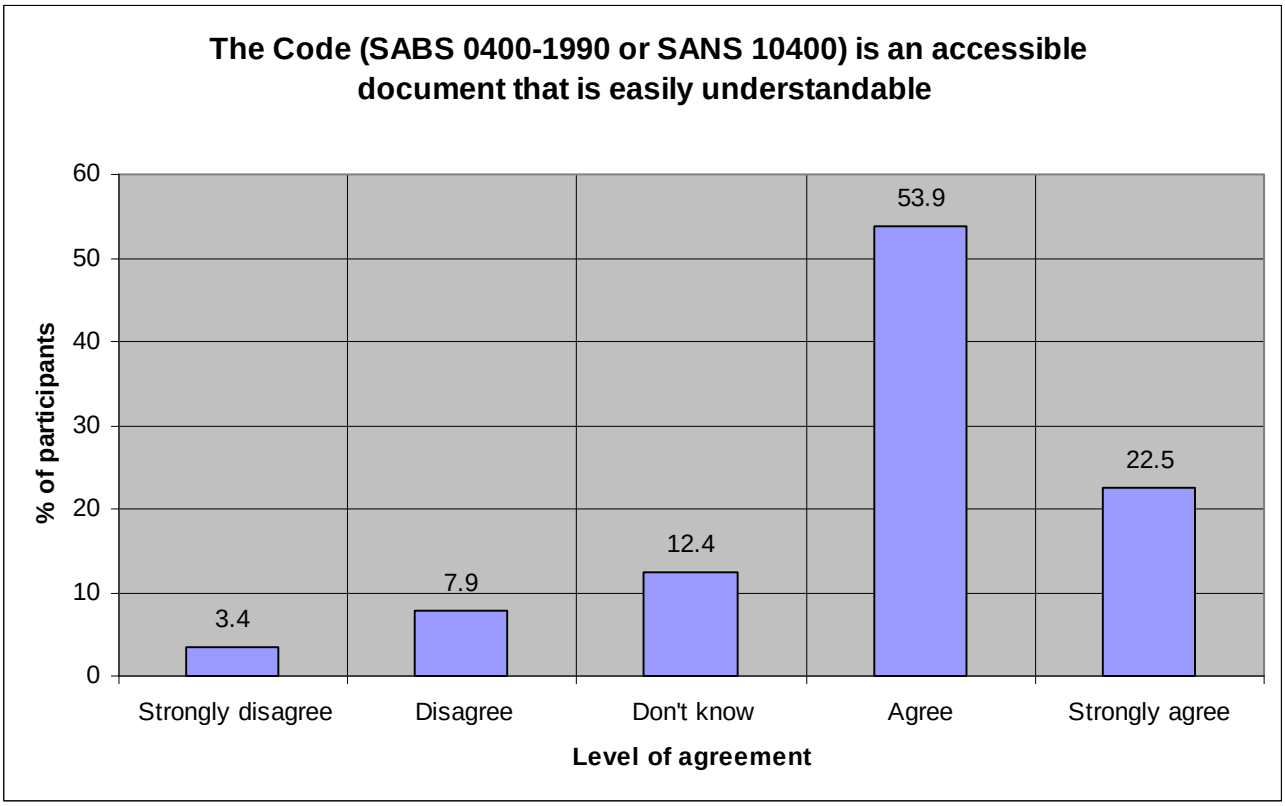


Figure 40: Graphic summary of responses to Question 9.2

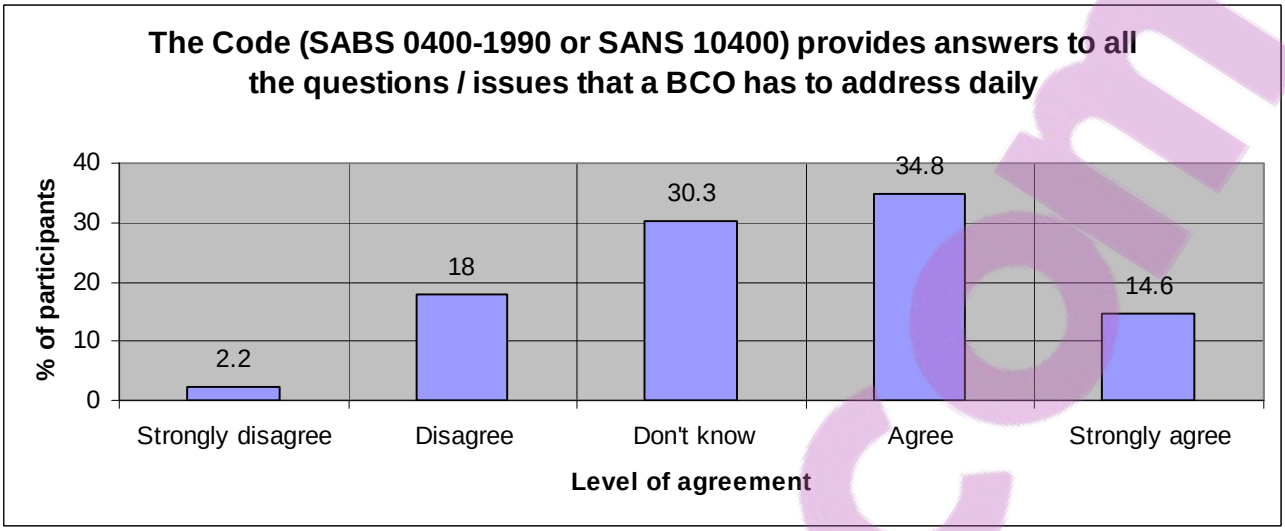


Figure 41: Graphic summary of responses to Question 9.3

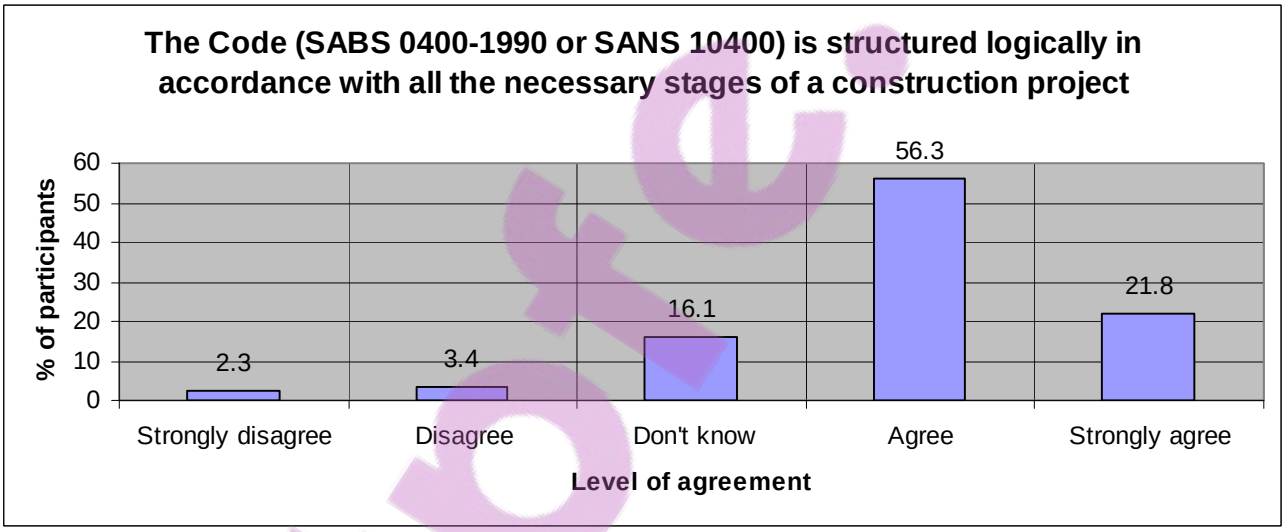


Figure 42: Graphic summary of responses to Question 9.4

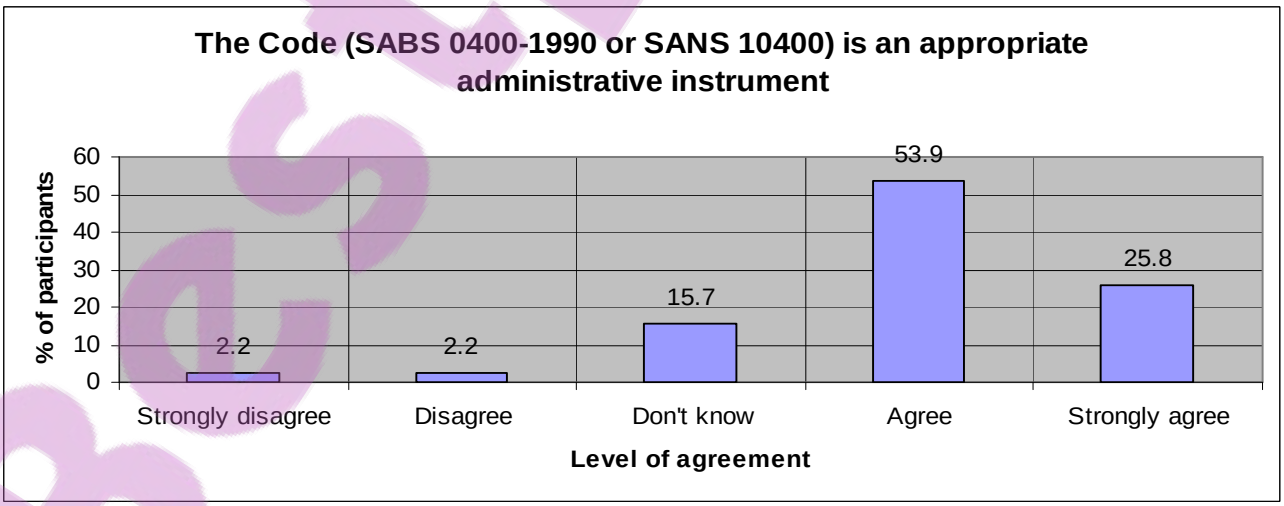
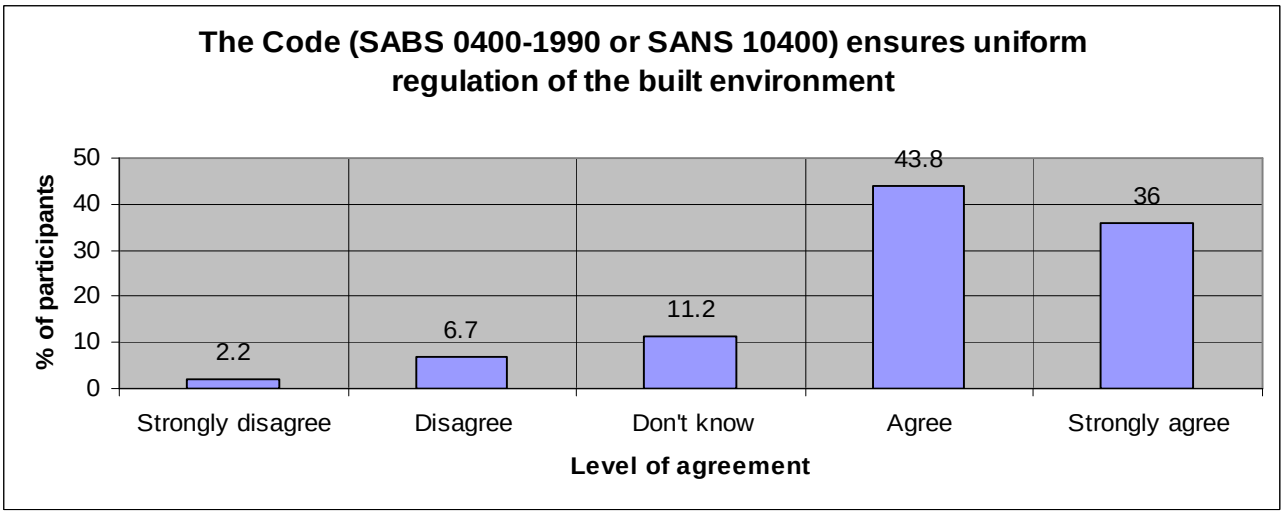


Figure 43: Graphic summary of responses to Question 9.5



4.4.10.3 Ranking of responses to Question 9

The mean averages of the responses were calculated for Questions 9.1 to 9.5. This calculation allows the responses to be ranked from most important to least important. According to the respondents, the order of importance was as follows:

- The Code (SABS 0400-1990 or SANS 10400) ensures uniform regulation of the built environment (Question 9.5)
- The Code (SABS 0400-1990 or SANS 10400) is an appropriate administrative instrument (Question 9.4)
- The Code (SABS 0400-1990 or SANS 10400) is structured logically in accordance with all the necessary stages of a construction project (Question 9.3)
- The Code (SABS 0400-1990 or SANS 10400) is an accessible document that is easily understandable (Question 9.1)
- The Code (SABS 0400-1990 or SANS 10400) provides answers to all the questions/issues that a BCO has to address daily (Question 9.2)

4.4.11 Question 10

4.4.11.1 Question 10 extracted from questionnaire (with corresponding number of respondents)

Table 55: Question 10

		Number of valid responses	% of total population
10	*The Code (**SABS 0400-1990** or SANS 10400) defines certain **requirements and procedures** relating to the **plan approval process**. However, at present the various LAs use different documents when implementing the relevant requirements and procedures.*		
	*Please indicate your **level of agreement** with each of the following statements:*		
10.1	*The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the **plan submission form** that is currently used by the LA.*	86	**97%**
10.2	*The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the **checklist for plan approval** that is currently used by the LA.*	87	**98%**
10.3	*The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the **notice of approval** that is currently used by the LA.*	86	**97%**
10.4	*The Code (SABS 0400-1990 or SANS 10400) should define a **national standardised submission and approval pro forma**.*	86	**97%**

4.4.11.2 Graphic summary of responses to Question 10

Figure 44: Graphic summary of responses to Question 10.1

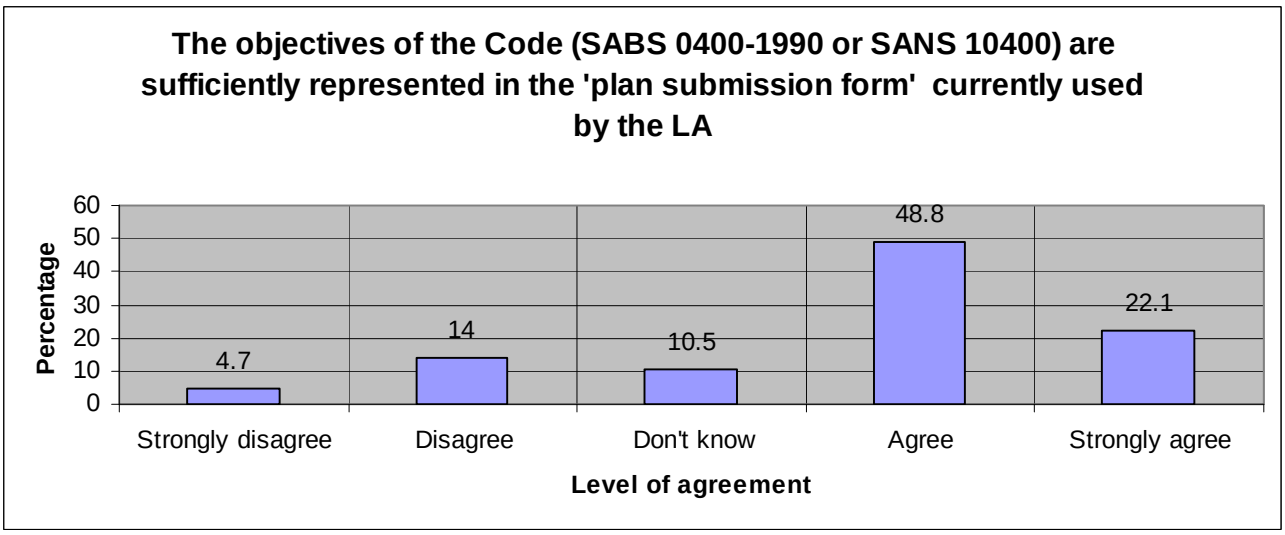


Figure 45: Graphic summary of responses to Question 10.2

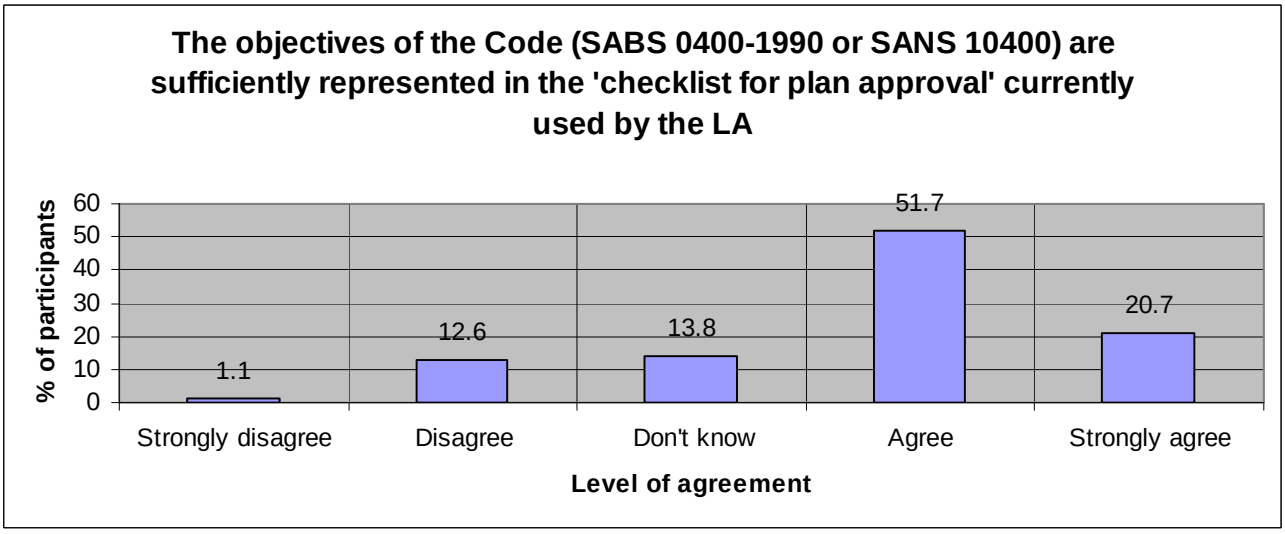


Figure 46: Graphic summary of responses to Question 10.3

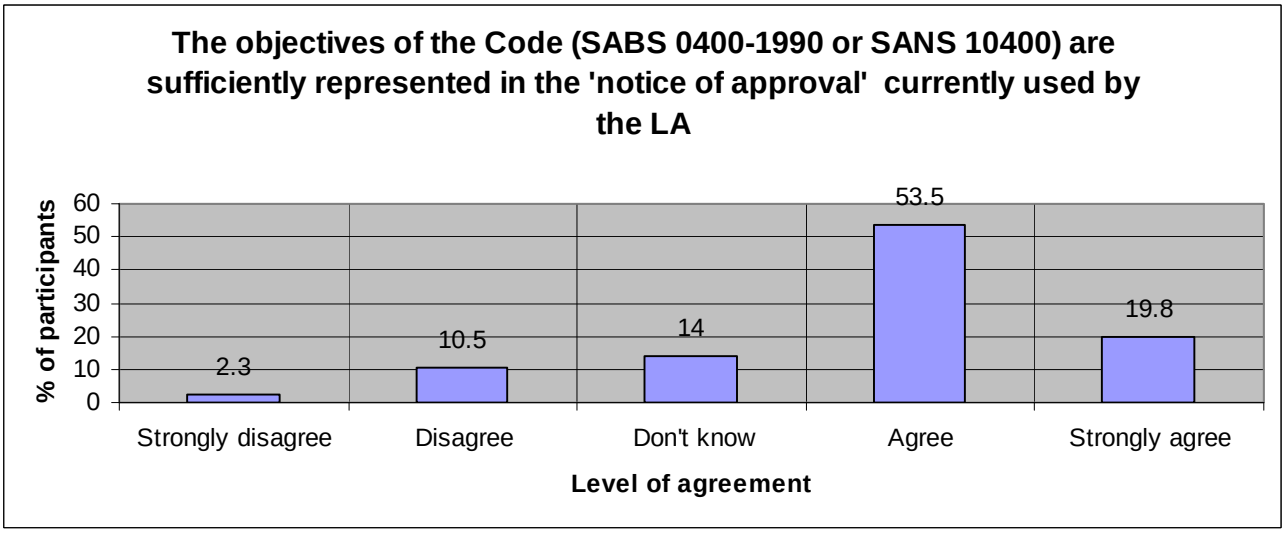
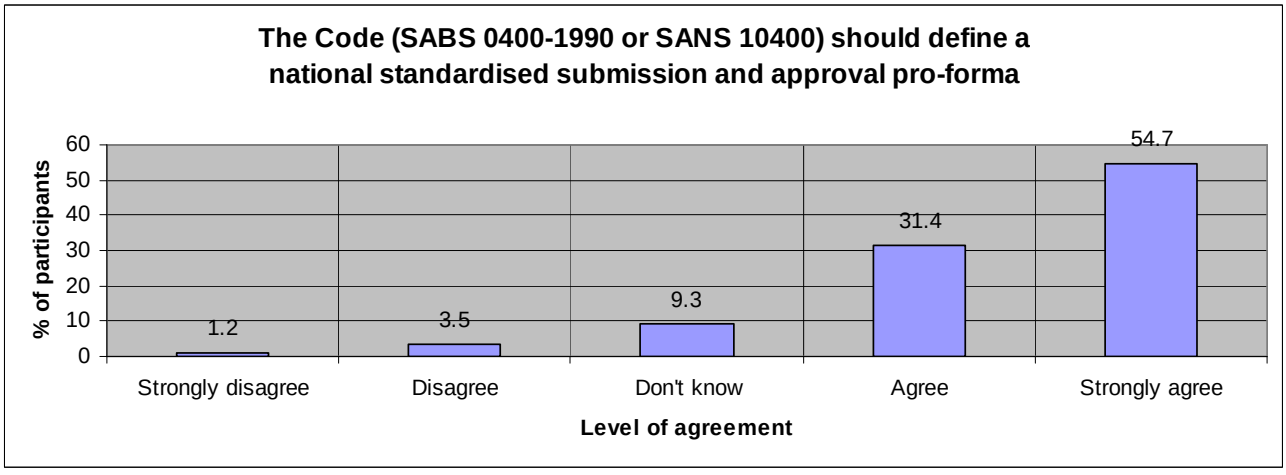


Figure 47: Graphic summary of responses to Question 10.4



4.4.12 Question 11

4.4.12.1 Question 11 extracted from questionnaire (with corresponding number of respondents)

Table 56: Question 11

		Number of valid responses	% of total population
11	*At present the Code (**SABS 0400-1990** or **SANS 10400**) is **not implemented uniformly in South Africa**. This is inter alia the result of certain parts being exempt from the NBR.*		
	*Please indicate your **level of agreement** with each of the following statements:*		
11.1	*There should be **two different Codes** under SABS 0400-1990 (or SANS 10400) – one applicable to the **formal segment** of the South African built environment, and a separate Code for **informal settlements**.*	87	**98%**
11.2	*The erection of **government-subsidised housing** should fall **outside the mandate of SABS 0400-1990** (or SANS 10400), and therefore also **outside the mandate of the BCO**. (In other words, low-cost housing should not be submitted to the LA for plan approval or be subject to inspections conducted by the BCO.)*	87	**98%**
11.3	*As soon as any **alterations or additions** are made **to a government-subsidised house**, it should fall under **the formal sector**, adhering to all the relevant requirements of SABS 0400-1990 (or SANS 10400).*	83	**93%**
11.4	*All **official government buildings** should be **exempt from** the full **approval** procedure.*	86	**97%**

4.4.12.2 Graphic summary of responses to Question 11

Figure 48: Graphic summary of responses to Question 11.1

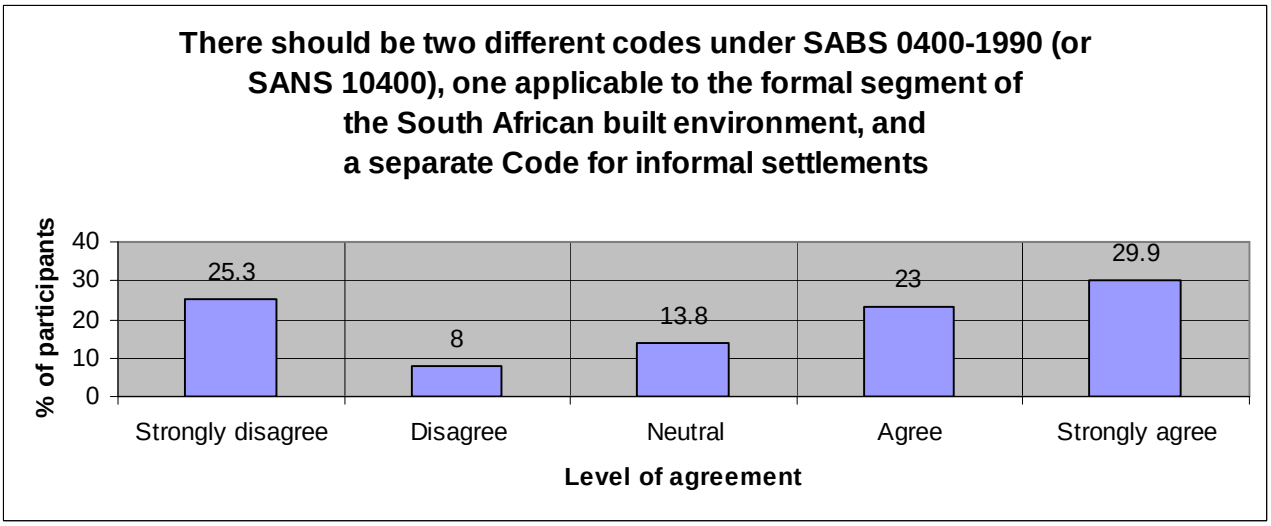


Figure 49: Graphic summary of responses to Question 11.2

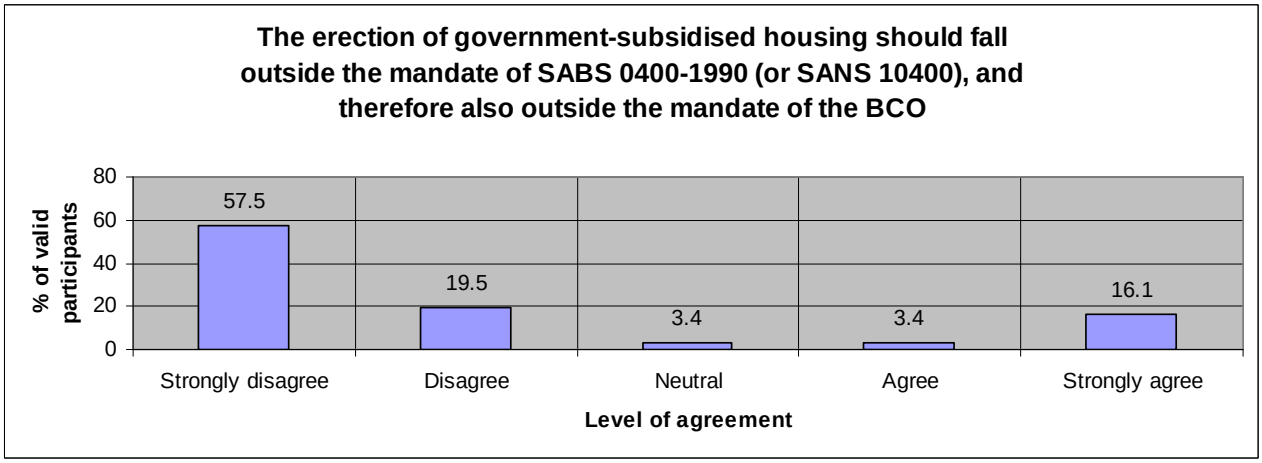


Figure 50: Graphic summary of responses to Question 11.3

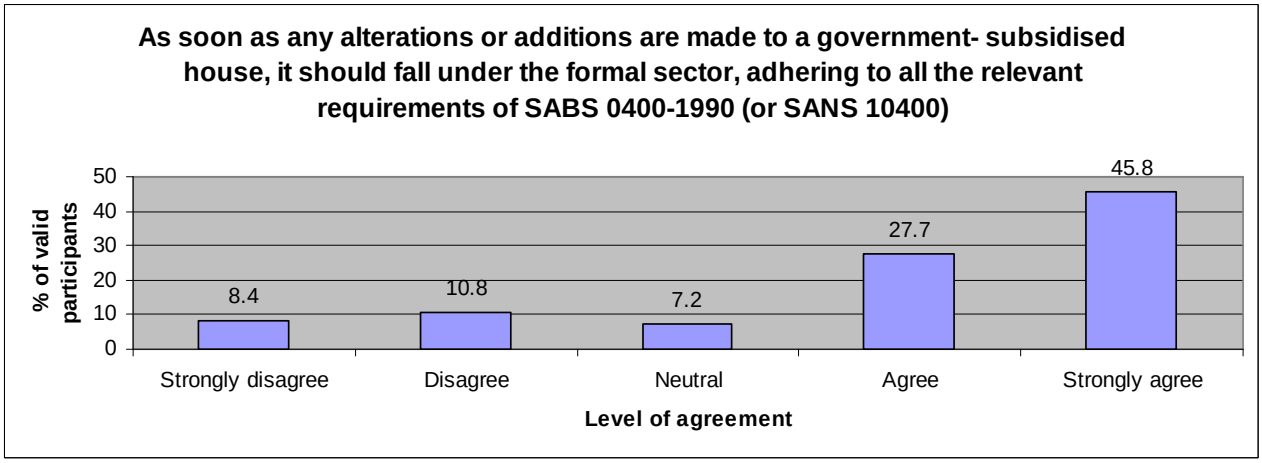
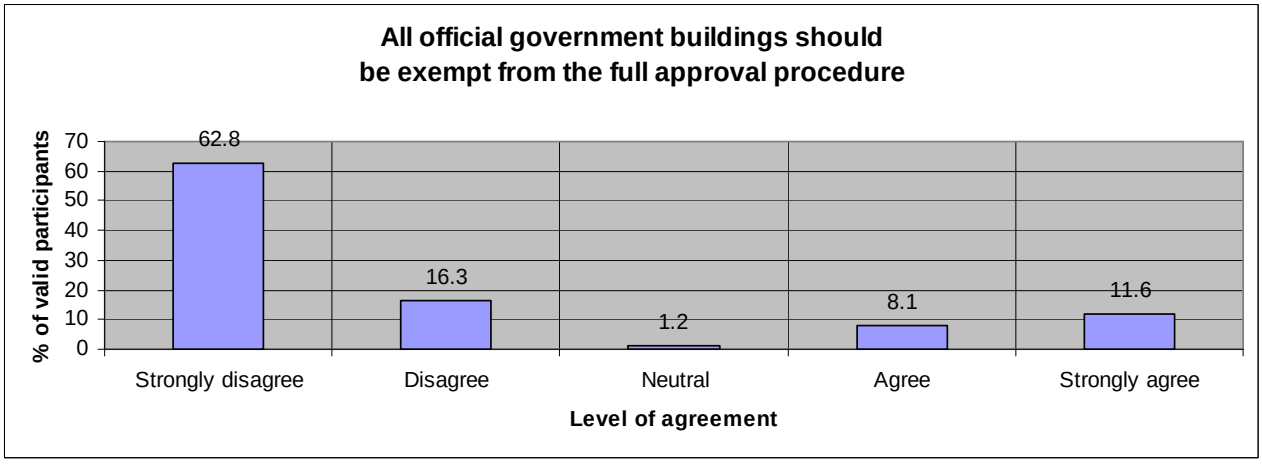


Figure 51: Graphic summary of responses to Question 11.4



4.4.13 Question 12

4.4.13.1 Question 12 extracted from questionnaire (with corresponding number of respondents)

Table 57: Question 12

		Number of valid responses	% of total population
12	*Various **imminent changes to the NBR** are envisioned.*		
	Please respond to the following statements:		
12.1	*I am aware that the respective standards for **SANS 10400** (**Parts A-H, J-W**) have been **published** to **replace the amended Code of Practice** for the Application of the National Building Regulations (**SABS 0400-1990**).*	87	**98%**
12.2	*I have **submitted a formal comment*** **on** the relevant published standards for **SANS 10400** (Parts A-H, J-W) that are scheduled to replace SABS 0400.*	86	**97%**
12.3	*I am **aware of** the voluntary standard **SANS 204: 2008** (Parts 1, 2 + 3) that focuses on energy efficiency in buildings.*	87	**98%**
12.4	*I am **aware that** the standard **SANS 10400-XA: 2010** (Energy usage in buildings) was **published for public comment** on 2010-06-15.*	85	**96%**
12.5	*I have **submitted a formal comment*** **on SANS 10400-XA: 2010** (Energy usage in buildings).*	87	**98%**
12.6	*I am **aware that** the standard **SANS 10400-O: 2010** (Lighting and ventilation) has been **published for public comment**.*	85	**96%**
12.7	*I **have submitted** (or plan to submit before or on 2010-10-26) **a formal comment*** **on SANS 10400-O: 2010** (Lighting and ventilation).*	86	**97%**
	***Note: Formal comments on standards:** These comments could have been made in your personal capacity, through the LA or other professional body during the period for invited comments.*		

4.4.13.2 Graphic summary of responses to Question 12

Figure 52: Graphic summary of responses to Question 12.1

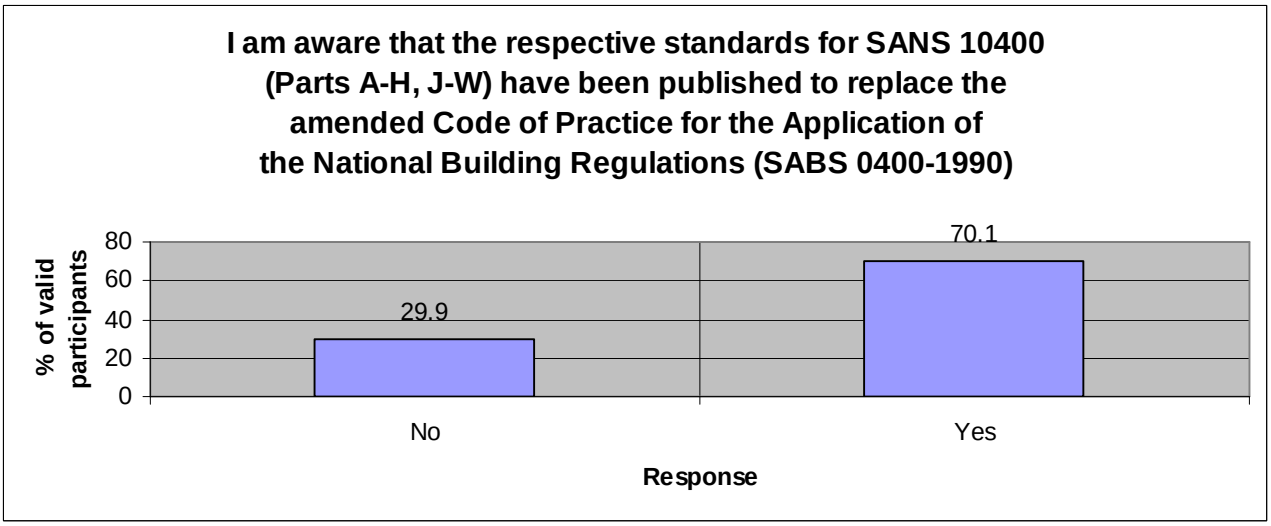


Figure 53: Graphic summary of responses to Question 12.2

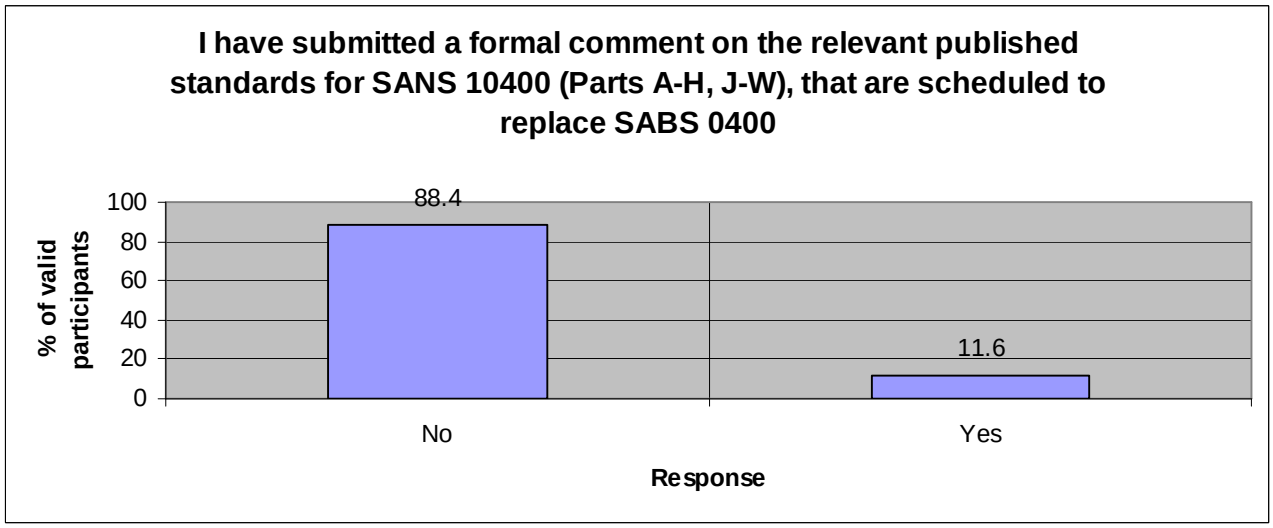


Figure 54: Graphic summary of responses to Question 12.3

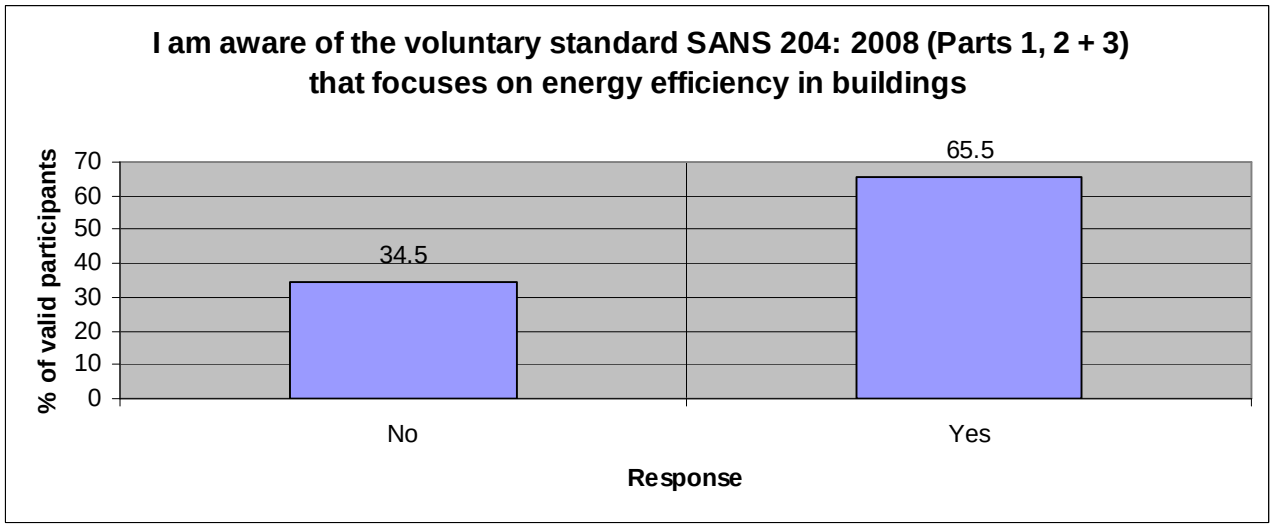


Figure 55: Graphic summary of responses to Question 12.4

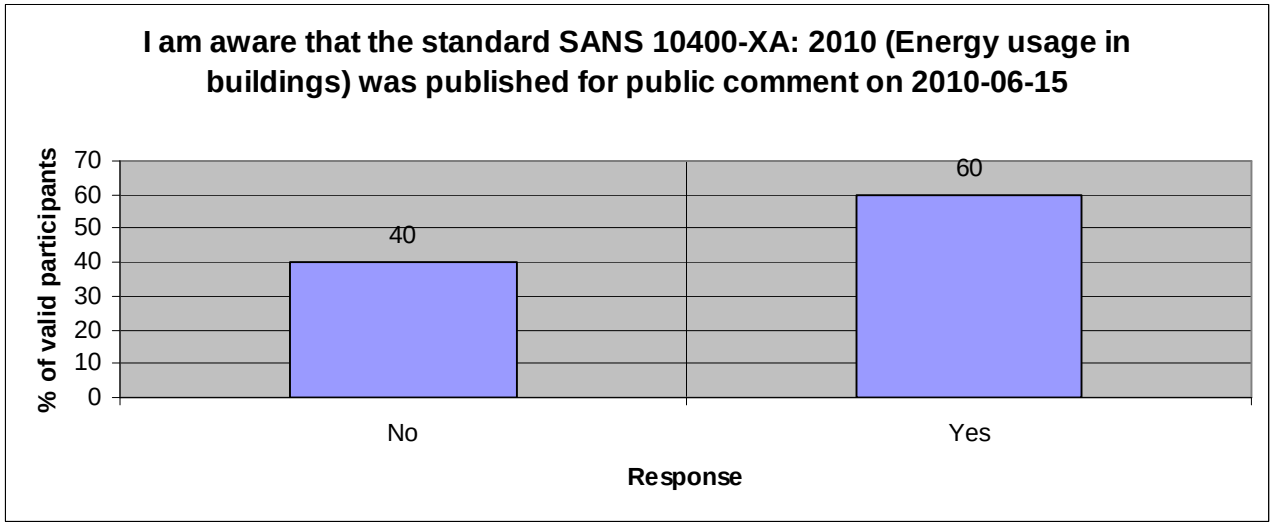


Figure 56: Graphic summary of responses to Question 12.5

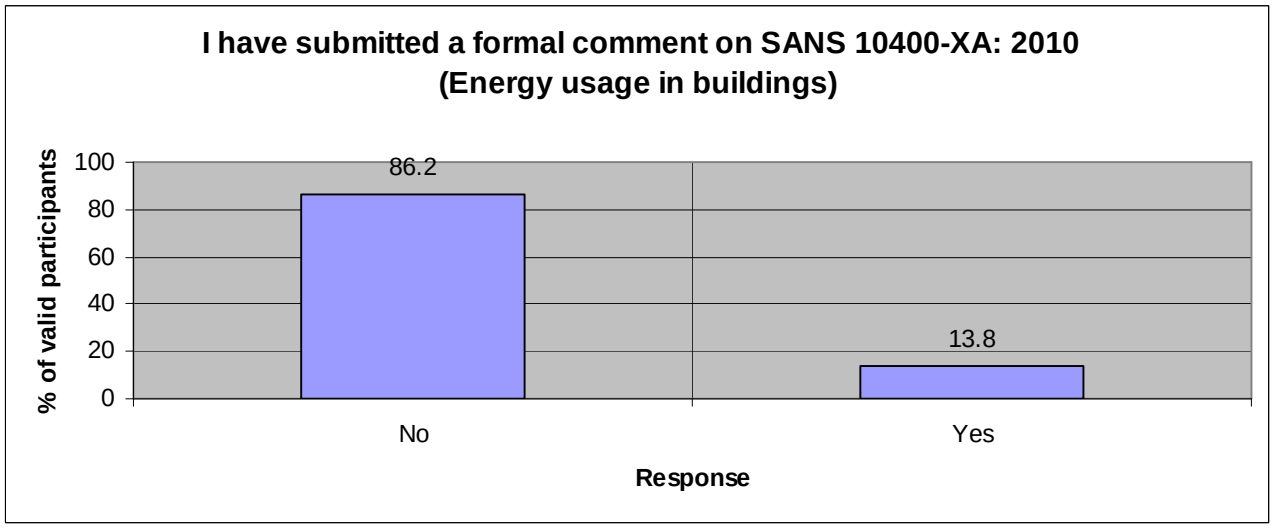


Figure 57: Graphic summary of responses to Question 12.6

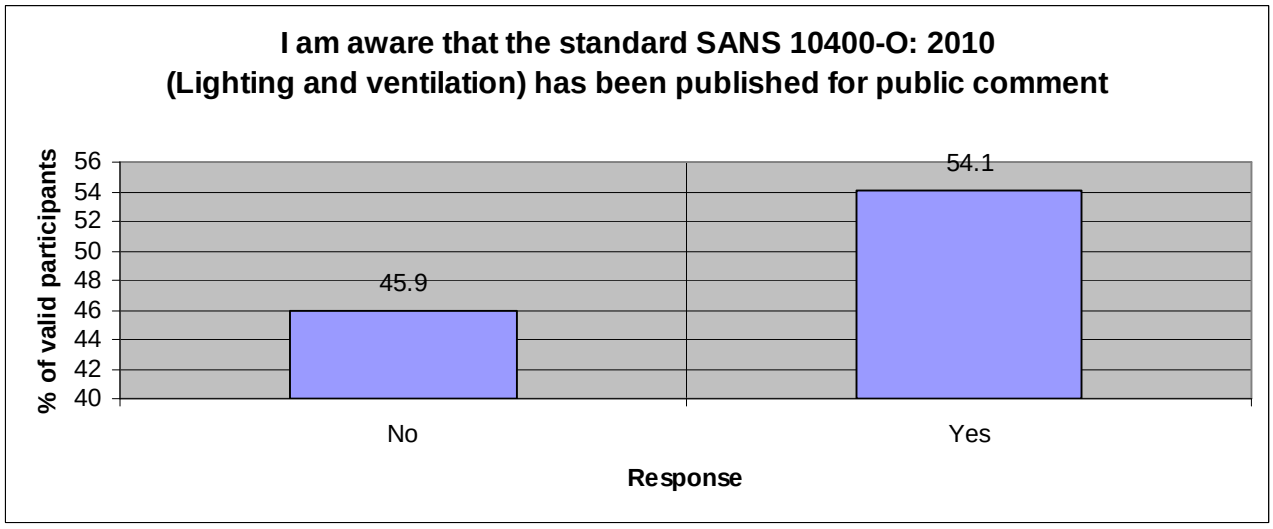
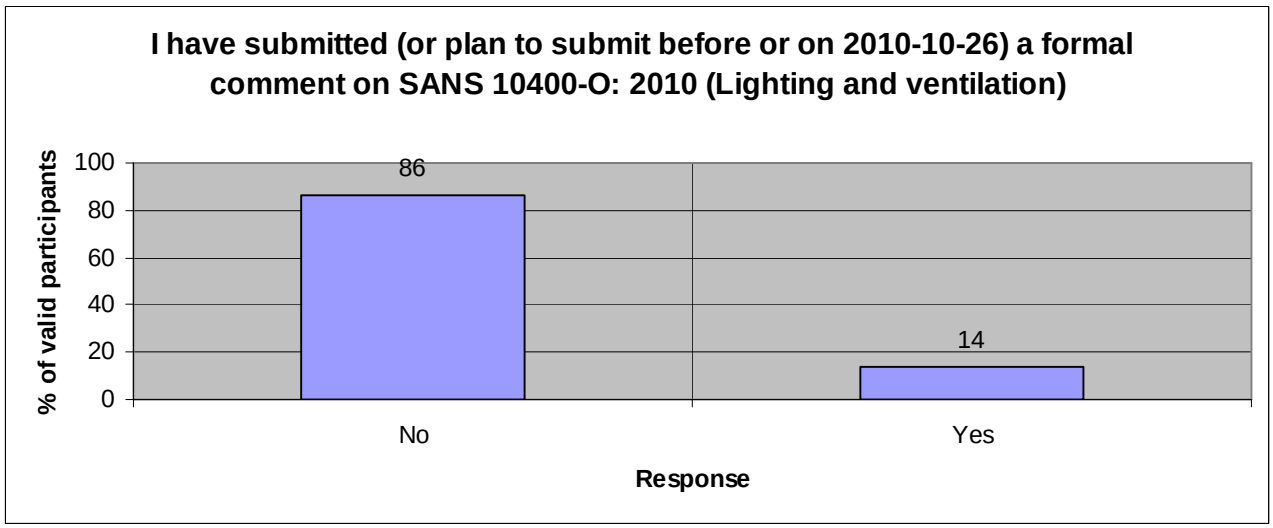


Figure 58: Graphic summary of responses to Question 12.7



4.4.14 Question 13

4.4.14.1 Question 13 extracted from questionnaire (with corresponding number of respondents)

Table 58: Question 13

		Number of valid responses	% of total population
13	*This section focuses on **the impact of envisioned changes to the NBR on the BCO**. (In other words, how the above changes would influence the daily operation of the BCO).*		
	*Please indicate your **level of agreement** with each of the following statements:*		
13.1	*The **implementation of** the new standards as set out in **SANS 10400 (Parts A-H, J-W)** will have **a significant impact** on my daily functioning as a BCO.*	85	**96%**
13.2	*The **implementation** of the new standards as set out in **SANS 10400-XA: 2010** (Energy usage in buildings) will have **a significant impact** on my daily functioning as a BCO.*	85	**96%**
13.3	*The implementation of the new standards as set out in SANS 10400-O: 2010 **(Lighting and ventilation)** will have **a significant impact** on my daily functioning as a BCO.*	85	**96%**

4.4.14.2 Graphic summary of responses to Question 13

Figure 59: Graphic summary of responses to Question 13.1

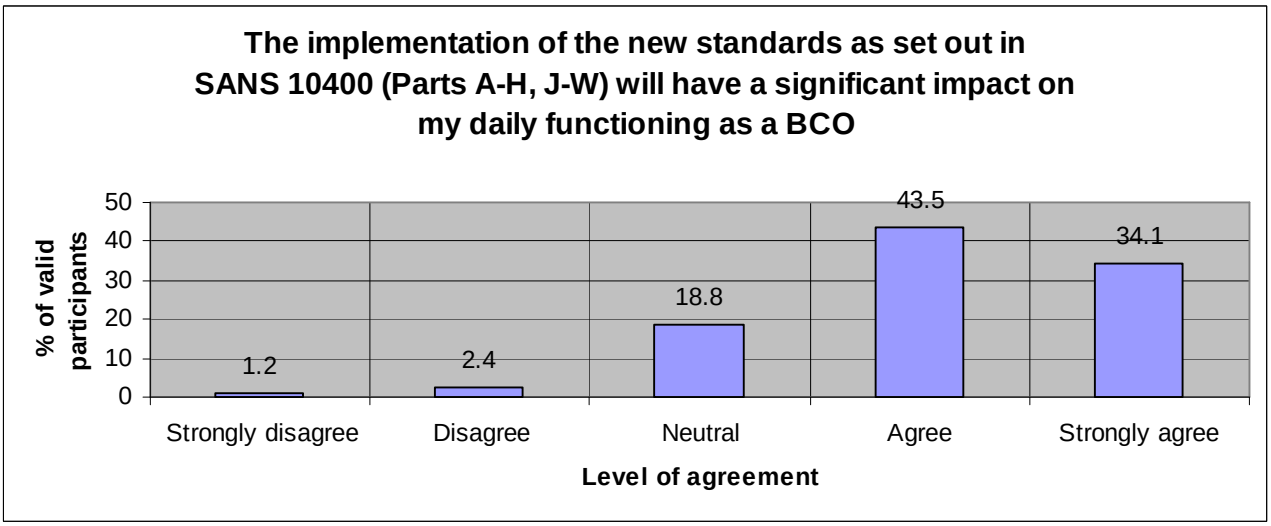


Figure 60: Graphic summary of responses to Question 13.2

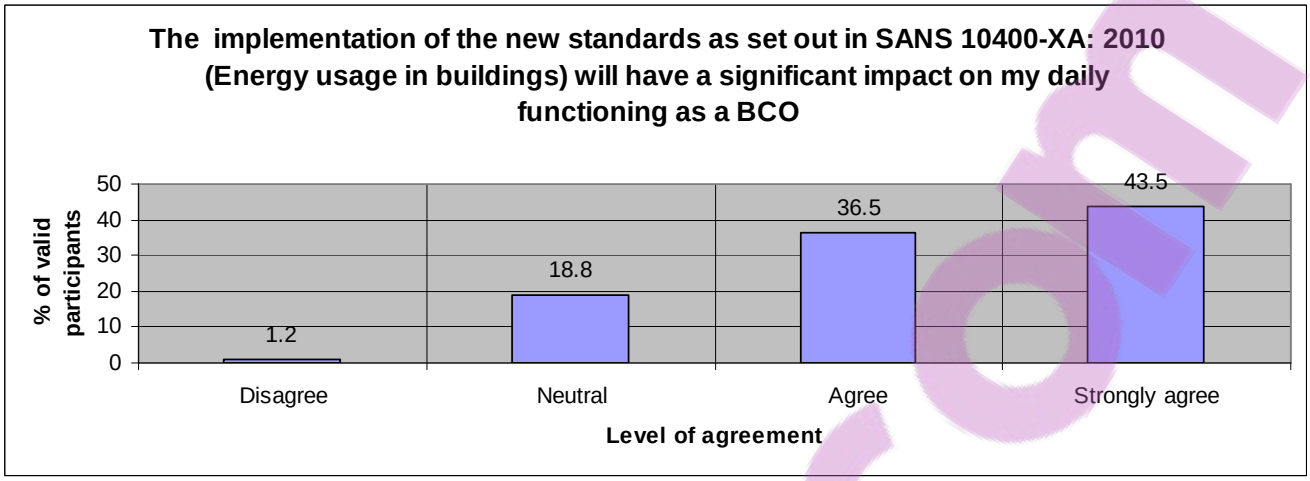
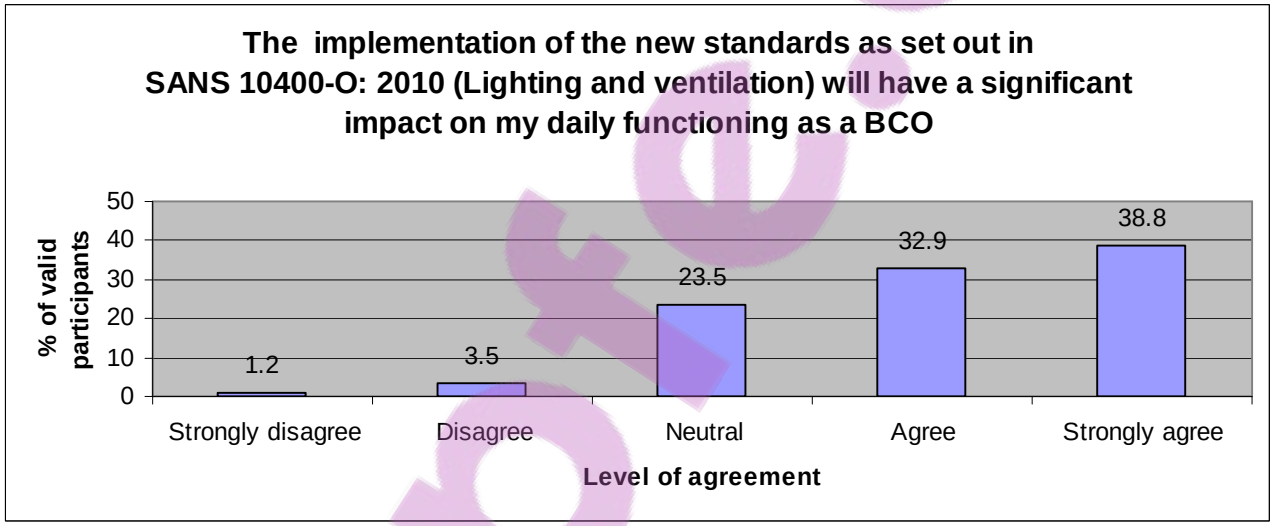


Figure 61: Graphic summary of responses to Question 13.3



4.4.15 Question 14

4.4.15.1 Question 14 (Part 1) extracted from questionnaire (with corresponding number of respondents)

Table 59: Question 14 (Part 1)

		Number of valid responses	% of total population
14	*This question focuses on the **possible** inclusion of **criteria** that could **promote sustainability** in the built environment as **additional requirements of the NBR**.*		
	*Please indicate your **level of agreement** with each of the following statements:*		
14.1	*The concept of '**sustainability**' should be incorporated in the NBR.*	88	**99%**
14.2	*The concept of '**resource efficiency**' should be incorporated in the NBR.*	88	**99%**
14.3	*The concept of '**green buildings**' should be incorporated in the NBR.*	86	**97%**
14.4	***Development** in the built environment should be done in a **sustainable** manner.*	84	**94%**
14.5	***Buildings** should be designed to **limit** their total **energy consumption** to a minimum.*	87	**98%**

4.4.15.2 Graphic summary of responses to Question 14 (Part 1)

Figure 62: Graphic summary of responses to Question 14.1

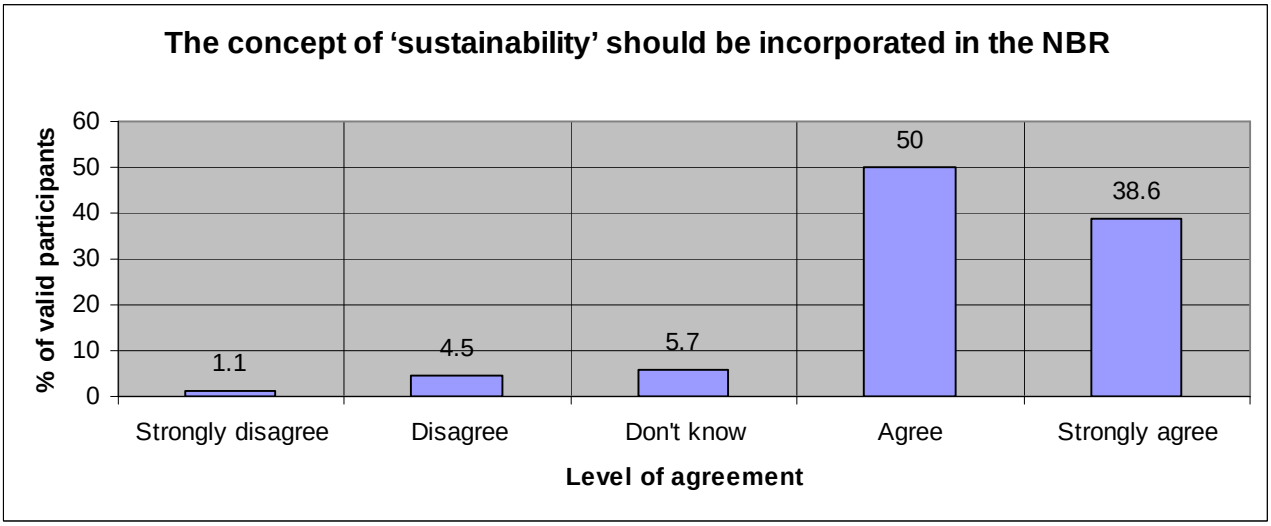


Figure 63: Graphic summary of responses to Question 14.2

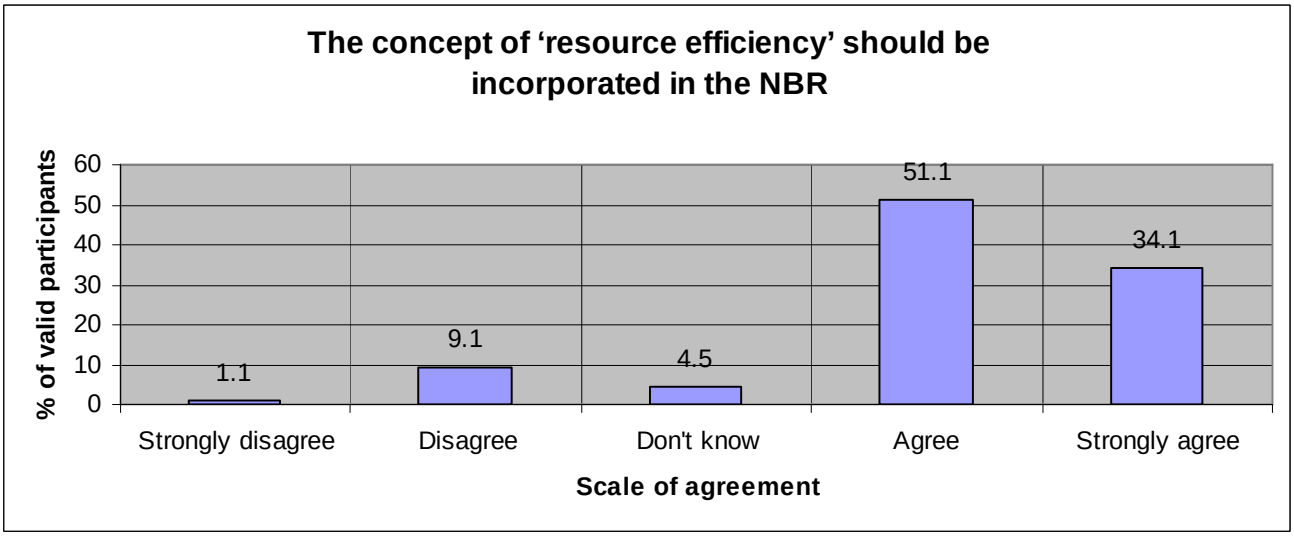


Figure 64: Graphic summary of responses to Question 14.3

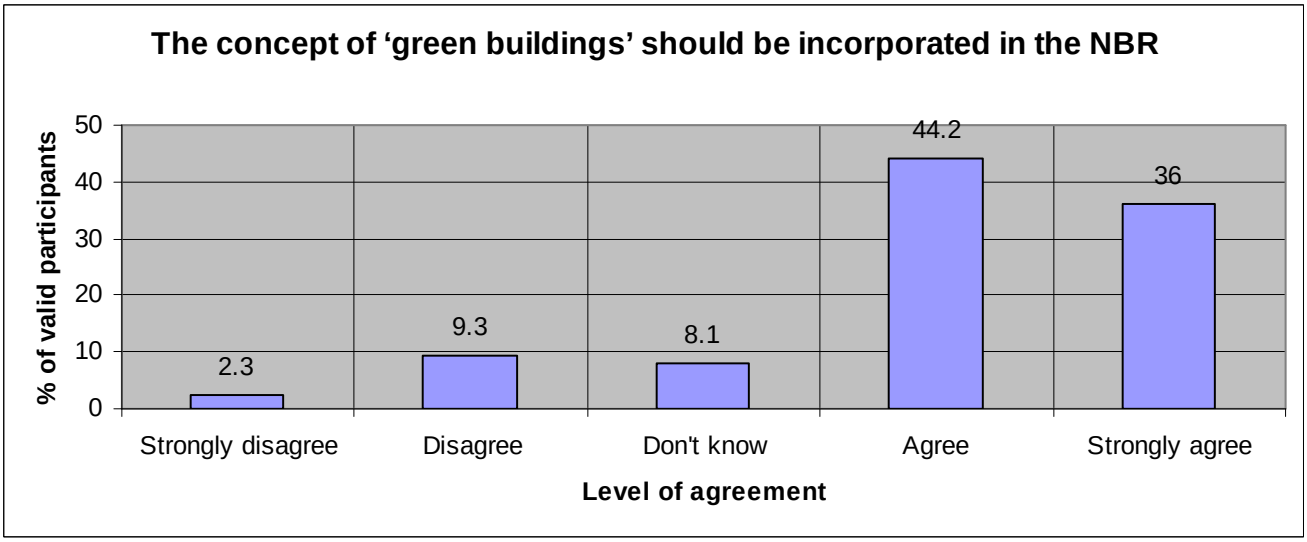


Figure 65: Graphic summary of responses to Question 14.4

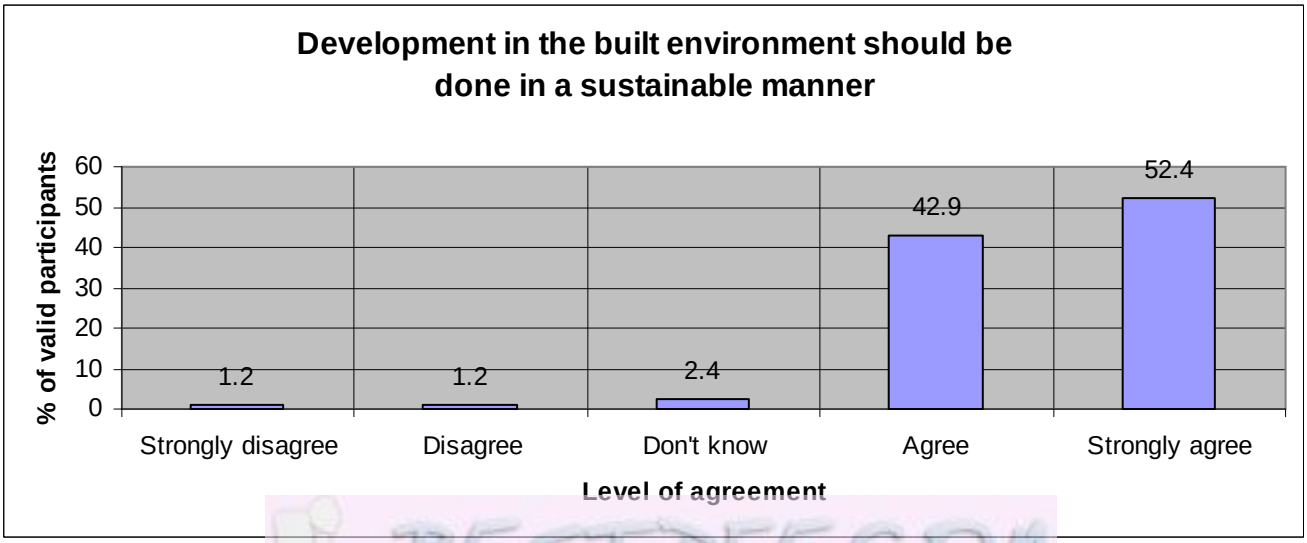
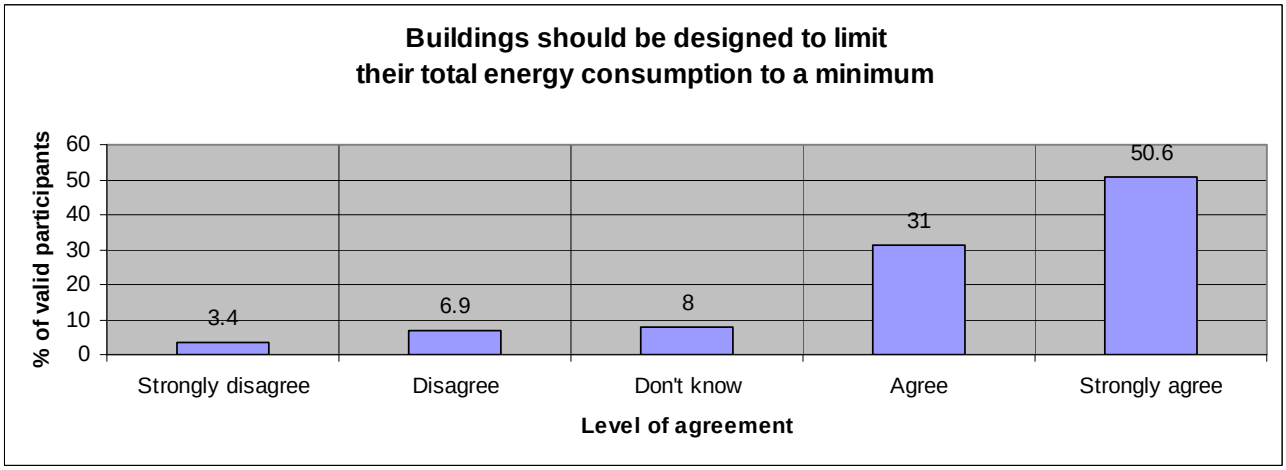


Figure 66: Graphic summary of responses to Question 14.5



4.4.15.3 Question 14 (Part 2) extracted from questionnaire (with corresponding number of respondents)

Table 60: Question 14 (Part 2)

		Number of valid responses	% of total population
14	*This question focuses on the **possible** inclusion of **criteria** that could **promote sustainability** in the built environment as **additional requirements of the NBR**.*		
	*Please indicate your **level of agreement** with each of the following statements:*		
14.6	*The **building regulations** should **control and limit the energy consumption** of the **building sector**.*	88	**99%**
14.7	*The **building regulations** should address the **future impact** of **buildings on** the **natural environment**.*	85	**96%**
14.8	*The **building regulations** should address the **future impact** of **buildings on** the **man-made environment**.*	88	**99%**
14.9	*Minimum **passive design criteria** should be included as **additional requirements** of the **NBR**.*	85	**96%**
14.10	*The **existing administration methods** of the NBR could be **adapted** without difficulty **to include** additional minimum **passive design criteria**.*	85	**96%**

4.4.15.4 Graphic summary of responses to Question 14

Figure 67: Graphic summary of responses to Question 14.6

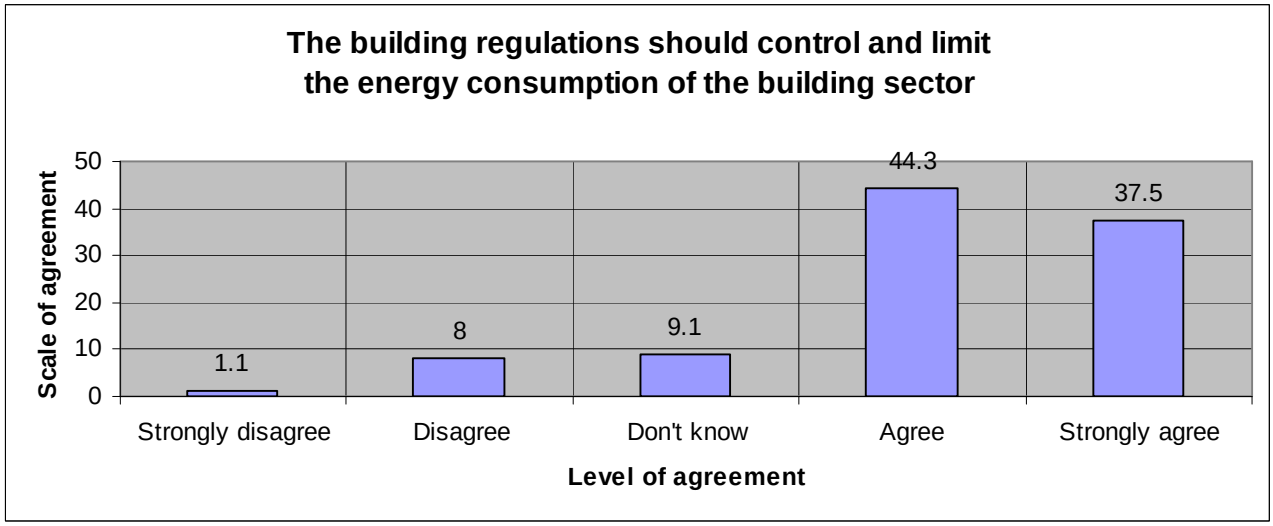


Figure 68: Graphic summary of responses to Question 14.7

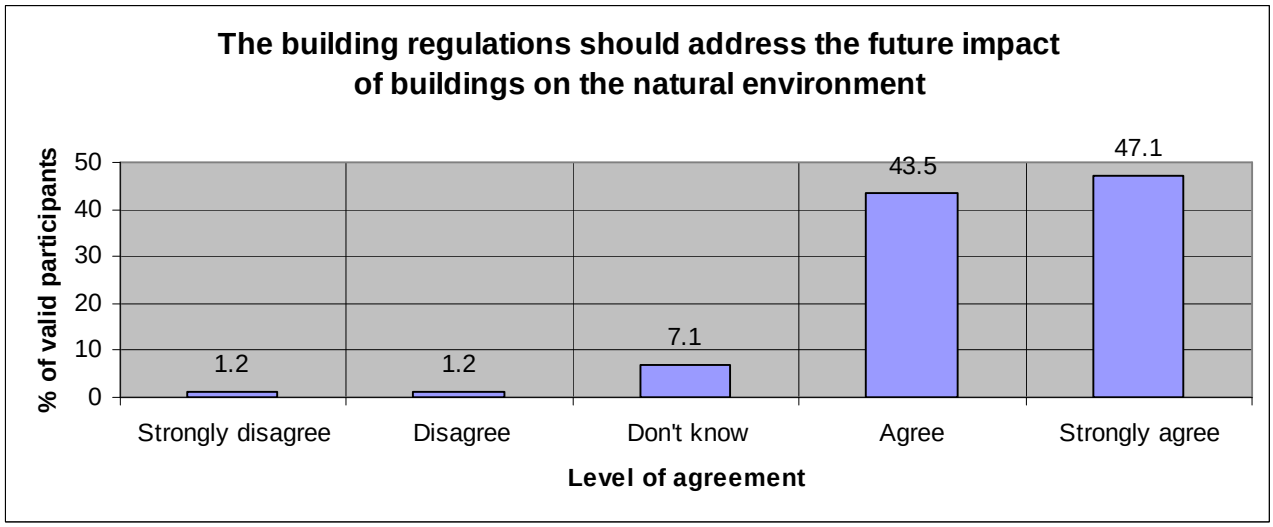


Figure 69: Graphic summary of responses to Question 14.8

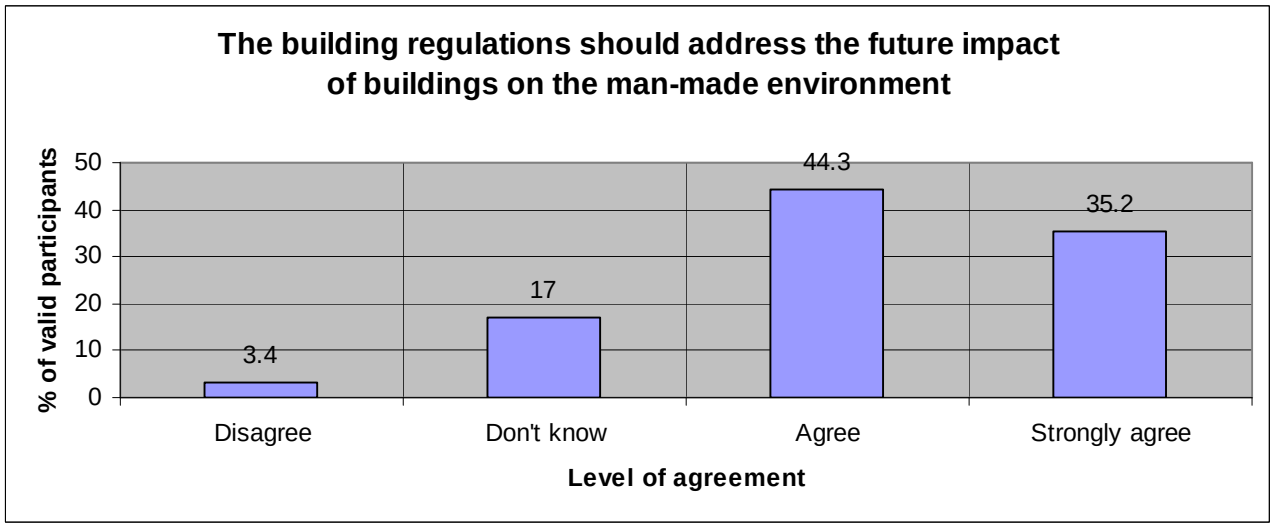


Figure 70: Graphic summary of responses to Question 14.9

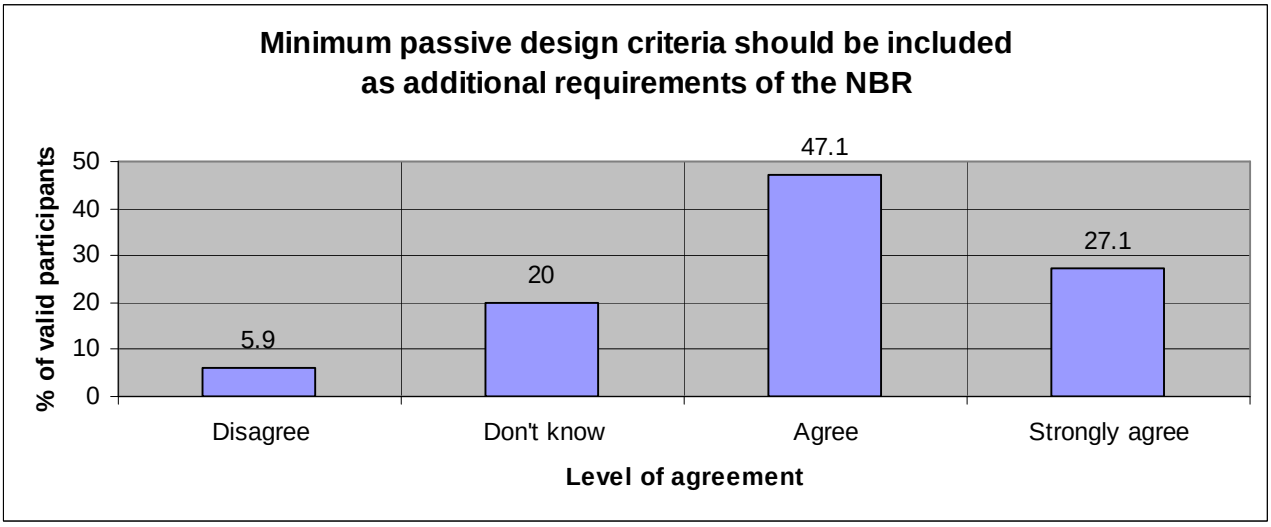
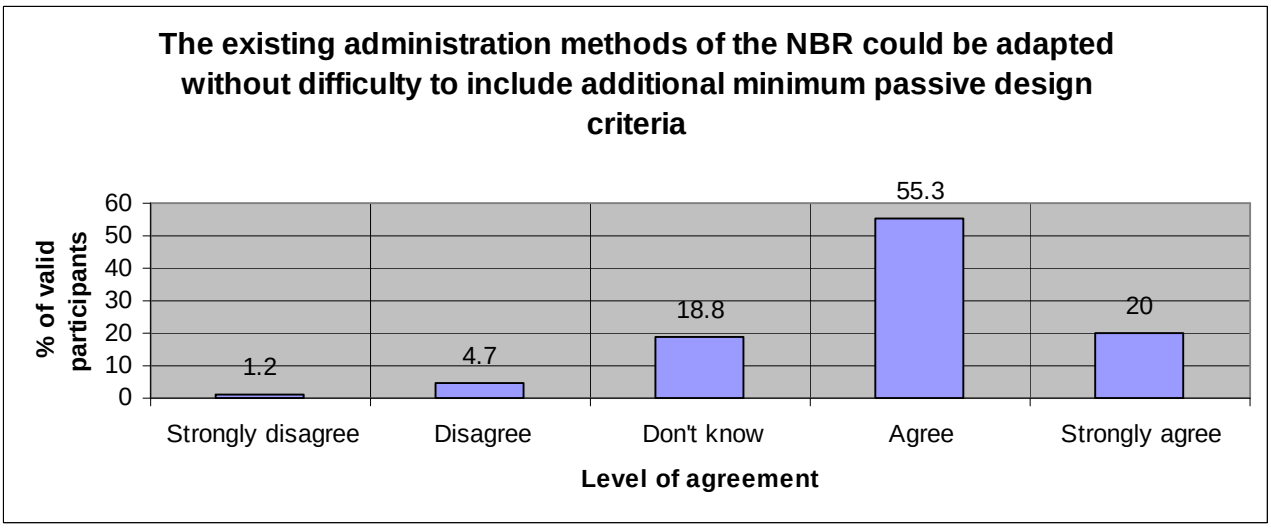


Figure 71: Graphic summary of responses to Question 14.10



4.4.15.5 Ranking of responses to Question 14

The mean averages of the responses were calculated for Questions 14.1 to 14.10. This calculation allows the responses to be ranked from high to low, or most important to least important. According to the respondents, the order of importance for the inclusion of sustainable design criteria was as follows:

- *Development in the built environment should be done in a sustainable manner* (Question 14.4)
- *The building regulations should address the future impact of buildings on the natural environment* (Question 14.7)

- *The concept of 'sustainability' should be incorporated in the NBR* (Question 14.1)
- *Buildings should be designed to reduce their total energy consumption to a minimum* (Question 14.5)
- *The building regulations should address the future impact of buildings on the man-made environment* (Question 14.8)
- *The building regulations should control and limit the energy consumption of the building sector* (Question 14.6)
- *The concept of 'resource efficiency' should be incorporated in the NBR* (Question 14.2)
- *The concept of 'green buildings' should be incorporated in the NBR* (Question 14.3)
- *Minimum passive design criteria should be included as additional requirements of the NBR* (Question 14.9)
- *The existing administration methods of the NBR could be adapted without difficulty to include additional minimum passive design criteria* (Question 14.10)

4.4.16 Question 15

4.4.16.1 Question 15 (Part 1) extracted from questionnaire (with corresponding number of respondents)

Table 61: Question 15 (Part 1)

		Number of valid responses	% of total population
15	*Please rate the following **passive design criteria** for possible **inclusion** as additional requirements in the NBR. This list has been specifically formulated to become part of the **plan checklist**.*		
	*Please indicate your **level of agreement** for each of the following statements:*		
15.1	*The **majority of habitable rooms** should **face** in a **northerly direction** to avoid unnecessary heating/cooling loads.*	87	**98%**
15.2	*If a **habitable room does not face in a northerly or southerly direction**, **mitigating passive measures** (i.e. shading devices, heat reflective glass, screens) should be taken to reduce possible heat gain.*	83	**93%**
15.3	*All **exposed glass surfaces**, except those facing south, should have a **protective roof overhang and/or shading device** (i.e. canopy, shutters) to reduce possible heat gain.*	83	**93%**
15.4	*Where applicable, all building **entrances/exits** should be **shielded from prevailing winds**.*	85	**96%**

15.5	*Each **habitable room** should have a total window area of at least **10% of the floor area** (or 0,2m²) for **natural lighting.***	84	**94%**
15.6	*Each **habitable room** should have **openable windows of** at least **5% of the floor area** (or 0,2m²) for natural ventilation**.***	86	**97%**
15.7	***Cross ventilation** should be provided for the majority of **habitable rooms.***	86	**97%**
15.8	*The **Zone of Space** outside any opening should not be less than 1,0m in length from the boundary line, or 0,5m from the building line, with a maximum requirement of 8m (with the exception of built-up urban areas)**.***	85	**96%**

4.4.16.2 Graphic summary of responses to Question 15 (Part 1)

Figure 72: Graphic summary of responses to Question 15.1

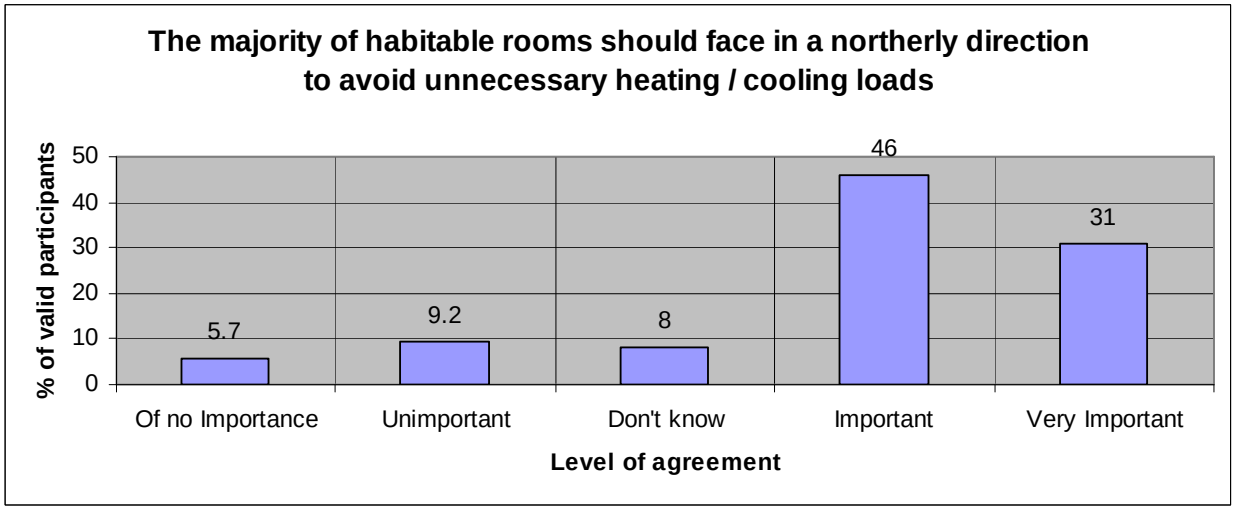


Figure 73: Graphic summary of responses to Question15.2

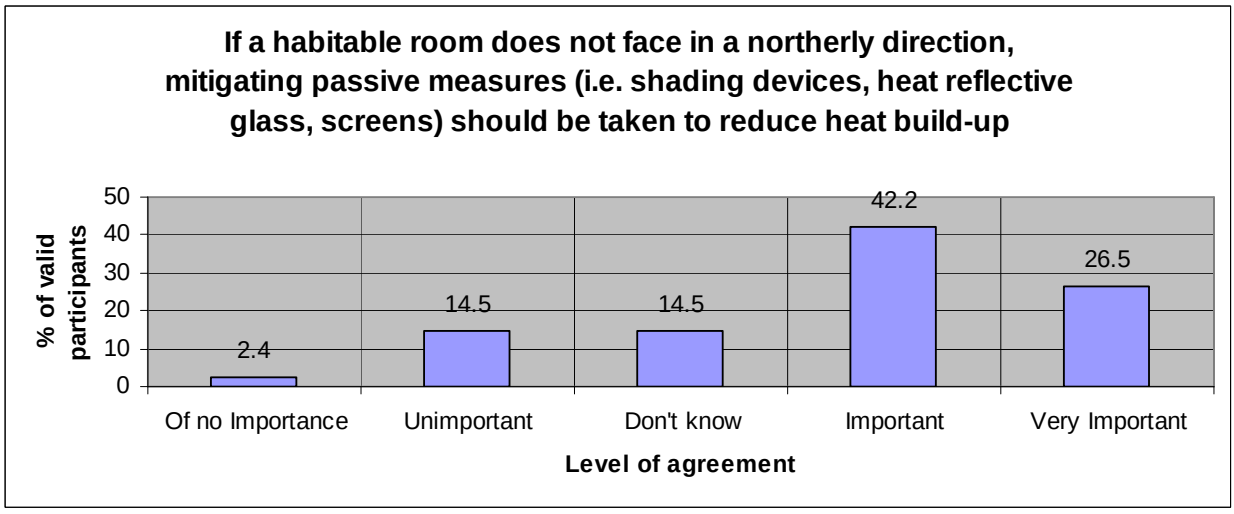


Figure 74: Graphic summary of responses to Question 15.3

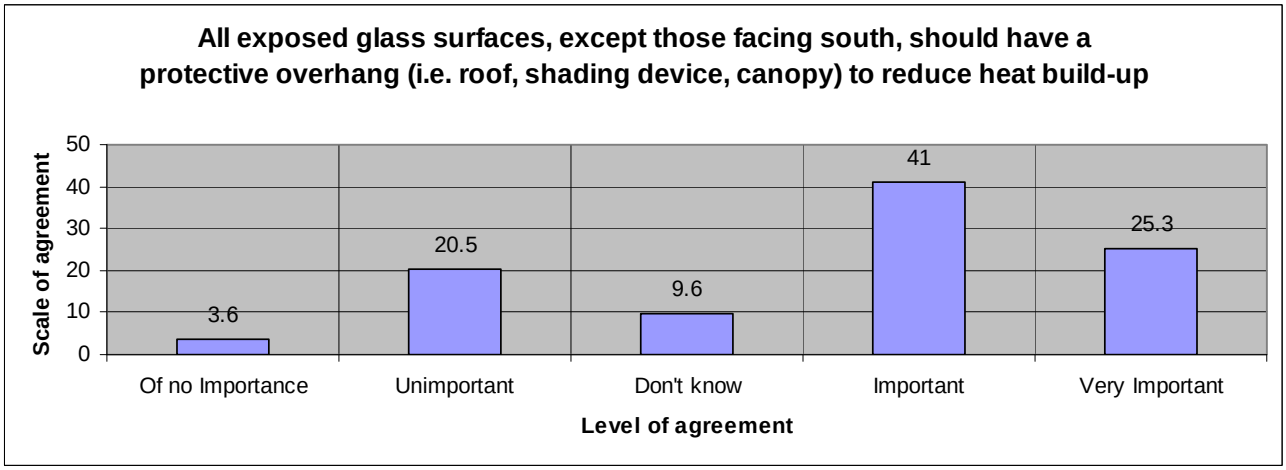


Figure 75: Graphic summary of responses to Question 15.4

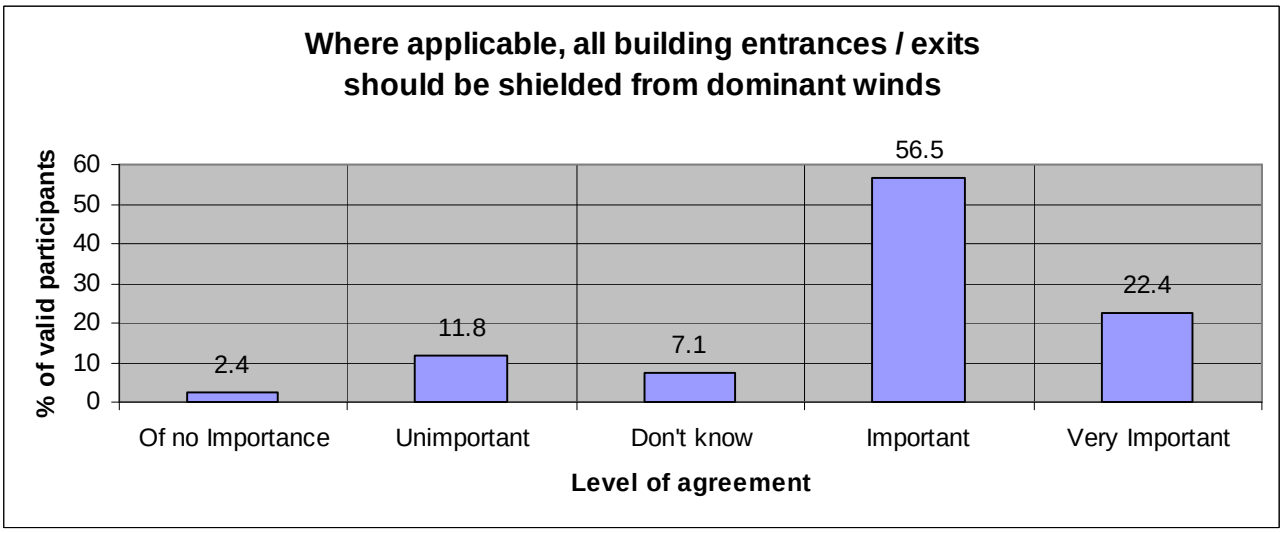


Figure 76: Graphic summary of responses to Question 15.5

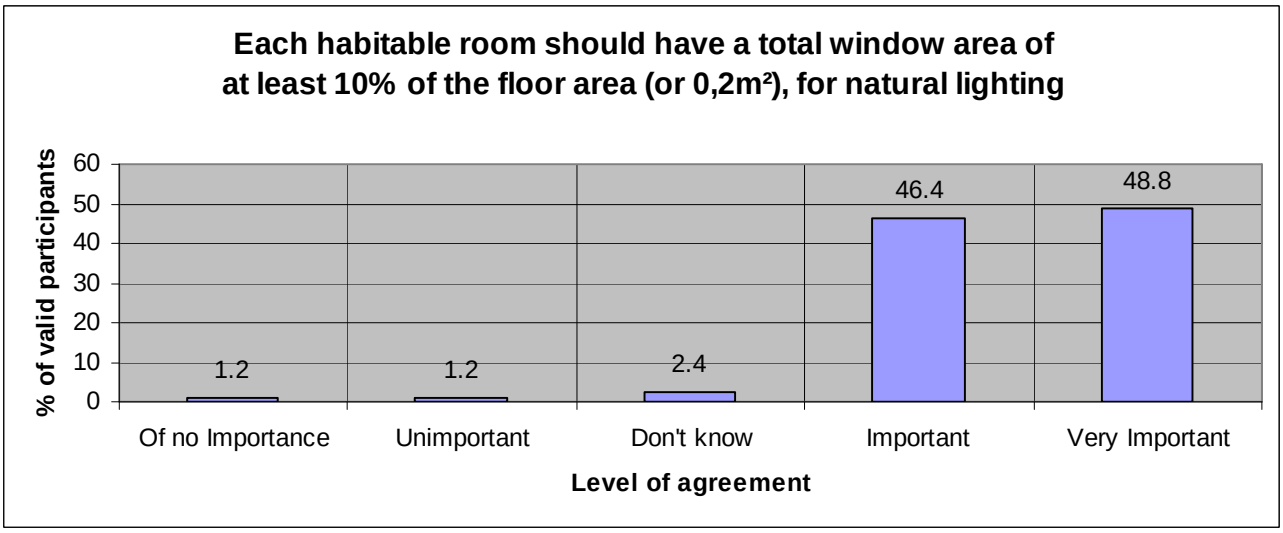


Figure 77: Graphic summary of responses to Question 15.6

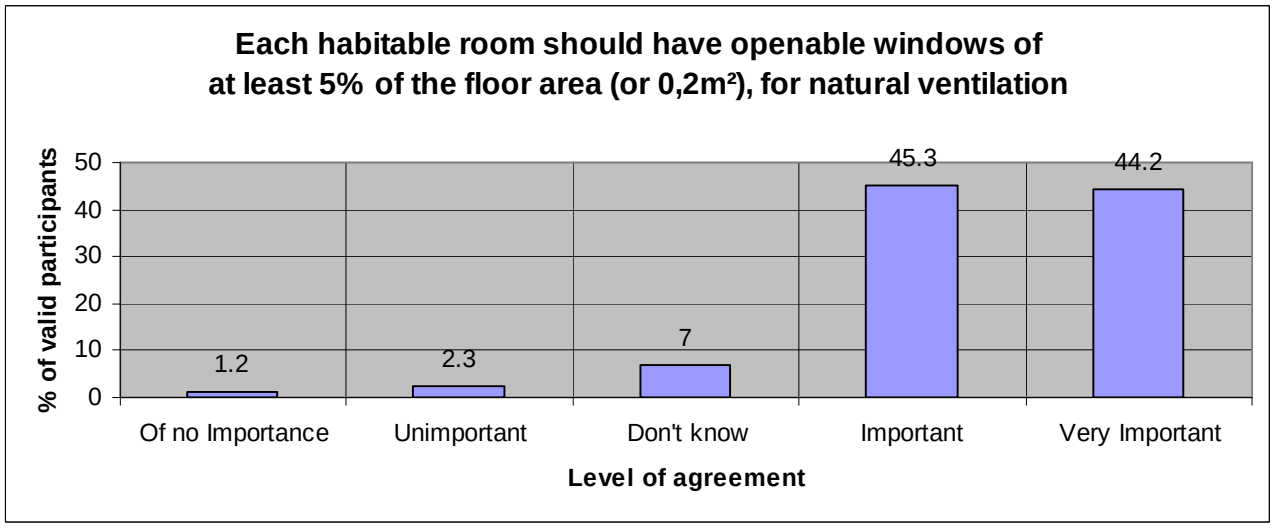


Figure 78: Graphic summary of responses to Question 15.7

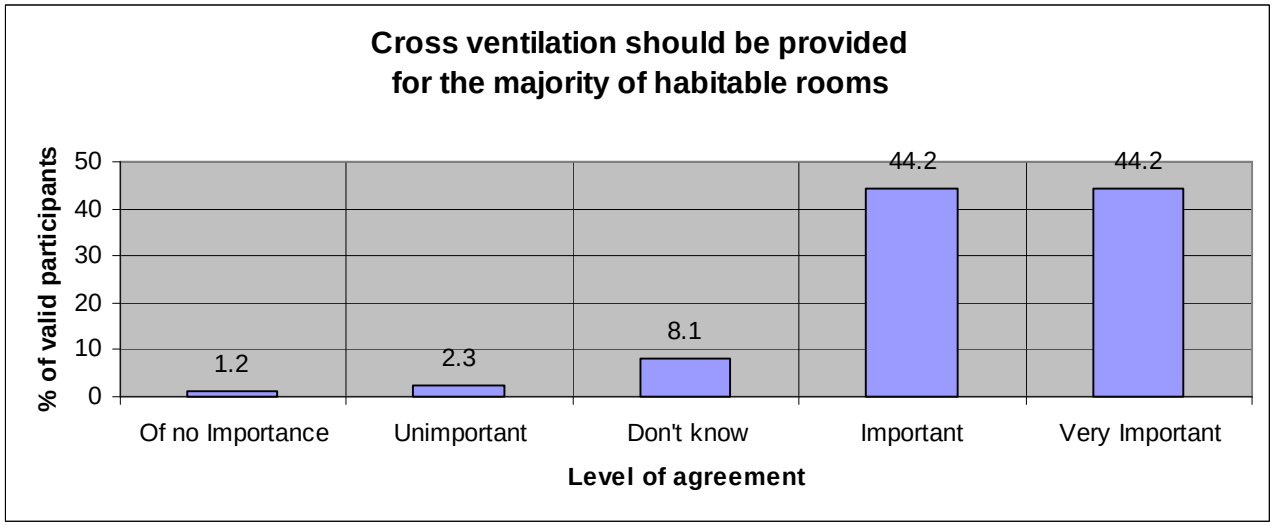
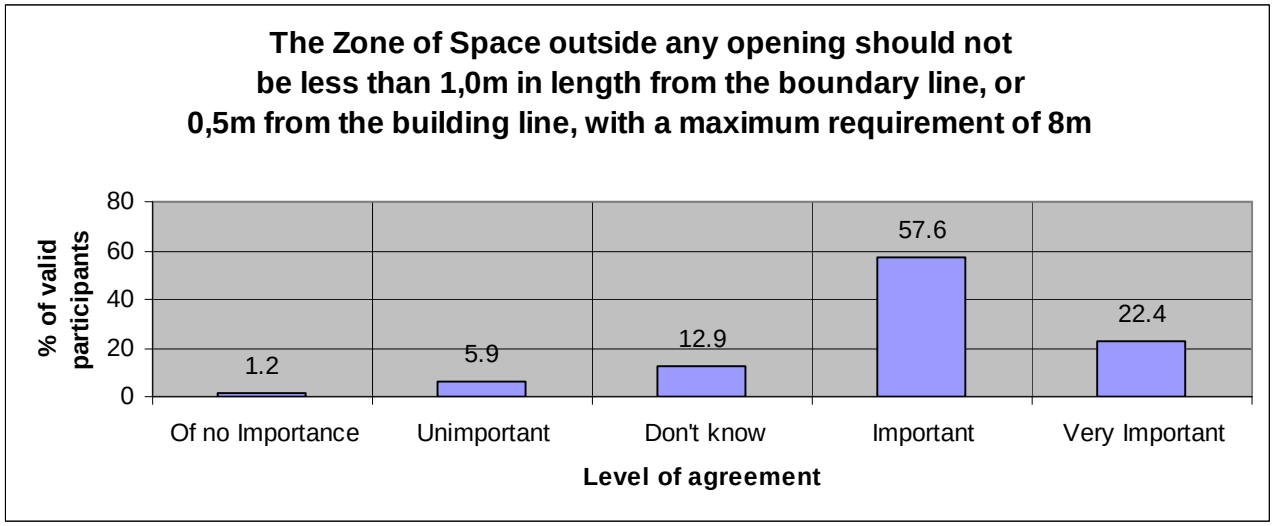


Figure 79: Graphic summary of responses to Question 15.8



4.4.16.3 Question 15 (Part 2) extracted from questionnaire (with corresponding number of respondents)

Table 62: Question 15 (Part 2)

		Number of valid responses	% of total population
15	*Please rate the following **passive design criteria** for possible **inclusion** as additional requirements in the NBR. This list has been specifically formulated to become part of the **plan checklist**.*		
	*Please indicate your **level of agreement** with each of the following statements:*		
15.9	*If **under-floor heating** is installed, **under-floor insulation material** should also be provided to avoid unnecessary heat loss.*	84	**94%**
15.10	*Except where the **roofing material** conforms to a **minimum thermal resistance level** (R-value), a ceiling should be installed in all habitable rooms to avoid unnecessary heat gain/loss.*	85	**96%**
15.11	*Where applicable, **water storage tanks** should be used **to harvest stormwater** from roofs for later use in cisterns, irrigation, etc.*	86	**97%**
15.12	*The **minimum number of ablution facilities required for males and females** in a development **should be reduced** from the current requirements.*	79	**89%**
15.13	*All **electric water heating** should be **supported by a renewable energy source** to limit electricity consumption for heating.*	86	**97%**
15.14	*All **electric water-heating cylinders** should be fitted with an **automatic timer** to limit electricity consumption for heating.*	86	**97%**
15.15	*Other (please describe briefly)*	5	**6%**

4.4.16.4 Graphic summary of responses to Question 15 (Part 2)

Figure 80: Graphic summary of responses to Question 15.9

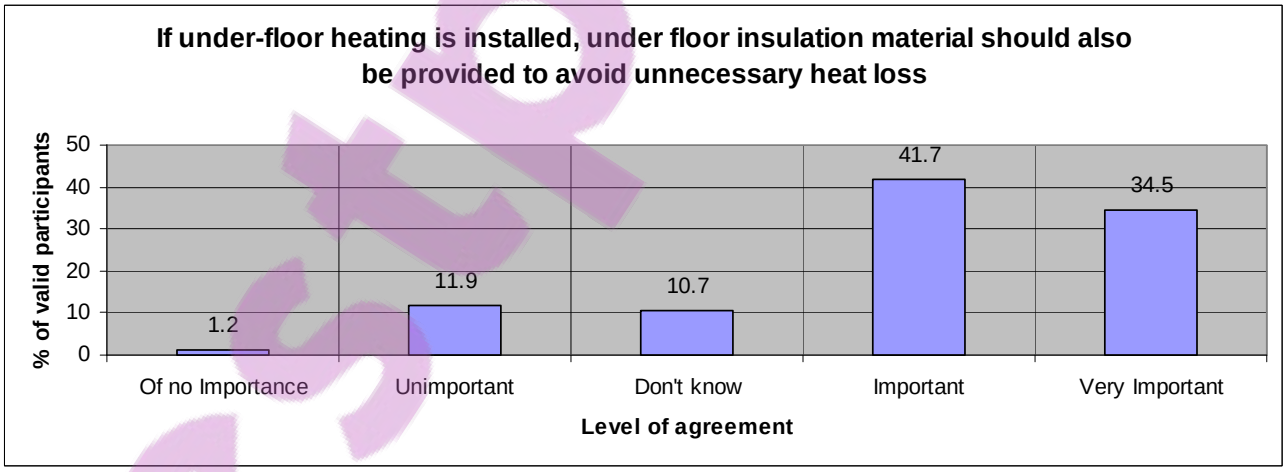


Figure 81: Graphic summary of responses to Question 15.10

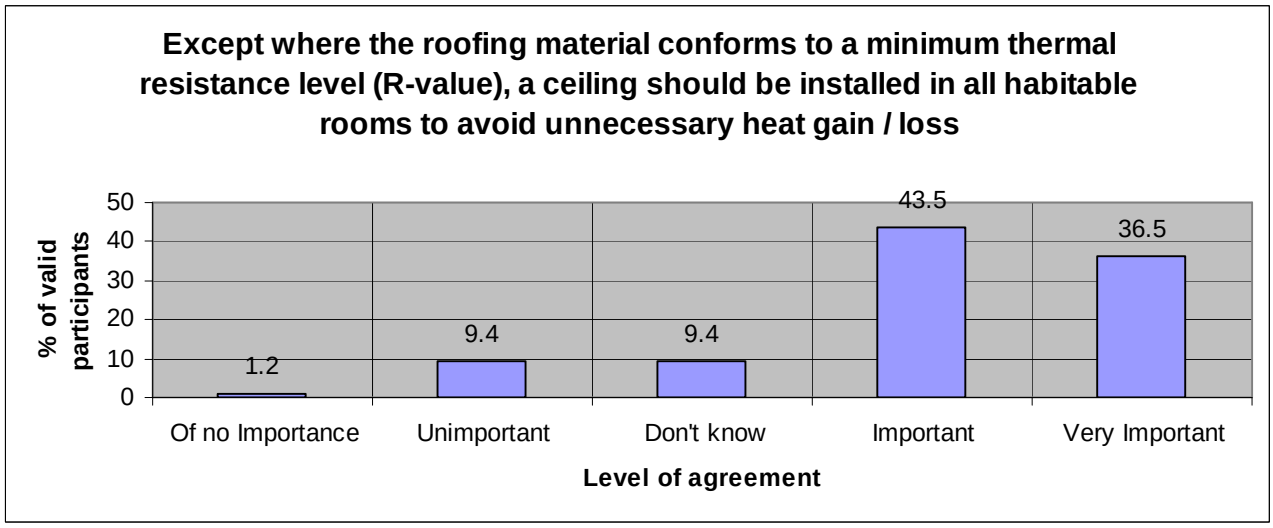


Figure 82: Graphic summary of responses to Question 15.11

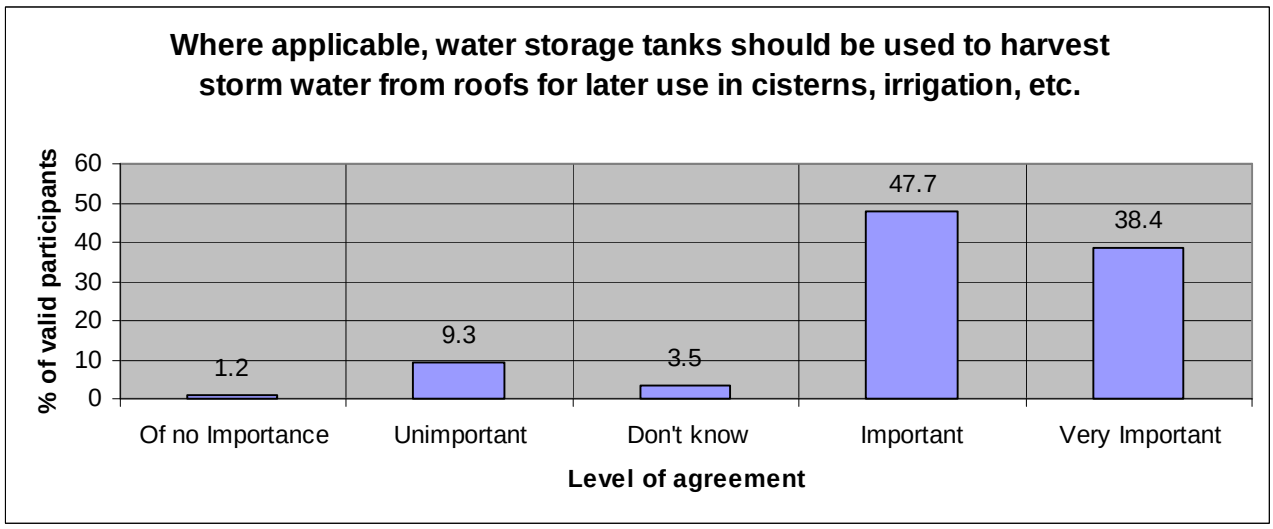


Figure 83: Graphic summary of responses to Question 15.12

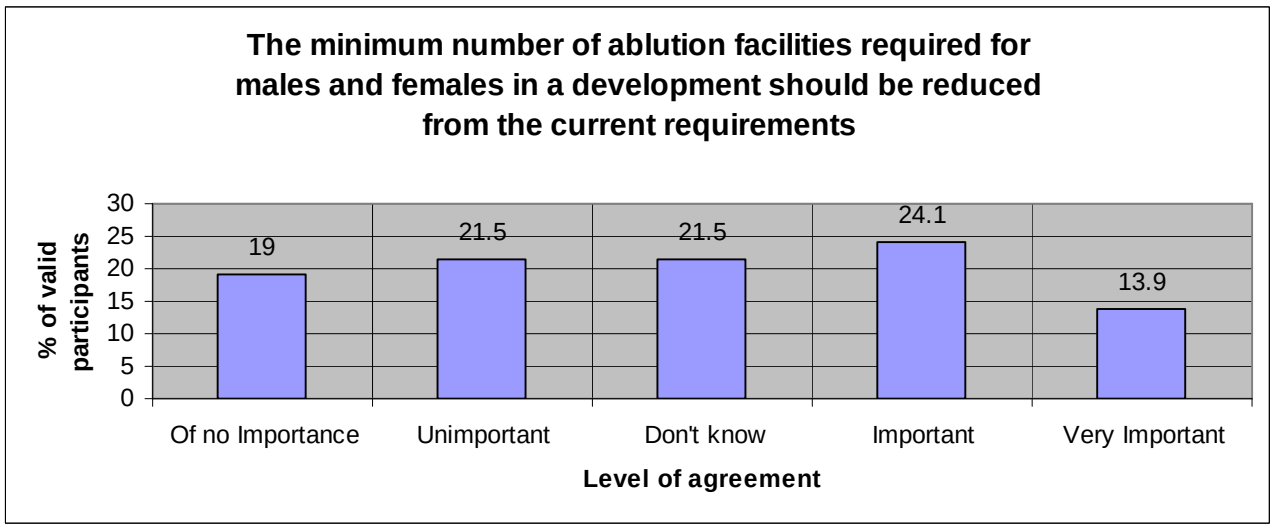


Figure 84: Graphic summary of responses to Question 15.13

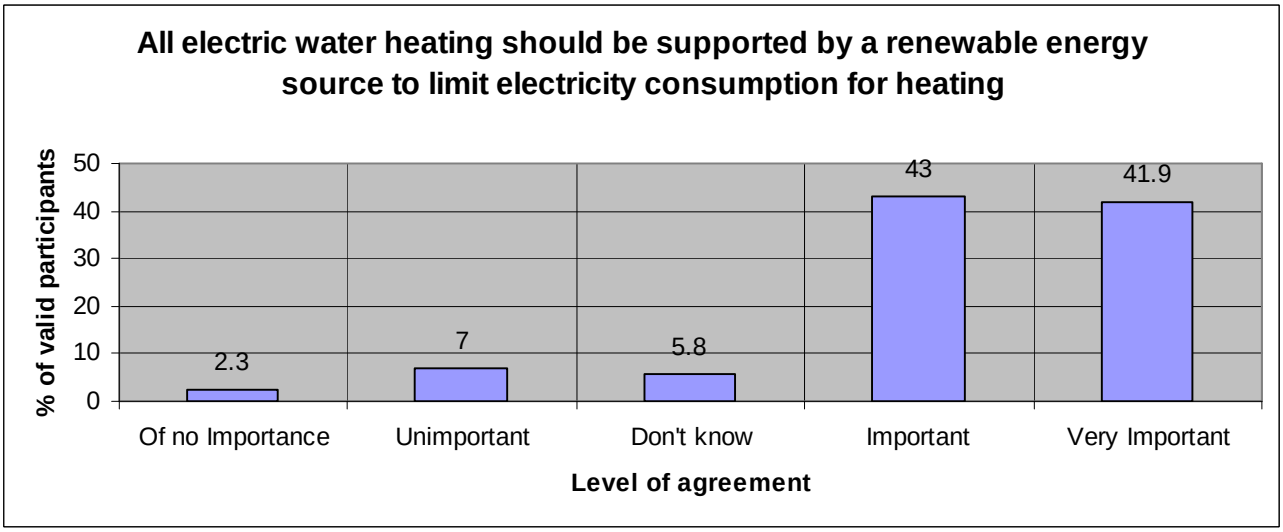
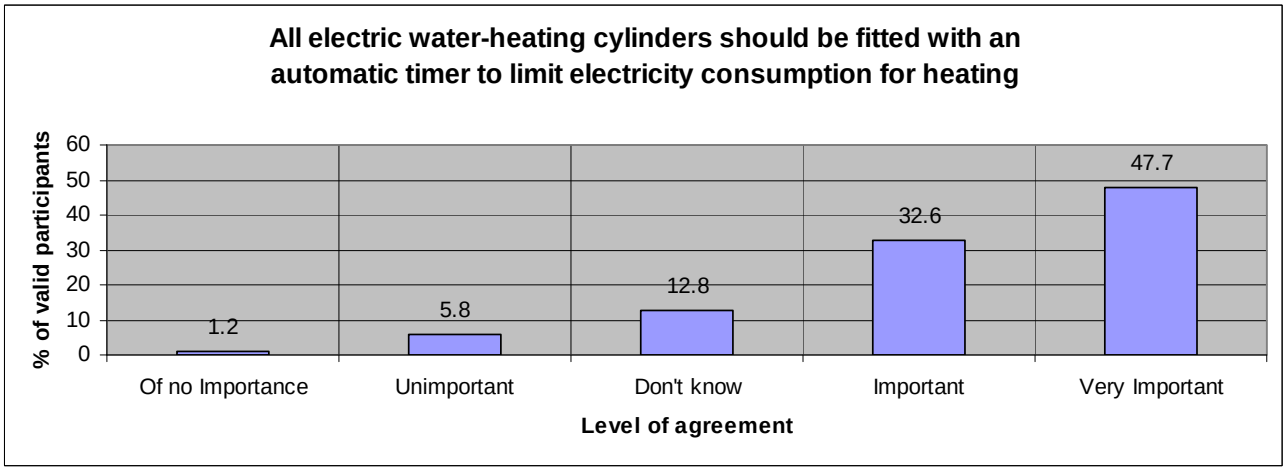


Figure 85: Graphic summary of responses to Question 15.14



4.4.16.5 Ranking of responses to Question 15

The mean averages of the responses were calculated for Questions 15.1 to 15.15. This calculation allows the responses to be ranked from most important to least important. According to the respondents, the order of importance for the inclusion of passive design criteria was as follows:

1. Each habitable room should have a total window area of at least 10% of the floor area (or 0,2m²) for natural lighting (Question 15.5)
2. Each habitable room should have openable windows of at least 5% of the floor area (or 0,2m²) for natural ventilation (Question 15.6)
3. Cross ventilation should be provided for the majority of habitable rooms (Question 15.7)

4. All electric water-heating cylinders should be fitted with an automatic timer to limit electricity consumption for heating (Question 15.14)
5. All electric water heating should be supported by a renewable energy source to limit electricity consumption for heating (Question 15.13)
6. Where applicable, water storage tanks should be used to harvest stormwater from roofs for later use in cisterns, irrigation, etc. (Question 15.11)
7. Except where the roofing material conforms to a minimum thermal resistance level (R-value), a ceiling should be installed in all habitable rooms to avoid unnecessary heat gain/loss (Question 15.10)
8. If under-floor heating is installed, under-floor insulation material should also be provided to avoid unnecessary heat loss (Question 15.9)
9. The Zone of Space outside any opening should not be less than 1,0m in length from the boundary line, or 0,5m from the building line, with a maximum requirement of 8m (with the exception of built-up urban areas) (Question 15.8)
10. The majority of habitable rooms should face in a northerly direction to avoid unnecessary heating/cooling loads (Question 15.1)
11. Where applicable, all building entrances/exits should be shielded from prevailing winds (Question 15.4)
12. If a habitable room does not face in a northerly or southerly direction, mitigating passive measures (i.e. shading devices, heat reflective glass, screens) should be taken to reduce possible heat gain (Question 15.2)
13. All exposed glass surfaces, except those facing south, should have a protective roof overhang and/or shading device (i.e. canopy, shutters) to reduce possible heat gain (Question 15.3)
14. The minimum number of ablution facilities required for males and females in a development should be reduced from the current requirements (Question 15.12)

4.5 INTERPRETATION OF DATA

After the graphic summary and description of the data, the essence of research is to deal with the interpretation of the data (Vosloo, 2008: 154-155). The following section interprets the gathered data and formulates preliminary findings to assist in the preparation of the conclusions and recommendations presented in the next chapter.

During its interpretation, each question is discussed separately with specific reference to

- the question's original purpose;
- what could be concluded from the responses;
- the question's background, by referring to earlier chapters, and lastly
- an indication of the recommendations to follow in Chapter 5.

4.5.1 Question 1

The intention of Question 1 was to determine the provincial distribution of the participants in the study. However, since it was necessary to contextualise the study within the broader context of the South African built environment, the information obtained in Question 1 was compared with data from Stats SA on the recorded value of building plans passed and buildings completed, according to province. Report No. P5041.3 from Stats SA (Stats SA, 2010a: 1-2, 89-90) was used for this purpose. The profile comparison is presented in Figures 86 and 87. (Note that the sequence in which the provinces are listed relates to the explanation on p. 90 and to Figure 6 on p. 130.)

Figure 86: Graphic summary of responses to Question 1 and recorded provincial value of building plans passed

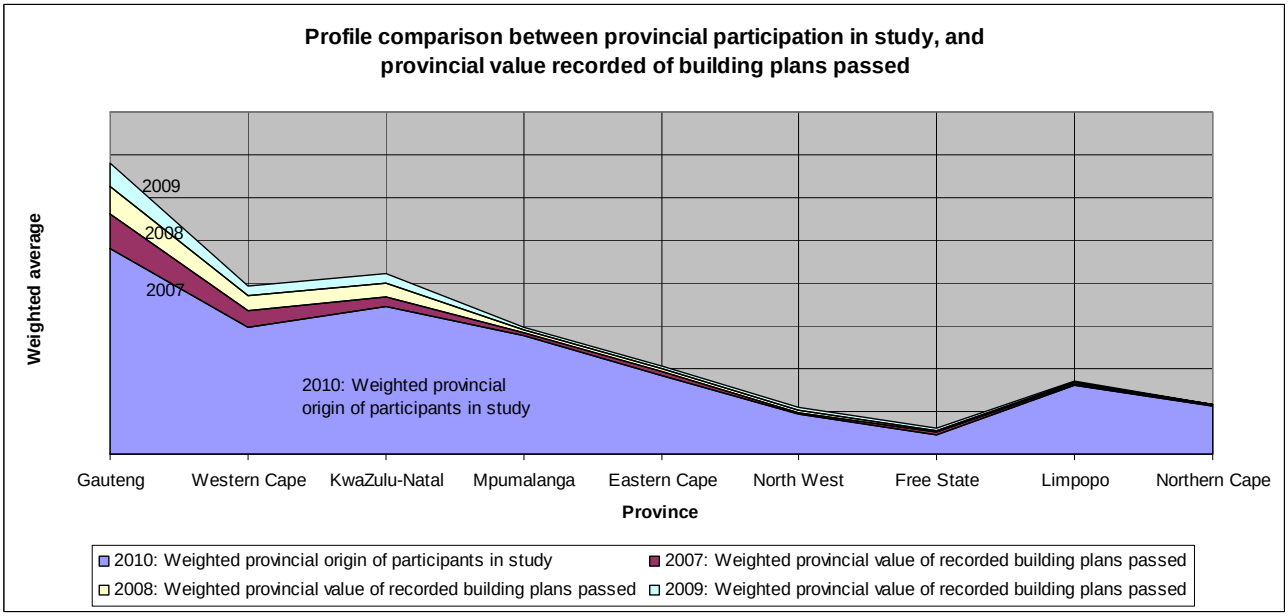
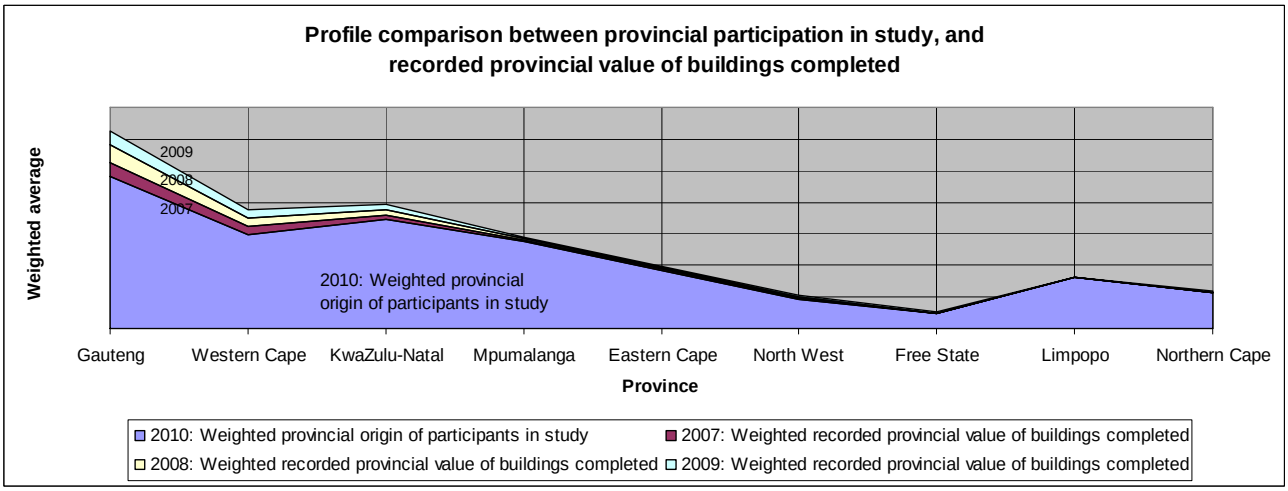


Figure 87: Graphic summary of responses to Question 1 and recorded provincial value of buildings completed



From Figures 86 and 87 it could be concluded that the specific profiles point to a correlation between provincial participation in the study and the relevant recorded values per province. There is no evident domination by (or neglect of) a particular province in the study, thereby rendering it representative of the built environment in South Africa.

However, the author is well aware that the above argument remains a post-rationalisation and feels it necessary to ascribe this resulting correlation to serendipity. It should be noted that the exact number of participants, and therefore their provincial origin, had been unknown to the researcher until the coding of the questionnaires was completed.

4.5.2 Question 2

The purpose of Question 2 was to determine the gender and age composition of the participants. The responses indicate that for every female participant there were 7.1 male participants, which implies a male-dominated regulatory environment, specifically for building control at the various LAs. This divergence was further compounded by the age difference in the respondents. The median age for males was 45,5 years, while for females it was 31 years.

The above observations possibly point to a female population with less experience in the built environment than their male counterparts. This hypothesis was proved in

Question 4 where the respondents indicated their work experience. The results revealed 9,5 years' work experience for the female contingent of the population, compared to the male contingent's 21 years of work experience.

Although the study did not set out to discover the above gender patterns, it is recommended that further studies be undertaken on the observed phenomenon. A detailed study could ascertain the particular challenges that the female BCO faces.

4.5.3 Question 3

The purpose of Question 3 was to determine the current occupation of the respondents. The majority of the participants indicated that they were BCOs (88%), which further validated the study because the respondents proved to be engaging actively with the subject matter (the NBR) on a daily basis. The remainder of participants held occupations within the built environment professions that would also be influenced by the requirements and application of the NBR.

4.5.4 Question 4

Question 4 determined the work experience of the participants in the built environment, at an LA and as a BCO. An additional option of '*other'* was provided for possible selection.

The median work experience of the participants in the built environment was 14,5 years. Respondents spent a median period of 12 years at an LA, and 6 years working as a BCO. Under *other,* a range of different occupancies in the built environment was listed, with a median experience of 5 years. This indicates a population that has extensive working experience, but is relatively inexperienced in the implementation of Act 103 of 1977.

As part of the recommendations in Chapter 5, the author will suggest an educational programme focusing on Act 103 of 1977 and its statutory requirements.

4.5.5 Question 5

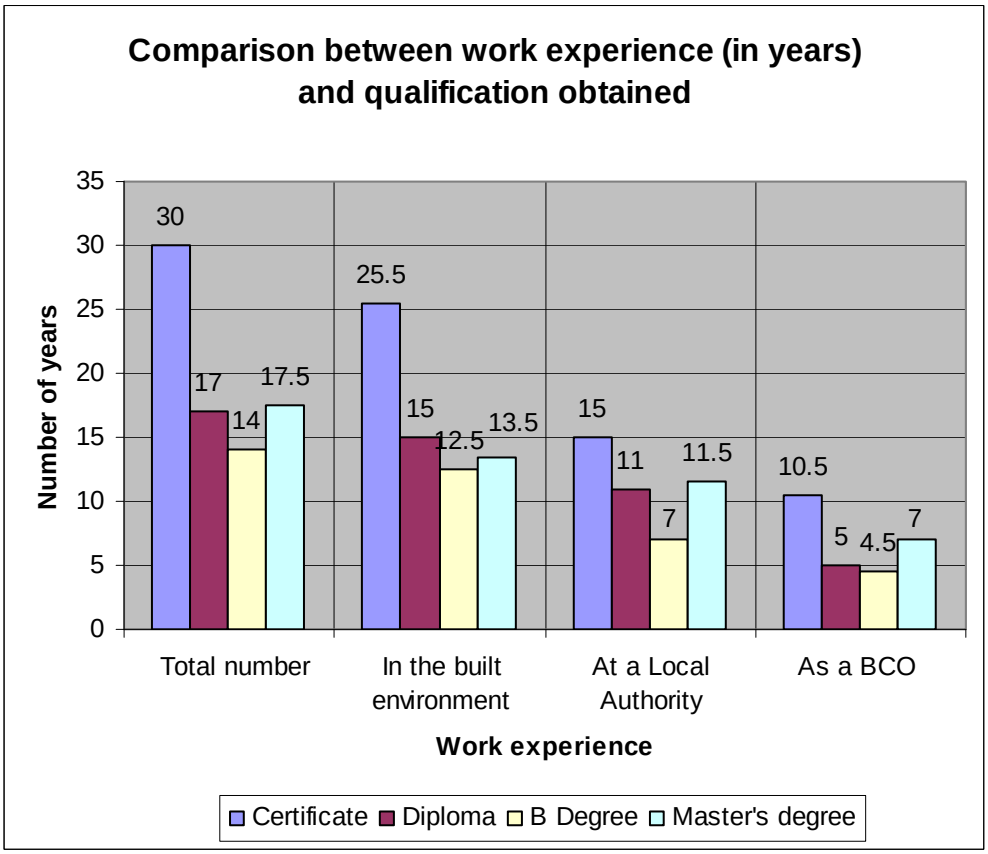
The purpose of this question was to determine the educational background of the respondents. The Regulations have specific requirements regarding the educational background of the BCO. Regulation *A16* in SANS 10400:1990 (SABS, 2010a: 32) states the following requirement:

> "The minimum qualification of any building control officer appointed in terms of section 5 of Act 103 of 1977 shall be of a standard equivalent to a senior certificate plus 3 years tertiary education, as evaluated by the Human Sciences Research Council, in one of the following building disciplines:
>
> (a) Civil engineering;
> (b) structural engineering;
> (c) architecture;
> (d) building management;
> (e) building science;
> (f) building surveying; or
> (g) quantity surveying."

16% of the participants in the survey did not comply with the above requirement; with 1% in possession of a Grade 12 (Standard 10) qualification, and 15% holding a Certificate. A further 62% of the respondents indicated that they possessed a Diploma. This group could well be compliant with the regulation, but further investigation would be needed to determine the precise field of study for which the Diploma was issued. Altogether 17% of the participants had a Bachelor's degree and 5% a Master's degree.

Nonetheless, the author believes that the level of education should be evaluated within the context of the participants' working experience. Figure 88 was compiled to compare the respondents' years of work experience and qualifications.

Figure 88: Graphic summary of responses to Questions 4.1, 4.2, 4.3 and 4.4, depicting the relationship between experience and qualifications



From the responses it is evident that there was an inverse relationship between the experience and qualifications of the BCOs. In other words, the BCO with a lower qualification had more years of working experience as a BCO. This observation was evident up to the Bachelor's level. The remaining part of the population (5%) that held a Master's degree had a slightly larger number of years' working experience.

As mentioned in the discussion of Question 4, one of the recommendations in Chapter 5 will be the suggestion to establish an educational programme for BCOs.

4.5.6 Question 6

The purpose of this question was to determine the primary focus of the amended National Building Regulations and Building Standards Act (Act 103 of 1977). Six focus areas were provided for possible selection; and *other* was allowed as a seventh and eighth option.

From the responses it appeared that the focus of Act 103 of 1977 was (in order of importance):

- To ensure a healthy built environment (92% selection of *very important*)
- To ensure a safe built environment (86.4% selection of *very important*, and 12.5% selection of *important*)
- To ensure uniform regulations in the built environment (81.6% selection of *very important*, and 14.9% selection of *important*)
- To promote sustainability in the built environment (69.3% selection of *very important*, and 28.7% selection of *important*)
- To form a basis for future development of the built environment (66.7% selection of *very important*, and 28.7% selection of *important*)
- To limit inflation in the built environment (19.5% selection of very important and 41.5% selection of important). This option generated the highest selection of *unimportant* (13%) and *of no importance* (14.6%).

In addition, the respondents provided the following *other* possible focus areas of Act 103 of 1977:

- Energy efficiency
- Quality control
- Enforcement of contraventions (*sic*)
- Conservation of the natural environment
- Long-term impact of decisions (*sic*) should be taken into account
- Remuneration of the BCO
- Enforcement of Act 103 of 1977/addressing of compliance
- Consideration of neighbours to avoid buildings becoming a nuisance to them

The literature review of the original function of building regulations in Chapter 2 highlighted the importance of a safe built environment that is healthy and uniformly regulated. This role of the regulations was confirmed by the respondents. However, the specific rationale behind the introduction of the 1977 Act – to limit inflation – is not rated as important by the respondents.

Recommendations in Chapter 5 will include the probable redefinition and emphasis of the original goal of Act 103 of 1977.

4.5.7 Question 7

This question investigated the exact documents used by the BCO in the execution of his daily tasks. Some of these were drafted by the BCO/LA to supplement the NBR. In particular, the respondents were asked to indicate how often they referred to (or consulted) specific documents. Seventeen possibilities were listed for potential selection, and *other* was allowed as 18th and 19th options.

The purpose of Question 7 was to determine which documents are used most often and also to establish their origin. The responses could provide guidance for future intervention by highlighting which documents should be addressed first.

From the responses it was clear that the BCO mostly referred to the following documents:

- Plan submission application form (the valid percentage selecting *often* and *very often* for Question 7.6 was 80.7%)
- Checklist for plan approval (the valid percentage selecting *often* and *very often* for Question 7.7 was 77.6%)
- The amended National Building Regulations and Building Standards Act (Act 103 of 1977) (the valid percentage selecting *often* and *very often* for Question 7.1 was 77.3%)
- Notice of approval (the valid percentage selecting *often* and *very often* for Question 7.8 was 72.4%)
- The National Building Regulations promulgated in terms of the relevant sections of Act 103 of 1977 (i.e. Section 17(1), Section 20 read with Section 9, Section 20 read with Section 16, and Section 20 read with Section 17(5)a) (the valid percentage selecting *often* and *very often* for Question 7.2 was 70.1%)
- Guidelines for the preparation of building plans (the valid percentage selecting *often* and *very often* for Question 7.5 was 69%)
- The Deemed-to-Satisfy Rules as included in The Code of Practice for the Application of the National Building Regulations (SABS 0400-1990 or SANS

10400) (the valid percentage selecting *often* and *very often* for Question 7.4 was 65.1%)

- The amended Code of Practice for the Application of the National Building Regulations (SABS 0400-1990 or SANS 10400) (the valid percentage selecting *often* and *very often* for Question 7.3 was 60.9%)

From the responses it emerged that the BCO sometimes also refers to

- regulations for relaxing a building line;
- urban planning/zoning schemes, and
- Planning Ordinances.

From the responses it was clear that the BCO hardly ever refers to

- regulations for reducing (or relaxing) a height restriction;
- regulations for the departure from urban planning/zoning schemes;
- guidelines for heritage and conservation;
- guidelines for architectural design manuals, or
- 'green' building guidelines/by-laws.

Although the valid percentage selecting *often* and *very often* for Question 7.18 (*Other*) was 62.5%, it was decided to exclude the results from the above lists due to the low participation rate of 15.7%. The respondents provided the following list of *other* possible documents:

- Spatial Development Frameworks (SDFs), especially concerning densification
- By-laws in respect of problem buildings
- Human Settlement Guidelines (popularly known as the 'Red Book')
- Reviews of court cases
- Other local by-laws and policy documents
- Other SANS/SABS codes
- Other (no description)
- Comments from other departments in the LA
- Applications for advertisements in terms of local by-laws
- *Specifile* (although no rating is provided)
- Building by-laws (although no rating is provided)

From the responses it could be concluded that the following documents are of paramount importance to the BCO in performing his daily functions:

- The Plan submission application form
- The checklist for plan approval
- Act 103 of 1977
- The National Building Regulations
- Guidelines for the preparation of building plans
- The Deemed-to-Satisfy Rules
- The amended Code of Practice

As pointed out in Chapter 1, the current administration system of the NBR does not provide a formalised version of a *plan submission application form*, a *checklist for plan approval*, or *guidelines for the preparation of building plans*. These documents are drafted by the BCO (as the representative of the LA). They represent interpretations of the NBR, and are used to enforce its statutory requirements.

Recommendations in Chapter 5 will focus on the provision of a standardised version of the application form for plan submission and the Checklist for plan approval.

4.5.8 Question 8

The purpose of this question was to determine the different ways in which the BCOs interpret the requirements of the amended Code of Practice for the Application of the National Building Regulations (SABS 0400-1990 or SANS 10400). Two possible options were provided and the respondents were asked to indicate their *level of agreement* with each.

The responses seem to indicate a comparable level of agreement with each of the statements, with 41.2% of the respondents *agreeing* (and 35.3% *strongly agreeing*) that the Code represents the minimum requirement as far as the applicant is concerned. Similarly, albeit somewhat lower, 33.3% and 28.7% of the respondents respectively *agreed* and *strongly agreed* that the Code represents the maximum requirement that the LA, and therefore the BCO, could expect from a building project.

However, it should be noted that 20.7% of the respondents *strongly disagreed* with the last interpretation.

The literature review in Chapter 2 indicated that the SABS 0400-1990 (or SANS 10400) represents both the minimum requirement for a building project as far as the applicant is concerned and the maximum requirement that the LA and BCO could expect from a building project. Therefore this original assumption was proved correct from the responses.

Recommendations in Chapter 5 will properly convey the premises of the Code for the Application of the NBR (SABS 0400-1990 or SANS 10400) to the BCO.

4.5.9 Question 9

The purpose of this question was to determine the BCO's opinion on and implementation of *The Code of Practice for the Application of the National Building Regulations (SABS 0400-1990 or SANS 10400).* Five statements were made and the respondents were asked to indicate their level of agreement with each.

From the responses it could be concluded that the Code (SABS 0400-1990 or SANS 10400)

- ensures uniform regulation of the built environment (43.8% of the respondents *agreed*, and 36.0% *strongly agreed* with this interpretation);
- is an appropriate administrative instrument (53.9% of the respondents *agreed*, and 25.8% *strongly agreed* with this interpretation);
- is an accessible document that is easily understandable *(*53.9% of the respondents *agreed*, and 22.5% *strongly agreed* with this interpretation), and
- is structured logically in accordance with all the necessary stages of a construction project (56.3% of the respondents *agreed*, and 21.8% *strongly agreed* with this interpretation).

However, the responses also seem to indicate that the Code (SABS 0400-1990 or SANS 10400) **does not** provide answers to all the questions/issues that a BCO has to address daily. Although 34.8% of the respondents *agreed*, and 14.6% *strongly agreed* with the interpretation that the Code **does** provide answers, 30.3% of the

respondents were *neutral* about this interpretation. The neutral response was the largest recorded under Question 9.

In his personal communication with the author, Opperman (13 May 2010) partially explained why the BCOs struggle to interpret *SABS 0400-1990 or SANS 10400*:

> "There are a number of BCOs in South Africa that operate in isolation. Without knowing about one another, the BCOs do not have a professional support base."

Recommendations in Chapter 5 will centre on the Code's limitations in assisting the BCO to answer questions that may arise on a daily basis. Additionally, the establishment of a forum for BCOs within the existing administrative structure of the NRCS will be recommended.

4.5.10 Question 10

The purpose of this question was to determine whether the following documents that are currently used by the BCO reflect the requirements of the Code (SABS 0400-1990 or SANS 10400):

- Plan submission form
- Checklist for plan approval
- Notice of approval

In addition, the respondents were asked whether the Code (SABS 0400-1990 or SANS 10400) should define a national standardised submission and approval pro forma. From their responses it was clear that the requirements of the Code (SABS 0400-1990 or SANS 10400) was indeed reflected in

- the plan submission form – 48.8% of the respondents *agreed* and 22.1% of the respondents *strongly agreed* with this statement;
- the notice of approval – 48.8% of the respondents *agreed* and 22.1% of the respondents *strongly agreed* with this statement, and
- the checklist for plan approval – 51.7% of the respondents *agreed* and 20.7% of the respondents *strongly agreed* with this statement.

It could be concluded that the Code (SABS 0400-1990 or SANS 10400) should define a pro forma for the LAs, as 31.4% of the respondents *agreed* and 54.7% of the respondents *strongly agreed* with this statement.

The desk review in Chapter 3 highlighted the different methods and tools used by the LA and BCO to implement the requirements of the NBR. This observation was confirmed by the responses to Question 10.

Recommendations in Chapter 5 will focus on the possibility of defining a national standardised submission and approval pro forma for South Africa.

4.5.11 Question 11

The purpose of this question was to determine whether certain parts of the South African built environment should be exempt from the implementation of the *Code* (SABS 0400-1990 or SANS 10400).

The following was clear from the responses:

- All official government buildings should be subject to the full approval procedure – 62.8% of the respondents *strongly disagreed* and 16.3% *disagreed* with the current practice of only submitting a 'courtesy application' to the relevant LA.
- Government-subsided housing should fall under the mandate of SABS 0400-1990 and therefore under that of the BCO – 57.5% of the respondents *strongly disagreed* and 19.5% *disagreed* with its current position outside the jurisdiction of the Code (and therefore the BCO).
- As soon as any alterations or additions are made to a government-subsided house, it should fall under the formal sector[59], conforming to all the relevant requirements of SABS 0400-1990 (or SANS 10400) – 45.8% of the respondents *strongly agreed* and 27.7% *agreed* with this statement.

[59] At present the construction of government-subsidised housing is exempt from the requirements of the NBR. Strictly speaking, this building typology falls in the 'formalised' sector of the built environment, but it does not adhere to its requirements. This becomes problematic when the owner of a house wishes to make alterations and additions to the original structure. See par. 2.10 and the responses of the BCOs to Questions 11.2 and 11.3 on pp. 159-161.

- There is uncertainty among the BCOs whether there should be two different codes under SABS 0400-1990 (or SANS 10400) – one applicable to the formal segment of the South African built environment and another separate code for informal settlements. Although 23.0% of the respondents *agreed* and 29.9% *strongly agreed* that there should be two different codes, 25.3% of the respondents *strongly disagreed* with this statement. In addition, 13.8% were uncertain.

The literature review in Chapter 2 referred to the current requirements for planning approval pertaining to official government buildings and government-subsidised housing. The current system only requires a submission to the LA for information purposes, thereby excusing a substantial part of the formal built environment from approval requirements of the NBR. The BCOs' uncertainty about whether two different codes should exist indicates that there is a need for further research, and this would be recommended as such.

Recommendations in Chapter 5 will also suggest the inclusion of official government buildings and government-subsidised housing as special categories for planning approval.

4.5.12 Question 12

The purpose of this question was to determine the BCOs' awareness of (and participation in) the various *imminent changes to the NBR*, which are currently envisioned by the regulating authorities (NRCS and SABS).

From the responses it seems that the majority of the respondents (70.1%) were aware of the publication of the respective standards for SANS 10400 (Parts A-H, J-W), which will replace the amended Code for the Application of the NBR (SABS 0400-1990). However, very few of the BCOs actually commented on the proposed change and 88.4% of the respondents indicated that they had not submitted a formal comment.

More than half of the respondents (65.5%) were aware of the voluntary standard SANS 204: 2008 (Parts 1, 2 + 3) that focuses on energy efficiency in buildings. Sixty

per cent of them knew that the standard SANS 10400-XA: 2010 (Energy usage in buildings) had been published for public comment on 15 June 2010. However, 86.2% of the BCOs had not submitted a formal comment.

Just more than half of the respondents (54.1%) were aware that the standard SANS 10400-O: 2010 (Lighting and ventilation) had been published for public comment, and again many of the respondents (86.0%) admitted that they had not submitted a formal comment.

It may be concluded form the above that the existing communication channels are inadequate, or perhaps non existent. Recommendations in Chapter 5 will include the potential establishment of a reiterative consultation process between the Department of Trade and Industry (DTI), the South African Bureau of Standards (SABS), the National Regulator for Compulsory Specifications (NRCS), and the BCOs through the relevant LAs.

4.5.13 Question 13

The purpose of this question was to determine how envisioned changes to the NBR would impact on (influence the daily operation of) the BCOs.

From the responses it could be concluded that the majority of respondents *agreed* that changes to the NBR will have a significant impact on their daily operation.

The specific replies included the following:

- 43.5% of the respondents agreed and 34.1% strongly agreed that the implementation of the new standards as set out in *SANS 10400 (parts A-H, J-W)* would have a significant impact. On the other hand, 18.8% of the respondents remained neutral.
- 36.5% of the respondents agreed and 43.5% strongly agreed that the implementation of the new standards as set out in *SANS 10400-XA: 2010 (Energy usage in buildings)* would have a significant impact. However, 18.8% of the respondents disagreed with the statement.
- 32.9% of the respondents agreed and 38.8% strongly agreed that implementation of the new standards as set out in *SANS 10400-O: 2010*

(Lighting and ventilation) would have a significant impact. In contrast, 23.5% of the respondents remained neutral.

In Chapter 2, the role of the BCO as primary agent responsible for implementing the requirements of the NBR was emphasised.

The recommendations in Chapter 5 emphasise the participatory role of the BCO in identifying existing shortcomings of the NBR and suggesting possible solutions to these.

4.5.14 Question 14

The purpose of this question was to determine the possible inclusion of criteria that would promote sustainability in the built environment as additional requirements of the NBR.

The following could be concluded from the responses:

- Development in the built environment should be done in a sustainable manner – altogether 95.3% of the respondents actively supported the statement (42.9% *agreed* and 52.4% *strongly agreed* with this notion).
- The building regulations should address the future impact that buildings will have on the natural environment – 90.6% of the respondents actively supported the statement (43.5% *agreed* and 47.1% *strongly agreed*).
- Buildings should be designed to reduce their total energy consumption to a minimum – 81.6% of the respondents actively supported the statement (31.0% *agreed* and 50.6% *strongly agreed*).
- The concept of ‘sustainability’ should be incorporated into the NBR – 88.6% of the respondents actively supported the statement (50.0% *agreed* and 38.6% *strongly agreed*).
- The concept of ‘resource efficiency’ should be incorporated into the NBR – 85.2% of the respondents actively supported the statement (51.1% *agreed* and 34.1% *strongly agreed*).
- The building regulations should control and limit the energy consumption of the building sector – 81.8% of the respondents actively supported the statement (44.3% *agreed* and 37.5% *strongly agreed*).

- The concept of 'green buildings' should be incorporated into the NBR – 80.2% of the respondents actively supported the statement (44.2% *agreed* and 36.0% *strongly agreed*).
- The building regulations should address the future impact that buildings will have on the man-made environment – 79.5% of the respondents actively supported the statement (44.3% *agreed* and 35.2% *strongly agreed*).
- The existing administration methods of the NBR could be adapted without difficulty to include additional minimum passive design criteria – 75.3% of the respondents actively supported the statement (55.3% *agreed* and 20.0% *strongly agreed*).
- Minimum passive design criteria should be included as additional requirements in the NBR – 74.2% of the respondents actively supported the statement (47.1% *agreed* and 27.1% *strongly agreed*).

The literature review in Chapter 2 highlighted the necessity of rendering the NBR more sustainable under the Constitution of South Africa[60]. The responses indicate that the participating BCOs also place a high premium on sustainability issues in the built environment. Chapter 5 will include recommendations to address this matter by utilising the plan approval process and associated skills of the BCOs.

4.5.15 Question 15

The purpose of this question was to determine whether certain ***passive design criteria*** could be included in the NBR as additional requirements, specifically as part of the plan checklist.

The responses confirmed the inclusion of the following aspects as part of the 'plan checklist':

- Each habitable room should have a total window area of at least 10% of the floor area (or 0,2m²), for natural lighting – altogether 95.2% of the respondents reacted positively (46.4% considered it *important* and 48.8% *very important*).

[60] See par. 2.7.1.

- Each habitable room should have openable windows of at least 5% of the floor area (or 0,2m²), for natural ventilation – 89.5% of the respondents reacted positively (45.3% considered it *important* and 44.2% *very important*).
- The Zone of Space outside any opening should not be less than 1,0m in length to the boundary line, or 0,5m to the building line, with a maximum requirement of 8m (with the exception of built-up urban areas) – 80% of the respondents reacted positively (57.6% considered it *important* and 22.4% *very important*).

The responses also suggested that the following proposals should be included as additional requirements to the NBR, specifically as part of the plan checklist:

- Cross ventilation should be provided for the majority of habitable rooms – altogether 88.4% of the respondents reacted positively (44.2% considered it *important* and 44.2% *very important*).
- Where applicable, water storage tanks should be used to harvest stormwater from roofs for later use in cisterns, irrigation, etc. – 86.1% of the respondents reacted positively (47.7% considered it *important* and 38.4% *very important*).
- All electric water heating should be supported by a renewable energy source to limit electricity consumption for heating – 84.9% of the respondents reacted positively (43.0% considered it *important* and 41.9% *very important*).
- All electric water-heating cylinders should be fitted with an automatic timer to limit electricity consumption for heating – 80.3% of the respondents reacted positively (32.6% considered it *important* and 47.7% *very important*).
- Except where the roofing material conforms to a minimum thermal resistance level (R-value), a ceiling should be installed in all habitable rooms to avoid unnecessary heat gain/loss – 80% of the respondents reacted positively (43.5% considered it *important* and 36.5% *very important*).
- Where applicable, all building entrances or exits should be shielded from prevailing winds – 78.9% of the respondents reacted positively (56.5% considered it *important* and 22.4% *very important*).
- The majority of habitable rooms should face in a northerly direction to avoid unnecessary heating/cooling loads – 77% of the respondents reacted positively (46.0% considered it *important* and 31.0% *very important*).

- If under-floor heating is installed, under-floor insulation material should also be provided to avoid unnecessary heat loss – 76.2% of the respondents reacted positively (41.7% considered it *important* and 34.5% *very important*).

The responses indicate that the following components could be included *as* additional requirements to the NBR, specifically as part of the plan checklist:

- If a habitable room does not face in a northerly or southerly direction, mitigating passive measures (i.e. shading devices, heat reflective glass, screens) should be taken to reduce possible heat gain – altogether 68.7% of the respondents reacted positively (42.2% considered it *important* and 26.5% *very important*).
- All exposed glass surfaces, except those facing south, should have a protective roof overhang and/or shading device (i.e. canopy, shutters) to reduce possible heat gain – 66.3% of the respondents reacted positively (41.0% considered it *important* and 25.3% *very important*). However, 20.5% of the respondents considered it unimportant.

It seems that the respondents deemed it unnecessary to include the proposal to reduce the *current minimum requirements for the number of ablution facilities for males and females in a development* as an amendment to the existing NBR requirements. A large number of the responses (40.5%) were negative (21.5% viewed it as unimportant and 19.0% of no importance), with only 38% of the respondents reacting positively (24.1% considered it *important* and 13.9% *very important*).

The literature review in Chapter 2 listed the following passive design measures for possible incorporation in the NBR:

1. Orientation
2. Shading of openings in northern walls
3. Natural light
4. Ventilation
5. Zone of Space
6. Cross ventilation
7. Roof / ceiling construction

8. In-slab heating
9. Stormwater harvesting
10. Solar energy
11. Services

It is the opinion of the researcher that the inclusion of the above aspects as additional requirements to the NBR will not result in unnecessary additional cost. The recommendations in Chapter 5 will list the proposed passive design measures to be included. However, the cost implication of these measures warrants further research and falls beyond the scope of this study.

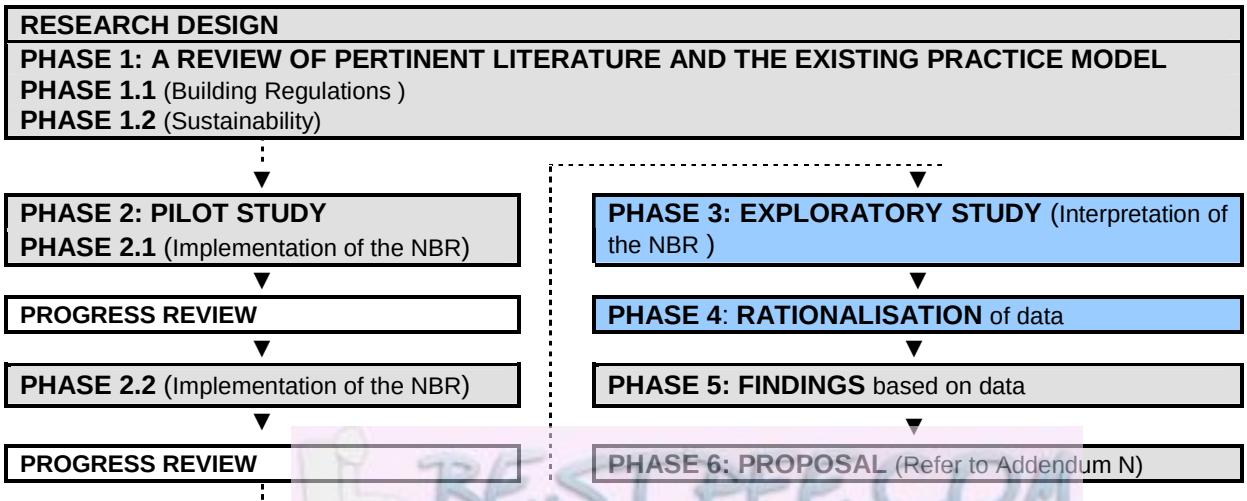
4.6 SUMMARY OF CHAPTER 4

Chapter 4 started off with a review of the research design. The proposed questionnaire put to the BCOs was subsequently introduced, highlighting the method, measurement and target population.

This was followed by a graphic presentation of data, after which the 15 questions were briefly described and analysed. Finally the data was interpreted in preparation for Chapter 5, where the conclusions reached through the study will be indicated and recommendations will be made.

To assist the reader, a summary of the research design is provided in Table 63, and the aspects that were addressed in Chapter 4 are highlighted.

Table 63: A summary of the research design highlighting the completed phases



5. FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF THE RESEARCH

The research can be summarised as follows:

5.1.1 Chapter 1

In this chapter the problem and its setting are described. Specific reference is made to the regulatory needs of the built environment and existing shortcomings of the NBR are identified. The most pressing of these are

- the lack of an appropriate instrument to ensure uniform implementation, and
- the limited inclusion of sustainability principles.

The statement of the main problem is divided into specific sub-problems, and the associated hypotheses are formulated for testing.

The delimitations are listed to define the scope within which the study was conducted. The assumptions are largely based on the existing Act (Act 103 of 1977) and the multi-lateral agreements on sustainability that were ratified by South Africa. The goals and objectives of the study are listed in brief.

The research context is discussed in detail, referring to the researcher's paradigm. Next the research design is presented and it serves as a roadmap for the research journey ahead. Lastly, the importance of the study is discussed, and the researcher's expertise to comment on the topic is touched upon.

5.1.2 Chapter 2

Chapter 2 starts off with a brief description of Hammurabi's code, and how the origin of building regulations can be linked with the growth of human settlements. A building regulation is defined, as well as the relationship between a building regulation and a building standard. Lastly, different approaches to formulating standards are concisely reviewed.

The origin of building regulations in Southern Africa is traced, and it is measured against the accepted definition of a building regulation.

Act 103 of 1977 is discussed in detail, referring to its original goals, particular sections and the development of the NBR. The chapter identifies the pertinent sustainability issues.

This chapter achieves the first defined goal of the study:

> *To determine the origin and goals of the current edition of the NBR*.

The second last goal listed in Chapter 1 is also accomplished, namely:

> *To identify specific passive design criteria that would have a limited impact on developmental costs, for possible inclusion in the NBR and the administrative processes thereof.*

Table 13 explicitly lists 16 different passive design criteria for possible inclusion in the NBR to achieve a more sustainable South African built environment. The identified criteria originate from SANS 10400 Edition 2, SANS 204 Edition 1, and Part XA Edition 1. In Table 14 a checklist is provided to assist the BCO in the implementation of these passive design criteria.

5.1.3 Chapter 3

The purpose of Chapter 3 is to determine whether the regulations contained in the NBR are implemented uniformly in South Africa. The main problem is aligned with specific goals, and research methods are listed to achieve these goals. A pilot study is initiated, based on Stats SA Building Statistics, Report No. P5041.3 (2009). The study area is then reviewed in accordance with Building Statistics Report Number P5041.1 (2010). The different NBR implementation tools utilised in the study area are presented for comparison.

This chapter addresses the second goal listed in Chapter 1:

> *To determine how various Local Authorities implement the requirements of the NBR, and whether this is done uniformly across South Africa.*

5.1.4 Chapter 4

Chapter 4 focuses on the research method to obtain the relevant data, and deals with a questionnaire presented to BCOs at a one-day convention organised by the NRCS.

The aim of this questionnaire is to determine the opinion and judgement of the BCO concerning the NBR, because the BCO is the most significant role-player in the plan approval process. The following specific aspects are considered:

- *Are BCOs aware of the origin, methods of implementation and goals of the NBR?*
- *Are BCOs willing to support the uniform implementation of the NBR?*
- *Are BCOs aware of recent developmental changes to the NBR?*
- *Are BCOs willing to implement new regulations that focus on sustainability in the existing administration system of the NBR?*

The progress made in addressing the main problem and its associated sub-problems is reviewed.

The proposed questionnaire for the BCOs is introduced, together with the responses thus collected. Finally, the data is interpreted in anticipation of the findings, conclusions and recommendations addressed in Chapter 5.

Chapter 4 achieves two of the main goals of Chapter 1:

- *To determine whether the relevant role-players (i.e. the BCOs) are aware of recent developmental changes to the NBR.*
- *To determine if Building Control Officers (BCOs) are willing to implement new regulations on sustainability in the existing administration system of the NBR.*

The final goal (partly addressed in Chapter 2) was reached in Chapter 4:

- *To identify specific passive design criteria that would have a limited impact on developmental costs, for possible inclusion in the NBR and the administrative processes thereof.*

5.2 FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

The findings of the study are presented against the background of the particular problem statements and consequential hypotheses.

The main problem statement, as formulated in Chapter 1, is:

> *The purpose of this study is to determine the origin of the current minimum regulations and standards applicable to the built environment of South Africa, and to examine the goals and implementation methods of Act 103 of 1977 and its Regulations (together with the Code of Application (SANS 10400:1990)), in an attempt to achieve uniform implementation of the requirements and align the aforementioned with accepted passive design principles to promote a more sustainable built environment in South Africa.*

The main problem is divided into four separate sub-problems. The respective sub-problems are posed in a question format:

1. *What is the origin of the NBR, and have the goals and methods of implementation of the current edition of the NBR (which represents the minimum regulations and standards applicable to the built environment of South Africa) evolved since its origin?*
2. *Are the current regulations and standards, as defined by the NBR, implemented uniformly by the respective Local Authorities?*
3. *Are the most significant role-players in the plan approval process, i.e. the BCOs,*
    - *3.1 aware of the origin, goals and implementation methods of the NBR, and*
    - *3.2 are they willing to support the uniform implementation of the NBR, and*
    - *3.3 are they aware of recent developmental changes to the NBR?*
4. *Are BCOs willing to implement new regulations on sustainability in the existing administration system of the NBR?*

The findings, conclusions, recommendations based on the findings, and recommendations for further study in respect of each question are presented in table

format within the research context (Tables 64-69). This format was selected to facilitate the accessibility of arguably the most important part of the study.

5.2.1 Sub-problem 1 and resulting hypothesis

Table 64: Sub-problem 1 and the associated hypothesis and conclusion

	Sub-problem (Posed as question)	**Positive hypothesis**	**Result**
1	What is the origin of the NBR, and have the goals and methods of implementation of the current edition of the NBR (which represents the minimum regulations and standards applicable to the built environment of South Africa) evolved since the origin of the NBR?	It is hypothesised that the goals and implementation methods of the NBR (which represents the minimum regulations and standards applicable to the built environment of South Africa) have evolved since the origin of the NBR.	The positive hypothesis was proved: **Positive**
Findings based on the desk review			
The first building regulation applicable to Southern Africa could be traced back to a diary inscription by Jan van Riebeeck on 7 January 1660			
Findings based on the questionnaire			
According to the BCOs, the primary focus of the amended Act 103 of 1977, is threefold: 1. To ensure a healthy built environment 2. To ensure a safe built environment 3. To ensure uniform regulations in the built environment For the BCOs, the following two aspects are of secondary importance in defining the focus of Act 103 of 1977: 1. To promote sustainability in the built environment 2. To form a basis for future development of the built environment The most contentious aspect is the original goal of the NBR, i.e. to limit inflation in the built environment, clearly indicating a changing perspective (at least in the opinion of the BCOs) since the original inception of the NBR. This was discussed in Chapter 2; see *The origin of building regulations in Southern Africa*. The majority of BCOs indicated their agreement with the fact that SABS 0400-1990 (or SANS 10400) represents both the minimum requirement for a building project as far as the applicant is concerned, and the maximum requirement that the LA, and therefore the BCO, could expect from a building project. The above aspect was discussed in Chapter 2; see *The changing objectives of Act 103 of 1977 and the NBR*. Should there be any uncertainty about the obligations of the owner or the		

expectations of the BCO, it could lead to the introduction of conditions that are not essential to the requirements of the NBR. This situation would ultimately result in unnecessary expenditure, thereby negating the original goal of the NBR.
Conclusion
Through the aforementioned research it is possible to conclude that the goals and implementation methods of the NBR (which represent the minimum regulations and standards applicable to the built environment of South Africa) have evolved over time.
Recommendations based on the findings
The DTI, the SABS with its appropriate sub-committees, the NRCS and the LAs (with specific representation by the BCOs) need to establish a forum to facilitate communication regarding important issues pertaining to the NBR. A channel of communication is necessary to ensure that the BCO (who takes responsibility for the implementation of the NBR through his appointment by the LA), interprets the NBR in the same way as the NRCS, SABS and DTI respectively.
Recommendations for further studies
None

5.2.2 Sub-problem 2 and resulting hypothesis

Table 65: Sub-problem 2, and the associated hypothesis and conclusion

	Sub-problem (Posed as question)	**Negative hypothesis**	**Result**
2	Are the current regulations and standards as defined by the NBR, implemented uniformly by the respective LAs?	It is hypothesised that the various LAs do not implement the current regulations and standards as defined by the NBR in a uniform manner.	The negative hypothesis was proved: **Positive**
Findings based on the pilot studies			
Although limited to the largest contributors to the built environment of South Africa, the pilot study on the tools used to implement the NBR (Chapter 3) clearly illustrates the varied approaches to plan approval among the respondents.			
Findings based on the questionnaire			
The BCOs do not agree that certain parts of the South African built environment should be exempt from the NBR. The study specifically pointed out that • all official government buildings should be subject to the full approval procedure, and • government-subsided housing should fall under the approval mandate of SABS 0400-1990 and that of the BCO. The BCOs indicated that a system could be implemented to incorporate existing government-subsidised housing in the formal sector. The following proposal was generally accepted by the BCOs: As soon as any alterations or additions are made to a government-subsided		

house, it should fall under the formal sector, adhering to all the relevant requirements of SABS 0400-1990 (or SANS 10400).

The possibility of introducing two different codes under SABS 0400-1990 (or SANS 10400), was met with ambivalence by the BCOs. In other words, it could be argued that the BCOs are not sure whether there should be two different codes; one applicable to the formal segment of the South African built environment, and a separate code for informal settlements.

Conclusion

Through the aforementioned research it is possible to conclude that the various LAs do not implement the current regulations and standards as defined by the NBR in a uniform manner.

Recommendations based on the findings

No building in the formal sector of the built environment should be exempt from the plan approval process.

Although it would represent a compromise in the opinion of the BCOs, government buildings and subsidised housing could possibly be incorporated as special categories for planning approval.

Presently, the informal sector is not included in the Code, and this remains problematic.

Recommendations for further studies

The inclusion of government-subsidised housing in the formal sector of the built environment should be further investigated. The possibility of an incremental approach to achieve such inclusion should be investigated. The study could also address the positive benefits of home ownership and access to funding from the formal banking sector.

Regulatory requirements for the informal built environment should be further investigated. These communities face the largest risks with regard to fire and health. Additionally, this sector could derive the most benefit from the implementation of passive design criteria since it can least afford the costs associated with heating.

Although it would represent a compromise in the opinion of the BCOs, the researcher would suggest investigating the possibility of two different codes, one applicable to the formal segment and a separate code for informal settlements. This could prove a viable option when addressing the existing complexities of the South African built environment.

5.2.3 Sub-problem 3.1 and resulting hypothesis

Table 66: Sub-problem 3.1, and the associated hypothesis and conclusion

	Sub-problem (Posed as question)	Negative hypothesis	Result
3.1	Are the most significant role-players in the plan approval process, i.e. the BCOs, aware of the goals and implementation methods of the NBR?	It is hypothesised that the most significant role-players in the plan approval process, i.e. the BCOs, are not aware of the goals and implementation methods of the NBR.	The negative hypothesis was proved: **Null**

Findings based on the desk review

The original goals of Act 103 of 1977 are to ensure uniform implementation and to limit inflation.

Findings based on the questionnaire

The Code for the Application of the NBR (SABS 0400-1990 or SANS 10400) is a document valued by the BCOs, and in their opinion the Code

- ensures uniform regulation of the built environment,
- is an appropriate administrative instrument,
- is an accessible document that is easily understandable, and
- is structured logically in accordance with all the necessary stages of a construction project.

According to the BCOs, the plan submission form, checklist for plan approval and notice of approval reflect the requirements of the Code (SABS 0400-1990 or SANS 10400). This seems somewhat contradictory, especially when compared with the findings of Sub-problem 2. However, the responses seem to indicate that the Code (SABS 0400-1990 or SANS 10400) does not necessarily provide answers to all the questions/issues that a BCO has to address daily.

Conclusion

Through the aforementioned research it is possible to conclude that the BCOs (as the most significant role-players in the plan approval process) are aware of the goals and methods of implementation of the NBR.

Recommendations based on the findings

In future, the BCOs should play a participatory role in identifying existing shortcomings of the NBR. The BCOs are ideally positioned to suggest possible solutions for the identified problems, and the existing administrative processes concerning the standards will continue to ensure objectivity.

Recommendations for further studies

The study exposed a limitation of the Code, i.e. the limited assistance available to the BCOs when it is necessary to interpret the requirements of the NBR. Further investigation regarding the daily requirements (i.e. the interpretation of the NBR) of the BCOs is crucial in order to develop an appropriate method of addressing this need.

5.2.4 Sub-problem 3.2 and resulting hypothesis

Table 67: Sub-problem 3.2, and the associated hypothesis and conclusion

	Sub-problem (Posed as question)	Negative hypothesis	Result
3.2	Are the most significant role-players in the plan approval process, i.e. the BCOs, willing to support the uniform implementation of the NBR?	It is hypothesised that the most significant role-players in the plan approval process, i.e. the BCOs, are not willing to support the uniform implementation of the NBR.	The negative hypothesis was proved: **Null**
Findings based on the questionnaire			
The research showed that the majority of respondents agreed that changes to the NBR are necessary, although this might have a significant impact on their daily operation. The participants are in overwhelming agreement that a national standardised submission and approval pro forma is required.			
Conclusion			
Through the aforementioned research it is possible to conclude that the most significant role-players in the plan approval process, i.e. the BCOs, are willing to support the uniform implementation of the NBR.			
Recommendations based on the findings			
It is evident that there is a distinct need to formulate a national standardised submission and approval pro forma. This pro forma would most probably assist in the uniform implementation of the requirements set by the NBR. A secondary goal of the proposed pro forma is to support the BCOs in the execution of their mandate to implement the NBR.			
Recommendations for further studies			
Once the design proposal for a national standardised submission and approval pro forma has been completed, it should be tested for possible universal implementation in the South African built environment.			

5.2.5 Sub-problem 3.3 and resulting hypothesis

Table 68: Sub-problem 3.3, and the associated hypothesis and conclusion

	Sub-problem (Posed as question)	Negative hypothesis	Result
3.3	Are the most significant role-players in the plan approval process, i.e. the BCOs, aware of recent developmental changes to the NBR?	It is hypothesised that the most significant role-players in the plan approval process, i.e. the BCOs, are not aware of recent developmental changes to the NBR.	The negative hypothesis was proved: **Null**
Findings based on the desk review			
The idea of inflation should be extended to curb spiraling environmental costs associated with the built environment.			
Findings based on the questionnaire			
The responses indicate that the majority of the respondents are aware of the respective standards for SANS 10400 (Parts A-H, J-W) that have been published to replace the amended Code of Practice for the Application of the NBR (SABS 0400-1990). The BCOs' awareness of the following is limited to approximately 50%: • The voluntary standard SANS 204: 2008 (Parts 1, 2 + 3) that focuses on energy efficiency in buildings) • The standard 10400-XA: 2010 (Energy usage in buildings) • The standard SANS 10400-O: 2010 (Lighting and ventilation) However, the responses indicated that very few of the BCOs actually made any comment on the above standards, and this should be an area of concern.		
Conclusion			
Through the aforementioned research it is possible to conclude that the most significant role-players in the plan approval process, i.e. the BCOs, are aware of recent developments in the NBR.			
Recommendations based on the findings			
The findings point to the necessity of establishing a formal channel of communication between the implementing officer, specifications writer, standards authority, government department and ministry. As an interim measure, a representative from the BCO fraternity could possibly be elected (although no formal structures are currently in place to facilitate this) to be co-opted to the relevant SABS technical committee. A measure to be considered is electronic communication with all BCOs when standards are proposed, altered, etc.			
Recommendations for further studies			
None			

5.2.6 Sub-problem 4 and resulting hypothesis

Table 69: Sub-problem 4, and the associated hypothesis and conclusion

	Sub-problem (Posed as a question)	Positive hypothesis	Result
4	Are BCOs willing to implement new regulations that focus on sustainability in the existing administration system of the NBR?	It is hypothesised that BCOs are willing to implement new regulations that focus on sustainability in the existing administration system of the NBR.	The positive hypothesis was proved: **Positive**

Findings based on the questionnaire

The research indicated that the BCOs hold the following opinions:

- Development in the built environment should be done in a sustainable manner.
- The building regulations should address the future impact that buildings will have on the natural environment.
- Buildings should be designed to reduce their total energy consumption to a minimum.
- The concept of sustainability should be incorporated in the NBR.
- The concept of resource efficiency should be incorporated in the NBR.
- The building regulations should control and limit the energy consumption of the building sector.
- The concept of 'green buildings' should be incorporated in the NBR.
- The building regulations should address the future impact that buildings will have on the man-made environment.
- The existing administration methods of the NBR could be adapted without difficulty to include additional minimum passive design criteria.
- Minimum passive design criteria should be included as additional requirements in the NBR.

It is therefore evident that the BCOs are willing to implement new regulations on sustainability within the existing administrative system of the NBR.

According to the opinions of the BCOs, the following aspects should be included as additional requirements in the NBR – specifically as part of the plan checklist:

- Cross ventilation should be provided for the majority of habitable rooms.
- Where applicable, water storage tanks should be used to harvest stormwater from roofs for later use in cisterns, irrigation, etc.
- All electric water heating should be supported by a renewable energy source to limit electricity consumption for heating.
- All electric water-heating cylinders should be fitted with an automatic timer to limit electricity consumption for heating.
- Except where the roofing material conforms to a minimum thermal resistance level (R-value), a ceiling should be installed for all habitable rooms to avoid unnecessary heat gain/loss.
- Where applicable, all building entrances/exits should be shielded from prevailing winds.
- The majority of habitable rooms should face in a northerly direction to avoid

unnecessary heating/cooling loads.
- If under-floor heating is installed, under-floor insulation material should also be provided to avoid unnecessary heat loss.

The following components could be included as additional requirements in the NBR, specifically as part of the plan checklist:
- If a habitable room does not face in a northerly or southerly direction, mitigating passive measures (i.e. shading devices, heat reflective glass, screens) should be taken to reduce possible heat gain.
- All exposed glass surfaces, except those facing south, should have a protective roof overhang and/or shading device (i.e. canopy, shutters) to reduce possible heat gain.

The respondents did not agree that the current minimum requirements for the number of ablution facilities for males and females in a development should be reduced.

Conclusion

Through the aforementioned research it is possible to conclude that BCOs are willing to implement new regulations focusing on sustainability in the existing administration system of the NBR.

Recommendations based on the findings

The aforementioned aspects should be incorporated in the NBR as a matter of urgency.

The utilisation of the plan approval process and associated skills of the BCOs could prove an ideal vehicle to render the South African built environment more sustainable.

Recommendations for further studies

In the researcher's opinion, a comparative study on the number of voluntary submissions to 'green' building councils versus the number of submissions that are made because it is a statutory requirement, would indicate a large difference in volumes. However, it would probably highlight the cost implications of putting 'green' strategies into practice. Consequently, a specific study is required that focuses on aspects that would render the largest part of the South African built environment more sustainable while limiting additional costs.

The impact of the requirements of the NBR on the *minimum number of ablution facilities for males and females* should be investigated according to international best practice. The minimum number of ablution service points required by the NBR has not changed since its inception (the author is of the opinion that this number might be unnecessarily high).

Although South Africa is a water scarce country, the current version of the NBR does not prescribe the use of water-efficient cisterns for ablution facilities. This might be an area where water consumption is unnecessarily high.

5.3 CONCLUSION

The study recognises the current administrative procedures of the National Building Regulations (NBR) as a vehicle to put sustainability ideals into practice in the South African built environment. It highlights the different methods currently used on Local Authority (LA) level to implement the requirements of a specific Act of Parliament, in this instance Act 103 of 1977.

During the plan approval process, the BCO plays a pivotal role in advising the LA on the approval of a submission. This administrative procedure could include specific passive design measures as part of the plan application process. The benefits would be as follows:

- Existing minimum requirements would be applied uniformly in South Africa (as required by the NBR).
- A more sustainable environment would be achieved through the inclusion of additional requirements.
- The additional requirements would focus on passive design in an attempt to become aligned with the original goal of the NBR.
- The original objective of the NBR, i.e. to limit inflationary tendencies, would be achieved to a certain extent.

The study identifies the plan submission checklist as an instrument that is part of the existing administrative process and that can be employed to achieve the above benefits. Additionally, the study lists existing NBR requirements that are not, but should be, included in the building plan checklist and also proposes additional requirements. It is argued that the inclusion and active implementation of the above items by the BCO in the existing administrative system of the NBR should contribute significantly to making the South African built environment more sustainable, without resulting in excessive additional costs for building projects.

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7. ADDENDA

The sequence of the different addenda corresponds with the order of discussion in the main document.

7.1 ADDENDUM A: CLIMATIC AND ATMOSPHERIC DATA FOR SOUTH AFRICA BY EARTHTRENDS

The country profile of South Africa indicates the extent of energy consumption, and the country's position in comparison with Sub-Saharan Africa and the World. Our local *Per Capita CO_2 Emissions* prove to be significantly higher than that of Sub-Saharan Africa and more than double the world's average for 1998. Construction and manufacturing industries are added in the graph displaying the 1999 figures of *CO_2 Emissions by Sector*. The impact of the built environment could be assumed to include part of *Electricity and Heat Production* and the entire *residential* component (Earthtrends, 2010).

7.2 ADDENDUM B: REGULATIONS APPLICABLE TO THE SOUTH AFRICAN BUILT ENVIRONMENT

The different regulations (SAIA, 2007; SABS, 2008c; Wegelin, 2010: 23.1-23.73) applicable to the South African built environment are provided for reference purposes.

7.3 ADDENDUM C: THE NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT, 1977

The current version of Act 103 of 1977 (South Africa, 2011), governing the NBR and the application thereof through the Deemed-to-Satisfy Rules (SABS, 2010a), is provided for reference purposes.

7.4 ADDENDUM D: NOTICE R. 574 IN *GOVERNMENT GAZETTE* NO. 31084

On 30 May 2008, the Minister of the DTI declared that a schedule of regulations had been published in the *Government Gazette* No. 31084 (Government Gazette, No. 31084, 30 May 2008). These regulations were to come into operation on 1 October 2008. Notice R. 574 and the relevant schedule are included for reference purposes.

7.5 ADDENDUM E: NOTICE R. 504 IN *GOVERNMENT GAZETTE* NO. 33265

On 11 June 2010, the Minister of the DTI invited comments on the proposed introduction of a regulation for the environmental sustainability for buildings in the *Government Gazette* No. 33265 (*Government Gazette* No. 33265, 11 June, 2010). Notice R. 504 and the proposed amendment to the NBR are included for reference purposes.

7.6 ADDENDUM F: COMPARING THE REQUIREMENTS OF THE 1990 AND 2008 EDITIONS OF THE NBR

Although the latest edition (2008) of the NBR is not currently being implemented, the researcher made a detailed comparison of the 1990 (SABS, 2010a) and 2008 editions (Government Gazette, No. 33265, 11 June, 2010, Keuler, 2008: 1-127) at the onset of the study. This exercise was necessary to highlight the extent of the envisioned changes and aided in determining the focal areas of the proposed changes. Specifics surrounding the format changes are discussed briefly in the corpus of the document.

7.7 ADDENDUM G: SANS 204-1:2008: ENERGY EFFICIENCY IN BUILDINGS: GENERAL REQUIREMENTS

Part 1 of SANS 204 is provided for reference purposes, and it "…specifies the requirements for the design and operation of energy efficient buildings with artificial or natural environmental control and their sub-systems" (SABS, 2008a: 3). The standard is presented under the headings; Foreword, Scope, Normative references, Definitions, Requirements, and Building electrical power factor correction.

The following aspects are discussed under requirements:

- General
- Building envelope and building fabric
- Electrical installations and appliances
- Heating, ventilation and air conditioning (HVAC) installations
- Hot water installations
- Vertical transport and travelators

- Natural environmental control
- Renewable energy sources
- Operation and maintenance of buildings
- Compliance
- Verification of compliance
- Occupancy
- Inspection and commissioning of the building services systems
- Maximum energy demand and maximum annual consumption

Three annexures are provided as part of the standard, namely:

- Building operation and maintenance
- Pro forma compliance certificate
- Energy efficiency certificate for environmentally controlled buildings

7.8 ADDENDUM H: SANS 204-2:2008: ENERGY EFFICIENCY IN BUILDINGS: THE APPLICATION OF THE ENERGY EFFICIENCY REQUIREMENTS FOR BUILDINGS WITH NATURAL ENVIRONMENTAL CONTROL

Part 2 of SANS 204 is provided for reference purposes, and it "…specifies the requirements for the design and operation of buildings with natural environmental control systems" (SABS, 2008b: 3). The standard is presented under the following headings: Foreword, Scope, Normative references, Definitions, Requirements, and Operation.

As part of Requirements the following aspects are discussed:

- Town planning
- Site orientation
- Building orientation
- Shading
- Building design
- Building sealing
- Services

Four annexures are provided as part of the standard, namely:

- Building orientation
- Guidelines for the glazing assessment
- General explanatory information on roof and ceiling construction
- General explanatory information on wall construction

7.9 ADDENDUM I: SANS 10400-XA: 2010 ENERGY USAGE IN BUILDINGS

The DSS SANS 10400-XA: 2010 is provided for reference purposes, and it provides the Deemed-to-Satisfy requirements for compliance with part XA (Energy Usage in Buildings) of the NBR (SABS, 2010b). The standard is presented under the following headings: Foreword, Scope, Normative references, Definitions, and Requirements.

As part of Requirements the following aspects are discussed:

- General
- Energy usage and building envelope
- Design assumptions
- Building envelope requirements for buildings

The following two annexures are provided as part of the standard (SABS, 2010b):

- NBR – Part XA: Energy Usage in Buildings
- Climatic zones of South Africa

7.10 ADDENDUM J: NAIROBI DECLARATION

From 4-6 May 2010, the UN Human Settlements Programme (UN-HABITAT, 2010) held a conference on *Promoting Green Building Rating in Africa* in Nairobi, Kenya. On 14 May 2010 the Nairobi Declaration was released placing renewed focus on the urgency to improve the environmental performance and energy efficiency of the built environment (UN-Habitat, 2010). The declaration is included to underline the importance of the study.

7.11 ADDENDUM K: ETHICS COMMITTEE APPROVAL

The application to the ethics committee comprised a background to the study amongst other required documents. This is provided for reference purposes and the notice of approval from the ethics committee is provided for information purposes.

7.12 ADDENDUM L: QUESTIONNARE

The complete questionnaire is provided for reference purposes.

7.13 ADDENDUM M: SURVEY DATA

The raw data was captured and processed by the UP DoS using SPSS version 17.0. The processed data is presented for ease of reference. This data was converted by the researcher and presented in graphic format, forming the data presented in the main document.

7.14 ADDENDUM N: PROPOSED PRO FORMA APPLICATION FORM FOR BUILDING PLAN APPROVAL

The proposed pro forma application form for building plan approval consists of seven stages and aims to achieve the consistent implementation of the requirements of the NBR and possibly contribute to a more sustainable built environment in South Africa. It is argued that the pro forma combines the requirements of the existing administrative system used by the LAs and the requirements of Act 103 of 1977 and regulations with passive design requirements.

In the authors' opinion, the pro forma is supported by the study. Nonetheless, it remains a proposal that has not been tested, and is only provided for information purposes.

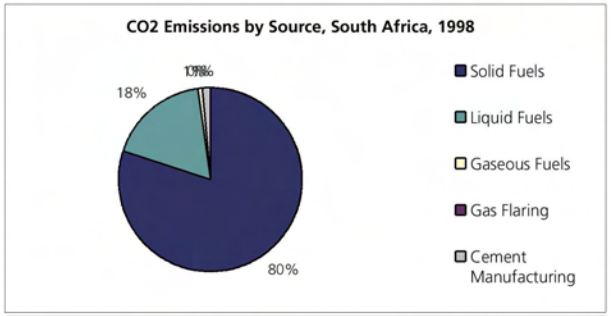
It should also be noted that in terms of the amended Copyright Act, 98 of 1978, and Intellectual Property Laws Amendment Act, 38 of 1997 of South Africa, an application was made to the UP to have the copyright of **Addendum N** transferred to the author.

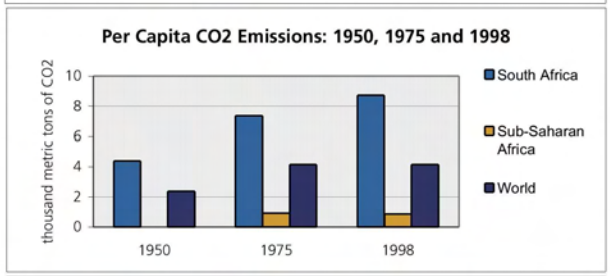
7.1 ADDENDUM A: CLIMATIC AND ATMOSPHERIC DATA FOR SOUTH AFRICA BY EARTHTRENDS

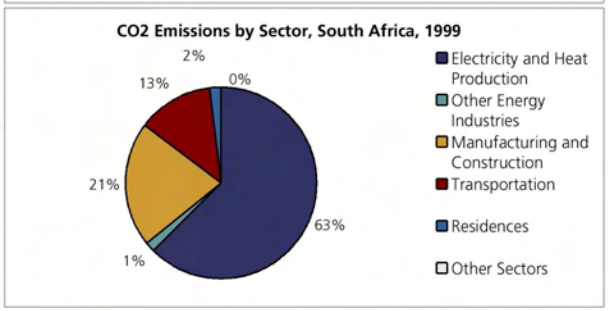
Climate and Atmosphere-- South Africa

EarthTrends Country Profiles

Carbon Dioxide (CO2) Emissions {a} (in thousand metric tons of CO2)	South Africa	Sub-Saharan Africa	World
Total Emissions, 1998	343,716	515,001	24,215,376
Percent change since 1990	18%	10%	8%
Emissions as a percent of global CO2 production	1.4%	2.1%	
Emissions in 1998 from:			
solid fuels	275,232	292,852	8,654,368
liquid fuels	61,094	151,843	10,160,272
gaseous fuels	2,656	16,330	4,470,080
gas flaring	0	42,110	172,208
cement manufacturing	4,734	11,865	758,448
Per capita CO2 emissions, 1998			
(thousand metric tons of CO2)	8.7	0.8	4.1
Percent change since 1990	2%	-12%	-2%
CO2 emissions (in metric tons) per million dollars Gross Domestic Product {b}, 1998	2,119	X	773
Percent change since 1990	5%	X	-10%
Cumulative CO2 emissions, 1900-1999 (in billion metric tons)	11,523	16,887	933,686
CO2 Emissions by Sector, 1999 {c} (in million metric tons of CO2)			
Public electricity, heat production, and autoproducers	178	X	8,693
Other Energy Industries	4	X	1,205
Manufacturing Industries and Construction	61	X	4,337
Transportation	36	X	5,505
Residential	6	X	1,802
Other Sectors {d}	X	X	5,640
Total Emissions All Sectors:	X	X	27,180
CO2 Intensity, 1999			
Emissions per total energy consumption (metric tons CO2 per terajoule energy)	76	32	56
Emissions per Gross Domestic Product {e} (metric tons of CO2/million $PPP)	960 X		582







View more Country Profiles on-line at http://earthtrends.wri.org

Atmosphere and Climate-- South Africa

	South Africa	Sub-Saharan Africa	World
Non-CO2 Air Pollution, thousand metric tons			
Sulfur dioxide emissions, 1995	1,854	5,345	141,875
Nitrogen oxide emissions, 1995	1,452	9,309	99,271
Carbon monoxide emissions, 1995	8,954	177,268	852,415
Non-methane VOC emissions {f}, 1995	1,068	17,375	159,634

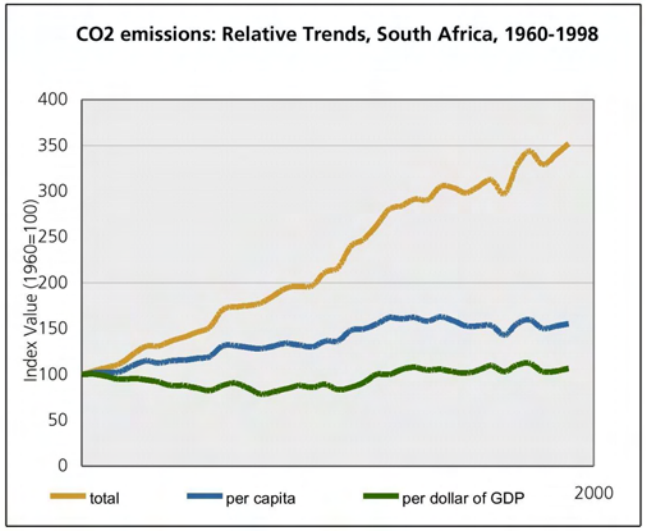
Multilateral Agreements Status as of September 2002

Data show the year each country ratified the agreement, unless labeled as "signed only".

Kyoto Protocol	2002
United Nations Framework Convention on Climate Change (UNFCCC)	1997
Vienna Convention	1990

Other Resources:

Sustainable Development Country Profile of the Food and Agriculture Organization of the United Nations:
http://www.fao.org/countryprofiles/index.asp?subj=2&iso3=



Footnotes:

Some footnotes are not incorporated here. Please refer to the Data Tables section of EarthTrends for a full listing.

a. Source: Carbon Dioxide Information Analysis Center (CDIAC). b. Constant US dollars. c. Source: International Energy Agency (IEA).
d. Includes the commercial sector, agriculture, the public service sector, and international bunkers
e. GDP is in 1995 international dollars, adjusted for Purchasing Power Parity. f. VOC: Volatile Organic Compounds.

View more Country Profiles on-line at http://earthtrends.wri.org

Climate and Atmosphere—Sources and Definitions

Carbon Dioxide (CO2) Emissions

Total CO2 emissions represent the mass of CO2 produced during the combustion of solid, liquid, and gaseous fuels, from gas flaring and the manufacture of cement. These estimates do not include bunker fuels used in international transportation due to the difficulty of apportioning these fuels among the countries benefiting from that transport. Carbon dioxide emissions are often calculated and reported in terms of their content of elemental carbon. For these data, their values were converted to the actual mass of CO2 by multiplying the carbon mass by 3.664 (the ratio of the mass of CO2 to that of carbon). The primary difference between Carbon Dioxide Information Analysis Center (CDIAC, reported here) and International Energy Agency (IEA) CO2 emission estimates (also available from EarthTrends) is that the CDIAC data include emissions from sources other than fossil fuel combustion, primarily cement manufacture. Further differences in methodology are outlined on Web pages listed below..
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=460&themeid=3

CO2 emissions from solid fuels represent the mass of carbon dioxide emitted primarily, but not exclusively, from burning coal. View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=461&themeid=3

Carbon dioxide emissions from liquid fuels are primarily, but not exclusively, from burning of petroleum products. These estimates do not include bunker fuels used in international transportation due to the difficulty of apportioning these fuels among the countries benefiting from that transport.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=462&themeid=3

Carbon dioxide emissions from gaseous fuels are primarily, but not exclusively, from burning of natural gas. View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=463&themeid=3

Carbon dioxide emissions from gas flaring result from the burning of gas released in the process of petroleum extraction.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=464&themeid=3

CO2 emissions from cement manufacturing are produced as cement is calcined to produce calcium oxide. Approximately 0.5 metric tons of carbon is released for each metric ton of cement production.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=465&themeid=3

Per capita CO2 emissions figures are obtained by dividing total emissions of carbon dioxide by the population for a particular country and year. Total CO2 emissions represent the mass of CO2 produced during the combustion of solid, liquid, and gaseous fuels, from gas flaring and the manufacture of cement. These estimates do not include bunker fuels used in international transportation due to the difficulty of apportioning these fuels among the countries benefiting from that transport.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=466&themeid=3

CO2 emissions per unit of GDP were calculated by WRI using CO2 emissions data compiled by CDIAC and GDP data provided by the World Bank. Total CO2 emissions represent the mass of CO2 produced during the combustion of solid, liquid, and gaseous fuels, from gas flaring and the manufacture of cement. These estimates do not include bunker fuels used in international transportation due to the difficulty of apportioning these fuels among the countries benefiting from that transport. Gross Domestic Product (GDP) measures the total output of goods and services for final use occurring within the domestic territory of a given country, regardless of the allocation to domestic and foreign claims. To obtain comparable series of constant price data, the World Bank rescales GDP and value added by industrial origin to a common reference year, currently 1995.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=468&themeid=3

Cumulative CO2 emissions levels are calculated by WRI based on CDIAC's CO2 emissions data through 1998, supplementing this data with the 1999 estimates from the Energy Information Administration. Total CO2 emissions figures consist of the sum of CO2 produced during the consumption of solid, liquid, and gaseous fuels, and from gas flaring and the manufacture of cement. These estimates do not include bunker fuels used in international transportation due to the difficulty of apportioning these fuels among the countries benefiting from that transport.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=779&themeid=3

Sources
Carbon Dioxide Information Analysis Center (CDIAC), Environmental Sciences Division, Oak Ridge National Laboratory: 2001. ***Global, Regional, and National CO2 Emission Estimates from Fossil Fuel Burning, Cement Production, and Gas Flaring: 1751-1998***, NDP-030 (Available online at http://cdiac.esd.ornl.gov/ftp/ndp030/). CDIAC, Oak Ridge, Tennessee.

Energy Information Administration of the U.S. Department of Energy: 2001. ***Carbon Dioxide Emissions from Use of Fossil Fuels***, International Energy Annual 1999. (Available on-line at http://www.eia.doe.gov/iea/carbon.html) Washington, DC: EIA.

CO2 Emissions by Sector

Carbon dioxide emissions from public electricity, heat production, and autoproducers include the sum of emissions from combustion of all fossil fuel types used for public electricity generation, public combined heat and power generation, and public heat plants. Public utilities are defined as those undertakings whose primary activity is to supply the public. Carbon dioxide emissions from unallocated autoproducers include the sum of emissions from combustion of all fossil fuel types used for generation of electricity and/or heat by autoproducers. Autoproducers generate electricity and/or heat wholly or partly for their own use to support their primary activity. Most of these emissions are attributed to the sector that the autoproducer falls within, but some autorproduction cannot be attributed to the end user and is represented here.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=478&themeid=3

Carbon dioxide emissions from other energy industries include the sum of emissions from combustion of all fossil fuel types used by energy industries. This includes fuel combusted in petroleum refineries, for the manufacture of solid fuels, coal mining, oil and gas exploration, and other energy-producing industries.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=480&themeid=3

Carbon dioxide emissions from manufacturing industries and construction include emissions from combustion of fossil fuels in all industries and construction.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=476&themeid=3

Carbon Dioxide emissions from all transportation include emissions from combustion of fossil fuels for road, rail, air, and other forms of transportation, and agricultural vehicles while they are on highways. The emissions include all sectors of the economy, but do not include international aviation or ship emissions, which are accounted for under bunker fuels. Emissions associated with international transport of people and goods are accounted for in the global total emissions and under bunker fuels.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=471&themeid=3

Carbon dioxide emissions from residential sources include emissions from combustion of all fossil fuel types in households.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=477&themeid=3

Carbon dioxide emissions from "other" sectors include the sum of emissions from combustion of all fossil fuel types used by Includes the commercial, agricultural, and public service sectors, as well as international bunkers.

View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=481&themeid=3

Sources
International Energy Agency (IEA), 2001. *CO2 Emissions from Fossil Fuel Combustion (2001 Edition)*. Eletronic database available online at http://data.iea.org/ieastore/default.asp. Paris: Organization for Economic Cooperation and Development (OECD).

CO2 Intensity, 1999

CO2 emissions per total energy consumption provides an indicator of how much carbon dioxide is emitted per amount of energy used in a country. This relationship is expressed in metric tons of CO2 per terajoule, and was calculated using the Reference Approach CO2 emissions and total primary energy supply (including biomass and other non-fossil forms of energy). A higher ratio indicates the use of more carbon-intensive fuels such as coal and oil and relative smaller usage of low-carbon fuels such as gas, and renewable energy.
Energy consumption is defined as the total amount of primary energy consumed as opposed to total final consumption. Primary energy includes losses through transportation, friction, heat loss and other inefficiencies. Specifically, consumption equals indigenous production plus imports minus exports plus stock changes minus international marine bunkers. IEA calls this category Total Primary Energy Supply (TPES).
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=605&themeid=3

CO2 emissions per GDP, PPP in 1995 $ Intl indicates the amount of carbon dioxide emitted per amount of income generated by the country's economy. Carbon dioxide emissions represent total emissions for each country and are based on the reference approach, which include emissions from combustion of all fossil fuels.
Gross Domestic Product (GDP), PPP in constant 1995 international dollars is gross domestic product converted to international dollars using Purchasing Power Parity (PPP) rates, and rescaled to 1995 to give a common reference year. An international dollar has the same purchasing power in a given country as a United States Dollar in the United States. In other words, an international dollar buys an equivalent amount of goods or services in all countries.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=606&themeid=3

Sources
International Energy Agency (IEA), 2001. *CO2 Emissions from Fossil Fuel Combustion (2001 Edition)*. Eletronic database available online at http://data.iea.org/ieastore/default.asp. Paris: Organization for Economic Cooperation and Development (OECD).

Non-CO2 Air Pollution

Sulfur Dioxide, or SO2, is a primary contributor to acid deposition, or acid rain. High concentrations of sulfur dioxide affect breathing and may aggravate existing respiratory and cardiovascular disease. Sulfur dioxide forms when fuel containing sulfur, such as coal and oil, is burned, when gasoline is extracted from oil, or metals are extracted from ore. Petroleum refineries, cement manufacturing, and metal processing facilities, as well as locomotives, large ships, and some nonroad diesel equipment burn high sulfur fuel and release SO2 emissions to the air in large quantities.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=812&themeid=3

Nitrogen oxides, or NOx, is the generic term for a group of highly reactive, acidifying gases, all of which contain nitrogen and oxygen in varying amounts. Nitrogen oxides are a precursor to ground-level ozone, which can trigger serious respiratory problems. NOx also contributes to acid rain and global warming. It forms when fuel is burned at high temperatures, as in a combustion process. The primary sources of Nox are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuels.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=813&themeid=3

Carbon monoxide, or CO, is a precursor gas of ground-level ozone, which can trigger serious respiratory problems. When CO enters the bloodstream, it reduces the delivery of oxygen to the body's organs and tissues. Exposure to elevated CO levels can cause impairment of visual perception, manual dexterity,

learning ability and performance of complex tasks. CO is formed when carbon in fuel is not burned completely, and is a component of motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, stoves, and natural sources such as forest fires.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=814&themeid=3

Non-methane VOCs (Volatile Organic Compounds) are chemicals that vaporize at room temperature, like benzene, toluene, methylene chloride and methyl chloroform. Common sources that emit VOCs include housekeeping and maintenance products, and building and furnishing materials, such as solvents, paints, and glues. In sufficient quantities, VOCs can have adverse health effects on humans; some are suspected of causing, or are known to cause, cancer. VOCs are also precursors to ground-level ozone, which can trigger respiratory problems.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=815&themeid=3

Sources
National Institute for Public Health (RIVM) and Netherlands Organization for Applied Scientific Research (TNO). 2001. The Emission Database for Global Atmospheric Research (EDGAR) 3.2. Precursors:CO (Carbon Monoxide): Aggregated Emissions 1990/1995. Electronic database available online at: http://arch.rivm.nl/env/int/coredata/edgar/. The Netherlands: RIVM.

Multilateral Agreements, Status as of September 2002

The Kyoto Protocol to the United Nations Framework Convention on Climate Change strengthens the international response to climate change, and promotes the Convention's ultimate objective of preventing "dangerous anthropogenic [human-made] interference with the climate system". The Kyoto Protocol, which was adopted by consensus at the third session of the Conference of the Parties (COP-3) in December 1997, contains emission targets for Annex I (developed) countries for the post-2000 period.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=428&themeid=3

The United Nations Framework Convention on Climate Change (UNFCCC) refers to the international agreement that targets industrial and other emissions of greenhouse gases such as carbon dioxide. The UNFCC is the centerpiece of global efforts to combat global warming. Initially adopted in 1992 at the Rio de Janeiro "Earth Summit" (http://www.un.org/geninfo/bp/enviro.html), the Convention entered into force on March 21, 1994. The ultimate objective of the UNFCC is the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human-made) interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner."
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=620&themeid=3

The Vienna Convention refers to the United Nations Environment Program's (UNEP) Convention on the Protection of the Ozone Layer, adopted by the governments of the world in 1985. Through the Vienna Convention on the Protection of the Ozone Layer, governments committed themselves to protect the ozone layer, to cooperate in scientific research, and to improve the understanding of atmospheric processes
Under the Convention, nations agree to take "appropriate measures…to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the Ozone Layer." The measures are unspecified. There is no mention of any substances that might harm the ozone; CFCs appear towards the end of the annex to the treaty, where they are mentioned as chemicals that should be monitored.
View full technical notes on-line at http://earthtrends.wri.org/searchable_db/variablenotes_static.cfm?varid=622&themeid=3

Sources
United Nations Framework Convention on Climate Change (UNFCCC). 2002. *Kyoto Protocol Status of Ratification.* Bonn: UNFCCC. Available on-line at http://www.unfccc.int/resource/kpstats.pdf.

United Nations Framework Convention on Climate Change (UNFCCC). 2001. ***UNFCCC Status of Ratification***. Bonn: UNFCCC. Available on-line at http://unfccc.int/resource/conv/ratlist.pdf.

Secretariat for the Vienna Convention and the Montreal Protocol . 2002. ***Status of Ratification/Accession/Acceptance/Approval of the agreements on the protection of the stratospheric ozone layer***. Nairobi: United Nations Environment Program. Available online at: http://www.unep.ch/ozone/ratif.shtml.

7.2 ADDENDUM B: REGULATIONS APPLICABLE TO THE SOUTH AFRICAN BUILT ENVIRONMENT

Current Standard

1. **SANS 10400:1987**	(SABS 0400)The application of the NBR [National Amendment 1990-08-01, National Amendment 1996-05-22]
2. **SANS 10401:1989**	(SABS 0401) The construction of dwelling houses in accordance with the NBR

New Standard drafted and circulated for comment

1. **SANS 10400-A:200X**	The application of the NBR Part A: General principles and requirements
2. **SANS 10400-B:200X**	The application of the NBR Part B: Structural design
3. **SANS 10400-C:200X**	The application of the NBR Part C: Dimensions
4. **SANS 10400-D:200X**	The application of the NBR Part D: Public safety
5. **SANS 10400-F:200X**	The application of the NBR Part F: Site operations
6. **SANS 10400-G:200X**	The application of the NBR Part G: Excavations
7. **SANS 10400-H:200X**	The application of the NBR Part H: Foundations
8. **SANS 10400-J:200X**	The application of the NBR Part J: Floors
9. **SANS 10400-K:200X**	The application of the NBR Part K: Walls
10. **SANS 10400-L:200X**	The application of the NBR Part L: Roofs
11. **SANS 10400-M:200X**	The application of the NBR Part M: Stairways
12. **SANS 10400-N:200X**	The application of the NBR Part N: Glazing
13. **SANS 10400-O:200X**	The application of the NBR Part O: Lighting and ventilation
14. **SANS 10400-P:200X**	The application of the NBR Part P: Drainage
15. **SANS 10400-Q:200X**	The application of the NBR Part Q: Non-water-borne means of sanitary disposal
16. **SANS 10400-R:200X**	The application of the NBR Part R: Stormwater disposal
17. **SANS 10400-S:200X**	The application of the NBR Part S: Facilities for disabled persons
18. **SANS 10400-T:200X**	The application of the NBR Part T: Fire protection
19. **SANS 10400-V:200X**	The application of the NBR Part V: Space heating
20. **SANS 10400-W:200X**	The application of the NBR Part W: Fire installation

Standard withdrawn

1. **SABS 020:1951**	Model regulations for farm dairy buildings
2. **SABS 022:1952**	Comprehensive model building regulations Chapter 1: Definitions
3. **SABS 023-1:1954**	Comprehensive model building regulations Chapter 2: Administration Part 1 (for the Cape Province)
4. **SABS 023-2:1953**	Comprehensive model building regulations Chapter 2: Administration Part 2 (for the Transvaal Province)
5. **SABS 023-3:1957**	Comprehensive model building regulations Chapter 2: Administration Part 3 (for the Province of Natal)
6. **SABS 023-4:1962**	Comprehensive model building regulations Chapter 2: Administration Part 4 (for the Province of the Orange Free State)
7. **SABS 024:1952**	Comprehensive model building regulations Chapter 3: Loads
8. **SABS 025:1952**	Comprehensive model building regulations Chapter 4: Foundations
9. **SABS 025:1955**	Comprehensive model building regulations Chapter 4: Foundations
10. **SABS 026:1958**	Comprehensive model building regulations Chapter 5: Plain and reinforced concrete
11. **SABS 027:1952**	Comprehensive model building regulations Chapter 6: Structural steelwork
12. **SABS 028:1951**	Comprehensive model building regulations Chapter 7: Structural timber
13. **SABS 029:1067**(sic)	Comprehensive model building regulations Chapter 8: Masonry and walling
14. **SABS 032:1958**	Comprehensive model building regulations Chapter 11: Lighting
15. **SABS 033:1953**	Comprehensive model building regulations Chapter 12: Drainage and water supply

16.	**SABS 034:1958**	Comprehensive model building regulations Chapter 13: Ventilation
17.	**SABS 035:1960**	Comprehensive model building regulations Chapter 14: Fire protection
18.	**SABS 036:1966**	Model building regulations Chapter 15: Public safety requirements
19.	**SABS 037:1952**	Comprehensive model building regulations Chapter 16: Urban aesthetics
20.	**SABS 038:1952**	Comprehensive model building regulations Chapter 17: Advertising
21.	**SANS 10400:1990**	SABS 0400 The application of the NBR

Other relevant current standards

1.	**SANS 4: 1979 (2001)**	Locks, latches and associated furniture for doors (domestic type)
2.	**SANS 11: 2007**	uPVC components for external rainwater systems
3.	**SANS 14: 1994 / ISO 49:1994**	Malleable cast iron fittings threaded to ISO 7-1
4.	**SANS 22: 2005**	Glazed ceramic wall tiles and fittings
5.	**SANS 28: 1986**	Metal tiles for cavity walls
6.	**SANS 32: 1997 / ENV 10240: 1997**	Internal and/or external protective coatings for steel tubes – specification for hot dip galvanised coatings applied to automatic plants
7.	**SANS 38: 2008 (1983)**	Metallic naphtenates for timber preservation
8.	**SANS 62:**	Steel pipes: Welded and seamless steel pipes
8.1	**Part 1:2003**	Pipes suitable for threading and of size not exceeding 150 mm
8.2	**Part 2:2001**	Screwed pieces and pipe fittings of nominal size not exceeding 150 mm
9.	**SANS 92: 2008**	Bituminous roofing felt
10.	**SANS 110: 2001**	Sealing compounds for the building industry, two-component polysulphide base
11.	**SANS 121:2000 / ISO 1461:1999**	Hot dip galvanised coatings on fabricated iron and steel articles – Specifications and test methods
12.	**SANS 141:2006**	Glass-reinforced polyester (GRP) laminates
13.	**SANS 151:2008**	Fixed electric storage water heaters
14.	**SANS 153:2006**	Electric stoves, cooking tops, ovens, grills and similar appliances
15.	**SANS 164:2007**	Plugs and socket-outlets for household and similar purposes for use in South Africa
16.	**SANS 187:2007**	Butyl rubber sheet (for waterproofing)
17.	**SANS 190:**	Expanded metal
17.1	**Part 1:2008**	Sheets and plates
17.2	**Part 2:2008**	Building products
18.	**SANS 198: 2009**	Functional control and safety valves for pressurised hot and cold water supply systems
19.	**SANS 204**	Energy efficiency in buildings
19.1	Part 1:	General requirements
19.2	Part 2:	The application of the energy efficiency requirements for buildings with artificial ventilation or air conditioning
20.	**SANS 207:2006**	The design and construction of reinforced soils and fills soil reinforcement
21.	**SANS 226:2004**	Water taps (metallic)
22.	**SANS 227:2007**	Burnt clay masonry units
23.	**SANS 242:2003**	Stainless steel sinks with draining boards (for domestic use)
24.	**SANS 248:2007**	Bituminous damp-proof courses
25.	**SANS 226:2003**	Gypsum plasterboard
26.	**SANS 281:1972(1999)**	Hardwood block and strip flooring
27.	**SANS 294:2004**	Construction procurement processes, methods and procedures
28.	**SANS 297:1999**	Mastic asphalt for roofing
29.	**SANS 298:2007**	Mastic asphalt for damp-proof courses and tanking
30.	**SANS 301:2004 / BS 1722:1999**	Fences
30.1	**Part 12:**	Specification for steel palisade fences
31.	**SANS 307:2005**	Penetration grade bitumen
32.	**SANS 308:1971 (1973)**	Cutback bitumen
33.	**SANS 309:2004**	Anionic bitumen road emulsion
34.	**SANS 317:2007**	Industrial bitumen

35.	**SANS 404/405:2008**	Phosphorous deoxidised non-arsenical and arsenical copper
36.	**SANS 428:2006**	Fire performance classification of thermal insulated building envelope systems
37.	**SANS 457:200**	Wooden poles, droppers, guardrail posts and spacer blocks
37.1	**Part 2:**	Softwood species
37.2	**Part 3:**	Hardwood species
38.	**SANS 460:2003**	Plain-ended solid-drawn copper tubes for potable water
39.	**SANS 470:2003**	Concrete poles for telephone, power and lighting purposes
40.	**SANS 497:2006**	Glazed ceramic sanitary ware
41.	**SANS 508:2008**	Concrete retaining blocks
42.	**SANS 515:2003**	Decorative paint for interior use
43.	**SANS 523:2007**	Limes for use in building
44.	**SANS 538:1980**	High temperature wood preserving creosote
45.	**SANS 540:**	Fibreboard products
45.1	**Part 1:2009**	Uncoated fibreboard
45.2	**Part 2:2009**	Coated fibreboard
46.	**SANS 541 2004**	Pre-cast concrete paving slabs
47.	**SANS 542:2004**	Concrete roofing tiles
48.	**SANS 543:2004**	Fire hose reels (with semi-rigid hose)
49.	**SANS 545:1989**	Wooden doors
50.	**SANS 548:2003**	Cationic bitumen road emulsions
51.	**SANS 558:2000**	Cast iron surface boxes and manhole and inspection covers and frames
52.	**SANS 559:2005**	Vitrified clay sewer pipes and fittings
53.	**SANS 580:2007**	Chloroprene rubber sheet for water proofing
54.	**SANS 581:2007**	Semi-flexible vinyl floor tiles
55.	**SANS 586:2007**	Resin modified vinyl floor tiles
56.	**SANS 622:2005**	Gypsum cove cornice
57.	**SANS 629:1983 (1999)**	Softwood flooring boards
58.	**SANS 630:2004**	Decorative high gloss enamel paints
59.	**SANS 632:2007**	Clay roofing tiles
60.	**SANS 635:2007**	Elastomeric structural glazing and panel gaskets
61.	**SANS 637:2008**	Wood-wool panels, cement-bonded
62.	**SANS 640:2005**	Flexible polyurethane (polyether) foams
63.	**SANS 641:2007**	Flexible polyurethane (polyester) foams
64.	**SANS 642:2007**	Reconstituted flexible polyurethane foams
65.	**SANS 657**	Steel tubes for non-pressure purposes
65.1	**Part 1:2004**	Steel tubes for scaffolding and structural and general engineering purposes
65.2	**Part 4:2004**	Steel tubes of round, oval, square and rectangular section for furniture
66.	**SANS 675:2009**	Zinc-coated fencing wire (plain and barbed)
67.	**SANS 676:2003**	Reinforced concrete pressure pipes
68.	**SANS 677:2003**	Concrete non-pressure pipes
69.	**SANS 678:2005**	Primers for wood for interior and exterior use
70.	**SANS 680:2006**	Glazing putty for wooden and metal window frames
71.	**SANS 681:2007**	Undercoats for paints
72.	**SANS 682:2007**	Aluminium paint type
73.	**SANS 685:2006**	Fibre-cement sheets: profiled and flat
74.	**SANS 727:2003**	Windows and doors made from rolled mild steel sections
75.	**SANS 731**	Road and runway markings
75.1	**Part 1 and 2:2006**	Single-pack solvent-borne and water-borne paints
76.	**SANS 746:1976 (2000)**	Cast iron pipes and pipe fittings for use above ground in drainage applications
77.	**SANS 752:2007**	Float valves
78.	**SANS 753:2007**	Pine poles, cross-arms and spacers for power distribution, telephone systems and street lighting
79.	**SANS 754:2007**	Eucalyptus poles, cross-arms and spacers for power distribution, telephone systems and street lighting
80.	**SANS 757:2004**	Sheet steel furniture

81.	**SANS 767**	Earth leakage protection units
81.1	**Part 1:1982**	Fixed earth leakage protection circuit-breakers
81.2	**Part 2:1983(2003)**	Single-phase, portable units
82.	**SANS 786:2007**	Flexible vinyl flooring
83.	**SANS 791:2004**	uPVC sewer and drain pipes and pipe fittings
84.	**SANS 794:2009**	Aggregates of low density
85.	**SANS 802:2001**	Bituminous aluminium paint
86.	**SANS 803:2005**	Fibre-cement boards
87.	**SANS 819:2006**	Fibre-cement pipes, couplings and fittings for sewerage, drainage and low pressure irrigation
88.	**SANS 820:2006**	Mild steel nails
89.	**SANS 821:2007**	WC flushing cisterns
90.	**SANS 824:2006**	Lime for soil stabilisation
91.	**SANS 871:1967**	Boron timber preservatives
92.	**SANS 878:2004**	Ready-mixed concrete
93.	**SANS 887:2005**	Varnish for interior use
94.	**SANS 903:1978**	Aluminium alloy corrugated and troughed sheets
95.	**SANS 906:2006**	Stainless steel wash-hand basins and wash troughs
96.	**SANS 907:2009**	Stainless steel sinks for institutional use
97.	**SANS 920: 2005**	Steel bars for concrete reinforcement
98.	**SANS 921: 2009**	Pitch-impregnated fibre pipes and fittings
99.	**SANS 924: 2003**	Stainless steel stall urinals
100.	**SANS 927:2007**	Precast concrete kerbs, edgings and channels
101.	**SANS 929:2008**	Plywood and composite board
102.	**SANS 935:2007**	Hot-dip (galvanised) zinc coatings on steel wire
103.	**SANS 940:2005**	Emulsion roof paint
104.	**SANS 947:2007**	Indoor Venetian blinds
105.	**SANS 949:2005**	Strong room and vault doors
106.	**SANS 950:2008**	uPVC rigid conduit and fittings for use in electrical installations
107.	**SANS 952:1985(2000)**	Polyolefin film for damp-proofing and waterproofing in buildings
108.	**SANS 966**	Components of pressure pipe systems
108.1	**Part 1:2008**	uPVC pressure pipe systems
108.2	**Part 2:2008**	Modified PVC pressure pipe systems
109.	**SANS 967:2004**	uPVC soil, waste and vent pipes and pipe fittings
110.	**SANS 974-1:1986 (2001)**	Rubber joint rings (non-cellular)
110.1	**Part 1:**	Joint rings for use in water, sewer and drainage systems
111.	**SANS 975: 1970 (2000)**	Pre-stressed concrete pipes
112.	**SANS 978: 2008**	Wood mosaic flooring
113.	**SANS 986: 2006**	Precast reinforced concrete culverts
114.	**SANS 993: 1972 (2002)**	Modular co-ordination
115.	**SANS 999: 2007**	Anodised coatings on aluminium (for architectural applications)
116.	**SANS 1006:2007:**	Plastics ball-floats for ball valves
117.	**SANS 1012:2006**	Electric light dimmers
118.	**SANS 1015:2008**	Fire-resisting door units for record rooms
119.	**SANS 1021:2007**	Water taps (plastic bodies)
120.	**SANS 1022:2006**	Metal roofing tiles
121.	**SANS 1024:2006**	Welded steel fabric for reinforcement of concrete
122.	**SANS 1039:2008**	Wooden ceiling and panelling boards
123.	**SANS 1042:2006**	Polymer floor dressings
124.	**SANS 1058:2006**	Concrete paving blocks
125.	**SANS 1067:**	Copper-based fittings for copper tubes
125.1	**Part 1:2005**	Compression fittings
125.2	**Part 2: 2005**	Capillary solder fittings
126.	**SANS 1077:1984 (2001)**	Sealing compounds for the building and construction industry, two-component polyurethane base
127.	**SANS 1083:2006**	Aggregates from natural sources – aggregates for concrete
128.	**SANS 1085:2004**	Wall outlet boxes for the enclosure of electrical accessories
129.	**SANS 1090:2002**	Aggregates form natural sources – fine aggregates for plaster and mortar
130.	**SANS 1091:2004**	National colour standard

131.	**SANS 1099:2008**	Hardwood furniture timber
132.	**SANS 1115:2007**	Cast iron gratings for gullies and stormwater drains
133.	**SANS 1125:2004**	Room air conditioners and heat pumps
134.	**SANS 1128:**	Fire fighting equipment
134.1	**Part 1:2008**	Components of underground and above ground hydrant systems
134.2	**Part 2:2008**	Hose couplings, connectors and branch pipe and nozzle connections
135.	**SANS 1129: 2008**	Steel door frames
136.	**SANS 1143: 2008**	Mushroom and countersunk-head bolts and nuts
137.	**SANS 1150: 2007**	Glass-reinforced polyester (GRP) laminated sheets (profiled or flat)
138.	**SANS 1151: 2005**	Portable rechargeable fire extinguishers – Halogenated hydrocarbon type extinguishers
139.	**SANS 1171: 2006**	Metal screws for wood
140.	**SANS 1174: 2005**	Bains-marie and hot cupboards
141.	**SANS 1186:**	Symbolic safety signs
141.1	**Part 1:2008**	Standard signs and general requirements
141.2	**Part 2:2007**	Self-luminous signs
141.3	**Part 3:2004**	Internally illuminated signs
141.4	**Part 4:2008**	Retro-reflective signs
141.5	**Part 5:2006**	Photo-luminous signs
142.	**SANS 1200**:	Standardised specification for civil engineering
142.1	**Section A:**	General
142.2	**Section C:**	Site clearance
142.3	**Section D:**	Earthworks
142.4	**Section F:**	Piling
142.5	**Section G:**	Concrete (structural)
142.6	**Section H:**	Structural steelwork
142.7	**Section L:**	Medium-pressure pipe lines
142.8	**Section M:**	Roads
143.	**SANS 1209:2008**	Pipe holder bats
144.	**SANS 1215:2008**	Concrete masonry units
145.	**SANS 1223: 2003**	Fibre-cement pressure pipes and couplings
146.	**SANS 1227: 2005**	Textured wall coatings, emulsion base, for interior and exterior use
147.	**SANS 1236: 2005**	Silver glass mirrors for general use
148.	**SANS 1240: 2006**	Automatic shut-off flush valves for water closets and urinals
149.	**SANS 1253: 2003**	Fire-doors and fire shutters
150.	**SANS 1263**	Safety and security glazing materials for buildings
150.1	**Part 1:2006**	Safety performance of glazing materials under human impact
150.2	**Part 2:2007**	Burglar-resistant and vandal-resistant glazing materials
150.3	**Part 3:2007**	Bullet-resistant glazing materials
151.	**SANS 1273:1979 (1999)**	Fasteners for roof and wall coverings in the form of sheeting
152.	**SANS 1274:2005**	Coatings applied by the powder-coating process
153.	**SANS 1288:2008**	Preservative-treated timber
154.	**SANS 1290:2005**	Wood-preserving mixture of creosote and waxy oil
155.	**SANS 1294:2006**	Precast concrete manhole sections and slabs
156.	**SANS 1305:1980 (2001)**	Sealing compounds for the building industry, one-component, and silicone-rubber base
157.	**SANS 1307:2009**	Domestic solar water heaters
158.	**SANS 1311:2007**	Metal clisco windows
159.	**SANS 1315:2002**	Polypropylene pressure pipes
160.	**SANS 1319:2006**	Zinc phosphate primer for steel
161.	**SANS 1321:**	Non-metallic waste traps
161.1	**Part 1:1981**	Plastic waste traps
161.2	**Part 2:2007:**	Rubber waste traps
162.	**SANS 1322:2004**	Portable, non-refillable fire extinguishers (general purpose type)
163.	**SANS 1348:2005**	Polyvinyl acetate dispersion adhesives for wood
164.	**SANS 1349:2006**	Phenolic and one-part polyurethane resin adhesives for the laminating and finger-jointing of timber, and for furniture and joinery
165.	**SANS 1372:1983 (2000)**	Prefabricated concrete components for fences
166.	**SANS 1373:1983 (2008)**	Chain-link fencing and its wire accessories

167.	**SANS 1375:2005**	Textile floor coverings (pile construction)
168.	**SANS 1381**	Materials for thermal insulation of buildings
168.1	**Part 1:2007**	Mineral fibre thermal insulations mats
168.2	**Part 2:2007**	Loose fill thermal insulation materials
168.3	**Part 4:1985**	Reflective foil laminates (rolls, sheets and sections)
168.4	**Part 6:1994 (1999)**	Cellulose loose fill thermal insulation material
169.	**SANS 1383:2008**	Rigid urethane and isocyanurate foams for use in thermal insulation
170.	**SANS 1385:2008**	Kitchen cupboards: built-in and free-standing
171.	**SANS 1388:2005**	Tributylin oxide-lindane timber preservative
172.	**SANS 1390:2005**	Steel fencing for private swimming pools
173.	**SANS 1402-1**	Acrylic sanitary ware
173.1	**Part 1:2008**	Baths
174.	**SANS 1407: 2007**	Anodised coatings on aluminium (for general application)
175.	**SANS 1411**	Materials of insulated electric cables and flexible cords
175.1	**Part 1:2008**	Conductors
175.2	**Part 2:2009**	PVC
175.3	**Part 3:2006**	Elastomers
175.4	**Part 4:2009**	Cross-linked polyethylene (XLPE)
175.5	**Part 5:2009**	Halogen-free materials
175.6	**Part 6:2008**	Armour
176.	**SANS 1415:2000**	Textile floor coverings (needle punched construction)
177.	**SANS 1416:2005**	Alkali-resistant plaster primer (pigmented, solvent type)
178.	**SANS 1419:2009**	Carpet underlays
179.	**SANS 1431:2007**	Weldable structural steels
180.	**SANS 1445:**	Thermal insulation materials for industrial applications
180.1	**Part 2:2008**	Metal-mesh-faced mineral fibre mattresses
180.2	**Part 3:2008**	Bonded preformed mineral fibre pipe sections
181.	**SANS 1449:2008**	Ceramic wall and floor tiles
182.	**SANS 1460:2006**	Laminated timber (glulam)
183.	**SANS 1480:2005**	Single control mixer taps
184.	**SANS 1491:**	Portland cement extenders
184.1	**Part 1:2005**	Ground granulated blast furnace slag
184.2	**Part 2:2005**	Fly ash
184.3	**Part 3:2006**	Condensed silica fume
185.	**SANS 1504:1990 (2000)**	Prestressed concrete lintels
186.	**SANS 1508:2007**	Expanded polystyrene thermal insulation boards
187.	**SANS 1509:2008**	Flush valves for WC flushing cisterns
188.	**SANS 1510-1:2008**	Door closers
188.1	**Part 1**	Single action overhead door closers
189.	**SANS 1526:2003**	Thermoplastics sheeting for use as a geo-membrane
190.	**SANS 1528**	Furniture
190.1	**Part 1:2008**	Seating
190.2	**Part 2:2008**	Desks, tables and computer stands
190.3	**Part 3:2008**	Storage units
190.4	**Part 4:2008**	Bunk beds for domestic use
190.5	**Part 6:2008**	High chairs for domestic use
190.6	**Part 7:2008**	Children's coats for domestic use
191.	**SANS 1529**	Water meters for cold potable water
191.1	**Part 1:2006**	Metrological properties of mechanical water meters with nominal bore not exceeding 100 mm
192.	**SANS 1530**	Prefabricated panels for thermal insulation
192.1	**Part 1: 1991 (1999)**	Panels with two impervious facing sheets
193.	**SANS 1532:2003**	Vent valves for drainage installations
194.	**SANS 1533:2005**	Padlocks
195.	**SANS 1549:1992**	Raised access flooring
196.	**SANS 1553-2:2007**	uPVC window and door frames for exterior use
196.1	**Part 1:**	uPVC profiles for window and door
196.2	**Part 2:**	Window with frames made from uPVC profiles
197.	**SANS 1567:2003**	Portable rechargeable fire extinguishers – CO_2 type
198.	**SANS 1574:2008**	Electric cables, flexible cords and flexible cables

199.	**SANS 1575:2007**	Burnt clay paving units
200.	**SANS 1578:2006**	Durable organic powders for coating of external architectural aluminium
201.	**SANS 1580:2005**	Hexagonal steel wire mesh gabions and revet mattresses
202.	**SANS 1586:2007**	Emulsion paints
203.	**SANS 1601:2007**	Structural wall pipes and fittings of uPVC for buried drainage and sewerage systems
204.	**SANS 1602:2007**	Electro-deposited coatings of copper and copper alloys
205.	**SANS 1620:1995 (2000)**	Barbed tape security barriers
206.	**SANS 1651:1996**	Glazed aluminium alloy windows and sliding glass doors for external use
207.	**SANS 1700 SET:1996**	Fasteners
207.1	**Part 1:**	Terminology and nomenclature
207.2	**Part 2:**	Screw threads
207.3	**Part 3:**	Forms, dimensions and designations
207.4	**Part 4:**	Tolerances
207.5	**Part 5:**	General requirements and mechanical properties
207.6	**Part 6:**	Testing and acceptance inspection
207.7	**Part 7:**	External drive hexagon bolts and screws
207.8	**Part 8:**	Square neck bolts
207.9	**Part 9:**	Hexagon socket head screws
207.10	**Part 10:**	Slotted head screws
207.11	**Part 11:**	Cross-recessed countersunk flat head screws (common head style)
207.12	**Part 12:**	Set screws
207.13	**Part 13:**	Tapping screws
207.14	**Part 14:**	Hexagon nuts
207.15	**Part 15:**	Prevailing torque type nuts
207.16	**Part 16:**	Washers
207.17	**Part 17:**	Pins
207.18	**Part 18:**	Rivets
207.19	**Part 19:**	Hex lobular socket head screws
208.	**SANS 1707: 1997**	Sawn Eucalyptus timber
208.1	**Part 1:2007**	Proof-graded structural timber
208.2	**Part 2:2007**	Eucalyptus brandering and battens
209.	**SANS 1765: 2003**	Low-voltage switchgear and control gear assemblies (distribution boards) with a rated short-circuit withstand strength up to and including 10 kA
210.	**SANS 1777: 2004**	Photoelectric control units for lighting (PECUs)
211.	**SANS 1783:**	Sawn softwood timber
211.1	**Part 1:2007**	General requirements
211.2	**Part 2:2007**	Stress-graded structural timber and timber for frame wall construction
211.3	**Part 3:2004**	Industrial timber
211.4	**Part 4:2007**	Brandering and battens
212.	**SANS 1797: 2003**	Coatings of durable organic powder and for external architectural aluminium
213.	**SANS 1808**	Water supply and distribution system components
213.1	**Part 2:2005**	Metallic compression-type pipe couplings
213.2	**Part 5:2008**	Flexible connectors
213.3	**Part 9:2008**	Metering taps and valves (metallic bodies)
213.4	**Part 10:2005**	Copper alloy check valves (spring-loaded)
213.5	**Part 13:2001**	Diaphragm valves
213.6	**Part 15:2007**	Mechanical backflow prevention devices
213.7	**Part 16:2008**	Drinking fountain taps
213.8	**Part 18:2004**	uPVC gate valves
213.9	**Part 24:2004**	Gas-operated water heaters
213.10	**Part 30:2004**	Laboratory water taps
213.11	**Part 31:2003**	Automatic control valves
213.12	**Part 32:2005**	Float valves (equilibrium type)
213.13	**Part 35:2004**	Electronically operated taps and valves

213.14	**Part 37:2005**	Single-control mixer taps (plastics)
213.15	**Part 44:2005**	Pipe saddles
213.16	**Part 45:2005**	Pipe repair clamps
213.17	**Part 53:2005**	Drain cocks for hot-water storage containers
213.18	**Part 58:2005**	In-line strainers
213.19	**Part 66:2005**	Demand-type water taps
213.20	**Part 85:2004**	Oriented polyvinyl chloride (PVC-O) pressure pipes for underground use
214.	**SANS 1817:2008**	Working on glass for glazing
215.	**SANS 1845:2003**	Pre-finished sheet metal products for interior and exterior building applications
216.	**SANS 1848:2006**	Geyser drip trays
217.	**SANS 1850:2003**	The design and manufacturing of commercial kitchen extraction systems
218.	**SANS 1879: 2004**	Pre-cast concrete suspended slabs
219.	**SANS 1882: 2003**	Polymer concrete surface boxes, manhole and inspection covers, gulley gratings and frames
220.	**SANS 1900: 2004**	Mono-planar pre-fabricated timber roof trusses (nail-plated)
221.	**SANS 1910: 2006**	Portable refillable fire extinguishers
222.	**SANS 1921:**	Construction and management requirements for works contracts
222.1	**Part 1:2004**	General engineering and construction works
222.2	**Part 3:2004**	Structural steelwork
222.3	**Part 4:2004**	Third-party management support in works contracts
222.4	**Part 5:2004**	Earthworks activities which are performed by hand
222.5	**Part 6:2004**	HIV/Aids awareness
223.	**SANS 1931:2003**	Particle boards – highly moisture resistant exterior type
224.	**SANS 2001**	Construction works
224.1	**Part BE1:2008**	Earthworks (general)
224.2	**Part BE2:2008**	Earthworks (small works)
224.3	**Part BS1:2008**	Site clearance
224.4	**Part CC1:2007**	Concrete works (structural)
224.5	**Part CC2:2007**	Concrete works (minor works**)**
224.6	**Part CG1:2007**	Installation of glazing in window and door frames
224.7	**Part CM1:2007**	Masonry walling
224.8	**Part CS1:2005**	Structural steelwork
224.9	**Part CT1:2007**	Structural timberwork (flooring)
224.10	**Part CT2:2007**	Structural timberwork (roofing)
224.11	**DP1: 2008**	Earthworks for buried pipelines and prefabricated culverts
224.12	**Part Em1:2007**	Cement plaster
225.	**SANS 2262:1984 / ISO 2262:1984**	General purpose thimbles for use with steel wire ropes
226.	**SANS 2394:2003 / ISO 2394:2004**	General principles on reliability for structures
227.	**SANS 2408:2005 / ISO 2408:2004**	Steel wire ropes for general purposes – minimum requirements
228.	**SANS 2415:2005 / ISO 2415:2004**	Forged shackles for general lifting purposes – Dee shackles and bow shackles
229.	**SANS 2424:1992 / ISO 2424:1992**	Textile floor coverings – vocabulary
230.	**SANS 3575:2008 / ISO 3575:2005**	Continuous hot-dip zinc-coated carbon steel sheet of commercial lock-forming and drawings qualities
231.	**SANS 4427:1996 / ISO 4427:1996**	Plastics piping systems **–** polyethylene (PE) pipes for water supply
232.	**SANS 4586 / ISO 4586:1997**	High pressure decorative laminates – sheets made from thermo-setting resins
232.1	**Part 1:1995**	Classification and specifications
233.	**SANS 4998:2007 / ISO 4998:2005**	Continuous hot-dip zinc-coated steel sheet of structural quality
234.	**SANS 7675:2004 / ISO 7675:2003**	Plastics piping systems for soil and waste discharge (low and high temperature) inside buildings – chlorinated PVC
235.	**SANS 8773:2007 / ISO 8773:2006**	Polypropylene (PP) pipes and fittings for buried drainage and sewerage systems – Specifications

236.	**SANS 9000:2005 / ISO 9000:2005**	Quality management systems – Fundamentals and vocabulary
237.	**SANS 9364:2007 / ISO 9364:2005**	Continuous hot-dip aluminium / zinc-coated steel sheet of commercial lock-forming and structural qualities
238.	**SANS 9933:1995 / ISO 9933:1995**	Products in fibre-reinforced cement – long corrugated or a-symmetrical section sheets and fittings for roofing and cladding
239.	**SANS 10005:2006**	Preservative treatment of timber (Code of practice)
240.	**SANS 10021:2006**	The waterproofing of buildings including damp-proofing and vapour barrier installation) (Code of Practice)
241.	**SANS 10043:2009**	The installation of wood and laminate flooring (Code of Practice)
242.	**SANS 10052:2007**	The construction of strongrooms (Code of Practice)
243.	**SANS 10062:2003**	Fixing of interlocking roofing tiles (Code of Practice)
244.	**SANS 10064:2005**	The preparation of steel surfaces for coating (Code of Practice)
245.	**SANS 10070:2007**	The laying of thermoplastic and similar flexible floor covering materials (Code of Practice)
246.	**SANS 10073:2000**	The safe application of masonry-type facings to buildings (Code of Practice)
247.	**SANS 10080:2009**	The rodent proofing of buildings (Code of Practice)
248.	**SANS 10082:2007**	Timber buildings (Code of Practice)
249.	**SANS 10094:2005**	The use of high-strength friction-grip bolts (Code of Practice)
250.	**SANS 10096:2008**	The manufacture of finger-jointed structural timber
251.	**SANS 10100:**	The structural use of concrete (Code of Practice)
251.1	**Part 1: 2000**	Design
251.2	**Part 2: 1992**	Materials and execution of work
252.	**SANS 10102-1:**	The selection of pipes for buried pipelines (Code of Practice)
252.1	**Part 1: 2005**	General provisions
252.2	**Part 2: 1987 (2000)**	Rigid pipes
253.	**SANS 10104: 1991**	Hand railing and balustrades (safety aspects) (Code of Practice)
254.	**SANS 10105:**	The use and control of fire-fighting equipment (Code of Practice)
254.1	**Part 1: 2005**	Portable and wheeled (mobile) fire extinguishers
254.2	**Part 2: 2005**	Fire hose reels, hydrants and booster connections
255.	**SANS 10106:2006**	The installation, maintenance, repair and replacement of domestic solar hot water heating systems
256.	**SANS 10107: 1996**	The design and installation of ceramic tiling (Code of Practice)
257.	**SANS 10109:**	Concrete floors (Code of Practice
257.1	**Part 1: 1995 (2000)**	Bases for concrete floors
257.2	**Part 2: 2004**	Finishes to concrete floors
258.	**SANS 10112: 2003**	The installation of polyethylene and PVC-U and PVC-M pipes (Code of Practice)
259.	**SANS 10114:**	Interior lighting
259.1	**Part 1:2005**	Artificial lighting of interiors
259.2	**Part 2:2002**	Emergency lighting
260.	**SANS 10120: SET**	Code of Practice for use with standardised specification for civil engineering construction and contract documents
261.	**SANS 10124:2006**	The application of soil insecticides for the protection of buildings (Code of Practice)
262.	**SANS 10137:2002**	The installation of glazing materials in buildings (Code of Practice)
263.	**SANS 10140**	Identification colour marking
263.1	**Part 1:2000**	General
263.2	**Part 2:1978**	Identification of hazards and equipment in work situations
263.3	**Part 3:2003**	Contents of pipe lines
263.4	**Part 4:2006**	Contents of taps and valves in laboratories
264.	**SANS 10142: 2008**	The wiring of premises
264.1	**Part 1:**	Low-voltage installations (Code of Practice)
265.	**SANS 10143:1980 (2000)**	Building Drawing Practice (Code of Practice)
266.	**SANS 10145:2000**	Concrete masonry construction (Code of Practice)
267.	**SANS 10155:1980 (2000)**	Accuracy in buildings
268.	**SANS 10160:1989 (1999)**	The general procedures and loadings to be adopted in the design of buildings

269.	**SANS 10161:1980**	The design of foundations for buildings (Code of Practice)
270.	**SANS 10162:**	The structural use of steel (Code of Practice)
270.1	**Part 1:2005**	Limit states design of hot-rolled steel work
270.2	**Part 2:1993 (1999)**	Limit states design of cold-formed steel work
270.3	**Part 4:1997**	The design of cold-formed stainless steel structural members
271.	**SANS 10163:**	The structural use of timber (Code of Practice)
271.1	**Part 1:2003**	Limit-states design
271.2	**Part 2:2001**	Allowable stress design
272.	**SANS 10164**	The structural use of masonry (Code of Practice)
272.1	**Part 1:1980 (2000)**	Un-reinforced masonry walling
272.2	**Part 2:2008**	Structural design and requirements for reinforced and pre-stressed masonry
273.	**SANS 10170:2004**	The cleaning and maintenance of floors (Code of Practice)
274.	**SANS 10177:2005**	Fire testing of materials, components and elements used in buildings (Code of Practice)
275.	**SANS 10186:2009**	Installation of textile floor coverings (Code of Practice)
276.	**SANS 10202:1985**	Colour marking for the identification of wrought steel commonly used in South Africa
277.	**SANS 10209:2003**	The design and construction of private swimming pools
278.	**SANS 10218:**	Acoustical properties of buildings
278.1	**Part 1:2004**	Grading criteria for the air-borne sound insulation of buildings
278.2	**Part 2:2004**	The assessment of building plans and buildings with respect to their acoustical properties
279.	**SANS 10222-1:2007**	Electrical security installations (Code of Practice)
280.	**SANS 10237:1991 (2000)**	Roof and side cladding (Code of Practice)
281.	**SANS 10243:2004**	The design, manufacture and erection of timber trusses (Code of Practice)
282.	**SANS 10244 / EN 10244**	Steel wire and wire products – Non-ferrous metallic coatings on steel wire
282.1	**Part 1:2003**	General principles
282.2	**Part 2:2003**	Zinc and zinc alloy coatings
283.	**SANS 10245:1993**	The maintenance of textile floor coverings (Code of Practice)
284.	**SANS 10246:1993**	Accessibility for disabled persons (Code of Practice)
285.	**SANS 10249:1993 (2000)**	Masonry walling (Code of Practice)
286.	**SANS 10252:**	Water supply and drainage for buildings (Code of Practice)
286.1	**Part 1:2004**	Water supply installations for buildings
286.2	**Part 2:1993**	Drainage installations for buildings
287.	**SANS 10254:2004**	Maintenance, replacement and repair of fixed electric storage water heating systems (Code of Practice)
288.	**SANS 10305:**	Painting of buildings (Code of Practice)
288.1	**Part 1:2005**	Paint and selection
288.2	**Part 2:2005**	Paint application and defects
288.3	**Part 3:2005**	Paint types
288.4	**Part 4:2005**	Painting of walls, ceilings and cladding
288.5	**Part 5:2005**	Painting of roofs and steel structures
288.6	**Part 6:2005**	Painting of wood
289.	**SANS 10313:2008**	The protection of structures against lighting (Code of Practice)
290.	**SANS 10322:2005**	Surface finishing of architectural aluminium
291.	**SANS 10389:**	Exterior lighting
291.1	**Part 1:2003**	Artificial lighting of exterior areas for work and safety
291.2	**Part 2:2003**	Exterior security lighting
291.3	**Part 3:2004**	Guide on the limitation of the effects of obtrusive light from outdoor lighting installations
292.	**SANS 10400:1990**	The applications of the NBR
292.1	**Part D**	Public safety
292.2	**Part F**	Site operations
292.3	**Part G**	Excavations
292.4	**Part H**	Foundations
292.5	**Part J**	Floors
292.6	**Part K**	Walls

292.7	**Part L**	Roofs
292.8	**Part M**	Stairways
292.9	**Part N**	Glazing
292.10	**Part O**	Lighting and ventilation
292.11	**Part P**	Drainage
292.12	**Part Q**	Non-water-borne means of sanitary disposal
292.13	**Part R**	Stormwater disposal
292.14	**Part S**	Facilities for persons with disabilities
292.15	**Part T**	Fire protection
292.16	**Part X**	Repeal of Regulations
293.	**SANS 10401:1989**	The construction of dwelling houses in accordance with NBR
294.	**SANS 10403:2003**	Formatting and compilation of construction procurement documents
295.	**SANS 10407:2006**	Thatched roof construction (Code of Practice)
296.	**SANS 10409:2005**	Design, selection and installation of geo-membranes (Code of Practice)
297.	**SANS 10508:2008 / ISO 10508:2006**	Thermoplastic pipes and fittings for hot and cold water systems
298.	**SANS 12944 / ISO 12944**	Paints and varnishes – Corrosion protection of steel structures by protective paint systems
298.1	**Part 1:1998**	General introduction
298.2	**Part 2:1998**	Classification of environments
298.3	**Part 3:1998**	Design considerations
298.4	**Part 4:1998**	Types of surface and surface preparation
298.5	**Part 5:1998**	Protective paint systems
298.6	**Part 6:1998**	Laboratory performance test methods
298.7	**Part 7:1998**	Execution and supervision of paint work
298.8	**Part 8:1998**	Development and specifications for new work and maintenance
299.	**SANS 13006:2003 / ISO 13006:1998**	Ceramic tiles – definitions, classifications, characteristics and marking
300.	**SANS 13746:2000 / ISO 13746:2000**	Textile floor coverings – guidelines for installation and use on stairs
301.	**SANS 14001:2005 ISO 104001:2005**	Environmental management systems – requirements with guidance for use
302.	**SANS 14713:1999 / ISO 14713:1999**	Protection against corrosion of iron and steel in structures – Zinc and aluminium coatings – Guidelines
303.	**SANS 14788:2007/ ISO 14788:2005**	Continuous hot-dip zinc – 5% aluminium alloy coated sheet and coil
304.	**SANS 15874 / ISO 15874**	Plastic piping systems for hot and cold water installations – Polypropylene (PP)
304.1	**Part 1**	General
304.2	**Part 2**	Pipes
304.3	**Part 3**	Fittings
304.4	**Part 5**	Fitness for purpose of the system
305.	**SANS 15875:2004 / ISO 15875:2003**	Plastic piping systems for hot and cold water installation – cross-linked polyethylene (PE-X)
305.1	**Part 1**	General
305.2	**Part 2**	Pipes
305.3	**Part 3**	Fittings
305.4	**Part 5**	Fitness for purpose of the system
306.	**SANS 15876: 2005 / ISO 15876:2003**	Plastic piping systems for hot and cold water installations – polybutylene (PB)
306.1	**Part 1:2004**	General
306.2	**Part 2:2004**	Pipes
306.3	**Part 3:2004**	Fittings
306.4	**Part 4:2004**	Fitness for purpose of the system
307.	**SANS 15877 / ISO 15877**	Plastics piping systems for hot and cold water installations – poly vinyl chloride (PVC)
308.	**SANS 50124:1994 / EN 124:1994**	Gulley tops and manhole tops for vehicular and pedestrian areas – design requirements, type testing, marking, quality control

309. **SANS 50197 / EN 197** Cement
309.1 **Part 1 and 2:2000** Composition, specifications and conformity criteria for common cements
310. **SANS 50198:1987 EN 198:1987** Specifications for finishes of baths for domestic purposes, made of acrylic material
311. **SANS 50295:1991 / EN 295:1991** Vitrified clay pipes and fittings and pipe joints for drains and sewers
311.1 **Part 1:1991** Requirements
311.2 **Part 2:1991** Quality control and sampling
311.3 **Part 3:1991** Test methods
312. **SANS 50312:2007 / EN 312:2003** Particle board – specifications
313. **SANS 50413 / EN 413** Masonry cement
313.1 **Part 1:2004** Composition, specifications and conformity criteria
314. **SANS 50572 / EN 572** Glass in building – basic soda lime silicate glass products
314.1 **Part 1:2006** Definition and general physical and mechanical properties
314.2 **Part 2:2006** Float glass
314.3 **Part 3:2006** Polished wire glass
314.4 **Part 4:2006** Drawn sheet glass
314.5 **Part 5:2006** Patterned glass
315. **SANS 53811: 2006** Sheradising – zinc diffusion coatings on ferrous products
316. **SANS 60335:2007 / IEC 60335:2004** Household and similar electrical appliances – Safety
317. **SANS 60439-1:2004 / IEC 60439-1:2004** Low-voltage switchgear and control gear assemblies
318. **SANS 60598:2004 / IEC 60598:2004** Luminaries
319. **SANS 60730 / IEC 60730** Automatic electrical controls for household and similar use
320. **SANS 60614 / IEC 60614-1** Specifications for conduits for electrical installations
321. **SANS 60669 / IEC 60669-1** Switches for household and similar fixed-electrical installations
322. **SANS 60670: 2002 / IEC 60670: 2002** Boxes and enclosures for electrical accessories for household and similar fixed-electrical installations
323. **SANS 601024:1990 / IEC 601024:1990** Protection of structures against lightning
324. **SANS 61386:1996 / IEC 61386:1996** Conduit systems for electrical installations
325. **ARP 040: 1998** The use of reinforcement cover devices for reinforced concrete
326. **ARP 051: 2002** Steel wire rope and connections
327. **CKS 05:1981** Laminated timber for furniture
328. **CKS 82:1973** Steel posts, stays standards, and droppers for strained wire fences
329. **CKS 146:1972** Gates, steel, with tubular frames (for farm and domestic use)
330. **CKS 370:1973** Adjustable steel shelving
331. **CKS 371:1973** Adjustable wooden shelving
332. **CKS 388:1973** Rubber water stops
333. **CKS 389:1973** Flexible PVC water stops
334. **CKS 413:1974** Adjustable louvered windows
335. **CKS 451:1976** Anti-intruder fences
336. **NRS 038-2:2007** Concrete poles
336.1 **Part 2** Concrete poles for lighting applications

7.3 ADDENDUM C: THE NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT, 1977

NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT 103 OF 1977

[ASSENTED TO 22 JUNE 1977] [DATE OF COMMENCEMENT: 1 SEPTEMBER 1985]

(English text signed by the State President)

as amended by

Standards Act 30 of 1982
National Building Regulations and Building Standards Amendment Act 36 of 1984
National Building Regulations and Building Standards Amendment Act 62 of 1989
National Building Regulations and Building Standards Amendment Act 49 of 1995
Mine Health and Safety Act 29 of 1996

Regulations under this Act

NATIONAL BUILDING REGULATIONS

ACT

To provide for the promotion of uniformity in the law relating to the erection of buildings in the areas of jurisdiction of local authorities; for the prescribing of building standards; and for matters connected therewith.

1 Definitions

In this Act, unless the context otherwise indicates-

'application' means an application referred to in section 4 (2);

'architect' means an architect as defined in section 1 of the Architects' Act, 1970 (Act 35 of 1970);

'architectural area' means the sum of the areas of the several floors of a building, including basements, mezzanine and intermediate floor tiers and penthouses of headroom height, measured from the exterior faces of the exterior walls;

[Definition of 'architectural area' inserted by s. 1 *(a)* of Act 62 of 1989.]

'building' includes-

(a) any other structure, whether of a temporary or permanent nature and irrespective of the materials used in the erection thereof, erected or used for or in connection with-

(i) the accommodation or convenience of human beings or animals;

(ii) the manufacture, processing, storage, display or sale of any goods;

[Sub-para (ii) substituted by s. 1 *(b)* of Act 62 of 1989.]

(iii) the rendering of any service;

(iv) the destruction or treatment of refuse or other waste materials;

(v) the cultivation or growing of any plant or crop;

(b) any wall, swimming bath, swimming pool, reservoir or bridge or any other structure connected therewith;

(c) any fuel pump or any tank used in connection therewith;

(d) any part of a building, including a building as defined in paragraph *(a)*, *(b)* or *(c)*;

(e) any facilities or system, or part or portion thereof, within or outside but incidental to a building, for the provision of a water supply, drainage, sewerage, stormwater disposal, electricity supply or other similar service in respect of the building;

[Para. *(e)* added by s. 1 *(c)* of Act 62 of 1989.]

'building control officer' means any person appointed or deemed to be appointed as building control officer by a local authority in terms of section 5;

'bureau' means the bureau as defined in section 1 of the Standards Act;

'code of practice' means code of practice as defined in section 1 of the Standards Act;

'compulsory standard specification' .....

[Definition of 'compulsory standard specification' deleted by s. 1 *(a)* of Act 36 of 1984.]

'council' means the council as defined in section 1 of the Standards Act;

'directive' means a directive made in terms of section 17 (4);

'erection', in relation to a building, includes the alteration, conversion, extension, rebuilding, re-erection, subdivision of or addition to, or repair of any part of the structural system of, any building; and **'erect'** shall have a corresponding meaning;

[Definition of 'erection' substituted by s. 1 *(e)* of Act 62 of 1989.]

'land surveyor' means a land surveyor as defined in section 49 of the Land Survey Act, 1927 (Act 9 of 1927);

'local authority' means-

(a) any institution, council or body contemplated in section 84 (1) *(f)* of the Provincial Government Act, 1961 (Act 32 of 1961);

(b) .....

(c) any statutory body designated by the Minister, after consultation with the Administrator of the province in question, by notice in the *Gazette* as a local authority for the purposes of this Act or any provision thereof;

[Definition of 'local authority' substituted by s. 1 *(f)* of Act 62 of 1989.]

'Minister' means the Minister of Economic Affairs and Technology;

[Definition of 'Minister' substituted by s. 1 *(b)* of Act 36 of 1984 and by s. 1 *(d)* of Act 62 of 1989.]

'national building regulations' means the national building regulations made in terms of section 17;

'owner', in relation to a building or land, means the person in whose name the land on which such building was or is erected or such land, as the case may be, is registered in the deeds office in question: Provided that if-

(a) such person, in the case of a natural person, is deceased or was declared by any court to be incapable of managing his own affairs or a prodigal or is a patient as defined in section 1 of the Mental Health Act, 1973 (Act 18 of 1973), or if his estate has been sequestrated, the executor or curator concerned, as the case may be;

(b) such person, in the case of a juristic person, has been liquidated or placed under judicial management, the liquidator or judicial manager concerned, as the case may be;

(c) such person is absent from the Republic or if his whereabouts are unknown, any person who, as agent or otherwise, undertakes the management, maintenance or collection of rentals or other moneys in respect of such building or land or who is responsible therefor;

[Para. *(c)* substituted by s. 1 *(c)* of Act 36 of 1984.]

(d) the local authority in question is unable to determine the identity of such person, any person who is entitled to the benefit of the use of such building or land or who enjoys such benefit,

shall be deemed to be the owner of such building or land;

'professional engineer' .....

[Definition of 'professional engineer' deleted by s. 1 *(a)* of Act 49 of 1995.]

'registered person' means a person defined in section 1 of the Engineering Profession of South Africa Act, 1990 (Act 114 of 1990), as a certificated engineer, engineering technician, professional engineer or professional technologist (engineering);

[Definition of 'registered person' inserted by s. 1 *(b)* of Act 49 of 1995.]

'regulations' means the regulations made in terms of section 20;

'review board' means the review board referred to in section 9;

'specification' means a specification as defined in section 1 of the Standards Act;

[Definition of 'specification' inserted by s. 1 *(d)* of Act 36 of 1984.]

'standard method' means a standard method as defined in section 1 of the Standards Act;

'Standards Act' means the Standards Act, 1982 (Act 30 of 1982);

[Definition of 'Standards Act' substituted by s. 1 *(e)* of Act 36 of 1984.]

'statutory body' means any board, fund, institution, company, corporation or other organization established or constituted by or under any law;

'structural system', in relation to a building, means the system of constructional elements and components of any building which is provided to resist the loads acting upon it and to transfer such loads to the ground upon which the foundation of the building rests;

[Definition of 'structural system' inserted by s. 1 *(g)* of Act 62 of 1989.]

'Territory' .....

[Definition of 'Territory' deleted by s. 1 *(f)* of Act 36 of 1984.]

'this Act' includes the national building regulations made and directives issued in terms of it.

2 Application of Act

(1) Subject to the provisions of any notice published in terms of subsection (2), the provisions of this Act shall apply in the area of jurisdiction of any local authority.

(2) *(a)* The Minister may, on such conditions as he may think fit and after consultation with the council and the Administrator of the province in question, of his own accord or at the request of a local authority or any other person, by notice in the *Gazette* exempt the area of jurisdiction, or any part thereof, of any local authority from the application of this Act, or of any provision or provisions thereof which are mentioned in the notice.

[Para. *(a)* substituted by s. 2 *(a)* of Act 36 of 1984 and by s. 2 *(a)* of Act 62 of 1989.]

(b) Different notices may in terms of paragraph *(a)* be published in respect of different local authorities or different categories of local authorities.

(3) Subject to the provisions of subsection (4) this Act shall not bind the State.

(4) In respect of any building to be erected by or on behalf of the State, such plans, specifications and certificate as may be prescribed by national building regulation, shall before the commencement of such erection be lodged with the local authority in question for its information and comment: Provided that the Minister may-

(a) if he, with the concurrence of the Minister of Defence, the Minister of Law and Order and the Minister of Justice, is of the opinion that the erection or proposed erection of any building or class of buildings by or on behalf of the State is in the interest of or connected with the security of the Republic, exempt the State in relation to any such building or class of buildings;

[Para. *(a)* substituted by s. 2 *(b)* of Act 36 of 1984 and by s. 2 *(b)* of Act 62 of 1989.]

(b) by virtue of economic considerations, necessity or expediency, exempt the State, either generally or in any particular case,

after notice in writing to the local authority in question, from the provisions of this subsection.

[**NB**: In terms of s. 36 (2) of the Legal Succession to the South African Transport Services Act 9 of 1989, the references to 'the State' in subsections (3) and (4) above are to be construed as having included the Company (Transnet Limited) and the Corporation (the South African Rail Commuter Corporation Limited) during the period 1 April 1990 to 1 April 1992.]

(5) Subject to the provisions of subsections (7) and (8), the Minister may, on such conditions as he may think fit and with the concurrence of the Minister of Defence, exempt the owner of-

(a) any place as defined in section 1 of the National Key Points Act, 1980 (Act 102 of 1980)-

(i) that has been declared a National Key Point in terms of section 2 of the said Act; or

(ii) in respect of which the Minister of Defence has certified that it will be declared a National Key Point under the said section 2 of that Act; or

(b) any prohibited place as defined in section 1 (1) of the Protection of Information Act, 1982 (Act 84 of 1982).

after notice in writing to the local authority in question from the provisions of this Act.

[Sub-s. (5) added by s. 2 *(c)* of Act 62 of 1989.]

(6) Subject to the provisions of subsection (7), the owner of any building which is or is to be erected on mining property and which is or is to be used exclusively for the operation of a mine or any works or machinery, as defined in the Mines and Works Act, 1956 (Act 27 of 1956), and which is in terms of section 2 of that Act subject to the supervision of the Chief Inspector as contemplated in the Mine Health and Safety Act, 1996, shall be exempted from the provisions of this Act.

[Sub-s. (6) added by s. 2 *(c)* of Act 62 of 1989 and amended by s. 99 of Act 29 of 1996.]

(7) An owner shall in respect of the erection or proposed erection of a building with regard to which an exemption contemplated in subsection (4), (5) or (6) applies, and in connection with-

(a) connections to electricity supply, water supply, sewer and stormwater drainage systems;

(b) provision on the relevant site for parking of more than 100 vehicles;

(c) service by the local authority's fire brigade in place of or in addition to any fire protection service provided by the owner,

supply the local authority concerned with sufficient details to enable such local authority to-

(i) provide any connection, road traffic control and fire brigade service which may be required; or

(ii) give notice in writing to such owner that it cannot so provide any such service.

[Sub-s. (7) added by s. 2 *(c)* of Act 62 of 1989.]

(8) The owner of a National Key Point in respect of which an exemption contemplated in subsection (5) applies, shall, if the provisions of the National Key Points Act, 1980 (Act 102 of 1980), cease to apply in respect of him, forthwith submit to the local authority concerned such plans, specifications and certificates as may be prescribed by the national building regulations, and shall comply with such requirements of this Act as should in the opinion of that local authority be complied with to ensure the safety and health of the occupants of any relevant building.

[Sub-s. (8) added by s. 2 *(c)* of Act 62 of 1989.]

3 Duties of draftsmen of plans, specifications, documents and diagrams

Any person who prepared any plan, specification, document or diagram submitted in terms of this Act shall affix his name and address and, in the case of an architect, land surveyor or registered person, also his profession and registration number, if any, to such plan, specification, document or diagram.

[S. 3 substituted by s. 2 of Act 49 of 1995.]

4 Approval by local authorities of applications in respect of erection of buildings

(1) No person shall without the prior approval in writing of the local authority in question, erect any building in respect of which plans and specifications are to be drawn and submitted in terms of this Act.

(2) Any application for approval refered to in subsection (1) shall be in writing on a form made available for that purpose by the local authority in question.

(3) Any application referred to in subsection (2) shall-

(a) contain the name and address of the applicant and, if the applicant is not the owner of the land on which the building in question is to be erected, of the owner of such land;

(b) be accompanied by such plans, specifications, documents and information as may be required by or under this Act, and by such particulars as may be required by the local authority in question for the carrying out of the objects and purposes of this Act.

(4) Any person erecting any building in contravention of the provisions of subsection (1) shall be guilty of an offence and liable on conviction to a fine not exceeding R100 for each day on which he was engaged in so erecting such building.

5 Appointment of building control officer by local authority

(1) Subject to the provisions of subsection (3) a local authority shall appoint a person as building control officer in

order to exercise and perform the powers, duties or activities granted or assigned to a building control officer by or under this Act.

(2) Any person not having the qualifications prescribed by national building regulation in respect of a building control officer shall not without the approval in writing of the Minister be appointed as building control officer in terms of subsection (1).

(3) Subsection (1) shall also be construed so as to enable-

(a) two or more than two local authorities to appoint, on such conditions as they may agree to, one person as building control officer for all such local authorities;

(b) a local authority from time to time to appoint a person temporarily as building control officer;

(c) a local authority, with the approval in writing of any other local authority and on such conditions as they may agree to, to make use of the services of any person appointed as building control officer by such other local authority.

(4) Any person who-

(a) immediately before the date of commencement of this Act was employed by a local authority in order to perform as controlling officer any activities substantially the same as the activities referred to in section 6 (1); and

(b) on such date is still so employed,

shall be deemed to have been appointed in terms of this section as building control officer by such local authority.

6 Functions of building control officers

(1) A building control officer shall-

(a) make recommendations to the local authority in question, regarding any plans, specifications, documents and information submitted to such local authority in accordance with section 4 (3);

(b) ensure that any instruction given in terms of this Act by the local authority in question be carried out;

(c) inspect the erection of a building, and any activities or matters connected therewith, in respect of which approval referred to in section 4 (1) was granted;

(d) report to the local authority in question, regarding non-compliance with any condition on which approval referred to in section 4(1) was granted.

(2) When a fire protection plan is required in terms of this Act by the local authority, the building control officer concerned shall incorporate in his recommendations referred to in subsection (1) *(a)* a report of the person designated as the chief fire officer by such local authority, or of any other person to whom such duty has been assigned by such chief fire officer, and if such building control officer has also been designated as the chief fire officer concerned, he himself shall so report in such recommendations.

[Sub-s. (2) substituted by s. 3 *(a)* of Act 62 of 1989.]

(3) .....

[Sub-s. (3) deleted by s. 3 *(b)* of Act 62 of 1989.]

(4) This section shall not be construed so as to prohibit a local authority from granting or entrusting to a building control officer any powers, duties or activities not connected with this Act or to prohibit any building control officer, with the approval of a local authority, from delegating to an officer under his control any power, duty or function granted or

entrusted to building control officers in terms of this Act.

7 Approval by local authorities in respect of erection of buildings

(1) If a local authority, having considered a recommendation referred to in section 6 (1) *(a)*-

(a) is satisfied that the application in question complies with the requirements of this Act and any other applicable law, it shall grant its approval in respect thereof;

[Para. *(a)* substituted by s. 4 *(a)* of Act 62 of 1989.]

(b) (i) is not so satisfied; or

(ii) is satisfied that the building to which the application in question relates-

(aa) is to be erected in such manner or will be of such nature or appearance that-

(aaa) the area in which it is to be erected will probably or in fact be disfigured thereby;

(bbb) it will probably or in fact be unsightly or objectionable;

(ccc) it will probably or in fact derogate from the value of adjoining or neighbouring properties;

(bb) will probably or in fact be dangerous to life or property,

such local authority shall refuse to grant its approval in respect thereof and give written reasons for such refusal:

[Para. *(b)* amended by s. 4 *(b)* of Act 62 of 1989.]

Provided that the local authority shall grant or refuse, as the case may be, its approval in respect of any application where the architectural area of the building to which the application relates is less than 500 square metres, within a period of 30 days after receipt of the application and, where the architectural area of such building is 500 square metres or larger, within a period of 60 days after receipt of the application.

[Sub-s. (1) amended by s. 4 *(c)* of Act 62 of 1989.]

(2) .....

[Sub-s. (2) deleted by s. 4 *(d)* of Act 62 of 1989.]

(3) When a local authority has granted its approval in accordance with subsection (1) *(a)* in respect of any application, such approval shall be endorsed on at least one of the copies of the plans, specifications and other documents in question returned to the applicant.

(4) Any approval granted by a local authority in accordance with subsection (1) *(a)* in respect of any application shall lapse after the expiry of a period of 12 months as from the date on which it was granted unless the erection of the building in question is commenced or proceeded with within the said period or unless such local authority extended the said period at the request in writing of the applicant concerned.

(5) Any application in respect of which a local authority refused in accordance with subsection (1) *(b)* to grant its approval, may, notwithstanding the provisions of section 22, at no additional cost and subject to the provisions of subsection (1) be submitted anew to the local authority within a period not exceeding one year from the date of such refusal-

(a) (i) if the plans, specifications and other documents have been amended in respect of any aspect

thereof which gave cause for the refusal; and

(ii) if the plans, specifications and other documents in their amended form do not substantially differ from the plans, specifications or other documents which were originally submitted; or

(b) where an application is submitted under section 18.

[Sub-s. (5) substituted by s. 4 *(e)* of Act 62 of 1989.]

(6) The provisions of this section shall not be construed so as to prohibit a local authority, before granting or refusing its approval in accordance with subsection (1) in respect of an application, from granting at the written request of the applicant and on such conditions as the local authority may think fit, provisional authorization to an applicant to commence or proceed with the erection of a building to which such application relates.

[Sub-s. (6) substituted by s. 4 *(f)* of Act 62 of 1989.]

(7) *(a)* An application which is substantially the same as an application referred to in this Act and which before the date of commencement of this Act has been lodged with a local authority for its consideration and in respect of which such local authority on that date has not yet granted or refused its approval, shall be considered by such local authority as if this Act had not been passed.

(b) Approval granted by a local authority before the date of commencement of this Act in respect of an application substantially the same as an application referred to in this Act, shall be deemed to have been granted in terms of this section if the erection of the building in question has not been commenced with before the said date.

8 Power of court in respect of approval by local authority

(1) If a local authority fails to grant or refuse timeously its approval in accordance with section 7 in respect of an application, a court may on the application of the applicant concerned make an order directing such local authority to perform its duties and exercise its powers in accordance with that section within the period stated in such order, or make such other order as it may deem just.

(2) Notwithstanding anything to the contrary contained in any law relating to magistrates' courts, a magistrate shall have the jurisdiction to make any order referred to in subsection (1).

9 Appeal against decision of local authority

(1) Any person who-

(a) feels aggrieved by the refusal of a local authority to grant approval referred to in section 7 in respect of the erection of a building;

(b) feels aggrieved by any notice of prohibition referred to in section 10; or

(c) disputes the interpretation or application by a local authority of any national building regulation or any other building regulation or by-law,

may, within the period, in the manner and upon payment of the fees prescribed by regulation, appeal to a review board.

[Sub-s. (1) substituted by s. 5 of Act 62 of 1989.]

(2) The review board referred to in subsection (1) shall consist of-

(a) a chairman designated by the Minister; and

(b) two persons appointed for the purpose of any particular appeal by the said chairman from persons whose names are on a list compiled in the manner prescribed by regulation.

10 Erection of buildings in certain circumstances subject to prohibition or conditions

(1) If any building or earthwork-

(a) in the opinion of the local authority in question is being or is to be erected in such manner that it-

(i) will not be in the interest of good health or hygiene;

(ii) will be unsightly or objectionable;

(iii) will probably or in fact be a nuisance to the occupiers of adjoining or neighbouring properties;

(iv) will probably or in fact derogate from the value of adjoining or neighbouring properties;

(b) is being or is to be erected on a site which is subject to flooding or on a site which or any portion of which in the opinion of the local authority in question does not drain properly or is filled up or covered with refuse or material impregnated with matter liable to decomposition,

such local authority may by notice in writing, served by post or delivered, prohibit the person erecting such building or earthwork or causing such building or earthwork to be erected from commencing or proceeding with the erection thereof or from so commencing or proceeding except on such conditions as such local authority may determine from time to time.

(2) Any person who fails to comply with any provision of a notice or condition referred to in subsection (1) shall be guilty of an offence and liable on conviction to a fine not exceeding R100 for each day on which he so failed.

11 Erection of buildings subject to time limit

(1) If for a period exceeding 3 months the erection of a building is not proceeded with, the local authority in question may by notice in writing, served by post or delivered, order the owner of such building to resume and to complete the erection of such building within the periods specified in such notice.

(2) If the owner of a building on or to whom a notice referred to in subsection (1) was served or delivered, fails to resume or complete the erection of such building within the periods specified in such notice, the local authority in question may extend such periods from time to time if such owner satisfies it that such failure was due to circumstances beyond his control.

(3) If the owner of a building on or to whom a notice referred to in subsection (1) was served or delivered, fails to resume or to complete the erection of such building within the periods specified in such notice or, when applicable, within such periods as extended in accordance with subsection (2), and the local authority in question is of the opinion that such building is unsightly or dangerous to life or property or derogates from the value of adjoining or neighbouring properties, such local authority may by notice in writing, served by post or delivered, order such owner to demolish such building, to remove the material of which such building consisted and any other material or rubbish from the site in question, and to otherwise clean up such site within the period specified in the lastmentioned notice.

(4) If the owner of a building fails to comply with a notice served on or delivered to him in accordance with subsection (3) in respect of such building, the local authority in question may demolish such building, remove the material of which such building consisted and any other material or rubbish from the site in question and otherwise clean up such site, and may recover the costs thereof from such owner: Provided that such local authority may sell such material and may utilize the proceeds of such sale to defray the costs of such demolition, removal or clean-up and shall pay the balance, if any, of such proceeds to such owner.

(5) Any approval granted by a local authority in accordance with section 7 (1) *(a)* in respect of any application shall lapse as soon as a notice in terms of subsection (3) is served on or delivered to the owner of the building in question in respect of such building.

12 Demolition or alteration of certain buildings

(1) If the local authority in question is of the opinion that-

(a) any building is dilapidated or in a state of disrepair or shows signs thereof;

(b) any building or the land on which a building was or is being or is to be erected or any earthwork is dangerous or is showing signs of becoming dangerous to life or property,

it may by notice in writing, served by post or delivered, order the owner of such building, land or earthwork, within the period specified in such notice to demolish such building or to alter or secure it in such manner that it will no longer be dilapidated or in a state of disrepair or show signs thereof or be dangerous or show signs of becoming dangerous to life or property or to alter or secure such land or earthwork in such manner that it will no longer be dangerous or show signs of becoming dangerous to life or property: Provided that if such local authority is of the opinion that the condition of any building, land or earthwork is such that steps should forthwith be taken to protect life or property, it may take such steps without serving or delivering such notice on or to the owner of such building, land or earthwork and may recover the costs of such steps from such owner.

(2) If the condition of any building or the land on which a building was or is being or is to be erected or any earthwork is such that it is dangerous to life or property, the owner of such building, land or earthwork shall forthwith notify the local authority in question thereof.

(3) *(a)* If the condition of any building or the land on which a building was or is being or is to be erected or any earthwork is such that it is dangerous or is showing signs of becoming dangerous to life or property, the local authority, irrespective of whether it was notified in terms of subsection (2), may by notice in writing, served by post or delivered, order the owner of such building, land or earthwork to instruct at the cost of such owner an architect or a registered person to investigate such condition and to report to such local authority on the nature and extent of the steps to be taken, in the opinion of such architect or registered person, in order to render such building, land or earthwork safe.

[Para. *(a)* substituted by s. 3 *(a)* of Act 49 of 1995.]

(b) The local authority in question may by notice in writing, served by post or delivered, order that any activities be stopped or prohibit the performance of any activities which may increase the danger or hinder or obstruct the architect or registered person referred to in paragraph *(a)* from properly carrying out the investigation referred to in that paragraph.

[Para. *(b)* substituted by s. 3 *(a)* of Act 49 of 1995.]

(c) If it is brought to the attention of a local authority or appears that an architect or registered person instructed in terms of paragraph *(a)* to perform certain duties is for any reason not competent to carry out the duties in question, the local authority may require such architect or registered person to submit evidence of his or her competence to carry out such duties.

[Para. *(c)* added by s. 3 *(b)* of Act 49 of 1995.]

(d) If the architect or registered person contemplated in paragraph *(c)* is unable to satisfy the local authority of his or her competence to carry out the duties in question, the local authority may order the owner of the building, land or earthwork in question to instruct another architect or registered person to carry out the duties.

[Para. *(d)* added by s. 3 *(b)* of Act 49 of 1995.]

(4) If the local authority in question deems it necessary for the safety of any person, it may by notice in writing, served by post or delivered-

(a) order the owner of any building to remove, within the period specified in such notice, all persons occupying or working or being for any other purpose in such building therefrom, and to take care that any person not authorized by such local authority does not enter such building;

(b) order any person occupying or working or being for any other purpose in any building, to vacate such building immediately or within a period specified in such notice.

(5) No person shall occupy or use or permit the occupation or use of any building in respect of which a notice was

[Sub-s. (1) substituted by s. 8 of Act 62 of 1989.]

(2) Any person who hinders or obstructs any building control officer or person authorized by the local authority in question in the exercise of his powers in terms of subsection (1), shall be guilty of an offence.

(3) Any building control officer shall, at the request of any person affected by the execution of any of his powers, duties or activities in terms of this Act, produce his certificate of appointment issued to him in the form prescribed by national building regulation.

16 Report on adequacy of certain measures and on certain building projects

(1) The Minister, after consultation with the Administrator of a province in which the area of jurisdiction of a local authority is situated, may order such local authority to report to him on-

(a) the adequacy of measures in or in connection with buildings in its area of jurisdiction against fire, floods or other disasters and to make recommendations in order to remove any inadequacies in such measures;

(b) any particular building project which was or is being undertaken in its area of jurisdiction.

[Sub-s. (1) amended by s. 3 of Act 36 of 1984.]

(2) If the Minister is satisfied that any local authority is unable to report as contemplated in subsection (1), he may order the bureau so to report.

(3) For the purposes of this section the local authority concerned or the bureau, as the case may be, shall have such powers, duties and functions as may be prescribed by regulation.

17 National building regulations and directives

(1) The Minister may after consultation with the council make regulations, to be known as national building regulations-

(a) regarding the preparation, submission and approval of plans and specifications of buildings, including the approval of amendments or alterations to plans and specifications of buildings during the erection thereof;

(b) to provide for inspections and tests in respect of buildings, whether before or during the erection or after the completion of the erection thereof, including the powers of building control officers in that regard, and the steps to be taken in order to prevent any nuisance which may occur before, during or after the completion thereof;

(c) regarding the nature and preparation of sites on which buildings are to be erected;

(d) regarding the strength and stability of buildings;

(e) to provide for the requirements with which buildings shall comply in so far as precautionary measures against fires or other emergencies are concerned, including the resistance of buildings against the outbreak and spreading of fires, the protection of the occupants or users of buildings or other persons against fires, the aids or other installations to be in buildings for the combating or prevention of fires and for the vacating of such buildings in cases of fires or other emergencies;

(f) regarding the resistance of buildings against floods, moisture, the transmission of heat, sound or other injurious factors, and infestation by insects, vermin or other pests;

(g) regarding the durability and other desirable properties of buildings;

(h) regarding the provision of water and of sewerage and drainage services in respect of buildings, including the compulsory connection with the supply, distribution or sewerage disposal works in question of local

authorities;

(i) regarding the ventilation and the provision for daylight in respect of buildings, including the provision of open spaces in connection therewith;

(j) regarding the heating and artificial lighting of buildings;

(k) regarding the supply and installing in respect of buildings of gas or electrical equipment, installations or service, including the supply and manner of installing of gas or electrical equipment for purposes of cooking or heating, or preventing, controlling or restricting the emission of smoke or other offensive fumes;

(l) to regulate, restrict or prohibit the use to which any building or categories of buildings may be put;

(m) to regulate, restrict or prohibit access to buildings, irrespective of whether erection thereof is completed, or the sites on which buildings were or are being erected;

(n) regarding the prevention of dangers or obstructions during or in connection with the erection of buildings, including the prevention of danger on adjoining or neighbouring premises, pavements, streets and other public places;

(o) to regulate, restrict or prohibit the erection of temporary buildings and the occupation or use thereof or access thereto;

(p) regarding the protection of property, including public streets, places or open spaces, of local authorities or other persons during or in connection with the erection of buildings;

(q) to regulate, restrict or prohibit the performance of certain activities or categories of activities in or in connection with the erection of buildings by or under the supervision of other persons than persons having specified qualifications, experience or training;

(r) subject to the provisions of the Housing Act, 1966 (Act 4 of 1966), regarding the demolition of buildings and matters connected therewith;

(s) regarding the powers, duties and functions of local authorities if buildings were or are being erected or used in contravention of the provisions of this Act or any other law in force immediately before the date of commencement of this Act or of any approval or authority granted in terms of this Act or the said other law or if no such approval or authority was granted for the erection of such buildings;

(t) regarding the general safety, health and convenience of the public in so far as they relate to the erection of buildings;

(u) regarding the safety, health and convenience of occupiers or users of buildings or of persons otherwise present in buildings or having access thereto, and the compulsory installing or supplying of equipment, installations or services in connection therewith;

(v) regarding any other matter which in terms of this Act is required or permitted to be prescribed by national building regulations;

(w) regarding, generally, any other matter deemed necessary or expedient by the council with the concurrence of the Minister in order to achieve the objects of this Act.

(2) Different national building regulations may in terms of subsection (1) be made in respect of different buildings or categories of buildings, uses of buildings, areas or categories of areas, local authorities or categories of local authorities, or portions or categories of portions of the areas of jurisdiction of local authorities.

(3) *(a)* When a national building regulation is published in the *Gazette*, the Minister shall publish together with it a notice calling upon all interested persons to lodge any objections which they have against such building regulation in

writing with the council within the period specified in such notice.

(b) A national building regulation referred to in paragraph *(a)* shall come into operation on a date fixed by the Minister by notice in the *Gazette* with regard to the period referred to in the said paragraph: Provided that the Minister, with the concurrence of the council, may in such notice alter such national building regulation in accordance with any objection lodged in respect thereof in terms of paragraph *(a)* without complying with the provisions of the said paragraph in respect of the national building regulation so altered.

(4) If the Minister after consultation with the council is satisfied that any of or all the applicable national building regulations are inadequate or do not make any provision in respect of any particular building or buildings and that for sound reasons it shall not be expedient to amend such national building regulations or make any further national building regulations, as the case may be, the Minister may, having in writing notified the local authority in question, by notice in the *Gazette* or by notice sent by post or delivered-

(a) exempt the owner of the land on which any such building is being or is to be erected from the provisions of such applicable national building regulations; and

(b) allow such owner to erect such building or buildings or to proceed with or complete the erection thereof in accordance with the applicable national building regulations from which he was not so exempted, if any, and the directives specified in such notice: Provided that no such directive may relate to any matter not specified in subsection (1).

(5) *(a)* Notwithstanding anything to the contrary contained in any law the Minister may, if he is of the opinion that it is necessary or expedient for the proper compliance with or operation of any of or all the national building regulations or directives that any servitude or restrictive condition or other provisions applicable in respect of any land by or under any law or registered in respect of any land in terms of the Deeds Registries Act, 1937 (Act 47 of 1937), or otherwise applicable in respect of land, be removed or amended, after consultation with the Administrator of the province in which such land is situated and after compliance with the procedure prescribed by regulation, by notice in the *Gazette* remove or, to such extent as he may indicate, amend such servitude, condition or provision.

[Para. *(a)* substituted by s. 4 *(a)* of Act 36 of 1984.]

(b) On the publication of a notice referred to in paragraph *(a)* the Registrar of Deeds concerned shall in respect of the removal or amendment of the servitude, condition or provision in question, make suitable entries in the registers in his office, and when the title deed of any land to which such notice relates is for any purpose submitted to such Registrar he shall endorse such removal or amendment on such title deed.

(6) Any provision occurring in a specification, standard specification, code of practice or standard method may be incorporated in a directive by mere reference, and in regard to such an incorporation the provisions of section 33 of the Standards Act shall *mutatis mutandis* apply as if it were an incorporation in a law.

[Sub-s. (6) substituted by s. 4 of *(b)* of Act 36 of 1984.]

(7) The national building regulations or any directive may provide that, without fully defining any particular materials or methods of erection, in so far as quality and standards are concerned the use or employment of any specified materials or methods of erection or compliance with any specified specification, standard specification, code of practice or standard method shall be deemed to comply with the quality and standard required by such national building regulations or directive.

[Sub-s. (7) substituted by s. 4 *(c)* of Act 36 of 1984.]

(8) In the national building regulations provisions may be included which the Minister deems necessary to ensure, notwithstanding the provisions of any other applicable law or the issue of a certificate of occupancy in terms of section 14, the essential maintenance or repair of any building or the efficient operation of any equipment or machinery installed therein.

[Sub-s. (8) added by s. 9 of Act 62 of 1989.]

18 Deviation and exemption from national building regulations

(1) A local authority may, at the request in writing of the owner of any building or any person having an interest therein, in respect of the erection of such building or the land on which it is being or is to be erected, in writing permit a deviation or grant an exemption from any applicable national building regulation except a national building regulation regarding the strength and stability of buildings.

(2) The council may, at the request in writing of the owner of any building or any person having an interest therein and after consultation with the local authority in question, in respect of the erection of such building or the land on which it is being or is to be erected, in writing permit a deviation or grant an exemption from any applicable national building regulation relating to the strength and stability of buildings.

19 Prohibition on use of certain methods or materials

(1) If the Minister, after consultation with the council and notwithstanding anything to the contrary contained in any law, is satisfied that any method or material used or to be used in the erection of any building will not be in the public interest or will be dangerous to life or property, the Minister may, having in writing notified the local authority in question, by notice in the *Gazette* or by notice sent by post or delivered, prohibit the owner of the land on which such building is being or is to be erected from using such method or material in such erection.

(2) Any person who contravenes or fails to comply with the provisions of a notice referred to in subsection (1) shall be guilty of an offence and liable on conviction to a fine not exceeding R100 for each day on which he so contravened or failed.

20 Regulations

(1) The Minister may make regulations-

(a) regarding the procedure to be followed at the hearing of an appeal by a review board;

(b) regarding the powers, duties and functions of a review board, including the power to summon witnesses for the purposes of hearing an appeal and to administer an oath or to accept an affirmation from any witness;

(c) regarding the costs in connection with an appeal to a review board;

(d) to prescribe the further matters in respect of which an appeal may be lodged with a review board;

(e) in order, with the concurrence of the Minister of Finance, to prescribe the remuneration and travel and subsistence allowances payable to members, except members in the full-time employ of the State or the bureau, of a review board;

(f) regarding any other matter which in terms of this Act is required or permitted to be prescribed by regulation.

(2) Any regulation made under this section may prescribe that any person who contravenes or fails to comply with such regulation shall be guilty of an offence and liable on conviction to a fine not exceeding R200 or to imprisonment for a period not exceeding 2 months.

21 Order in respect of erection and demolition of buildings

Notwithstanding anything to the contrary contained in any law relating to magistrates' courts, a magistrate shall have jurisdiction, on the application of any local authority or the Minister, to make an order prohibiting any person from commencing or proceeding with the erection of any building or authorizing such local authority to demolish such building if such magistrate is satisfied that such erection is contrary to or does not comply with the provisions of this Act or any approval or authorization granted thereunder.

22 Power of local authorities relating to rates, taxes, fees and other moneys

The provisions of this Act shall not derogate from any power conferred by or under any other law upon any local authority to levy, receive or charge any rates, taxes, fees or other moneys in respect of any building or land or to levy, receive or charge moneys in connection with the examination of plans, specifications or information or the performance of any other duties in terms of this Act.

23 Exemption from liability

No approval, permission, report, certificate or act granted, issued or performed in terms of this Act by or on behalf of any local authority or the council in connection with a building or the design, erection, demolition or alteration thereof, shall have the effect that-

(a) such local authority or the council be liable to any person for any loss, damage, injury or death resulting from or arising out of or in any way connected with the manner in which such building was designed, erected, demolished or altered or the material used in the erection of such building or the quality of workmanship in the erection, demolition or alteration of such building;

(b) the owner of such building be exempted from the duty to take care and to ensure that such building be designed, erected, completed, occupied and used or demolished or altered in accordance with the provisions of this Act and any other applicable law;

(c) any person be exempted from the provisions of any other law applicable in the area of jurisdiction of such local authority.

[S. 23 substituted by s . 10 of Act 62 of 1989.]

24 General penalty clause

Any person convicted of an offence under this Act in respect of which a fine or imprisonment is not expressly provided for, shall be liable to a fine not exceeding R4000 or to imprisonment for a period not exceeding 12 months.

[S. 24 substituted by s. 11 of Act 62 of 1989.]

25 Presumption

If in any prosecution for an offence in terms of this Act it is necessary, in order to establish the charge against the accused, to prove that he failed to comply with the requirements of this Act relating to standard or quality of materials, design or workmanship, an allegation in the charge sheet that such accused so failed, shall be sufficient proof thereof unless the contrary is proved.

26 Payment of certain moneys to local authorities

Notwithstanding anything to the contrary contained in any law all moneys recovered by way of fines or estreated bail in connection with any offence in terms of this Act, except an offence referred to in section 20 (2), shall be paid to the local authority concerned.

27 Powers of Minister in respect of certain local authorities

(1) If the Minister, after consultation with the council and the Administrator of the province in question, is satisfied that a local authority fails to apply any relevant provision of this Act properly in its area of jurisdiction, the Minister may by notice in writing, served by post or delivered, order such local authority to so apply such provision forthwith.

[Sub-s. (1) substituted by s. 5 *(a)* of Act 36 of 1984.]

(2) If a local authority without reasonable cause fails to comply within a reasonable time with the provisions of any notice served on or delivered to it in terms of subsection (1), the Minister, after consultation with the council and the Administrator of the province in question, may by notice in the *Gazette* deprive such local authority of any power or

exempt it from any duty conferred upon or entrusted to it by or in terms of this Act and confer such power or entrust such duty to any person, including such Administrator, mentioned in such notice, and thereupon such person shall for the purposes of such power or duty be deemed to be such local authority.

[Sub-s. (2) substituted by s. 5 *(b)* of Act 36 of 1984.]

(3) Any notice published in the *Gazette* in terms of subsection (2) may be withdrawn in like manner.

28 Delegations of powers

(1) The Minister may on such conditions as he may think fit, in writing delegate any power conferred on him by or under this Act, other than a power referred to in section 2 (2) or (4), 9 (2), 17, 19, 20, 27 or 29, to the director-general of the bureau, but the delegation of any such power shall not prevent the exercise thereof by the Minister himself.

[Sub-s. (1) substituted by s. 12 of Act 62 of 1989.]

(2) The council may in writing delegate any power conferred upon it-

(a) by or under this Act, other than a power referred to in section 17 or 27, to the director-general of the bureau;

(b) in terms of section 18 (2), on such conditions as it generally or in any particular case may think fit, to any local authority or category of local authorities,

but the delegation of any such power shall not prevent the exercise thereof by the council itself.

(3) The director-general of the bureau may in writing delegate any power delegated to him in terms of subsection (1) or (2) to any person in the employ of the bureau, but the delegation of any such power shall not prevent the exercise thereof by the director-general himself.

(4) Any local authority may in writing delegate any power conferred upon it by or under this Act, other than a power referred to in section 5, to any committee appointed by it or to any person in its employ, but the delegation of any such power shall not prevent the exercise thereof by such local authority itself.

29 Repeal of laws

(1) Subject to the provisions of section 31 the provisions of any law applicable to any local authority are hereby repealed in so far as they confer a power to make building regulations or by-laws regarding any matter provided for in this Act: Provided that such provisions shall be deemed not to have been repealed in respect of-

(a) any such building regulation or by-law which has not been replaced by or which is not repugnant to any national building regulation;

(b) the area of jurisdiction, or any part thereof, of any local authority in so far as it has in terms of section 2 (2) been exempted from the application of any national building regulation, irrespective of whether such area of jurisdiction or part was exempted after the commencement of such national building regulation.

(2) A local authority shall within six months after the coming into operation of the National Building Regulations and Building Standards Amendment Act, 1989, submit any building regulation or by-law referred to in paragraph *(a)* of subsection (1), and any standard building regulation referred to in the proviso to section 31, which is applied by the local authority by reason thereof that it is considered that the regulation or by-law, or standard building regulation, has not lapsed by virtue of subsection (1) or section 31, as the case may be, in consolidated form in both official texts to the Minister.

[Sub-s. (2) added by s. 13 of Act 62 of 1989.]

(3) The Minister shall consider a regulation or by-law, or standard building regulation, referred to in subsection (2), in consultation with the council and taking into consideration any submissions submitted thereon by the local authority in question, in order to determine whether in his opinion and in the opinion of the council it has been replaced by or is

repugnant to any national building regulation, and shall forthwith make known in writing the decision to which he and the council came to the local authority.

[Sub-s. (3) added by s. 13 of Act 62 of 1989.]

(4) With effect from the date of a written notification contemplated in subsection (3) of a decision that a relevant regulation or by-law, or standard building regulation, has been replaced by or is repugnant to any national building regulation, it shall-

(a) for the purposes of subsection (1) *(a)* be deemed that the law under which the relevant building regulation or by-law was made, has been repealed in respect of a regulation or by-law to which the said decision relates; and

(b) for the purposes of section 31 be deemed that section 14*bis* of the Standards Act, 1962 (Act 33 of 1962), under which the standard building regulation was framed and published, has been repealed in respect of a standard building regulation to which the said decision relates.

[Sub-s. (4) added by s. 13 of Act 62 of 1989.]

(5) A local authority shall, in the case of a notification to it in terms of subsection (3) of a decision that a relevant regulation or by-law, or standard building regulation, has not been replaced by or is not repugnant to any national building regulation, make known the decision within a period of three months from the date of the decision by notice in the *Official Gazette* concerned, mentioning the full text of the regulation or by-law, or standard building regulation, concerned, in consolidated form and the law under which it was made or framed.

[Sub-s. (5) added by s. 13 of Act 62 of 1989.]

(6) If a local authority fails to comply with a provision-

(a) of subsection (2) within the period of six months contemplated therein; or

(b) of subsection (5) within the period of three months contemplated therein,

the provisions of paragraph *(a)* or *(b)*, as the case may be, of subsection (4) shall with effect from the day immediately following on the last day of the period of six or three months mentioned in paragraphs *(a)* and *(b)*, respectively, *mutatis mutandis* apply in respect of the relevant regulation or by-law, or standard building regulation.

[Sub-s. (6) added by s. 13 of Act 62 of 1989.]

(7) *(a)* The Minister may at any time, after written notice to the local authority concerned, and *mutatis mutandis* in accordance with the provisions of subsection (3), review any decision contemplated in subsection (5).

(b) The provisions of subsection (4) shall *mutatis mutandis* apply in respect of a decision on review contemplated in paragraph *(a)*, that a regulation or by-law, or standard building regulation, concerned has been replaced by or is repugnant to a national building regulation.

[Sub-s. (7) added by s. 13 of Act 62 of 1989.]

(8) *(a)* A local authority which intends to make any regulation or by-law which relates to the erection of a building, shall prior to the promulgation thereof submit a draft of the regulation or by-law in writing and by registered post to the Minister for approval.

(b) A regulation or by-law referred to in paragraph *(a)* which is promulgated without the Minister previously having approved of it shall, notwithstanding the fact that the promulgation is effected in accordance with all other legal provisions relating to the making and promulgation of the regulation or by-law, be void.

[Sub-s. (8) added by s. 13 of Act 62 of 1989.]

30 .....

[S. 30 repealed by s. 40 (1) of Act 30 of 1982.]

31 Repeal of section 14*bis* of Act 33 of 1962, as inserted by section 4 of Act 72 of 1964

Section 14*bis* of the Standards Act is hereby repealed: Provided that that section shall be deemed not to have been repealed in respect of any standard building regulation which was framed and published in terms of that section and which has not been replaced by or is not repugnant to any national building regulation.

32 .....

[S. 32 repealed by s. 40 (1) of Act 30 of 1982.]

33 .....

[S. 33 repealed by s. 6 of Act 36 of 1984.]

34 Short title and commencement

This Act shall be called the National Building Regulations and Building Standards Act, 1977, and shall come into operation on a date fixed by the State President by proclamation in the *Gazette*.

7.4 ADDENDUM D: NOTICE R. 574 IN *GOVERNMENT GAZETTE* NO. 31084

DEPARTMENT OF TRADE AND INDUSTRY

No. R. 574 **30 May 2008**

NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT, 1977 (ACT 103 OF 1977)

NATIONAL BUILDING REGULATIONS

I, Mandisi Mpahlwa, Minister of Trade and Industry, hereby under Section 17(3) of the National Building Regulations and Building Standards Act (Act No. 103 of 1977), and on the recommendation of the Council of the South African Bureau of Standards, declare the regulations, as set out in the Schedule, to come into operation on the 1 October 2008.

M Mpahlwa
Minister of Trade and Industry

SCHEDULE

Substitution of Regulation AZ.1

1 Regulation **AZ1** of the Regulations is substituted for the following regulation:

These amended regulations shall in terms of section 17(3) of the Act come into operation on 1 October 2008.

Amendment of Regulation AZ.2

Regulation **AZ2** of the Regulations is amended as follows:

2 Delete " suitable" in heading for definition for **"acceptable", "adequate", "satisfactory" or "suitable"** and in the text of the definition itself

3 Add the following new definition:

"action" means an assembly of concentrated or distributed mechanical forces acting on a building or the cause of deformations imposed on the building or constrained in it

4 Add the following new definition:

"Agrément certificate means a certificate that confirms fitness-for-purpose of a non-standardised product, material or component or the acceptability of the related non-standardised design and the conditions pertaining thereto (or both) issued by the Board of Agrément South Africa."

5 Add the following new definition:

Board of Agrément South Africa
the body that operates under the delegation of authority of the Minister of Public Works.

6 Delete definition for **"class"**

7 Substitute **"competent person"** with the following:

means a person who is qualified by virtue of his education, training, experience and contextual knowledge to make a determination regarding the performance of a building or part thereof in relation to a functional regulation or to undertake such duties as may be assigned to him in terms of these regulations .

8 Add the following new definition

"contaminated land" means any land that, due to substances contained within or under it, is in a condition that presents an unacceptable risk to the health and safety of occupants of buildings constructed on such land.

9 Add the following new definition:

"deemed-to-satisfy provision" means non-mandatory requirement, the compliance with which ensures compliance with a functional regulation

10 Add the following new definition:

"dolomite land" means land underlain by dolomite or limestone rock directly or at a shallow depth less than:
(a) 60 m in areas underlain by limestone;
(b) 60 m in areas underlain by dolomite where no de-watering has taken place and the local authority has jurisdiction, is monitoring and has control over the groundwater levels over the areas under consideration; or
(c) 100 m in areas underlain by dolomite where de-watering has taken place or where the local authority has no jurisdiction or control over ground water levels.

11 Substitute "SANS 10177-2" for "SABS 0177 Part II" in definition for **"fire resistance"**

12 Add the following new definition:

"functional regulation" means a regulation that sets out in qualitative terms what is required of a building or building element or building component in respect of a particular characteristic without specifying the method of construction, dimensions or material to be used

13 Add the following new definition:

geotechnical site investigation
the process of evaluating the geotechnical character of a site in the context of existing or proposed works or land usage, which may include one or more of the following:
(a) evaluation of the geology and hydrogeology of the site;
(b) examination of existing geotechnical information pertaining to the site;
(c) excavating or boring in soil or rock and the systematic description of the soil and rock profiles;
(d) determining the depth of any fill that might be present;
(e) in-situ assessment of geotechnical properties of materials;
(f) recovery of samples of soil or rock for examination, identification, recording, testing or display;
(g) testing of soil or rock samples to quantify properties relevant to the purpose of the investigation;
(h) evaluation of geotechnical properties of tested soils; and
(i) reporting the results.

14 Delete definition for **"incremental house"**

15 Insert " waste water" before "or stormwater" at the end of the definition for "industrial effluent

16 Add the following new definition:

"inspection" means the general inspection by a competent person of a system or measure or installation of a building, or part thereof, at such intervals as might be necessary in accordance with accepted professional practice to enable such competent person to be satisfied that the design assumptions are valid, the design is being correctly interpreted and the work is being executed generally in accordance with the designs, appropriate construction techniques and good practice but shall exclude detailed supervision and day-to-day inspection.

17 Substitute **"load"** with the following:

"load" means the value of a force corresponding to an action.

18 Substitute (a) ix) in "**minor building work**" with the following:

(ix) any free-standing wall constructed of masonry, concrete, steel, aluminium or timber or any wire fence where such wall or fence does not exceed 1,8 m in height at any point above ground level and does not retain soil;

19 Substitute "SANS 10177-5" for "SABS 0177-V" in definition for **"non-combustible"**

20 Delete definition for **"pail closet"**

21 Add the following new definition:

"**persons with disabilities**" means those persons who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers might hinder their full and effective participation in society on an equal basis with others."

22 Delete definition for **"pit latrine"**

23 Add the following new definition:

"prescriptive regulation" means a regulation which describes in some detail an operation to be performed, or the dimensions of a building, building element or building component and the materials and method of construction to be used in such building, building element or building component

24 Add the following new definition:

"rational assessment" means assessment by a competent person of the adequacy of the performance of a solution in relation to requirements including, as necessary, a process of reasoning, calculation and consideration of accepted analytical principles, based on a combination of deductions from available information, research and data, appropriate testing and service experience;

25 Substitute **"rational design"** with the following:

"rational design" means any design by a competent person involving a process of reasoning and calculation and which may include a design based on a standard or other suitable document

26 Delete definition for **"roof assembly"**

27 Delete definition for **"sanitary group"**

28 Substitute "WC" in the definition for "**storage tank**" with "toilet"

29 Delete "mezzanine floor" in definition for "**storey**"

30 Delete definition for **"street boundary"**

31 Add the following new definition:

"suitable" means capable of fulfilling or having fulfilled the intended function or fit for its intended purpose

32 Add to the end of the definition for "**trained plumber**" the words "or has obtained a National Certificate in Construction Plumbing, National Qualification Framework level 3".

Substitution of Regulation AZ.3

33 Regulation **AZ.3** of the Regulations is substituted with the following regulation:
Where in these regulations reference is made to a SANS number, such reference shall relate to the latest edition of the national standard having the number and title given in the following table:

1	2
SANS No.	**Title**
1125	Room air conditioners and heat pumps
10005	The preservative treatment of timber
10082	Timber frame buildings .
10105	The use and control of fire fighting equipment
10124	The application of soil insecticides for the protection of buildings
10177	Fire testing of materials, components, and elements used in buildings Part I Part 2 Part 3, Part 4
10400	The application of the National Building Regulations

Addition of Regulation AZ.4

34 Add the following Regulation **AZ.4**

AZ.4 Complying with the requirements of the National Building Regulations

(1) The requirements of the National Building Regulations shall be complied with by:
(a) adhering to the requirements of all the prescriptive regulations; and
(b) satisfying all functional regulations by:

(i) adopting building solutions that comply with the requirements of the relevant part of SANS 10400; or
(ii) reliably demonstrating, or predicting with certainty, to the satisfaction of the appropriate local authority, that an adopted building solution has an equivalent or superior performance to a solution that complies with the requirements of the relevant part of SANS 10400.

(2) A competent person who is registered in an appropriate category of registration in terms of the Architectural Professions Act, 2000 (Act No 44 of 2000), the Engineering Profession Act, 2000 (Act No 46 of 2000), the Natural Scientific Professions Act, 2003 (Act No. 27 of 2003) or any other relevant Act and, in accordance with the requirements of Regulation A19, shall prepare and submit to the local authority a rational design or rational assessment where compliance with the requirements of sub-regulation (1) is to be satisfied in terms of sub-regulation (1)(b)(ii).

(3) An approved competent persons who satisfies the requirements of sub-regulation (1) in terms of sub-regulation (1)(b)(ii) in respect of a system, measure, facility, parameter or installations shall inspect and certify upon completion, in accordance with the requirements of Regulation A19, the construction, erection or installation thereof.

Amendment of Regulation A1

Regulation **A1** of the Regulations is amended as follows:

35 Substitute sub-regulation **A1(1)** with the following:

(1) The designing, planning and the supervision of the erection of any building or structure or the performance of any function in connection therewith in terms of these regulations is subject to the provisions of any law in terms of which the person undertaking such work or performing such function is required to be registered in terms of the Architectural Profession Act, 2000 (Act No 44 of 2000), Engineering Profession Act, 2000 (Act No 46 of 2000), Natural Scientific Professions Act, 2003 (Act No. 27 of 2003), or Professional and Technical Surveyors' Act. 1984 (Act No 40 of 1984) , or any other relevant Act

36 Substitute sub-regulation **A1(3)** with the following:

(3) **(a)** No person shall erect any building which is to be structurally supported by an existing building or extend an existing building unless an approved competent person has judged the existing building to be capable of carrying any additional load arising from such erection or extension and has, in writing, so informed the local authority.

(b) Such notification shall accompany the application for approval of the erection of the building in terms of Section 4 of the Act.

(c) For the purposes of this regulation "existing building" shall include a partly erected building.

(d) Any structural support provided by the existing building shall be deemed to be part of the structural system of the building to be erected.

(e) The local authority may require that the above notification be accompanied by a documented rational assessment of the adequacy of the structural support."

37 Delete sub-regulation **A1(7)(c)** and renumber sub-regulation **A1(7)(d)** as **A1(7)(c)**

Amendment of Regulation A2

Regulation **A2** of the Regulations is amended as follows:

38 Substitute sub-regulation **A2(1)(f)(iv)** with the following:

(iv) any certificate contemplated in these regulations, including any applicable Agrément Certificate;

39 Substitute sub-regulation **A2(1)(f)(v)** with the following:

(v) particulars required in terms of any applicable legislation, by-laws, or part of SANS 10400

40 Add sub-regulation **A2(1)(g)**

(g) a declaration by a person registered in a professional category of registration in terms of the one of the councils for the professions identified in the Council for the Built Environment Act, 2000 (Act No 43 of 2000) in the relevant portion of Form 1 contained in SANS 10400-A as to how the applicable functional regulations shall be satisfied

41 Add sub-regulations **A2(2), A2(3)** and **A2(4)** and renumber sub-regulations **A2(2)** and **A2(3)** as **A2(5)** and **A2(6)**

(2) The owner of a building shall appoint and retain the services of the person responsible for submitting the declaration required in sub-regulation (1)(g) and shall advise such person after such declaration has been submitted to the local authority of any changes made in the manner in which any functional regulation shall be satisfied or if the services of the competent person is for whatever reason terminated prior to the conclusion of his obligations in terms of these Regulations, or the appointment of any other competent person. Such person shall within one month of being notified by the owner or becoming aware of any change submit an amended declaration to the local authority.

(3) Where it is not possible for the person appointed by the owner of a building in sub-regulation (2) to fulfil his or her duties, the owner of such building shall appoint and retain another suitably qualified person to take over and perform the duties and responsibilities assigned to such person in sub-regulation (2)

(4) The names of all approved competent persons shall be entered into the appropriate schedule of Form 1 contained in SANS 10400-A before local authority approval may be granted.

42 Substitute sub-regulation **A(2)(6)** with:

(6) **(a)** Where design work for the proposed erection of any building was commenced before the date of coming into effect of any amendment to these regulations or within 6 months of the publication of an edition of any part of SANS 10400 or a by-law and an application in respect of such erection has not been made prior to such date, the owner of the building, or a person authorized by the owner, may notify the local authority that such design work was so commenced and has so progressed.

(b) Subject to the provisions of this subregulation, an application in respect of an erection which has been the subject of a notification contemplated in paragraph **(a)** shall if so requested by the owner be dealt with by the local authority in accordance with the provisions of the building regulations, by-laws or edition of SANS 10400 in force immediately before such date.

(c) Any notification contemplated in paragraph **(a)** shall -

(i) be submitted by registered post within 6 months of the coming into effect of any new regulation, by-law or publication of a new edition of any part of SANS 10400; and

(ii) contain the name and address of the owner, the address of the site of the building concerned, the date of commencement of such design work and a description of the proposed erection and its intended use.

(d) The local authority shall, in writing, inform the owner concerned of acceptance of such notification.

(e) The provisions of paragraph **(b)** shall not apply in respect of any application which is made to the local authority more than 12 months after the date that the local authority informs the owner that it is so satisfied: Provided that the local authority may extend such period if it thinks it reasonable or necessary.

(f) Any person who gives false or misleading information in a notification in terms of this subregulation shall be guilty of an offence and such notification is null and void.

Amendment of Regulation A4

Regulation **A4** of the Regulations is amended as follows:

43 Substitute "a professional engineer or other" with "an" in sub-regulation **A4(1)(b)**

44 Substitute "code of practice" with "standard" in Regulation **A4(1) (h), (i), (j)** and **(k)**

45 Substitute "forces" with "actions" in sub-regulation **A4(4)(d)** wherever it occurs

46 Substitute "grade" with "class" in sub-regulation **A4(5)(a)**

47 Substitute "SABS" with "SANS" in sub-regulation **A4(8)(a)**

48 Substitute "a professional engineer or other" with "an" in sub-regulation **A4(8)(b)**

49 Insert "Agrément " before certificate and delete "issued by the Agrément Board of South Africa" in sub-regulation **A4(9)(ii)**

Amendment of Regulation A5

Regulation **A5** of the Regulations is amended as follows:

50 Substitute sub-regulation **A5(2)(b)** with the following:
(b) be drawn on any suitable material or be provided in a medium acceptable to the local authority;

51 Delete "paper " in sub-regulation **A5(3)**

52 Substitute "1:300" with "1:250" in sub-regulation **A(5)(5)(a)(i)**

53 Substitute sub-regulation **A5(5)(b)** with the following:

(b) The local authority may accept a scale not provided for in this sub-regulation.

54 Substitute sub-regulations **A8(6)** and **A8(7)** with the following:

(6) One copy of the plans and drawings contemplated in subregulation **(2)** shall, for the convenience of the local authority, identify in a suitable manner or colour the following as indicated below:

	Material	Colour (in plan or section)
(a)		
(i)	New masonry	Red
(ii)	New concrete	Green
(iii)	New iron or steel	Blue
(iv)	New wood	Yellow
(v)	New glass	Black
(vi)	Existing materials (all materials)	Grey
(vii)	All other new materials	To be clearly indicated in colours other than the above

(b)	Site plans	Colour
(i)	Proposed work	Red
(ii)	Existing work	Not coloured
(iii)	Work to be demolished	Drawn with black dotted lines

(c)	Drainage installation contemplated in regulation **A2(1)(d)**	Colour
(i)	Drains and soil pipes	Brown
(ii)	Waste pipes	Green
(iii)	Soil and combined vents	Red
(iv)	Waste vents	Blue
(v)	Pipes for the conveyance of industrial effluent	Orange
(vi)	Existing drains	Black
(vii)	Stormwater drains	Not coloured

55 Renumber sub-regulations **A5(8)** and **A5(9)** as **A5(7)** and **A5(8)**

56 Substitute "2 mm" with "2,5mm" in sub-regulation **A5(8)**

Amendment of Regulation A7

Regulation **A7** of the Regulations is amended as follows:

57 Add the following sub-regulation A7(1)(e) and renumber sub-regulations **A7(1)(e)** to **A7(1)h** as **A7(1)f** to **A7(1)(i)**

(e) all details relating to the facilities provided for persons with disabilities

Amendment of Regulation A8

Regulation **A8** of the Regulations is amended as follows:

58 Add "Two way vent valve .....2WVV to list in sub-regulation **A8(5)**

59 Substitute "WC" in sub-regulation **A8(5)** with "toilet" wherever it occurs

Amendment of Regulation A9

Regulation **A9** of the Regulations is amended as follows:

60 Add "protection" before "fire" in sub-regulation **A9(1)**

Amendment of Regulation A10

Regulation **A10** of the Regulations is amended as follows:

61 Add the following symbols to the list in sub-regulation **A10:**

Escape door .....ED
Escape route.....ER
Feeder route .....FR

Amendment of Regulation A11

Regulation **A11** of the Regulations is amended as follows:

62 Delete" before granting approval in relation to an application" in sub-regulation **A11(1)**

Amendment of Regulation A13

Regulation A13 of the Regulations is amended as follows:

63 Substitute sub-regulation **A13(1)** with the following:

(1) **(a)** Material used in the erection of a building shall be suitable for the purpose for which it is to be used.

(b) All timber used in the erection of a building shall be treated against termite and wood borer attack and fungal decay in accordance with the requirements of SANS 10005 and shall bear the product certification mark of a body certified by the South African National Accreditation Systems.

(c) The requirements of subregulation **(1)(a))** shall be deemed to be satisfied if such material complies with and is incorporated into buildings in accordance with the requirements of SANS 10400,

Amendment of Regulation A14

Regulation A14 of the Regulations is amended as follows:

64 Substitute regulations A14(1) to A14(4) with the following and renumber sub-regulation A14(5) as A14(2):

(1) **(a)** The construction of any building or element shall be such that the building or element as constructed does not compromise the design intent of any design solution that satisfies the requirements of a functional regulation.

(2) **(b)** The requirements of sub-regulation **(1)(a)** shall be deemed to be satisfied if such construction satisfies the requirements of SANS 10400.

Amendment of Regulation A15

Regulation A15 of the Regulations is amended as follows:

65 Substitute title of Regulation A15 and sub-regulations A15(1) and A15(2) with the following:

A15 MAINTENANCE AND OPERATION

(1) **(a)** The owner of any building shall ensure that any mechanical equipment, facility or any service installation provided in or in connection with such building, pursuant to these regulations or pursuant to any building by-law which was in operation prior to the coming into operation of the Act, shall be maintained in a safe and functional condition.

(b) Such owner or any person appointed by such owner to be in control of such building shall ensure that where such equipment, facility or installation is designed to be kept operating during the times of normal occupancy of the building, it is kept operating in such a manner as to attain any standard of performance prescribed in these regulations or in any by-law for such equipment or installation.

(2) The owner of any building shall ensure that pursuant to these regulations or pursuant to any building by-law that was in operation prior to the coming into operation of the Act, the following is maintained in accordance with the requirements of the relevant functional regulations contained in Regulations B, H, J, K and L:

i) the structural safety performance (behaviour of buildings under all actions that can be reasonably expected to occur);

ii) the measures taken to resist the penetration of rain water and the passage of moisture into the interior of a building

66 Substitute "equipment or installation" with "building, equipment, installation or facility" in sub-regulation **A15(4)**

Amendment of Regulation A16

Regulation **A16** of the Regulations is amended as follows:

67 Substitute "as evaluated by the Human Sciences Research Council" with "at an accredited educational institution" in Regulation **A16**

Amendment of Regulation A17

Regulation **A17** of the Regulations is amended as follows:

68 Substitute " Town Clerk or Secretary" with "municipal manager" in sub-regulation **A17(1)(e)**

69 Substitute subregulation **A17(2)** with the following:

(2) Sub-regulation **(1)** shall be deemed to be satisfied where the certificate is in accordance with that provided in SANS 10400-A.

Substitution of Regulation A19

Regulation **A19** of the Regulations is substituted with the following Regulation:

70 Substitute Regulation **A19** with the following:

A19 - APPOINTMENT OF PERSONS RESPONSIBLE FOR DESIGN, INSPECTION AND ASSESSMENT DUTIES

(1) Where in terms of these regulations and in respect of the erection of any building:

(a) a rational design or rational assessment, is required in terms of :

(i) Regulations **Z.4(1)(b)(ii), A(1)(3), A23(4), G1(3), O4, P2(2), Q(3), R(3), T1(2)** or **W4** in respect of a system, measure, facility, parameter, or installation, as relevant, or

(ii) a part of SANS 10400; or

(b) a geotechnical investigation is required in terms of Regulation **F3**

the owner of the building shall subject to the provisions of sub-regulations **(4)** and **(5)** appoint and retain one or more approved competent persons to undertake responsibility for the work associated with such regulations including any inspections and certifications that may be required.

(2) Where it is not possible for such person to fulfil his or her duties as contemplated in sub-regulation (1), the owner of such building shall appoint and retain another approved competent person to take over and fulfil such duties and responsibilities both in respect of the work already designed or erected or installed and in respect of the balance of such work still to be undertaken to complete the project.

(3) The local authority may exempt from the requirements of this regulation any building classified in these regulations as minor building work or foundations to an addition or extension to a single storey building where the applicant has satisfied himself that the existing foundations are in accordance with the rules contained in SANS 10400-H and any local damage (including cracking) and deformation in the existing building are within tolerable limits.

(4) The owner of any building who is required by these regulations to appoint an approved competent person shall state in the terms of the appointment for the competent person that such person undertake all duties and responsibilities required by these regulations. Such persons shall declare his or her acceptance of such responsibilities in the relevant portion of Form 2 contained in SANS 10400-A.

(5) Notwithstanding the provisions of sub-regulation (1) or (2), a person may be appointed to undertake the relevant responsibilities and duties in respect of more than one of the systems, measures, facilities, parameters or installations provided for in sub-regulation (1) if the local authority accepts in terms of these regulations that he or she is competent to do so.

(6) (a) Where any building to be extended, the local authority may on receipt of the application for such extension and before granting approval require that the approved competent persons who have accepted responsibility for such work to timeously prepare and submit rational assessments as to the adequacy of the existing systems and installations in combination with the contemplated extensions to comply with the relevant requirements of these regulations for the whole building including the extensions.
(b) If the local authority is satisfied that any such rational assessment meets the requirement of these regulations and in particular of sub-regulation 6(a) it shall accept such assessment which shall be deemed to be part of the application submitted.
(c) If the local authority is not so satisfied it may after first consulting with the competent person who has submitted such assessment and subject to appeal to the Review Board decline to accept the assessment for reasons which it shall furnish in writing to such competent person and require him or her to submit a revised assessment to the satisfaction of the local authority.

(7) Where in a building any element of the structural, fire protection, artificial ventilation, stormwater disposal or non-water borne sanitary disposal, fire installation or drainage installation system as provided for in sub-regulation (1) is or is required to be the subject of a rational design or rational assessment, the person appointed as an approved competent person shall assume responsibility for satisfying the functional regulation relating to that particular system in its entirety.

(8) (a) Where an approved competent person is required in terms of sub-regulation (7) to assume responsibility for the system in its entirety and where parts of the system are to be undertaken by other competent persons, the approved competent person shall assume overall responsibility for the design of such system and shall ensure that:
(i) the component designs are generally in accordance with the approved application and in accordance with the requirements of these regulations.
(ii) the component designs will achieve the necessary co-ordination and interaction of the different elements so as to achieve the objectives of the systems.

(iii) in the case of the structural system, the interaction of the various component elements will be such that the structural adequacy of all the parts of the building and the overall stability of the building is assured

but in all cases excluding responsibility for the detailed design of elements carried out by the other competent persons, provided that such exclusion shall not preclude the approved competent person from taking any action which he or she considers necessary in terms of sub-regulation **(8)(b)**.

(b) (i) For the purpose of satisfying him or herself of the adequacy of any design or designs contemplated in sub-regulation **(8)(a)** and of their compatibility with any system, measure or installation in its entirety, the approved competent person may at any time after his or her appointment, require the designer or designers of the different elements of the system referred to in sub-regulation **(8)(a)** to complete Form 3 contained in SANS 10400-A as he or she may deem necessary, and return it timeously, or in any event before building construction or installation proceeds. Each such designer shall, when called upon so to do, provide the information and documents concerned in respect of the work he or she has designed.

(ii) The person appointed as approved competent person may further require, after consultation with the designer concerned, modifications to the relevant designs, plans and specifications, if in his or her opinion they do not comply with the provisions of these regulations.

(iii) Copies of designs, plans and specifications accepted by the approved competent person shall be submitted if so required to the local authority counter-signed by the approved competent person.

(iv) Each designer of a part of a system shall on completion of the erection or installation thereof, if called upon to do so by the approved competent person, complete and submit the section of Form 3 relating to inspection contained in SANS 10400-A.

(c) The provisions of sub-regulation **(8)(a)** and **(b)** for designs shall also apply in the case of any applicable rational assessments.

(9) **(a)** Any person appointed by the owner in terms of sub-regulations **(1)** or **(2)**, shall apply to the local authority for acceptance as an approved competent person and shall:

(i) make application, and

(ii) declare his or her competence to undertake the relevant duties in the manner prescribed in the Regulations

on Form 2 contained in SANS 10400-A and shall complete all applicable sections of such form.

(b) The owner shall also complete the applicable section of Form 2 contained in SANS 10400-A.

(c) The local authority may, subject to appeal to the Review Board, decline to accept the appointment of any person who:

(i) in completing any portion of Form 2 provides incorrect or incomplete information which in the opinion of the local authority is material to the determination of such applicant's competence;

(ii) is not an employee of the owner of the building and is not in possession of professional indemnity insurance cover;

(iii) is not professionally registered in terms of the Engineering Professions Act, 2000 (Act No. 46 of 2000), the Architectural Professions Act (Act No. 44 of 2000) or the National Scientific Professions Act, 2003 (Act No. 27 of 2003);

(iv) is in the opinion of the local authority inadequately qualified or has insufficient experience or contextual knowledge to make the determinations that are required in terms of these regulations, provided however that any person that satisfies the relevant definition for a competent person provided in a part of SANS 10400 in relation to the duties contemplated in this sub-regulation, is deemed to satisfy this sub-regulation; and

(v) is under investigation by a disciplinary tribunal of the Engineering Council of South Africa, the South African Council for the Architectural Profession or the South African Council for Natural Scientific Professions and the chief executive officer of such a Council has expressed an opinion in writing that the applications made by such persons should not be approved in the public interest.

(10) (a) Where in respect of any building the local authority, after consideration of:
(i) the details of registration in respect of category, date and discipline in which the applicant is registered, qualifications, experience, training and contextual knowledge provided in terms of this regulation by any person seeking acceptance of his or her appointment as a competent person, and
(ii) the declaration of competence provided by such person in terms of sub-regulation (9),
considers that such person does not possess the degree of competence necessary to undertake the relevant duties, it may decline to accept the appointment of such person, who may appeal to the Review Board.
(b) If the appeal is upheld, the local authority shall accept the appointment of the appellant as a person competent to undertake such duties or any part thereof in respect of such building as the Review Board may decide.

(11) Where the local authority is satisfied with an application in respect of the matters specified in sub-regulations **(10)(a)(i)** and **(ii)** it shall indicate acceptance of the application in the manner specified in Form 2 as contained in SANS 10400-A.

(12) **(a)** On completion of the structural, fire protection or fire installation system for which an approved competent person has been appointed in terms of sub-regulations **(1)** or **(2)**, such competent person shall complete and submit to the local authority a fully completed Form 4 as contained in SANS 10400-A in respect of each such system for which such person has accepted responsibility in terms of Section 14(2A) of the Act 103.
(b) The local authority may require from the owner that an approved competent person submit a copy of the certification of the specific work, other than the structural, fire protection or fire installation, for which he has been appointed on completion of the building.

(13) Where any person provides any information or certificate required in terms of this regulation or which he or she knows to be incomplete or false, such person shall be guilty of an offence

Amendment of Regulation A20

Regulation **A20** of the Regulations is amended as follows:

71 Add the following definitions to Table 1:

E4	**Health care** Occupancy which is a common place of long term or transient living for a number of unrelated persons consisting of a single unit on its own site who, due to varying degrees of incapacity, are provided with personal care services or are undergoing medical treatment.
H5	**Hospitality** Occupancy where unrelated persons rent furnished rooms on a transient basis within a dwelling house or domestic residence with sleeping accommodation for not more than 16 persons within a dwelling unit.

Amendment of Regulation A21

Regulation **A21** of the Regulations is amended as follows:

72 Substitute Table 2 with the following table:

1	2
Class of occupancy of room or storey or portion thereof	**Population**
A1, A2, A4, A5	Number of fixed seats or 1 person per m² if there are no fixed seats
E1, E3, H1, H3, H4	2 persons per bedroom
E4	16 persons provided that the total number of persons per room is not more than 4
H5	16 persons per dwelling unit provided that the total number of persons per room is not more than 4
G1	1 person per 15 m²
J1, J2, J3, J4	1 person per 50 m²
C1, E2, F1, F2	1 person per 10 m²
B1, B2, B3, D1, D2, D3	1 person per 15 m²
C2, F3	1 person per 20 m²
A3, H2	1 person per 5 m²

Amendment of Regulation A22

Regulation **A22** of the Regulations is amended as follows:

73 Add " **(d)** the building will be completed" to sub-regulation **A22(2)**

Amendment of Regulation A23

Regulation **A23** of the Regulations is amended as follows:

74 Substitute "a professional engineer or other" with "an" in sub-regulation **A23(4)**

Amendment of Regulation B1

Regulation **B1** of the Regulations is amended as follows:

75 Add "under all actions which can reasonably be expected to occur" after "durability" in sub-regulation **B1(1)**

76 Substitute "part B of Section 3 of SABS 0400" with "SANS 10400-B" in sub-regulation **B3(3)**

Amendment of Regulation C

Regulation **C** of the Regulations is amended as follows:

77 Substitute "part C of Section 3 of SABS 0400" with "SANS 10400-C" in sub-regulation **C1(3)**

Amendment of Regulation D

Regulation **D** of the Regulations is amended as follows:

78 Substitute "part D of Section 3 of SABS 0400" with "SANS 10400-D" in sub-regulation **D5**

Amendment of Regulation F

Regulation F of the Regulations is amended as follows:

79 Substitute Regulation **F3** with the following:

F3 GEOTECHNICAL SITE AND ENVIRONMENTAL CONDITIONS

(1) Where the local authority has reason to believe that a site upon which a building is to be erected:

(a) is situated on contaminated land;

(b) is situated on potentially unstable land to the extent, insofar as risk can reasonably be foreseen, that ground movements caused by land-slip, slope stability or subsidence may impair the stability of the building or part thereof or pose a threat to the safety of occupants; or

(c) is underlain by subsoils which have the potential to cause foundation movements caused by swelling, consolidation, shrinkage or settlements and as a result may impair the stability of the building or part thereof;

it shall on receipt of an application for the erection of the building inform the applicant accordingly.

(2) On receipt of any such notification or where the applicant is aware of such conditions or they are evident, such applicant shall appoint an approved competent person to undertake an appropriate geotechnical site investigation.

(3) Such approved competent person shall, as appropriate, determine in accordance with accepted principles, methods and technical considerations, as relevant:

(a) whether or not the erection of a building on the site under **(1)** (a) or **(1)** (b) above should be permitted, and if so under what conditions, providing full details of the measures which need to be effected to fulfil such conditions and

(b) the magnitude of any potential total and differential movements to which the building or part thereof may be subjected to,

and shall report to the owner and the local authority such findings.

(4) Geotechnical investigations conducted in accordance with the requirements of SANS 10400-B in the case of dolomite lands and SANS 10400-H in the case of foundations for buildings shall in terms of **F3(2)** be deemed to be appropriate investigations

(5) The measures contemplated in sub-regulations **(3)(a)** and **(b)** shall be applied in the erection of the building and the site works.

80 Add "seasonally waterlogged" after "waterlogged" in sub-regulation **F4(2)**

81 Substitute "SABS 0124" with "SANS 10124" in sub-regulation **F5** wherever it occurs

82 Substitute Regulation **F5** with the following:

(1) Buildings shall, where so required by the local authority or in areas of high termite infestation, be protected from subterranean termite activity.

(2) The requirements of subregulation **(1)** shall be deemed to be satisfied where the means of termite protection complies with SANS 10400-F.

83 Substitute the title of Regulation **F6** with the following:

CONTROL OF UNREASONABLE LEVELS OF DUST AND NOISE

84 Substitute sub-regulation **F6(2)(a)** and **F6(2)(b)** with the following and renumber **F6(2)(c)** as **F6(2)(b):**

(2) **(a)** No person shall during the course of any building, demolition or excavation work use any machine, machinery, engine, apparatus, tool or contrivance, which in the opinion of the local authority may unreasonably disturb or interfere with the amenity of the neighbourhood:
(i) on a public holiday or Sunday
(ii) before 06:00 or after 17:00 on any Saturday; and
(iii) before 06:00 or after 18:00 on any day other than those days contemplated in subparagraphs **(i)** and **(i)**

85 Substitute "part F of Section 3 of SABS 0400" with "SANS 10400-F" in sub-regulation **F11(3)**

Amendment of Regulation G

Regulation **G** of the Regulations is amended as follows:

86 Add " or an approved competent person" before "in such authorisation in sub-regulation **G1(3)(b).**

87 Substitute "part G of Section 3 of SABS 0400" with "SANS 10400-G" in sub-regulation **G2**

Amendment of Regulation H

Regulation **H** of the Regulations is amended as follows:

88 Substitute sub-regulation **H1(1)** with the following:

(1) The foundation of any building shall be designed and constructed to safely transmit all the actions which can reasonably be expected to occur from such building to the ground and in such a manner that any local damage (including cracking), deformation or vibration do not compromise the efficient use of a building or the functioning of any element of a building or equipment within a building.

89 Substitute "part H of Section 3 of SABS 0400" with "SANS 10400-H" in sub-regulation **H1(2)**

Amendment of Regulation J

Regulation J of the Regulations is amended as follows:

90 Substitute sub-regulation **J1(1)(a)** with the following:
(a) be designed and constructed to safely support its own weight and any actions which can reasonably be expected to occur and in such a manner that any local damage (including cracking), deformation or vibration do not compromise the efficient use of the building or the functioning of equipment supported by such floor; and

91 Substitute "WC" in sub-regulation **J1(2)** with "toilet"

92 Substitute sub-regulation **J(5)** with the following:

(5) The requirements of subregulations **(1), (2), (3)** and **(4)** shall be deemed to be satisfied where the design and construction of any floor complies with SANS 10400-J: Provided that where the local authority deems it necessary in order to satisfy the requirements of subregulation **(4)**, such local authority may require that the entire area within the foundation walls of any building be covered by a suitable damp-proof membrane, and in the case of the floor of a basement or semi-basement where the highest known level of the extreme watertable is higher than the floor level of the basement to such an extent that uplift of the floor might occur, the local authority may require that adequate sub-soil drains under the floor be provided together with means of removing the water so drained.

Amendment of Regulation K

Regulation **K** of the Regulations is amended as follows:

93 Substitute sub-regulation **K1** with the following:
Any wall shall be designed and constructed to safely sustain any actions which can reasonably be expected to occur and in such a manner that any local damage (including cracking) or deformation do not compromise the opening and closing of doors and windows or the weather tightness of the wall and in the case of any structural wall, be capable of safely transferring such actions to the foundations supporting such wall.

94 Substitute sub-regulation **K2** with the following:

(1) Any wall shall be so constructed that it will adequately resist the penetration of water into any part of the building where it would be detrimental to the health of occupants or to the durability of such building.

(2) Where a building includes a basement or semi-basement, the local authority may, if it considers that conditions on the site on which the building is to be erected necessitate integrated designs for the penetration of water into such basement or semi-basement applicable to all construction elements or components thereof, require the submission of such designs for approval. Construction shall be in accordance with the requirements of the approved design.

95 Substitute "forces" with "actions" in sub-regulation **K3**

96 Substitute "part K of Section 3 of SABS 0400" with "SANS 10400-K" in sub-regulation **K5**

Amendment of Regulation L

Regulation **L** of the Regulations is amended as follows:

97 Substitute sub-regulation **L1** with the following:

The roof of any building shall be so designed and constructed that it -
(a) safely sustains any actions which can reasonably be expected to occur and in such a manner that any local damage (including cracking) or deformation do not compromise its functioning;
(b) is adequately anchored against wind uplift;
(c) is durable and does not allow the penetration of rainwater or any other surface water to its interior;
(d) does not allow the accumulation of any water upon its surface; and
(e) as part of a roof and ceiling assembly, provides adequate height in any room immediately below such assembly.

98 Substitute "part L of Section 3 of SABS 0400" with "SANS 10400-L" in sub-regulation **L3**

Amendment of Regulation M

Regulation **M** of the Regulations is amended as follows:

99 Substitute **M1** with the following:
Any stairway, including any wall, screen, railing or balustrade to such stairway, shall:

(a) be capable of safely sustaining any actions which can reasonably be expected to occur and in such a manner that any local damage (including cracking) or deformation do not compromise its functioning;
(b) permit safe movement of persons from floor to floor; and
(c) have dimensions appropriate to its use.

100 Substitute "part M of Section 3 of SABS 0400" with "SANS 10400-M" in sub-regulation **M3**

Amendment of Regulation N

Regulation **N** of the Regulations is amended as follows:

101 Substitute sub-regulation **N1(1)(a)** with the following:

"a) safely sustain any wind actions which can reasonably be expected"

102 Substitute sub-regulation **N1(3)** with the following:

Replace "part N of Section 3 of SABS 0400" with "SANS 10400-N"

Amendment of Regulation O

Regulation **O** of the Regulations is amended as follows:

103 Substitute "WC" with "toilet" in sub-regulation **O1(1)**

104 Substitute sub-regulation **O1(2)** and **O1(3)** with the following:

(2) The requirement of subregulation **(1)** shall be deemed to be satisfied where the lighting and ventilation are in accordance with SANS 10400-O

(3) **(a)** Notwithstanding the provision of any openings for natural light in accordance with subregulation **(2)** any room contemplated in subregulation **(1)** or any corridor, lobby or staircase serving such room shall be provided with a means of artificial lighting-
(i) for periods when natural lighting is inadequate; or
(ii) where the size or shape of any such room, or the glazing material used in any such opening, will not permit sufficient natural light effectively to illuminate all parts of such room.
(b) Notwithstanding the provision of openings for natural ventilation in accordance with subregulation **(2)** any room subject to the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), shall in terms of the said Act be provided with artificial ventilation as prescribed by such Act; and any room contemplated in subregulation **(1)** which is -
(i) a room which, due to conditions of high temperature, may be dangerous to safety or health;
(ii) a room where there will be dust, gas, vapour or volatile matter and hazardous biological agents which might be dangerous to safety or health; or
(iii) used for any purpose for which natural ventilation is not suitable,
shall be provided with a means of artificial ventilation.

105 Substitute sub-regulation **O4** with the following:

Any rational design of an artificial ventilation system shall be carried out by or under the supervision of an approved competent person who shall certify in accordance with the requirements of Regulation **A19** that the system has been designed to comply with regulation **O1.**

106 Substitute "part O of Section 3 of SABS 0400" with "SANS 10400-O" in sub-regulation **O5(2)**

107 Substitute sub-regulation **O6** with the following

(1) The owner shall at acceptable intervals of time submit to the local authority test reports indicating that any artificial ventilation system installed in terms of these regulations is operating in the designed manner.
(2) Records and log books shall be kept of the commissioning information, operational management, monitoring and maintenance and repair of all ventilation plant, including individual ventilation fans.
(3) Where specialist ventilation plants are provided as part of the protection measures against hazardous substances, and for the protection of occupants and to ensure safe procedures, such as in hospital theatres, such plant shall be inspected and validated at least every 12 months by an independent competent person.

Amendment of Regulation P

Regulation P of the Regulations is amended as follows:

108 Substitute "loads and forces" with "actions" in sub-regulation **P2(1)(f)**

109 Substitute sub-regulation **P2(2)** with the following:

(2) The requirements of subregulation (1) shall be deemed to be satisfied where such installation complies with SANS 10400-P: Provided that where a local authority is of the opinion that the size or complexity of the drainage installation in any building renders it essential for such installation to be the subject of an approved rational design prepared by an approved competent person, such local authority shall, in writing, notify the owner of such building of its reasons for the necessity for such design and may require such owner to submit for approval plans and particulars of a complete drainage installation based on such design.

110 Substitute sub-regulation **P3(1)(b)** with the following:

(b) subject to the National Water Act, 1998 (Act No 36 of 1998), any river, stream or natural watercourse whether ordinarily dry or otherwise; or

111 Substitute "part P of Section 3 of SABS 0400" with "SANS 10400-P" in sub-regulation **P7(1)**

Amendment of Regulation Q

Regulation **Q** of the Regulations is amended as follows:

112 Substitute sub-regulation **Q1** with the following:
Where water-borne sewage disposal is not available other means of sewage disposal shall be permitted by the local authority: Provided that:

a) it stores, conveys, processes and disposes of human body wastes and wastewater in such a way that the pathogens, pollutants and contaminants associated therewith do not compromise the health and safety of the original user or others; and
b) in the case of chemical or toilet a satisfactory means is available for the removal and disposal of sewage from such closets;

113 Substitute "latrine" with "toilet" in sub-regulation **Q2**

114 Substitute sub-regulation **Q3(3)(a)** with the following:

(3) **(a)** The requirements of subregulation **(1)** shall be deemed to be satisfied where the design and construction, siting of, and access to such other means of sewage disposal complies with SANS 10400-Q; Provided however that where a local authority is of the opinion that the nature of the means of sanitary disposal is such that it is essential for such installation to be the subject of an approved rational design prepared by an approved competent person, such local authority shall, in writing, notify the owner of such building of its reasons for the necessity for such design and may require such owner to submit for approval plans and particulars of a complete installation based on such design

Amendment of Regulation R

Regulation R of the Regulations is amended as follows:

115 Substitute sub-regulation **R1(3)** with the following:

(3) The requirements of subregulation **(1)** shall be deemed to be satisfied where such means of stormwater disposal is provided in accordance with SANS 10400-R: Provided that where a local authority is of the opinion that the conditions on any site render it essential for stormwater disposal to be the subject of an acceptable rational design prepared by an approved competent person, such local authority shall, in writing, notify the owner of such site of its reasons for the necessity for such design, and may require such owner to submit for approval plans and particulars of a complete stormwater control and disposal installation for such site and for any building erected thereon, based on such design.

Substitution of Regulation S

116 Regulation **S** of the Regulations is substituted with the following Regulation:

PART S. FACILITIES FOR PERSONS WITH DISABILITIES

S1. APPLICATION

(1) Facilities that accommodate persons with disabilities shall be provided in any building except the following:
(a) any building of which the whole of the ground storey comprises one or more occupancies classified in terms of regulation **A20** as B1, B2, D4, H4, J1 or J2
(b) any building classified as H1 in terms of regulation **A20** where such building has less than 25 bedrooms and it can be reasonably proven that it is not possible to include wheelchair access in certain aspects of the design; and
(c) any storey above ground floor level of a building classified as H3 in terms of regulation **A20** and not provided with a lift.

S2. FACILITIES TO BE PROVIDED

(1) In any building contemplated in regulation **S1** requiring facilities for persons with disabilities:
(a) persons with disabilities shall be able to safely enter the building, use all the facilities subject to the provisions of sub-regulation (3) within it and leave it;
(b) there shall be a means of access suitable for use by persons with disabilities, from the main and ancillary approaches of the building to the ground storey; via the main entrance, and any secondary entrance;
(c) there shall be a means of egress suitable for use by persons with disabilities from any point in a building to a place of safety in the event of an emergency;
(d) any lift installation that is provided shall be capable of serving the needs of persons with disabilities who are likely to be using the building; and (e) any commonly used path of travel shall be free of obstacles which limit, restrict or endanger the travel of persons with disabilities, or which prevent persons with disabilities from accessing the facilities provided in the building and the presence of such obstruction shall be made evident in a suitable manner to persons with impaired vision; and

(f) a suitable means of access shall be provided to any auditorium or hall situated in any building and such auditorium or hall shall, in relation to its seating capacity, be provided with sufficient open space to accommodate a reasonable number of people who use wheelchairs or other assistive devices.

(2) Where parking for more than 50 motor vehicles is provided in or in connection with any building having a means of access contemplated in subregulation **(1)**, adequate parking space shall be provided for the parking of motor vehicles used by persons with disabilities and a suitable means of access shall be provided from the parking area, whether such parking area be inside or outside such building, to the ground storey of such building.

(3) Where, in terms of regulation **P1**, toilet facilities are required and the building is one requiring facilities for persons with disabilities in terms of regulation **S1**, an adequate number of such facilities shall be suitable for use by persons with disabilities: Provided that toilet facilities shall not be required in any such building classified as H3 in terms of regulation **A20**.

S3. DEEMED-TO-SATISFY REQUIREMENTS

The requirements of regulation **S2** shall be deemed to be satisfied where:
(a) the facilities provided are in accordance with SANS 10400-S
(b) the egress from the building in the event of fire is in accordance with SANS 10400-T.

Amendment of Regulation T

Regulation **T** of the Regulations is amended as follows:

117 Replace **T(1)(a)** with the following:

(a) the protection of occupants or users, including persons with disabilities, therein is ensured and that provision is made for the safe evacuation of such occupants or users;

118 Substitute sub-regulation **T1(2)** with the following:

(2) The requirements of subregulation **(1)** shall be deemed to be satisfied where the design, construction and equipment of any building complies with SANS 10400-T: Provided that where any local authority is of the opinion that such compliance would not comply with all the requirements of subregulation **(1)**, such local authority shall, in writing, notify the owner of the building of its reasons for its opinion and may require the owner to submit for approval a rational design prepared by an approved competent person.

(3)

119 Substitute sub-regulation **T2(1)(a)** with the following:

(1) Any owner of any building who fails to -
(a) provide sufficient fire extinguishers to satisfy the requirements of subregulation **T1(1)(e)**, or who installs fire extinguishers that do not comply with the relevant South African national standard, or who fails to ensure that such fire extinguishers are installed, maintained and serviced in accordance with SANS 10105; or

Amendment of Regulation V

Regulation **V** of the Regulations is amended as follows:

120 Substitute "part V of Section 3 of SABS 0400" with "SANS 10400-V" in sub-regulation **V1(2)**

Amendment of Regulation W

Regulation **W** of the Regulations is amended as follows:

121 Substitute " Any approved fire installation" with "All approved fire installations" in sub-regulation **W1**.

122 Substitute "pumping connection" with "and suitable connection" in sub-regulation **W3(a)**

123 Substitute Regulation **W4** with the following:

The requirements of regulation **W3** shall be deemed to be satisfied where any fire installation complies with SANS 10400-W; Provided that where a local authority is of the opinion that it essential for the fire installation to be the subject of an acceptable rational design prepared by an approved competent person, such local authority shall, in writing, notify the owner of such site of its reasons for the necessity for such design, and may require such owner to submit for approval plans and particulars of a complete fire installation, based on such design.

7.5 ADDENDUM E: NOTICE R. 504 IN *GOVERNMENT GAZETTE* NO. 33265

DEPARTMENT OF TRADE AND INDUSTRY
DEPARTEMENT VAN HANDEL EN NYWERHEID

No. R. 504 **11 June 2010**

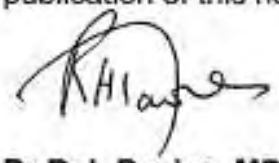
NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT (ACT 103 OF 1977)

PROPOSED INTRODUCTION OF A REGULATION FOR THE ENVIRONMENTAL SUSTAINABILITY OF BUILDINGS

This section XA deals with Energy Efficiency of buildings.

It is hereby made known under section 20 (1) (f) of the National Building Regulation and Building Standards Act (Act 103 of 1977) that the Minister of Trade and Industry intends to introduce a sub-regulation for the *Energy Efficiency of Buildings* as set out in the attached Schedule.

Any person who wishes to make comments on the intention of the Minister to introduce the building regulation concerned shall submit their comments, in writing, to the Chief Executive Officer, National Regulator for Compulsory Specifications, Private Bag X25, Brooklyn, 0075, on or before the date two (2) months after publication of this notice.



Dr Rob Davies, MP
Minister of Trade and Industry

DEPARTMENT OF TRADE AND INDUSTRY

NATIONAL BUILDING REGULATIONS AND BUILDING STANDARDS ACT 2008 (ACT NO. 103 OF 1977)

SCHEDULE

AMENDMENTS TO THE NATIONAL BUILDING REGULATIONS TO INTRODUCE REQUIREMENTS FOR THE ENERGY USAGE IN BUILDINGS

1 Regulation A7 is amended as follows:

A7 Layout Drawing

Add the following additional requirements:

(m) where provided, the location and capacity of water heating installations; and

(n) where provided, details of insulation required to satisfy energy usage requirement of Regulation XA.

2 Regulation A19 is amended as follows:

A19 Competent persons

Add the following additional requirement to sub-regulation A19 (1):

(c) The requirements of Regulation XA are satisfied by a competent person in accordance with SANS 10400 - XA,

Add the following additional requirement to sub-regulation A19(12):

(c) Where regulation XA is satisfied by a competent person in accordance with the requirements of SANS 10400 Part XA, the competent person who is responsible for such determination shall on completion of the construction and commissioning of the building submit to the local authority a fully completed Form 4 as contained in SANS 10400-A.

3 Renumber Regulation X (Repeal of regulations) as Regulation AZ5 (Repeal of regulations)

Delete Part X Repeal of regulations and add the following AZ5:

AZ5 Repeal of regulations

The National Building Regulations published under Government Notice no. R 1081 of 10 June 1988, as amended by Government Notice No. R 1726 of 26 August 1988 are repealed from the date of the coming into operation of these regulations.

4 Add the following new regulation Part X:

PART X: Environmental sustainability

X1 Definitions

"building envelope" means the elements of a building that separate a habitable room from the exterior of a building or a garage or storage area;

"certified thermal calculation software" means software certified by the Board of Agrément South Africa in terms of Agrément South Africa's Energy Software Protocols as being fit for thermal modelling or calculation purposes in terms of these regulations;

"reference building" means a hypothetical building that is used to determine the maximum allowable heating load for the proposed building.

REGULATION

XA: Energy usage in buildings

XA1 Buildings having A1, A2, A3, A4, C1, C2, E1, E2, E3, E4, F1, F2, F3, G1, H1, H2, H3, H4 and H5 occupancy or building classifications in accordance with regulation A20, excluding garage and storages areas contained within such occupancies shall be designed and constructed so that buildings

a) are capable of using energy efficiently while fulfilling user needs in relation to vertical transport, if any, thermal comfort, lighting and hot water; or

b) have features and services which facilitate the efficient use of energy appropriate to their function and use, internal environment and geographical location,

XA2 At least 50% by volume of the annual average hot water heating requirement shall be provided by means other than electrical resistance heating including but not limited to solar heating, heat pumps, heat recovery from other systems or processes and renewable combustible fuel.

XA3 The requirements of sub-regulations XA1 shall be deemed to be satisfied when such building is designed and constructed in accordance with the following requirements:

a) Has an orientation, shading, services and building envelope in accordance with SANS 10400 Part XA; or

b) Is the subject of a rational design by a competent person, which demonstrates that the energy usage of such building is equivalent to or better than which would have been achieved by compliance with the requirements of SANS 10400 XA, or

c) Has a theoretical energy usage performance determined using certified thermal calculation software, less than or equal to that of a reference building in accordance with SANS 10400 Part XA.

7.6 ADDENDUM F: COMPARING THE REQUIREMENTS OF THE 1990 AND 2008 EDITIONS OF THE NBR

Ref. no. 014/009/11-030

SABS

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AND

JACQUES LAUBSCHER

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The SABS hereby grants Jacques Laubscher permission to use full-text copies of SANS 204-1:2008, SANS 204-2:2008 and a draft version of SANS 10400-XA as Addenda to his Ph D thesis for the Department of Architecture at the University of Pretoria under the following conditions:

1. Printed copies of the thesis as well as electronic copies (e.g. in PDF) may contain the full-text copies of the said standards and draft standard.
2. The printed copies may be distributed to academic staff at the University of Pretoria and other universities in South Africa but must be controlled by the library lending system.
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12. Jacques Laubscher must keep a copy of this agreement signed by both as proof that permission has been granted for the specific use of SANS standards and SABS reserves the right to audit compliance with this agreement.

Signed at ..... on the ..... day of ..... 2011.

.....
G. Seopa
Manager: Standards Sales
South African Bureau of Standards
Dr Lategan Rd, Groenkloof, Pretoria

Signed at ..... on the ..... day of ..... 2011.

.....
J. Laubscher
University of Pretoria: Lynnwood Road, Hillcrest, Pretoria

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www.sabs.co.za

The referenced standard is available on the SABS Webstore, see https://www.sabs.co.za/index.php?page=standardspurchase.

7.7 ADDENDUM G SANS 204-1:2008: ENERGY EFFICIENCY IN BUILDINGS: GENERAL REQUIREMENTS

Ref. no. 014/009/11-030

SABS

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THE SOUTH AFRICAN BUREAU OF STANDARDS

AND

JACQUES LAUBSCHER

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7.8 ADDENDUM H: SANS 204-2:2008: ENERGY EFFICIENCY IN BUILDINGS: THE APPLICATION OF THE ENERGY EFFICIENCY REQUIREMENTS FOR BUILDINGS WITH NATURAL ENVIRONMENTAL CONTROL

Ref. no. 014/009/11-030

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7.9 ADDENDUM I: SANS 10400-XA: 2010 ENERGY USAGE IN BUILDINGS

Ref. no. 014/009/11-030

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7.10 ADDENDUM J: NAIROBI DECLARATION

Nairobi Declaration on Green Building for Africa

Conference on Green Building Rating Systems in Africa

4-6 May 2010, Nairobi, KENYA

We, experts, practionners and decision makers from twenty countries in Africa, meeting at the Conference on Green Building Rating Systems for Africa, after three days of fruitful debates and discussions, declare our commitment to promoting and fostering green building practices in Africa.

We take note of the tremendous environmental challenges and threats currently being faced by the African Continent:

In a continent of rapid urbanization the volume of building operation continues to grow very rapidly and requires close monitoring in terms of its environmental impact;

Africa's intense development pressure, the resulting rapid urbanization and generally carbon intensive mediums of energy generation, leaves the built environment under particular pressure to thoroughly embrace the sustainability imperative.

Considering that building operations are estimated to be responsible for 56% of energy used in Sub- Saharan Africa by buildings alone, this is an urgent matter that can no longer be underestimated by decision makers, the building industry and building professionals.

We resolve that in order to reduce CO2 emissions and help strengthen the ability of cities to adapt to climate change while improving the quality of the built environment, it is urgent to improve the environmental performance and energy efficiency in buildings.

We are committed to being the promoters of green practices, from planning, design, construction and operation of the built environment, as well as to the use of appropriate building materials, technologies, services and processes that minimize CO2 emissions in our Continent.

We underline the importance of taking into account social and cultural specificities of Africa in particular:

Exploring traditional practices that have been proved to be environmentally beneficial while addressing the need for mass housing constructions in Africa given the fact of rapidly increasing urban population growth;

Addressing the needs of populations at the bottom of the social and economic pyramid that require affordable housing and simple solutions to face economic challenges.

We emphasize the importance of:

Sourcing building materials and appropriate technology that are locally available.

Designing buildings taking into account climatic conditions on the continent and by so doing making use of naturally available energies that can be harnessed profitably.

The role of urban design and planning in sustainable urban development.

The use of renewable energy.

The development and or use of a green building rating system.

We recommend that models of Green Building Councils and the associated green rating systems be developed and considered that cater for the different country needs and specificities on a national and/ or on a sub-regional basis while collaborating with different countries.

We further emphasize the importance of training professionals, and introducing green building practices in the education system in order to increase public awareness and skills to spread green practices.

We call the World Green Building Council and UN-Habitat to support this process through best practices exchange in order for African countries to learn from various models available in the World.

We further call on the respective Governments to support the Green Building Councils of their respective Countries.

We further propose a road map for the next two years to engage African countries in a decisive process to:

- Set up National and/ or sub-regional Green Building Councils.
- Set up an African network to foster exchange between experts, professionals, decision makers and the private sector and to assist emerging Green Building Councils in the Region.
- Advocate for policy and regulation to encourage the adoption and enforcement of the appropriate rating system and best practices in each country.

Finally, we re-iterate the need to set-up an African Platform that will promote and/ or confederate the different green building initiatives in Africa.

7.11 ADDENDUM K: ETHICS COMMITTEE APPROVAL

Background information supporting the request for approval by the EBIT faculty committee for Research Ethics and Integrity

Date:	*2010/08/01*		
Researcher	*Mr J Laubscher*	*e-mail: jacques.laubscher@up.ac.za*	*Student No: 29708398*
Supervisor	*Prof PT Vosloo*	*e-mail: piet.vosloo@up.ac.za*	
Degree	*PhD (12262030)*		

Project Title:
Investigating the National Building Regulations as regulating instrument to promote sustainability within the built environment of South Africa.

Introduction:
In South Africa, the built environment is regulated by the National Building Regulations (NBR) and Building Standards Act (Act 103 of 1977). The current implementation of these regulations takes place through the amended Code of Practice for the application of the National Building Regulations (SABS 0400-1990). This code is in the process of being replaced by SANS 10400 (Parts A-W, and Part XA). The implementation of these requirements is the responsibility of the Building Control Officer (BCO), who is appointed by the relevant Local Authority (LA).

It is argued that the implementation of the regulations and Code of Practice by the BCO requires an intimate knowledge of the Act and the subsequent code, together with the applicable goals and objectives.

Main activities in the project + Manner of completion:
The National Regulator for Compulsory Specifications (NRCS) has invited all the BCOs in South Africa to a one-day convention in Pretoria. The theme of the conference is 'Sharing indigenous Wisdom' and it is scheduled for 21 September 2010.
The researcher will be allowed to present an introductory lecture to this assembly on proposed changes to SABS 0400-1990. Following the lecture, a questionnaire will be completed by the group, under the supervision of the researcher to clarify any aspect, if required.
Because the BCO is responsible for the implementation of SABS 0400-1990 or SANS 10400, the results obtained in this study could provide valuable data/information in determining the future direction and method of communication of amendments to SABS 0400-1990 (or SANS 10400).

Target group:
BCOs employed at LAs attending a one-day conference on 21 September 2010, under the auspices of the NCRS.

Rating of target group:
The appointment of a BCO by an LA takes place in terms of the minimum requirements as set out in SABS 0400-1990 (or SANS 10400). In addition to a minimum qualification, the respondent should also have daily contact with the subject matter. Therefore the response obtained from this target group is rated as informed.

Aim of the project:
To determine the response of the BCOs on:

1. *The current status of the SABS 0400-1990 or SANS 10400 with regard to its implementation.*
2. *Expected changes in the SABS 0400-1990 or SANS 10400, specifically the recently published Part XA (Energy usage in buildings)*
3. *The future inclusion of sustainability issues in SABS 0400-1990 or SANS 10400.*

Support/Underwriting:
The questionnaire is completed during (or after) the conference hosted by the NCRS. The association of the questionnaire with an event hosted by the NCRS provides the necessary underwriting. To encourage a high rate of completion, the respondents will be allowed an opportunity to indicate whether they would like to be informed about the results of the questionnaire. However, this possibility will only be investigated upon receiving approval from the Ethics Committee.

Anonymity:
All information disclosed as part of this questionnaire will be considered confidential and no personal information will be published as part of the research project.

*For **more information** on the project, the researcher could be contacted via e-mail at the following address: jacques.laubscher@up.ac.za*

University of Pretoria

Reference number: EBIT/30/2010 27 August 2010

Mr J Laubscher
P O Box 95469
Waterkloof
0145

Dear Mr Laubscher

YOUR RECENT APPLICATION TO THE FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

1. I hereby wish to inform you that the research project titled "Investigating the National Building Regulations as regulating instrument to promote sustainability within the built environment of South Africa" has been approved by the Committee.

   This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Codes of Research Ethics of the University of Pretoria, if action is taken beyond the approved proposal.

2. According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of any member of the Faculty Committee who will deal with the matter.

3. The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof. J.J. Hanekom
Chairman: Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, THE BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

7.12 ADDENDUM L: QUESTIONNAIRE

100 1908 - 2008

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

20 September 2010

Dear Respondent

You are hereby invited to participate in an academic research study in the area of compulsory regulation of the built environment, at the University of Pretoria. The purpose of the study is to investigate the application of the NBR by the Building Control Officer.

I value your participation and will appreciate it if you can complete this questionnaire. It should not take more than 20 minutes of your time.

All information will be treated as confidential. However, the results of this questionnaire will be publicly available after it had been processed.

Thank you in advance for your cooperation.

Jacques Laubscher Pr Arch

telephone: +27 (0)12 420-4542 • fax: +27 (0)12 420-5788 • web: www.up.ac.za/academic/architecture •
e-mail: jacques.laubscher@ up.ac.za
GRADUATE AND POSTGRADUATE PROGRAMMES IN
ARCHITECTURE • INTERIOR ARCHITECTURE • LANDSCAPE ARCHITECTURE

Questionnaire on the amended National Building Regulations and Buildings Standards Act (**Act No. 103 of 1977**), **and** the relevant Code of practice for the Application thereof (**SABS 0400-1990** or **SANS 10400**)

For official use only

Respondent number (**For official use only**) v0

1 In which **province** are you currently working?

Northern Province	1	v1.1
Mpumalanga	2	v1.2
Gauteng	3	v1.3
Northwest Province	4	v1.4
Free State	5	v1.5
Northern Cape	6	v1.6
Western Cape	7	v1.7
Eastern Cape	8	v1.8
KwaZulu Natal	9	v1.9

2

2.1 What is your **gender**? Male 1 Female 2 v2.1

2.2 What is your **age**? (in years) v2.2

3 What is you **current occupation**?

Administrator	1	v3.1
Architect	2	v3.2
Building Control Officer	3	v3.3
Specifications writer	4	v3.4
Planner	5	v3.5
Other	6	v3.6

Other (please describe briefly).

4 Please provide the following information on your **working experience:**

4.1 **Total number** of work experience (in years)	(in years)	v4.1
4.2 **Number** of work experience **in** the **built environment** (in years)	(in years)	v4.2
4.3 **Number** of work experience **at** a **Local Authority** (in years)	(in years)	v4.3
4.4 **Number** of work experience **as** a **BCO** (in years)	(in years)	v4.4
4.5 **Other** work experience (please describe briefly)	(in years)	v4.5

v5.5.1
v5.5.2
v5.5.3
v5.5.4

5 Please tick all your **qualifications**:

5.1 Standard 10 / Grade 12	No	1	Yes	2	Partially	3	v5.1
5.2 Certificate	No	1	Yes	2	Partially	3	v5.2
5.3 Diploma	No	1	Yes	2	Partially	3	v5.3
5.4 Bacchaleurs degree	No	1	Yes	2	Partially	3	v5.4
5.5 Masters degree	No	1	Yes	2	Partially	3	v5.5
5.6 **Other** (please describe briefly).	No	1	Yes	2	Partially	3	v5.6

v5.6.1
v5.6.2

6 There are different views on **the primary focus of the** amended **National Building Regulations and Buildings Standards Act** (Act No. 103 of 1977).

Please rate the importance of the following possible focus areas:

	of no importance	unimportant	don't know	important	very important	
6.1 To limit inflation in the built environment	1	2	3	4	5	v6.1
6.2 To ensure uniform regulation in the built environment	1	2	3	4	5	v6.2
6.3 To ensure a healthy built environment.	1	2	3	4	5	v6.3
6.4 To ensure a **safe built environment**.	1	2	3	4	5	v6.4
6.5 To **promote sustainability** in the built environment.	1	2	3	4	5	v6.5
6.6 To form a **basis for future development** of the built environment.	1	2	3	4	5	v6.6
6.7 **Other** (please describe briefly).	1	2	3	4	5	v6.7

v6.7.1
v6.7.2
v6.7.3

7	Legislative control of the built environment is a complex issue. A number of LAs have drafted **documents to supplement the NBR. How often does the BCO make use of these** during the execution of his daily tasks, and which documents are consulted?	never	rarely (once a quarter)	sometimes (once a month)	often (once a week)	very often (once a day)	For official use only
	How often do you refer to (or consult) the following documents?						
7.1	The amended National Building Regulations and Buildings Standards Act (Act No. 103 of 1977)	1	2	3	4	5	v7.1
7.2	The **National Building Regulations** promulgated in terms of the relevant sections of the Act (i.e. section 17(1) section 20 read with section 9, section 20 read with section 16, and section 20 read with section 17(5)a)	1	2	3	4	5	v7.2
7.3	The amended **Code of Practice** for the Application of the National Building Regulations (SABS 0400-1990 or SANS 10400)	1	2	3	4	5	v7.3
7.4	The **Deemed-to-Satisfy** Rules as included in The Code of Practice for the Application of the National Building Regulations (SABS 0400-1990 or SANS 10400)	1	2	3	4	5	v7.4
7.5	Guidelines for the **preparation of building plans**.	1	2	3	4	5	v7.5
7.6	Plan submission **application form**	1	2	3	4	5	v7.6
7.7	**Checklist** for plan approval	1	2	3	4	5	v7.7
7.8	**Notice of approval**	1	2	3	4	5	v7.8
7.9	Regulations for **relaxing a building line**	1	2	3	4	5	v7.9
7.10.	Regulations for **reducing** (or relaxing) a **height restriction**	1	2	3	4	5	v7.10
7.11.	**Planning Ordinances**	1	2	3	4	5	v7.11
7.12.	Urban planning / **zoning scheme**	1	2	3	4	5	v7.12
7.13.	Regulations for the **departure from urban planning** / zoning scheme	1	2	3	4	5	v7.13
7.14.	**'Green' building** guidelines/by-laws	1	2	3	4	5	v7.14
7.15.	**Sustainable housing policy**	1	2	3	4	5	v7.15
7.16.	Guidelines for **architectural design manuals**	1	2	3	4	5	v7.16
7.17.	Guidelines for **Heritage and Conservation**	1	2	3	4	5	v7.17
7.18.	**Other** (please describe briefly)	1	2	3	4	5	v7.18
							v7.18.1
							v7.18.2
							v7.19.1

8	The various **role players** in the built environment **interpret the requirements of the** amended Code of Practice for the Application of the National Building Regulations (**SABS 0400-1990 or SANS 10400**) in different ways.	strongly disagree	disagree	don't know	agree	strongly agree	For official use only
	Please indicate your **level of agreement** for each of the following statements:						
8.1	As far as the **applicant** is concerned, SABS 0400-1990 (or SANS 10400) represents the **minimum requirement** for a **building** project	1	2	3	4	5	v8.1
8.2	SABS 0400-1990 (or SANS 10400) represents the **maximum requirement** that the **Local Authority*** (LA), and therefore the **Building Control Officer**** (BCO), could expect from a building project	1	2	3	4	5	v8.2

9	The **Building Control Officer** (BCO) of a Local Authority (LA) is **responsible for the implementation of** the latest version of '**The Code of Practice for the Application of the National Building Regulations** (SABS 0400-1990 or SANS 10400)'. Therefore it is important to obtain the opinion of the BCO on this Code and its implementation.	strongly disagree	disagree	neutral	agree	strongly agree	For official use only
	Please indicate your **level of agreement** with each of the following statements:						
9.1	The Code (SABS 0400-1990 or SANS 10400) is **an accessible document** that is easily understandable	1	2	3	4	5	v9.1
9.2	The Code (SABS 0400-1990 or SANS 10400) **provides answers to all the questions**/issues that **a BCO** has to **address daily**	1	2	3	4	5	v9.2
9.3	The Code (SABS 0400-1990 or SANS 10400) is **structured logically** in accordance with all the necessary **stages of a construction** project	1	2	3	4	5	v9.3
9.4	The Code (SABS 0400-1990 or SANS 10400) is an **appropriate administrative instrument**	1	2	3	4	5	v9.4
9.5	The Code (SABS 0400-1990 or SANS 10400) **ensures uniform regulation** of the built environment	1	2	3	4	5	v9.5

10 The Code (**SABS 0400-1990** or SANS 10400) defines certain **requirements and procedures** relating to the **plan approval process**. However, at present the various LAs use different documents when implementing the relevant requirements and procedures.

Please indicate your **level of agreement** for each of the following statements:

		strongly disagree	disagree	don't know	agree	strongly agree	For official use only
10.1	The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the '**plan submission form**' that is currently used by the LA	1	2	3	4	5	v10.1
10.2	The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the '**checklist for plan approval**' that is currently used by the LA	1	2	3	4	5	v10.2
10.3	The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the '**notice of approval**' that is currently used by the LA	1	2	3	4	5	v10.3
10.4	The Code (SABS 0400-1990 or SANS 10400) should define a **national standardised submission and approval pro-forma**	1	2	3	4	5	v10.4

11 At present the Code (**SABS 0400-1990** or **SANS 10400**) is **not implemented uniformly in the RSA**. This is the result of certain areas being exempt from the NBR, amongst other reasons

Please indicate your **level of agreement** with each of the following statements:

		strongly disagree	disagree	neutral	agree	strongly agree	For official use only
11.1	There should be **2 different Codes** under SABS 0400-1990 (or SANS 10400), one applicable to the **formal segment** of the South African built environment, and a separate Code for **informal settlements**	1	2	3	4	5	v11.1
11.2	The erection of **government subsidised housing** should fall **outside the mandate of SABS 0400-1990** (or SANS 10400), and therefore also **outside the mandate of the BCO**. (In other words, low-cost housing should not be submitted to the LA for plan approval or be subject to inspections conducted by the BCO)	1	2	3	4	5	v11.2
11.3	As soon as any **alterations or additions** are made **to a government subsidised house**, it should fall under **the formal sector**, adhering to all the relevant requirements of SABS 0400-1990 (or SANS 10400)	1	2	3	4	5	v11.3
11.4	All **official government buildings** should be **exempt from** the full **approval** procedure .	1	2	3	4	5	v11.4

12 Various **imminent changes to the NBR** are envisioned.

Please respond to the following statements:

		NO	YES	For official use only
12.1	I am aware that the respective standards for **SANS 10400 (Parts A-H, J-W)** have been **published** to **replace the amended Code of Practice** for the Application of the National Building Regulations (**SABS 0400-1990**)	1	2	v12.1
12.2	I have **submitted a formal comment* on** the relevant published standards for **SANS 10400** (parts A-H, J- W) , that is scheduled to replace SABS 0400.	1	2	v12.2
12.3	I am aware of the **voluntary** standard **SANS 204: 2008** (Parts 1, 2 + 3) that focuses on energy efficiency in buildings	1	2	v12.3
12.4	I **am aware** that the standard **SANS 10400-XA: 2010** (Energy usage in buildings) was **published for public comment** on 2010-06-15	1	2	v12.4
12.5	I have **submitted a formal comment* on SANS 10400-XA: 2010** (Energy usage in buildings)	1	2	v12.5
12.6	I am **aware that** the standard **SANS 10400-O: 2010** (Lighting and ventilation) has been **published for public comment**	1	2	v12.4
12.7	I **have submitted** (or plan to submit before or on 2010-10-26) **a formal comment* on SANS 10400-O: 2010** (Lighting and ventilation)	1	2	v12.6

***Note: Formal comments on standards:** These comments could have been made in your personal capacity, through the LA or other professional body during the period for invited comments.

13 This section focuses on the **impact of envisioned changes to the NBR on the BCO.** (In other words, how the above changes would influence the daily operation of the BCO).

Please indicate your **level of agreement** for each of the following statements:

		strongly disagree	disagree	neutral	agree	strongly agree	For official use only
13.1	The **implementation of** the new standards as set out in **SANS 10400 (Parts A -H, J - W)** will have **a significant impact** on my daily functioning as a BCO	1	2	3	4	5	v13.1
13.2	The **implementation** of the new standards as set out in **SANS 10400-XA: 2010** (Energy usage in buildings) will have **a significant impact** on my daily functioning as a BCO	1	2	3	4	5	v13.2
13.3	The **implementation** of the new standards as set out in SANS 10400-O: 2010 (**Lighting and ventilation**) will have **a significant impact** on my daily functioning as a BCO	1	2	3	4	5	v13.3

14 This question focuses on **possible** inclusion of **criteria** that could **promote sustainability** in the built environment as **additional requirements of the NBR**.

	Please indicate your **level of agreement** for each of the following statements:	strongly disagree	disagree	don't know	agree	strongly agree	For official use only
14.1	The concept of "**sustainability**" should be incorporated in the NBR	1	2	3	4	5	v14.1
14.2	The concept of "**resource efficiency**" should be incorporated in the NBR	1	2	3	4	5	v14.2
14.3	The concept of "**Green buildings**" should be incorporated in the NBR	1	2	3	4	5	v14.3
14.4	**Development** in the built environment should be done in a **sustainable** manner	1	2	3	4	5	v14.4
14.5	**Buildings** should be designed to **reduce** their total **energy consumption** to a minimum	1	2	3	4	5	v14.5
14.6	The **building regulations** should **control and limit the energy consumption** of the **building sector**	1	2	3	4	5	v14.6
14.7	The **building regulations** should address the **future impact** of **buildings on** the **natural environment**	1	2	3	4	5	v14.7
14.8	The **building regulations** should address the **future impact** of **buildings on** the **man-made environment**	1	2	3	4	5	v14.8
14.9	Minimum **passive design criteria** should be included as **additional requirements** of the **NBR**	1	2	3	4	5	v14.9
14.10.	The **existing administration methods** of the NBR could be **adapted** without difficulty **to include** additional minimum **passive design criteria**	1	2	3	4	5	v14.10

15 Please rate the following **passive design criteria** for possible **inclusion** as additional requirements in the NBR. This list has been specifically formulated to become part of the '**plan checklist**'.

	Please indicate your **level of agreement** for each of the following statements:	of no importance	unimportant	don't know	important	very important	For official use only
15.1	The **majority of habitable rooms** should **face** in a **northerly direction** to avoid unnecessary heating/cooling loads	1	2	3	4	5	v15.1
15.2	If a **habitable room does not face in a northerly direction, mitigating passive measures** (i.e. shading devices, heat reflective glass, screens) should be taken to reduce heat gain	1	2	3	4	5	v15.2
15.3	All **exposed glass surfaces**, except those facing south, should have a **protective roof overhang and/or shading device** (i.e. canopy, shutters etc.) to reduce possible heat gain	1	2	3	4	5	v15.3
15.4	Where applicable, all building **entrances/exits should be shielded from prevailing winds**	1	2	3	4	5	v15.4
15.5	Each **habitable room** should have a total window area of at least **10% of the floor area** (or 0,2m²), for **natural lighting**	1	2	3	4	5	v15.5
15.6	Each **habitable room** should have **openable windows of** at least **5% of the floor area** (or 0,2m²), for natural ventilation	1	2	3	4	5	v15.6
15.7	**Cross ventilation** should be provided for the majority of **habitable rooms**	1	2	3	4	5	v15.7
15.8	The **Zone of Space** outside any opening should not be less than 1,0m in length from the boundary line, or 0,5m from the building line, with a maximum requirement of 8m (with the exception of built-up urban areas)	1	2	3	4	5	v15.8
15.9	If **under floor heating** is installed, **under floor insulation material** should also be provided to avoid unnecessary heat loss	1	2	3	4	5	v15.9
15.10.	Except where the **roofing material** conforms to a **minimum thermal resistance level** (R-value), a ceiling should be installed in all habitable rooms to avoid unnecessary heat gain/loss	1	2	3	4	5	v15.10
15.11.	Where applicable, **water storage tanks** should be used to **harvest storm water** from roofs for later use in cisterns, irrigation, etc.	1	2	3	4	5	v15.11
15.12.	The **minimum number of ablution facilities required for males and females** in a development **should be reduced** from the current requirements	1	2	3	4	5	v15.12
15.13.	All **electric water heating** should be **supported by a renewable energy source** to limit electricity consumption for heating.	1	2	3	4	5	v15.13
15.14.	All **electric water heating cylinders** should be fitted with an **automatic timer** to limit electricity consumption for heating	1	2	3	4	5	v15.14
15.15.	Other (please describe briefly)	1	2	3	4	5	v15.15
							v15.15.1

15.16.	Other (please describe briefly)	1	2	3	4	5	v15.16
							v15.16.1

Thank you for completing the questionnaire.

For official use only
v16.1
v16.2
v16.3
v16.4

16 If you would like to **elaborate** (**or** provide **comment**) on any of the answers provided, **please use this sheet.**

7.13 ADDENDUM M: SURVEY DATA

Frequencies

[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav

Statistics

V1: In which province are you currently working?

N	Valid	87
	Missing	2

V1: In which province are you currently working?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Northern Province	7	7.9	8.0	8.0
	Mpumalanga	12	13.5	13.8	21.8
	Gauteng	21	23.6	24.1	46.0
	Northwest Province	4	4.5	4.6	50.6
	Free State	2	2.2	2.3	52.9
	Northern Cape	5	5.6	5.7	58.6
	Western Cape	13	14.6	14.9	73.6
	Eastern Cape	8	9.0	9.2	82.8
	KwaZulu Natal	15	16.9	17.2	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

```
SAVE OUTFILE='S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav'
 /COMPRESSED.
FREQUENCIES VARIABLES=V2.1 V2.2
  /ORDER=ANALYSIS.
```

Frequencies

[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav

Statistics

		V2.1: What is your gender?	V2.2: What is your age?
N	Valid	89	87
	Missing	0	2

Frequency Table

V2.1: What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	78	87.6	87.6	87.6
	Female	11	12.4	12.4	100.0

V2.1: What is your gender?

		Frequency	Percent	Valid Percent
Valid	Total	89	100.0	100.0

V2.2: What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	24	1	1.1	1.1	1.1
	26	5	5.6	5.7	6.9
	28	4	4.5	4.6	11.5
	29	1	1.1	1.1	12.6
	30	2	2.2	2.3	14.9
	31	3	3.4	3.4	18.4
	32	3	3.4	3.4	21.8
	33	2	2.2	2.3	24.1
	34	1	1.1	1.1	25.3
	35	4	4.5	4.6	29.9
	36	2	2.2	2.3	32.2
	37	2	2.2	2.3	34.5
	38	4	4.5	4.6	39.1
	39	4	4.5	4.6	43.7
	40	2	2.2	2.3	46.0
	41	2	2.2	2.3	48.3
	42	2	2.2	2.3	50.6
	43	3	3.4	3.4	54.0
	44	3	3.4	3.4	57.5
	45	4	4.5	4.6	62.1
	46	1	1.1	1.1	63.2
	47	2	2.2	2.3	65.5
	48	1	1.1	1.1	66.7
	49	1	1.1	1.1	67.8
	50	2	2.2	2.3	70.1
	51	2	2.2	2.3	72.4
	52	2	2.2	2.3	74.7
	53	4	4.5	4.6	79.3
	54	3	3.4	3.4	82.8
	55	2	2.2	2.3	85.1
	56	3	3.4	3.4	88.5
	57	1	1.1	1.1	89.7
	58	2	2.2	2.3	92.0
	59	1	1.1	1.1	93.1
	60	1	1.1	1.1	94.3
	61	2	2.2	2.3	96.6
	64	1	1.1	1.1	97.7
	65	1	1.1	1.1	98.9
	74	1	1.1	1.1	100.0
	Total	87	97.8	100.0	

V2.2: What is your age?

		Frequency	Percent
Missing	System	2	2.2
	Total	89	100.0

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RECODE V3.1 (1=1) (SYSMIS=0) INTO VV3.1.
EXECUTE.
SAVE OUTFILE='S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav'
 /COMPRESSED.
RECODE V3.2 (2=1) (SYSMIS=0) INTO VV3.2.
EXECUTE.
SAVE OUTFILE='S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav'
 /COMPRESSED.
RECODE V3.3 (3=1) (SYSMIS=0) INTO VV3.3.
EXECUTE.
SAVE OUTFILE='S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav'
 /COMPRESSED.
RECODE V3.4 (4=1) (SYSMIS=0) INTO VV4.3.
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 /COMPRESSED.
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EXECUTE.
RECODE V3.3 (3=1) (SYSMIS=0) INTO VV3.3.
EXECUTE.
RECODE V3.4 (4=1) (SYSMIS=0) INTO VV3.4.
EXECUTE.
SAVE OUTFILE='S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav'
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EXECUTE.
SAVE OUTFILE='S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav'
 /COMPRESSED.
SAVE OUTFILE='S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav'
 /COMPRESSED.
RECODE V3.6 (6=1) (SYSMIS=0) INTO VV3.6.
EXECUTE.
SAVE OUTFILE='S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav'
 /COMPRESSED.
MULT RESPONSE GROUPS=$MRVV3 (vv3.1 vv3.2 vv3.3 vv3.4 vv3.5 vv3.6 (1))
  /FREQUENCIES=$MRVV3.
```

Multiple Response

```
[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav
```

Page 3

Case Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
$MRVV3[a]	77	86.5%	12	13.5%	89	100.0%

a. Dichotomy group tabulated at value 1.

$MRVV3 Frequencies

		Responses		
		N	Percent	Percent of Cases
$MRVV3[a]	V3.2: Your current occupation: Architect	3	3.8%	3.9%
	V3.3: Your current occupation: BCO	70	87.5%	90.9%
	V3.4: Your current occupation: Spes writer	1	1.3%	1.3%
	V3.5: Your current occupation: Partner	2	2.5%	2.6%
	V3.6: Your current occupation: Other	4	5.0%	5.2%
a	Total	80	100.0%	103.9%

a. Dichotomy group tabulated at value 1.

```
FREQUENCIES VARIABLES=V4.1 V4.2 V4.3 V4.4 V4.5
  /ORDER=ANALYSIS.
```

Frequencies

```
[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav
```

Statistics

		V4.1: Total number of work experience (in years)	V4.2: Number of work experience in the build environment (in years)	V4.3: Number of work experience at a Local Authority (in years)	V4.4: Number of work experience as a BCO (in years)	V4.5: Other work experience (please describe briefly) (in years)
N	Valid	84	84	83	68	39
	Missing	5	5	6	21	50

Frequency Table

V4.1: Total number of work experience (in years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	1.1	1.2	1.2
	3	1	1.1	1.2	2.4
	4	3	3.4	3.6	6.0
	5	4	4.5	4.8	10.7
	6	3	3.4	3.6	14.3

V4.1: Total number of work experience (in years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	7	5	5.6	6.0	20.2
	8	1	1.1	1.2	21.4
	9	3	3.4	3.6	25.0
	10	4	4.5	4.8	29.8
	11	1	1.1	1.2	31.0
	12	4	4.5	4.8	35.7
	13	4	4.5	4.8	40.5
	14	2	2.2	2.4	42.9
	15	5	5.6	6.0	48.8
	16	2	2.2	2.4	51.2
	18	1	1.1	1.2	52.4
	19	1	1.1	1.2	53.6
	20	1	1.1	1.2	54.8
	21	4	4.5	4.8	59.5
	22	2	2.2	2.4	61.9
	24	3	3.4	3.6	65.5
	25	4	4.5	4.8	70.2
	26	3	3.4	3.6	73.8
	28	2	2.2	2.4	76.2
	30	4	4.5	4.8	81.0
	31	2	2.2	2.4	83.3
	32	6	6.7	7.1	90.5
	33	1	1.1	1.2	91.7
	35	2	2.2	2.4	94.0
	38	1	1.1	1.2	95.2
	39	1	1.1	1.2	96.4
	42	1	1.1	1.2	97.6
	43	1	1.1	1.2	98.8
	47	1	1.1	1.2	100.0
	Total	84	94.4	100.0	
Missing	System	5	5.6		
	Total	89	100.0		

V4.2: Number of work experience in the build environment (in years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	3.4	3.6	3.6
	3	2	2.2	2.4	6.0
	4	4	4.5	4.8	10.7
	5	7	7.9	8.3	19.0
	6	3	3.4	3.6	22.6
	7	4	4.5	4.8	27.4
	8	3	3.4	3.6	31.0
	9	3	3.4	3.6	34.5

V4.2: Number of work experience in the build environment (in years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10	2	2.2	2.4	36.9
	11	2	2.2	2.4	39.3
	12	4	4.5	4.8	44.0
	13	3	3.4	3.6	47.6
	14	2	2.2	2.4	50.0
	15	4	4.5	4.8	54.8
	16	2	2.2	2.4	57.1
	17	1	1.1	1.2	58.3
	18	1	1.1	1.2	59.5
	19	1	1.1	1.2	60.7
	20	5	5.6	6.0	66.7
	21	3	3.4	3.6	70.2
	24	1	1.1	1.2	71.4
	25	3	3.4	3.6	75.0
	26	2	2.2	2.4	77.4
	27	1	1.1	1.2	78.6
	28	2	2.2	2.4	81.0
	29	1	1.1	1.2	82.1
	30	2	2.2	2.4	84.5
	31	2	2.2	2.4	86.9
	32	4	4.5	4.8	91.7
	35	3	3.4	3.6	95.2
	38	1	1.1	1.2	96.4
	39	1	1.1	1.2	97.6
	42	1	1.1	1.2	98.8
	47	1	1.1	1.2	100.0
	Total	84	94.4	100.0	
Missing	System	5	5.6		
	Total	89	100.0		

V4.3: Number of work experience at a Local Authority (in years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	4.5	4.8	4.8
	2	4	4.5	4.8	9.6
	3	3	3.4	3.6	13.3
	4	4	4.5	4.8	18.1
	5	7	7.9	8.4	26.5
	6	3	3.4	3.6	30.1
	7	7	7.9	8.4	38.6
	8	1	1.1	1.2	39.8
	9	2	2.2	2.4	42.2
	10	2	2.2	2.4	44.6
	11	4	4.5	4.8	49.4

V4.3: Number of work experience at a Local Authority (in years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	12	4	4.5	4.8	54.2
	13	3	3.4	3.6	57.8
	14	2	2.2	2.4	60.2
	15	2	2.2	2.4	62.7
	16	4	4.5	4.8	67.5
	17	2	2.2	2.4	69.9
	18	2	2.2	2.4	72.3
	20	5	5.6	6.0	78.3
	21	2	2.2	2.4	80.7
	22	2	2.2	2.4	83.1
	23	1	1.1	1.2	84.3
	24	3	3.4	3.6	88.0
	25	1	1.1	1.2	89.2
	26	1	1.1	1.2	90.4
	27	2	2.2	2.4	92.8
	28	2	2.2	2.4	95.2
	30	1	1.1	1.2	96.4
	32	1	1.1	1.2	97.6
	35	1	1.1	1.2	98.8
	37	1	1.1	1.2	100.0
	Total	83	93.3	100.0	
Missing	System	6	6.7		
	Total	89	100.0		

V4.4: Number of work experience as a BCO (in years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	7	7.9	10.3	10.3
	2	1	1.1	1.5	11.8
	2	4	4.5	5.9	17.6
	3	6	6.7	8.8	26.5
	4	7	7.9	10.3	36.8
	5	8	9.0	11.8	48.5
	6	4	4.5	5.9	54.4
	7	3	3.4	4.4	58.8
	8	4	4.5	5.9	64.7
	9	1	1.1	1.5	66.2
	10	6	6.7	8.8	75.0
	11	1	1.1	1.5	76.5
	12	4	4.5	5.9	82.4
	13	2	2.2	2.9	85.3
	14	1	1.1	1.5	86.8
	15	3	3.4	4.4	91.2
	16	1	1.1	1.5	92.6

V4.4: Number of work experience as a BCO (in years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	17	1	1.1	1.5	94.1
	20	2	2.2	2.9	97.1
	24	1	1.1	1.5	98.5
	25	1	1.1	1.5	100.0
	Total	68	76.4	100.0	
Missing	System	21	23.6		
	Total	89	100.0		

V4.5: Other work experience (please describe briefly) (in years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	5.6	12.8	12.8
	2	5	5.6	12.8	25.6
	3	6	6.7	15.4	41.0
	4	1	1.1	2.6	43.6
	5	4	4.5	10.3	53.8
	6	1	1.1	2.6	56.4
	8	1	1.1	2.6	59.0
	9	1	1.1	2.6	61.5
	10	2	2.2	5.1	66.7
	11	1	1.1	2.6	69.2
	13	1	1.1	2.6	71.8
	15	3	3.4	7.7	79.5
	16	1	1.1	2.6	82.1
	20	1	1.1	2.6	84.6
	23	1	1.1	2.6	87.2
	26	1	1.1	2.6	89.7
	28	2	2.2	5.1	94.9
	29	1	1.1	2.6	97.4
	42	1	1.1	2.6	100.0
	Total	39	43.8	100.0	
Missing	System	50	56.2		
	Total	89	100.0		

```
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  /ORDER=ANALYSIS.
```

Frequencies

```
[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav
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Statistics

		V5.1: Qualifications: Standard 10 / Grade 12	V5.2: Qualifications: Certificate	V5.3: Qualifications: Diploma	V5.4: Qualifications: Baccalaureus degree
N	Valid	74	48	68	19
	Missing	15	41	21	70

Statistics

		V5.5: Qualifications: Masters degree	V5.6: Other (please describe briefly)
N	Valid	5	11
	Missing	84	78

Frequency Table

V5.1: Qualifications: Standard 10 / Grade 12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	74	83.1	100.0	100.0
Missing	System	15	16.9		
	Total	89	100.0		

V5.2: Qualifications: Certificate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	48	53.9	100.0	100.0
Missing	System	41	46.1		
	Total	89	100.0		

V5.3: Qualifications: Diploma

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	67	75.3	98.5	98.5
	3	1	1.1	1.5	100.0
	Total	68	76.4	100.0	
Missing	System	21	23.6		
	Total	89	100.0		

V5.4: Qualifications: Baccalaureus degree

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	1	1.1	5.3	5.3
	Yes	17	19.1	89.5	94.7
	3	1	1.1	5.3	100.0
	Total	19	21.3	100.0	
Missing	System	70	78.7		
	Total	89	100.0		

V5.5: Qualifications: Masters degree

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	1	1.1	20.0	20.0
	Yes	4	4.5	80.0	100.0
	Total	5	5.6	100.0	
Missing	System	84	94.4		
	Total	89	100.0		

V5.6: Other (please describe briefly)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	1	1.1	9.1	9.1
	Yes	10	11.2	90.9	100.0
	Total	11	12.4	100.0	
Missing	System	78	87.6		
	Total	89	100.0		

```
FREQUENCIES VARIABLES=V6.1 V6.2 V6.3 V6.4 V6.5 V6.6 V6.7
  /ORDER=ANALYSIS.
```

Frequencies

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Statistics

		V6.1: Rate the importance to limit inflation in the built environment	V6.2: Rate the importance to ensure uniform regulation in the built environment	V6.3: Rate the importance to ensure a healthy built environment	V6.4: Rate the importance to ensure a safe built environment	V6.5: Rate the importance to promote sustainability in the built environment
N	Valid	82	87	88	88	88
	Missing	7	2	1	1	1

Statistics

		V6.6: Rate the importance to form a basis for future development of the built environment	V6.7: Other (please describe briefly)
N	Valid	87	14
	Missing	2	75

Frequency Table

V6.1: Rate the importance to limit inflation in the built environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	12	13.5	14.6	14.6
	Unimportant	11	12.4	13.4	28.0
	Don't know	9	10.1	11.0	39.0
	Important	34	38.2	41.5	80.5
	Very Important	16	18.0	19.5	100.0
	Total	82	92.1	100.0	
Missing	System	7	7.9		
	Total	89	100.0		

V6.2: Rate the importance to ensure uniform regulation in the built environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	2	2.2	2.3	2.3
	Unimportant	1	1.1	1.1	3.4
	Important	13	14.6	14.9	18.4
	Very Important	71	79.8	81.6	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V6.3: Rate the importance to ensure a healthy built environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.1	1.1
	Important	6	6.7	6.8	8.0
	Very Important	81	91.0	92.0	100.0
	Total	88	98.9	100.0	
Missing	System	1	1.1		
	Total	89	100.0		

V6.4: Rate the importance to ensure a safe built environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.1	1.1
	Important	11	12.4	12.5	13.6
	Very Important	76	85.4	86.4	100.0
	Total	88	98.9	100.0	
Missing	System	1	1.1		
	Total	89	100.0		

V6.5: Rate the importance to promote sustainability in the built environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.1	1.1
	Don't know	3	3.4	3.4	4.5
	Important	23	25.8	26.1	30.7

V6.5: Rate the importance to promote sustainability in the built environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very Important	61	68.5	69.3	100.0
	Total	88	98.9	100.0	
Missing	System	1	1.1		
	Total	89	100.0		

V6.6: Rate the importance to form a basis for future development of the built environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.1	1.1
	Unimportant	1	1.1	1.1	2.3
	Don't know	2	2.2	2.3	4.6
	Important	25	28.1	28.7	33.3
	Very Important	58	65.2	66.7	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V6.7: Other (please describe briefly)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Don't know	1	1.1	7.1	7.1
	Important	2	2.2	14.3	21.4
	Very Important	11	12.4	78.6	100.0
	Total	14	15.7	100.0	
Missing	System	75	84.3		
	Total	89	100.0		

```
FREQUENCIES VARIABLES=V7.1 V7.2 V7.3 V7.4 V7.5 V7.6 V7.7 V7.8 V7.9
  /ORDER=ANALYSIS.
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Frequencies

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Statistics

	N	
	Valid	Missing
V7.1: Refer to the amended National Building Regulations and Buildings Standards Act?	88	1
V7.2: Refer to the National Building Regulations promulgated in terms of the relevant sections of the Act?	87	2

Statistics

	N	
	Valid	Missing
V7.3: Refer to the amended Code of practice for the Application of the National Building Regulations?	87	2
V7.4: Refer to the" Deemed-to-satisfy-rules" as included in The Code of practice for the Application of the National Building Regulations?	89	0
V7.5: Refer to the Guidelines for the preparation of building plans?	87	2
V7.6: Refer to the Plan submission application form?	88	1
V7.7: Refer to the Checklist for plan approval?	89	0
V7.8: Refer to the Notice of approval?	87	2
V7.9: Refer to the Regulations for relaxing a building line?	89	0

Frequency Table

V7.1: Refer to the amended National Building Regulations and Buildings Standards Act?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	2	2.2	2.3	2.3
	Rarely (once a quarter)	3	3.4	3.4	5.7
	Sometimes (once a month)	15	16.9	17.0	22.7
	Often (once a week)	28	31.5	31.8	54.5
	Very often (once a day)	40	44.9	45.5	100.0
	Total	88	98.9	100.0	
Missing	System	1	1.1		
	Total	89	100.0		

V7.2: Refer to the National Building Regulations promulgated in terms of the relevant sections of the Act?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	5	5.6	5.7	5.7
	Rarely (once a quarter)	5	5.6	5.7	11.5
	Sometimes (once a month)	16	18.0	18.4	29.9
	Often (once a week)	34	38.2	39.1	69.0
	Very often (once a day)	27	30.3	31.0	100.0
	Total	87	97.8	100.0	

V7.2: Refer to the National Building Regulations promulgated in terms of the relevant sections of the Act?

		Frequency	Percent
Missing	System	2	2.2
	Total	89	100.0

V7.3: Refer to the amended Code of practice for the Application of the National Building Regulations?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	6	6.7	6.9	6.9
	Rarely (once a quarter)	9	10.1	10.3	17.2
	Sometimes (once a month)	19	21.3	21.8	39.1
	Often (once a week)	27	30.3	31.0	70.1
	Very often (once a day)	26	29.2	29.9	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V7.4: Refer to the"Deemed-to-satisfy-rules" as included in The Code of practice for the Application of the National Building Regulations?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	2	2.2	2.2	2.2
	Rarely (once a quarter)	7	7.9	7.9	10.1
	Sometimes (once a month)	22	24.7	24.7	34.8
	Often (once a week)	23	25.8	25.8	60.7
	Very often (once a day)	35	39.3	39.3	100.0
	Total	89	100.0	100.0	

V7.5: Refer to the Guidelines for the preparation of building plans?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	4	4.5	4.6	4.6
	Rarely (once a quarter)	6	6.7	6.9	11.5
	Sometimes (once a month)	17	19.1	19.5	31.0
	Often (once a week)	22	24.7	25.3	56.3
	Very often (once a day)	38	42.7	43.7	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V7.6: Refer to the Plan submission application form?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	2	2.2	2.3	2.3
	Rarely (once a quarter)	6	6.7	6.8	9.1

V7.6: Refer to the Plan submission application form?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sometimes (once a month)	9	10.1	10.2	19.3
	Often (once a week)	22	24.7	25.0	44.3
	Very often (once a day)	49	55.1	55.7	100.0
	Total	88	98.9	100.0	
Missing	System	1	1.1		
	Total	89	100.0		

V7.7: Refer to the Checklist for plan approval?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	4	4.5	4.5	4.5
	Rarely (once a quarter)	7	7.9	7.9	12.4
	Sometimes (once a month)	9	10.1	10.1	22.5
	Often (once a week)	20	22.5	22.5	44.9
	Very often (once a day)	49	55.1	55.1	100.0
	Total	89	100.0	100.0	

V7.8: Refer to the Notice of approval?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	8	9.0	9.2	9.2
	Rarely (once a quarter)	6	6.7	6.9	16.1
	Sometimes (once a month)	10	11.2	11.5	27.6
	Often (once a week)	25	28.1	28.7	56.3
	Very often (once a day)	38	42.7	43.7	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V7.9: Refer to the Regulations for relaxing a building line?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	13	14.6	14.6	14.6
	Rarely (once a quarter)	12	13.5	13.5	28.1
	Sometimes (once a month)	19	21.3	21.3	49.4
	Often (once a week)	22	24.7	24.7	74.2
	Very often (once a day)	23	25.8	25.8	100.0
	Total	89	100.0	100.0	

```
FREQUENCIES VARIABLES=V7.10 V7.11 V7.12 V7.13 V7.14 V7.15 V7.16 V7.17 V7.1
8
  /ORDER=ANALYSIS.
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Frequencies

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Statistics

	N	
	Valid	Missing
V7.10: Refer to the Regulations for reducing (or relaxing) a height restriction?	87	2
V7.11: Refer to the Planning Ordinances?	87	2
V7.12: Refer to the Urban planning / Zoning scheme?	89	0
V7.13: Refer to the Regulations for the departure from urban planning / zoning scheme?	89	0
V7.14: Refer to the Green building guidelines / bylaws?	89	0
V7.15: Refer to the Sustainable housing policy?	89	0
V7.16: Refer to the Guidelines for architectural design manuals?	87	2
V7.17: Refer to the Guidelines for Heritage + Conservation?	89	0
V7.18: Other (please describle briefly)	8	81

Frequency Table

V7.10: Refer to the Regulations for reducing (or relaxing) a height restriction?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	19	21.3	21.8	21.8
	Rarely (once a quarter)	17	19.1	19.5	41.4
	Sometimes (once a month)	18	20.2	20.7	62.1
	Often (once a week)	17	19.1	19.5	81.6
	Very often (once a day)	16	18.0	18.4	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V7.11: Refer to the Planning Ordinances?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	20	22.5	23.0	23.0
	Rarely (once a quarter)	16	18.0	18.4	41.4
	Sometimes (once a month)	13	14.6	14.9	56.3
	Often (once a week)	15	16.9	17.2	73.6
	Very often (once a day)	23	25.8	26.4	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V7.12: Refer to the Urban planning / Zoning scheme?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	15	16.9	16.9	16.9
	Rarely (once a quarter)	15	16.9	16.9	33.7
	Sometimes (once a month)	17	19.1	19.1	52.8
	Often (once a week)	17	19.1	19.1	71.9
	Very often (once a day)	25	28.1	28.1	100.0
	Total	89	100.0	100.0	

V7.13: Refer to the Regulations for the departure from urban planning / zoning scheme?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	22	24.7	24.7	24.7
	Rarely (once a quarter)	17	19.1	19.1	43.8
	Sometimes (once a month)	20	22.5	22.5	66.3
	Often (once a week)	15	16.9	16.9	83.1
	Very often (once a day)	15	16.9	16.9	100.0
	Total	89	100.0	100.0	

V7.14: Refer to the Green building guidelines / bylaws?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	27	30.3	30.3	30.3
	Rarely (once a quarter)	25	28.1	28.1	58.4
	Sometimes (once a month)	16	18.0	18.0	76.4
	Often (once a week)	12	13.5	13.5	89.9
	Very often (once a day)	9	10.1	10.1	100.0
	Total	89	100.0	100.0	

V7.15: Refer to the Sustainable housing policy?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	24	27.0	27.0	27.0
	Rarely (once a quarter)	20	22.5	22.5	49.4
	Sometimes (once a month)	19	21.3	21.3	70.8
	Often (once a week)	20	22.5	22.5	93.3
	Very often (once a day)	6	6.7	6.7	100.0
	Total	89	100.0	100.0	

V7.16: Refer to the Guidelines for architectural design manuals?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	19	21.3	21.8	21.8
	Rarely (once a quarter)	16	18.0	18.4	40.2
	Sometimes (once a month)	26	29.2	29.9	70.1
	Often (once a week)	17	19.1	19.5	89.7
	Very often (once a day)	9	10.1	10.3	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V7.17: Refer to the Guidelines for Heritage + Conservation?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	22	24.7	24.7	24.7
	Rarely (once a quarter)	20	22.5	22.5	47.2
	Sometimes (once a month)	20	22.5	22.5	69.7
	Often (once a week)	16	18.0	18.0	87.6
	Very often (once a day)	11	12.4	12.4	100.0
	Total	89	100.0	100.0	

V7.18: Other (please describle briefly)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sometimes (once a month)	3	3.4	37.5	37.5
	Often (once a week)	2	2.2	25.0	62.5
	Very often (once a day)	3	3.4	37.5	100.0
	Total	8	9.0	100.0	
Missing	System	81	91.0		
	Total	89	100.0		

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FREQUENCIES VARIABLES=V7.18.1 V7.18.2 V7.19.1
  /ORDER=ANALYSIS.

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Statistics

		V7.18.1: Other (please describle briefly)	V7.18.2: Other (please describle briefly)	V7.19.1: Other (please describle briefly)
N	Valid	9	2	3
	Missing	80	87	86

Frequency Table

V7.18.1: Other (please describle briefly)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	1.1	11.1	11.1
	2	1	1.1	11.1	22.2
	3	1	1.1	11.1	33.3
	4	1	1.1	11.1	44.4
	5	1	1.1	11.1	55.6
	6	1	1.1	11.1	66.7
	8	1	1.1	11.1	77.8
	9	1	1.1	11.1	88.9
	10	1	1.1	11.1	100.0
	Total	9	10.1	100.0	
Missing	System	80	89.9		
	Total	89	100.0		

V7.18.2: Other (please describle briefly)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	5	2	2.2	100.0	100.0
Missing	System	87	97.8		
	Total	89	100.0		

V7.19.1: Other (please describle briefly)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	1.1	33.3	33.3
	2	1	1.1	33.3	66.7
	3	1	1.1	33.3	100.0
	Total	3	3.4	100.0	
Missing	System	86	96.6		
	Total	89	100.0		

```
FREQUENCIES VARIABLES=V3.6.1
  /ORDER=ANALYSIS.
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Frequencies

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Statistics

V3.6.1: Other (please describe briefly?

N	Valid	1
	Missing	88

V3.6.1: Other (please describe briefly?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	9	1	1.1	100.0	100.0
Missing	System	88	98.9		
	Total	89	100.0		

FREQUENCIES VARIABLES=V8.1 V8.2
/ ORDER=ANALYSIS.

Frequencies

[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav

Statistics

	N	
	Valid	Missing
V8.1: SABS 0400-1990 represents the minimum requirement as far as the applicant is concerned for a building project	85	4
V8.2: SABS 0400-1990 represents the maximum requirement that the Local Authority*(LA) and the Buiding Control Officer could expect from a building project	87	2

Frequency Table

V8.1: SABS 0400-1990 represents the minimum requirement as far as the applicant is concerned for a building project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	5	5.6	5.9	5.9
	Disagree	7	7.9	8.2	14.1
	Don't know	8	9.0	9.4	23.5
	Agree	35	39.3	41.2	64.7
	Strongly agree	30	33.7	35.3	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

V8.2: SABS 0400-1990 represents the maximum requirement that the Local Authority* (LA) and the Buiding Control Officer could expect from a building project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	18	20.2	20.7	20.7
	Disagree	9	10.1	10.3	31.0
	Don't know	6	6.7	6.9	37.9
	Agree	29	32.6	33.3	71.3
	Strongly agree	25	28.1	28.7	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

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FREQUENCIES VARIABLES=V9.1 V9.2  V9.3  V9.4  V9.5
  /ORDER=ANALYSIS.
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Frequencies

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Statistics

	N	
	Valid	Missing
V9.1: The Code (SABS 0400-1990 or SANS 10400) is an accessible document that is easily understandable	89	0
V9.2: The Code (SABS 0400-1990 or SANS 10400) provides answers to all the questions / issues that a BCO has to address daily	89	0
V9.3: The Code (SABS 0400-1990 or SANS 10400) is structured logically in accordance with all the necessary stages of a construction project	87	2
V9.4: The Code (SABS 0400-1990 or SANS 10400) is an appropriate administrative instrument	89	0
V9.5: The Code (SABS 0400-1990 or SANS 10400) ensures uniform regulation of the built environment	89	0

Frequency Table

V9.1: The Code (SABS 0400-1990 or SANS 10400) is an accessible document that is easily understandable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	3.4	3.4	3.4
	Disagree	7	7.9	7.9	11.2
	Don't know	11	12.4	12.4	23.6
	Agree	48	53.9	53.9	77.5
	Strongly agree	20	22.5	22.5	100.0
	Total	89	100.0	100.0	

V9.2: The Code (SABS 0400-1990 or SANS 10400) provides answers to all the questions / issues that a BCO has to address daily

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	2.2	2.2	2.2
	Disagree	16	18.0	18.0	20.2
	Don't know	27	30.3	30.3	50.6
	Agree	31	34.8	34.8	85.4
	Strongly agree	13	14.6	14.6	100.0
	Total	89	100.0	100.0	

V9.3: The Code (SABS 0400-1990 or SANS 10400) is structured logically in accordance with all the necessary stages of a construction project

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	2.2	2.3	2.3
	Disagree	3	3.4	3.4	5.7
	Don't know	14	15.7	16.1	21.8
	Agree	49	55.1	56.3	78.2
	Strongly agree	19	21.3	21.8	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V9.4: The Code (SABS 0400-1990 or SANS 10400) is an appropriate administrative instrument

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	2.2	2.2	2.2
	Disagree	2	2.2	2.2	4.5
	Don't know	14	15.7	15.7	20.2
	Agree	48	53.9	53.9	74.2
	Strongly agree	23	25.8	25.8	100.0
	Total	89	100.0	100.0	

V9.5: The Code (SABS 0400-1990 or SANS 10400) ensures uniform regulation of the built environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	2.2	2.2	2.2
	Disagree	6	6.7	6.7	9.0
	Don't know	10	11.2	11.2	20.2
	Agree	39	43.8	43.8	64.0
	Strongly agree	32	36.0	36.0	100.0
	Total	89	100.0	100.0	

```
FREQUENCIES VARIABLES=V10.1 V10.2 V10.3 V10.4
  /ORDER=ANALYSIS.
```

Frequencies

[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav

Statistics

	N	
	Valid	Missing
V10.1: The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the 'plan submission form' currently used by the LA	86	3
V10.2: The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the 'checklist for plan approval' currently used by the LA	87	2
V10.3: The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the 'notice of approval' currently used by the LA	86	3
V10.4: The objectives of the Code (SABS 0400-1990 or SANS 10400) should define a national standardised submission and approval pro-forma	86	3

Frequency Table

V10.1: The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the 'plan submission form' currently used by the LA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	4	4.5	4.7	4.7
	Disagree	12	13.5	14.0	18.6

V10.1: The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the 'plan submission form' currently used by the LA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Don't know	9	10.1	10.5	29.1
	Agree	42	47.2	48.8	77.9
	Strongly agree	19	21.3	22.1	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

V10.2: The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the 'checklist for plan approval' currently used by the LA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.1	1.1	1.1
	Disagree	11	12.4	12.6	13.8
	Don't know	12	13.5	13.8	27.6
	Agree	45	50.6	51.7	79.3
	Strongly agree	18	20.2	20.7	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V10.3: The objectives of the Code (SABS 0400-1990 or SANS 10400) are sufficiently represented in the 'notice of approval' currently used by the LA

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	2.2	2.3	2.3
	Disagree	9	10.1	10.5	12.8
	Don't know	12	13.5	14.0	26.7
	Agree	46	51.7	53.5	80.2
	Strongly agree	17	19.1	19.8	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

V10.4: The objectives of the Code (SABS 0400-1990 or SANS 10400) should define a national standardised submission and approval pro-forma

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.1	1.2	1.2
	Disagree	3	3.4	3.5	4.7
	Don't know	8	9.0	9.3	14.0
	Agree	27	30.3	31.4	45.3
	Strongly agree	47	52.8	54.7	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

```
FREQUENCIES VARIABLES=V11.1 V11.2  V11.3  V11.4
  /ORDER=ANALYSIS.
```

Frequencies

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[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav
```

Statistics

	N	
	Valid	Missing
V11.1: There should be 2 different Codes of SABS 0400-1990, one applicable to the formal segment of the SA built environment, and a separate Code for informal settlements	87	2
V11.2: The erection of government subsided housing should fall outside the mandate of (SABS 0400-1990 or SANS 10400), and therefore also outside the mandate of the BCO.	87	2
V11.3: As soon as any alterations or additions are made to a government subsided house, it should resort under the formalised sector, adhering to all relevant requirements for SABS 0400-1995	83	6
V11.4: All official government buildings should be excempted from to the full approval procedure	86	3

Frequency Table

V11.1: There should be 2 different Codes of SABS 0400-1990, one applicable to the formal segment of the SA built environment, and a separate Code for informal settlements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	22	24.7	25.3	25.3
	Disagree	7	7.9	8.0	33.3
	Neutral	12	13.5	13.8	47.1
	Agree	20	22.5	23.0	70.1
	Strongly agree	26	29.2	29.9	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V11.2: The erection of government subsided housing should fall outside the mandate of (SABS 0400-1990 or SANS 10400), and therefore also outside the mandate of the BCO.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	50	56.2	57.5	57.5
	Disagree	17	19.1	19.5	77.0
	Neutral	3	3.4	3.4	80.5
	Agree	3	3.4	3.4	83.9
	Strongly agree	14	15.7	16.1	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V11.3: As soon as any alterations or additions are made to a government subsided house, it should resort under the formalised sector, adhering to all relevant requirements for SABS 0400-1995

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	7	7.9	8.4	8.4
	Disagree	9	10.1	10.8	19.3
	Neutral	6	6.7	7.2	26.5
	Agree	23	25.8	27.7	54.2
	Strongly agree	38	42.7	45.8	100.0
	Total	83	93.3	100.0	
Missing	System	6	6.7		
	Total	89	100.0		

V11.4: All official government buildings should be excempted from to the full approval procedure

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	54	60.7	62.8	62.8
	Disagree	14	15.7	16.3	79.1
	Neutral	1	1.1	1.2	80.2
	Agree	7	7.9	8.1	88.4
	Strongly agree	10	11.2	11.6	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

FREQUENCIES VARIABLES=V12.1 V12.2 V12.3 V12.4 V12.5 V12.6 V12.7
/ORDER=ANALYSIS.

Frequencies

[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav

Statistics

	N	
	Valid	Missing
V12.1: I am aware that the respective standards for SANS 10400 (parts A-H, J-W) have been published, and will replace the amended Code of practice for the Application of the National Building Regulations	87	2
V12.2: I have submitted a formal comment on the relevant published standards for SANS 10400 (parts A-H,J-W) that is scheduled to replace SABS 0400	86	3
V12.3: I am aware of the voluntary standard SANS 204: 2008 (Parts 1,2 + 3) that focuses on Energy efficiency in buildings	87	2
V12.4: I am aware that the standard SANS 10400-XA: 2010 (Energy usage in buildings) has been published for public comment on 2010-06-15	85	4
V12.5: I have submitted a formal comment* on SANS 10400-XA: 2010 (Energy usage in buildings)	87	2
V12.6: I am aware that the standard SANS 10400-O: 2010 (Lighting and ventilation) has been published for public comment	85	4
V12.7: I have submitted (or plan to submit before or on 2010-10-26) a formal comment* on SANS 10400-O: 2010 (lighting and ventilation)	86	3

Frequency Table

V12.1: I am aware that the respective standards for SANS 10400 (parts A-H, J-W) have been published, and will replace the amended Code of practice for the Application of the National Building Regulations

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	26	29.2	29.9	29.9
	Yes	61	68.5	70.1	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V12.2: I have submitted a formal comment on the relevant published standards for SANS 10400 (parts A-H,J-W) that is scheduled to replace SABS 0400

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	76	85.4	88.4	88.4
	Yes	10	11.2	11.6	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

V12.3: I am aware of the voluntary standard SANS 204: 2008 (Parts 1,2 + 3) that focuses on Energy efficiency in buildings

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	30	33.7	34.5	34.5
	Yes	57	64.0	65.5	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V12.4: I am aware that the standard SANS 10400-XA: 2010 (Energy usage in buildings) has been published for public comment on 2010-06-15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	34	38.2	40.0	40.0
	Yes	51	57.3	60.0	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

V12.5: I have submitted a formal comment* on SANS 10400-XA: 2010 (Energy usage in buildings)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	75	84.3	86.2	86.2
	Yes	12	13.5	13.8	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

V12.6: I am aware that the standard SANS 10400-O: 2010 (Lighting and ventilation) has been published for public comment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	39	43.8	45.9	45.9
	Yes	46	51.7	54.1	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

V12.7: I have submitted (or plan to submit before or on 2010-10-26) a formal comment* on SANS 10400-O: 2010(lighting and ventilation)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	74	83.1	86.0	86.0
	Yes	12	13.5	14.0	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

```
FREQUENCIES VARIABLES=V13.1 V13.2 V13.3
  /ORDER=ANALYSIS.
```

Frequencies

[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav

Statistics

	N	
	Valid	Missing
V13.1: The implementation of the new standards as set out in SANS 10400(parts A-H, J-W) will have a significant impact on my daily functioning as a BCO	85	4
V13.2: Agreement for the implementation of the new standards as set out in SANS 10400-XA: 2010 (Energy usage in buildings) will have a significant impact on my daily functioning as a BCO	85	4
V13.3: The implementation of the new standards as set out in SANS 10400-O: 2010 (Lighting and ventilation) will have a significant impact on my daily functioning as a BCO	85	4

Frequency Table

V13.1: The implementation of the new standards as set out in SANS 10400(parts A-H, J-W) will have a significant impact on my daily functioning as a BCO

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.1	1.2	1.2
	Disagree	2	2.2	2.4	3.5
	Neutral	16	18.0	18.8	22.4
	Agree	37	41.6	43.5	65.9

V13.1: The implementation of the new standards as set out in SANS 10400(parts A-H, J-W) will have a significant impact on my daily functioning as a BCO

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	29	32.6	34.1	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

V13.2: Agreement for the implementation of the new standards as set out in SANS 10400-XA: 2010 (Energy usage in buildings) will have a significant impact on my daily functioning as a BCO

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	1	1.1	1.2	1.2
	Neutral	16	18.0	18.8	20.0
	Agree	31	34.8	36.5	56.5
	Strongly agree	37	41.6	43.5	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

V13.3: The implementation of the new standards as set out in SANS 10400-O: 2010 (Lighting and ventilation) will have a significant impact on my daily functioning as a BCO

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.1	1.2	1.2
	Disagree	3	3.4	3.5	4.7
	Neutral	20	22.5	23.5	28.2
	Agree	28	31.5	32.9	61.2
	Strongly agree	33	37.1	38.8	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

```
FREQUENCIES VARIABLES=V14.1 V14.2  V14.3 V14.4 V14.5
  /ORDER=ANALYSIS.
```

Frequencies

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[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav
```

Statistics

	N	
	Valid	Missing
V14.1: The concept of "sustainability" should be incorporated in the NBR	88	1

Statistics

	N	
	Valid	Missing
V14.2: The concept of "resource efficiency should be incorporated in the NBR	88	1
V14.3: The concept of "green buildings should be incorporated in the NBR	86	3
V14.4: Development in the built environment should be done in a sustainable manner	84	5
V14.5: Buildings should be designed to reduce its total energy consumption to a minimum	87	2

Frequency Table

V14.1: The concept of "sustainability" should be incorporated in the NBR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.1	1.1	1.1
	Disagree	4	4.5	4.5	5.7
	don't know	5	5.6	5.7	11.4
	Agree	44	49.4	50.0	61.4
	Strongly agree	34	38.2	38.6	100.0
	Total	88	98.9	100.0	
Missing	System	1	1.1		
	Total	89	100.0		

V14.2: The concept of "resource efficiency should be incorporated in the NBR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.1	1.1	1.1
	Disagree	8	9.0	9.1	10.2
	don't know	4	4.5	4.5	14.8
	Agree	45	50.6	51.1	65.9
	Strongly agree	30	33.7	34.1	100.0
	Total	88	98.9	100.0	
Missing	System	1	1.1		
	Total	89	100.0		

V14.3: The concept of "green buildings should be incorporated in the NBR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	2	2.2	2.3	2.3
	Disagree	8	9.0	9.3	11.6
	don't know	7	7.9	8.1	19.8

V14.3: The concept of "green buildings should be incorporated in the NBR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	38	42.7	44.2	64.0
	Strongly agree	31	34.8	36.0	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

V14.4: Development in the built environment should be done in a sustainable manner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.1	1.2	1.2
	Disagree	1	1.1	1.2	2.4
	don't know	2	2.2	2.4	4.8
	Agree	36	40.4	42.9	47.6
	Strongly agree	44	49.4	52.4	100.0
	Total	84	94.4	100.0	
Missing	System	5	5.6		
	Total	89	100.0		

V14.5: Buildings should be designed to reduce its total energy consumption to a minimum

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	3	3.4	3.4	3.4
	Disagree	6	6.7	6.9	10.3
	don't know	7	7.9	8.0	18.4
	Agree	27	30.3	31.0	49.4
	Strongly agree	44	49.4	50.6	100.0
	Total	87	97.8	100.0	
Missing	System	2	2.2		
	Total	89	100.0		

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FREQUENCIES VARIABLES=V14.6 V14.7 V14.8 V14.9 V14.10
  /ORDER=ANALYSIS.
```

Frequencies

[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav

Statistics

	N	
	Valid	Missing
V14.6: The building regulations should control and limit the energy consumption of the building sector	88	1

Statistics

	N	
	Valid	Missing
V14.7: The building regulations should address the future impact that buildings will have on the natural environment	85	4
V14.8: The building regulations should address the future impact that buildings will have on the man-made	88	1
V14.9: Minimum passive design criteria should be included as additional requirements to the NBR	85	4
V14.10: The existing administration methods of the NBR could be adapted without difficulty to include additional minimum passive design criteria	85	4

Frequency Table

V14.6: The building regulations should control and limit the energy consumption of the building sector

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.1	1.1	1.1
	Disagree	7	7.9	8.0	9.1
	don't know	8	9.0	9.1	18.2
	Agree	39	43.8	44.3	62.5
	Strongly agree	33	37.1	37.5	100.0
	Total	88	98.9	100.0	
Missing	System	1	1.1		
	Total	89	100.0		

V14.7: The building regulations should address the future impact that buildings will have on the natural environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.1	1.2	1.2
	Disagree	1	1.1	1.2	2.4
	don't know	6	6.7	7.1	9.4
	Agree	37	41.6	43.5	52.9
	Strongly agree	40	44.9	47.1	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

V14.8: The building regulations should address the future impact that buildings wil have on the man-made

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	3	3.4	3.4	3.4
	don't know	15	16.9	17.0	20.5
	Agree	39	43.8	44.3	64.8
	Strongly agree	31	34.8	35.2	100.0
	Total	88	98.9	100.0	
Missing	System	1	1.1		
	Total	89	100.0		

V14.9: Minimum passive design criteria should be included as additional requirements to the NBR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Disagree	5	5.6	5.9	5.9
	don't know	17	19.1	20.0	25.9
	Agree	40	44.9	47.1	72.9
	Strongly agree	23	25.8	27.1	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

V14.10: The existing administration methods of the NBR could be adapted without difficulty to include additional minimum passive design criteria

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	1	1.1	1.2	1.2
	Disagree	4	4.5	4.7	5.9
	don't know	16	18.0	18.8	24.7
	Agree	47	52.8	55.3	80.0
	Strongly agree	17	19.1	20.0	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

```
FREQUENCIES VARIABLES=V15.1 V15.2 V15.3 V15.4 V15.5 V15.6 V15.7 V15.8
  /ORDER=ANALYSIS.
```

Frequencies

[DataSet1] S:\Joyce Jordaan\Laubscher T10070 Mr J\Laubscher.sav

Statistics

	N	
	Valid	Missing
V15.1: The majority of habitable rooms should face in a Northerly direction to avoid unnecessary heating / cooling loads	87	2
V15.2: If a habitable room does not face in a northerly direction, mitigating passive measures (i.e. shading devices, heat reflective glass, screens) should be taken to reduce heat build-up	83	6
V15.3: All exposed glass surfaces, except South facing, should have a protective overhang to reduce heat build-up	83	6
V15.4: Where applicable, all building entrances / exits shielded from dominant winds	85	4
V15.5: Each habitable room should have at least 10% of floor area total window area, for natural lighting	84	5
V15.6: Each habitable room have at least 5% of floor area openable windows, for natural ventilation	86	3
V15.7: Cross ventilation should be provided for the majority of habitable rooms	86	3
V15.8: The zone of space outside any opening should not be less than 1,0m in length to the boundary line, or 0,5m to the building line, with a maximum requirement of 8m	85	4

Frequency Table

V15.1: The majority of habitable rooms should face in a Northerly direction to avoid unnecessary heating / cooling loads

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	5	5.6	5.7	5.7
	Unimportant	8	9.0	9.2	14.9
	don't know	7	7.9	8.0	23.0
	Important	40	44.9	46.0	69.0
	Very Important	27	30.3	31.0	100.0

V15.1: The majority of habitable rooms should face in a Northerly direction to avoid unnecessary heating / cooling loads

		Frequency	Percent	Valid Percent
Valid	Total	87	97.8	100.0
Missing	System	2	2.2	
	Total	89	100.0	

V15.2: If a habitable room does not face in a northerly direction, mitigating passive measures (i.e. shading devices, heat reflective glass, screens) should be taken to reduce heat build-up

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	2	2.2	2.4	2.4
	Unimportant	12	13.5	14.5	16.9
	don't know	12	13.5	14.5	31.3
	Important	35	39.3	42.2	73.5
	Very Important	22	24.7	26.5	100.0
	Total	83	93.3	100.0	
Missing	System	6	6.7		
	Total	89	100.0		

V15.3: All exposed glass surfaces, except South facing, should have a protective overhang to reduce heat build-up

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	3	3.4	3.6	3.6
	Unimportant	17	19.1	20.5	24.1
	don't know	8	9.0	9.6	33.7
	Important	34	38.2	41.0	74.7
	Very Important	21	23.6	25.3	100.0
	Total	83	93.3	100.0	
Missing	System	6	6.7		
	Total	89	100.0		

V15.4: Where applicable, all building entrances / exits shielded from dominant winds

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	2	2.2	2.4	2.4
	Unimportant	10	11.2	11.8	14.1
	don't know	6	6.7	7.1	21.2
	Important	48	53.9	56.5	77.6
	Very Important	19	21.3	22.4	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

V15.5: Each habitable room should have at least 10% of floor area total window area, for natural lighting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.2	1.2
	Unimportant	1	1.1	1.2	2.4
	don't know	2	2.2	2.4	4.8
	Important	39	43.8	46.4	51.2
	Very Important	41	46.1	48.8	100.0
	Total	84	94.4	100.0	
Missing	System	5	5.6		
	Total	89	100.0		

V15.6: Each habitable room have at least 5% of floor area openable windows, for natural ventilation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.2	1.2
	Unimportant	2	2.2	2.3	3.5
	don't know	6	6.7	7.0	10.5
	Important	39	43.8	45.3	55.8
	Very Important	38	42.7	44.2	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

V15.7: Cross ventilation should be provided for the majority of habitable rooms

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.2	1.2
	Unimportant	2	2.2	2.3	3.5
	don't know	7	7.9	8.1	11.6
	Important	38	42.7	44.2	55.8
	Very Important	38	42.7	44.2	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

V15.8: The zone of space outside any opening should not be less than 1,0m in length t the boundary line, or 0,5m to the building line, with a maximum requirement of 8m

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.2	1.2
	Unimportant	5	5.6	5.9	7.1
	don't know	11	12.4	12.9	20.0
	Important	49	55.1	57.6	77.6
	Very Important	19	21.3	22.4	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

FREQUENCIES VARIABLES=V15.9 V15.10 V15.11 V15.12 V15.13 V15.14 V15.15
/ORDER=ANALYSIS.

Frequencies

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Statistics

		V15.9: If under floor heating is installed, under floor insulation material should also be provided to avoid unnecessary heat loss	V15.10: Except where the roofing material conforms to a minimum thermal resistance level (R-value), a ceiling should be installed for all habitable rooms to avoid unnecessary heat gain / loss	V15.11: Where applicable, water storage tanks should be used to harvest storm water from roofs for later use in cisterns irrigation, ext	V15.12: The minimum number of ablution facilities required for males + females in a development should be reduced from the current requirements	V15.13: All electric water heating should be supported by a renewable energy source to limit electricity consumption for heating
N	Valid	84	85	86	79	86
	Missing	5	4	3	10	3

Statistics

		V15.14: All electric water heating cylinders should be fitted by an automatic timer to limit electricity consumption for heating	V15.15: Other (please describe briefly)
N	Valid	86	5
	Missing	3	84

Frequency Table

V15.9: If under floor heating is installed, under floor insulation material should also be provided to avoid unnecessary heat loss

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.2	1.2
	Unimportant	10	11.2	11.9	13.1
	don't know	9	10.1	10.7	23.8
	Important	35	39.3	41.7	65.5
	Very Important	29	32.6	34.5	100.0
	Total	84	94.4	100.0	

V15.9: If under floor heating is installed, under floor insulation material should also be provided to avoid unnecessary heat loss

		Frequency	Percent
Missing	System	5	5.6
	Total	89	100.0

V15.10: Except where the roofing material conforms to a minimum thermal resistance level (R-value), a ceiling should be installed for all habitable rooms to avoid unnecessary heat gain / loss

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.2	1.2
	Unimportant	8	9.0	9.4	10.6
	don't know	8	9.0	9.4	20.0
	Important	37	41.6	43.5	63.5
	Very Important	31	34.8	36.5	100.0
	Total	85	95.5	100.0	
Missing	System	4	4.5		
	Total	89	100.0		

V15.11: Where applicable, water storage tanks should be used to harvest storm water from roofs for later use in cisterns irrigation, ext

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.2	1.2
	Unimportant	8	9.0	9.3	10.5
	don't know	3	3.4	3.5	14.0
	Important	41	46.1	47.7	61.6
	Very Important	33	37.1	38.4	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

V15.12: The minimum number of ablution facilities required for males + females in a development should be reduced from the current requirements

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	15	16.9	19.0	19.0
	Unimportant	17	19.1	21.5	40.5
	don't know	17	19.1	21.5	62.0
	Important	19	21.3	24.1	86.1
	Very Important	11	12.4	13.9	100.0
	Total	79	88.8	100.0	
Missing	System	10	11.2		
	Total	89	100.0		

V15.13: All electric water heating should be supported by a renewable energy source to limit electricity consumption for heating

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	2	2.2	2.3	2.3
	Unimportant	6	6.7	7.0	9.3
	don't know	5	5.6	5.8	15.1
	Important	37	41.6	43.0	58.1
	Very Important	36	40.4	41.9	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

V15.14: All electric water heating cylinders should be fitted by an automatic timer to limit electricity consumption for heating

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Of no Importance	1	1.1	1.2	1.2
	Unimportant	5	5.6	5.8	7.0
	don't know	11	12.4	12.8	19.8
	Important	28	31.5	32.6	52.3
	Very Important	41	46.1	47.7	100.0
	Total	86	96.6	100.0	
Missing	System	3	3.4		
	Total	89	100.0		

V15.15: Other (please describe briefly)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Important	2	2.2	40.0	40.0
	Very Important	3	3.4	60.0	100.0
	Total	5	5.6	100.0	
Missing	System	84	94.4		
	Total	89	100.0		

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FREQUENCIES VARIABLES=V15.15.1 V15.16.1
  /ORDER=ANALYSIS.
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Frequencies

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Statistics

		V15.15.1: Other (please describe briefly)	V15.16.1: Other (please describe briefly)
N	Valid	3	1
	Missing	86	88

Frequency Table

V15.15.1: Other (please describe briefly)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	1.1	33.3	33.3
	3	1	1.1	33.3	66.7
	4	1	1.1	33.3	100.0
	Total	3	3.4	100.0	
Missing	System	86	96.6		
	Total	89	100.0		

V15.16.1: Other (please describe briefly)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	1.1	100.0	100.0
Missing	System	88	98.9		
	Total	89	100.0		

7.14 ADDENDUM N: PROPOSED PRO FORMA APPLICATION FORM FOR BUILDING PLAN APPROVAL

It is envisioned that the applicant and LA are equally responsible for implementing the proposed pro forma application form for building plan approval. However, the LA (and specifically the BCO) remains the controlling body ensuring the implementation of the NBR requirements. During stages one to five (of the building plan approval process), compliance with the requirements and the provision of necessary information remain the responsibility of the applicant, whereas the role of the LA is to verify the accuracy of the information provided. This could be achieved by doing spot checks. During stage six, the LA determines the amount of plan approval fees due, and this is paid by the applicant. In the final stage the applicant should provide the LA with the required notification before an inspection is conducted by the LA.

Stage		Detailed information/ Requirement	Responsible party
1	Preparation of building plans	1.1 General requirements 1.2 Minimum required plans and particulars (and their associated scales) 1.3 Colouring of plans, drawings and diagrams	Applicant and/or his appointed agent
2	Additional information required*	2.1 Plans and particulars that may be required by the LA 2.2 Other information that may be required by the LA 2.3 Additional schedule(s) required	Applicant and/or his appointed agent
3	Drawing checklist 1	3.1 Site plan 3.2 Plans 3.3 Sections 3.4 Elevations 3.5 Plumbing installation drawings and particulars 3.6 Fire installation drawings and particulars 3.7 Artificial ventilation details	Applicant and/or his appointed agent
4	Drawing checklist 2**	Passive design checklist	Applicant and/or his appointed agent
5	Application forms	5.1 Application for building plan approval 5.2 Property information / Description 5.3 Details of applicant (handed in by) 5.4 Details of applicant (property owner) 5.5 Details of author 5.6 Power of attorney (POA)	Applicant and/or his appointed agent
6	Fees	Fees assessment (for office use only)	LA / BCO
7	Notices of inspection	7.1 Erection of building 7.2 Demolition of building 7.3 Fire installation connected to any communication pipe 7.4 Trenches or excavations ready for inspection 7.5 Drainage installation 7.6 Building will be completed 7.7 Occupation certificate	Applicant and/or his appointed agent and LA / BCO
Notes	* The NBR provide the LA (BCO) with a list of possible additional items that may be required as part of an application. The LA should establish which of the additional items should be included as part of an application, and list them accordingly under stage 2. ** The inclusion of the 'Passive Design' Checklist will be a direct result of the envisioned new regulations (an amendment of the proposed SANS 10400:XA). However, its implementation should follow the existing prescribed method in terms of regulations A1(8), A2(6(a) and A2(6(b).		

Only the different stages are communicated, see the copyright notice on p x.

The program for this evening is not new
You've seen this entertainment
Through and through
You've seen your birth, your life and death
You might recall all the rest
Did you have a good world when you died?
Jim Morrison in *THE DOORS* (Riordan 1995: 307)