Annexure A

OUTPUTS OF aaSIDRA INTERSECTION ANALYSES

LANE SUMMARY

Site: 2016AM1

R511 / R114
Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: R511 FROM N14																
Lane 1	28	399	0	428	5.0	1882	0.227	100	0.6	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	356	69[0]	426	5.0	1872	0.227	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 3	0	0	364	364	5.0	340	1.068	100	113.7	LOS F	25.5	186.2	75	Turn Bay	0.0	49.8
Approach	28	756	433	1217	5.0		1.068		34.2	NA	25.5	186.2				
East: R114																
Lane 1	492	4	136[8]	632	5.0	250	2.525	100	1405.6	LOS F	246.8	1802.0	500	–	0.0	100.0
Lane 2	0	0	82	82	5.0	60[2]	1.366	100	427.4[8]	LOS F[8]	17.0[8]	124.3[8]	50	Turn Bay	0.0	49.9
Approach	492	4	218	714	5.0		2.525		1294.2	LOS F	246.8	1802.0				
North: R511 FROM ERASMIA																
Lane 1	164	499	0	664	5.0	1864	0.356	100	2.1	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	672	0	672	5.0	1889	0.356	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 3	0	0	1	1	5.0	695	0.002	100	11.3	LOS B	0.0	0.0	50	Turn Bay	0.0	0.0
Approach	164	1172	1	1337	5.0		0.356		1.0	NA	0.0	0.0				
West: KOEDOE STREET																
Lane 1	5	18	41	64	5.0	60[2]	1.070	100	253.0	LOS F	9.1	66.1	500	–	0.0	0.0
Approach	5	18	41	64	5.0		1.070		253.0	LOS F	9.1	66.1				
Intersection				3332	5.0		2.525		295.0	NA	246.8	1802.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

0 Excess flow from back of an adjacent short lane
2 Minimum Capacity
8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

LANE SUMMARY

Site: 2016PM1

R511 / R114
Stop (Two-Way)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: R511 FROM N14																
Lane 1	16	310	0	326	5.0	1884	0.173	100	0.4	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	327	0	327	5.0	1889	0.173	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 3	0	0	202	202	5.0	872	0.232	100	10.7	LOS B	0.9	6.4	75	Turn Bay	0.0	0.0
Approach	16	637	202	855	5.0		0.232		2.7	NA	0.9	6.4				
East: R114																
Lane 1	207	4	19[c]	231	5.0	696	0.332	100	15.2	LOS C	1.4	10.0	500	–	0.0	0.0
Lane 2	0	0	143	143	5.0	126	1.137	100	216.1	LOS F	17.0	124.3	50	Turn Bay	0.0	49.9
Approach	207	4	162	374	5.0		1.137		92.1	LOS F	17.0	124.3				
North: R511 FROM ERASMIA																
Lane 1	125	153	0	278	5.0	1844	0.151	100	3.8	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 2	0	285	0	285	5.0	1889	0.151	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Lane 3	0	0	1	1	5.0	800	0.001	100	10.5	LOS B	0.0	0.0	50	Turn Bay	0.0	0.0
Approach	125	438	1	564	5.0		0.151		1.9	NA	0.0	0.0				
West: KOEDOE STREET																
Lane 1	1	4	5	11	5.0	123	0.086	100	40.8	LOS E	0.2	1.6	500	–	0.0	0.0
Approach	1	4	5	11	5.0		0.086		40.8	LOS E	0.2	1.6				
Intersection				1803	5.0		1.137		21.2	NA	17.0	124.3				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model used.

c Excess flow from back of an adjacent short lane

LANE SUMMARY

Site: 2017AM1_140 000sqm

R511 / R114
Signals - Fixed Time Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: R511 FROM N14																
Lane 1	28	363	0	391	5.0	1129	0.347	100	8.2	LOS A	6.7	49.1	500	–	0.0	0.0
Lane 2	0	393	0	393	5.0	1133	0.347	100	7.6	LOS A	6.8	49.3	500	–	0.0	0.0
Lane 3	0	0	250	250	5.0	512	0.488	61[6]	30.8	LOS C	7.3	53.1	75	Turn Bay	0.0	0.0
Lane 4	0	0	413	413	5.0	512	0.806	100	38.0	LOS D	14.9	108.8	75	Turn Bay	0.0	39.0
Approach	28	756	663	1447	5.0		0.806		20.4	LOS C	14.9	108.8				
East: R114																
Lane 1	632	0	0	632	5.0	1011[1]	0.625	100	13.1	LOS B	7.7	56.0	100	Turn Bay	0.0	0.0
Lane 2	0	4	0	4	5.0	432	0.010	100	22.4	LOS C	0.1	0.8	500	–	0.0	0.0
Lane 3	0	0	295	295	5.0	349	0.845	100	42.1[8]	LOS D[8]	11.2[8]	81.6[8]	50	Turn Bay	0.0	50.0
Approach	632	4	295	931	5.0		0.845		22.3	LOS C	11.2	81.6				
North: R511 FROM ERASMIA																
Lane 1	421	0	0	421	5.0	1095	0.385	100	12.2	LOS B	5.7	41.7	100	Turn Bay	0.0	0.0
Lane 2	0	410	0	410	5.0	486	0.844	100	33.8	LOS C	15.7	114.3	500	–	0.0	0.0
Lane 3	0	410	0	410	5.0	486	0.844	100	33.8	LOS C	15.7	114.3	500	–	0.0	0.0
Lane 4	0	0	1	1	5.0	257	0.004	100	29.0	LOS C	0.0	0.2	50	Turn Bay	0.0	0.0
Approach	421	820	1	1242	5.0		0.844		26.5	LOS C	15.7	114.3				
West: KOEDOE STREET																
Lane 1	5	18	41	64	5.0	373	0.172	100	29.7	LOS C	1.8	13.2	500	–	0.0	0.0
Approach	5	18	41	64	5.0		0.172		29.7	LOS C	1.8	13.2				
Intersection				3684	5.0		0.845		23.1	LOS C	15.7	114.3				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects
8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

LANE SUMMARY

Site: 2017PM1_140 000sqm

R511 / R114
Signals - Fixed Time Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: R511 FROM N14																
Lane 1	16	310	0	326	5.0	511	0.637	100	25.3	LOS C	10.1	73.7	500	–	0.0	0.0
Lane 2	0	327	0	327	5.0	513	0.637	100	24.9	LOS C	10.1	73.9	500	–	0.0	0.0
Lane 3	0	0	99	99	5.0	239	0.415	61[6]	36.7	LOS D	3.2	23.2	75	Turn Bay	0.0	0.0
Lane 4	0	0	164	164	5.0	239	0.685	100	40.0	LOS D	5.8	42.2	75	Turn Bay	0.0	0.0
Approach	16	637	263	916	5.0		0.685		29.0	LOS C	10.1	73.9				
East: R114																
Lane 1	526	0	0	526	5.0	1085[1]	0.485	100	10.0	LOS A	5.2	37.8	100	Turn Bay	0.0	0.0
Lane 2	0	4	0	4	5.0	1052	0.004	100	7.2	LOS A	0.1	0.5	500	–	0.0	0.0
Lane 3	0	0	316	316	5.0	488[1]	0.646	100	17.6	LOS B	6.3	45.8	50	Turn Bay	0.0	0.0
Approach	526	4	316	846	5.0		0.646		12.8	LOS B	6.3	45.8				
North: R511 FROM ERASMIA																
Lane 1	168	0	0	168	5.0	1247[1]	0.135	100	8.6	LOS A	0.8	5.5	100	Turn Bay	0.0	0.0
Lane 2	0	219	0	219	5.0	513	0.427	100	23.2	LOS C	6.3	46.1	500	–	0.0	0.0
Lane 3	0	219	0	219	5.0	513	0.427	100	23.2	LOS C	6.3	46.1	500	–	0.0	0.0
Lane 4	0	0	1	1	5.0	172	0.006	100	37.3	LOS D	0.0	0.2	50	Turn Bay	0.0	0.0
Approach	168	438	1	607	5.0		0.427		19.1	LOS B	6.3	46.1				
West: KOEDOE STREET																
Lane 1	1	4	5	11	5.0	899	0.012	100	12.0	LOS B	0.2	1.1	500	–	0.0	0.0
Approach	1	4	5	11	5.0		0.012		12.0	LOS B	0.2	1.1				
Intersection				2380	5.0		0.685		20.7	LOS C	10.1	73.9				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Site: 2021AM1_140 000sqm

R511 / R114
Signals - Fixed Time Cycle Time = 75 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: R511 FROM N14																
Lane 1	28	382	0	410	5.0	1204	0.341	100	7.2	LOS A	6.9	50.1	500	--	0.0	0.0
Lane 2	0	412	0	412	5.0	1209	0.341	100	5.6	LOS A	6.9	50.3	500	--	0.0	0.0
Lane 3	0	0	250	250	5.0	430	0.581	61[8]	35.8	LOS D	8.3	60.8	75	Turn Bay	0.0	0.0
Lane 4	0	0	413	413	5.0	430	0.960	100	44.6[8]	LOS D[8]	16.8[8]	122.4[8]	75	Turn Bay	0.0	50.0
Approach	28	794	663	1485	5.0		0.960		22.3	LOS C	16.8	122.4				
East: R114																
Lane 1	632	0	0	632	5.0	873[1]	0.723	100	18.5	LOS B	10.8	79.0	100	Turn Bay	0.0	0.0
Lane 2	0	4	0	4	5.0	378	0.011	100	25.9	LOS C	0.1	0.9	500	--	0.0	0.0
Lane 3	0	0	295	295	5.0	306	0.964	100	41.4[8]	LOS D[8]	11.3[8]	82.2[8]	50	Turn Bay	0.0	50.7
Approach	632	4	295	931	5.0		0.964		25.8	LOS C	11.3	82.2				
North: R511 FROM ERASMIA																
Lane 1	421	0	0	421	5.0	1168	0.360	100	12.2	LOS B	5.9	42.8	100	Turn Bay	0.0	0.0
Lane 2	0	615	0	615	5.0	655	0.939	100	47.9	LOS D	30.9	225.9	500	--	0.0	0.0
Lane 3	0	615	0	615	5.0	655	0.939	100	47.9	LOS D	30.9	225.9	500	--	0.0	0.0
Lane 4	0	0	1	1	5.0	363	0.003	100	25.2	LOS C	0.0	0.2	50	Turn Bay	0.0	0.0
Approach	421	1230	1	1652	5.0		0.939		38.8	LOS D	30.9	225.9				
West: KOEDOE STREET																
Lane 1	5	18	41	64	5.0	328	0.196	100	33.4	LOS C	2.0	14.7	500	--	0.0	0.0
Approach	5	18	41	64	5.0		0.196		33.4	LOS C	2.0	14.7				
Intersection				4132	5.0		0.964		29.8	LOS C	30.9	225.9				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
8 Lane underutilisation due to downstream effects
8 Delay, queue length and stops for the short lane have been cut down to fit in the queuing space. You may wish to change the short lane to a full lane to investigate the effect on the adjacent lane performance.

LANE SUMMARY

R511 / R114
Signals - Fixed Time Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: R511 FROM N14																
Lane 1	16	374	0	390	5.0	592	0.658	100	23.2	LOS C	11.8	86.1	500	–	0.0	0.0
Lane 2	0	390	0	390	5.0	594	0.658	100	22.9	LOS C	11.8	86.2	500	–	0.0	0.0
Lane 3	0	0	99	99	5.0	253	0.392	61[6]	34.8	LOS C	3.1	22.5	75	Turn Bay	0.0	0.0
Lane 4	0	0	164	164	5.0	253	0.647	100	37.7	LOS D	5.6	40.8	75	Turn Bay	0.0	0.0
Approach	16	784	263	1043	5.0		0.658		26.5	LOS C	11.8	86.2				
East: R114																
Lane 1	526	0	0	526	5.0	1054[1]	0.499	100	10.4	LOS B	5.9	42.8	100	Turn Bay	0.0	0.0
Lane 2	0	4	0	4	5.0	971	0.004	100	8.7	LOS A	0.1	0.5	500	–	0.0	0.0
Lane 3	0	0	316	316	5.0	459[1]	0.689	100	20.9	LOS C	7.2	52.9	50	Turn Bay	0.0	10.1
Approach	526	4	316	846	5.0		0.689		14.3	LOS B	7.2	52.9				
North: R511 FROM ERASMIA																
Lane 1	168	0	0	168	5.0	1259[1]	0.134	100	8.6	LOS A	0.8	5.5	100	Turn Bay	0.0	0.0
Lane 2	0	263	0	263	5.0	594	0.443	100	21.0	LOS C	7.3	53.2	500	–	0.0	0.0
Lane 3	0	263	0	263	5.0	594	0.443	100	21.0	LOS C	7.3	53.2	500	–	0.0	0.0
Lane 4	0	0	1	1	5.0	175	0.006	100	36.4	LOS D	0.0	0.2	50	Turn Bay	0.0	0.0
Approach	168	525	1	695	5.0		0.443		18.0	LOS B	7.3	53.2				
West: KOEDOE STREET																
Lane 1	1	4	5	11	5.0	831	0.013	100	13.5	LOS B	0.2	1.3	500	–	0.0	0.0
Approach	1	4	5	11	5.0		0.013		13.5	LOS B	0.2	1.3				
Intersection				2595	5.0		0.689		20.2	LOS C	11.8	86.2				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

R114 / ACCESS ROAD
Signals - Fixed Time Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: ACCESS ROAD																
Lane 1	105	0	0	105	10.0	785	0.134	100	13.6	LOS B	1.2	9.1	500	–	0.0	0.0
Lane 2	0	0	74	74	10.0	99	0.744	100	67.3	LOS E	4.1	31.5	500	–	0.0	0.0
Approach	105	0	74	179	10.0		0.744		33.9	LOS C	4.1	31.5				
East: R114																
Lane 1	284	0	0	284	10.0	991[1]	0.287	100	9.2	LOS A	2.1	16.2	100	Turn Bay	0.0	0.0
Lane 2	0	458	0	458	10.0	1099	0.417	56[6]	11.9	LOS B	12.4	93.9	500	–	0.0	0.0
Lane 3	0	505	0	505	10.0	672[1]	0.751	100	15.1	LOS B	14.7	111.7	100	Turn Bay	0.0	15.0
Approach	284	963	0	1247	10.0		0.751		12.6	LOS B	14.7	111.7				
West: R114																
Lane 1	0	182	0	182	10.0	1059[1]	0.172	56[6]	1.8	LOS A	1.7	13.2	100	Turn Bay	0.0	0.0
Lane 2	0	470	0	470	10.0	1517	0.310	100	2.2	LOS A	5.4	41.3	500	–	0.0	0.0
Lane 3	0	0	426	426	10.0	565	0.753	100	31.6	LOS C	18.9	143.8	100	Turn Bay	0.0	35.2
Approach	0	653	426	1079	10.0		0.753		13.8	LOS B	18.9	143.8				
Intersection				2505	10.0		0.753		14.6	LOS B	18.9	143.8				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

SIDRA INTERSECTION

LANE SUMMARY

R114 / ACCESS ROAD
Signals - Fixed Time Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: ACCESS ROAD																
Lane 1	426	0	0	426	10.0	1155	0.369	100	10.4	LOS B	4.2	31.8	500	–	0.0	0.0
Lane 2	0	0	284	284	10.0	619	0.459	100	27.3	LOS C	7.6	57.8	500	–	0.0	0.0
Approach	426	0	284	711	10.0		0.459		17.2	LOS B	7.6	57.8				
East: R114																
Lane 1	74	0	0	74	10.0	1333[1]	0.055	100	8.5	LOS A	0.3	2.0	100	Turn Bay	0.0	0.0
Lane 2	0	143	0	143	10.0	549	0.260	56[6]	20.4	LOS C	3.8	28.6	500	–	0.0	0.0
Lane 3	0	257	0	257	10.0	549	0.468	100	22.0	LOS C	7.3	55.6	100	Turn Bay	0.0	0.0
Approach	74	400	0	474	10.0		0.468		19.4	LOS B	7.3	55.6				
West: R114																
Lane 1	0	112	0	112	10.0	722[1]	0.155	56[6]	11.2	LOS B	2.1	16.3	100	Turn Bay	0.0	0.0
Lane 2	0	241	0	241	10.0	863	0.279	100	12.2	LOS B	5.0	38.2	500	–	0.0	0.0
Lane 3	0	0	105	105	10.0	386	0.272	100	26.9	LOS C	2.7	20.4	100	Turn Bay	0.0	0.0
Approach	0	353	105	458	10.0		0.279		15.3	LOS B	5.0	38.2				
Intersection				1642	10.0		0.468		17.3	LOS B	7.6	57.8				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

SIDRA INTERSECTION

LANE SUMMARY

R114 / ACCESS ROAD
Signals - Fixed Time Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: ACCESS ROAD																
Lane 1	105	0	0	105	10.0	149	0.709	100	46.6	LOS D	3.9	29.9	500	–	0.0	0.0
Lane 2	0	0	74	74	10.0	149	0.496	70[5]	44.1	LOS D	2.8	19.9	500	–	0.0	0.0
Approach	105	0	74	179	10.0		0.709		45.6	LOS D	3.9	29.9				
East: R114																
Lane 1	284	0	0	284	10.0	1005[1]	0.283	100	8.9	LOS A	1.4	10.9	100	Turn Bay	0.0	0.0
Lane 2	0	413	0	413	10.0	1360	0.303	56[6]	3.2	LOS A	4.6	35.3	500	–	0.0	0.0
Lane 3	0	743	0	743	10.0	1360	0.546	100	4.2	LOS A	10.9	83.1	500	–	0.0	0.0
Approach	284	1156	0	1440	10.0		0.546		4.8	LOS A	10.9	83.1				
West: R114																
Lane 1	0	280	0	280	10.0	1360	0.206	56[6]	2.9	LOS A	2.9	21.8	500	–	0.0	0.0
Lane 2	0	503	0	503	10.0	1360	0.370	100	3.4	LOS A	6.1	46.0	500	–	0.0	0.0
Lane 3	0	0	213	213	10.0	295	0.723	100	26.8	LOS C	6.7	50.7	100	Turn Bay	0.0	0.0
Lane 4	0	0	213	213	10.0	295	0.723	100	26.8	LOS C	6.7	50.7	100	Turn Bay	0.0	0.0
Approach	0	783	426	1209	10.0		0.723		11.6	LOS B	6.7	50.7				
Intersection				2828	10.0		0.723		10.3	LOS B	10.9	83.1				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Site: 2021PM2 - 140 000sqm

R114 / ACCESS ROAD
Signals - Fixed Time Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows L veh/h	T veh/h	R veh/h	Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Lane Length m	SL Type	Cap. Adj. %	Prob. Block. %
South: ACCESS ROAD																
Lane 1	426	0	0	426	10.0	842	0.506	100	21.9	LOS C	10.0	76.1	500	–	0.0	0.0
Lane 2	0	0	284	284	10.0	842	0.338	67[5]	20.3	LOS C	6.0	45.6	500	–	0.0	0.0
Approach	426	0	284	711	10.0		0.506		21.3	LOS C	10.0	76.1				
East: R114																
Lane 1	74	0	0	74	10.0	1350[1]	0.055	100	8.4	LOS A	0.2	1.7	100	Turn Bay	0.0	0.0
Lane 2	0	171	0	171	10.0	628	0.273	56[6]	18.2	LOS B	4.3	32.7	500	–	0.0	0.0
Lane 3	0	309	0	309	10.0	628	0.492	100	19.9	LOS B	8.5	64.4	500	–	0.0	0.0
Approach	74	480	0	554	10.0		0.492		17.9	LOS B	8.5	64.4				
West: R114																
Lane 1	0	151	0	151	10.0	628	0.241	56[6]	17.9	LOS B	3.7	28.4	500	–	0.0	0.0
Lane 2	0	272	0	272	10.0	628	0.433	100	19.4	LOS B	7.3	55.4	500	–	0.0	0.0
Lane 3	0	0	53	53	10.0	248	0.213	100	34.2	LOS C	1.6	11.8	100	Turn Bay	0.0	0.0
Lane 4	0	0	53	53	10.0	248	0.213	100	34.2	LOS C	1.6	11.8	100	Turn Bay	0.0	0.0
Approach	0	423	105	528	10.0		0.433		22.0	LOS C	7.3	55.4				
Intersection				1793	10.0		0.506		20.4	LOS C	10.0	76.1				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model used.

1 Reduced capacity due to a short lane effect
5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects

SIDRA INTERSECTION

Annexure B

AERIAL PHOTO

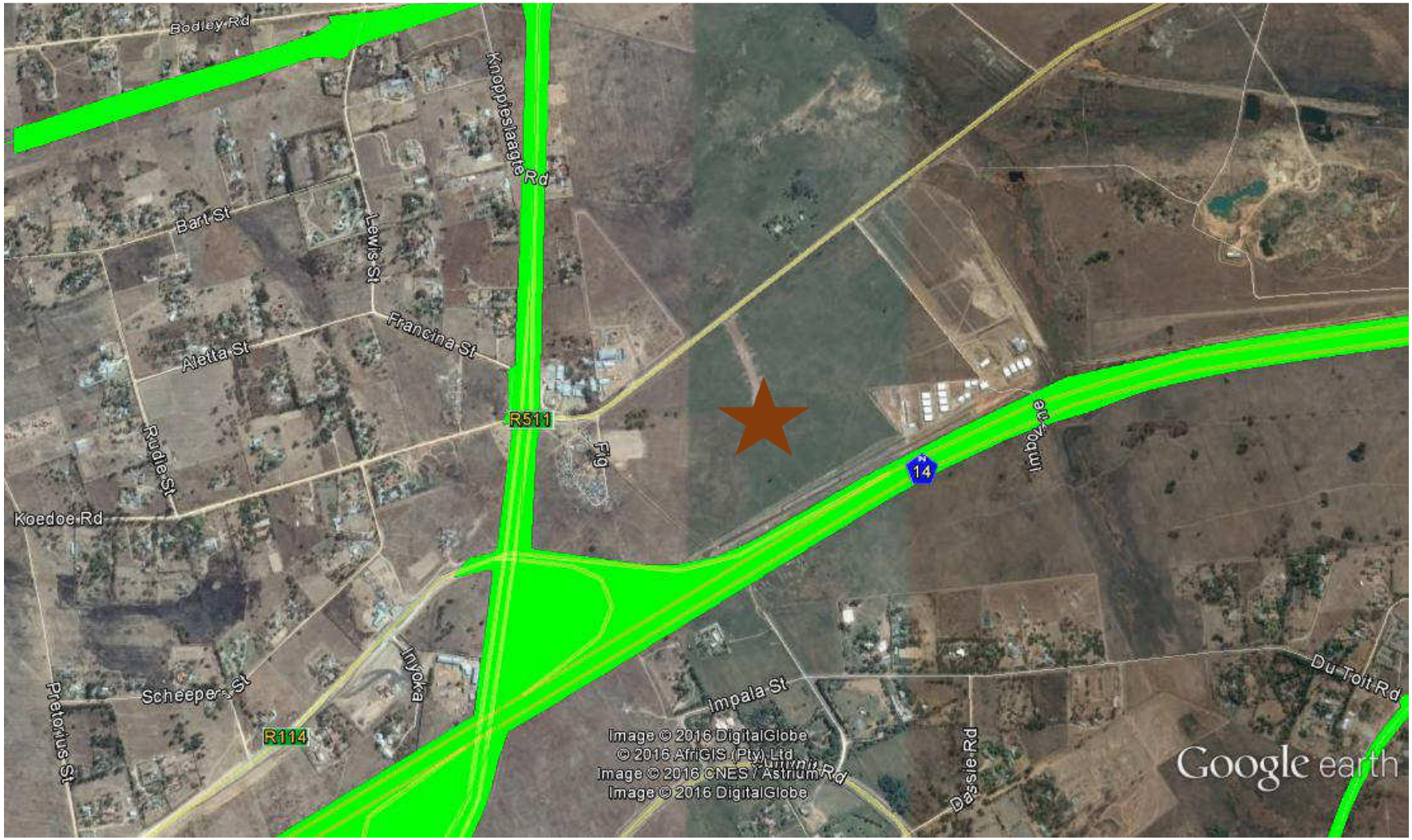
Bodley Rd
Knoppieslaagte Rd
Bart St
Lewis St
Francina St
Aletta St
R511
Rudie St
Fig
Koedoe Rd
14
Imbox Rd
Pretorius St
Scheepers St
R114
Invoka
Impala St
Du Toit Rd
Dessie Rd
Image © 2016 DigitalGlobe
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Image © 2016 CNES / Astrium
Image © 2016 DigitalGlobe
Google earth

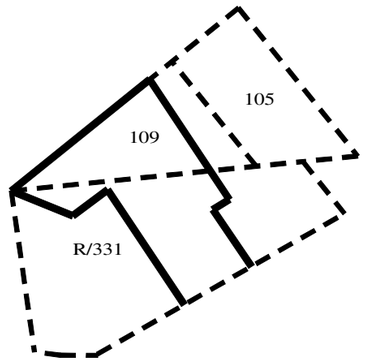
Annexure C

PROPOSED SITE LAYOUT

PROPOSED TOWNSHIP: PEACH TREE EXTENSION 23

LOCALITY MAP 1:20 000

GEOTECHNICAL ZONES



THIS IS TO CERTIFY THAT THE TOWNSHIP LAYOUT ON THE PLAN IS IN ACCORDANCE WITH THE PROVISIONS AND RECOMMENDATIONS AS SET OUT IN THE GEOTECHNICAL INVESTIGATION FOR THE PROPOSED TOWNSHIP.

GEOTECHNICAL ZONES:

ZONE	DESCRIPTION
P-C2-S2	THE ENTIRE SITE IS ZONED - NHBRC ZONE P(FILL)-C2-S2

FLOOD LINE CERTIFICATION

1 : 50 AND 1 : 100 YEAR FLOODS

I HEREBY CERTIFY THAT IN TERMS OF SECTION 144 OF THE NATIONAL WATER ACT, ACT OF 1996, IT IS HEREBY CERTIFIED THAT THE TOWNSHIP IS NOT SUBJECT TO A FLOOD WITH AN EXPECTED FREQUENCY OF 1 : 50 YEARS AND 1 : 100 YEARS.

GENERAL NOTE:

1. CONTOURS: SUPPLIED BY ISAZI SURVEYS LAND SURVEYORS.
   1,00m INTERVALS
   DATUM: SEA LEVEL
   SYSTEM WGS
   THE CONTOURS ARE IN ACCORDANCE WITH REGULATION 18(1) OF THE TOWN-PLANNING AND TOWNSHIPS ORDINANCE, 1986
2. ALL DIMENSIONS AND AREAS ARE APPROXIMATE PENDING FINAL SURVEY.
3. PROPOSED PHASES SUBJECT TO CHANGE.
4. REPRESENTS A GEOTECHNICAL ZONE LINE.
5. REPRESENTS A LINE OF NO ACCESS.
6. REPRESENTS THE RELEVANT BUILDING LINES.

SERVITUDE NOTE:

1. EXISTING SERVITUDES TO BE INCORPORATED IN THE DESIGN OF THE TOWNSHIP.
2. PROPOSED 5m WIDE WATER SERVITUDE OVER ERVEN 9 AND 10.
3. PROPOSED ROW SERVITUDE OVER ERVEN 9 AND 10.

urban innovate

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www.urbanonnovate.co.za

PO BOX 27011
MONUMENT PARK
0105

PLAN No: PEACH TREE X23/1 **DATE:** AUG 2016

LAND USE

USE ZONE	ERF NUMBERS	TOT. NO. OF ERVEN	MIN. ERF SIZE (m²)	AVERAGE	TOTAL AREA (Ha)	
"INDUSTRIAL 2" FOR BUSINESS BUILDINGS, COMMERCIAL USE, LIGHT INDUSTRY, CAFETERIA, CAR WASH, PLACE OF REFRESHMENT, PARKING GARAGE, RETAIL INDUSTRY AND SHOPS.	1 - 7	7	N/A	N/A	10,8900	92,52
"SPECIAL" FOR ACCESS AND ACCESS CONTROL	8, 9	2	N/A	N/A	0,8800	7,48
EXISTING STREETS AND WIDENING	N/A	N/A	N/A	N/A	N/A	N/A
	TOTAL	9			11,7700	100,00

SITUATED ON PART OF PORTION 109 AND REM/331 OF THE FARM KNOPJESLAAGTE 385-JR.
REPRESENTED BY THE FIGURE A-B-C-D-E-F-G-H-J-K-L-M-N-O-P-Q-R-S-A

CITY OF TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG

PORTION 107
KNOPJESLAAGTE 385-JR

PORTION 106
KNOPJESLAAGTE 385-JR

PORTION 11
KNOPJESLAAGTE

PEACH TREE X21

PEACH TREE X22

PEACH TREE X24

PORTION 105
KNOPJESLAAGTE 385-JR

PORTION 914

PORTION 109
KNOPJESLAAGTE 385-JR

R/PORTION 331
KNOPJESLAAGTE 385-JR

REM/PTN 22
KNOPJESLAAGTE 385-JR

PORTION 4
AIE 392-JR

58
NIA A.H.

157

M34 KRUGERSDORP PRETORIA ROAD

N14-HIGHWAY (P158/2)

16m BUILDING LINE

PROPOSED 25m STREET

PROPOSED 20m STREET

PROPOSED 20m STREET

PROPOSED 20m STREET

PROPOSED 20m STREET

PROPOSED 20m STREET

5m WIDE R.O.W SERVITUDE

5m WIDE WATER PIPELINE SERVITUDE S.G. No. 1004B/2007

20m R.O.W SERVITUDE (FUTURE ROAD)

30m BUILDING LINE

20m BUILDING LINE

1 1,9485 Ha
2 1,7940 Ha
3 1,3350 Ha
4 1,1090Ha
5 1,0770 Ha
6 1,7915 Ha
7 1,8265 Ha
8 0,4760 Ha
9 0,4000 Ha

A B C D E F G H J K L M N O P Q R S

X 2866500 X 2866800 X 2867100

Y 97200 Y 96900 Y 96600 Y 96300 Y 96000 Y 95900

N
SCALE 1 : 3000
0 20 40 60 100m

Appendix H

Environmental Management Plan

Environmental Management Programme (EMPr)

For the Proposed Peach Tree X23

On a part of Portion 109 and part of the Remainder of Portion 331 of the Farm Knopjeslaagte 385 JR

City of Tshwane Metropolitan Municipality, Gauteng Province

October 2016

BOKAMOSO

LANDSCAPE ARCHITECTS AND ENVIRONMENTAL CONSULTANTS CC

Tel: 012 346 3810
Fax: 086 570 5659
E-Mail: reception@bokamoso.net
P.O. Box 11375
Maroelana
0161

1 Project Outline

1.1 Background

Bokamoso Landscape Architect and Environmental Consultants cc was appointed by ***Tembibex (Pty) Ltd*** *to* compile a basic assessment report for the proposed development of ***Peach Tree X23*** as well as its associated activities.

1.2 Project description

The proposed development of Peach Tree X23 is situated on a part of Portion 109 and part of the Remainder of Portion 331 of the Farm Knopjeslaagte 385 JR.

The proposed development is for the establishment of a township to be known as **Peach Tree X23**. The proposed development comprises an area of approximately 11.8 hectares and is located in the area of jurisdiction of the **City of Tshwane Metropolitan Municipality** in **Gauteng Province.**

The study area is situated east of the R511 Road and north of the N14, adjacent to the Centurion Flight Academy (Pty) Ltd. The R114 runs along the site's northern boundary. Major city attractions such as the Zwartkops Raceway and the Gautrain Station are situated in the area. The proposed township will comprise of nine erven zoned as follows:

- Seven (7) erven zoned as "Industrial 2" for the main purpose of Commercial Use and Light Industry. *Industrial 2 zoning allows for Business Buildings, Commercial Use, Light Industry, Cafeteria, Car Wash, Place of Refreshment, Parking Garage, Retail Industry and Shops*; and
- Two (2) erven zoned as "Special" for Access and Access Control.

(Refer to Figure 1 for the Locality Map and Figure 2 for the Aerial Map)

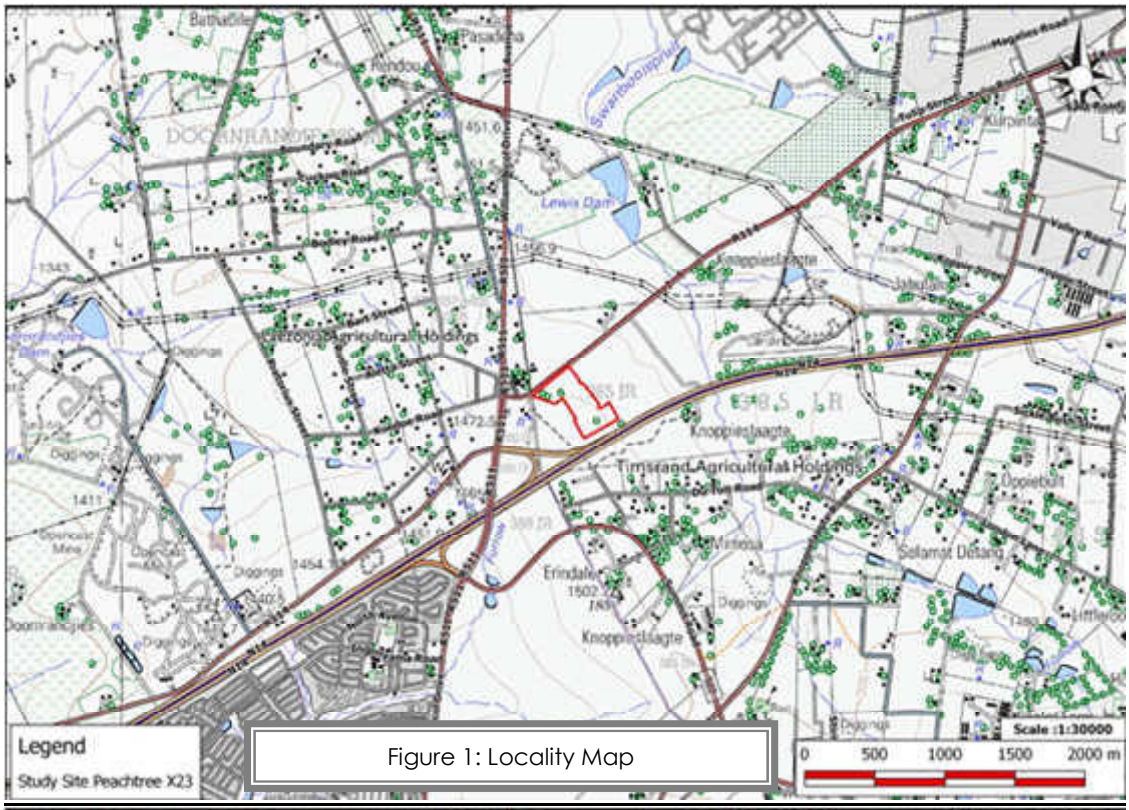


Figure 1: Locality Map

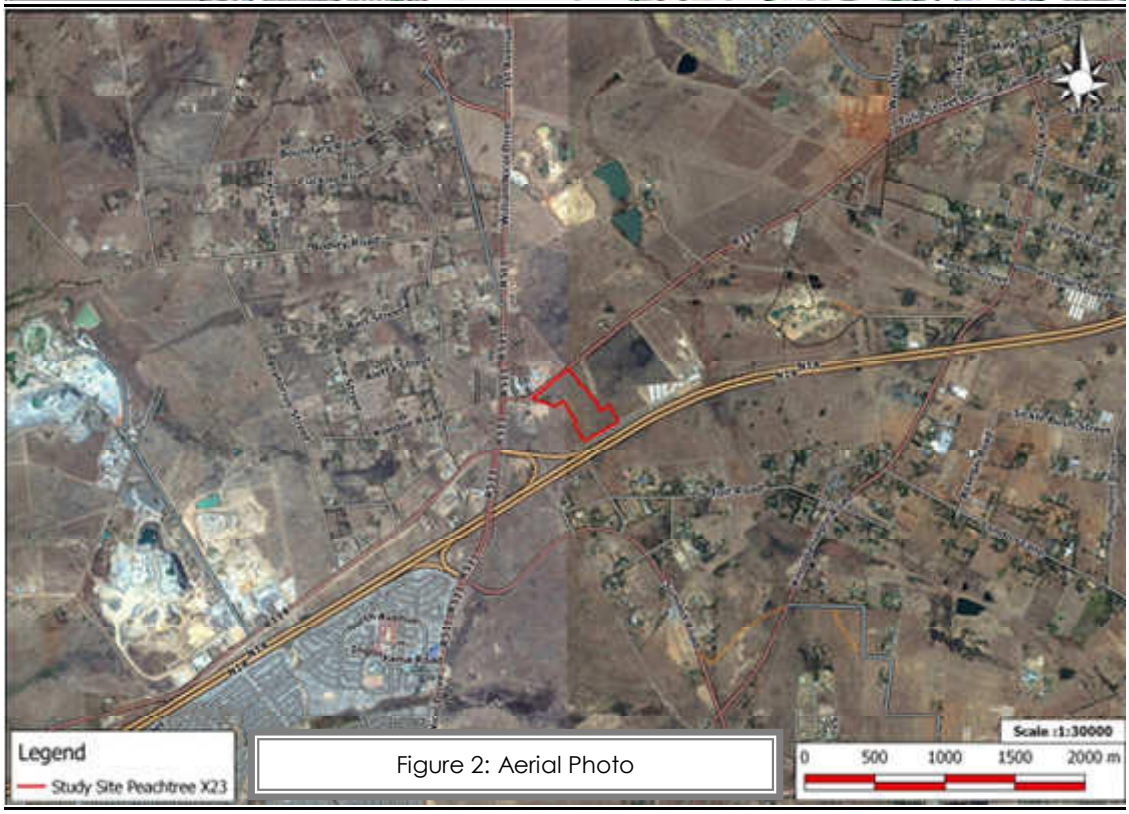


Figure 2: Aerial Photo

Timeframe for construction:

Will be provided when or if the application for the proposed development is approved. Therefore the timeframe for construction is unknown.

The developer will be responsible for the on-site activities. The EMPr will be a binding document for purposes of compliance.

1.3 Receiving Environment

Hydrology:

- No river or wetlands occur within the application site. The proposed development is not subjected to flood lines of any natural stream or water course within an expected frequency of 1:50 and 1:100 years and therefore in terms of Section 21 of the National Water Act, the developer will not need any water-use licenses for the proposed development.

Fauna and flora:

- The application sites are not located within any conservancy or protected area;
- According to a desktop study, no ridges are present on both of the development sites, which could create sensitive habitats;
- The site is considered of moderately sensitivity;
- No rare and endangered fauna and flora species were either recorded during the field visit; and
- Only one Orange Listed plant species (*Hypoxis hemerocallidea*) were found on the study site.

Cultural /Historical:

- No obvious features, sites or artefacts of cultural significance were found on the site during the desktop survey. However a Heritage specialist has

been appointed to conduct a Heritage Impact Assessment which will be included within the FBAR. Due to the study area being in close proximity to the Cradle of Humankind we thought it necessary to conduct a Heritage Impact Assessment.

Visual:

- The construction phase will cause a visual impact and must be mitigated accordingly.

Geology:

- According to the 1: 50 000 scale geological map the site is underlain by migmatite gneiss (granite) of the Halfway House Suite. The geology of the site was confirmed during this investigation, granite bedrock was encountered in the test pits; and
- No dolomite is found on the proposed development area. Valuable topsoil may be lost during the construction process. The loss of topsoil can however be minimised through the storage of topsoil in designated stockpiles on site and the re-use thereof within the landscape component of the development.

2 EMPr Objectives and context

Objectives

The objectives of this plan are to:

- Identify the possible environmental impacts of the proposed activity;
- Develop measures to minimise, mitigate and manage these impacts;
- Meet the requirements of the Environmental Authorization of GDARD and requirements of other Authorities; and

- Monitor the project.

EMPr context

This EMPr fits into the overall planning process of the project by carrying out the conditions of consent set out by the Gauteng Department of Agriculture and Rural Development. In addition, all mitigation measures recommended in the Basic Assessment report are included in the EMPr.

This EMPr addresses the following three phases of the development:

- Pre-construction planning phase;
- Construction phase; and
- Operational phase.

3 Monitoring

In order for the EMPr to be successfully implemented all the role players involved must have a clear understanding of their roles and responsibilities in the project.

These role players may include the Authorities (A), other Authorities (OA), Developer/proponent(D), Environmental Control Officer (ECO), Project Manager (PM), Contractors (C), Environmental Assessment Practitioner (EAP) and Environmental Site Officer (ESO). Landowners interested and affected parties and the relevant environmental and project specialists are also important role players.

3.1 Roles and responsibilities

Developer (D)

The developer is ultimately accountable for ensuring compliance with the EMPr and conditions contained in the Environmental Authorization (EA). The developer must appoint an independent Environmental Control Officer (ECO), for the duration of the pre-construction and construction phases, to ensure compliance with the requirements of this EMPr. The developer must ensure that the ECO is integrated as part of the project team. The responsibility of compliance will be carried across to the individual property owners as soon as transfer of the erven has taken place. It will be ensured that a copy of this document accompanies the purchase agreements for the erven.

Project Manager (PM)

The project Manager is responsible for the coordination of various activities and ensures compliance with this EMPr through delegation of the EMPr to the contractors and monitoring of performance as per the Environmental Control Officer's monthly reports.

Environmental Control Officer (ECO)

An independent Environmental Control Officer (ECO) shall be appointed, for the duration of the pre-construction and construction phase of the services and bulk infrastructure, by the developer to ensure compliance with the requirements of this EMPr. Thereafter the individual property owners will be responsible for the further appointment of the ECO.

- The Environmental Control Officer shall ensure that the contractor is aware of all the specifications pertaining to the project;
- Any damage to the environment must be repaired as soon as possible after consultation between the Environmental Control Officer, Consulting Engineer and Contractor;
- The Environmental Control Officer shall ensure that the developer staff and/or contractor are adhering to all stipulations of the EMPr;
- The Environmental Control Officer shall be responsible for monitoring the EMP throughout the project by means of site visits and meetings. This should be documented as part of the site meeting minutes;
- The Environmental Control Officer shall be responsible for the environmental training program;
- The Environmental Control Officer shall ensure that all clean up and rehabilitation or any remedial action required, are completed prior to transfer of properties;
- A post construction environmental audit is to be conducted to ensure that all conditions in the EMPr have been adhered to.

Contractor (C):

The contractors shall be responsible for ensuring that all activities on site are undertaken in accordance with the environmental provisions detailed in this document and that sub-contractor and laborers are duly informed of their roles and responsibilities in this regard.

The contractor will be required, where specified to provide Method Statements setting out in detail how the management actions contained in the EMPr will be implemented.

The contractors will be responsible for the cost of rehabilitation of any environmental damage that may result from non-compliance with the environmental regulations.

Environmental Site Officer (ESO):

The ESO is appointed by the developer and then finally the owners of the individual properties as his/her environmental representative to monitor, review and verify compliance with the EMPr by the contractor. The ESO is not an independent appointment but must be a member of the contractor's management team. The ESO must ensure that he/she is involved at all phases of the construction (from site clearance to rehabilitation).

Authority (A):

The authorities are the relevant environmental department that has issued the Environmental Authorisation. The authorities are responsible for ensuring that the monitoring of the EMPr and other authorization documentation is carried out by means of reviewing audit reports submitted by the ECO and conducting regular site visits.

Other Authorities (OA):

Other authorities are those that may be involved in the approval process of the EMPr.

Environmental Assessment Practitioner (EAP):

According to section 1 of NEMA the definition of an environmental assessment practitioner is "the individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental

assessments, environmental management plans or any other appropriate environmental instruments through regulations".

3.2 Lines of Communication

The Environmental Control Officer in writing should immediately report any breach of the EMPr to the Project Manager. The Project Manager should then be responsible for rectifying the problem on-site after discussion with the contractor. Should this require additional cost, then the developer should be notified immediately before any additional steps are taken.

3.3 Reporting Procedures to the Developer

Any pollution incidents must be reported to the Environmental Control Officer immediately (within 12 hours). The Environmental Control Officer shall report to the Developer on a regular basis (site meetings).

3.4 Site Instruction Entries

The site instruction book entries will be used for the recording of general site instructions as they relate to the works on site. There should be issuing of stop work order for the purposes of immediately halting any activities of the contractor that may pose environmental risk.

3.5 ESA/ESO (Environmental Site Officer) Diary Entries

Each of these books must be available in duplicate, with copies for the Engineer and Environmental Site Officer. These books should be available to the authorities for inspection or on request. All spills are to be recorded in the ESA/Environmental Site Officer's dairy.

3.6 Methods Statements

Methods statements from the contractor will be required for specific sensitive actions on request of the authorities or ESA/ESO (Environmental Site Officer). All method statements will form part of the EMPr documentation and are subject to all terms and conditions contained within the EMPr document. For each instance wherein it is requested that the contractor submit a method statement to the satisfaction of ESA/ESO, the format should clearly indicate the following:

- What – a brief description of the work to be undertaken
- How- a detailed description of the process of work, methods and materials
- Where- a description / sketch map of the locality of work; and
- When- the sequencing of actions with due commencement dates and completion date estimate.

The contractor must submit the method statement before any particular construction activity is due to start. Work may not commence until the method statement has been approved by the ESA/ESO.

3.7 Record Keeping

All records related to the implementation of this management plan (e.g. site instruction book, ESA/ESO dairy, methods statements etc.) must be kept together in an office where it is safe and can be retrieved easily. These records should be kept for two years at any time be available for scrutiny by any relevant authorities.

3.8 Acts

3.8.1. The National Water Act, 1998 (Act No: 36 of 1998)

The purpose of this Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled in ways that take into account, amongst other factors, the following:

- Meeting the basic human needs of present and future generations;
- Promoting equitable access to water;
- Promoting the efficient, sustainable and beneficial use of water in the public interest;
- Reducing and preventing pollution and degradation of water resources;
- Facilitating social and economic development; and
- Providing for the growing demand for water use.

Impact on proposed Development:

Not Significant – the proposed development is not subjected to flood lines of any natural stream or water course within an expected frequency of 1:50 and 1:100 years and therefore in terms of Section 21 of the National Water Act, the developer will not need any water-use licenses for the proposed development.

3.8.2. Atmospheric Pollution Prevention Act (Act 45 of 1965)

The NEMA: AQA serves to repeal the Atmospheric Pollution Prevention Act (45 of 1965) and various other laws dealing with air pollution and it provides a more comprehensive framework within which the critical question of air quality can be addressed.

The purpose of the Act is to set norms and standards that relate to:

- Institutional frameworks, roles and responsibilities

- Air quality management planning
- Air quality monitoring and information management
- Air quality management measures
- General compliance and enforcement.

Amongst other things, it is intended that the setting of norms and standards will achieve the following:

- The protection, restoration and enhancement of air quality in South Africa
- Increased public participation in the protection of air quality and improved public access to relevant and meaningful information about air quality
- The reduction of risks to human health and the prevention of the degradation of air quality.

The Act describes various regulatory tools that should be developed to ensure the implementation and enforcement of air quality management plans. These include:

- Priority Areas, which are air pollution 'hot spots'
- Listed Activities, which are 'problem' processes that require an Atmospheric Emission License
- Controlled Emitters, which includes the setting of emission standards for 'classes' of emitters, such as motor vehicles, incinerators, etc.
- Control of Noise
- Control of Odours.

Impact on proposed Development:

Significant – The Act has relevance to the proposed development during the construction phase, dust and the generation of noise can become a significant factor, especially to the surrounding landowners. However if the development is well planned and the mitigation measures are successfully implemented the

proposed township's contribution to air pollution and the generation of air pollution can become less significant. None of the listed activities, according to this Act, have been triggered.

3.8.3 National Environmental Management Act (Act 107 of 1998)

The NEMA is primarily an enabling Act in that it provides for the development of environmental implementation plans and environmental management plans. The principles listed in the act serve as a general framework within which environmental management and implementation plans must be formulated.

The principles in essence state that environmental management must place people and their needs at the forefront of its concern and that development must be socially, environmentally and economically sustainable.

Impact on proposed Development:

Significant – Section 28 (1) of NEMA stated that every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

The EMPr is compiled in terms of Section 28 of NEMA.

3.8.4. TheNational Environmental Management: Waste Act (Act 59 of 2008)

This Act came into effect on 11 June 2009. It aims to consolidate waste management in South Africa, and contains a number of commendable provisions, including:

- The establishment of a national waste management strategy, and national and provincial norms and standards for, amongst others, the classification of waste, waste service delivery, and tariffs for such waste services;
- Addressing reduction, reuse, recycling and recovery of waste;
- The requirement for industry and local government to prepare integrated waste management plans;
- The establishment of control over contaminated land;
- Identifying waste management activities that requires a licence, which currently include facilities for the storage, transfer, recycling, recovery, treatment and disposal of waste on land;
- Co-operative governance in issuing licenses for waste management facilities, by means of which a licensing authority can issue an integrated or consolidated license jointly with other organs of state that has legislative control over the activity; and
- The establishment of a national waste information system.

On 3 July 2009 the Minister of Environmental Affairs and Tourism promulgated a list of waste management activities that might have a detrimental effect on the environment. These listed activities provide the activities that require a Waste Management License. Two Categories is specified: Category A and Category B. As part of Category A Waste Management License application a Basic Assessment in terms of Section 24(5) of the National Environmental Management Act (Act 107 of 1998) must be submitted to the relevant Authority. As part of a Category B Waste Management License a Scoping and EIA process in terms of Section 24(5) of the National Environmental Management Act (Act 107 of 1998) must be followed and submitted to the relevant Authority.

Impact on proposed Development:

Not Significant – No waste management license will be required during the construction or operational phases of the proposed township. Due to the fact that a small amount of solid construction waste will be stored and handled on the site, before it is hauled away and dumped at the nearest registered landfill site.

3.8.5 . The Municipal Systems Act (Act 32 of 2000)

This Act was introduced to provide for the core principles, mechanisms and processes that are necessary to enable municipalities to move progressively towards the social and economic upliftment of local communities, and ensure universal access to essential services that are affordable to all.

The proposed development will support the local authority in complying with the principles of the Municipal Systems Act, by assisting in providing the community with essential services, such as water and sewage infrastructure.

Impact on proposed Development:

Significant –The proposed development will promote the Municipal System within the area of Centurion, as the proposed development will install, upgrade, and improve the essential services such as water and sewage reticulation networks, therefore contributing to the social and Economic upliftment of the involved City of Tshwane Metropolitan Municipality.

3.8.6 National Veld and Forest Fire Act, 1998 (Act No. 101, 1998)

The purpose of this Act is to prevent and combat veld, forest and mountain fires throughout the Republic. Furthermore the Act provides for a variety of institutions, methods and practices for achieving the prevention of fires.

Impact on proposed Development:

Significant – Fires of construction workers may only be lit in the designated site camp as indicated in assistance with the ECO. It is important that a site development camp be located on a part of the application site that is already disturbed.

3.8.7 National Heritage Resources Act, 1999 (Act No. 25 of 1999)

The National Heritage Resources Act legislates the necesity and heritage impact assessment in areas earmarked for development, which exceed 0.5ha. The Act makes provision for the potential destruction to existing sites, pending the archaelogist's recommendations through permitting procedures. Permits are administered by the South African Heritage Resources Agency (SAHRA).

Impact on proposed Development:

Not significant - No cultural/historical significant areas were identified within the application site and thus no areas of historical or cultural value will be affected.

3.8.8. Conservation of Agricultural Resources Act (Act No. 43 of 1983)

This Act provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.

Impact on proposed Development:

Not Significant – According to the Gauteng Agricultural Potential Atlas (GAPA 3), the Proposed Peach Tree X23 is located on land with low agricultural potential.

The study area does not fall within any of the Seven Agriculture Hubs identified for the Gauteng Province.

3.8.9. National Environmental Management Act: Biodiversity Act (Act No. 10 of 2004)

The purpose of the Biodiversity Act is to provide for the management of South Africa's biodiversity within the Framework of the NEMA and the protection of species and ecosystems that warrant National protection. As part of the implementation strategy, the National Spatial Biodiversity Assessment was developed.

Impact on proposed Development:

Not Significant – Although one Orange Listed Species were observed, the study site cannot be deemed highly sensitive, on account of agricultural and urban development threatening this ecosystem. According to the GDARD C-Plan, the area is considered a Critical Biodiversity Area (CBA) due to Primary Vegetation. HOWEVER, specialists have visited the site and conducted both a Fauna and Flora Assessment. The Flora Assessment showed that the site consist of Secondary Grassland and no longer Primary Vegetation. This Secondary Grassland is isolated from similar grassland vegetation units. It is surrounded by urban development and agricultural activities. The ecological status of this study unit will only decrease as movement of plant species is limited on account of isolation from natural vegetated areas.

3.8.11 Protected Species – Provincial Ordinances

Provincial ordinances were developed to protect particular plant species within specific provinces. The protection of these species is enforced through

permitting requirements associated with provincial lists of protected species. Permits are administered by the Provincial Departments of Environmental Affairs.

Impact on proposed Development:

Not Significant - A Fauna & Flora Specialist study was conducted. The study area consists of only one study unit, dominated by the graminoid vegetation layer. Although one Orange Listed Species were observed, the study site cannot be deemed ecologically highly sensitive, on account of agricultural and urban development threatening this ecosystem.

3.8.12. National Environmental Management: Protected Areas Act, 2003 (Act No. 57 of 2003)

The purpose of this Act is to provide for the protection, conservation and management of ecologically viable areas representative of South Africa's biological biodiversity and its natural landscapes.

Impact on proposed Development:

Not Significant- The Application site is not located within any conservancy or protected area.

3.8.13 National Road Traffic Act, 1996 (Act No. 93 of 1996)

This Act provides for all road traffic matters which shall apply uniformly throughout the Republic and for matters connected therewith.

Impact on proposed Development:

Not significant – Not Applicable.

4 Project activities

4.1 Pre-Construction Phase

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
General	**Project contract**	To make the EMP enforceable under the general conditions of the contract.	The EMPr document must be included as part of the tender documentation	The EMPr is included as part of the tender documentation	Developer	-
	Surrounding Residents	Service Interruption.	Contractor should inform all residents, landowners and tenants at least 48hours before the proposed interruption.		Developer Contractor	
Design and planning	**Geology-** **Stability of structures and restriction of land use due to geology**	To ensure stability of structures	- The layout and land must correspond to the stability zonation and development types recommended by the geotechnical engineer; - More detailed foundation investigations should be done for each of the structures prior to construction.		Geotechnical Engineer, Structural Engineer,	-
	Erosion and Siltation	To prevent the unnecessary loss of soil through bad management	All surface run-offs should be managed in such a way so as to ensure erosion of soil does not occur. Provisions should be made for the development of a rehabilitation plan, prior to construction, to ensure that all the areas which are susceptible to erosion shall be covered with a suitable vegetative cover as soon as	No soil lost	Landscape Architect, Environmental Consultants, Flora Specialist	-

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			construction is completed.			
	Compaction	To prevent the compaction of valuable soils due to traffic and equipment	Designated routes shall be determined prior to construction for movement of construction vehicles and areas for the storage of equipment. All the areas that are compacted by machinery shall be ripped prior to them being rehabilitated.		ECO, Site Supervisor, Contractor	
			The site access point should be clearly marked as well as routes designated to be used by construction vehicles and pedestrians.		ECO, Site Supervisor Contractor	
	Topsoil	To Prevent the loss of valuable topsoil	Designated areas should be identified prior to construction for the stockpile of stripped topsoil. The stockpile areas should be designated were the material will not be damaged, removed or compacted. The stockpiled topsoil shall be used for the rehabilitation of the site during and after construction and for landscaping purposes.	Designated stockpile areas identified prior to construction for the storage of Top soil	ECO, Site Supervisor, Contractor	
			When the stripping of topsoil takes place, the grass component shall be included in the stripped topsoil. The soil will contain a natural grass seed mixture that may assist in the re-growth of grass once the soil is used for backfilling and landscaping.		Contractor	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
	Storm water design- -Environmental Damage due to erosion, water pollution, gully formation and siltation;	To prevent and restrict erosion, siltation and groundwater pollution, through the design of a proper storm water management system	- A proper storm water management plan should be developed, to be implemented during the construction and operational phases of the proposed development; - Storm water outlets shall be correctly designed to prevent erosion; -Construction guidelines should be provided for the prevention and restriction of erosion and siltation - It is important to note the trenches for the water pipeline and even those for sewage lines do not need to be wide, which means that the environmental damage caused by the actual digging can be reduced to a minimum. However, while they are open, their presence will mean that herpetofauna of any size may fall into them, from where it will be difficult to escape and death may cause by drowning, excessive exposure to the sun or by being buried alive during the final construction work.	Compilation and approval of storm water management plan	Civil Engineer	
		To ensure the sustainability of the drainage and the open space systems lower down in the catchment area	-The storm water design for the proposed development must be designed to: ➢ Reduce and/or prevent siltation, erosion and water pollution. Storm water runoff should not be concentrated as far as possible and sheet flow		Civil Engineer	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			should be implemented; ➢ Run-off from paved surfaces should be slowed down through the strategic placement of berms; ➢ Attenuation ponds and energy dissipaters must be installed on the study area to break the speed of the water and to act as siltation ponds where required. ➢ Sheet runoff from paved surfaces and access roads needs to be curtailed; ➢ Surface storm water generated as a result of the development must not be channeled directly into any natural drainage system or wetland; ➢ The storm water management plan should be designed in a way that aims to ensure that post development runoff does not exceed predevelopment values in: - Peak discharge for any given storm;			

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			- Total volume of runoff for any given storm; - Frequency of run-off; - Pollutants and debris reaching watercourses; ➢ As much of the vegetation should be retained as far as possible and rehabilitated if disturbed by construction activities to endure that erosion and siltation does not take place; ➢ No Trees should be planted within three meters form water bearing services.			
	Waste storage	To control the temporary storage of waste.	Temporary waste storage points on site shall be determined. These storage points shall be accessible by waste removal trucks and these points should not be located in sensitive areas/areas highly visible from the properties of the surrounding land-owners/tenants/in areas where the wind direction will carry bad odours across the properties of adjacent tenants or landowners.		Contractor ESO	-
		Ensure waste storage area does not generate pollution.	Build a bund around the waste storage area to avoid occurrence of pollution.		Contractor	-

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		To control the temporary storage of waste	No waste materials shall at any stage be disposed of in the open veld of adjacent properties or in sensitive areas. Temporary waste storage points should be determined prior to construction on site. These storage points shall be accessible by waste removal trucks. Such areas should not be located in areas highly visible from the properties of the surrounding land-owners/tenants.	Designated areas determined prior to construction for the storage of waste on site.	ECO, Contractor	
		To ensure that the waste storage area does not generate any pollution	- The area designated for the storage of waste on site should be located in non-sensitive areas and areas where it would not be able to contaminate storm water. - In order to prevent any visual pollution, as well as mitigate anticipated visual impacts, the area designated for the storage of waste should be located in an area that is not highly visible.		Site Supervisor	
	Waste Generation, and air, water and noise pollution	Best Practice to minimise environmental impacts and ensure efficient management	Coordinate with other trades working on site regarding, site management, timing of works and waste management (recycling and reuse potential)		Project Manager	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			Plan the activities on site prior to construction for access, deliveries, construction areas, washout area, waste stockpiles, and chemical storage.		Environmental Site Officer. Occupational Health and Safety officer etc.	
		Solid Waste Disposal	Solid waste shall be disposed of in a manner approved by the relevant local authorities, and at a registered land-fill site.		Contractor	
	Fauna and Flora	To give smaller birds, mammals and reptiles a chance to move into other undisturbed areas close to their natural territories	Construction work should be planned beforehand and restricted to one area at a time.		Contractor	
		To ensure that the species introduced to the area, are compatible with the current and future quality of the ecological processes.	- The landscape development plan for the proposed development shall be submitted to the local authority for approval; - It is important that all the plant positions, quantities and coverage per m² be indicated on a plan; - The proposed planting materials for the areas to be landscaped shall be non-invasive, and preferably indigenous and /or endemic; - Where possible, trees naturally growing on the site should be retained as part of the landscaping.	The landscape development plan submitted to the local authority for approval.	Landscape Architect	-

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			- Staff should be trained not to destroy herpetological specimens unnecessarily. Herpetofauna that are exposed during the construction phase should be removed and translocated. - It is important to note the trenches for the water pipeline and even those for sewage lines do not need to be wide, which means that the environmental damage caused by the actual digging can be reduced to a minimum. However, while they are open, their presence will mean that herpetofauna of any size may fall into them, from where it will be difficult to escape and could lead to death which may be caused by drowning, excessive exposure to the sun or by being buried alive during the final construction work. - Environmental damage caused by these trenches may be kept to a minimum by good forward planning and thereby reducing the actual length of time that trenches are left open. Possible damage to herpetofauna is in direct proportion to the time that these trenches are left open and may destroy amphibian and reptilian species. - The design of the storm water lines is not known. If cement pipes of large			

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			diameter are used and the trenches are filled in again, potential danger is substantially reduced. Open storm water channels are dangerous, as they will continuously contribute to herpetofauna destruction.			
		To ensure the removal of all the Declared weeds and invaders from the site	All the declared weeds and invaders should be removed from site prior to construction.		Flora Specialist /Contractor	
Other Design Requirements	**Extreme change in micro climate temperatures**	To prevent the extreme change in micro climate temperatures	Where open parking bays are involved, one tree for every two parking bays shall be indicated on Landscape Development Plan which shall be approved by the Design Review Committee / Local Authority.	Landscape Development Plan complies	Landscape Architect	-
	Light Pollution	To prevent excessive light pollution through ineffective design	The generation of light through security lighting and other lighting should be effectively designed to not spill unnecessary outward into the oncoming traffic, or into the yards of the neighbouring properties or open spaces.		Architect, Landscape Architect/ Contractor	
	Visual Impact	To minimize the visual impact of the proposed development.	Architectural guidelines should be compiled for the proposed development and the styles used must promote unity through the use of certain street furniture, planting and paving patterns, colours and textures that do not only blend in tastefully with the character of the area, but		Architect Contractor.	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			are also functional and easy to maintain.			

4.2 Construction Phase

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
General	**Surrounding Residents**	Service Interruption.	Contractor should inform all residents, landowners and tenants at least 48hours before the proposed interruption.		Developer Contractor	
Contractors Camp	**Vegetation and topsoil**	To minimize damage to and loss of vegetation and retain quality of Topsoil.	- Site to be established under supervision of ECO; - Clearing and relocation of plants to be undertaken in accordance with site specific requirements; - The clearing of the site should take place within phases to prevent large areas exposed which could be prone to erosion; - The Contractor's Camp should not be established in areas which are deemed to be sensitive. Areas with low sensitivity such as degraded areas should rather be considered for the establishment of the contractor's Site Camp; - Valuable Topsoil that is cleared should be retained in designated stockpiles and used again during rehabilitation	Minimal vegetation removed/ damaged during site activities.	Contractor	As and when required

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			works			
	Surface and ground water pollution	To minimize pollution of surface and groundwater resources.	1) Sufficient and temporary facilities including ablution facilities must be provided for construction workers operating on the site; 2) A minimum of one chemical toilet shall be provided per 10 persons. - The contractor shall keep the toilets in a clean, neat and hygienic condition. - Toilets provided by the contractor must be easily accessible and a maximum of 50m from the working area to ensure they are utilized. The contractor (who must use reputable toilet-servicing company) shall be responsible for the cleaning, maintenance and servicing of the toilets. The contractor (using reputable toilet-servicing company) shall ensure that all toilets are cleaned and emptied before the builders' or other public holidays; 3) No person is allowed to use any other area than chemical toilets; 4) No French drain systems may be installed; 5) No chemical or waste water must be allowed to contaminate the run-off on site; 6) Avoid the clearing of the site camp (of specific phase) or paved surfaces with soap.	Effluents managed Effectively. No pollution of water resources from site. Workforce use toilets provided.	Contractor ESO	As and when required
		To minimize pollution of	1) Drip trays and/ or lined earth bunds must be provided under vehicles and	No pollution of the	Contractor ESO	Daily

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		surface and groundwater resources due to spilling of materials.	equipment, to contain spills of hazardous materials such as fuel, oil and cement; 2) Repair and storage of vehicles only within the demarcated site area; 3) Spill kits must be available on site; 4) Oils and chemicals must be confined to specific secured areas within the site camp. These areas must be bunded with adequate containment (at least 1.5 times the volume of the fuel) for potential spills or leaks; 5) All spilled hazardous substances must be contained in impermeable containers for removal to a licensed hazardous waste site; 6) No leaking vehicle shall be allowed on site. The mechanic/ the mechanic of the appointed contractor must supply the environmental officer with a letter of confirmation that the vehicles and equipment are leak proof; 7) No bins containing organic solvents such as paints and thinners shall be cleaned on site, unless containers for liquid waste disposal are placed for this purpose on site.	environment		
		To minimize pollution of surface and groundwater resources by cement	The mixing of concrete shall only be done at specifically selected sites, as close as possible to the entrance, on mortar boards or similar structures to prevent run-off into drainage lines, streams and natural vegetation.	No evidence of contaminated soil on the construction site.	Contractor ESO	Daily

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		To minimize pollution of surface and groundwater resources due to effluent.	No effluent (including effluent from any storage areas) may be discharged into any water surface or ground water resource.	No evidence of contaminated water resources.	Contractor ESO	Daily
	Pollution of the environment	To prevent unhygienic usage on the site and pollution of the natural assets.	1) Weather proof waste bins must be provided and emptied regularly; 2) The contractor shall provide laborers to clean up the contractor's camp and construction site on a daily basis; 3) Temporary waste storage points on the site should be determined. THESE AREAS SHALL BE PREDETERMINED AND LOCATED IN AREAS THAT IS ALREADY DISTURBED. These storage points should be accessible by waste removal trucks and these points should be located in already disturbed areas /areas not highly visible from the properties of the surrounding land-owners/ in areas where the wind direction will not carry bad odours across the properties of adjacent landowners. This site should comply with the following: • Skips for the containment and disposal of waste that could cause soil and water pollution, i.e. paint, lubricants, etc.; • Small lightweight waste items should be contained in skips with lids to prevent wind littering; • Bunded areas for containment	No waste bins overflowing No litter or building waste lying in or around the site	Contractor ESO	Daily Weekly

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			and holding of dry building waste. 4) No solid waste may be disposed of on the site; 5) No waste materials shall at any stage be disposed of in the open veld of adjacent properties; 6) The storage of solid waste on the site, until such time as it may be disposed of, must be in a manner acceptable to the local authority and DWS; 7) Cover any wastes that are likely to wash away or contaminate storm water.			
		Recycle material where possible and correctly dispose of unusable wastes	1) Waste shall be separated into recyclable and non-recyclable waste, and shall be separated as follows: • General waste: including (but not limited to) construction rubble, • Reusable construction material. 2) Recyclable waste shall preferably be deposited in separate bins; 3) All solid waste including excess spoil (soil, rock, rubble etc.) must be removed to a permitted waste disposal site on a weekly basis; 4) No bins containing organic solvents such as paints and thinners shall be cleaned on site, unless containers for liquid waste disposal are placed for this purpose on site; 5) Keep records of waste reuse,	Sufficient containers available on site No visible signs of pollution	Contractor ESO	Daily Weekly

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			recycling and disposal for future reference. Provide information to ECO.			
	Increased fire risk to site and surrounding areas	**To decrease fire risk.**	1) Fires shall only be permitted in specifically designated areas and under controlled circumstances' 2) Food vendors shall be allowed within specified areas; 3) Fire extinguishers to be provided in all vehicles and fire beaters must be available on site; 4) Emergency numbers/ contact details must be available on site, where applicable.	No open fires on site that have been left unattended	Contractor	Monitor daily
Construction site	**Geology and soils-** ***Unstable structured due to the underlying geotechnical conditions of the site;** ***Loss of valuable Topsoil**	To Ensure the Stability of Structures	-The standard precautionary measures and founding recommendations made during the design and planning phase by the Geotechnical/Structural Engineers should be implemented during construction;	To ensure that all the precautionary measures has been taken and implemented during construction	Contractor, Consulting Engineers	
		To prevent the damaging of the existing soils and geology.	1) The top layer of all areas to be excavated for the purposes of construction shall be stripped and stockpiled in areas where this material will not be damaged, removed or compacted; 2) All surfaces that are susceptible to erosion, shall be protected either by cladding with biodegradable material or with the top layer of soil being seeded with grass seed/planted with a suitable groundcover.	Excavated materials correctly stockpiled No signs of erosion	Contractor	Monitor daily

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		To prevent the loss of topsoil To prevent siltation & water pollution.	1) Stockpiling will only be done in designated places where it will not interfere with the natural drainage paths of the environment; 2) In order to minimize erosion and siltation and disturbance to existing vegetation, it is recommended that stockpiling be done/ equipment is stored in already disturbed/exposed areas; 3) Cover stockpiles and surround downhill sides with a sediment fence to stop materials washing away; 4) Remove vegetation only in areas designated during the planning stage; 5) Rehabilitation/ landscaping are to be done immediately after the involved works are completed; 6) All compacted areas should be ripped prior to them being rehabilitated/landscaped by the contractor as appointed by the individual erf owner; 7) The top layer of all areas to be excavated must be stripped and stockpiled in areas where this material will not be damaged, removed or compacted. This stockpiled material should be used for the rehabilitation of the site and for landscaping purposes; 8) Strip topsoil at start of works and store in stockpiles no more than 1,5 m high in designated materials storage area;	Excavated materials correctly stockpiled No visible signs of erosion and sedimentation Minimal invasive weed growth Vegetation only removed in designated areas	Contractor of the Individual Developer	Monitor daily

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			9) During the laying of any cables, pipelines or infrastructure (on or adjacent to the site) topsoil shall be kept aside to cover the disturbed areas immediately after such activities are completed.			
	Erosion and siltation	To prevent erosion and siltation	1) It is recommended that the construction of the development be done in phases; 2) Each phase should be rehabilitated immediately after the construction for that phase has been completed. The rehabilitated areas should be maintained by the appointed rehabilitation contractor until a vegetative coverage of at least 80% has been achieved as appointed by the individual erf owner; 3) Mark out the areas to be excavated; 4) Large exposed areas during the construction phases should be limited. Where possible areas earmarked for construction during later phases should remain covered with vegetation coverage until the actual construction phase. This will prevent unnecessary erosion and siltation in these areas; 5) Unnecessary clearing of flora resulting in exposed soil prone to erosive conditions should be avoided; 6) All embankments must be adequately compacted and planted with grass to stop any excessive soils	No erosion scars No loss of topsoil All damaged areas successfully rehabilitated	Contractor ESO	Monitor daily

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			erosion and scouring of the landscape if required; 7) The eradication of alien vegetation should be followed up as soon as possible by replacement with indigenous vegetation to ensure quick and sufficient coverage of exposed areas by the individual erf owner; 8) Storm water outlets shall be correctly designed to prevent any possible soil erosion; 9) All surface run-offs shall be managed in such a way so as to ensure erosion of soil does not occur; 10) Implementation of temporary storm water management measures that will help to reduce the speed of surface water by the individual erf owner / developer; 11) All surfaces that are susceptible to erosion shall be covered with a suitable vegetative cover as soon as construction is completed by the individual erf owner / developer.			
	Hydrology	To ensure that: -Construction works and structures are not flooded during heavy precipitation;	The storm water management plan which has been developed prior to construction should be implemented on a continuous basis;	No damage caused to construction works and structures due to the effective management of floodwater;	Contractor, Civil Engineers	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		-To minimise potential significant environmental damage due to extensive soil erosion, saltation and water pollution		-No visible signs of Environmental damage in the form of erosion, water pollution etc.		
		To minimise pollution of soil, surface and groundwater	-Increased run-off during construction must be managed using berms and other suitable structures as required to ensure flow velocities are reduced; -The contractor shall ensure that excessive quantities of sand, silt and silted water do not enter the storm water system.	No visible signs of erosion. No visible signs of pollution	Contractor	Monitor daily
	Fauna and Flora	To protect the existing fauna and flora.	1) All exotic invaders and weeds must be eradicated on a continuous basis; 2) Exotic invaders must be included in an alien management program for the site. Eradication must occur every 3 months; 3) No plants not indigenous to the area, or exotic plant species, especially lawn grasses and other ground-covering plants, should be introduced in the communal landscaping of the proposed site, as they will drastically interfere with the nature of the area; 4) Where possible, trees naturally growing on the site should be retained	No exotic plants used for landscaping	Contractor ESO / Home Owners Association / Design Review Committee	As and when required Every 6 months

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			as part of the landscaping. 5) Only indigenous plant species, preferably species that are indigenous to the natural vegetation of the area, should be used for landscaping in communal areas. As far as possible, plants naturally growing on the development site, but would otherwise be destroyed during clearing for development purposes, should be incorporated into landscaped areas. Forage and host plants required by pollinators should be planted in landscaped areas. 6) Alien and invasive species must be removed.			
		To protect the existing fauna and flora.	1) Trees that are intended to be retained shall be clearly marked on site; 2) Snaring and hunting of fauna by construction workers on or adjacent to the study area are strictly prohibited and the Council shall prosecute offenders; 3) All mitigation measures for impacts on the indigenous flora of the area should be implemented in order to limit habitat loss as far as possible and maintain and improve available habitat, in order to maintain and possibly increase numbers and species of indigenous fauna; 4) Wood harvesting of any trees or shrubs on the study area or adjacent areas shall be prohibited;	No measurable signs of habitat destruction	Contractor ESO	As and when required

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			5) Where possible, work should be restricted to one area at a time; 6) Noise should be kept to a minimum and the development should be done in phases to allow faunal species to temporarily migrate into the conservation areas in the vicinity; 7) The integrity of remaining wildlife should be upheld, and no trapping or hunting by construction personnel should be allowed. Caught animals should be relocated to the conservation areas in the vicinity. 8)Where possible, work should be restricted to one area at a time, as this will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories.			
			All Declared weeds and invaders should be removed from the open spaces on an ongoing basis.			
		To mitigate the negative impact on the ecological environment due to the installation of services	Rehabilitate areas which were disturbed by the instillation of services immediately after works have been completed.	Disturbed areas successfully rehabilitated	Site Supervisor, Contractor	
	Social, safety and Security	To ensure the safety of the public	Although regarded as a normal practice, it is important to erect proper signs indicating the operations of heavy machinery in the vicinity of dangerous crossings and access roads or erven in	Visible signs erected	Contractor	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			the development site if necessary.			
			With the exemption of the appointed security personnel, no other workers, friend or relatives will be allowed to sleep on the construction site (weekends included).		Security Personal, contractor	
			- Heavy construction vehicles should avoid using the local road network during peak traffic times; - These vehicles should use only specific roads, and strictly keep within the speed limits and abide to all traffic laws. No speeding or reckless driving should be allowed; - Access to the site for construction vehicles should be planned to minimize the impact on the surrounding road network; - Warning signs should be erected on the roads if needed.			
			The following actions would assist in the management of safety along the road: -Adequate road marking; -Adequate roadside recovery areas; -Allowance for pedestrians and cyclists.		Project Manager, Environmental Site officer, Heath and Safety officer	

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		Noise Impact- To maintain noise levels below "disturbing" as defined in the National Noise Regulations.	- Site workers must comply with the Provincial noise requirements; - Construction will only be permitted during working hours of between 07h00 and 19h00; - The surrounding residents must be notified of blasting activities in advance. The necessary safety measures must also be implemented.	No complaints from surrounding residents and I & AP	Contractor	Monitored daily
		Dust Impact- Minimise dust from the site. To ensure the adequate protection of construction workers against dust pollution	- Dust pollution could occur during the construction works, especially during the dry months. Regular and effective damping down of working areas (especially during the dry and windy periods) must be carried out to avoid dust pollution that will have a negative impact on the surrounding environment; - Stockpiles of fine material should be wetted and/or covered during windy conditions; - Workers on site should wear dust masks during dry and windy conditions; - During the construction phase, noise must be kept to a minimum to reduce the impact of the development on the fauna residing on the site.	No visible signs of dust pollution No complaints from surrounding residents and I & AP	Contractor	Monitored daily
		Visual Impact- In order to minimise the visual impact.	The disturbed areas shall be rehabilitated immediately after the involved construction works are completed as the construction vehicle and equipment will be causing visual impacts during the construction phase.	Visual impacts minimized	Contractor ESO	Monitor daily

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		To mitigate the inconvenience of temporary power failures, disconnection of water and sewage, and telecommunication	There should be consultation with affected parties to determine the most convenient times for service disruptions. The interested and affected parties should also be notified in advance of dates that services will be disrupted.		Project Manager, Contractor	
		Increased fire risk to site and surrounding areas - To decrease fire risk.	- Fires shall only be permitted in specifically designated areas and under controlled circumstances. - Food vendors shall be allowed within specified areas. - Fire extinguishers to be provided in all vehicles and fire beaters must be available on site. - Emergency numbers/contact details must be available on site, where applicable.	No open fires on site that have been left unattended.	Contractor	Monitor daily
	Infrastructure and services	Installation of services	Determine areas where services will be upgraded and relocated well in advance. Discuss possible disruptions with affected parties to determine most convenient times for service disruptions and warn affected parties well in advance of dates that service disruptions will take place.	No complaints from I & AP	Contractor ESO	When required
	Cultural Resources	To ensure the protection of heritage resources if	If any graves or archaeological sites are exposed during construction work it should immediately be reported to a museum. The report from the	No destruction of or damage to graves or known	Contractor ESO	Monitor daily

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
		exposed during construction	archaeologist must be provided to GDARD if any graves are recovered.	archaeological sites		
	Vegetation	Landscaping	1) When planting trees, care should be taken to avoid the incorrect positioning of trees and other plants, to prevent the roots of trees planted in close proximity to the line of water-bearing services from causing leaking in, or malfunctioning of the services; 2) The proposed planting materials for the areas to be landscaped should preferably be endemic and indigenous; 3) All new trees and shrubs to be planted on the study area shall be inspected for pests and diseases prior to them being planted; 4) The inspection shall be carried out by the maintenance contractor at the property of the supplier and not on the study area; 5) All trees to be planted shall be in 20L containers with a height of approximately 1,8 metres and a main stem diameter of approximately 300 mm.	Landscaping done according to landscape development plan	Landscape architect Contractor / Individual Developer	When required
		Loss of plants	1) Aerate compacted soil and check and correct pH for soils affected by construction activities; 2) Make sure plant material will be matured enough and hardened off ready for planting. Water in plants immediately as planting proceeds; 3) Apply mulch to conserve moisture	Landscaping done according to landscape development plan	Landscape architect Contractor / Individual Developer	When required

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Performance indicator*	*Responsibility*	*Frequency of Action*
			Plant according to the layout and planting techniques specified by the Landscape Architect in the Landscape Development Plans for the site. 4) Alien and invasive plants must be removed.			
		Spread of weeds	Ensure that materials used for mulching and topsoil/ fertilisers are certified weed free. Collect certifications where available. Control weeds growth that appears during construction.	Weed growth controlled	Landscape architect Contractor	When required
		To ensure rehabilitation of the site	1) Compacted soils shall be ripped at least 200mm; 2) All clumps and rocks larger than 30mm diameter shall be removed from the soil to be rehabilitated; 3) The soil shall be leveled before seeding; 4) Watering shall take place at least once per day for the first 14 days until germination of seeds have taken place; 5) Thereafter watering should take place at least for 20 minutes every 4 days until grass have hardened off.	Grass have hardened off	Landscape architect Contractor	Once a day Then every 4 days

4.3 Operational Phase

TYPE	*Environmental risk or issue*	*Objective or requirement*	*Mitigation measure*	*Responsibility*	*Frequency of Action*
SITE CLEAN UP AND PREPARED FOR USE	**Storm water pollution**	Do not allow any materials to wash into the storm water system.	Remove erosion and sediment controls only if all bare soil is sealed, covered or re-vegetate. Sweep roadways clean and remove all debris from kerb and gutter areas. Do not wash into drains.	Contractor	-
		Minimise waste	Decontaminate and collect waste in storage area ready for off-site recycling or disposal. Arrange for final collection and removal of excess and waste materials.	Contractor	-
ESTABLISHING PLANTS	**Slow or no re-vegetation to stabilise soil; loss or degradation of habitat**	To ensure re-vegetation to stabilize soil	Agreed schedule for regular follow-up watering, weed control, mulch supplements and amenity pruning, if needed. Replace all plant failures within three month period after planting.	Contractor	To be agreed
MATERIALS FAILURE	***Structural damage. Loss of site materials.***		Inspect all structures monthly to detect any cracking or structural problems. Confirm with designer if there are design problems. Rectify with materials to match, or other agreed solution.	Contractor	-
DRAINAGE FAILURE	**The flooding of structures and basements etc, due to drainage failure**	To ensure effective storm water management on site during the operational phase	All site drainage works should be inspected and maintained on a continues basis.	Maintenance contractor	
SITE AUDIT	***Eventual***	Successful	Routinely audit the works and adjust	Contractor	-

TYPE	***Environmental risk or issue***	***Objective or requirement***	***Mitigation measure***	***Responsibility***	***Frequency of Action***
	project failure	project establishment	maintenance schedule accordingly.		
GENERAL			Open fires and smoking during maintenance works are strictly prohibited.	Contractor Maintenance Contractor	-
			No waste material shall at any stage be disposed of on adjacent properties.	Contractor, Maintenance Contractor	
			Disturbed areas will be rehabilitated and re-vegetated. All declared weeds and invaders should be removed from the open space areas on an ongoing basis.	Landscape Contractor	

5 Procedures for environmental incidents

5.1 Leakages & spills

- Identify source of problem.
- Stop goods leaking, if safe to do so.
- Contain spilt material, using spills kit or sand.
- Notify Environmental Control Officer
- Remove spilt material and place in sealed container for disposal (if possible).
- Environmental Control Officer to follow Incident Management Plan.

5.2 Failure of erosion/sediment control devices

- Prevent further escape of sediment.
- Contain escaped material using silt fence, hay bales, pipes, etc.
- Notify ECO.
- Repair or replace failed device as appropriate.
- Dig/scrape up escaped material; take care not to damage vegetation.
- Remove escaped material from site.
- ECO to follow Incident Management plan.
- Monitor for effectiveness until re-establishment.

5.3 Bank/slope failure

- Stabilize toe of slope to prevent sediment escape using aggregate bags, silt fence, logs, hay bales, pipes, etc.
- Notify ECO.
- ECO to follow Incident Management plan.
- Divert water upslope from failed fence.
- Protect area from further collapse as appropriate.
- Restore as advised by ECO.
- Monitor for effectiveness until stabilized.

5.4 Discovery of rare or endangered species

- Stop work.
- Notify ECO.
- If a plant is found, mark location of plants.
- If an animal, mark location where sighted.
- ECO to identify or arrange for identification of species and or the relocation of the species if possible.
- If confirmed significant, ECO to liaise with Endangered Wildlife Trust.
- Recommence work when cleared by ECO.

5.5 Discovery of archeological or heritage items

- Stop work.
- Do not further disturb the area.
- Notify ECO.
- ECO to arrange appraisal of specimen.
- If confirmed significant, ECO to liaise with National, Cultural and History Museum.
  P.O. Box 28088
  SUNNYSIDE
  0132
  Contact Mr. J. van Schalkwyk
  or
  Mr.Naude

- Recommence work when cleared by ECO.

6 EMPr review

1. The Site supervisor is responsible for ensuring the work crew is complying with procedures, and for informing the work crew of any changes. The site supervisor is responsible for ensuring the work crew is aware of changes that may have been implemented by GDARD before starting any works.

2. If the contractor cannot comply with any of the activities as described above, they should inform the ECO with reasons within 7 working days.

Appendix I

Other information

Appendix Ii

Company Profile and EAP CV

Landscape Architects &
Environmental consultants

P.O.BOX 11375
Maroelana
0161

Tel: (012) 346 3810
Fax: (086) 570 5559

E-mail: lizelle@bokamoso.net
reception@bokamoso.net
Website: www.bokamoso.net

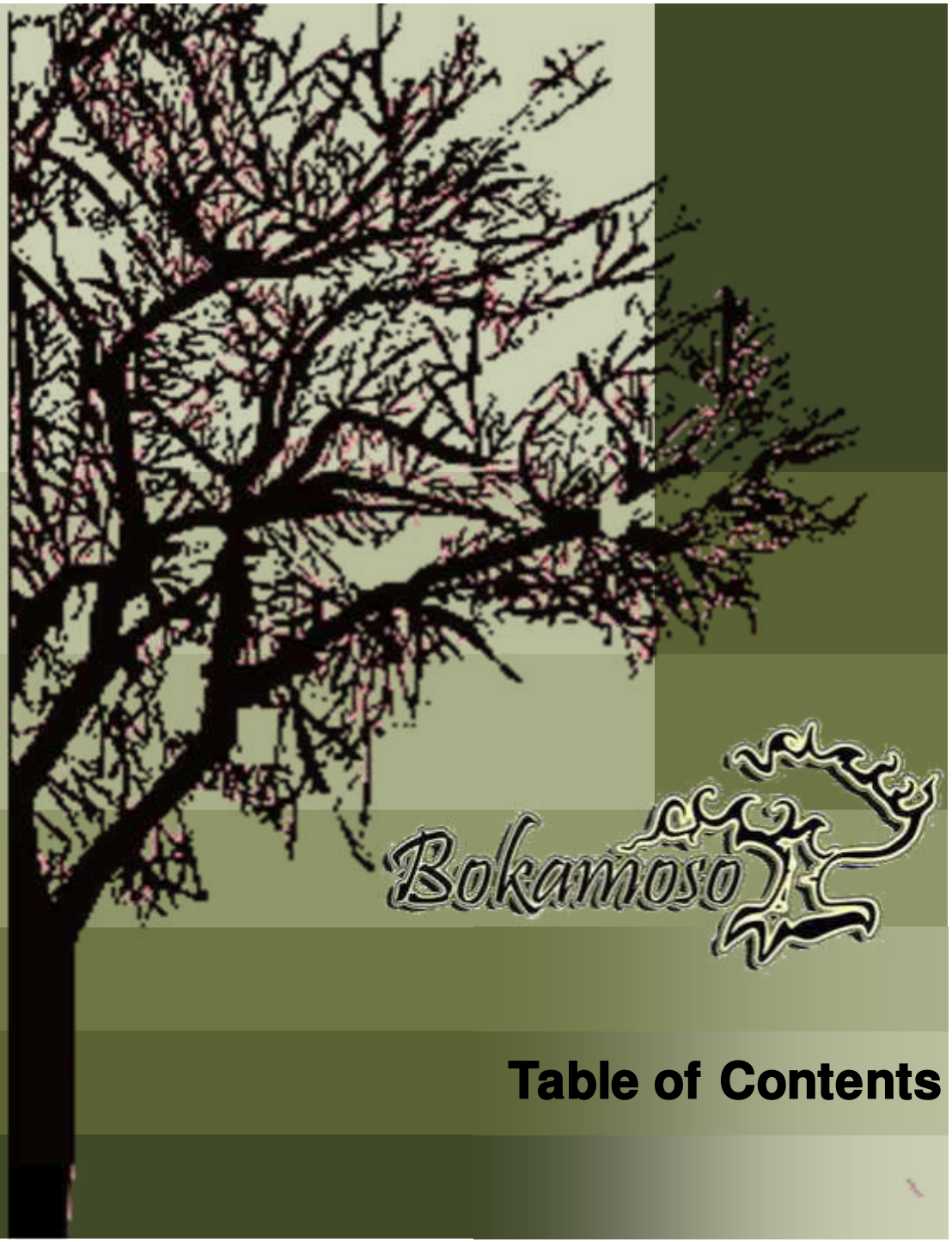
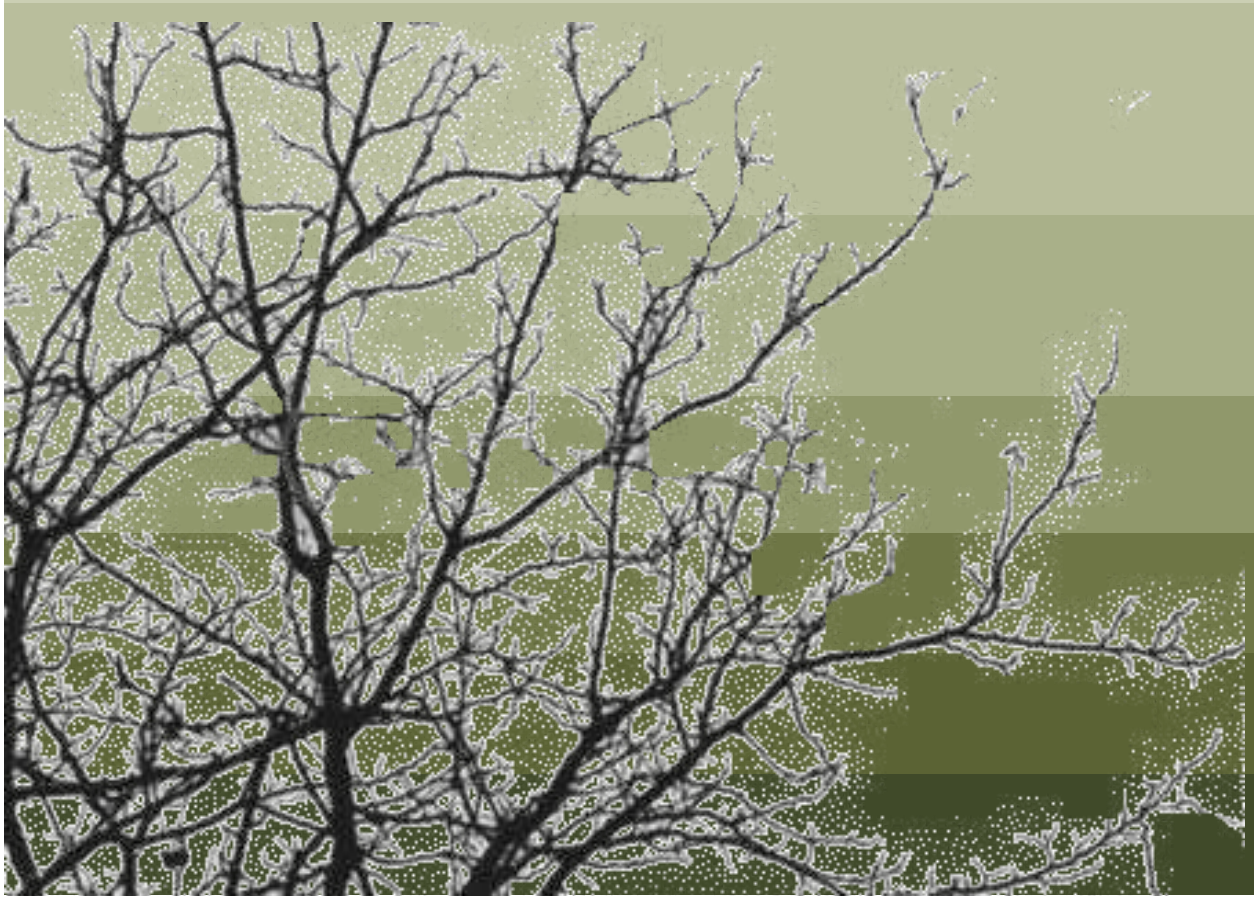


Table of Contents

Bokamoso specialises in the fields of Landscape Architecture and all aspects of Environmental Management and Planning. Bokamoso was founded in 1992 and has shown growth by continually meeting the needs of our clients. Our area of expertise stretches throughout the whole of South Africa. Our projects reflect the competence of our well compiled team. The diversity of our members enables us to tend to a variety of needs. Our integrated approach establishes a basis for outstanding quality. We are well known to clients in the private, commercial as well as governmental sector.

At Bokamoso we stand on a firm basis of environmental investigation in order to find unique solutions to the requirements of our clients and add value to their operations.



Bokamoso

01 Executive Summary

011 Company Overview

Vision:

At Bokamoso we strive to find the best planning solutions by taking into account the functions of a healthy ecosystem. Man and nature should be in balance with each other.

Mission:

We design according to our ethical responsibility, take responsibility for successful completion of projects and constitute a landscape that contributes to a sustainable environment. We add value to the operations of our clients and build long term relationships that are mutually beneficial.

Values:

Integrity

Respect

Bokamoso

Bokamoso stands on the basis of fairness. This include respect within our multicultural team and equal opportunities in terms of gender, nationality and race.

We have a wide variety of projects to tend to, from complicated reports to landscape installation. This wide range of projects enables us to combine a variety of professionals and skilled employees in our team.

Bokamoso further aids in the development of proficiency within the working environment. Each project, whether in need of skilled or unskilled tasks has its own variety of facets to bring to the table.

We are currently in the process of receiving our BEE scorecard. We support transformation in all areas of our company dynamics.

Bokamoso

03 Human Resources

031 Employment Equity

Lizelle Gregory (100% interest)

Lizelle Gregory obtained a degree in Landscape Architecture from the University of Pretoria in 1992 and passed her board exam in 1995.
Her professional practice number is PrLArch 97078.

Ms. Gregory has been a member of both the Institute for Landscape Architecture in South Africa (ILASA) and South African Council for the Landscape Architecture Profession (SACLAP), since 1995.

Although the existing Environmental Legislation doesn't yet stipulate the academic requirements of an Environmental Assessment Practitioner (EAP), it is recommended that the Environmental Consultant be registered at the International Association of Impact Assessments (IAIA). Ms. Gregory has been registered as a member of IAIA in 2007.

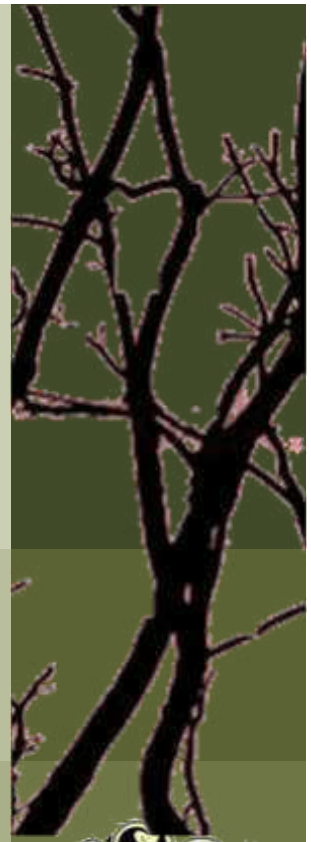
Ms. Gregory attended and passed an International Environmental Auditing course in 2008.
She is a registered member of the International Environmental Management and Assessment Council (IEMA).

She has lectured at the Tshwane University of Technology (TUT) and the University of Pretoria (UP). The lecturing included fields of Landscape Architecture and Environmental Management.

Ms. Gregory has more than 20 years experience in the compilation of Environmental Evaluation Reports:
Environmental Management Plans (EMP);
Strategic Environmental Assessments;
All stages of Environmental input ;
EIA under ECA and the new and amended NEMA regulations and various other Environmental reports and documents.

Ms. Gregory has compiled and submitted more than 600 Impact Assessments within the last 5-6 years. Furthermore, Ms. L. Gregory is also familiar with all the GDARD/Provincial Environmental policies and guidelines. She assisted and supplied GAUTRANS/former PWV Consortium with Environmental input and reports regarding road network plans, road determinations, preliminary and detailed designs for the past 12 years.

Consulting



Anè Agenbacht

Introduction to Sustainable Environmental Management—An overview of Principles, Tools,& Issues (Potch 2006)
Leadership Training School (Lewende Woord 2010)
BA Environmental Management (UNISA 2011)
PGCE Education (Unisa 2013) - CUM LAUDE
Project Manager
More than 10 years experience in the compilation of various environmental reports

Mary-Lee Van Zyl

MSc Plant Science (UP)
BSc (Hons) Plant Science (UP)
BSc Ecology (UP)
More than 3 years working experience in the Environmental field
Specialises in ECO works, Basic Assessments, EIA's, and Flora Reports
Compilation of various Environmental Reports

Dashentha Moodley

BA (Hons) Degree in Environmental Management (UNISA) - CUM LAUDE
Bachelor of Social Science in Geography & Environmental Management (UKZN)
More than 6 years experience in WUL Applications & Integrated Environmental Management within water resource management.
Senior Environmental Practitioner & Water Use Licence Consultant
Specialises in Water Use License & Compilation of various Env. Reports

Adéle Drake

BA Geography & History (UP)
NQF Level 7 Air Quality Management (UJ)
More than 15 years experience in the field of Environmental Management within Mining Industry (surface and underground), Forestry Industry, Renewable Energy Industry (WEF), and Environmental Consulting. Also ISO 14000, ISO 9000, and Safety Management Auditor.

Ronell Kuppen

BSc (Hons) in Geography (UNISA)
BA Environmental and Development (UKZN)
More than 5 years experience in Environmental Consulting
Specializing in WUL Applications, Waste License Applications, EIAs, Basic Assessments, Public Participations, Borrow Pits

Bokamoso

Ben Bhukwana

BSc Landscape Architecture (UP)
More than 6 years experience in the field of Landscape Architecture (Design, Construction, Implementation, and Management).
Specialises in landscape design, ECO, rehabilitation plans and compilation various environmental reports and compilation of tender documents

Juanita de Beer

Diploma Events Management and Marketing (Damelin)
Specializes in Public relations and Public Participation Processes (4 years experience)
Specialises in compiling various environmental reports

Alfred Thomas

CIW Foundation& Internet Marketing (IT Academy)
12 years experience in GIS and IT in general.
GIS Operator and Multimedia Specialist.

Bianca Reyneke

Applying SHE Principles and Procedures (NOSA)
Intro to SAMTRAC Course (NOSA)
SHEQ Coordinator and compilation of environmental reports
Specialises in compiling various environmental reports

A.E. van Wyk

BSc Environmental Sciences (Zoology and Geography)
Specialises in compiling various environmental reports

Elsa Viviers

Interior Decorating (Centurion College)
(Accounting/ Receptionist) and Secretary to Lizelle Gregory

Loura du Toit

N. Dip. Professional Teacher (Heidelberg Teachers Training College)
Librarian and PA to the Project Manager

Merriam Mogalaki

Administration Assistant with in-house training in bookkeeping

Landscape Contracting

Elias Maloka

Assisting with Public Participations and Office Admin
Site manager overseeing landscape installations.
Irrigation design and implementation.
Landscape maintenance
More than 18 years experience in landscape construction works.

The contracting section compromises of six permanently employed black male workers.
In many cases the team consists of up to 12 workers, depending on the quantity of work.

Bokamoso

In-house Specialists

Corné Niemandt

MSc Plant Science (UP 2015) – Cum Laude
BSc (Hons) Zoology (UP 2012)
BSc Ecology (UP 2011)
Specialises in ecological surveys and report writing
Compilation of fauna and flora specialist reports
GIS: Generating maps

Garth van Rooyen

BSc (Hons) Environmental Soil Science
BSc Geology
Soil and Wetland Specialist

Bokamoso

01 Environmental Management Services

- Basic Assessment Reports
- EIA & Scoping Reports
- Environmental Management Plans
- Environmental Scans
- Strategic Environmental Assessments
- EMP for Mines
- Environmental Input and Evaluation of Spatial Development Frameworks
- State of Environmental Reports
- Compilation of Environmental Legislation and Policy Documents
- Environmental Auditing and Monitoring
- Environmental Control Officer (ECO)
- Visual Impact assessments
- Specialist Assistance with Environmental Legislation Issues and Appeals
- Development Process Management
- Water Use License applications to DWA
- Waste License Application

Bokamoso

04 Services

041 Consulting Services

02 Landscape Architecture

- Master Planning
- Sketch Plans
- Planting Plans
- Working Drawings
- Furniture Design
- Detail Design
- Landscape Development Frameworks
- Landscape Development Plans (LDP)
- Contract and Tender Documentation
- Landscape Rehabilitation Works

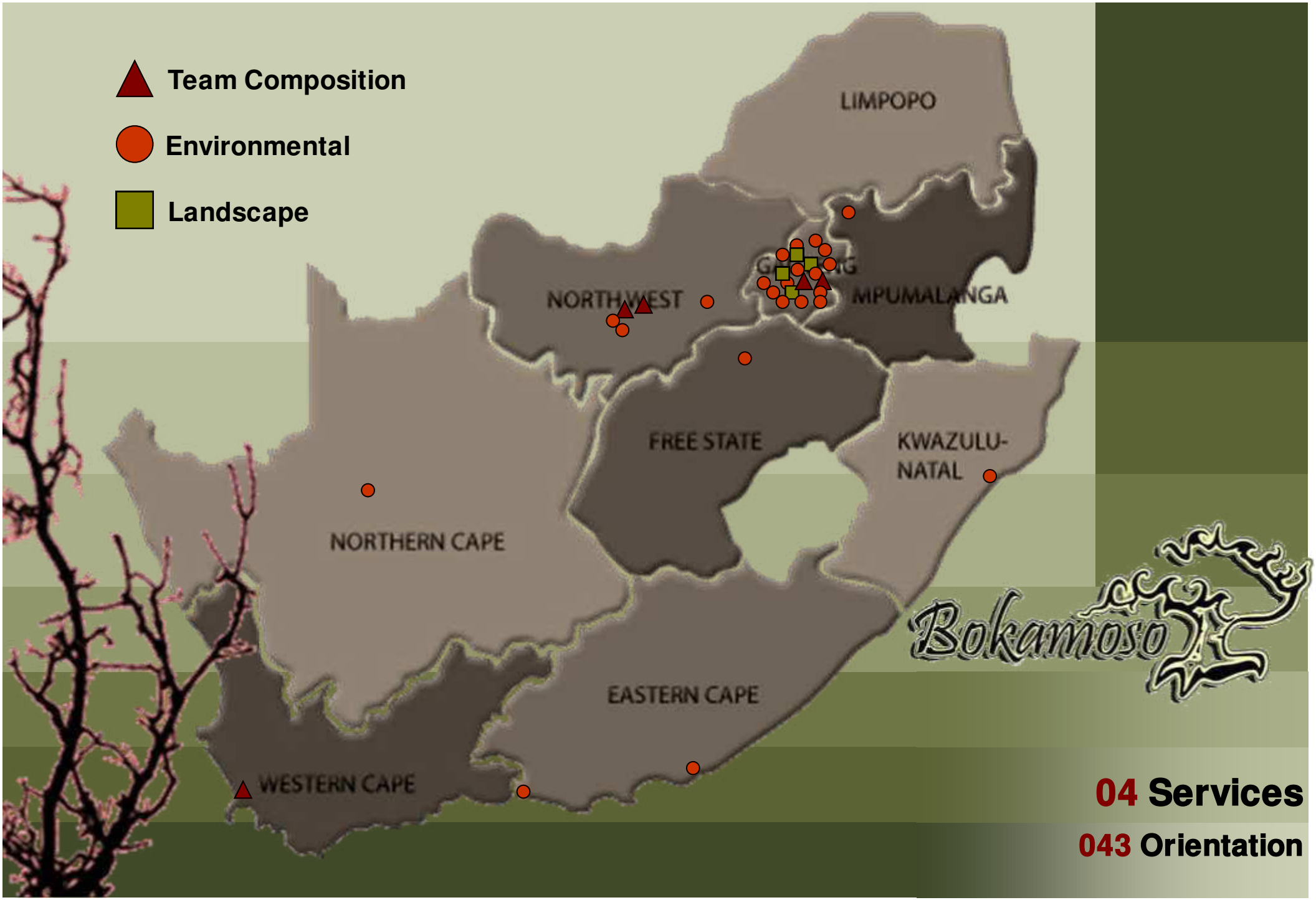
03 Landscape Contracting

Implementation of Plans for:

- Office Parks
- Commercial/ Retail / Recreational Development
- Residential Complexes
- Private Residential Gardens
- Implementation of irrigation systems

04 Services

042 Contracting Services


Team Composition
Environmental
Landscape
LIMPOPO
NORTHWEST
MPUMALANGA
FREE STATE
KWAZULU-
NATAL
NORTHERN CAPE
EASTERN CAPE
WESTERN CAPE
Bokamoso
04 Services
043 Orientation

01 Valpre Bottling Plant, Heidelberg

project

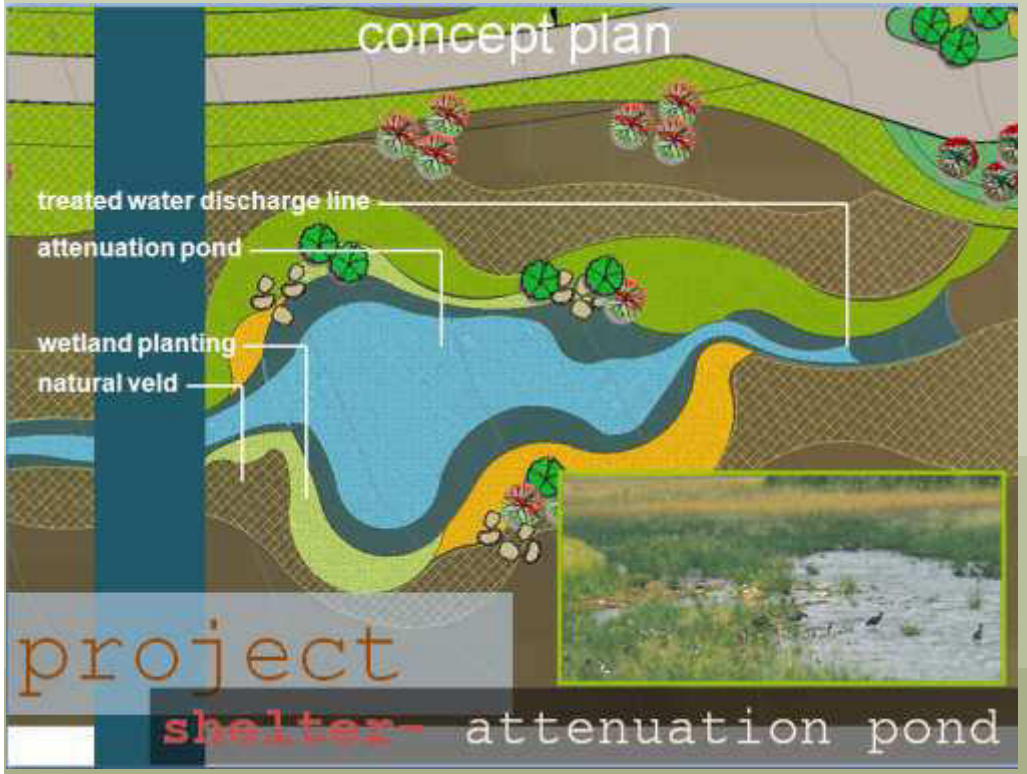
shelter– site plan

Bokamoso

05 Landscape Projects– Current

051 Commercial

01 Valpre Bottling Plant, Heidelberg



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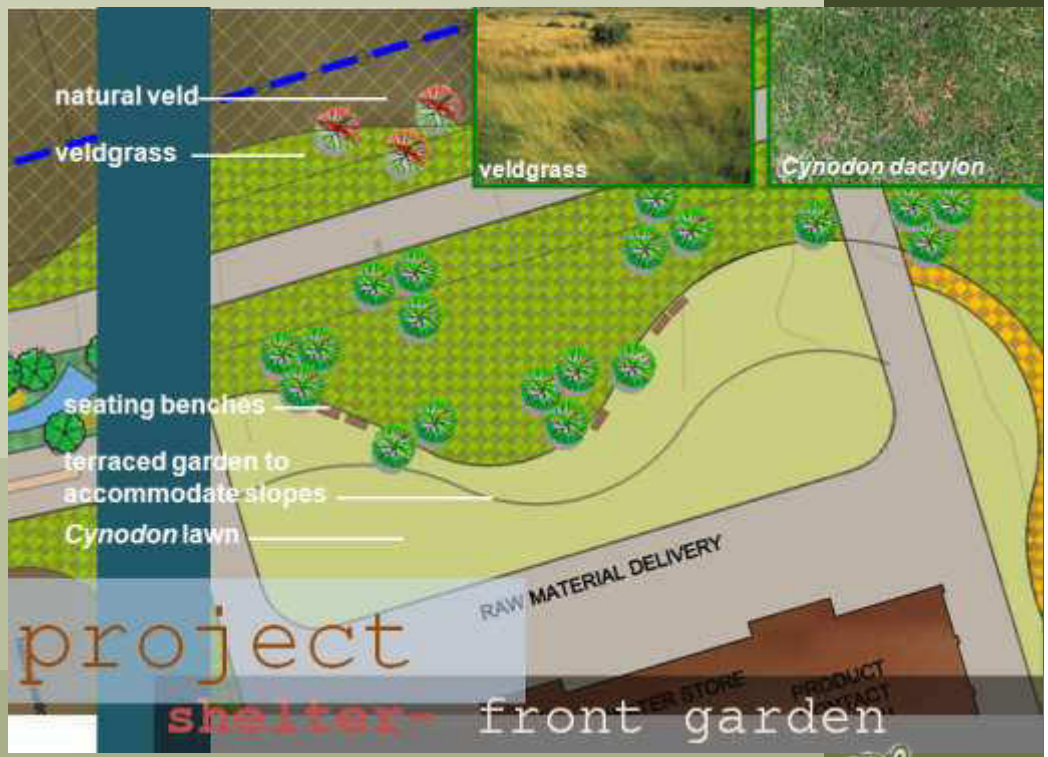
05 Landscape Projects– Current

051 Commercial

01 Valpre Bottling Plant, Heidelberg



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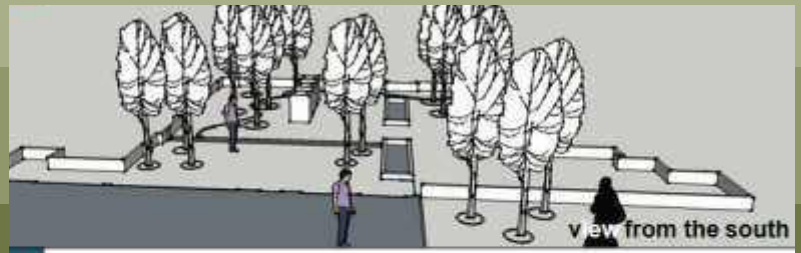
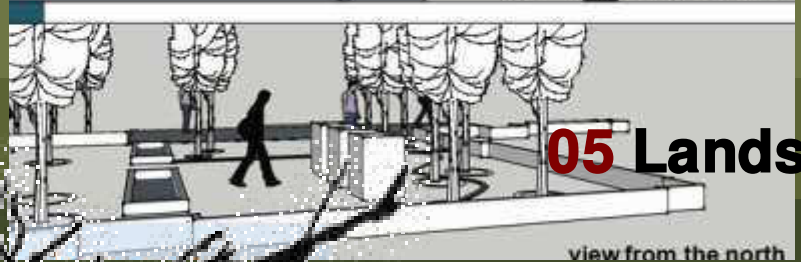
05 Landscape Projects– Current

051 Commercial

01 Valpre Bottling Plant, Heidelberg





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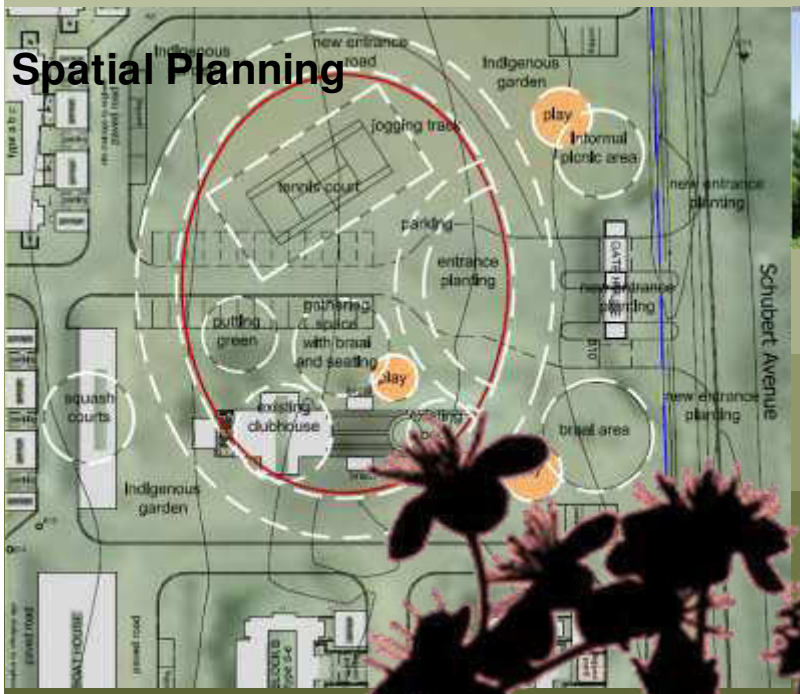
05 Landscape Projects– Current

051 Commercial

02 Melodie Waters, Hartebeespoortdam

Spatial Planning



Streetscape

Indigenous Planting

Bokamoso

05 Landscape Projects – Current

052 Commercial/Recreational

02 Melodie waters, Hartebeestpoortdam

Development Framework

Rehabilitation

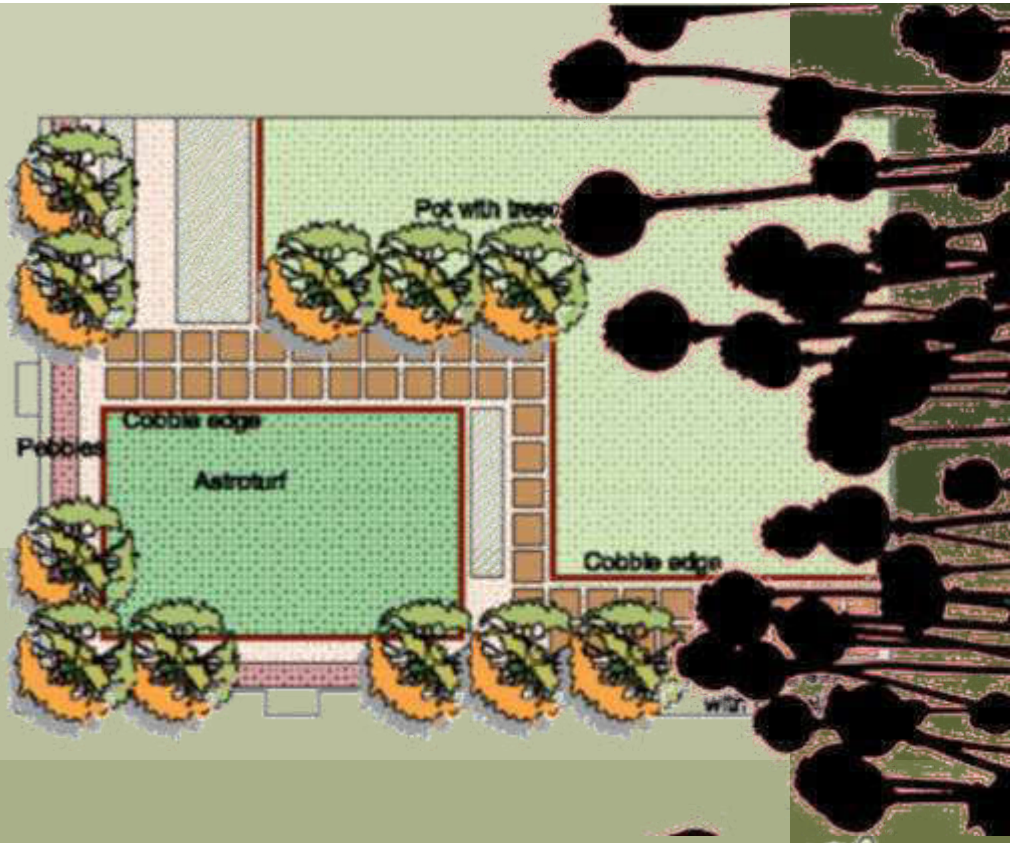
Area Layout

Bokamoso

05 Landscape Projects– Current

052 Commercial/Recreational

03 Grain Building, Pretoria

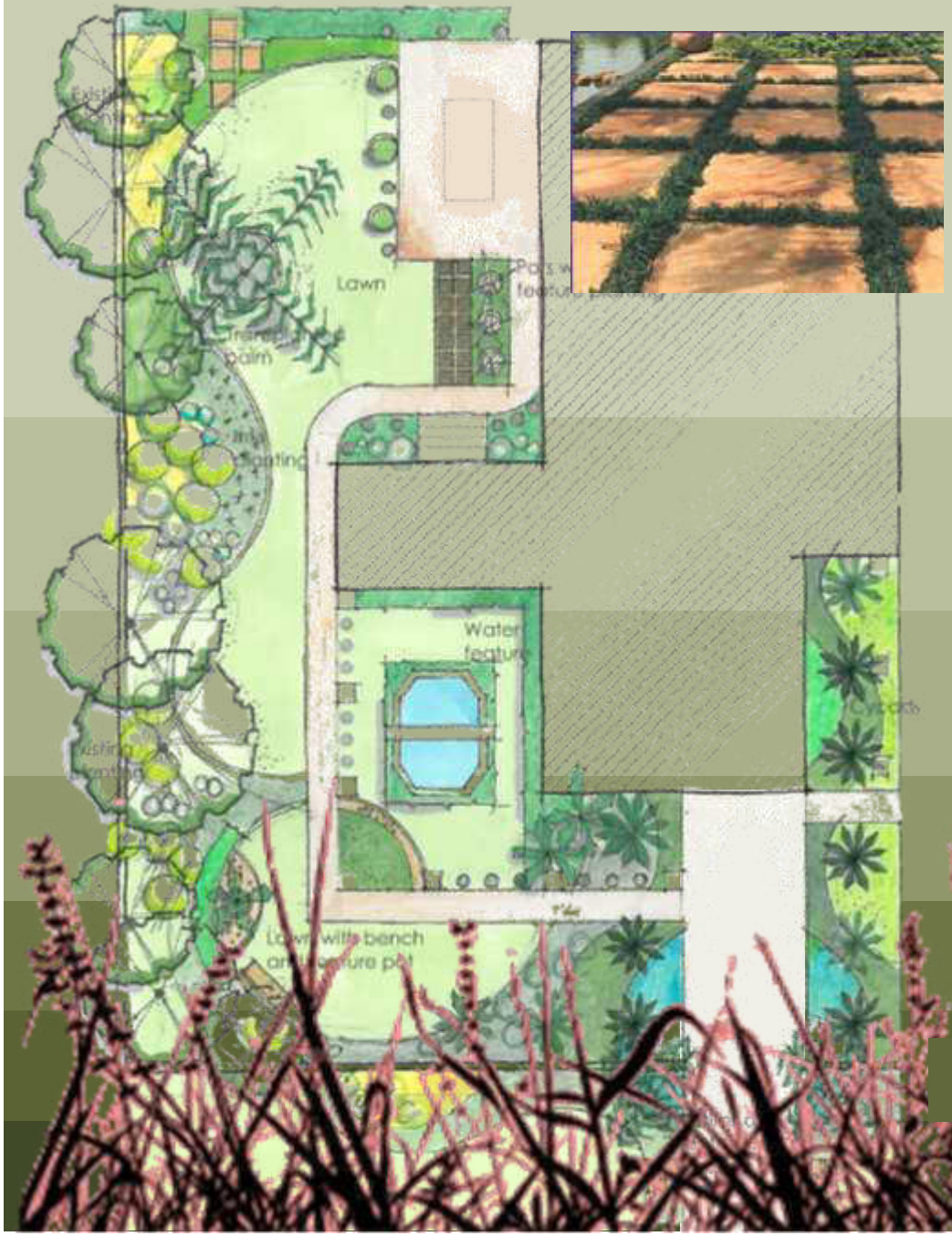


Bokamoso

05 Landscape Projects– Completed

053 Offices

04 Ismail Dawson offices, Pretoria



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05 Landscape Projects – Conceptual

053 Offices

05 Celtic Manor, Pretoria







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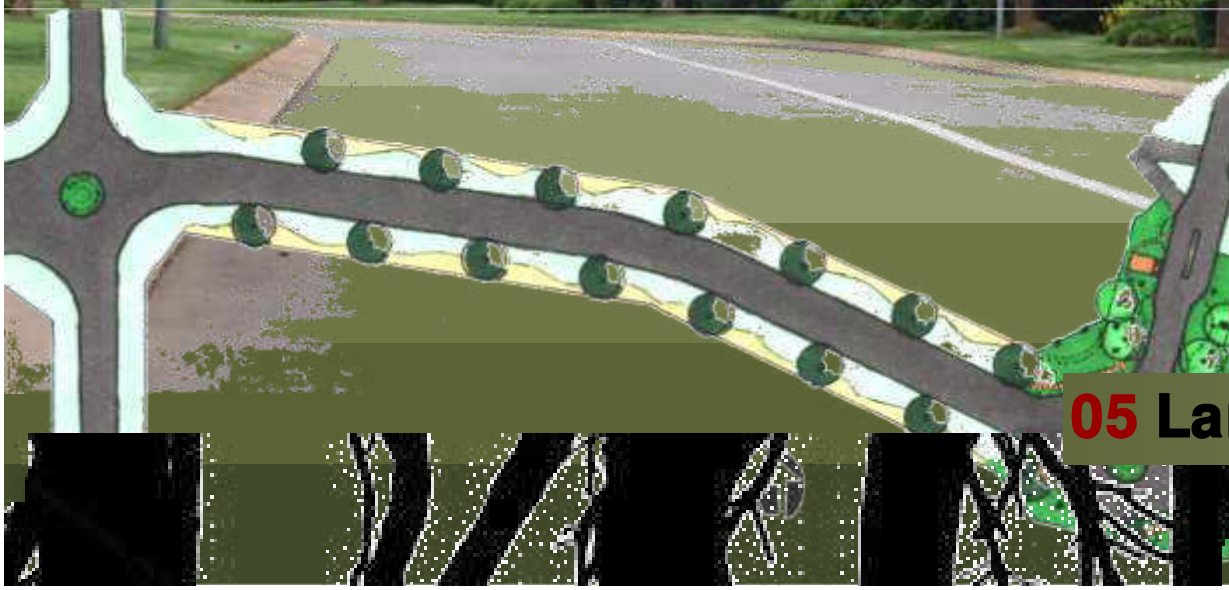
Natural Vegetation Boundary Brick Kerb Kikuyu

05 Landscape Projects - Completed

054 Complex Development

06 The Wilds, Pretoria



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05 Landscape Projects – Completed

054 Complex Development

07 The Wilds, Pretoria

Bokamoso

05 Landscape Projects – Completed

055 Residential

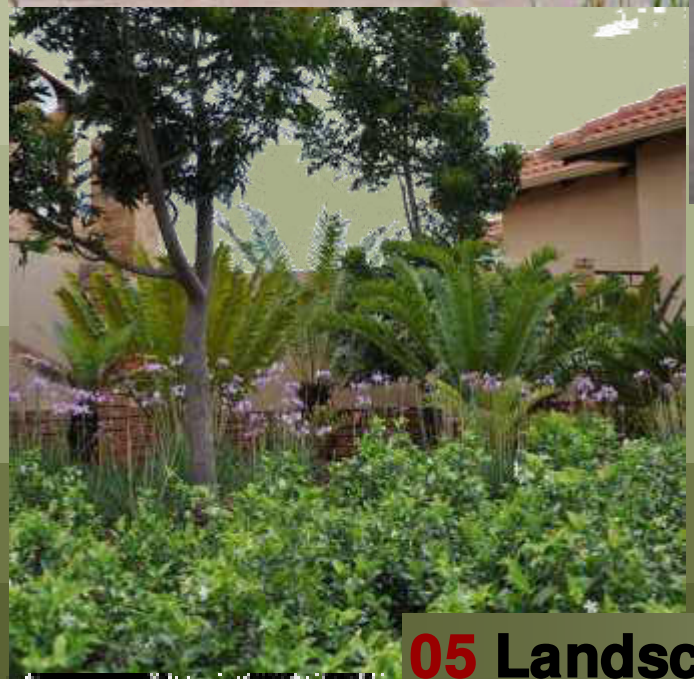
08 The Wilds, Pretoria

Bokamoso

05 Landscape Projects – Completed

055 Residential

09 The Wilds, Pretoria



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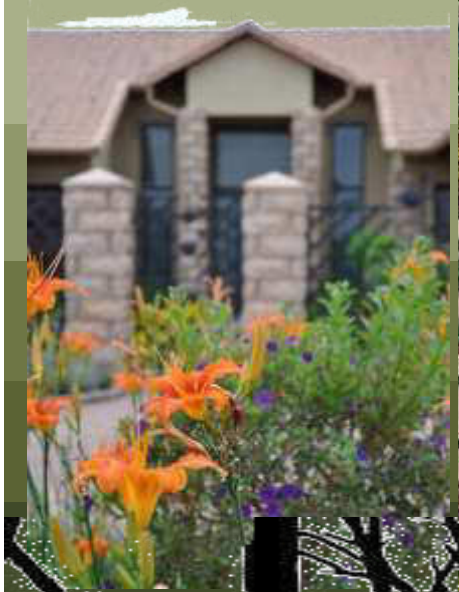
05 Landscape Projects – Completed

055 Residential

010 The Wilds, Pretoria



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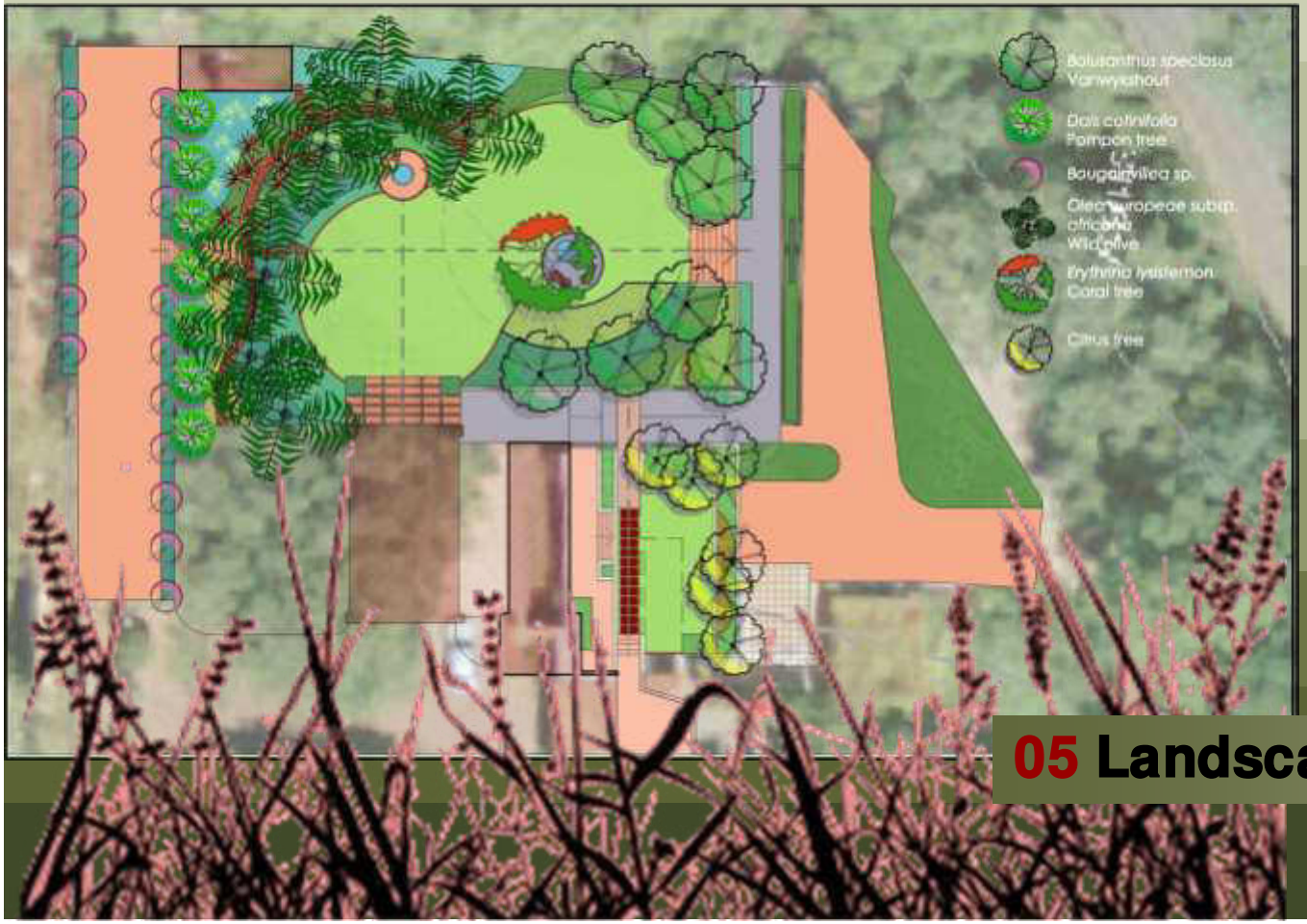
05 Landscape Projects – Completed

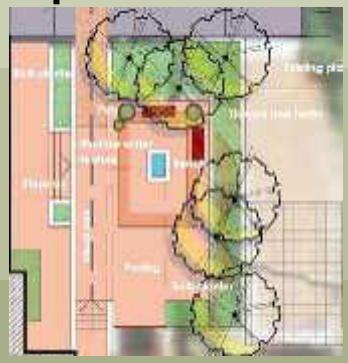
055 Residential

011 Governor of Reserve Bank's Residence, Pretoria

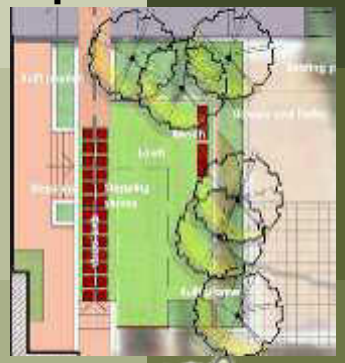
Plant Palette



Option 1



Option 2



Bokamoso

05 Landscape Projects – Conceptual

055 Residential

012 House Ismail, Pretoria







Front Garden

Back Garden



Bokamoso

05 Landscape Projects - Conceptual

055 Residential

013 Forest Garden, Pretoria

Bokamoso

05 Landscape Projects – Completed

055 Residential

015 Forest Garden, Pretoria

Bokamoso

05 Landscape Projects - Completed

055 Residential

01 Safari Garden Expo

Received a Silver Certificate at the Safari Garden Expo, 2010

Bokamoso

06 Corporate Highlights

061 Awards

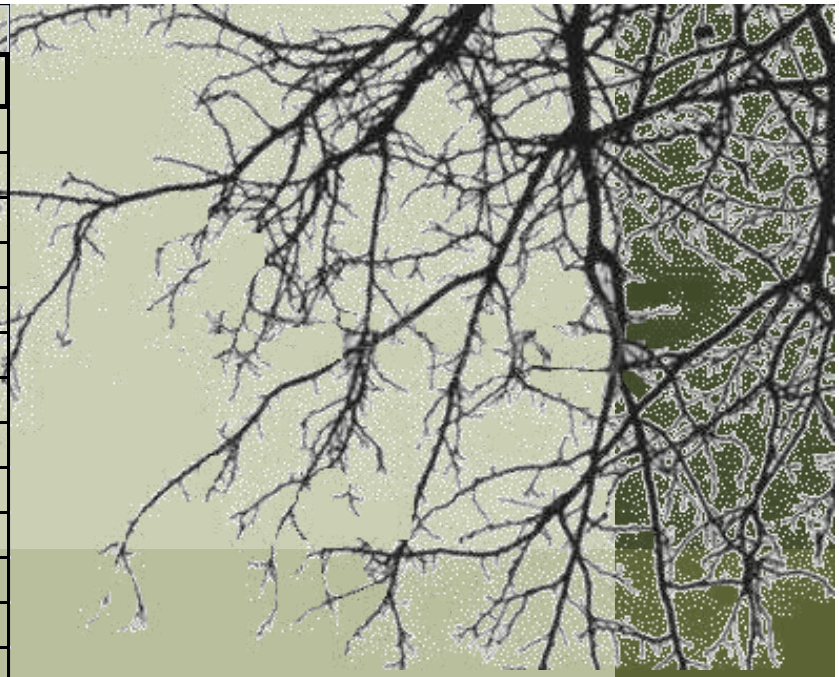
02 UNISA Sunnyside Campus, Pretoria

Best Commercial Paving Plan in Gauteng, 1997

06 Corporate Highlights

061 Awards

Project Name	Status	Project
Environmental Impact Assessment(EIA) and Scoping Report		
Junction 21	ROD	EIA
5 O'clock site access	In Progress	EIA
Bokamoso X 1	In Progress	Scoping & EIA
Doornvallei Phase 6 & 7	In Progress	EIA
Engen Interchange	In Progress	Scoping & EIA
Erasmia X15	In Progress	EIA
Franschkloof	In Progress	EIA
K113	Amendment of ROD	EIA
K220 East	ROD	EIA
K220 West	ROD	EIA
K54 ROD conditions	In Progress	EIA
Knopjeslaagte 95/Peachtree	ROD	EIA
Knopjeslaagte portion 20 & 21	ROD	EIA
Lillieslief/Nooitgedacht	In Progress	EIA
Mooiplaats 70 (Sutherland)	In Progress	EIA
Naauwpoort 1 - 12/Valley View	In Progress	EIA
PeachTree X5	In Progress	EIA
Strydfontein 60	In Progress	EIA
Thabe Motswere	In Progress	Scoping & EIA
Vlakplaats	In Progress	EIA
Waterval Valley	In Progress	EIA
Environmental Opinion		
Doornkloof 68 (Ross)	In Progress	Opinion
Monavoni X 53	In Progress	BA & Opinion
Mooikloof (USN)	In Progress	Opinion
Norwood Mall/Sandspruit	In Progress	Opinion
Riversong X 9	In Progress	Opinion
Sud Chemie	In Progress	Opinion
USN Benjoh Fishing Resort	In Progress	Opinion



The adjacent list host the status of our current projects. Only a selected amount of projects are displayed.

Bokamoso

07 Current Environmental Projects

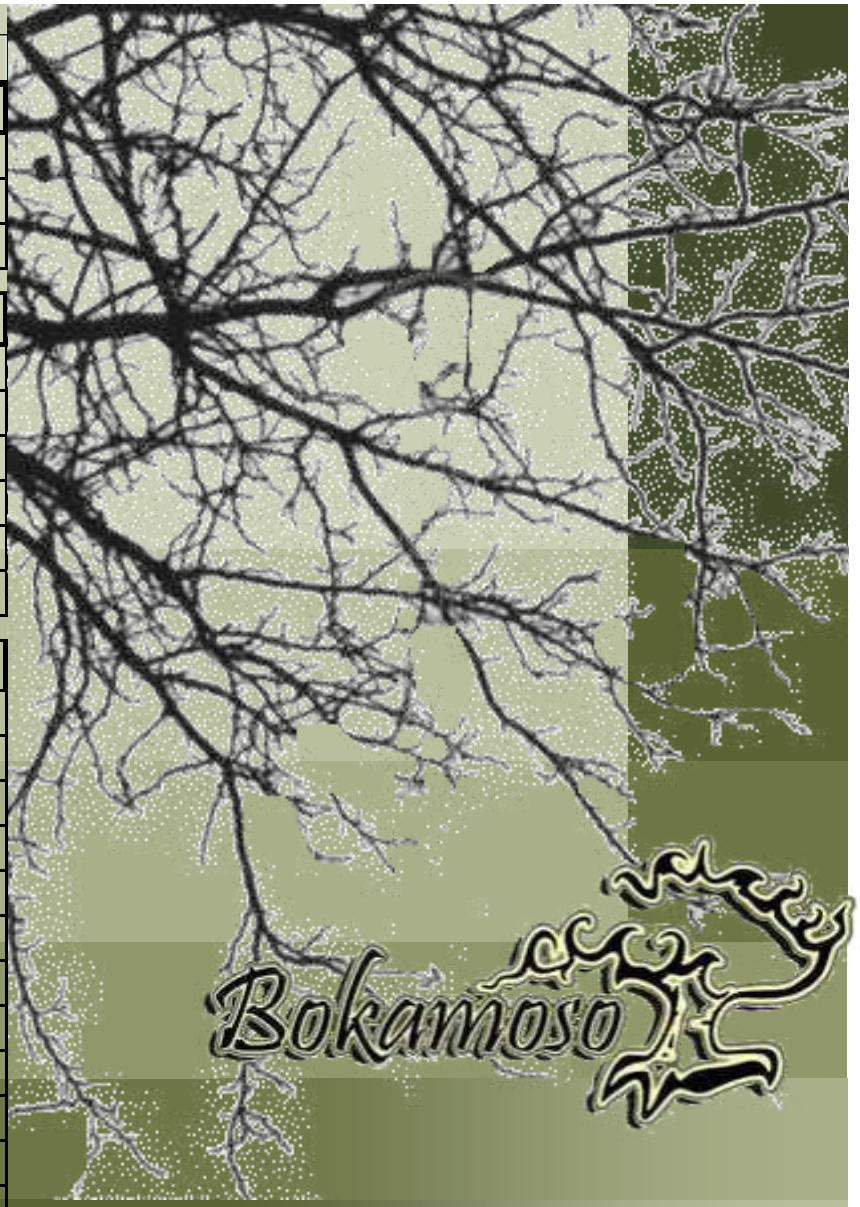
071 EIA, Scoping& Opinion

Project Name	Status	Project
Basic Assessment(BA)		
Annlin X 138	In Progress	BA
Clubview X 29	ROD	BA
Darrenwood Dam	In Progress	BA
Durley Holding 90 & 91	In Progress	BA
Elim	In Progress	BA
Fochville X 3	In Progress	BA
Hartebeeshoek 251	In Progress	BA
Klerksdorp (Matlosana Mall)	In Progress	BA
Monavoni External Services	ROD	BA
Monavoni X 45	Amendment of ROD	BA
Montana X 146	In Progress	BA
Rooihuiskraal X29	In Progress	BA
Thorntree Mall	In Progress	BA
Environmental control officer (ECO)		
Grace Point Church	In Progress	ECO
R 81	In Progress	ECO
Highveld X 61	In Progress	ECO
Mall of the North	In Progress	ECO
Olievenhoutbosch Road	In Progress	ECO
Orchards 39	In Progress	ECO
Pierre van Ryneveld Reservoir	In Progress	ECO
Project Shelter	In Progress	ECO
S24 G		
Wonderboom	In Progress	S24 G
Mogwasi Guest houses	Completed	S24 G

07 Current Environmental Projects

072 BA, ECO & S24 G

Project Name	Status	Project
Objection		
Colesberg WWTW	In Progress	Objection
Nigel Steelmill	Completed	Objection
Chantilly Waters	Completed	Objection
Development facilitation Act- Input (DFA)		
Burgersfort	In Progress	DFA & BA
Doornpoort Filling Station	In Progress	DFA & EIA & Scoping
Eastwood Junction	In Progress	DFA
Ingersol Road (Erf 78, 81 - 83)	In Progress	DFA
Roos Senekal	In Progress	DFA & EIA & Scoping
Thaba Meetse 1	In Progress	DFA & EIA & Scoping
Water Use License Act (WULA)		
Britstown Bulk Water Supply	In Progress	WULA
Celery Road / Green Channel	In Progress	WULA
Clayville X 46	In Progress	WULA
Dindingwe Lodge	In Progress	WULA
Doornpoort Filling Station	In Progress	WULA+DFA+EIA+SC
Eco Park Dam	In Progress	WULA
Groote Drift Potch	In Progress	WULA
Jozini Shopping Centre	In Progress	WULA+BA
K60	Completed	WULA
Maloto Roads	In Progress	WULA
Kwazele Sewage Works	In Progress	WULA
Monavoni External Services	In Progress	WULA+BA
Nyathi Eco Estate	In Progress	WULA
Prairie Giants X 3	In Progress	WULA
Waveside Water Bottling Plant	Completed	WULA



07 Current Environmental Projects

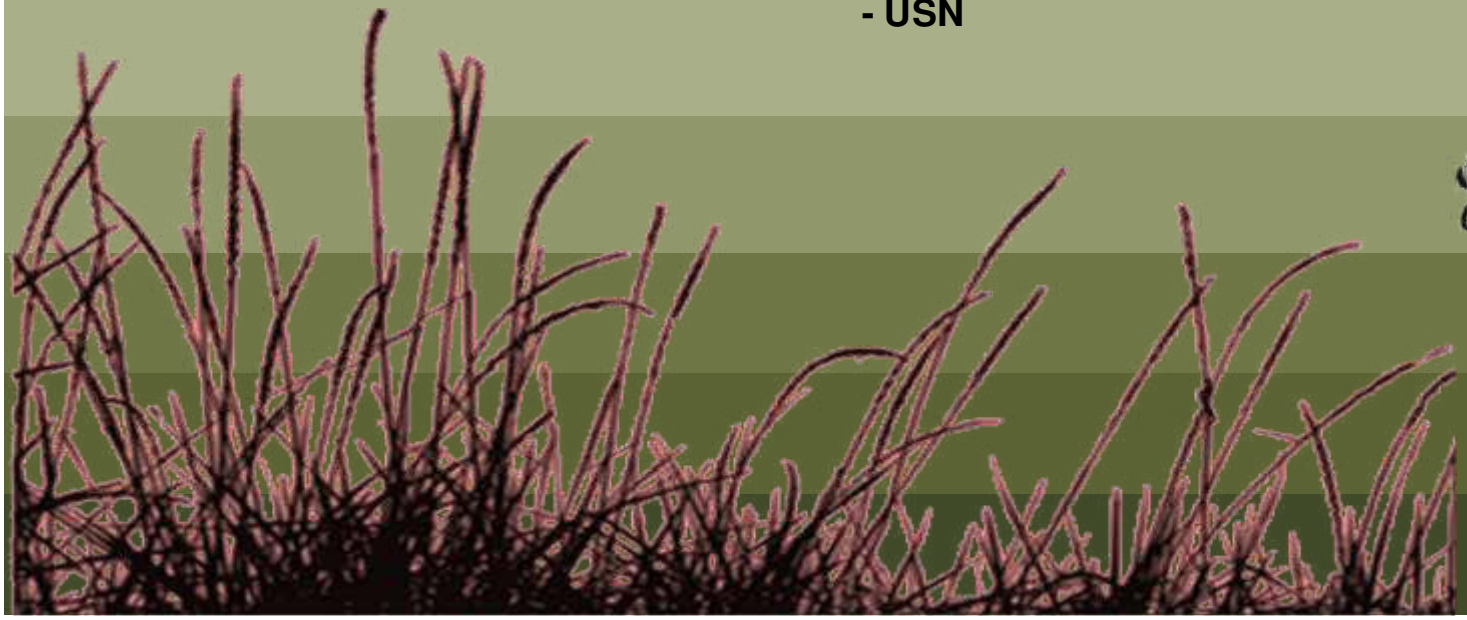
073 Objection, DFA & WULA

Project Name	Status	Project
Environmental Management Plan(EMP)		
Heidelberg X 12	ROD	EMP
Monavoni Shopping Centre	Completed	EMP
Forest Hill Development	Completed	EMP
Weltevreden Farm 105KQ	Completed	EMP+EIA
Raslouw Holding 93	Completed	EMP+BA
Durley Development	Completed	EMP+BA
Rooihuiskraal North X 28	Completed	EMP
Rehabilitation Plan		
Norwood Mall/Sandspruit	In Progress	Rehabilitation
Project Shelter Heidelberg	In Progress	Rehabilitation
Sagewood Attenuation Pond	ROD	Rehabilitation
Velmore Hotel	Completed	Rehabilitation
Grace Point Church	Completed	Rehabilitation
Mmamelodi Pipeline	Completed	Rehabilitation
Visual Impact Assessment		
Swatzkop Industrial Developme	Completed	Assessment +DFA
Erasmia	Completed	Assessment
Signage Application		
Menlyn Advertising	Completed	Signage
The Villa Mall	Completed	Signage+EMP+BA

07 Current Environmental Projects

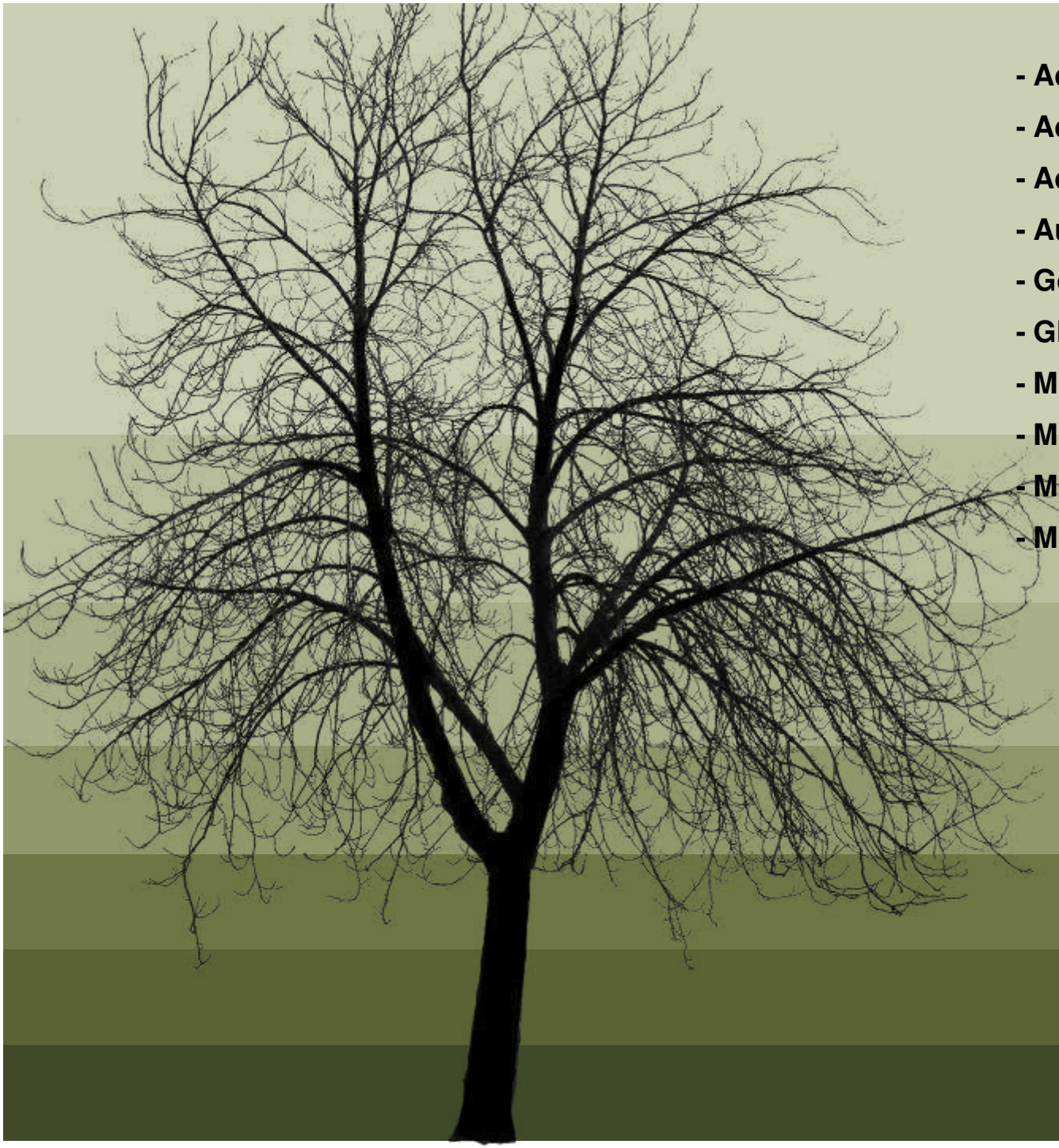
074 EMP, Rehabilitation , Waste Management & Signage Application

- Billion Property Group
- Cavaleros Developments
- Centro Developers
- Chaimberlains
- Chieftain
- Century Property Group
- Coca Cola
- Elmado Property Development
- Flanagan & Gerard
- Gautrans
- Hartland Property Group
- Moolman Group
- MTN
- M&T Development
- Old Mutual
- Property Investment Company
- Petroland Developments
- RSD Construction
- SAND
- Stephan Parsons
- Twin City Developments
- Urban Construction
- USN



Bokamoso

08 Indicative Clients



- Adobe Illustrator CS3
- Adobe Photoshop CS3
- Adobe InDesign CS3
- AutoCAD
- Google SketchUP
- GIS
- Microsoft Office Word
- Microsoft Office Excel
- Microsoft Office Publisher
- Microsoft Office Power Point

Bokamoso

09 Tools

Qualifications And Experience In The Field Of Environmental Planning And Management (Lizelle Gregory (Member Bokamoso)):

Qualifications:

-Qualified as ***Landscape Architect*** *at UP 1991;*
-Qualified as ***Professional Landscape Architect in 1997****;*
-A Registered Member at The ***South African Council for the Landscape Architect Profession (SACLAP)*** *with Practise Number:* ***PrLArch97078****;*
- A Registered Member at the ***International Association for Impact Assessment Practitioners (IAIA)****;*
- Qualified as an ***Environmental Auditor in July 2008*** *and also became a Member of the International Environmental Management Association (IEMAS) in 2008.*

Working Experience:

-Worked part time at Eco-Consult – 1988-1990;
-Worked part time at ***Plan Associates as Landscape Architect in training*** *– 1990-1991;*
-Worked as Landscape Architect at ***Environmental Design Partnership (EDP)*** *from 1992 - 1994*
-Practised under ***Lizelle Gregory Landscape Architects*** *from 1994 until 1999;*
*-****Lectured*** *at Part-Time at* ***UP*** *(1999) – Landscape Architecture and* ***TUT*** *(1998- 1999)- Environmental Planning and Plant Material Studies;*
-Worked as ***part time Landscape Architect and Environmental Consultant at Plan Associates*** *and* ***managed their environmental division for more that 10 years*** *– 1993 – 2008 (assisted the* ***PWV Consortium*** *with various road planning matters which amongst others included environmental Scans, EIA's, Scoping reports etc.)*
-Renamed business as ***Bokamoso in 2000*** *and is the only member of Bokamoso Landscape Architects and Environmental Consultants CC;*
*-****More than 20 years experience in the compilation of Environmental Reports,*** *which amongst others included the compilation of various* ***DFA Regulation 31 Scoping Reports****, EIA's for EIA applications in terms of the applicable environmental legislation, Environmental Management Plans, Inputs for Spatial Development Frameworks, DP's, EMF's etc. Also included EIA Application on and adjacent to mining land and slimes dams (i.e. Brahm Fisherville, Doornkop)*

Qualifications And Experience In The Field Of Landscape Architecture (Lizelle Gregory (Member Bokamoso)):

Landscape Architecture:

-Compiled landscape and rehabilitation plans for more than 22 years.

The most significant landscaping projects are as follows:
-Designed the Gardens of the Witbank Technicon (a branch of TUT). Also supervised the implementation of the campus gardens (2004);
-Lizelle Gregory was the Landscape Architect responsible for the paving and landscape design at the UNISA Sunnyside Campus and received a Corobrick Golden Award for the paving design at the campus (1998-2004);
-Bokamoso assisted with the design and implementation of a park for the City of Johannesburg in Tembisa (2010);
-The design and implementation of the landscape gardens (indigenous garden) at the new Coca-Cola Valpre Plant (2012-2013);
-Responsible for the rehabilitation and landscaping of Juksei River area at the Norwood Shopping Mall (johannesburg) (2012-2013);
-Designed and implemented a garden of more than 3,5ha in Randburg (Mc Arthurpark). Bokamoso also seeded the lawn for the project (more than 2,5 ha of lawn successfully seeded) (1999);
-Bokamoso designed and implemented more than 800 townhouse complex gardens and submitted more than 500 Landscape Development Plans to CTMM for approval (1995 – 2013);
-Assisted with Landscape Designs and the Masterplan at Eco-Park (M&T Developments) (2005-2011);
-Bokamoso designed and implemented an indigenous garden at an office park adjacent to the Bronberg. In this garden it was also necessary to establish a special garden for the Juliana Golden Mole. During a recent site visit it was established that the moles are thriving in this garden. Special sandy soils had to be imported and special indigenous plants had to be established in the natural section of the garden.

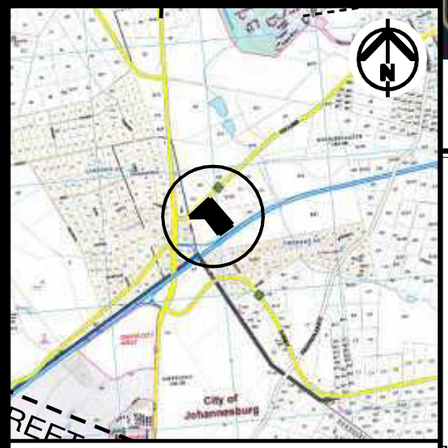
-Lizelle Gregory also owns her own landscape contracting business**. For the past 20 years she trained more than 40 PDI jobless people (sourced from a church in Mamelodi)** to become landscape contracting workers. All the workers are (on a continuous basis) placed out to work at nurserys and other associated industries;
-Over the past 20 years the Bokamoso team compiled more than 800 landscape development plans and also implemented most of the gardens. Bokamoso also designed and implemented the irrigation for the gardens (in cases where irrigation was required). Lizelle regarded it as important to also obtain practical experience in the field of landscape implementation.

Appendix Iii

Enlarged Figures

PROPOSED TOWNSHIP: PEACH TREE EXTENSION 23

LOCALITY MAP 1:20 000



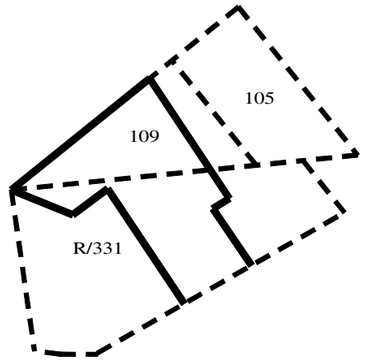
urban innovate

URBAN INNOVATE CONSULTING CC

TEL: 012 460-0670
FAX: 086 592 9974
E-MAIL: info@urbaninnovate.co.za
www.urbanonnovate.co.za

PO BOX 27011
MONUMENT PARK
0105

GEOTECHNICAL ZONES



THIS IS TO CERTIFY THAT THE TOWNSHIP LAYOUT ON THE PLAN IS IN ACCORDANCE WITH THE PROVISIONS AND RECOMMENDATIONS AS SET OUT IN THE GEOTECHNICAL INVESTIGATION FOR THE PROPOSED TOWNSHIP.

GEOTECHNICAL ZONES:

ZONE	DESCRIPTION
P-C2-S2	THE ENTIRE SITE IS ZONED - NHBRC ZONE P(FILL)-C2-S2

FLOOD LINE CERTIFICATION

1 : 50 AND 1 : 100 YEAR FLOODS

I HEREBY CERTIFY THAT IN TERMS OF SECTION 144 OF THE NATIONAL WATER ACT, ACT OF 1996, IT IS HEREBY CERTIFIED THAT THE TOWNSHIP IS NOT SUBJECT TO A FLOOD WITH AN EXPECTED FREQUENCY OF 1 : 50 YEARS AND 1 : 100 YEARS.

GENERAL NOTE:

1. CONTOURS: SUPPLIED BY ISAZI SURVEYS LAND SURVEYORS.
   1,00m INTERVALS
   DATUM: SEA LEVEL
   SYSTEM WGS
   THE CONTOURS ARE IN ACCORDANCE WITH REGULATION 18(1) OF THE TOWN-PLANNING AND TOWNSHIPS ORDINANCE, 1986
2. ALL DIMENSIONS AND AREAS ARE APPROXIMATE PENDING FINAL SURVEY.
3. PROPOSED PHASES SUBJECT TO CHANGE.
4. REPRESENTS A GEOTECHNICAL ZONE LINE.
5. REPRESENTS A LINE OF NO ACCESS.
6. REPRESENTS THE RELEVANT BUILDING LINES.

SERVITUDE NOTE:

1. EXISTING SERVITUDES TO BE INCORPORATED IN THE DESIGN OF THE TOWNSHIP.
2. PROPOSED 5m WIDE WATER SERVITUDE OVER ERVEN 9 AND 10.
3. PROPOSED ROW SERVITUDE OVER ERVEN 9 AND 10.

PLAN No: PEACH TREE X23/1 **DATE:** AUG 2016

LAND USE

USE ZONE	ERF NUMBERS	TOT. NO. OF ERVEN	MIN. ERF SIZE (m²)	AVERAGE	TOTAL AREA (Ha)	
"INDUSTRIAL 2" FOR BUSINESS BUILDINGS, COMMERCIAL USE, LIGHT INDUSTRY, CAFETERIA, CAR WASH, PLACE OF REFRESHMENT, PARKING GARAGE, RETAIL INDUSTRY AND SHOPS.	1 - 7	7	N/A	N/A	10,8900	92,52
"SPECIAL" FOR ACCESS AND ACCESS CONTROL	8, 9	2	N/A	N/A	0,8800	7,48
EXISTING STREETS AND WIDENING	N/A	N/A	N/A	N/A	N/A	N/A
	TOTAL	9			11,7700	100,00

SITUATED ON PART OF PORTION 109 AND REM/331 OF THE FARM KNOPJESLAAGTE 385-JR.
REPRESENTED BY THE FIGURE A-B-C-D-E-F-G-H-J-K-L-M-N-O-P-Q-R-S-A

CITY OF TSHWANE METROPOLITAN MUNICIPALITY, GAUTENG

PORTION 107
KNOPJESLAAGTE 385-JR

PORTION 106
KNOPJESLAAGTE 385-JR

PORTION 11
KNOPJESLAAGTE

PEACH TREE X21

PEACH TREE X22

PEACH TREE X24

PORTION 105
KNOPJESLAAGTE 385-JR

PORTION 109
KNOPJESLAAGTE 385-JR

PORTION 914

R/PORTION 331
KNOPJESLAAGTE 385-JR

REM/PTN 22
KNOPJESLAAGTE 385-JR

PORTION 4
AIE 392-JR

58
NIA A.H.

157

M34 KRUGERSDORP PRETORIA ROAD

N14-HIGHWAY (P158/2)

16m BUILDING LINE

PROPOSED 25m STREET

PROPOSED 20m STREET

PROPOSED 20m STREET

PROPOSED 20m STREET

PROPOSED 20m STREET

PROPOSED 20m STREET

5m WIDE R.O.W SERVITUDE

5m WIDE WATER PIPELINE SERVITUDE S.G.No. 1004B/2007

20m R.O.W SERVITUDE (FUTURE ROAD)

30m BUILDING LINE

20m BUILDING LINE

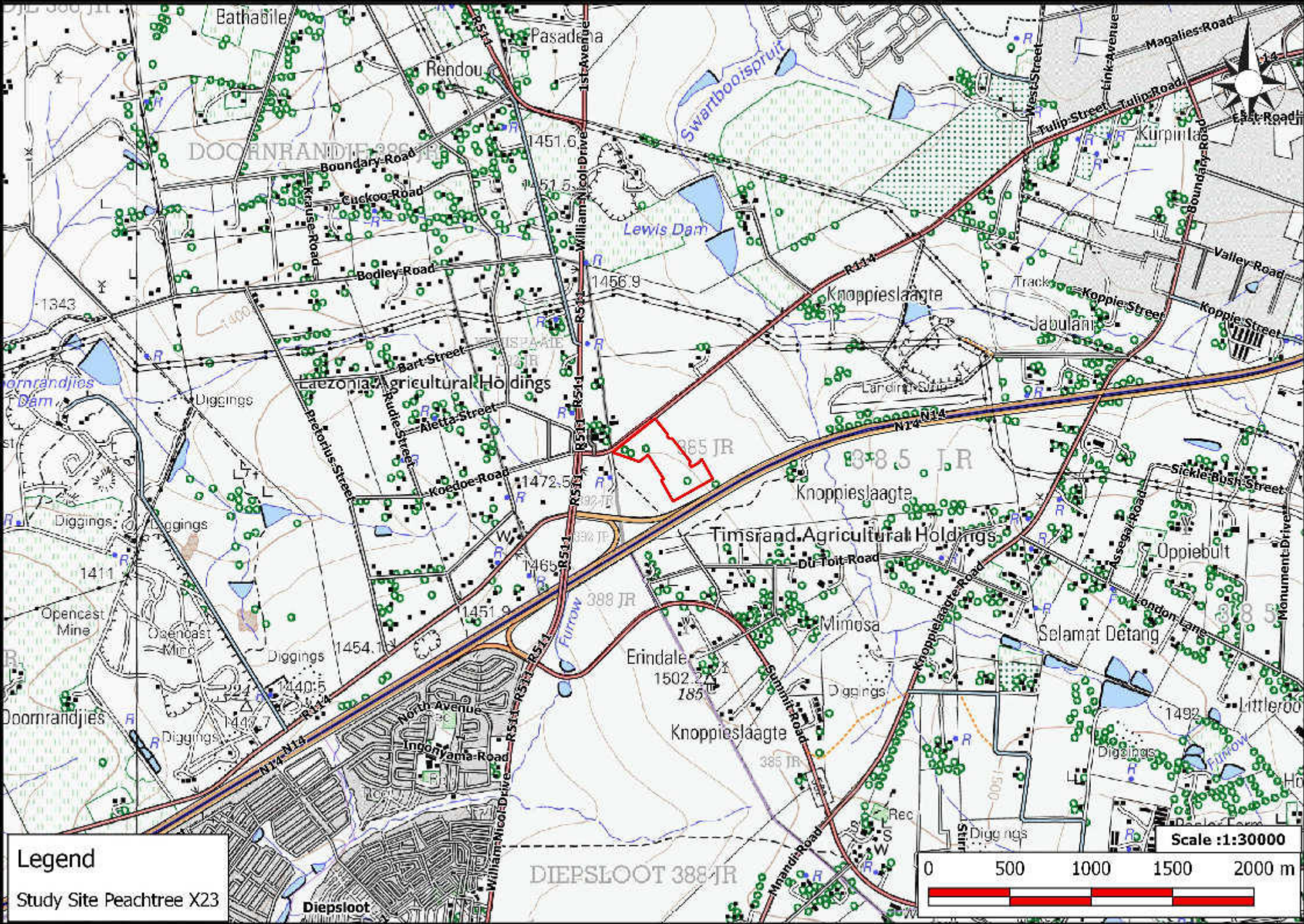
1 1,9485 Ha
2 1,7940 Ha
3 1,3350 Ha
4 1,1090Ha
5 1,0770 Ha
6 1,7915 Ha
7 1,8265 Ha
8 0,4760 Ha
9 0,4000 Ha

A B C D E F G H J K L M N O P Q R S

X 2866500 X 2866800 X 2867100

Y 97200 Y 96900 Y 96600 Y 96300 Y 96000 Y 95700 Y 95600 Y 95500

N
SCALE 1 : 3000
0 20 40 60 100m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Study Site Peachtree X23
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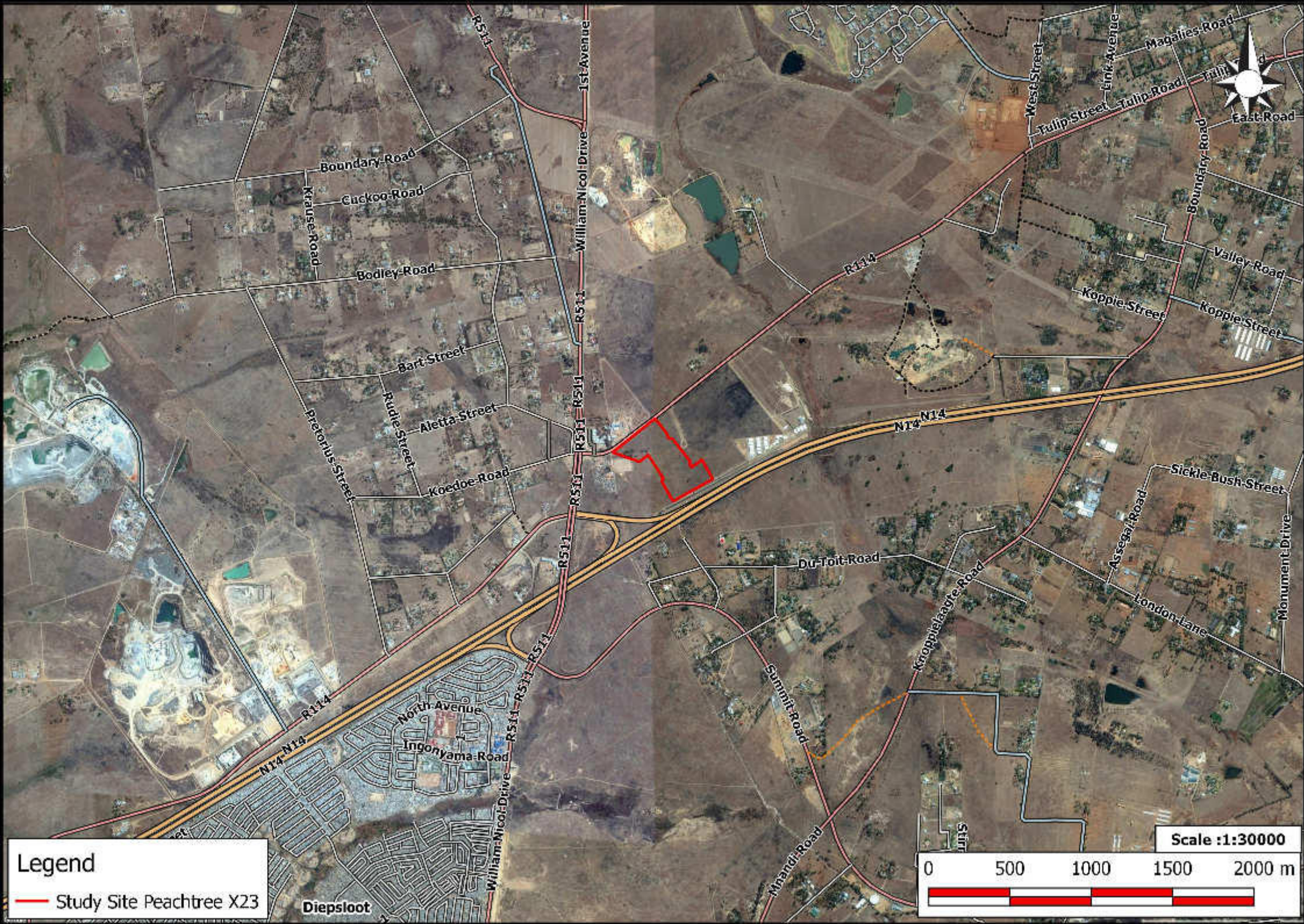
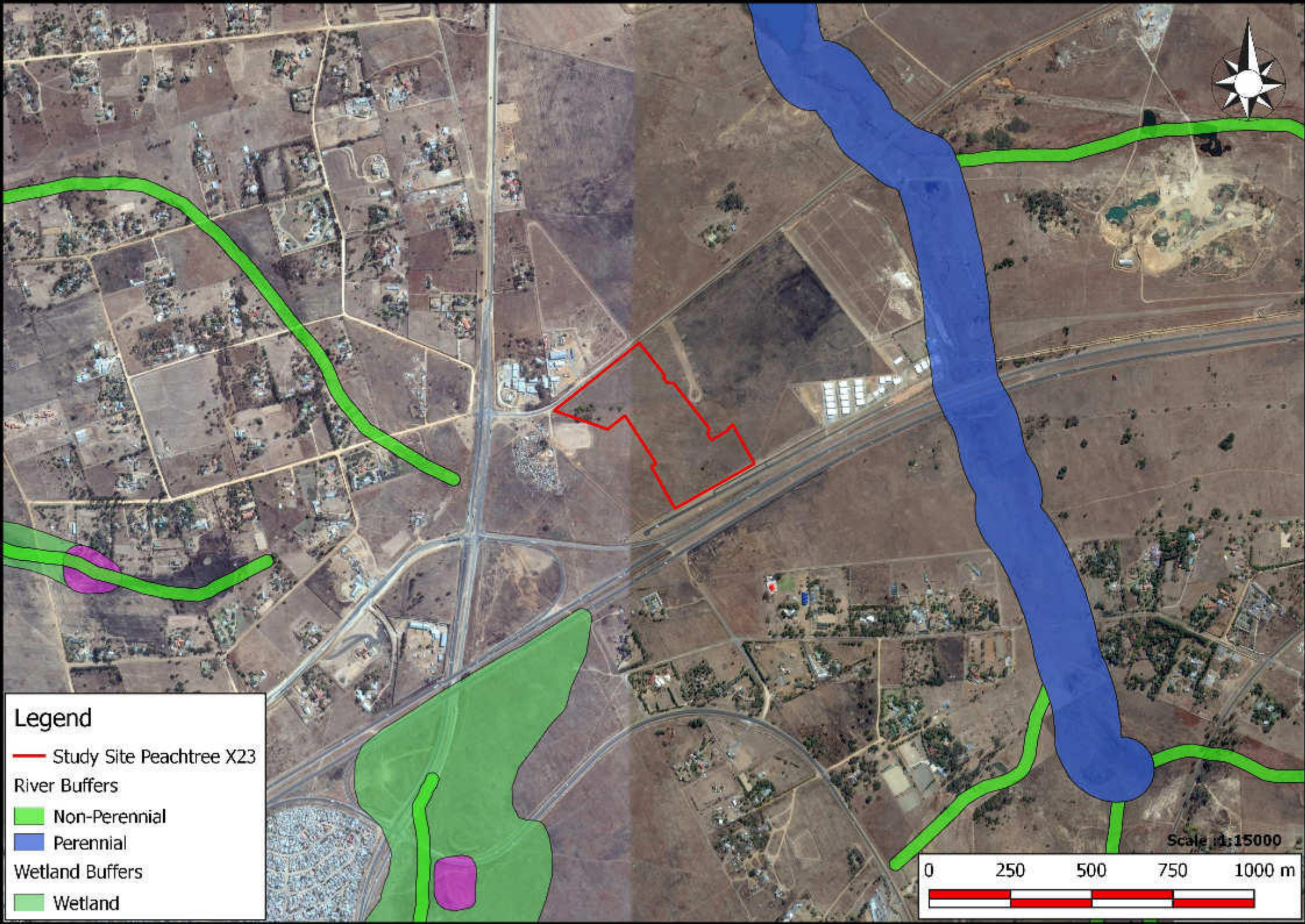
0
500
1000
1500
2000 m
Bathadile
Pasadena
Rendou
Swartbooispruit
Lewis Dam
DOORNRANDJIE 386 JR
DIEPSLOOT 388 JR
Boundary Road
Cuckoo Road
Krause Road
Bodley Road
William Nicol Drive
1st Avenue
West Street
Tulip Street
Tulip Road
Magalies Road
East Road
Kurpintal
Valley Road
Koppie Street
Knoppieslaagte
Jabulani
Landing Strip
Bart Street
Laezonia Agricultural Holdings
Rudie Street
Aletta Street
Pretorius Street
Koedoe Road
R114
N14
R511
R514
385 JR
388 JR
Timsrand Agricultural Holdings
Du Toit Road
Assegai Road
Sickle Bush Street
Monument Drive
Oppiebult
Selamat Detang
London Lane
Littleroo
Mimosa
Erindale
Summit Road
Knoppieslaagte Road
Furrow
Diggings
Opencast Mine
North Avenue
Ingonyama Road
Mngandi Road
Diepsloot
Doornrandjies Dam
1343
1411
1451.6
1451.5
1456.9
1472.5
1465
1451.9
1454.1
1440.5
1443.7
1492
1502.2
185


R514
1st Avenue
William Nicol Drive
R511
West Street
Link Avenue
Magalies Road
Tulip Street
Tulip Road
East Road
Boundary Road
Cuckoo Road
Krause Road
Bodley Road
Boundary Road
Valley Road
R114
Koppie Street
Koppie Street
Bart Street
Rudie Street
Aletta Street
Pretorius Street
Koedoe Road
N14
N14
Sickle Bush Street
Assegai Road
Monument Drive
Du Toit Road
Kroppielaagte Road
London Lane
Summit Road
North Avenue
Ingonyama Road
R114
N14
N14
Mnandi Road
Diepsloot
Legend
Study Site Peachtree X23
Scale :1:30000
0
500
1000
1500
2000 m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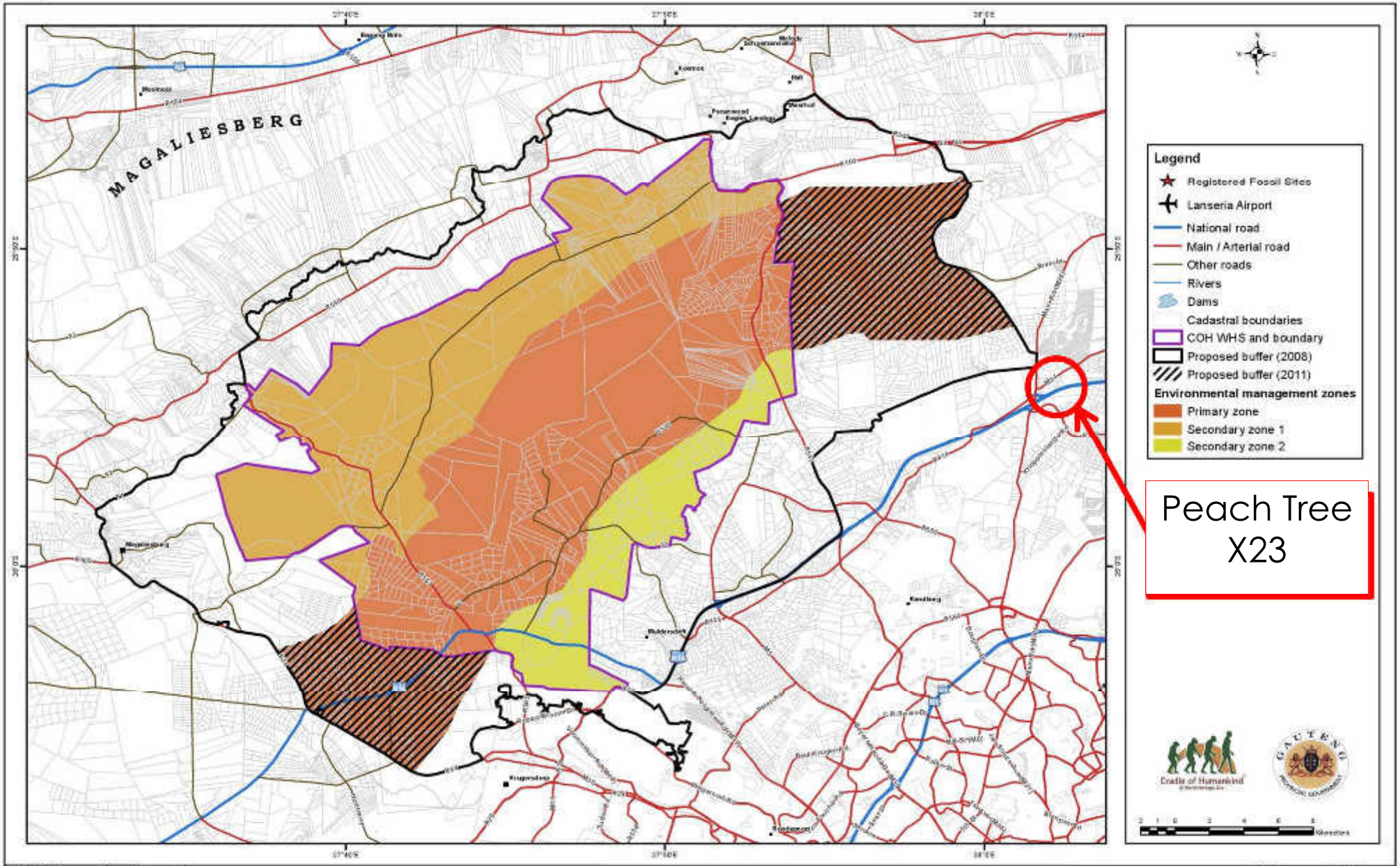
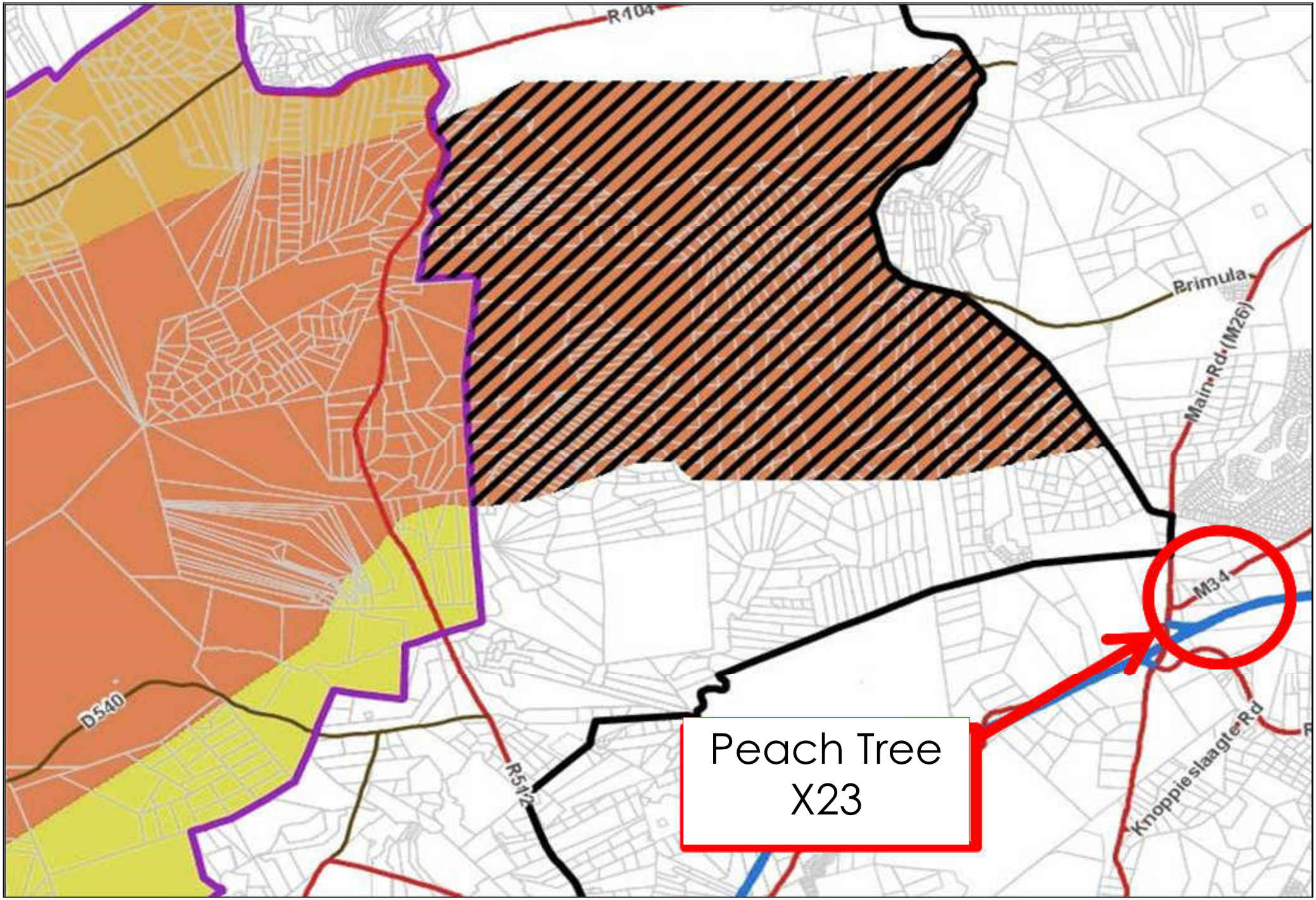
Study Site Peachtree X23
River Buffers
Non-Perennial
Perennial
Wetland Buffers
Wetland
Scale 1:15000
0
250
500
750
1000 m

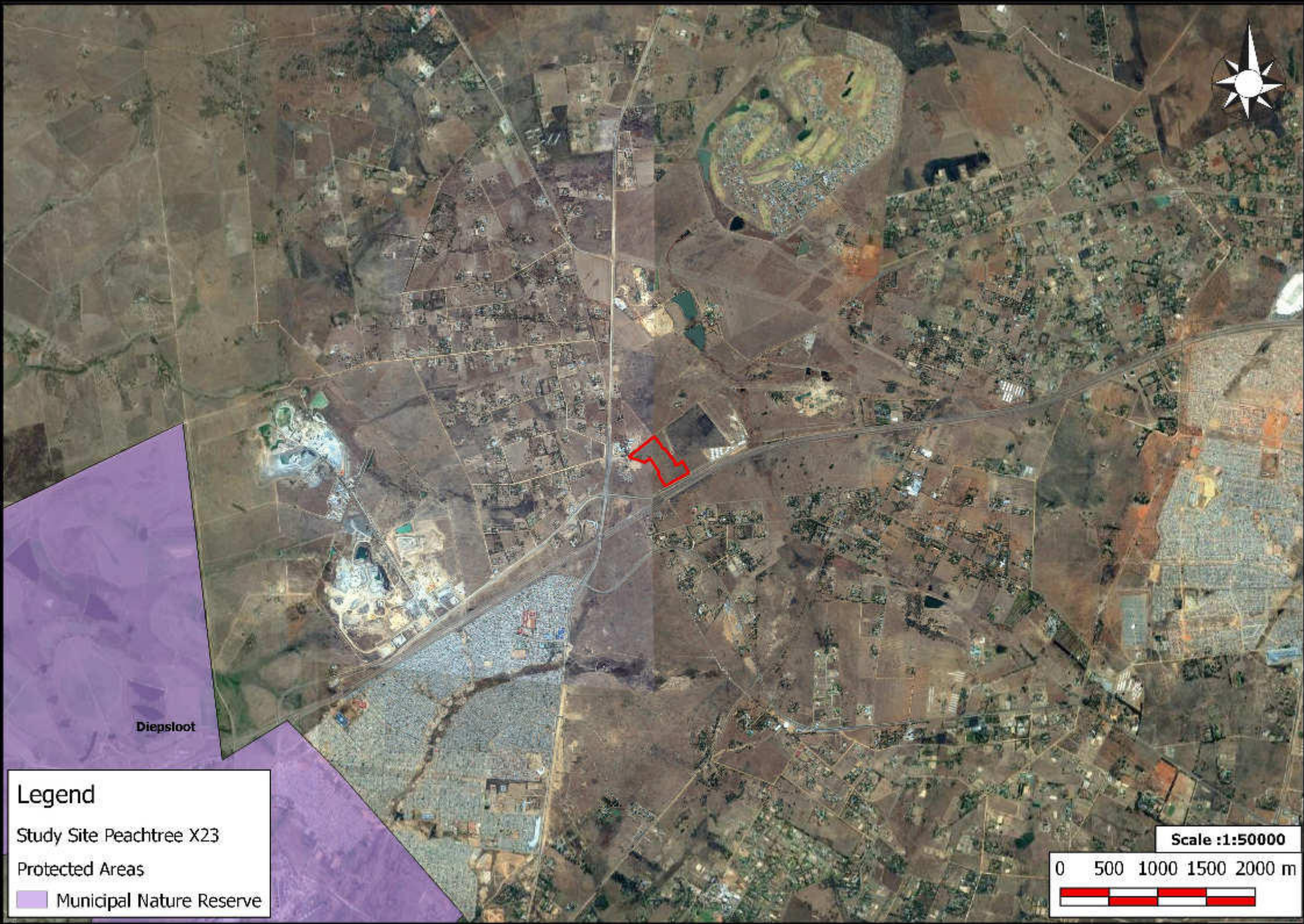
SRK Consulting
Engineers and Scientists



PROJECT NO.	DATUM		DATE	SCALE
382239	PROJECTION: Geographic	ENVIRONMENTAL MANAGEMENT ZONES FOR THE COH WHS AND PROPOSED BUFFER ZONES (2011)	06/01/2011	1:200,000
			COMPILED BY: ELSA	MAP NO. 6

Path: J:\Proj\382239_Cradle_EMF\8GIS\GISPROJ\MXD\Jan2011_Final_EMF_maps\Map6_A3_Composite\Map_COHWHS.mxd


R104
Primula
Main Rd (M26)
M34
D540
R512
Knoppieslaagte Rd
Peach Tree
X23


Diepsloot
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Study Site Peachtree X23
Protected Areas
Municipal Nature Reserve
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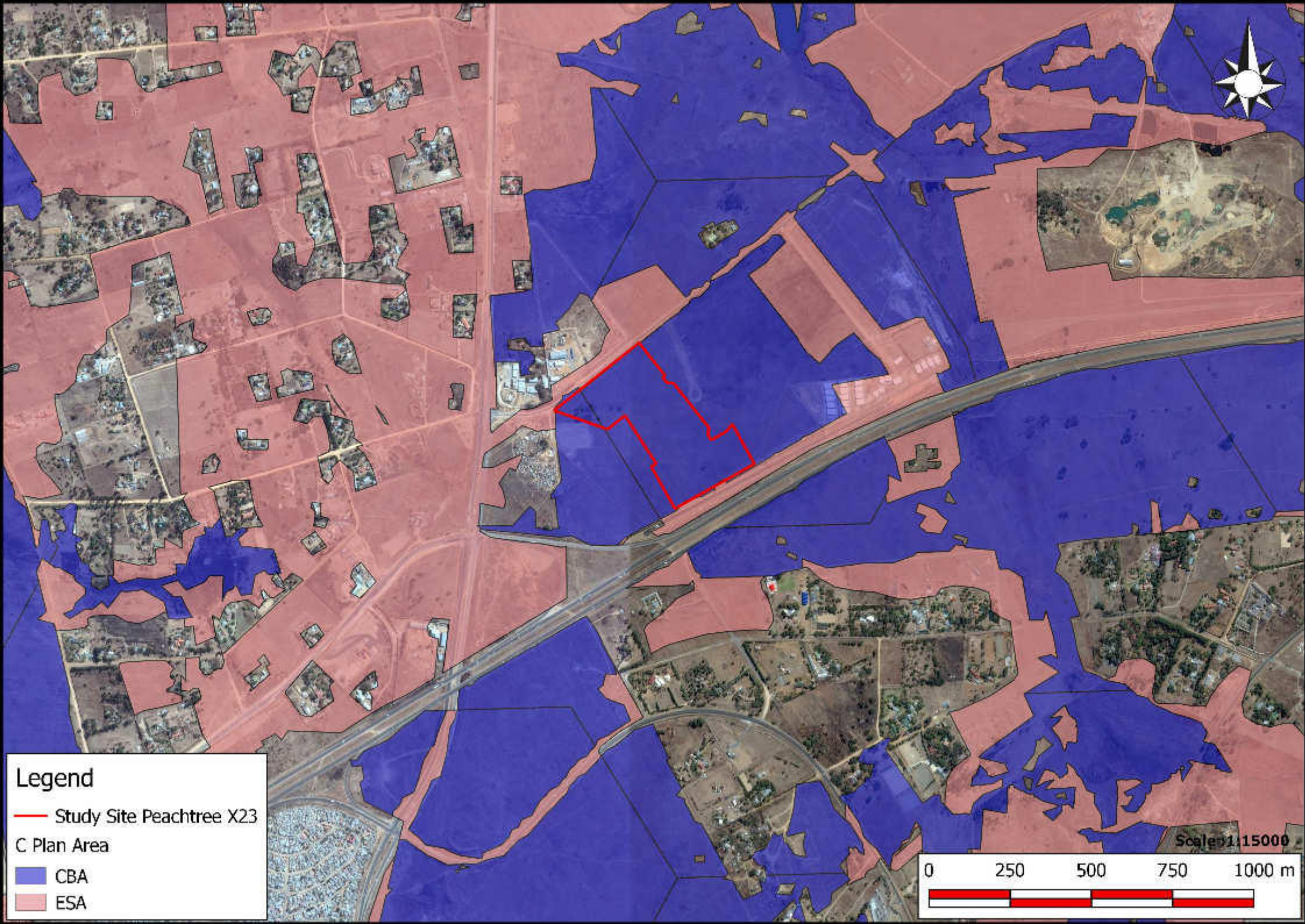
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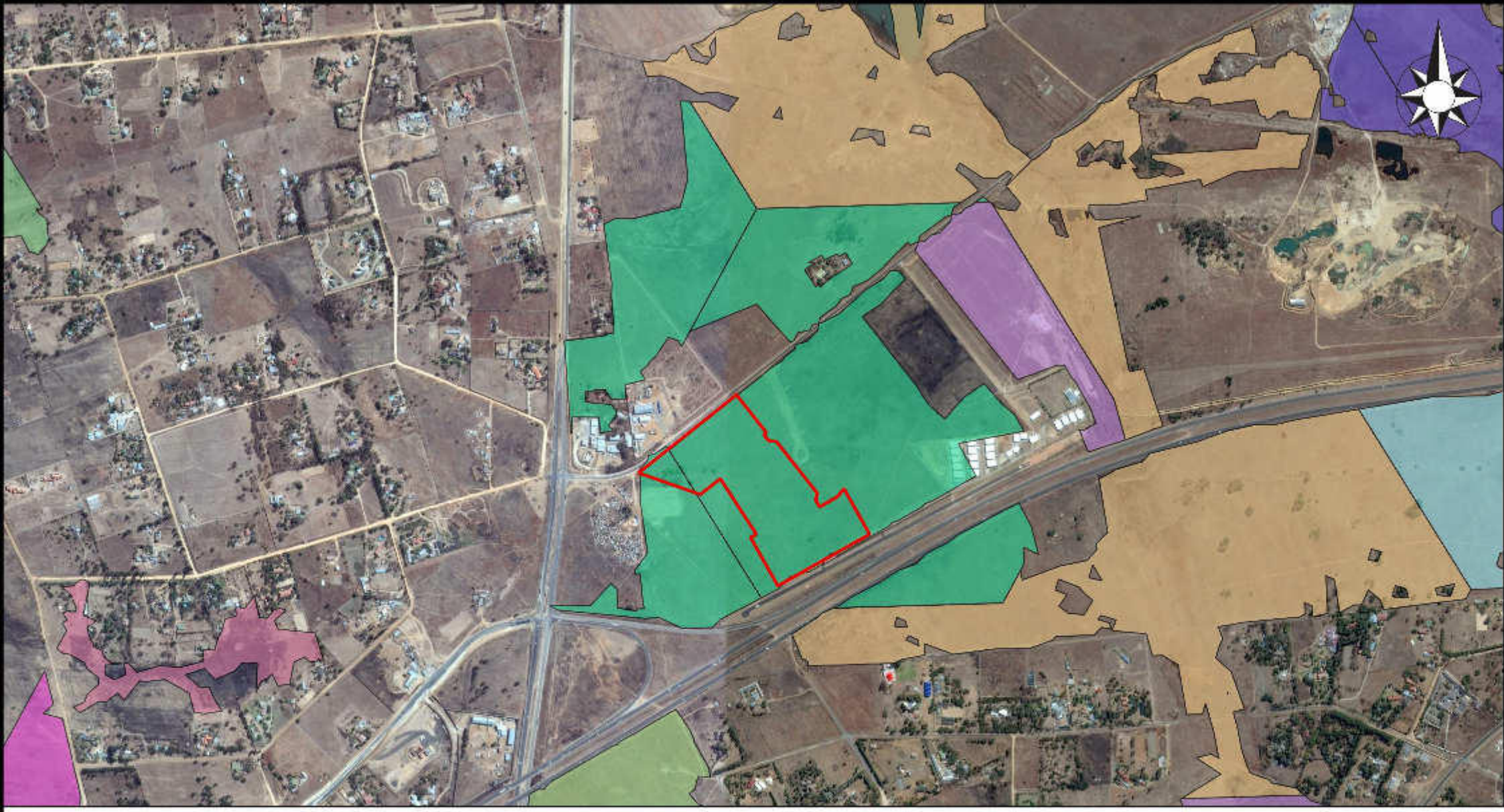
Study Site Peachtree X23
C Plan Area
CBA
ESA
Scale 1:15000
0
250
500
750
1000 m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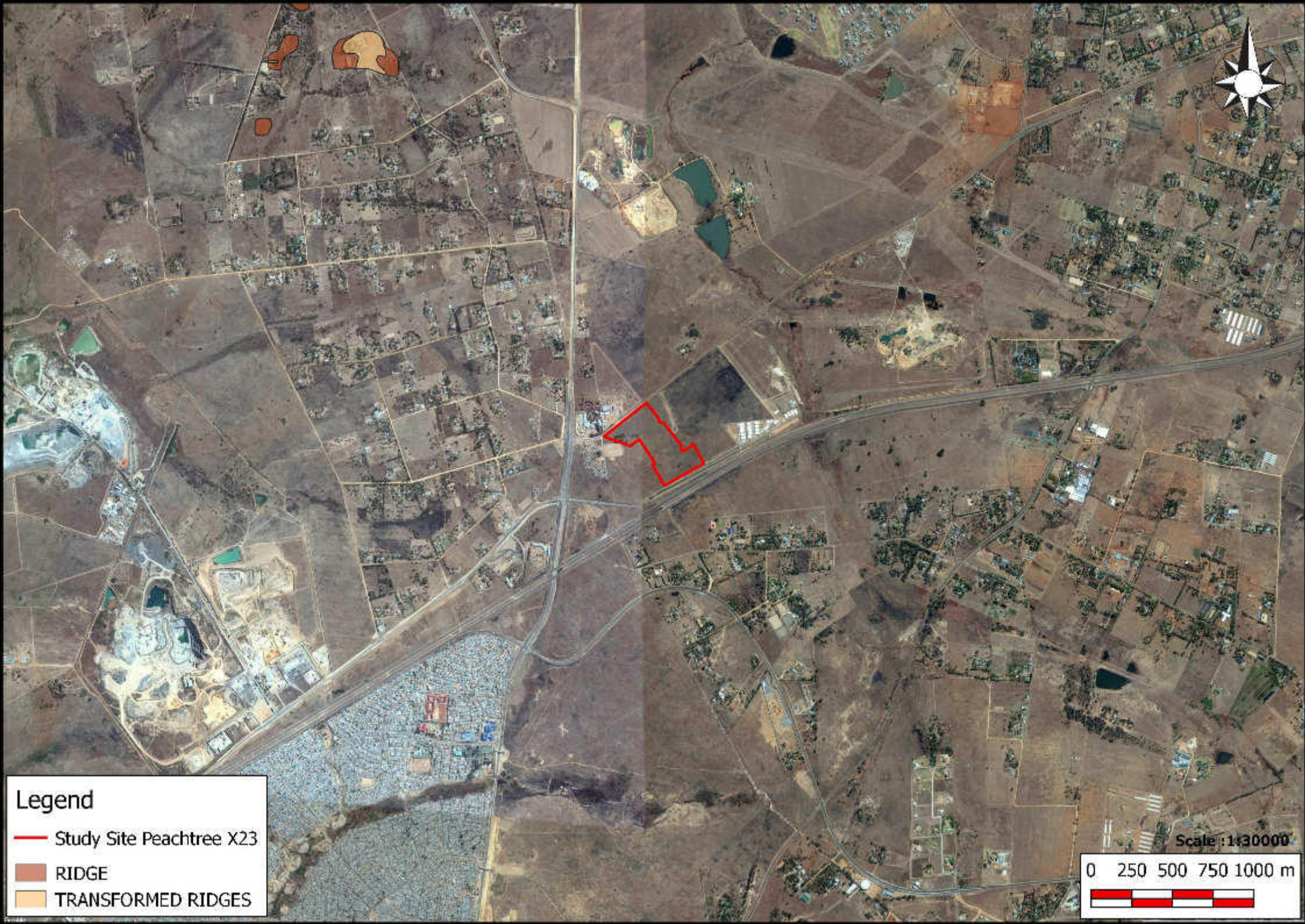
Study Site Peachtree X23
C Plan
OL plant hab, Prim veg
OL plant hab, RL mammal hab, Prim veg
OL plant hab, RL mammal hab, RL bird hab, Prim veg
Prim veg
RL bird hab, Prim veg
RL plant hab, OL plant hab, Prim veg
RL plant hab, OL plant hab, RL bird hab, Prim veg
RL plant hab, OL plant hab, RL mammal hab, Prim veg
RL plant hab, OL plant hab, RL mammal hab, RL bird hab, Prim veg
RL plant hab, Prim veg
Scale :1:15000
0
250
500
750
1000 m


Legend
Study Site Peachtree X23
RIDGE
TRANSFORMED RIDGES
Scale :1:30000
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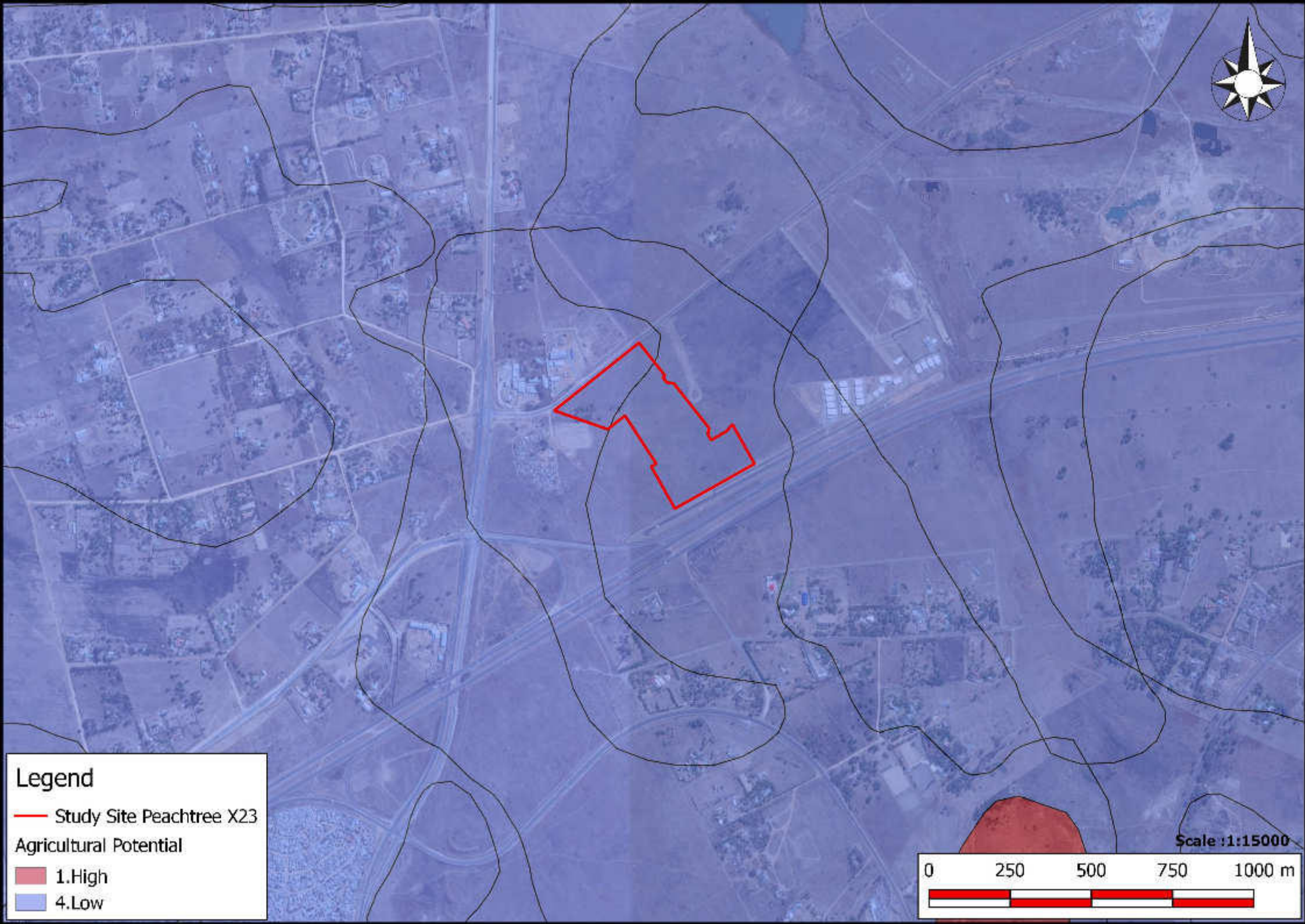
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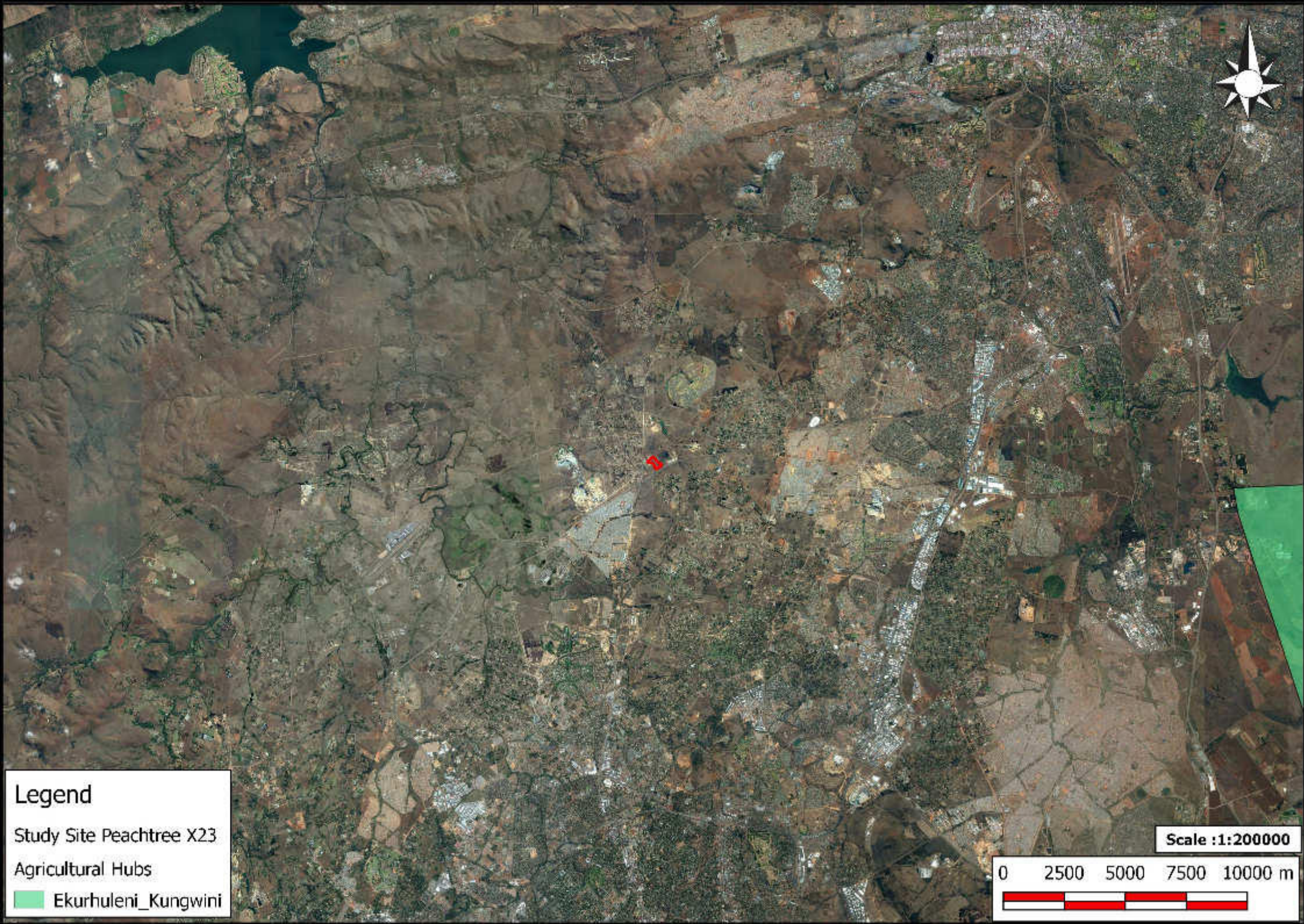
Study Site Peachtree X23
Agricultural Potential
1.High
4.Low
Scale :1:15000
0
250
500
750
1000 m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Study Site Peachtree X23
Agricultural Hubs
Ekurhuleni_Kungwini
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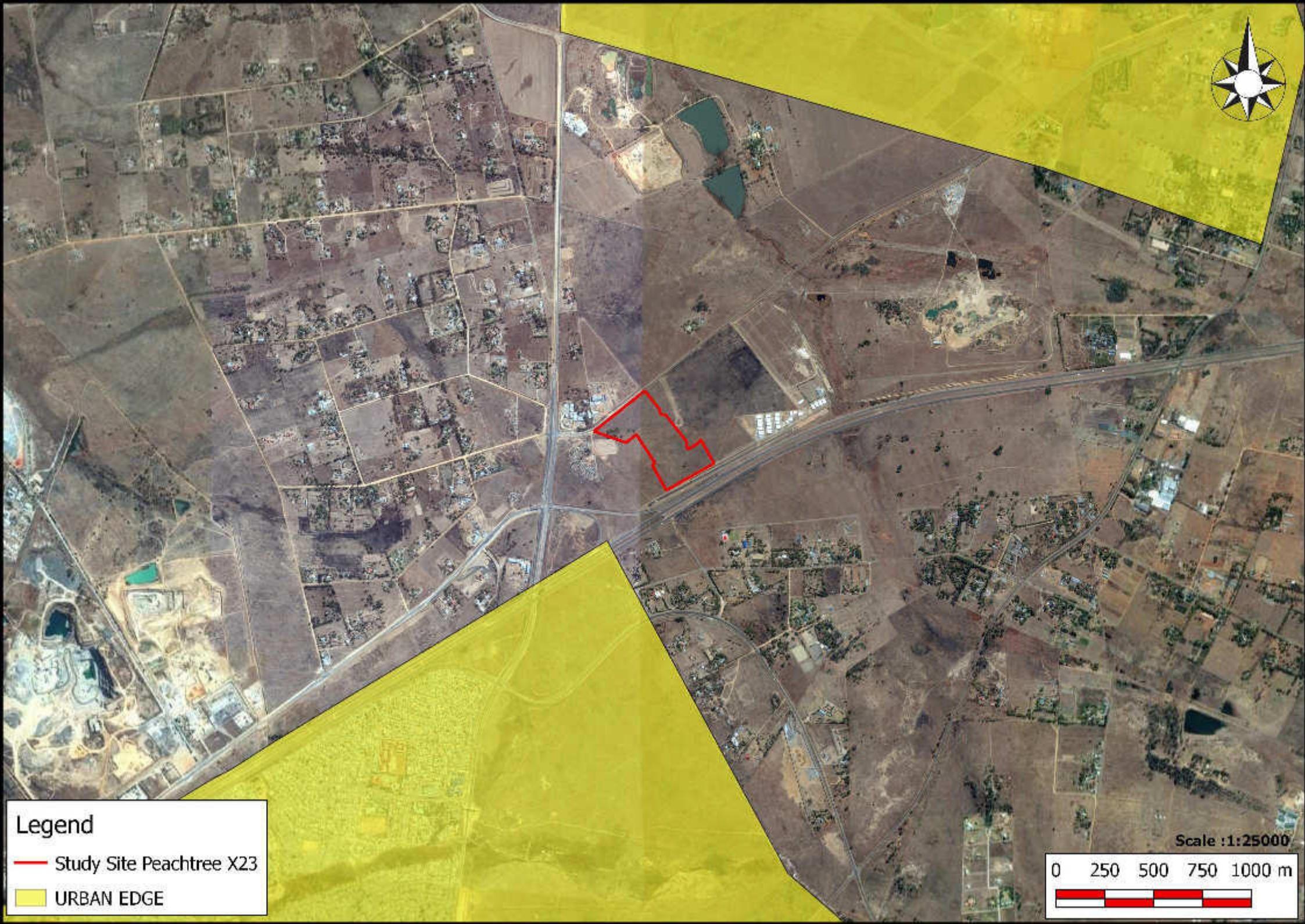
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Study Site Peachtree X23
URBAN EDGE
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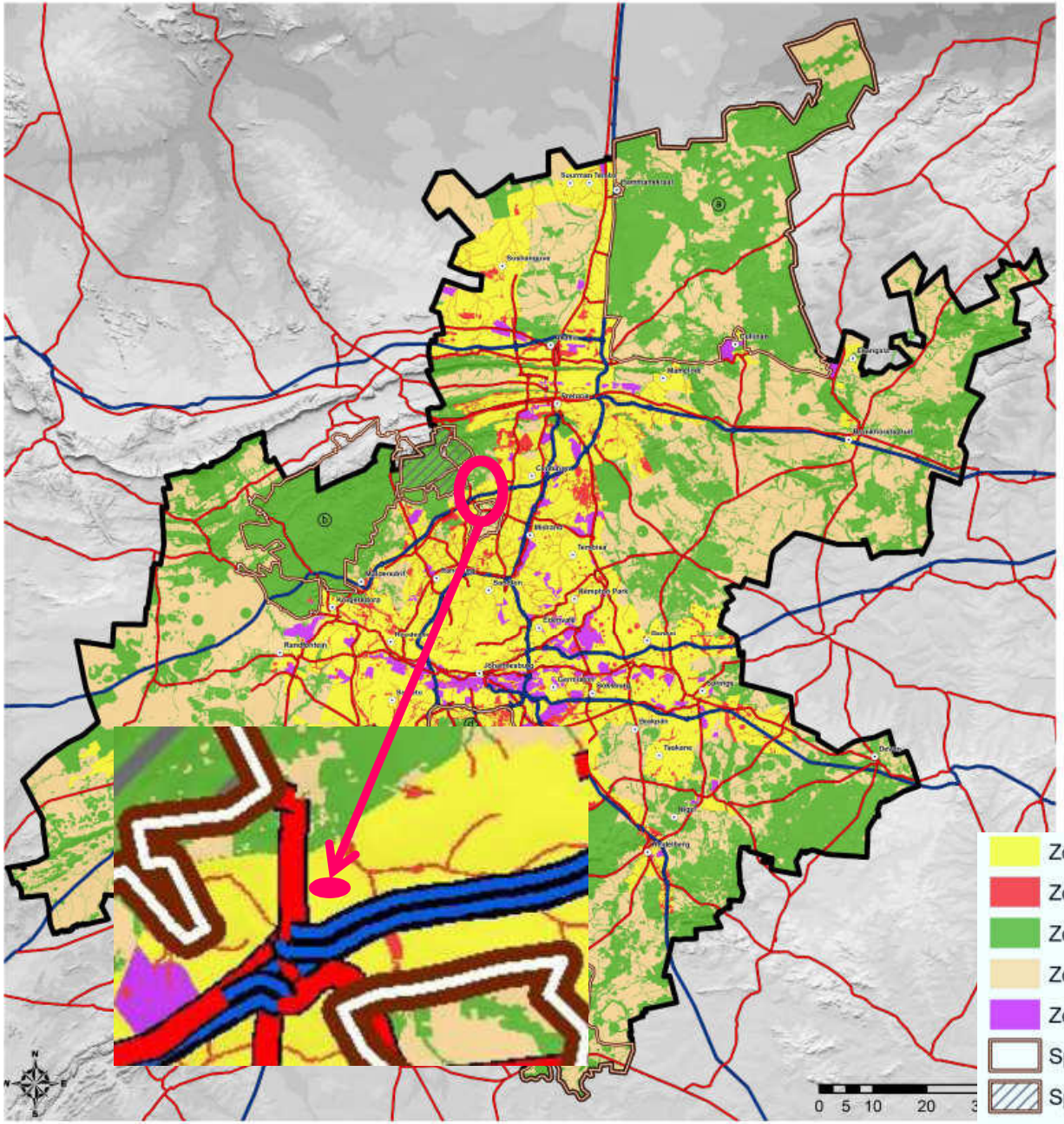
Gauteng Provincial Environmental Management Framework



MAP LEGEND:

ENVIRONMENTAL MANAGEMENT ZONES

- Zone 1
- Zone 2
- Zone 3
- Zone 4
- Zone 5
- Special Control Zones
- Special Control Zone for Conservation, Recreation and Tourism

- Gauteng Provincial Boundary

Roads

- National Road
- Arterial Road

Special Control Zones:
(a) Dinokeng
(b) CoHWHS
(c) Vaaldam
(d) Jhb South
(e) Jhb North

Zone 1: Urban development zone

Intention
The intention with this zone is to streamline urban development activities in it and to promote development infill, densification and concentration of urban development, in order to establish a more effective and efficient city region that will minimise urban sprawl into rural areas.

Zone 2: High control zone (within the urban development zone)

Intention
This zone is sensitive to development activities. Only conservation should be allowed in this zone. Related tourism and recreation activities must be accommodated in areas surrounding this zone.

Zone 3: High control zone (outside the urban development zone)

Intention
This zone is sensitive to development activities and in several cases also have specific values that need to be protected. Conservation and related tourism and recreation activities should dominate development in this zone.

Special control zones (SCZ):

Special control zones are areas that have specific additional
account in

SCZ (a): Din

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activities th

- Recreation (especially in the Roodeplaat Dam area);
- Hospitality (especially lodges);
- Rural development that caters for the specific needs of the area; and
- Maintenance of current agricultural activities.

Activities that should be avoided as far as possible include:

- Battery farming and feedlots;
- Mining and sand winning;
- Industrial activities; and
- Large commercial and retail developments.

SCZ (b): Cradle of Humankind World Heritage Site

The purpose of this special zone is to incorporate the Cradle of Humankind World Heritage Site EMF into the Gauteng EMF. It has its own management zones and management guidelines that must be followed.

SCZ (d): Johannesburg South

The Johannesburg South special control zone
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ives in the area.
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sociated
developments. These activities will form the nature and basis of economic activities in the area and the integration of agricultural, tourism and recreation value chains.

SCZ (e): Johannesburg North (the Greater Kayalami Conservancy)

The area is a rural island surrounded by urban areas. It is important to retain its character as it provides specific services to surrounding areas including:

- Habitat for threatened species;
- Equestrian therapy centres (with an exceptional service to the community of Diepsloot through their programmes with at-risk youth and disabled individuals);
- Environmental educational facilities;
- Nature trails and training of nature guides;
- Bird watching facilities;
- Green building resource centre;

ojects to increase food
employment for neighbouring

local indigenous plants and

iking;

cilities and supporting

ecreation and tourism

ithin the buffer area of the
nent plan should at least
tions placed on the buffer
HS Management Guidelines.
high potential for
ation (hiking, mountain
style hospitality.
making must take the
to account to ensure its
nt conservation and

recreation area.

protected areas and other conservation areas)

Intention
Where a management plan for a protected area is in place, it will override the GPEMF. Where there is no management plan, the area must be treated as Zone 3.

SCZ (c): Vaal Dam

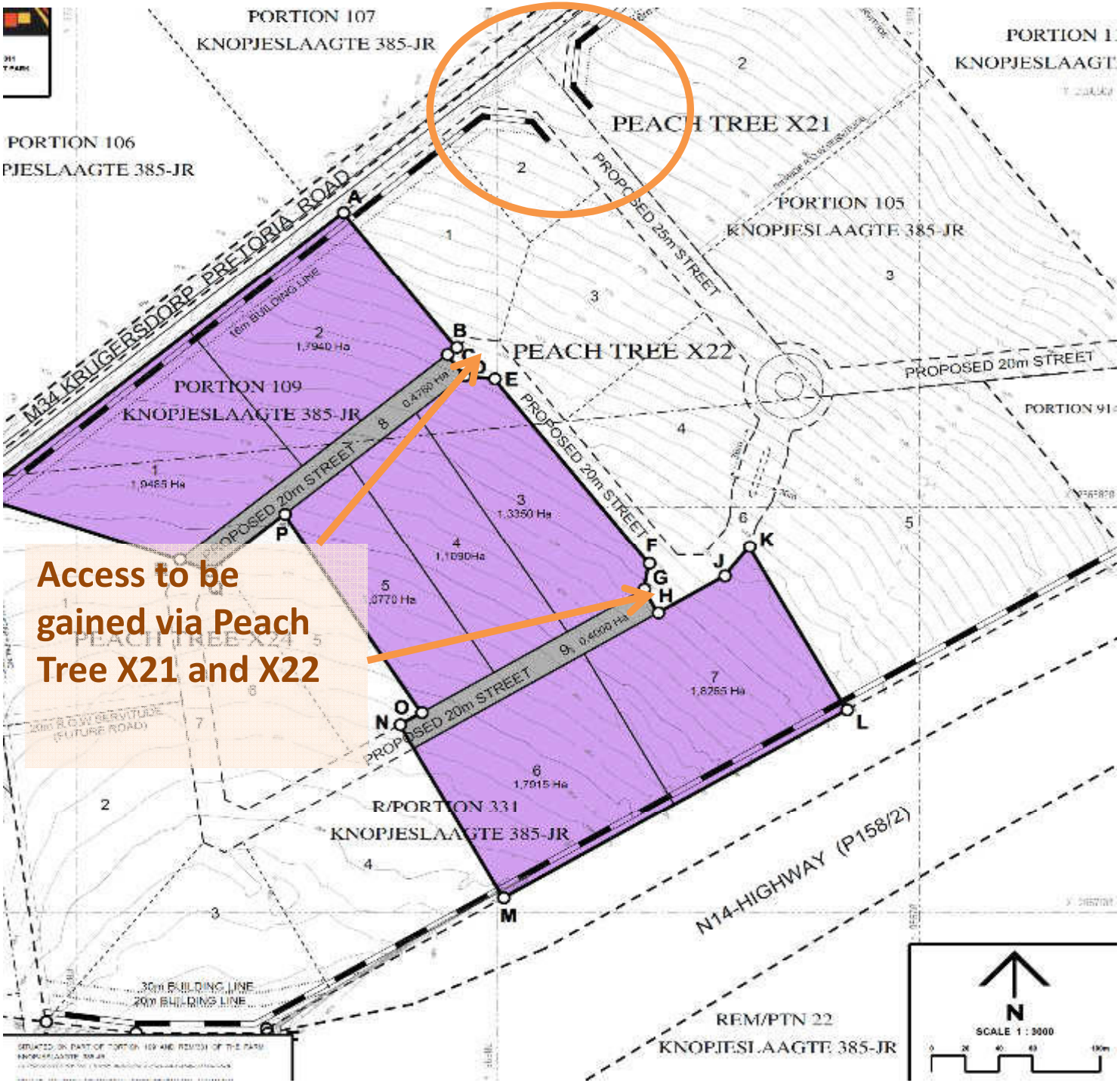
This area has good potential for development that focusses on the following:

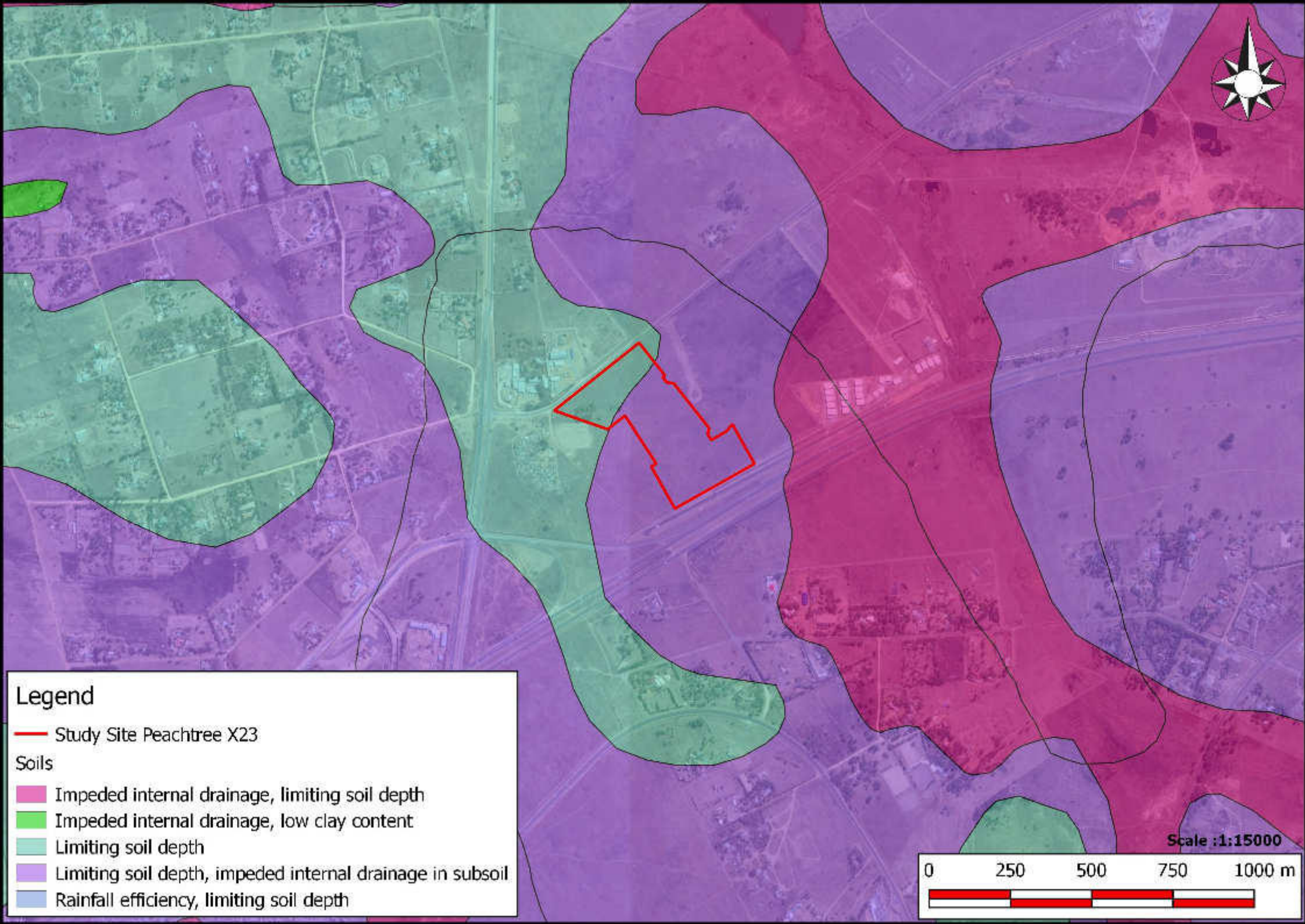
- Local tourism focused on the domestic market;
- Intensive recreation next to the Vaal Dam;
- Conservation of grassland habitat in the area;
- Rural development that focusses on tourism and recreation.

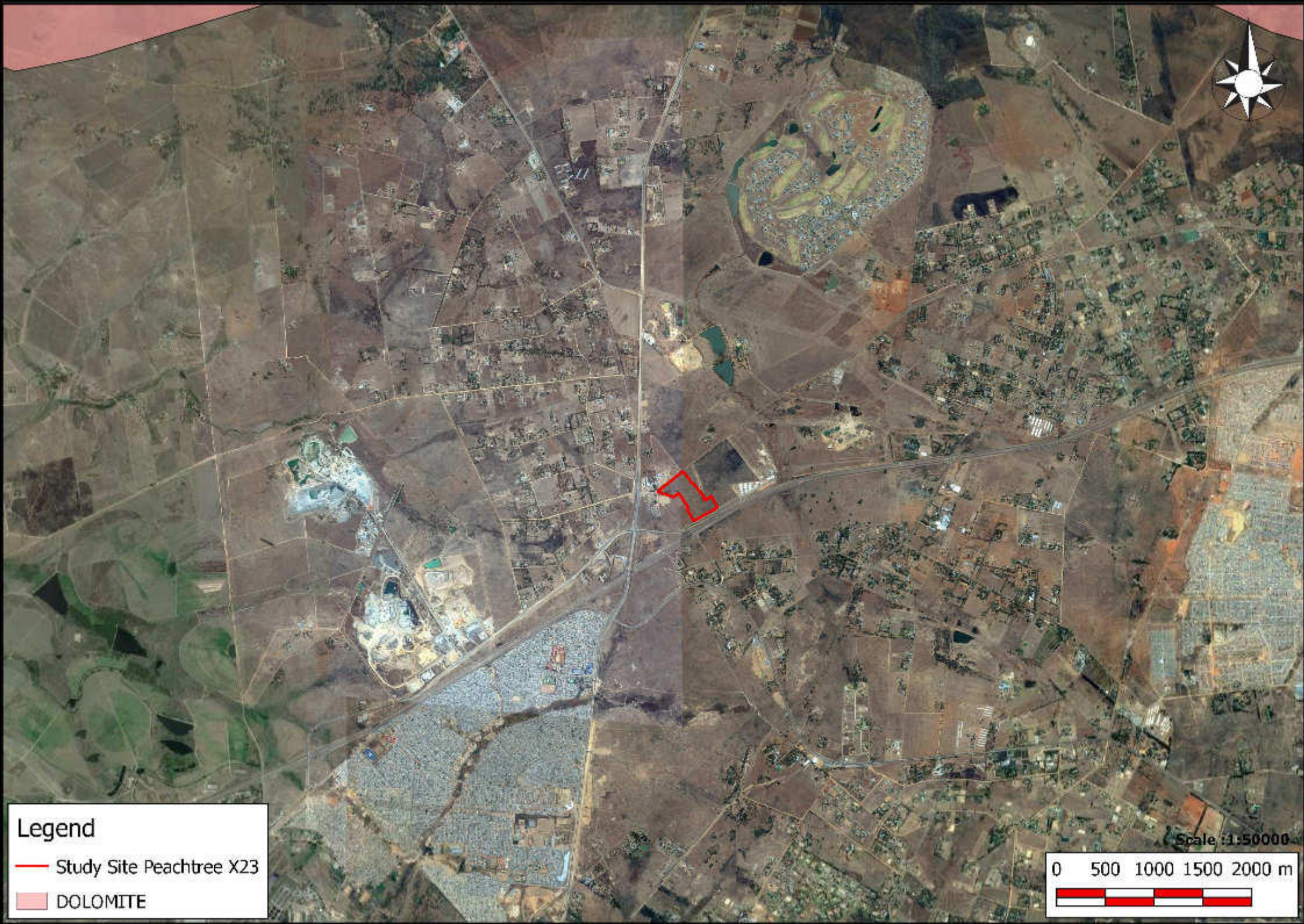
For enquiries, contact: 082 378 7201
Poster prepared by
ENVIRONOMICS
and
MetroGIS

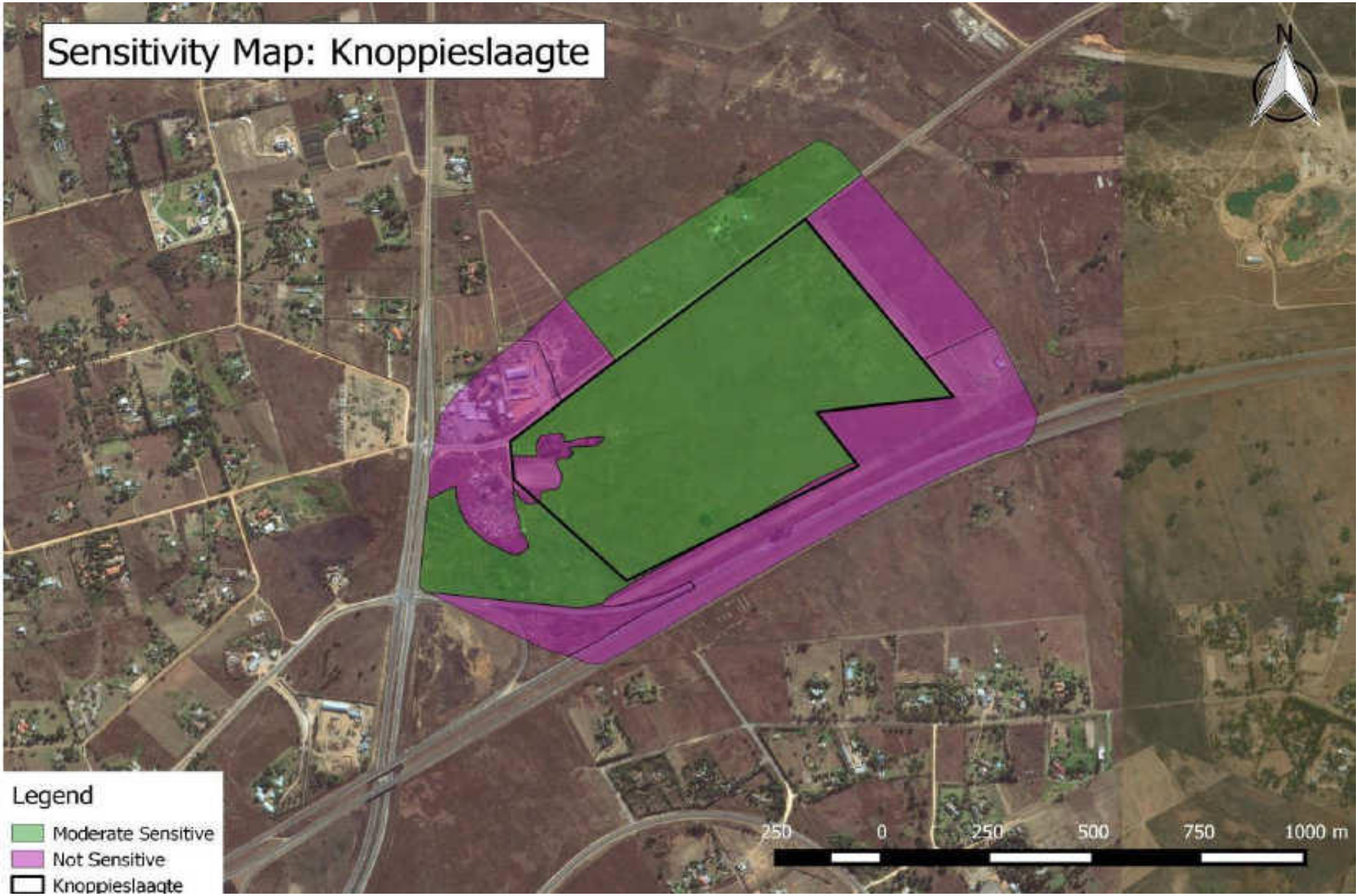
GAUTENG PROVINCE
AGRICULTURE AND RURAL DEVELOPMENT
REPUBLIC OF SOUTH AFRICA

Together, Moving Gauteng City Region Forward


PORTION 107
KNOPJESLAAGTE 385-JR
PORTION 1
KNOPJESLAAGT
PEACH TREE X21
PORTION 106
PJESLAAGTE 385-JR
PROPOSED 25m STREET
PORTION 105
KNOPJESLAAGTE 385-JR
M34 KRUGERSDORP PRETORIA ROAD
PEACH TREE X22
PROPOSED 20m STREET
PORTION 109
KNOPJESLAAGTE 385-JR
PORTION 91
Access to be gained via Peach Tree X21 and X22
R/PORTION 331
KNOPJESLAAGTE 385-JR
N14-HIGHWAY (P158/2)
REM/PTN 22
KNOPJESLAAGTE 385-JR
N
SCALE 1 : 3000


Legend
Study Site Peachtree X23
Soils
Impeded internal drainage, limiting soil depth
Impeded internal drainage, low clay content
Limiting soil depth
Limiting soil depth, impeded internal drainage in subsoil
Rainfall efficiency, limiting soil depth
Scale :1:15000
0
250
500
750
1000 m


Legend
Study Site Peachtree X23
DOLOMITE
Scale :1:50000
0 500 1000 1500 2000 m


Sensitivity Map: Knoppieslaagte
N
Legend
Moderate Sensitive
Not Sensitive
Knoppieslaagte
250
0
250
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750
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