INSTITUTE OF ENVIRONMENTAL AND RECREATIONAL MANAGEMENT

PUBLIC SPACES AND PLACES – FUTURE VALUE, TRENDS, AND GLOBAL VIEWS:

The Development of the Lanseria Integrated Open Space Plan based on development trends, ecological and park planning requirements.

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1. INTRODUCTION

City of Johannesburg Metropolitan Municipality (CoJ) has invested in **Integrated Open Space Plans** for various regions within the Johannesburg boundaries. These Open Space Plans aim to assist with informing decision making processes relating to development and open spaces and to identify areas to be protected for greening, park development or conservation programs. Integrated Open Space Plans have been prepared for the Greater Kyalami, Ruimsig-Honeydew and Greater Bosonia areas by Royal Haskoning DHV. CoJ commissioned Newtown Landscape Architects Consortium to develop the Integrated Open Space Plan for the **Lanseria Sub-region**. Integrated Open Space Plan for the Lanseria Sub-region (for ease of reference the document is further referred to as LIOSP).

The LIOSP is intended to achieve the following:

- Providing a detailed information base on all open space resources within the study area, including existing conservation areas as well as key ecological and socio-economic open spaces;
- Develop a set of Principles and Guidelines to inform integrated decision making by the CoJ regarding issues affecting open space resources on the Regional and Local scale;
- Providing an institutional, management and implementation framework, including the identification of implementation priorities, to ensure effective and collaborative management of the Open Space Network.

1.1. Study area

The study area extends from Lanseria Airport in the north, Kya Sand / Bloubosrand to the south, Diepsloot to the east and the R512 which forms the western boundary of the study area, as reflected in Figure 1 and falls within the jurisdiction of City of Johannesburg Metropolitan Municipality.

The study area, includes the following small holdings/suburbs/townships: Northern Farm; Sunrella Agricultural Holdings; Diepsloot; Dainfern; Broadacres; Steyn City; Chartwell; Farmall; Nietgedacht; Lanseria

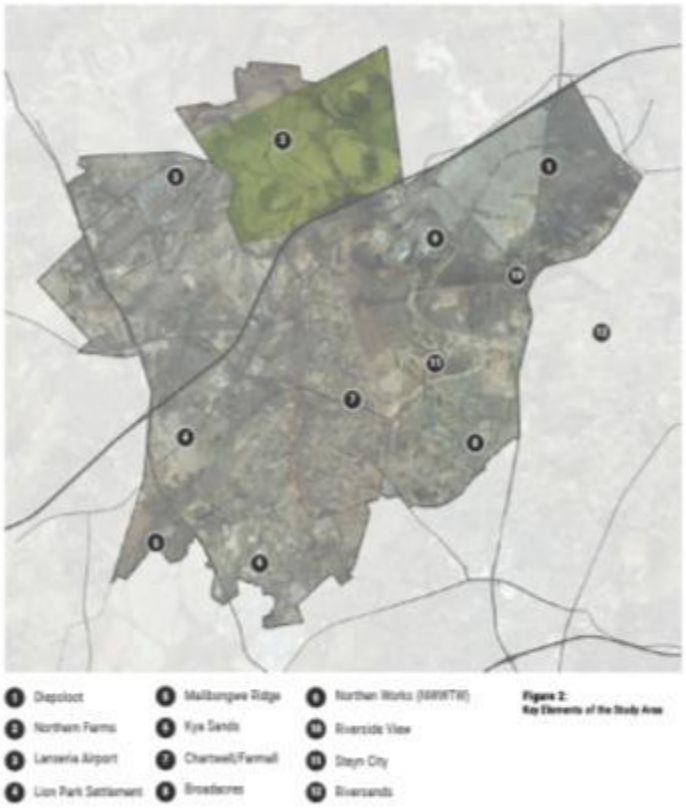

Figure 1: Locality Map

The study area is characterised by mix of developments, some planned, some incremental and others informal in nature. It also include a diverse range of socio-economic communities

A significant protected area is the Northern Farms complex/Nature Reserve, north of Diepsloot. The reserve has various land uses such as grazing and cultivation to major recreational activities such as Mountain Biking. Additional to these activities the Northern (Wastewater Treatment) Works falls within the proclaimed protected area, however development has encroached significantly.

From a broader developmental perspective, the study area is strategically located within a broader regional “opportunity” area, and the future development and growth in the area is likely to be driven as much by external (beyond the boundary) factors as by internal pressures.

2. APPROACH

The 2040 Spatial Development Framework (SDF 2040) for CoJ refers to open space as Green Infrastructure and recognizes the importance of it. The SDF states that “natural environment becomes an increasingly important element in the structuring of the future compact polycentric city. The open spaces and ecological corridors should be seen as a city asset that provides valuable infrastructure services and not merely as unused land available for development.

Open space can be defined broadly as areas that provide ecological, socio- economic and place-making functions that contribute to a broader open space network. Open Space is not confined to parks or natural areas, but includes elements of the built environment such as sidewalks, and can also include visual connections. It is therefore that the LIOSP approach required an understanding of not only the natural systems (green systems) and networks, but also the urban-related (brown systems) open space elements and the interrelationship between them.

2.1. Urban Processes

Historic Growth

Historically, much of the study area functioned as an important agricultural area for the growing city of Johannesburg, with most parts of the study area transformed, to some extent, by this activity. The vast majority of urban development within the study area has occurred within the last 25 to 30 years, a comparatively short span of time in the context of the growth of Johannesburg.

Current Urban Patterns

The current residential settlement within the study area comprises a range of different housing typologies, each with specific implications/issues related to open space:

- Single Residential units, generally detached dwellings in conventional suburb/township areas,
- Group Residential Developments, such as cluster developments, security villages, and retirement centres;
- Residential Apartments, such as flats, walk-up units, and newer townhouse developments;
- Informal Residential units, including backyard structures and transitional settlement areas, as well as conventional informal settlements;
- Rural Residential units, comprising smallholding dwellings, farmhouses and worker's cottages.

Non-residential development is assessed in terms of industrial development, commercial and office development, and retail development.

Formal industrial development is concentrated largely around the Kya Sands Industrial Node, adjacent to Cosmo City. Future growth in this area is likely to take the form of "infill" development on existing serviced industrial land. In addition, there is a gradual spread of industrial and related developments into the adjoining smallholding areas, a trend that is likely to continue into the future. The Lanseria node is also starting to develop

Demographic Assessment

An accurate understanding of the current, and likely/possible future, demographic structure of the sub-region was critical in the development of the Integrated Open Space Plan as it indicated the likely future pressure on the natural environment resource base, as well as providing guidance to future open space planning. Currently the City is only meeting around 50% of the required standard of open space in the northern region.

A demographic model for the study area was thus developed that could interface with the land use model to provide a degree of consistency, and sufficient spatial detail, to inform the process. Whilst not a purely scientific process, given the variables involved and the scale of the study area, it did provide a consistent, and spatially located, demographic benchmark that can inform future planning for open space in the sub-region.

Development Trends and future growth

The vast majority of “urban” development that we see in the study area has all take occurred over the last 25-years. During the same period, there has been significant densification and infill in the areas closest to existing urban development, such as Broadacres, Farmall and Kya Sands.

The pattern of growth over the last two decades has, to a large extent, been “channelled” by the Urban Development Boundary / Urban Edge. Looking at current plans and proposals that exist, the next 25 years is likely to see significantly more growth as investment in infrastructure begins to unlock development opportunities for public and private sector interests.

Beyond the growth of current and planned developments that is currently underway or imminent in the study area, and the potential infill and densification that can occur in areas within the existing Urban Development Boundary, primarily in the areas around Lanseria and Diepsloot. Future growth in these areas is likely to be driven as much by external factors, specifically an emerging (proposed) development between Centurion (and Tshwane) and the western parts of Gauteng. The Mogale City Spatial Policy Framework emphasises the importance of the corridor connecting the broader Krugersdorp area to the Lanseria Airport and envisaged opportunities that could happen around in the future.

From a structural perspective, such a scenario would likely see both Lanseria and Diepsloot emerging as key nodal areas along this corridor, with the secondary routes, (the R114 in this case) providing accessibility connections to allow development to grow between the nodes. The current RSDF proposals allow for nodal growth around these areas. It is likely that over time, as these two nodal areas intensify and pressure for growth along the R114 spine increases, that there will be pressure on the CoJ to adjust the Urban Development Boundary to allow for a logical pattern of development to be managed along the corridor.

2.2. Ecological Processes

The study area is home to a wide variety of ecological assets and sensitive areas that play a key role in the open space network. There are at least 12 threatened plant species and 10 threatened animal species in the City of Johannesburg, and 9 ecosystems listed as threatened according to NEMBA (SANBI, 2008). The ecological process focused on the Aquatic assessment as it is the main contributor to ecological processes and provides the main ecological corridors. Though the aquatic assessment was the main focus and ground truthing completed for it, Critical Biodiversity Areas (CBA), Ecological Sensitive Areas (ESA) were incorporated into the plan as well as ridges identified on the GDARD C-Plan.

The GDARD ridges are important for ecological connectivity and should be protected along with water courses, not in isolation, but as interacting ecologically functioning areas. The conservation and/or establishment of connectivity between ridges and watercourses are essential for species survival and retaining ecological processes.

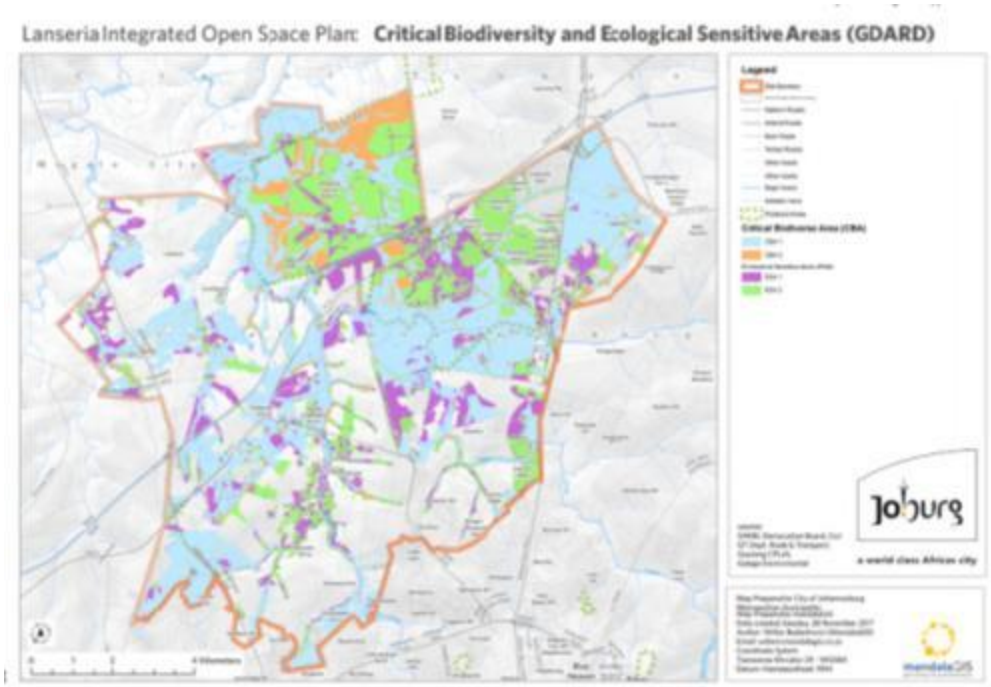

Figure 2: CBA Areas

Ecological Corridors are impacted on by roads, railways, infrastructure (buildings), fences, walls and other movement barriers that blocks connectivity. Conserving naturally existing corridors supports ecological processes, as well as regional and local biological diversity. Additional connections must therefore be provided should the natural corridors be blocked with existing or future development.

The aquatic assessment indicates that the study area falls in the A21C and A21E quaternary catchments of the Crocodile-West and Marico Water Management Area. The main drainage areas of the Jukskei and Klein Jukskei rivers include several ridges, some with associated seepage wetlands.

The delineation of these zones was classified into five levels:
The main levels of the system are then classified into the following, based on the drivers in terms of hydrology, gradient and location and based on the nomenclature of Ollis et al (2013):

Level One: Main rivers (Crocodile and Jukskei)
Level two: Secondary Rivers (Klein Jukskei)
Level three: Channelled valley bottom wetlands linking directly into level one and two
Level four: The remaining Channelled and Unchannelled valley bottom wetlands and
Level five: Seepage wetlands and depression wetlands.

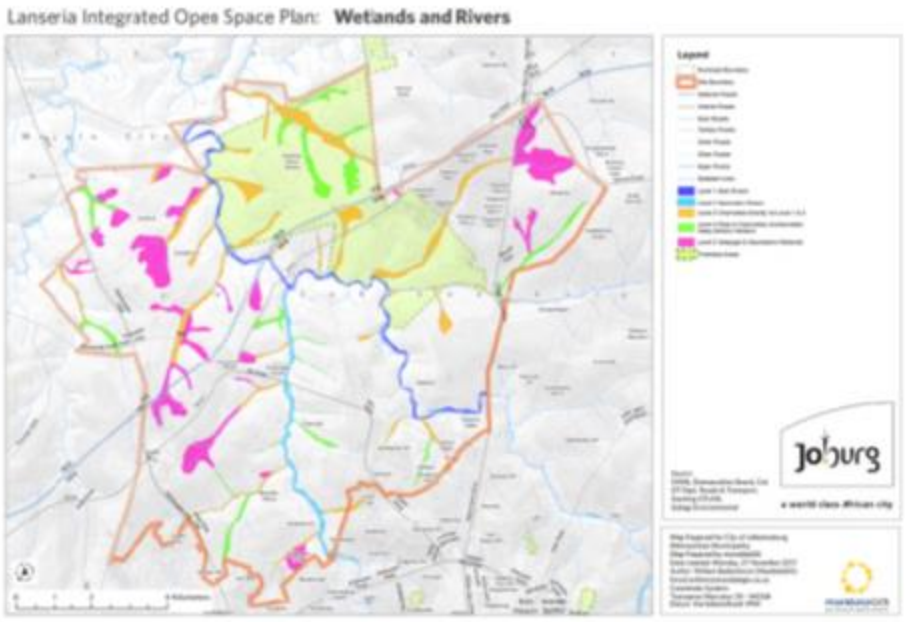

Figure 3: Wetland & River Delineation

Important Ecosystems identified:

Jukskei River:

This is the only level 1 system, draining most of the study area. The system confluences into the Crocodile River, north of the study area. The system is important in the context of the drainage of the study area and connectivity of the aquatic ecosystems and terrestrial units. Most of the threatened species found in the study area link along the Jukskei River. It also forms the back bone of the Open Space system in this region due to the regulated environmental buffer zones and flood line servitudes.

The Jukskei River itself is a particularly important element in a broader (regional) open space network that connects and structures the City Region. Much of the current and future growth in the city region is happening in the catchment of this system (developments such as Waterfall and Modderfontein for example). This system is also significant in its ability to connect the city and its future growth into a broader open space system that extends through the City-region, including the Cradle of Humankind, Hartebeespoort Dam, as well as the ridge/mountain systems that connect the northern parts of Gauteng.

Confluence of the Jukskei and Klein Jukskei River:

This confluence is highly important in terms of hydrology and aquatic faunal movements. This area requires conservation in terms of development footprints around the site and near the system. It is highly recommended that a buffer of 200 meters be incorporated, on both sides of the confluence, to support hydrological and ecological functions.

Through the assessment of the ecological data the Diepsloot Nature Reserve was identified as the largest near-natural area that has not been permanently transformed in the study area. The relative size, the variety of habitat types, the adjacent conservation areas to the north, as well as the current biodiversity (especially a variety of indigenous fauna species such as the Fish Eagle, spotted necked otter, Lesser Bush baby, etc.) made the Diepsloot Nature Reserve the most logical area to protect for source population habitat for many faunal species.

2.3. Hydrological Processes

As urban areas establish, the water supply generally comes from local resources. As cities grow, imported water resources replace local ones, and water supply becomes centralized. Open spaces are lost, including their associated environmental services. Surfaces are sealed preventing infiltration and recharge, generating massive runoff and stormwater, which is generally discharged downstream of the urban area.

The pressures of increasing urban water demand, combined with the impacts of climate change on surface water-dominated supply systems, results in the need for increased resilience in urban water supplies. Groundwater is not considered as a bulk water supply within the area, but it's importance in sustaining smaller scale abstraction and its contribution to surface water bodies and local (ecologically important) wetlands, should not be underestimated. The primary source of water to the underlying aquifers is considered direct recharge from rainfall. However, the groundwater recharge within the area is certainly not in a natural state and it is impacted by anthropogenic influences on recharge. Any potential new development arising in the currently vegetated areas (i.e. open space areas) is an important consideration for management of the groundwater sensitive areas (still to be delineated as part of the project outcome). Increasing areas of hard surfaces may restrick recharge, if runoff from these areas translates to little infiltration. However, if the runoff reports to the storm water system and is removed from the hydro(geo)logical cycle, recharge will certainly be reduced.

Natural recharge has been estimated at 7% of MAP for the underlying aquifer, while the developed areas were assigned lower or higher recharge rates.

3. Integration of Open Space Plan

Growth that is currently evidenced in the study area generally tends to "fill in" rather than structure the area. Future growth is inevitable, and will be intensive (because of the requirements for higher densities, etc.) The peculiar predicament we are in now requires us to formulate a plan for a future that has not yet happened, and has also not been cohesively visualised.

Defining/inscribing an open space plan onto today's spatial landscape requires us to look forward to a future scenario for the study area to understand who/what we are planning for. What is evident from the above snapshot is that there is, as yet, no common vision for the long-term spatial development of the sub-region, with a number of often competing processes and development pressures impacting the area with little overall spatial policy "leadership".

Growth is inevitable, current land use management and spatial policy processes are containing growth within a defined Urban Development Boundary, and will continue to do so in the short to medium term. This provides an opportunity for the LIOSP process to set in place a level of open space planning in areas beyond the urban edge that is not possible in existing developed areas.

Issues that have emerged during the analytical process of the study include:

- The Diepsloot Nature Reserve and the main river systems are integral to the future sustainable development of the area, and form the core of the future open space system.
- The preliminary assessment shows a wide variety of housing typologies that have been developed, and are planned within the study does not include sufficient or any land use for open space system. This also relates to a increase demand for higher order open space resources.

- The “privatisation” of natural assets, as evidenced in developments such as the Steyn City and Dainfern estates, remains one of the biggest obstacles to achieving a truly integrated open space network in the sub-region.
- Open Space Functionality – the extensive nature of the study area and diverse character of current and future development proposals suggests an approach to open space that is as much about sustainable urban growth as it is about ecological and hydrological resource security. This requires a broad set of open space resources that allow not just for spaces for ecological and for urban vitality, but also open space elements that are able to integrate and enrich both natural and built.
- “Informal” use of open space – pedestrian and bicycles (non-motorized) movement as a primary means of movement, is widespread across the study area, and much of this movement takes place along the rivers and channels that cross the area and should be maintained.

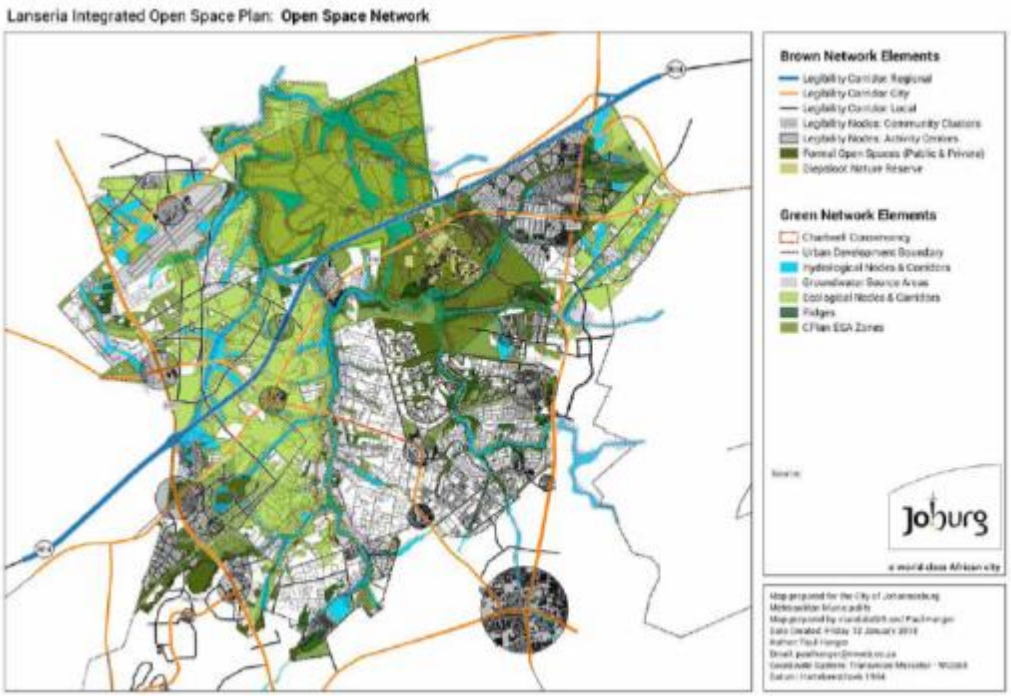

Figure 4: Open Space Network

4. INTEGRATION & IMPLEMENTATION

4.1 Priority Focus areas

T he study highlighted the importance of the Lanseria sub-region within a broader open space context, firstly in terms of connecting to a regional scale natural space network and secondly, integrating a network with a finer scale of public open space that provides vital amenity to a rapidly expanding population. Four focus areas were identified, that could have a significant impact in dealing with existing pressures and future growth. The areas identified: Cosmo City, Broadacres/Cedar Road, Jukskei Confluence and Diepsloot/Adelaide Tambo

One of the focus areas namely, the Jukskei Confluence is of significance as it forms a broader “corridor” between the Diepsloot settlement and the future Lanseria growth area. Exploring this area as a Priority Focus Area allows for the integration and co-ordination of a number of proposals and programmes moving forward, including, inter-alia:

- Diepsloot Nature Reserve - Boundary confirmation, Conservation Plan, implementation of buffer zones.
- Establishing fixed environmental corridors between the northern and southern parts of the Diepsloot Nature Reserve
- Exploring options for integrating NMT planning and open space corridors to facilitate east-west movement of pedestrians & cyclists;
- Identification of a Regional Park sites in proximity to areas of current greatest need (broader Diepsloot area)

Figure 5: Jukskei Confluence priority area

4.2 Guidelines for range of open space typologies

Guideline have been developed relating to management of green network open spaces (water courses, ridges and ecological protected areas). These guidelines identify area type, management activities, supported activities within areas as well as undesired activities for identified areas. Furthermore the guidelines propose mitigation measures for developments next to green network open spaces such as watercourses and ridges.

The guideline further relates to the planning process and guides officials in approval of developments subsequent to open space incorporation. Developers are required to set aside sufficient portion of land for open space, parkland within their development(s). In line with the open space framework, a minimum of 6-8 ha per 1000 population 'breathing space' is required. All households should on average be located within a 30 minute drive of a natural open space.

4.3 Legislative context / offences & penalties including land swap options

The LIOSP includes legislative requirements for development and protection of open spaces to assist the City in their planning process. The plan highlights the GDARD requirements relating to buffer zones and potential land use within the buffers, Authorisations required for developments as well as potential penalties associated with non-compliance of these requirements.

The City is investigating the possibility of allowing landowners to apply and register an open space as servitude. The benefit of this servitude would be to allow for a tax cut on the property relating to the protection of the open space servitude.

4.4 Public Consultation

The Department of Development Planning and Johannesburg City Parks and Zoo were consulted during the development of the LIOSP, as the plan will ultimately be implemented and maintained by them.

The LIOSP was also presented to the various conservancies located within the study areas as well as the neighbouring municipalities namely Mogale City Local Municipality and City of Tshwane. The two municipalities were very perceptive of the plan and requested that the final plan be made available to them to ensure incorporation and alignment into their current and future spatial plans.

5. CONCLUSION

The Integrated Open Space Plan responded to the need to identify and maintain ecological goods and services, which in return will contribute to the sustainability of the City Development of an Integrated Open Space Plan for Lanseria

The green infrastructure of CoJ should not only encompass vacant open space, but be integrated with urban development, providing environmental services to the region. Ideally it should include several different categories of spaces, including smaller green patches, such as small community and neighbourhood parks and gardens, as well as larger elements such as regional parks, forests and natural areas (grass land), hillslope seep zones and wetlands

Protection of these areas should not be implemented for the sake of conservation alone, but to ensure surrounding developed parts of the city are more sustainable, liveable and valuable. Open Spaces should also be protected to maximise their intrinsic value in providing ecosystem services as green infrastructure, including supporting, provisioning, regulating and cultural services.

In the absence of a detailed spatial vision to guide long term development in the sub-region, the open space network must take the lead, and set out sustainable patterns of natural and open landscape around which the city can grow.

6. REFERANCES

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