



**NAMIPIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF NATURAL RESOURCES AND SPATIAL SCIENCES
DEPARTMENT OF ARCHITECTURE AND SPATIAL PLANNING**

QUALIFICATION: BACHELOR OF TOWN AND REGIONAL PLANNING	
QUALIFICATION CODE: O7BTAR	LEVEL: 7
COURSE CODE: SSP720S	COURSE NAME: SUSTAINABLE SETTLEMENT PLANNING
SESSION: JANUARY 2020	PAPER: THEORY
DURATION: 3 HOURS	MARKS: 100

SECOND OPPORTUNITY / SUPPLEMENTARY EXAMINATION QUESTION PAPER	
EXAMINER(S)	Ms. G.B van Rooi gvanrooi@nust.na / 2072359
MODERATOR:	Ms. H. Kevanhu hkevanhu@swkmun.com.na

NOTES
<ul style="list-style-type: none">• The question paper consists of 5 pages (Including this front page)• Read the entire question paper before answering the questions• Ensure you number your answers correctly• Please write clearly and legibly• You must answer all questions <p>Make sure your Student Number is on the Examination Book(s)</p>

QUESTION 1

- (a) Provide the Brundtland Commission definition for ‘Sustainable Development’. (2)
- (b) With your understanding of the role an urban planner plays in the development of Namibia, provide an indication of what you ought to do to ensure that your work does not result therein that the needs of future generations cannot be met. (3)

The Sustainable Development Goal (SDG) No. 11 calls on nation states to “Make cities and human settlements inclusive, safe, resilient and sustainable.”

- (c) Discuss this goal in detail. (10)
- [15]

QUESTION 2

As a newly qualified urban planner in the employment of the Swakopmund Municipality you are tasked to advocate the concept of complete streets and you must convince engineers of the viability of such.

- (a) Indicate the positive aspects that the community would enjoy should complete streets be developed in strategic locations of the municipal area. (10)
- (b) In continuance of the fantasy, you are now a Swakopmund Municipality employee. You have pursued complete streets and it touches on non-motorised transportation (NMT). You are specifically tasked to come up with a more detailed plan for NMT. Briefly discuss the principles that you will apply to guide your NMT plan. (5)

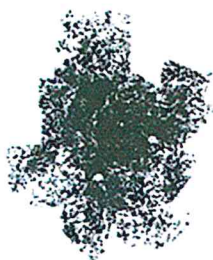
[15]

QUESTION 3

Study the urban footprints of Barcelona, Spain and Atlanta, Georgia, USA as depicted on Figure 1.

ATLANTA

Built-up Area

**BARCELONA**

Built-up Area



Figure 1

It is quite evident that the USA city is a sprawling city. Sprawl, according to the New Urbanist proponents is the most unsustainable city form.

- (a) Identify the threats to sustainability that must be evident in the City of Atlanta. (5)
- (b) Indicate the general characteristics of compact cities such as Barcelona. (5)
- (c) How would the delineation of an “Urban Growth Boundary” ensure the development of a compact city? Use Windhoek as a case study to substantiate your claims. (5)

New Urbanist’s firmly belief that urban sprawl is one of the major threats to sustainable city building initiatives.

- (d) Discuss the methods of densification the City of Windhoek could pursue to revive areas such as Pionierspark. (5)

[20]

QUESTION 4

Urban Planners invariably are complicit in causing the destruction of the natural environment with the continual development of townships. The adoption of a green infrastructure planning approach can aide as a form of environmental restitution.

- (a) Discuss in brief the main components of the green infrastructure planning approach. (5)

One of the main challenges to sustainable city building is the sprawl. Sprawling cities generally have dedicated excessive space to streets and roadways. The ‘green infrastructure approach’ puts to the fore that streets ought to be green to minimize the environmental impact related to transportation.

- (b) Discuss the concept of ‘green streets’. (5)

[10]

QUESTION 5

The area south of Rocky Crest within the Windhoek Municipal area will be subjected to township developments. Such would have an environmental impact which can be likened to an environmental footprint.

- (a) Briefly discuss the “Ecological Footprint” concept as applied to the envisaged township development. (5)

Urban Planners can minimize the “Ecological Footprint” of the aforementioned township development by pursuing ‘brownfield’ developments within older parts of Windhoek.

- (b) Describe what a typical brownfield development entail. (2)
- (c) What are the benefits of developing brownfields? (3)

[10]

QUESTION 6

The Windhoek Town Planning Scheme that was discussed at an interactive session at the City of Windhoek, where you as SSP720S student were present, is an example of a Euclidian Zoning Scheme.

- (a) Describe what a Euclidian Zoning Scheme is. (2)
- (b) What in your opinion is the negative and positive impact of the application of Euclidian zoning on the sustainability of Windhoek? (4)
- (c) As an alternative to the Euclidian zoning; the adoption of Form Based Codes could aide in ensuring a sustainable urban environment in Windhoek. Provide reasons why that would be so. (4)

[10]

QUESTION 7

The world’s oceans are of utmost importance in the functioning of the Earth system. The oceans however are dramatically affected by increased CO² emissions, which lead, through the effects of warming and thermal expansion, to a rise in sea levels, as well as to ocean acidification.

- (a) Provide an explanation of what ocean acidification is. (5)

The environmental threats to the world’s oceans have prompted countries to engage in Marine Spatial Planning.

- (b) Discuss the principles of Marine Spatial Planning in Namibia. (5)

[10]

QUESTION 8

Environmentalists are of the opinion that the blind pursuit of economic development causes grave consequences to our natural environment. These proponents advise that in order to pursue sustainable economic growth, nations ought to adopt 'green economy' principles.

- (a) Provide a brief overview of the "green economy" concept. (5)
- (b) Explain how the "green economy" concept relates to sustainable development. (5)

[10]

TOTAL = 100



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SECOND OPPORTUNITY / SUPPLEMENTARY EXAMINATION MEMORANDUM

EXAMINER(S)	Ms. G.B van Rooi gvanrooi@nust.na / 2072359
MODERATOR:	Ms. H. Kevanhu hkevanhu@swkmun.com.na

NOTES

- The Memorandum consists of **10** pages (including this front page).
- The model answers are used as guidelines only.
- The information presented by the students will be evaluated on merit.

QUESTION 1

- (a) Provide the Brundtland Commission definition for 'Sustainable Development'. (2)

*"Sustainable development is development that meets the needs of the present ✓
without compromising the ability of future generations to meet their own needs. ✓"*

- (b) With your understanding of the role an urban planner plays in the development of Namibia, provide an indication of what you ought to do to ensure that your work does not result therein that the needs of future generations cannot be met. (3)

(Open ended answer; however, student should discuss at least the following issues)

*Sustainable utilization of land; ✓ densification/compact/smart growth, ✓
Discouraging urban sprawl/densification; ✓ environmental protection/biodiversity conservation. ✓*

The Sustainable Development Goal No. 11 calls on nation states to "Make cities and human settlements inclusive, safe, resilient and sustainable."

- (c) Discuss this goal in detail. (10)

By 2030, ensure access for all to adequate, safe and affordable housing ✓ and basic services and upgrade slums; ✓

By 2030, provide access to safe, affordable, accessible and sustainable transport systems ✓ for all, improving road safety ✓, notably by expanding public transport, ✓ with special attention to the needs of those in vulnerable situations ✓, women, children, persons with disabilities and older persons;

By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning ✓ and management in all countries.

Strengthen efforts to protect and safeguard the world's cultural and natural heritage ✓

By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses ✓ relative to global gross domestic product caused by disasters, including water-related disasters, ✓ with a focus on protecting the poor and people in vulnerable situations.

By 2030, reduce the adverse per capita environmental impact of cities, ✓ including by paying special attention to air quality and municipal and other waste management ✓

By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, ✓ for women and children, older persons and persons with disabilities

Support positive economic, social and environmental links between urban, peri-urban and rural areas ✓ by strengthening national and regional development planning ✓

By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies ✓ and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, ✓ and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels ✓.

(Any ten (10) of these points will score a mark)

[15]

QUESTION 2

As a newly qualified urban planner in the employment of the Swakopmund Municipality you are tasked to advocate the concept of complete streets and you must convince engineers of the viability of such.

(a) Indicate the positive aspects that the community would enjoy should complete streets be developed in strategic locations of the municipal area. (10)

- *Lower motor vehicle traffic speeds. Complete streets often reduce maximum traffic speeds, typically from 50-80 km down to 30-40 km/ hour. ✓*
- *Increased safety - Lower traffic speeds tend to reduce traffic collision rates and severity, and therefore crash costs, particularly injury risk for pedestrians and cyclists. ✓*
- *Improved non-motorized conditions - Complete streets generally include wider sidewalks, better crosswalks, bike lanes and reduced traffic speeds, which improve walking and cycling convenience, comfort and safety. ✓*
- *Improved public transit service - Complete streets often include improved bus stops and pedestrian access, and sometimes bus-lanes which increase public transit speed, reliability, comfort and efficiency. ✓*
- *Mode shifts - By improving walking, cycling and public transit, and reducing maximum vehicle traffic speeds, complete streets encourage shifts from automobile to alternative modes, reducing total vehicle travel. ✓*
- *Reduced local air and noise pollution - By reducing traffic speeds and total motor vehicle travel, and improving bus flow, complete streets tend to reduce local air and noise pollution. ✓*
- *Improved aesthetics – Complete streets often include landscaping and other design changes that tend to be more attractive. ✓*
- *Improved liveability - By improving walkability, accessibility, and aesthetics, and reducing pollution, complete streets tend to improve liveability (local environmental quality and affordability). ✓*

- Increase economic activity and local property values – By improving liveability, complete streets can increase local business activity and property values ✓

(Any ten (10) of these points will score a mark)

- (b) In continuance of the fantasy, you are now a Swakopmund Municipality employee. You have pursued complete streets and it touches on non-motorised transportation (NMT). You are specifically tasked to come up with a more detailed plan for NMT. Briefly discuss the principles that you will apply to guide your NMT plan. (5)

- NMT will be successful if it is located along contour lines ✓ to minimise gradients while streets and erven can be placed to optimise solar conditions in buildings.
- NMT can follow watercourses ✓, where appropriate, to provide mobility at right angles to contours and can be placed within the 1:50 year flood lines ✓ in order to maximise mobility without reducing developable land. ✓
- NMT placement needs to consider safety, ✓ user function ability ✓ and security ✓ to ensure good and well-lit sightlines and easily controlled access to facilities and developments.
- NMT should be considered as the primary mode of transport for short trips and scholars. ✓

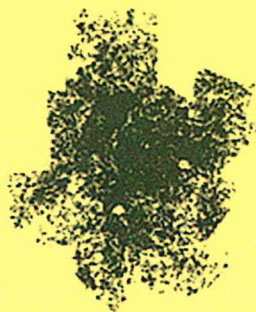
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QUESTION 3

Study the urban footprints of Barcelona, Spain and Atlanta, Georgia, USA as depicted on Figure 1.

ATLANTA

Built-up Area



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Figure 1

It is quite evident that the USA city is a sprawling city. Sprawl, according to the New Urbanist proponents is the most unsustainable city form.

- (a) Identify the threats to sustainability that must be evident in the City of Atlanta. (5)

Urban sprawl has been correlated with increased energy use, ✓ pollution, ✓ and traffic congestion ✓ and a decline in community distinctiveness ✓ and cohesiveness. ✓ Monofunctional cities, ✓ inefficient city systems. ✓ Long Travel distances as land uses are separated. ✓

In addition, by increasing the physical and environmental “footprints” of metropolitan areas, the phenomenon leads to the destruction of wildlife habitat ✓ and to the fragmentation of remaining natural areas. ✓

(Any five (5) of these points will score a mark)

- (b) Indicate the general characteristics of compact cities such as Barcelona. (5)

Urban compaction involves the promotion of urban regeneration ✓, the revitalisation of town centres ✓, restraint on development in rural areas ✓, higher density development ✓, mixed-use development ✓, promotion of public transport ✓ and the concentration of urban development at public transport nodes. ✓

(Any five (5) of these points will score a mark)

- (c) How would the delineation of an “Urban Growth Boundary” ensure the development of a compact city? Use Windhoek as a case study to substantiate your claims. (5)

The boundary contains urban sprawl ✓ as it controls expansion onto farm and forest lands. It is one of the planning tools used to protect farms and forests /natural resources ✓ from development. It promotes the efficient use of land ✓ public facilities and services inside the boundary. It stimulates the development and redevelopment of land and buildings in the urban core ✓.

Furthermore, it provides assurance for businesses and local governments about where to place infrastructure ✓ (such as roads and sewers), needed for future development. Service provision is also more financially efficient ✓ as funding spent on the provision of services renders efficient return on investment. (More benefit from expenditure in a smaller geographical area)

(Any five (5) of these points will score a mark)

New Urbanist's firmly belief that urban sprawl is one of the major threats to sustainable city building initiatives.

- (d) Discuss the methods of densification the City of Windhoek could pursue to revive areas such as Pionierspark. (5)
- Construction of attached/detached second dwellings including the changing of non-residential buildings, or parts of buildings, to residential buildings (e.g. garages). ✓
 - Increasing the existing bulk rights through the extension of the building or adding on of floors to accommodate an increased number of units. ✓
 - Block consolidation of erven with redevelopment at higher densities. ✓
 - Subdivision of land and redevelopment at higher densities. ✓
 - Consolidation with re-development at higher densities including the demolition and integration of existing structures. ✓
 - Higher density infill on vacant and under-utilised land throughout the built area of the City. ✓
 - Consolidation of sites within a street block to create a single larger parcel for redevelopment into multi-storey units.

(Any five (5) of these points will score a mark)

[20]

QUESTION 4

Urban Planners invariably are complicit in causing the destruction of the natural environment with the continual development of townships. The adoption of a green infrastructure planning approach can aide as a form of environmental restitution.

- (a) Discuss in brief the main components of the green infrastructure planning approach. (5)

The main components of this approach include stormwater management, ✓ climate adaptation, ✓ less heat stress, ✓ more biodiversity, ✓ food production, ✓ better air quality, ✓ sustainable energy production, ✓ clean water, ✓ and healthy soils, ✓ as well as the more anthropocentric functions such as increased quality of life ✓ through recreation ✓ and providing shade and shelter ✓ in and around towns and cities.

(Any five (5) of these points will score a mark)

One of the main challenges to sustainable city building is the sprawl. Sprawling cities generally have dedicated excessive space to streets and roadways. The 'green infrastructure approach' puts to the fore that streets ought to be green to minimize the environmental impact related to transportation.

- (b) Discuss the concept of 'green streets'. (5)

Green streets protect water quality in rivers and streams ✓ by removing up to 90% of pollutants. ✓ They replenish groundwater supplies, ✓ absorb carbon, ✓ improve air quality ✓ and neighbourhood aesthetics, ✓ and supply green connections between parks and open space. ✓ Vegetated curb extensions improve pedestrian/ bicycle safety, ✓ and calm traffic. ✓ Green streets reduce peak stormwater flows, ✓ free capacity in the pipes to carry more wastewater ✓ to the sewage treatment plant and reduce or stop sewer backups ✓ in basements. They can eliminate the need to install or replace expensive underground collection, conveyance and treatment systems. ✓

(Any five (5) logically construed points will score a mark)

[10]

QUESTION 5

The area south of Rocky Crest within the Windhoek Municipal area will be subjected to township developments. Such would have an environmental impact which can be likened to an environmental footprint.

- (a) Briefly discuss the "Ecological Footprint" concept as applied to the envisaged township development. (5)

A development's environmental impact can be likened to a footprint. The footprint might initially appear small: the site area on which the development sits ✓ together with the destruction of any natural environment that existed there. ✓ When the 'invisible' environmental capital inherent in constructing that development is considered, a second, larger footprint becomes apparent – the energy and resources ✓ expended in the manufacture and transport ✓ of materials, the energy required to prepare the site ✓ and construct the development, ✓ the energy required to extend the infrastructure needed to service ✓ the site, etc. When the development is occupied, there is a third, even larger footprint – the energy and resources expended to sustain the development ✓: the maintenance requirements, ✓ the development's energy requirements ✓, and the waste disposal requirements ✓, the occupants' travel to and from the development, ✓ etc.

Finally, when the development reaches the end of its life, ✓ the energy required for altering or demolishing it ✓ and dealing with the resulting site and materials completes its lifetime environmental costs, thereby further enlarging the footprint.

(Any five (5) logically construed points will score a mark)

Urban Planners can minimize the “Ecological Footprint” of the aforementioned township development by pursuing ‘brownfield’ developments within older parts of Windhoek.

- (b) Describe what a typical brownfield development entail. (2)

Brownfield development is a term used in urban planning to describe development on land previously used ✓ for industrial or commercial purposes ✓.

- (c) What are the benefits of developing brownfields? (3)

Brownfield sites could provide well located and hopefully affordable housing ✓, create opportunities for employment ✓, promote conservation and environmental rehabilitation ✓, and offer a shared place for sport, recreation and community engagement ✓.

(Any three (3) of these points will score a mark)

[10]

QUESTION 6

The Windhoek Town Planning Scheme that was discussed at an interactive session at the City of Windhoek, where you as SSP720S student were present, is an example of a Euclidian Zoning Scheme.

- (a) Describe what a Euclidian Zoning Scheme is. (2)

Euclidean zoning is characterized by the segregation of land uses ✓ into specified zones stipulating limitations on development activity ✓ within each type of zone.

- (b) What in your opinion is the negative and positive impact of the application of Euclidian zoning on the sustainability of Windhoek? (4)

Positive: *Euclidean zoning enables cities to avoid unnecessary noise, glare, and pollution impacts ✓ resulting from the incompatible placement of uses. ✓*

Negative: *Euclidean zoning is negative because of its inherent nature to separate land uses are enabling urban sprawl ✓ and discourage mixed land use ✓ developments.*

- (c) As an alternative to the Euclidian zoning; the adoption of Form Based Codes could aide in ensuring a sustainable urban environment in Windhoek. Provide reasons why that would be so. (4)

Form-based codes address the relationship between building facades and the public realm, ✓ the form and mass of buildings in relation to one another, ✓ and the scale and types of streets and blocks. ✓ The regulations and standards in form-based codes are presented in both words and clearly drawn diagrams and other visuals. ✓ They are keyed to a regulating plan ✓ that designates the appropriate form and scale (and therefore, character) ✓ of development, rather than only distinctions in land-use types. ✓

OR

A form-based code is a land development regulation ✓ that fosters predictable built results ✓ and a high-quality public realm ✓ by using physical form ✓, rather than separation of uses ✓ as the organizing principle for the code. A form-based code is a regulation ✓, not a mere guideline, adopted into city, town, or county law. A form-based code offers a powerful alternative to conventional zoning regulation.

(Any four (4) points of either option will score a mark)

[10]

QUESTION 7

The world's oceans are of utmost importance in the functioning of the Earth system. The oceans however are dramatically affected by increased CO² emissions, which lead, through the effects of warming and thermal expansion, to a rise in sea levels, as well as to ocean acidification.

- (a) Provide an explanation of what ocean acidification is. (5)

Ocean acidification is the name given to the ongoing decrease in the pH of the Earth's oceans, ✓ caused by their uptake of anthropogenic carbon dioxide from the atmosphere. ✓ An estimated 30–40% of the carbon dioxide from human activity released into the atmosphere dissolves into oceans, rivers and lakes. ✓ This could undermine the functioning of marine ecosystems ✓ and disrupt the provision of many goods ✓ and services associated with the ocean beginning as early as 2100. It could halt or even reverse coral reef growth ✓ and in combination with sea-level rise, would endanger coastal regions worldwide.

(Any five (5) of these points will score a mark)

The environmental threats to the world's oceans have prompted countries to engage in Marine Spatial Planning.

- (b) Discuss the principles of Marine Spatial Planning in Namibia. (5)

Namibia sees Marine Spatial Planning as: a participative action ✓ that guides where ✓ and when ✓ human activities ✓ occur in marine spaces, ✓ providing for comprehensive, integrated and complementary planning ✓ and management across all sectors and for all ocean uses in order to enable sustainable ocean development. ✓

(Any five (5) points will score a mark)

[10]

QUESTION 8

Environmentalists are of the opinion that the blind pursuit of economic development causes grave consequences to our natural environment. These proponents advise that in order to pursue sustainable economic growth, nations ought to adopt 'green economy' principles.

- (a) Provide a brief overview of the "green economy" concept. (5)

In its simplest expression, a green economy is low-carbon, ✓ resource efficient, ✓ and socially inclusive. ✓ In a green economy, growth in income and employment are driven by public and private investments that reduce carbon emissions and pollution, ✓ enhance energy, ✓ and resource efficiency, and prevent the loss of biodiversity and ecosystem services. ✓

(Any five (5) of these points will score a mark)

- (a) Explain how the "green economy" concept relates to sustainable development. (5)

The entire concept of sustainable development is driven by concern that economic development may be leading to rapid accumulation of physical and human capital ✓ at the expense of excessive depletion and degradation of natural capital. ✓ The major concern is that by irreversibly depleting the world's stock of natural wealth ✓, today's development path will have detrimental implications for the well-being of future generations. ✓ It has been argued that because today's economies are biased towards depleting natural capital to secure growth, ✓ sustainable development is unachievable. ✓

(Any five (5) of these points will score a mark)

[10]

TOTAL = 100

January 2020

SSP720S

Sustainable Settlement Planning

Included:

Moderator's report

Supplementary / Second Opportunity question paper

Supplementary / Second Opportunity Memorandum