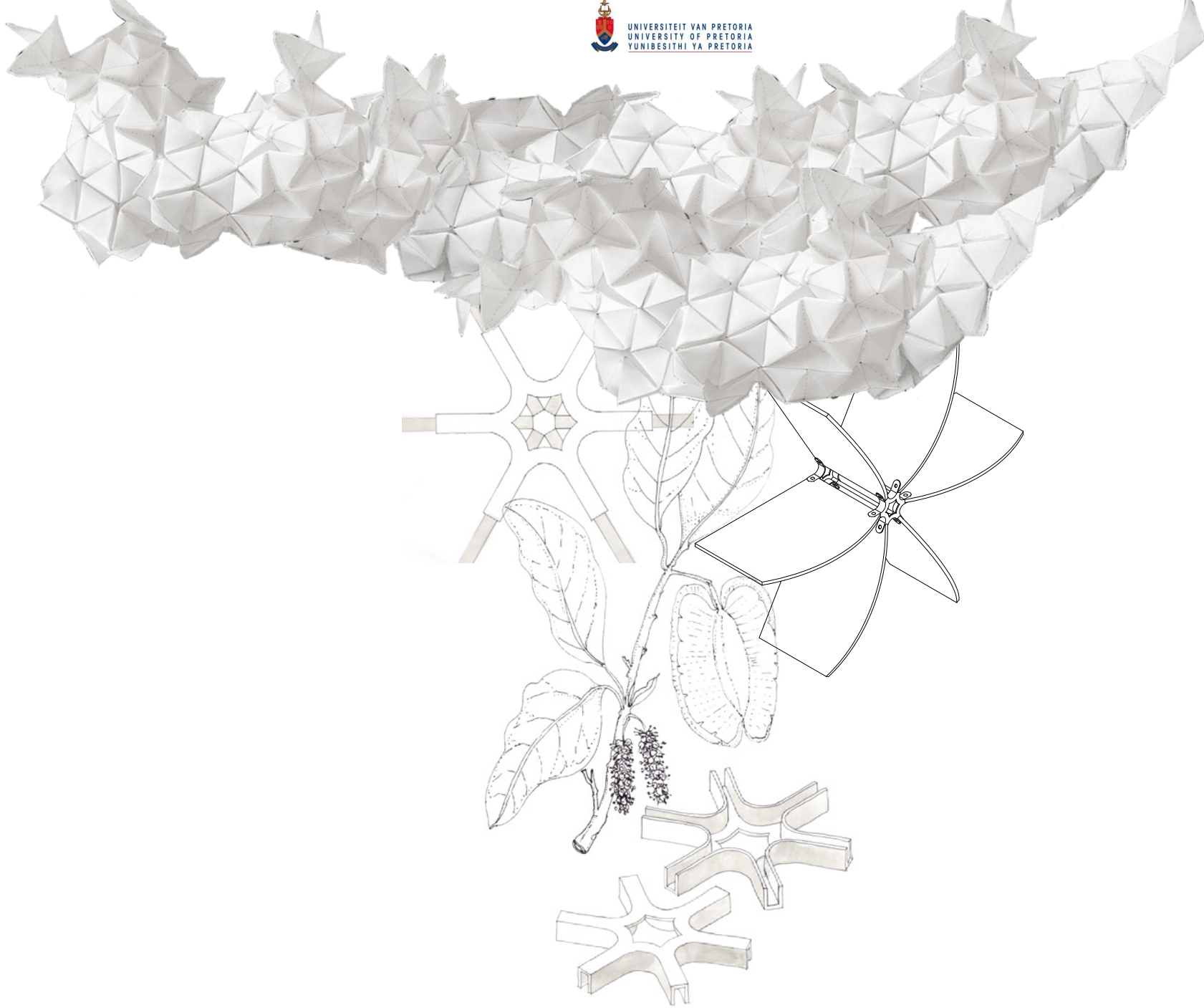


CONCLUSION

Final Reflections

08



CONCLUSION

This dissertation investigated the design of a branded skincare servicescape for Margaret Roberts, influenced by nature as a model and mentor through the application of Biomimicry and Biophilic design theories.

In following the Biomimicry design principles, the design intervention was able to implement nature's resource efficient and zero-waste strategies towards creating a model for sustainable retail design. The potential environmental impact of the design solution was analysed using the Green Star Interior rating tool, which resulted in a '6 Star World Leadership' rating. This rating was achieved as a result of the implementation of Biomimicry and Biophilic principles.

Furthermore, Biophilic design theories paved the way for creating a retail experience that mimics the atmospheric qualities in nature. Creating a desired 'atmosphere' proved to be challenging since it is an intangible quality within a space and consequently very difficult to express. The application of Biophilic Patterns in the design intervention therefore guided the approach towards successful expression of the experiential qualities.

Through the implementation of Biomimicry and Biophilia, the design of Margaret Roberts' new proposed brand identity was able to evolve and develop into a contemporary product that sets itself apart from other competitors in the market through its sustainable and experiential characteristics.

As a whole, this dissertation contributed towards building a body of knowledge centred around nature-inspired design tools, including Biomimicry and Biophilia. Through research and design, this dissertation proved that both Biomimicry and Biophilia serve great value in the discipline of interior design, and offers a vast array of solutions to contemporary design problems.

LIST OF REFERENCES

Adams, Anne-Taylor. 2014. *Social Responsibility*. [Online]. Available: <http://www.nielsen.com/us/en/press-room/2014/global-consumers-are-willing-to-put-their-money-where-their-heart-is.html> [Accessed 03 Aug 2016].

Alcock, I., M.P. White, B.W. Wheeler, L.E. Fleming, & M.H. Depledge. 2014. *Longitudinal Effects on Mental Health of Moving to Greener and Less Green Urban Areas*. *Environmental Science & Technology*,

Alvarsson, J., S. Wiens & M. Nilsson. 2010. *Stress Recovery during Exposure to Nature Sound and Environmental Noise*. *International Journal of Environmental Research and Public Health*,

AskNature, 2015. *ZERI Coffee Farming System*. [Online]. Available: https://asknature.org/idea/zeri-coffee-farming-system/#.V_oabiN95FQ [Accessed 13 Aug 2016]

Barton, J. & J. Pretty 2010. *What Is the Best Dose of Nature and Green Exercise for Improving Mental Health*. *Environmental Science & Technology*,

Benyus, J. 1997. *Biomimicry: Innovation Inspired by Nature*. Harper Collins Publishers Inc: New York

Biomimicry 3.8, 2014. *Life's Principles*. [Online]. Available: <http://biomimicry.net/about/biomimicry/biomimicry-designlens/lifes-principles/> [Accessed 13 Aug 2016]

Bourke, P. 2001. *Fractals*. Available: <http://astronomy.swin.edu.au/prbourke/fractals/> [Accessed 03 Aug 2016]

Bradley, M. 2016. *Cardboard to Caviar*. [Online]. Available: <http://algalbiomass.weebly.com/graham-wiles-cardboard-to-caviar.html> [Accessed 13 Aug 2016]

Bradley, S. 2010. *The Meaning of Shapes: Developing Visual Grammar*. Available: <http://vanseodesign.com/web-design/visual-grammar-shapes/> [Accessed 10 Sept 2016]

Browning, W.D., Ryan, C.O., Clancy, J.O. 2014. *14 Patterns of Biophilic Design*. New York: Terrapin Bright Green llc.

Clanton, N. 2014. Clanton & Associates, Inc. Personal communication with the authors.

Davis, M. 2009. *The Fundamentals of Branding*. AVA Publishing SA: Switzerland.

Dykstra, P. 2008. *History of Environmental Movements*. [Online]. Available: http://edition.cnn.com/2008/TECH/science/12/10/history.environmental.movement/index.html?eref=rss_tech [Accessed 19 May 2016]

EPA. 2013. *Natural Resources: The Quest for Less*. [Online]. Available: http://www.epa.gov/osw/education/quest/pdfs/unit1/chap1/u1_natresources.pdf [Accessed 19 May 2015]

Haakdoorn Nursery. 2016. *Lavender – Margaret Roberts*. [Online]. Available: http://www.haakdoornnursery.co.za/product/lavender_margaret_roberts [Accessed 19 May 2016]

Heerwagen, J.H. 2006. *Investing In People: The Social Benefits of Sustainable Design*. Rethinking Sustainable Construction. Sarasota, FL.

Hussain, S. 2011. *The Impact of Sensory Branding on Consumers: A case study on KFC*. *International Journal of Research in Business Management*.

Jones, L. 2008. *Environmentally Responsible Design*. Canada: John Wiley & Sons, Inc.

Justema, W. 1982. *The Pleasures of Pattern*. Van Nostrand Reinold: New York.

Kapferer, Jean-Noël. 2012. *The Luxury Strategy: Break the Rules of Marketing to Build Luxury Brands*. Philadelphia, PA: London.

Kellert, S.F., J.H. Heerwagen, & M.L. Mador Eds. 2008. *Biophilic Design: The Theory, Science & Practice of Bringing Buildings to Life*. Hoboken, NJ: John Wiley & Sons.

Kotler, P. 1974. *Atmospherics as a Marketing Tool*. Illinois: Northwestern University. 48-64.

Leone, C.W. 2008. *Come to Your Senses*. Perspring: Architempts. 35-43.

Li, Q., M. Kobayashi, H. Inagaki, Y. Wakayama, M. Katsumata, Y. Hirata, Y. Li, K. Hirata, T. Shimizu, A.

Nakadai, & T. Kawada 2012. *Effect of Phytoncides from Forest Environments on Immune Function*. In Q. Li (Ed.). Forest Medicine ebook: Nova Science Publishers.

Magdof, F. 2013. Global Resource Depletion. [Online]. Available: http://www.hst.org.za/uploads/files/chap13_07.pdf [Accessed 19 May 2016]

Margaret Roberts. n.d. The Herbal Centre. [Online]. Available: <http://www.margaretroberts.co.za/index.htm> [Accessed 15 July 2016]

McDonough & Braungart, 2000). *Cradle to Cradle: Remaking the way we make things*. London: Vintage.

Mesher, L. 2010. *Basics Interior Design: Retail Design*. AVA Publishing SA: Switzerland.

Neidlinger, J. 2016. *The Ultimate Guide to Using Colour Psychology in Marketing*. [Online]. Available: <http://coschedule.com/blog/color-psychology-marketing/> [Accessed 03 Aug 2016]

Nicklas, M.H. & G.B. Bailey 1996. *Student Performance in Daylit Schools*. [Online]. Available <http://www.innovativedesign.net/Profile-Resources-Technical-Papers.html> [Accessed 03 Aug 2016]

Nicolae, I. 2011. *The Psychology of Colour for Interior Design*. [Online]. Available: <http://designlike.com/the-psychology-of-color-for-interior-design/> [Accessed 03 Aug 2016]

Nordqvist, J. 2014. *Health Benefits of Lavender*. [Online]. Available: <http://www.medicalnewstoday.com/articles/265922.php> [Accessed 19 May 2016]

Park, B.J., Y. Tsunetsugu, T. Kasetani, T. Morikawa, T. Kagawa, & Y. Miyazaki 2009. *Physiological Effects of Forest Recreation in a Young Conifer Forest in Hinokage Town, Japan*. Silva Fennica,

Pawlyn, M. 2011. *Biomimicry in Architecture*. RIBA Publishing: London.

Pine, BJ & Gilmore, JH. 1998. *Welcome to the experience economy*. [Online]. Available: http://www.hospitality.ucf.edu/faculty/raywang/HFT_6938/Experiential%20consumption/WelcomeToExperienceEconomy.pdf [Accessed 05 Nov 2016].

Reiwooldt, O. 2002. *Brandscaping: Worlds of Experience in Retail Design* Birkha user,

Schumacher, E.F 1973. *Small is Beautiful. Economics as if People Mattered*. New York: Harper and Row

The World Counts. 2015. *Consequences of Depletion of Natural Resources*. [Online]. Available: http://www.theworldcounts.com/stories/consequences_of_depletion_of_natural_resources [Accessed 19 May 2016]

van den Berg, A.E., Y. Joye, & S. de Vries 2007. *Health Benefits of Nature*. In: L. Steg, A.E. van den Berg, & J.I.M. de Groot (Eds.), *Environmental Psychology: An Introduction* (47-56). First Edition. Chichester: Wiley- Blackwell.

Wheeler, A. 2009. *Designing Brand Identity*. John Wiley & Sons Inc: New Jersey.

Wigo, H. 2005. *Technique and Human Perception of Intermittent Air Velocity Variation*. KTH Research School, Centre for Built Environment.

Zanowick, M.B. 2012. *Biomimicry: Nature's Time Tested Framework for Sustainability*. Available: <http://peakstoprairies.org/media/Biomimicry-Overview.docx> [Accessed 05 May 2016]

Zuidhof, J. 2007. *3D In-store Design towards meaningful brand experiences in in physical in- store environments*. Netherlands: University of Twente.

FIGURE REFERENCES

Advanced Building, 2012. Waterkloof Corner Shopping Centre. [Online]. <http://www.advanced-building.org/waterkloof-corner-shopping-centre/> [Accessed 13 Aug 2016]

Air Plant Supply, 2016. Air plants. [Online]. <http://www.airplantsupplyco.com/collections/wholesale/products/wholesale-harrisii-minimum-order-of-12-plants> [Accessed 13 Aug 2016]

ArchiTonic, 2013. Seating Armchairs. [Online]. <https://www.architonic.com/en/product/zimmer-rohde-club-chair/1190961> [Accessed 13 Aug 2016]

AskNature, 2016. AskNature Resources. [Online]. <https://asknature.org/> [Accessed 13 Aug 2016]

Bunnings, 2016. Bunnings Warehouse. [Online]. https://www.bunnings.co.nz/handy-storage-5-tier-1830x-910x400mm-shelving-unit_p00991345 [Accessed 13 Aug 2016]

Cochrane, S. 2015. Summer Fruit. [Online]. <http://shaycochrane.com/blog/2015/03/03/in-the-shop-summer-fruit-styled-stock/> [Accessed 13 Aug 2016]

Etsy, 2007. Nature Photography Prints. [Online]. https://www.etsy.com/shop/RockyTopPrintShop?section_id=8129994 [Accessed 13 Aug 2016]

Fetrow, K. 2011. Searching Safe Energy. [Online]. <http://subversify.com/2011/04/08/obama%E2%80%99s-energy-plan%E2%80%99s-dirty-secrets/> [Accessed 13 Aug 2016]

Flickrriver, 2006. Wood Weave. [Online]. <http://www.flickrriver.com/photos/visionairy/309338843/> [Accessed 13 Aug 2016]

Gardeners, 2014. Aroma Oil Diffuser. [Online]. <http://www.gardeners.com/buy/ultrasonic-aromatherapy-oil-diffuser/> [Accessed 13 Aug 2016]

Gombikova, Z. 2014. Health Effects of Light. [Online]. <https://freyaled.com/en/blog/health-effects-of-the-light> [Accessed 13 Aug 2016]

Howarth, D. 2015. Fairphone Amsterdam Offices. [Online]. <http://www.dezeen.com/2015/06/24/fairphone-amsterdam-offices> [Accessed 13 Aug 2016]

Kostreva, J. 2016. Crashing Waves. [Online]. <http://blog.juliakostreva.com/page/2/> [Accessed 13 Aug 2016]

Margolis, M. 2016. Drought Tolerant Garden. [Online]. <http://www.houzz.com/ideabooks/3352661/thumbs/www.houzz.com/ideabooks/3352661/list/Drought-Tolerant-Garden> [Accessed 13 Aug 2016]

Pixel, P. 2013. Architecture from around the World. [Online] <http://snappypixels.com/interesting/cool-architecture-around-world/> [Accessed 13 Aug 2016]

Schmidt, P. 2016. Scethno Inteiror. [Online] <http://www.heimatbaum.com/scethno-interior-vom-feinsten/> [Accessed 13 Aug 2016]

Snowy River Lavender, 2016. Composting Lavender. [Online] <http://snowyriverlavender.com.au/composting-lavender/> [Accessed 13 Aug 2016]

Solatube, 2016. Southdowns Shopping Centre. [Online] <http://www.southdownscentre.co.za/> [Accessed 13 Aug 2016]

Southdowns, 2016. SolaMaster Series. [Online] <http://solatube.co.za/solamaster-series/> [Accessed 13 Aug 2016]

StudioChoo, 2010. Fungi Growth. [Online] <http://www.designsponge.com/2011/02/we-like-it-wild-fungi-love.html/pioppini> [Accessed 13 Aug 2016]

Panero, J & Zelnik, M. 1979. Human Dimension and Interior Space. Canada: Whitney Library of Design.

Verdina, A. 2013. Berries. [Online]. <https://www.flickr.com/photos/58739058@N07/9648768356/> [Accessed 13 Aug 2016]

VivreDemain, 2016. Lavender Harvesting. [Online] <http://vivredemain.fr/recolte-lavande-photos/> [Accessed 13 Aug 2016]

APPENDIX A

SBAT SCORING SHEETS

Performance - Social

Indicator	Indicative performance measure	Measured	Points
Indicative performance measure			
		<i>Explanatory notes</i>	4,3
Daylight	% of occupied spaces that are within distance 2H from window, where H is the height of the window or where there is good daylight from skylights	70	0,7
Acoustic	% of occupied spaces have equivalent of opening window area equivalent to 10% of floor area or adequate mechanical system, with unpolluted air source	100	1,0
	% of occupied spaces where external/internal/reverberation noise does not impinge on normal conversation (50dbA)	100	1,0
Thermal comfort	Temperature of occupied space does not exceed 28 or go below 19°C for less than 5 days per year (100%)	100	1,0
	% of occupied space that is 6m from an external window (not a skylight) with a view	60	0,6
		<i>Explanatory notes</i>	4,5
Transport	% of building (s) within 400m of disabled accessible (20%) and affordable (80%) public transport	100	1,0
Wayfinding	Comprehensive signage provided (50%), Signage high contrast, clear print signage in appropriate locations and language(s) / use of understandable symbols / manned reception at all entrances (50%)	100	1,0
	% of occupied spaces that are accessible to ambulant disabled / wheelchair users	70	0,7
	% of occupied space with fully accessible toilets within 50m along easily accessible route	100	1,0
Accessibility & Furniture	% of commonly used furniture and fittings (reception desk, kitchenette, auditorium) fully accessible	80	0,8
		<i>Explanatory notes</i>	5,0
Proximity	All users can walk (100%) / use public transport (50%) to get to their childrens' schools and creches	100	1,0
Banking	All users can walk (100%) / use public transport (50%) to get to banking facilities	100	1,0
Food retail	All users can walk (100%) / use public transport (50%) to get to food retail	100	1,0
Communication	All users can walk (100%) / use public transport (50%) to get to communication facilities (post/telephone/internet)	100	1,0
Recreation	All users can walk (100%) / use public transport (50%) to get to recreation/exercise facilities	100	1,0
		<i>Explanatory notes</i>	2,5
Thermal control	% of occupied space able to control their thermal environment (adjacent to openable windows/thermal controls)	0	0,0
Light control	% of occupied space able to control their light (adjacent to controllable blinds etc/local lighting control)	0	0,0
Meeting spaces	Social informal meeting spaces (parks / staff canteens / cafes) provided locally (within 400m) (100%)	100	1,0
Shared facilities	5% or more of facilities shared with other users / organisations on a weekly basis (100%)	100	1,0
Participation	Users actively involved in the design process (50%) / Active and representative management user group (50%)	50	0,5
		<i>Explanatory notes</i>	4,5
Education	Two percent or more space/facilities available for education (seminar rooms / reading / libraries) per occupied space (75%). Construction training provided on site (25%)	50	0,5
Security	All well used routes in and around building well lit (25%), all routes in and around buildings visually supervised (25%), secure perimeter and access control (50%), No crime (100%)	100	1,0
Health & Safety	% of users who can access information on health & safety issues (ie HIV/AIDS), training and employment opportunities easily (posters/personnel/intranet site)	100	1,0
Indoor Air Quality	All materials/components used have no negative effects on indoor air quality (100%)	100	1,0

Building Performance - Economic

	Criteria	Indicative performance measure	Measured	Points
EC 1	Local economy		<u>Explanatory notes</u>	5.0
EC 1.1	Local contractors	% value of the building constructed by local (within 50km) small (employees<20) contractors	100	1.0
EC 1.2	Local materials	% of materials (sand, bricks, blocks, roofing material) sourced from within 50km	100	1.0
EC 1.3	Local components	% of components (windows, doors etc) made locally (in the country)	100	1.0
EC 1.4	Local furniture/fitings	% of furniture and fittings made locally (in the country)	100	1.0
EC 1.5	Maintenance	% of maintenance and repairs by value that can, and are undertaken, by local contractors (within 50km)	100	1.0
EC 2	Efficiency		<u>Explanatory notes</u>	4.8
EC 2.1	Capacity	% capacity of building used on a daily basis (actual number of users / number of users at full capacity*100)	90	0.9
EC 2.2	Occupancy	% of time building is occupied and used (actual average number of hours used / all potential hours building could be used (24)*100)	100	1.0
EC 2.3	Space per occupant	Space provision per user not more than 10% above national average for building type (100%)	90	0.9
EC 2.4	Communication	Site/building has access to internet and telephone (100%), telephone only (50%)	100	1.0
EC 2.5	Material & Components	Building design coordinated with material / component sizes in order to minimise wastage. Walls (50%), Roof and floors (50%)	100	1.0
EC 3	Adaptability		<u>Explanatory notes</u>	4.1
EC 3.1	Vertical heights	% of spaces that have a floor to ceiling height of 3000mm or more	90	0.9
EC 3.2	External space	Design facilitates flexible external space use (100%)	100	1.0
EC 3.3	Internal partition	Non loadbearing internal partitions that can be easily adapted (loose partitioning (100%), studwall (50%), masonry (25%)	50	0.5
EC 3.4	Modular planning	Building with modular structure, envelope (fenestration) & services allowing easy internal adaptaptation (100%)	80	0.8
EC 3.5	Furniture	Modular, limited variety furniture - can be easily configured for different uses (100%)	90	0.9
EC 4	Ongoing costs		<u>Explanatory notes</u>	4.3
EC 4.1	Induction	All new users receive induction training on building systems (50%), Detailed building user manual (50%)	100	1.0
EC4.2	Consumption & waste	% of users exposed on a monthly basis to building performance figures (water (25%), electricity (25%), waste (25%), accidents (25%)	80	0.8
EC 4.2	Metering	Easily monitored localised metering system for water (50%) and energy (50%)	100	1.0
EC4.3	Maintenance & Cleaning	% of building that can be cleaned and maintained easily and safely using simple equipment and local non-hazardous materials	50	0.5
SO 4.5	Procurement	% of value of all materials/equipment used in the building on a daily basis supplied by local (within the country) manufacturers	100	1.0
EC 5	Capital Costs		<u>Explanatory notes</u>	4.8
EC 5.1	Local need	Five percent capital cost allocated to address urgent local issues (employment, training etc) during construction process (100%)	100	1.0
EC5.2	Procurement	Tender / construction packaged to ensure involvement of small local contractors/manufacturers (100%)	100	1.0
EC 5.3	Building costs	Capital cost not more than fifteen % above national average building costs for the building type (100%)	100	1.0
EC5.4	Technology	3% or more of capital costs allocated to new sustainable/indigenous technology (100%)	80	0.8
EC 5.5	Existing Buildings	Existing buildings reused (100%)	100	1.0

Building Performance - Environmental

	Criteria	Indicative performance measure	Measured	Points
EN 1	Water			2,9
			Explanatory notes	
EN 1.1	Rainwater	% of water consumed sourced from rainwater harvested on site	0	0,0
EN 1.2	Water use	% of equipment (taps, washing machines, urinals showerheads) that are water efficient	100	1,0
EN 1.3	Runoff	% of carparking, paths, roads and roofs that have absorbant/semi absorbant/permeable surfaces (grassed/thatched/looselaid paving/ absorbant materials)	60	0,6
EN 1.4	Greywater	% of water from washing/relatively clean processes recycled and reused	40	0,4
EN 1.5	Planting	% of planting (other than food gardens) on site with low / appropriate water requirements	90	0,9
EN 2	Energy			3,8
			Explanatory notes	
EN 2.1	Location	% of users who walk / cycle / use public transport to commute to the building	50	0,5
EN 2.2	Ventilation	% of building ventilation requirements met through natural / passive ventilation	70	0,7
EN 2.3	Heating & Cooling	% of occupied space which relies solely on passive environmental control (no or minimal energy consumption)	80	0,8
EN 2.4	Appliances & fittings	% of appliances / lighting fixtures that are classed as highly energy efficient (ie energy star rating)	100	1,0
EN 2.5	Renewable energy	% of building energy requirements met from renewable sources	80	0,8
EN 3	Waste			4,0
			Explanatory notes	
EN 3.1	Toxic waste	% of toxic waste (batteries, ink cartridges, flourescent lamps) recycled	100	1,0
EN 3.2	Organic waste	% of organic waste recycled	100	1,0
EN 3.3	Inorganic waste	% of inorganic waste recycled.	100	1,0
EN 3.4	Sewerage	% of sewerage recycled on site	0	0,0
EN 3.5	Construction waste	% of damaged building materials / waste developed in construction recycled on site	100	1,0
EN 4	Site			3,6
			Explanatory notes	
EN 4.1	Brownfield site	% of proposed site already disturbed / brownfield (previously developed)	100	1,0
EN 4.2	Neighbouring buildings	No neighbouring buildings negatively affected (access to sunlight, daylight, ventilation) (100%)	100	1,0
EN 4.3	Vegetation	% of area of area covered in vegetation (include green roofs, internal planting) relative to whole site	60	0,6
EN 4.4	Food gardens	Food gardens on site (100%)	0	0,0
EN 4.5	Landscape inputs	% of landscape that does not require mechanical equipment (ie lawn cutting) and or artificial inputs such as weed killers and pesticides	100	1,0
EN 5	Materials & Components			4,6
			Explanatory notes	
EN 5.1	Embodied energy	Materials with high embodied energy (aluminium,plastics) make up less than 1% of weight of building (100%)	90	0,9
EN 5.2	Material sources	% of materials and components by volume from grown sources (animal/plant)	90	0,9
EN 5.3	Ozone depletion	No materials and components used requiring ozone depleting processes (100%)	90	0,9
EN 5.4	Recyled / reuse	% of materials and components (by weight) reused / from recycled sources	90	0,9
EN 5.5	Construction process	Volume / area of site disturbed during construction less than 2X volume/area of new building (100%)	100	1,0

APPENDIX B

PHOTOS FROM FINAL EXAM



