

03

Site analysis

3.1 Introduction

This chapter is an analysis of the Diepsloot Nature Reserve. The aim is to comprehend the site within its surroundings, as well as the current state and workings of the reserve. From this the site's opportunities and constraints can be identified.

3.2 Site selection

Johannesburg, like many other cities in South Africa, is rapidly running out of burial space. Since 78% of cemeteries are passive, Johannesburg City Parks issued the development of two additional cemeteries: Waterval and Diepsloot (Johannesburg City Parks 2008). The Diepsloot Cemetery, Figure 29, located in the northern suburbs of Johannesburg, is considered South Africa's first eco park concept. In 2007, 60 hectares of the Diepsloot Nature Reserve (DNR) was rezoned to burial space, with an additional 200 hectares to be developed at a later stage (Wilkins 2011). According to Alan Buff, Johannesburg City Park's technological support specialist, the idea behind the Diepsloot cemetery was to design a cemetery that is ecologically sound, as well as a place for passive recreation. In drawing up the brief, Johannesburg City Parks decided to move away from the traditional square layout and adopted a circular pattern, Figure 30, inspired by the central cattle pattern, trying to build on the heritage idea of the Cradle of Mankind (Wilkins 2011). Furthermore, MLA Engineers requested an environmentally friendly cemetery, which would require little to no maintenance. In order to comply with the above-mentioned requests, local flora was studied and implemented. To address the issue of suitable burial, gaps between graves were narrowed and headstones were flush with the ground surface to gain space (Wilkins 2011).

Although the Diepsloot cemetery has received praise, as well as a featured article in the Urban Green File in June 2011, the Author does not consider this an eco cemetery. Instead of addressing the issue of unsustainable burial practice, all that have changed are the grave layout and the surface treatment. Phase one of the Diepsloot cemetery has a burial capacity of 120 000 corpses (Johannesburg City Parks 2008), which is not even enough to cover the current 150 000 residents of the Diepsloot township. Once the graves have been filled, the Diepsloot cemetery will be added to the list of passive cemeteries, regardless of its indigenous planting and water wise systems. Instead of green washing cemeteries, town planners, landscape architects, and local authorities need to address the actual concern: we require sustainable and environmentally friendly corpse disposal methods.

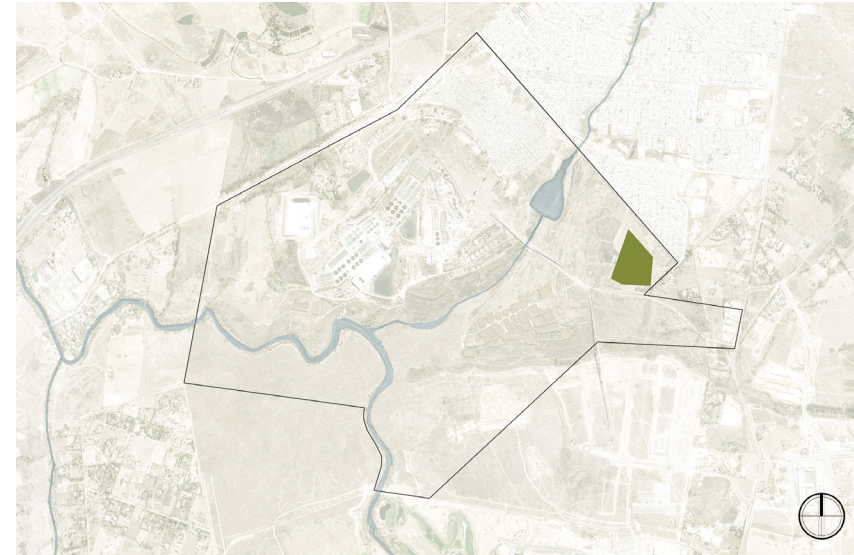


Figure 29. Location of the Diepsloot cemetery within the boundary of the DNR (Author 2015).



Figure 30. Aerial view of the Diepsloot cemetery's circular grave layout inspired by heritage idea at the Cradle of Mankind (Author 2015).

Since Johannesburg City Parks has already approved the DNR for additional burial space, it will be used as the study area for this thesis. Instead of implementing phase two of the unsustainable Diepsloot cemetery, this thesis will strive to provide an alternative, which will focus on the problems stated in chapter one.

3.3 Adjacent land use

The DNR is located in region A of Johannesburg, it is situated between extremely high-density informal settlements in the north and very low density private estates in the south, Figure 31. These different residential densities are indicated in Figure 32.

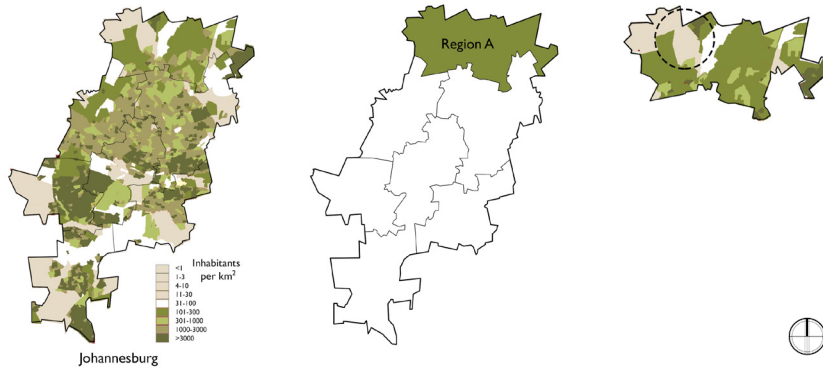


Figure 31. The DNR is located between extremely high and low population density areas (Author 2015).

Private residential estates have sprawled north up to the nature reserve's boundary, while the informal settlement of Diepsloot has sprawled south into the reserve, due to the absence of a proper reserve boundary fence. Figure 33 shows the rapid expansion of Diepsloot Township into the reserve from 2006 to 2014. Other adjacent land uses include mixed use (commercial and residential), and green open space, as illustrated in Figure 32.

3.4 Access

Although there are two mayor arteries, the N14 and R114, on the western side of the site, they do not provide access to the nature reserve. The three streets with access to the reserve are Runnymede Avenue, Zeven Street, and School Road, indicated on Figure 34.

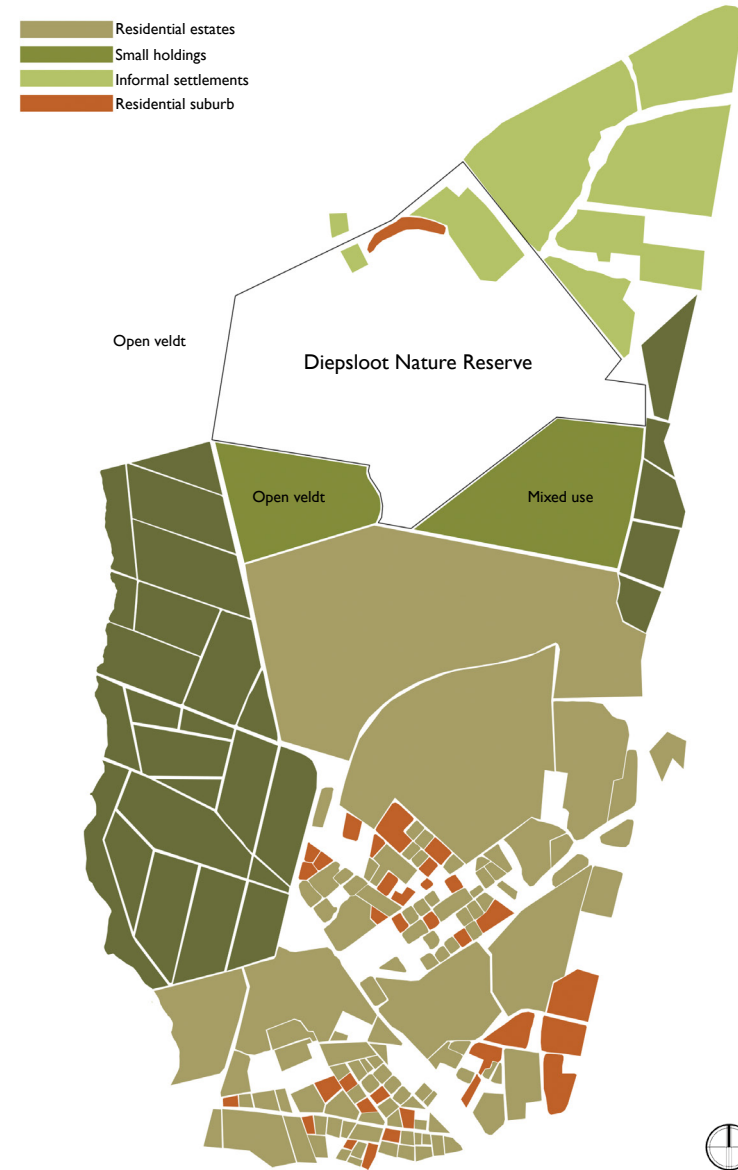


Figure 32. Types of residential areas surrounding the DNR (Author 2015).

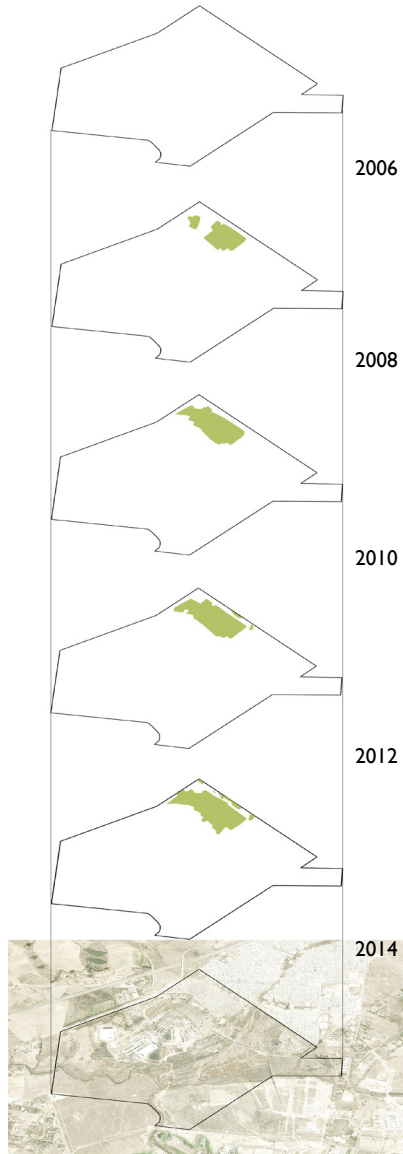


Figure 33. Expansion of the informal settlement into the Diepsloot Nature Reserve from 2006 to 2014 (Author 2015).

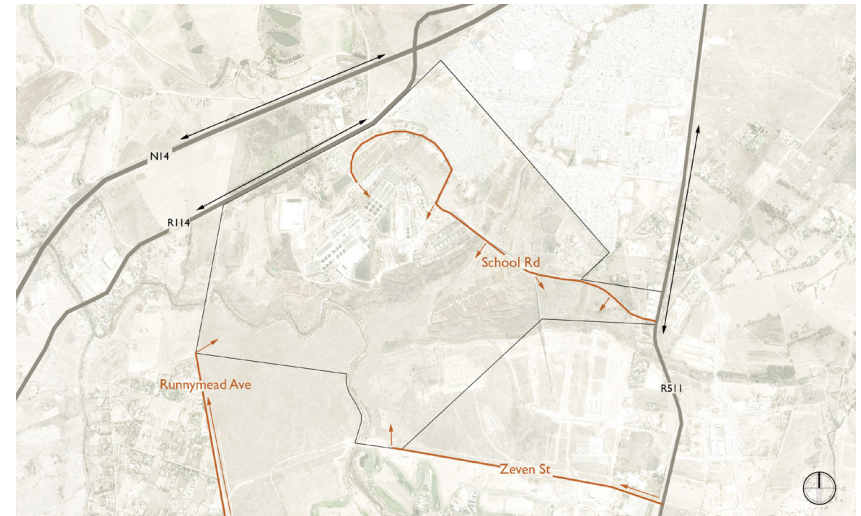


Figure 34. Adjacent roads and vehicle access to the Diepsloot Nature Reserve (Author 2015).

3.5 Visual Analysis

The DNR is a pastoral and romantic landscape with undulating plains, Figure 35 to 38. It is grassland with a few tree clusters. The on site sewage plant is not visually displeasing. The concrete sewage cylinders are submerged into the soil, thus it does not ruin the experience of the reserve, and instead the cylinders' tops form an interesting pattern on the surface, Figure 39. There are also two substantial elevated sewage lines running across the site. These act as a datums and emphase the topography of the reserve, Figure 40.





OPPOSITE PAGE Figure 35. Diepsloot extension resident walking through the reserve with a view of the sewage line (Author 2015).

TOP Figure 36. Old sewage drying pans overgrown with grasses and crops. Old concrete pillars remain from a broken palisade (Author 2015).

MIDDLE Figure 37. Diepsloot Nature Reserve's undulating planes, grassland, and the sewage line (Author 2015).

BOTTOM Figure 38. Less disturbed grassland area of the reserve (Author 2015)



Figure 39. Tops of the concrete sewage cylinders emerging from the landscape of the DNR (Author 2015).



Figure 40. Sewage Line as seen from within an informal road on the DNR (Author 2015).

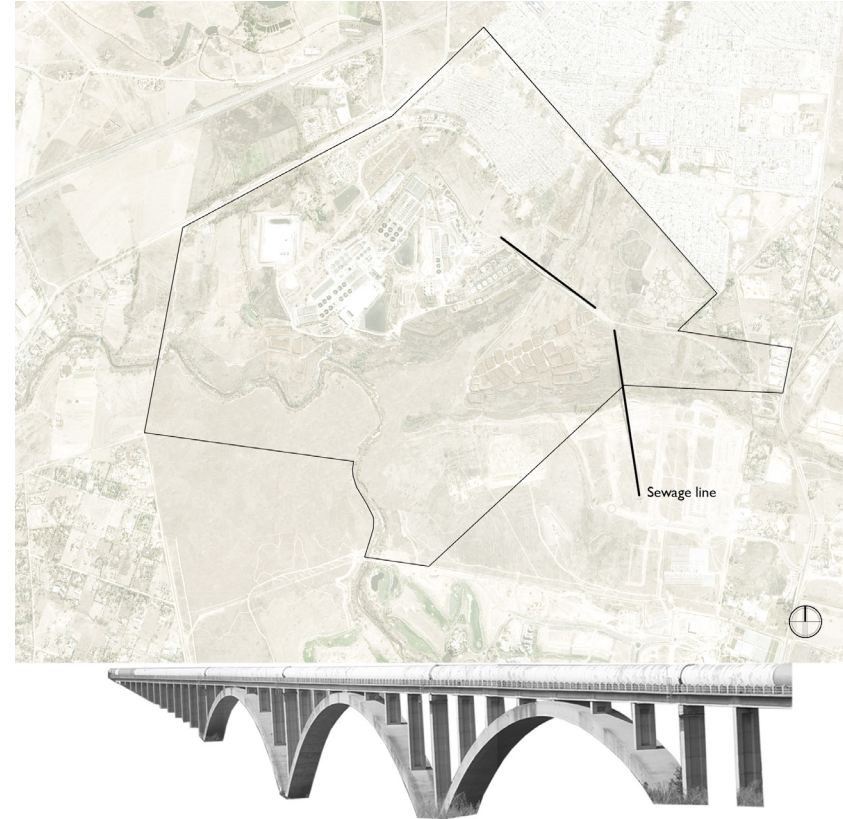


Figure 41. Location of the suspended sewage line in the Diepsloot Nature Reserve (Author 2015).

3.6 On site activities

3.6.1 Sewage treatment plant

The Northern Water Works is the largest sewage treatment plant in Johannesburg, Figure 42. It serves 1.6 million people and treats 400 million liter of soil water a day. During the past couple of decades, the sewage plant has tried numerous ways to treat the sewage, one of which degraded the reserve. The sewage plant initiated a project called JoGrow, where raw sewage was dried in drying pans and

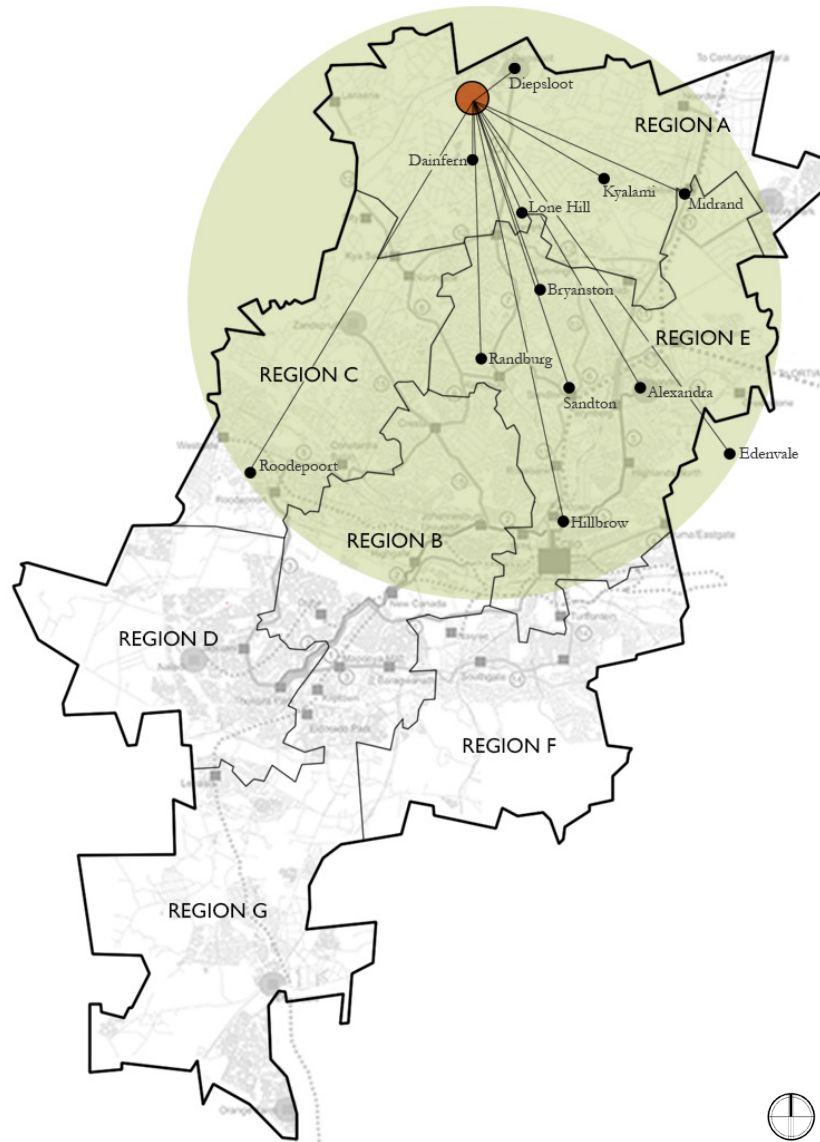


Figure 42. The Northern Waste Water Works is the largest sewage treatment plant in Johannesburg and serves almost 50% of its residents (Author 2015).

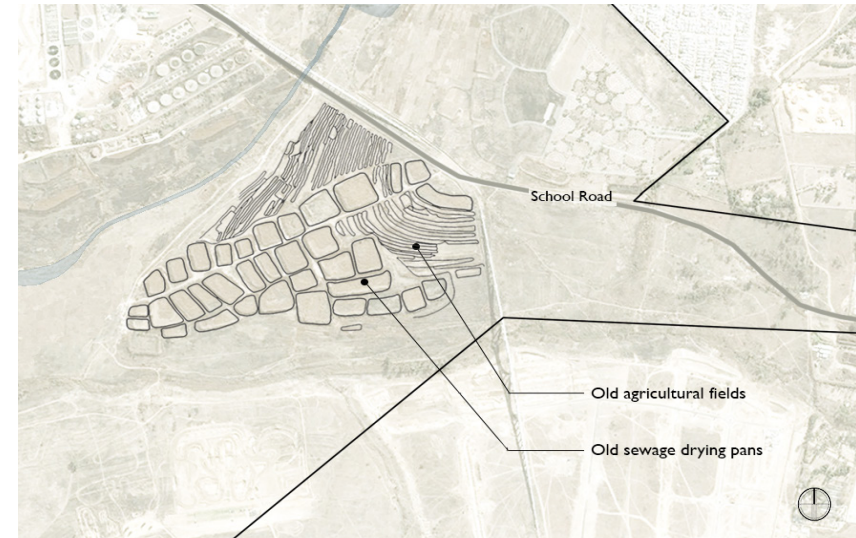


Figure 43. Remaining arial patterns of agricultural fields and sewage drying pans (Author 2015).

then applied to agricultural fields and lawn areas, Figure 43. Cattle were brought in to graze on the lawn. The agricultural fields, lawn areas, as well as the addition of livestock disturbed areas of natural vegetation. The project ended because it was not financially feasible. The pans, agricultural fields and lawn remain, the areas have not been rehabilitated by the Johannesburg City Parks, however through natural succession and pollination grassland species have established inbetween the lawn and crops, as well as in the drying pans. The remaining patterns are only visible on aerial photos.

Currently the sewage is fed into a bio digester, which turns the sewage sludge into electricity. The sewage plant is sanitary, safe, and not foul smelling. The water from the plant is treated before it is fed into the Jukskei river.

3.6.2 Racetrack

In 2005, an informal dirt bike track developed on site. A decade later, the track has caused substantial erosion, Figure 44.

3.6.3 Recreational

Hikers, mountain bikers, joggers, and dog walkers also use the reserve, mainly over the weekend.



Figure 44. Erosion causing informal dirt bike racetrack in the Diepsloot Nature Reserve (Author 2015).

3.7 Ecology

The reserve falls within the boundaries of the Egoli Granite Grassland. Portions of the natural vegetation have been extremely disturbed over the years. Due to the previously mentioned activities the area is no longer a pure Egoli Granite Grassland, and has very little sensitivity in this regard. Regardless of the type or types of grasslands on site, the reserve provides many ecosystem services as an open green space. Egoli Granite Grassland Restoration is not a feasible option, however rehabilitation of the grassland is. Many of the disturbed areas can easily be rehabilitated, and have already done so without any human interference: the sewage drying pans and old agricultural field is covered with grassland species.

Instead of mapping ecological sensitivity, where there is very little, the areas are grouped according to its rehabilitation feasibility, Figure 45. From this mapping conclusions can be drawn and decisions can be made. For instance: the informal settlement sprawling into the site is an area that is highly unfeasible to rehabilitate as a grassland, however a boundary surrounding the grassland next to the settlement will prevent further sprawl.

3.8 Soil

The underlying geology is Halfway House Granite Dome. The soil of the reserve is sandy, gravelly, and relatively deep. According to the Department of Water Affairs and Forestry the soil and underlying geology is suitable for corpse burial, this is discussed in chapter seven.

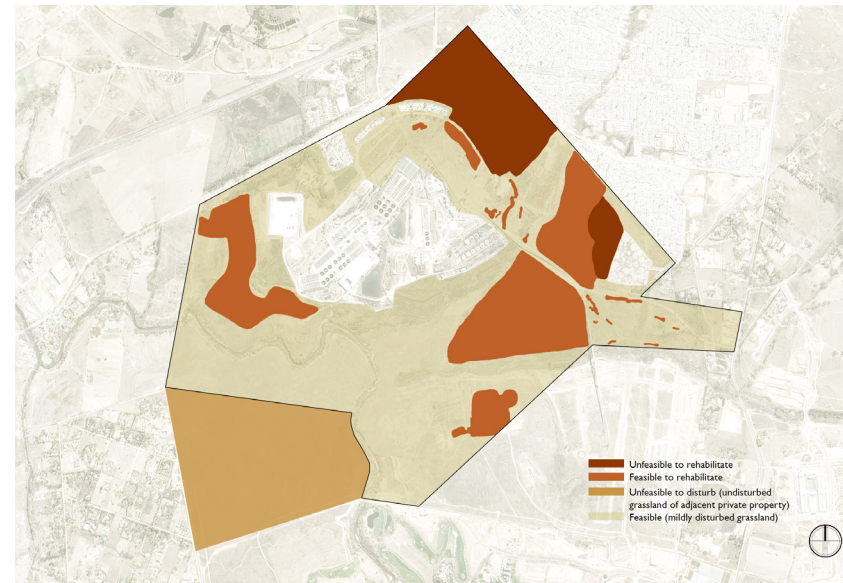


Figure 45. Rehabilitation feasibility mapping of the Diepsloot Nature Reserve (Author 2015).

3.9 Hydrology

There is one river, one perennial stream, and one seasonal stream running through the reserve, Figure 46. The perennial stream's catchment area is the entire Diepsloot township, thus the stream is highly polluted. The Jukskei River does not run through any developed areas before it reached the reserve and is therefore clean. The water from the sewage plant is purified before it is fed into river.

3.10 Climate

The site has a semi arid and cool climate with summer rainfall and an annual rainfall of 543mm. Valleys get cold, thus vegetation has to be frost resistant. The prevailing wind direction is north-east.

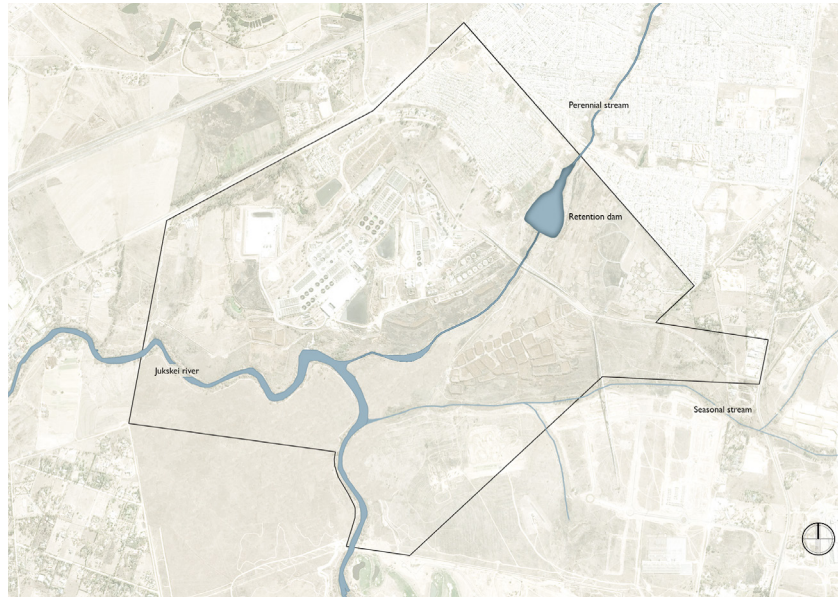


Figure 46. Streams, river, and retention dam on in the DNR (Author 2015).

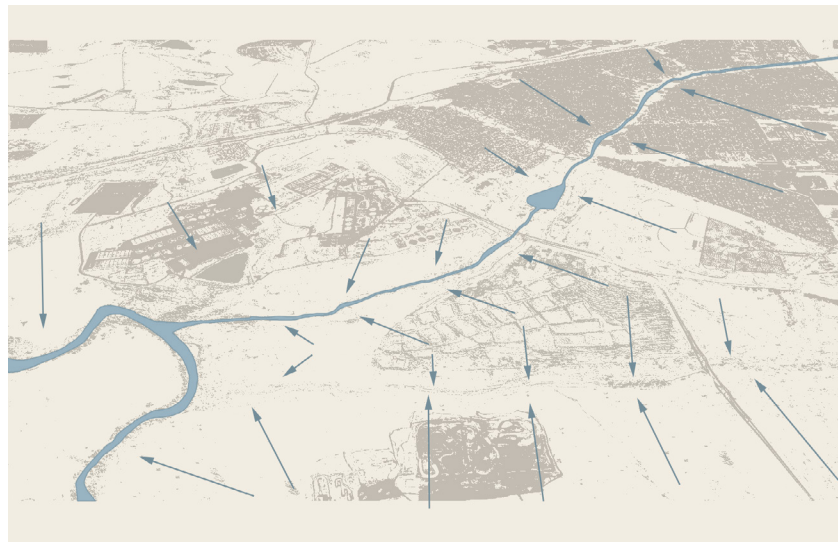


Figure 47. Hydrology of the Diepsloot Nature Reserve (Author 2015).

3.11 Opportunities and constraints

Opportunities	Constraints
Disturbed areas can be developed. If the entire reserve had a high sensitivity, it would have been difficult to justify development.	A large portion of the reserve is disturbed and of low ecological sensitivity; rehabilitating it may not be feasible.
Even in a degraded state people use the reserve. Through additional programmes more users can be drawn in.	The close proximity to Diepsloot township draws into question the safety of the reserve.
The rehabilitation of the site and the addition of wildlife will enable ecosystem services and increase the biodiversity of the area.	Wildlife such as game can not be brought in the reserve without upgrades to the site and the Diepsloot stream.

3.12 Conclusion

The DNR, although degraded has the potential to be rehabilitated into a proper nature reserve. Its close proximity to high and low-income residences, commercial centers, and numerous roads makes it easily accessible to both vehicles and pedestrians. The site has areas of disturbed vegetation, thus the development of a burial site is feasible. Without any intervention the reserve will continue to degrade due to township sprawl, erosion caused by dirt bike tracks, and the illegal dumping of rubble. This will result in the de-proclamation of the site's nature reserve status.

The next chapter discusses the proposed framework to upgrade the reserve, as well as where the burial site fits in.

