

XA EXPOSED

Debunking the Myths

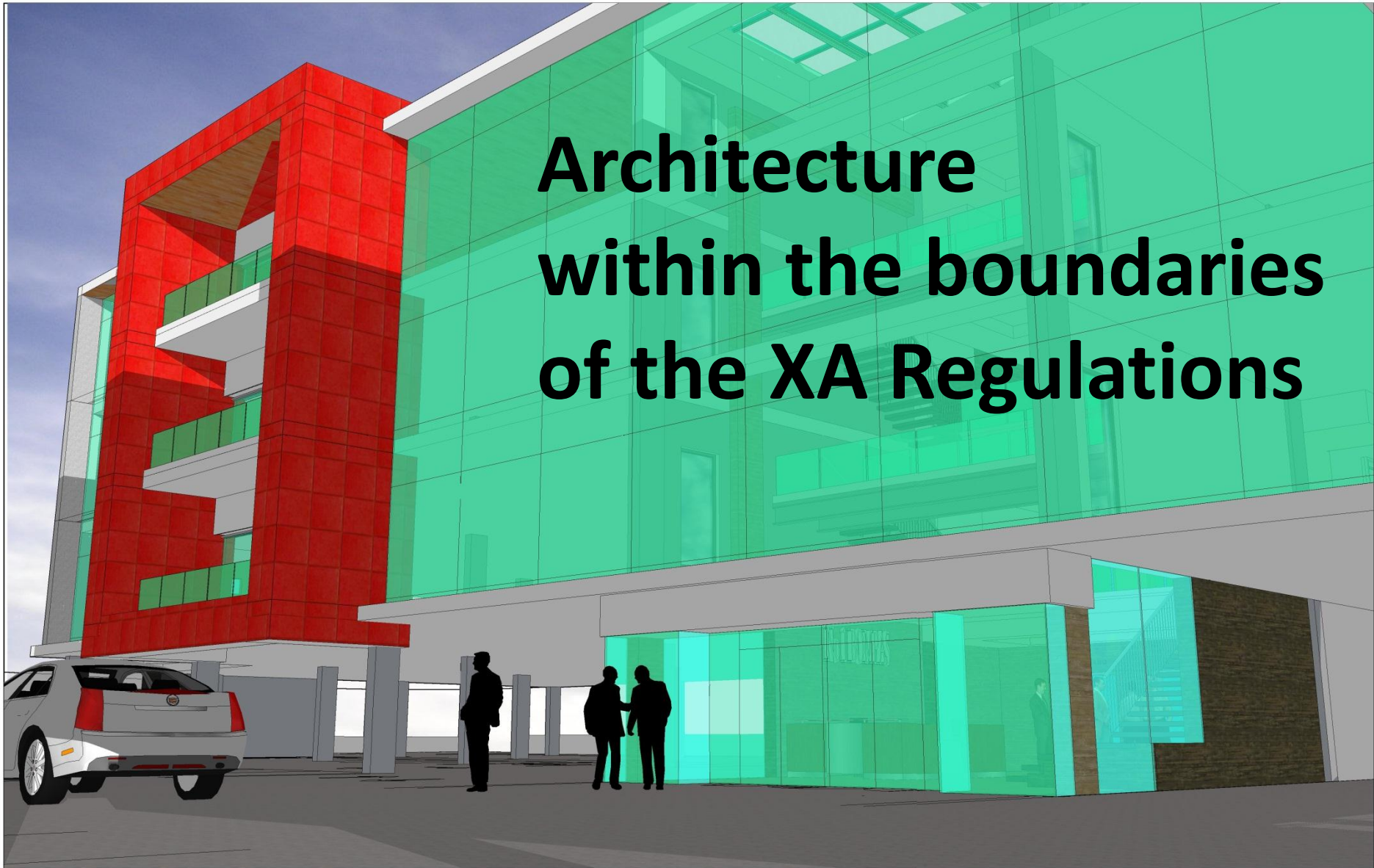
**Presented by:
Howard Harris**



The Myths

- That we have to comply with SANS 204
- Double glazing with low e glass necessary to achieve large glazed areas
- SANS 10400XA is restrictive and inhibits good design
- Roof insulation levels are excessive
- Rational Design is in the realm of the engineers

Architecture within the boundaries of the XA Regulations



BOMPAS EXTERNAL FRONT PERSPECTIVES

COORDINATION	
Architectural	Structural
Mechanical	Electrical
Plumbing	Other
DRAWING STATUS	
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REVISIONS

NO.	DATE	REVISIONS
1		
2		
3		
4		
5		

Fenestration possibilities?



Using the Rational Design options of Regulation XA for a cost effective low energy build

Introduction to the regulatory system

Regulations XA1, XA2 and XA3

Three routes to compliance

Prescriptive route requirements

Energy modelling & modelling software

Rational Designs for Energy

Case studies

Constitution of the Republic of South Africa

[extract] 24. environment

everyone has the right to:

(a) an environment that is not harmful to their health or well-being; and

(b) **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

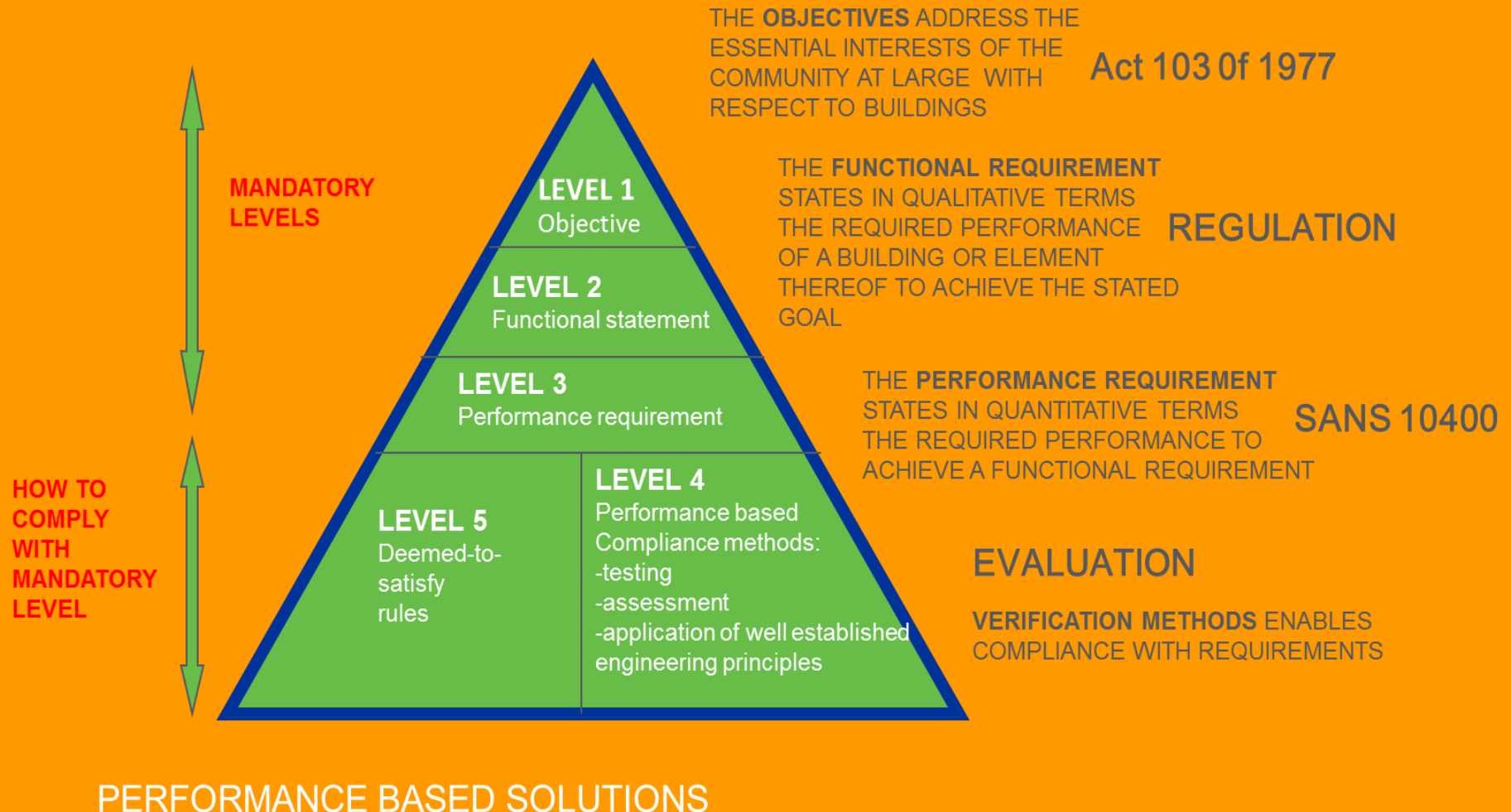
(ii) promote conservation; and

(iii) **secure ecologically sustainable**

development and use of natural resources while promoting justifiable economic and social development

amended National Building Regulations

NORDIC 5 MODEL Regulatory framework



The Constitution

ACT 103 OF 1977

REGULATION XA1

Capable of using energy efficiently while fulfilling user needs

Have a building envelope and services which provides comfort & facilitates the efficient use of energy

REGULATION XA2

At least 50% (volume fraction) of the annual average hot water heating requirement shall be provided by means other than electrical resistance heating

REGULATION XA3

Prescriptive route

Performance route

Reference building route

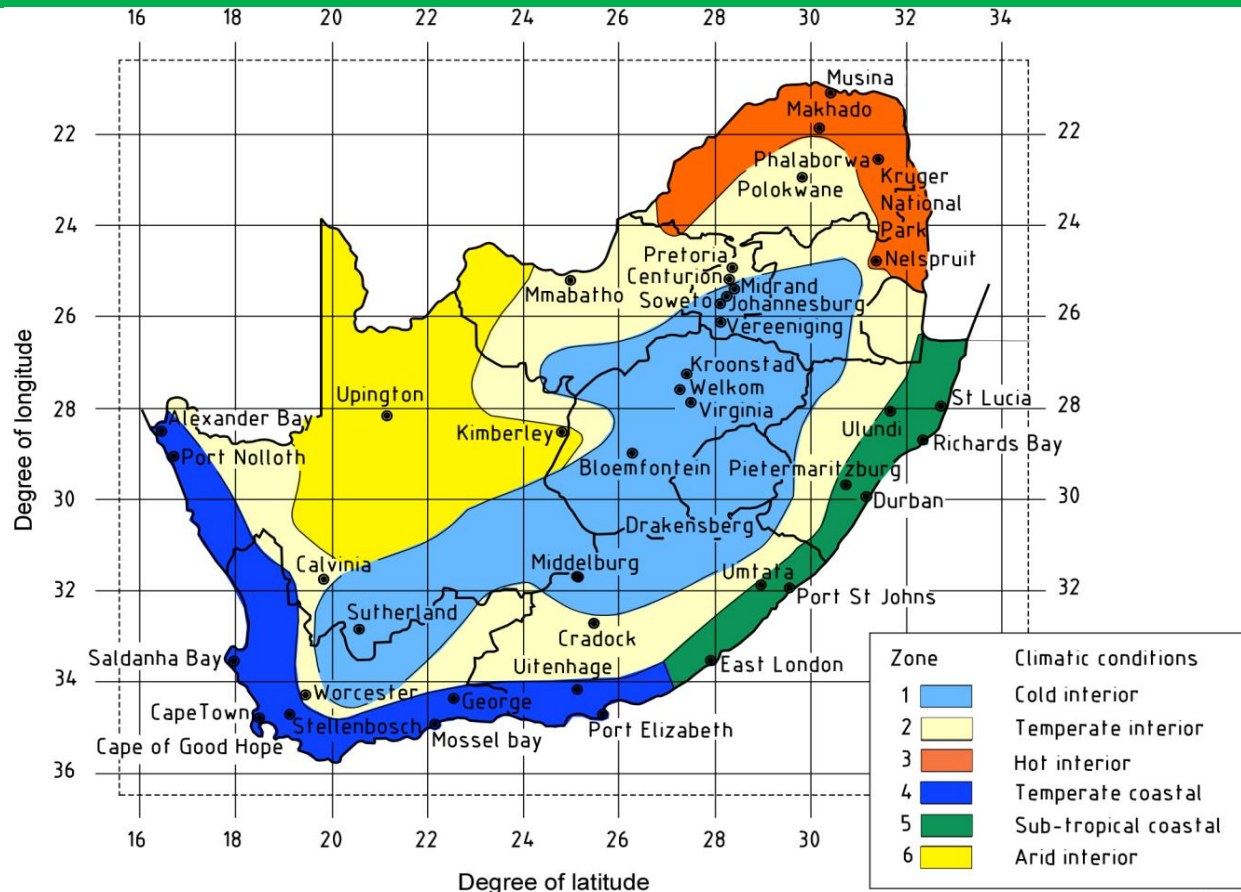
Quick review of the Prescriptive route

Eight boxes to tick as per the LA Submission Form 1

- Orientation and shading
- External walls
- Fenestration less than 15% of NFA
- Roof assembly
- Floors – only if in-floor heating
- Services
- Hot water systems
- or
- Fenestration by SANS204

Note this Form has been amended by the SC59 and one single Box – covering all of the above will be provided.

Six climate zone map for the RSA



Drq.727

climatic zone map	description	major centre
zone 1	cold interior	Johannesburg, Bloemfontein
zone 2	temperate interior	Pretoria, Polokwane
zone 3	hot interior	Makhado, Nelspruit
zone 4	temperate coastal	Cape Town, Port Elizabeth
zone 5	sub-tropical coastal	East London, Durban, Richards Bay
zone 6	arid interior	Upington, Kimberley

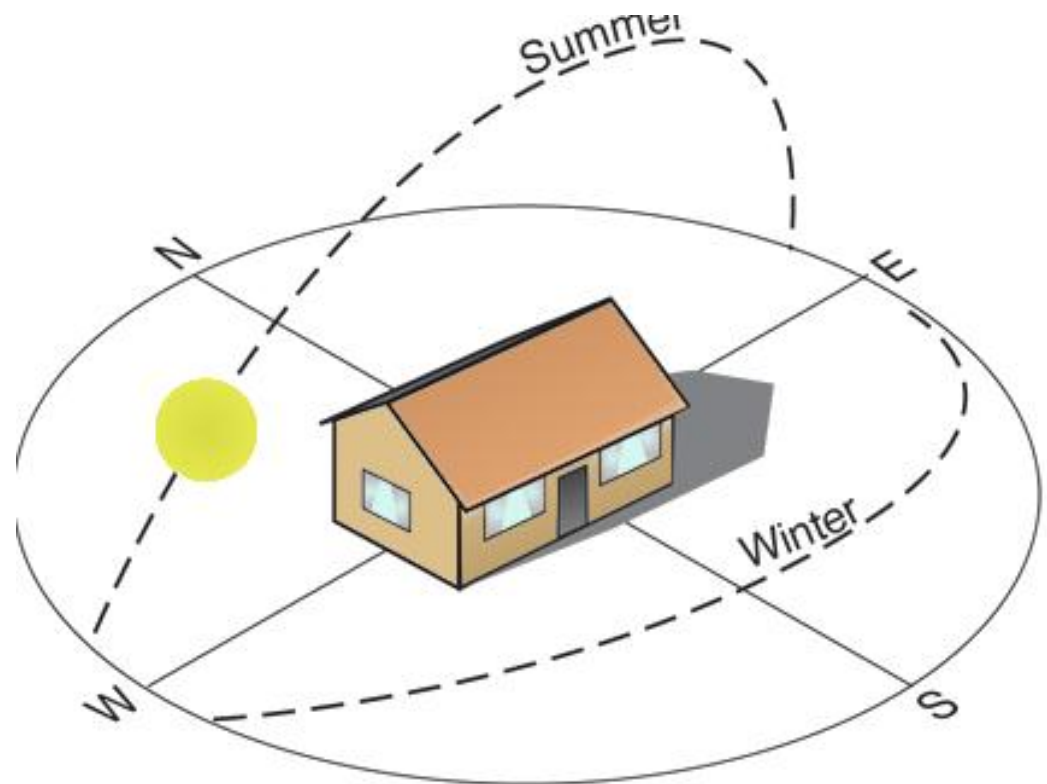
Orientation

Recommendation to face North

There are no compulsory requirements

Mitigation by fenestration calculations

Lowest net energy usage requirement



Shading

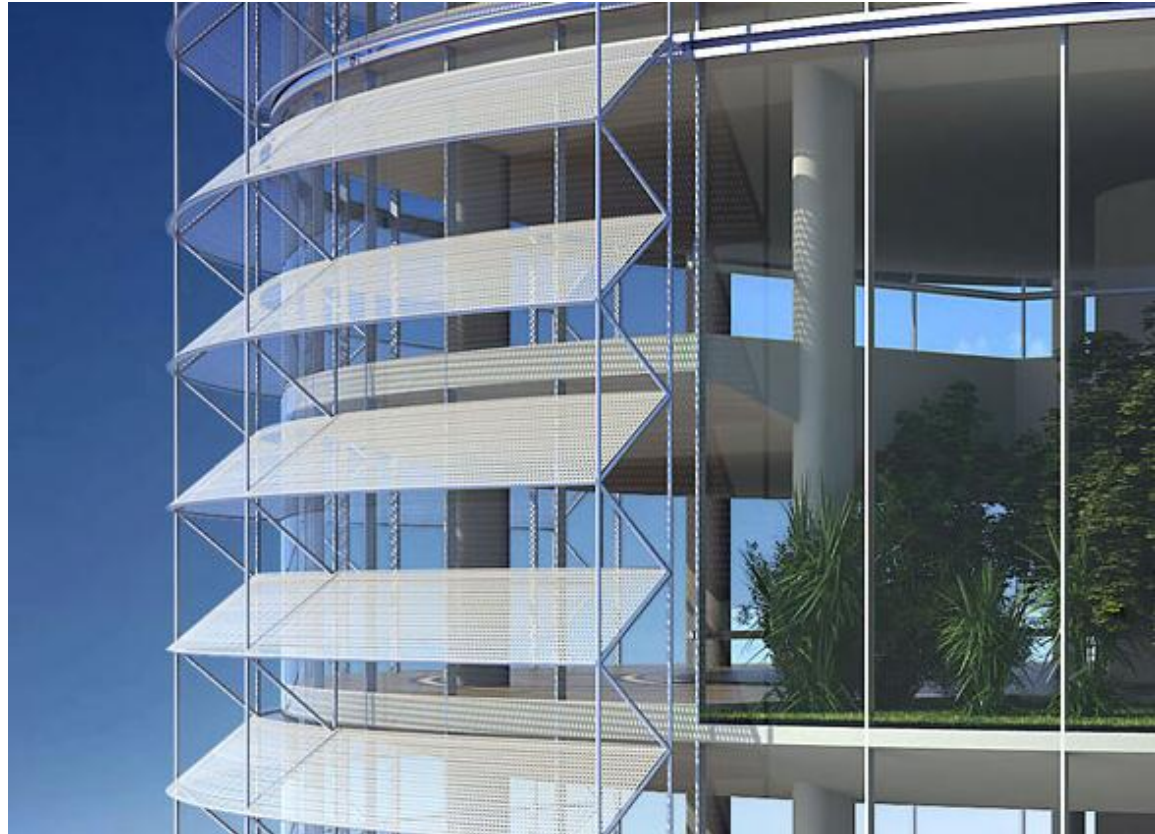
There are no compulsory requirements

Mitigation is by the fenestration calculations

When shading is used the building shall:

A. Have a permanent feature or

B. Have an external shading device, such as a shutter, blind, vertical or horizontal building screen with blades, battens or slats



Floors

No requirement except where In-Slab Heating is installed

Where in-slab heating is used then insulation required. (R-value not less than 1.0)

Recommended to insulate edge of footings



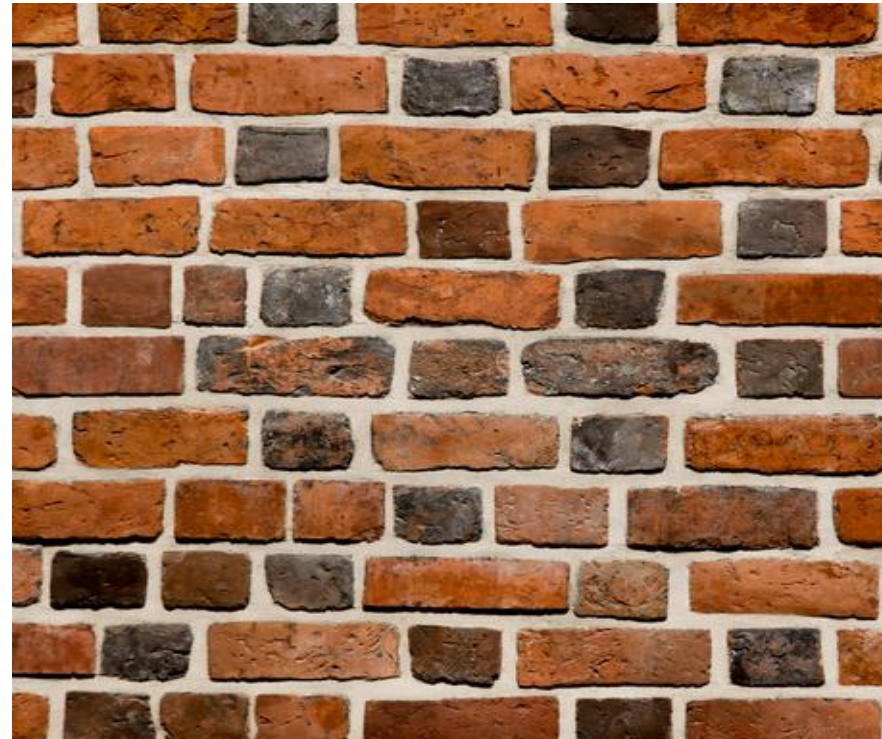
External Walls

Non masonry walls to have min R-value of 1.9

Masonry walls to have min R-value of 0.35

The following masonry walls comply:

- **Double skin masonry wall (plastered or rendered)**
- **Cavity & grouted cavity wall**
- **140mm single-leaf masonry wall plastered internally rendered externally**



External Walls

Thermal mass opportunities are missing from XA



Roofs and ceilings

table 6 – establishes minimum total R-values of roof and ceilings which are irrespective of occupancy

description	climatic zones					
	1	2	3	4	5	6
minimum required total R-value (m ² .K/W)	3.7	3.2	2.7	3.7	2.7	3.5
direction of heat flow	up	up	down and up	up	down	up





Fenestration

Buildings with fenestration area up to 15% of net floor area per storey comply automatically.

Buildings with fenestration area greater than 15% of net floor need to comply to SANS 204

Plans to be detailed to show diligent application of calculation has been applied.

(In some Local Authorities a competent person is needed to sign and to take responsibility for the design.)



air infiltration performance

currently steel windows and many wooden windows are not achieving the requirements. Designers should select from manufacturers who have upgraded their product performance and are able to show compliance with a test certificate to the **SANS613** test for air leakage to 2.0L/sec/m²

4 lt/sec/m²



2 lt/sec/m²



Lighting

Use max energy demand and energy consumption table for lighting Refer to Table 12 of SANS 204

Notes to plans that lighting complies to this table

Note that the type of bulbs used e.g. LED, T5 or CFL saving bulbs needs to be disclosed to the Local Authority.



Mechanical ventilation & air conditioning:

**Design criteria for the
systems per the CoP
(Co-efficient of
Performance)
depending on the
cooling capacity as per
table 14 of SANS 204**



Hot Water Supply

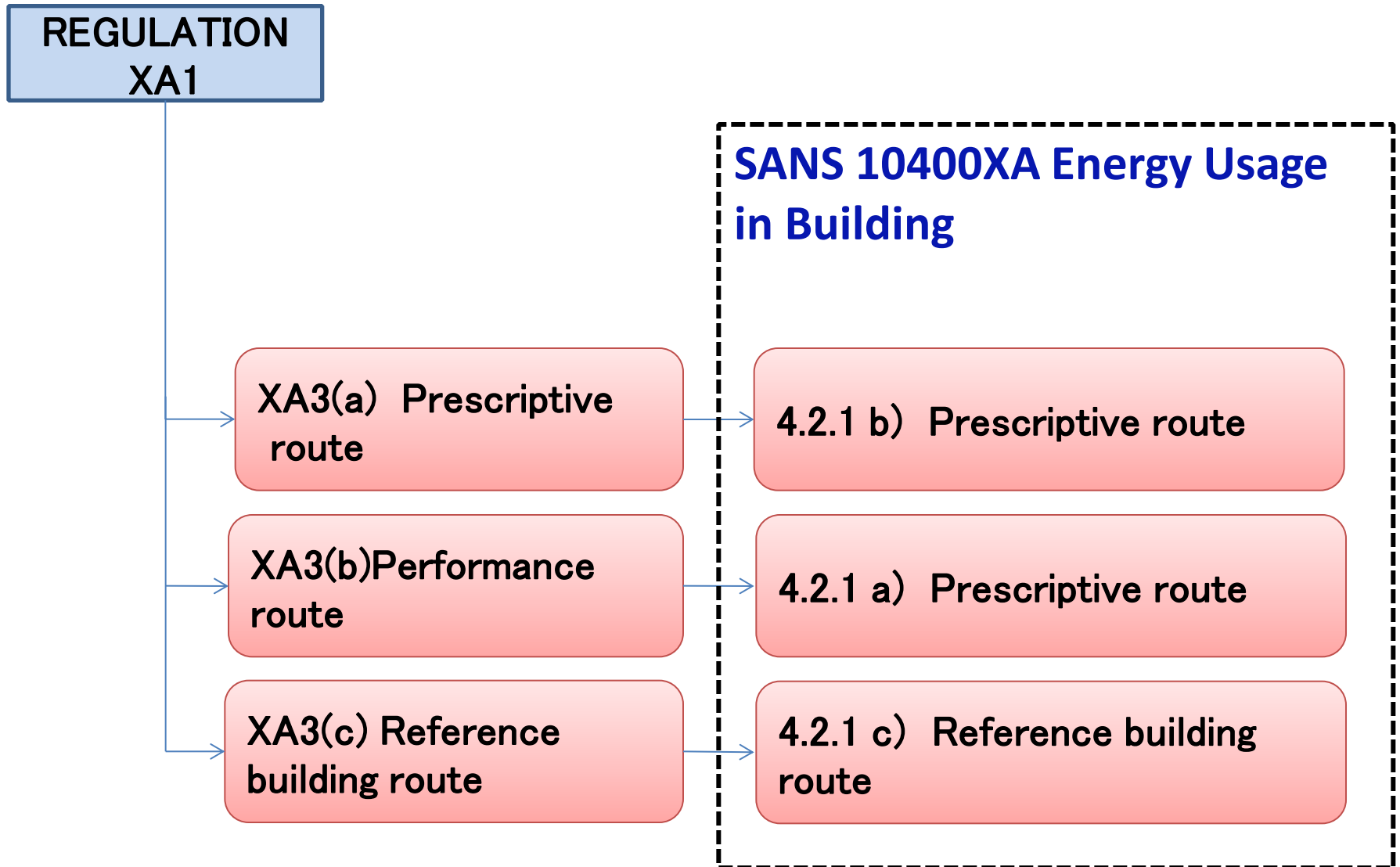
**To be in accordance with
SANS 10400XA paragraph 4.1**

**Can use tables 2 & 5 of SANS
10252-1:2004 (Water Supply
& Drainage Standard) as
guidelines.**

**Pipe Insulation performance
levels are mandated for all
hot water piping**



Regulation XA3 Routes to compliance



Interval

