

Technical Report no. GH 3855

Groundwater Conditions in the
Tugela - Mhlautzi Water Transfer Tunnel Area
Drainage Regions V40 - W12

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Directorate of Geohydrology

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1. INFORMATION AVAILABLE

A short report was required by the Directorate: Civil Design on the groundwater conditions (waterlevels above mean sea level, depth to groundwater level below datum and borehole yields) in the vicinity of the Tugela - Mhlatuzi transfer tunnel.

According to a map provided the proposed tunnel lies mainly on the 1 : 50 000 topographic map 2831CC Mbongolwane, with a short section extending onto the mapsheet 2831CD Eshowe. Data available came from the National Groundwater Databank and from a borehole survey carried out by Martinelli and Associates as part of the regional characterisation project of the Directorate: Geohydrology, plus the accompanying report. Information on the databanks includes x and y coordinates, altitudes, depth to water levels, water strikes and discharge rates. All borehole data is attached to this report (see appendices).

The static water levels are highly variable in the area investigated, due to the large variations in topography. To achieve a more even spread of data points to be used as input for the contour maps it was attempted to interpolate groundwater levels from points of known altitudes (under the assumption that the groundwater levels follow the topography). Points of known altitudes were digitized from a 1 : 50 000 topographic map. From these values waterlevels were interpolated with the Bayes interpolation method using known waterlevels as input data. Unfortunately, it was found that the terrain in the area of the Tugela - Mhlatuzi tunnel is too mountainous ie irregular in surface contours, so that the interpolated values are unreliable and the interpolated data points do not improve the contour maps.

Contour maps were then drawn with the actual data measured, ie waterlevel below collar, waterlevel a.m.s.l. and borehole yields. Very few waterlevels have been measured during drilling, especially north of the tunnel line. Additional water levels were measured by drilling holes into the handpump borehole covers.

All contour maps should be interpreted with caution, as the data set is small for the area investigated (see Figure 1).

2. FINDINGS

2.1. Depth to waterlevel (see Figure 2)

Water level depths in the area investigated show large variations ranging from 3.5m to 96m. These irregularities are most probably due to the large variations in topography of the region. In the vicinity of the proposed tunnel the water levels vary between 25m and 50m. Many dry boreholes have been drilled on the mapsheet 2831CC (Martinelli et al, 1994).

A natural spring occurs in the vicinity of kwaKomo to the north of the tunnel (see Figure 2 - Figure 3). No details of the yield of the spring are available.

2.2. Waterlevels in metres above mean sea level (see Figure 3)

The constructed contour map shows, that the waterlevel contours roughly follow the topography. The general flow direction is towards the west to the Tugela River and the east towards the Mhlatuzi River. The groundwater divide follows a north - north - west south - south - east direction and is approximately in the same position as the surface water divide between the Tugela and the Mhlatuzi River catchments.

2.3. Borehole yields (l/s) (see Figure 4)

The borehole yields in the investigated area are generally low, ranging from 0.08l/s and 6,67l/s. The contour lines in the vicinity of the tunnel show yields between 0,5l/s and 2,5l/s.

3. CONCLUSIONS

According to the 1 : 250 000 geological map (2830 Dundee), the proposed tunnel line cuts through lithologies of the Natal structural and metamorphic province, namely amphibolites and granite gneisses of the Tugela group. After the draft report by Martinelli and Associates (1994), groundwater properties in this area are controlled by secondary features such as fracture zones and related weathering. The lithologies of the Tugela group are described as

fractured aquifers with shallow weathering and deep water strikes (see Appendix 4). Groundwater flow is likely to occur predominantly along connected fractures in the rockmass.

Groundwater resources in the Tugela Group are generally poor (Martinelli et al, 1994). Boreholes in the vicinity of the tunnel have low yields with higher yielding boreholes probably associated with major structures such as faults or major joints (see Figure 4). If any of these water bearing structures are intersected during tunnelling the inflow of water can be expected, but following available information the inflow rate is assumed to be less than 3 l/s and of short duration.

Shortage of borehole data and geohydrological parameters in the vicinity of the proposed tunnel site places restrictions on any quantitative assessments. The large variations in the topography of the area constrains any extrapolation of data necessary for the evaluation of eg localised occurrences of groundwater, depth to groundwater levels and reliable contour maps.

Dewatering of the existing water supply boreholes drilled close to the tunnel can theoretically take place. The low borehole yields and steep gradients in water level contour (see Figure 3) suggest a low permeability of the rock formations present which should limit the extent of influence of dewatering.

4. REFERENCE

Department of Water Affairs and Forestry, Characterization and Mapping of the Groundwater Resources of Mapping Unit 1, Kwazulu Natal. Martinelli and Associates. Draft Report, August 1994.

APPENDIX 1

SITE_ID_NR, Y_COORD, X_COORD, COORD_ACC, DATE MEAS, YIELD (l/s)

2831CC00001	31.19305	28.93722	Accurate to within 10 000 units	19500207	0.71
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2831CC00006	31.20211	28.92453	Accurate to within 1 000 units	19871130	0.67
2831CC00008	31.00639	28.85000	Accurate to within 10 000 units	19551220	0.89
2831CC00009	31.00640	28.85000	Accurate to within 10 000 units	19840413	0.45
2831CC00010	31.01362	28.93333	Accurate to within 10 000 units	19700817	0.20
2831CC00012	31.00839	28.99091	Accurate to within 1 000 units	19831025	0.50
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2831CC00024	31.19169	28.92802	Accurate to within 1 000 units	19890214	0.17
2831CC00026	31.19519	28.93245	Accurate to within 1 000 units	19900000	0.14
2831CC00027	31.10237	28.87117	Accurate to within 1 000 units	19871130	6.67
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2831CC00046	31.16814	28.81783	Accurate to within 1 000 units	19860201	0.27
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APPENDIX 2

SITE_ID_NR, Y_COORD, X_COORD, COORD_ACC, ALTITUDE, DATE MEAS, WATER_LEV, LEVEL_STAT-
US,

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2831CC00003,	31.22194,	28.85111,	Accurate to within 100 units,	708.00,	19940223,	3.50	Static water level
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2831CC00008,	31.00639,	28.85000,	Accurate to within 10 000 units,	9999.99,	19551220,	15.24	
2831CC00009,	31.00640,	28.85000,	Accurate to within 10 000 units,	9999.99,	19840413,	60.00	
2831CC00010,	31.01362,	28.93333,	Accurate to within 10 000 units,	9999.99,	19700817,	85.95	
2831CC00012,	31.00839,	28.99091,	Accurate to within 1 000 units,	365.76,	19831025,	55.00	
2831CC00015,	31.00992,	28.97584,	Accurate to within 1 000 units,	327.66,	19831112,	30.00	
2831CC00023,	31.05923,	28.89868,	Accurate to within 1 000 units,	411.48,	19890225,	39.00	
2831CC00024,	31.19169,	28.92802,	Accurate to within 1 000 units,	624.84,	19890214,	19.00	
2831CC00027,	31.10237,	28.87117,	Accurate to within 1 000 units,	365.76,	19871130,	17.00	
2831CC00031,	31.09790,	28.88897,	Accurate to within 1 000 units,	411.48,	19860311,	13.50	
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2831CC00039,	31.10623,	28.77454,	Accurate to within 1 000 units,	381.00,	19890228,	23.00	
2831CC00044,	31.04846,	28.87908,	Accurate to within 1 000 units,	274.32,	19890225,	3.00	
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2831CC50002,	31.23253,	28.81840,	Accurate to within 100 units,	551.22,	19930500,	112.00	Static water level
2831CC50002,	31.23253,	28.81840,	Accurate to within 100 units,	551.22,	19930600,	112.00	Static water level
2831CC50004,	31.12307,	28.82752,	Accurate to within 100 units,	470.00,	19940921,	31.20	Static water level
2831CC50005,	31.22383,	28.82242,	Accurate to within 100 units,	501.01,	19930200,	8.65	Static water level
2831CC50005,	31.22383,	28.82242,	Accurate to within 100 units,	501.01,	19930300,	8.70	Static water level
2831CC50006,	31.19978,	28.83077,	Accurate to within 100 units,	585.19,	19930200,	6.86	Static water level
2831CC50006,	31.19978,	28.83077,	Accurate to within 100 units,	585.19,	19930300,	6.84	Static water level
2831CC50007,	31.24080,	28.81639,	Accurate to within 100 units,	513.80,	19930200,	40.21	Static water level
2831CC50007,	31.24080,	28.81639,	Accurate to within 100 units,	513.80,	19930300,	40.40	Static water level
2831CC50007,	31.24080,	28.81639,	Accurate to within 100 units,	513.80,	19930500,	60.00	Static water level
2831CC50007,	31.24080,	28.81639,	Accurate to within 100 units,	513.80,	19930600,	60.00	Static water level
2831CC50007,	31.24080,	28.81639,	Accurate to within 100 units,	513.80,	19930800,	29.00	Static water level
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2831CC50007,	31.24080,	28.81639,	Accurate to within 100 units,	513.80,	19940100,	27.70	Static water level
2831CC50008,	31.15764,	28.84367,	Accurate to within 100 units,	490.33,	19930500,	38.10	Static water level
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2831CC50009,	31.23823,	28.81692,	Accurate to within 100 units,	506.51,	19930500,	90.00	Static water level

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2831CC50011, 31.24228, 28.81641, Accurate to within 100 units,	494.70, 19930300, 40.00	Static water level
2831CC50012, 31.17805, 28.83915, Accurate to within 100 units,	591.64, 19930500, 10.25	Static water level
2831CC50012, 31.17805, 28.83915, Accurate to within 100 units,	591.64, 19930600, 14.60	Static water level
2831CC50013, 31.16135, 28.82021, Accurate to within 100 units,	603.86, 19930500, 59.10	Static water level
2831CC50013, 31.16135, 28.82021, Accurate to within 100 units,	603.86, 19930600, 62.50	Static water level
2831CC50013, 31.16135, 28.82021, Accurate to within 100 units,	603.86, 19931000, 42.30	Static water level
2831CC50013, 31.16135, 28.82021, Accurate to within 100 units,	603.86, 19931100, 41.60	Static water level
2831CC50014, 31.23517, 28.81145, Accurate to within 100 units,	470.04, 19930200, 5.00	Static water level
2831CC50014, 31.23517, 28.81145, Accurate to within 100 units,	470.04, 19930300, 5.60	Static water level
2831CC50015, 31.15754, 28.82424, Accurate to within 100 units,	558.71, 19930800, 45.40	Static water level
2831CC50015, 31.15754, 28.82424, Accurate to within 100 units,	558.71, 19930900, 46.20	Static water level
2831CC50016, 31.24628, 28.80814, Accurate to within 100 units,	503.08, 19930200, 30.80	Static water level
2831CC50016, 31.24628, 28.80814, Accurate to within 100 units,	503.08, 19930300, 31.20	Static water level
2831CC50017, 31.15088, 28.82567, Accurate to within 100 units,	502.68, 19930900, 33.00	Static water level
2831CC50020, 31.17016, 28.82234, Accurate to within 100 units,	600.66, 19931100, 22.20	Static water level
2831CC50020, 31.17016, 28.82234, Accurate to within 100 units,	600.66, 19931200, 22.10	Static water level
2831CC50020, 31.17016, 28.82234, Accurate to within 100 units,	600.66, 19940100, 22.10	Static water level
2831CCA0010, 31.17667, 28.82667, Accurate to within 100 units,	700.00, 19940921, 71.96	Static water level
2831CCA0022, 31.15550, 28.83639, Accurate to within 100 units,	500.00, 19940921, 47.20	Static water level
2831CCA0023, 31.14472, 28.83778, Accurate to within 100 units,	480.00, 19940921, 47.80	Static water level
2831CCA0024, 31.13722, 28.83583, Accurate to within 100 units,	480.00, 19940921, 37.60	Static water level
2831CCAK005, 31.23333, 28.80444, Accurate to within 100 units,	615.00, 19921023, 46.00	Static water level
2831CCAK006, 31.08528, 28.92972, Accurate to within 100 units,	302.00, 19921027, 66.00	Static water level
2831CCAK009, 31.16250, 28.89389, Accurate to within 100 units,	545.00, 19921029, 36.00	Static water level
2831CCAK010, 31.18083, 28.89806, Accurate to within 100 units,	670.00, 19921030, 17.50	Static water level
2831CCAK011, 31.21333, 28.92500 No info	0.00, 19921107, 7.50	Static water level
2831CCAK012, 31.22083, 28.94972, Accurate to within 100 units,	580.00, 19930724, 23.30	Static water level
2831CCAK013, 31.22500, 28.91861 No info	0.00, 19930726, 16.20	Static water level
2831CCAK017, 31.23583, 28.80111, Accurate to within 100 units,	540.00, 19921119, 25.40	Static water level
2831CCAK020, 31.11056, 28.81694, Accurate to within 100 units,	380.00, 19921124, 36.00	Static water level
2831CCAK021, 31.10528, 28.80167, Accurate to within 100 units,	320.00, 19921124, 66.00	Static water level
2831CCAK022, 31.11194, 28.77889, Accurate to within 100 units,	475.00, 19921127, 46.70	Static water level
2831CCAK024, 31.12083, 28.79444, Accurate to within 100 units,	510.00, 19921201, 26.00	Static water level
2831CCAK025, 31.09639, 28.84111, Accurate to within 100 units,	430.00, 19921203, 28.00	Static water level
2831CCAK027, 31.09944, 28.86000, Accurate to within 100 units,	365.00, 19940429, 96.00	Static water level
2831CCAK029, 31.01250, 28.82306 No info	0.00, 19930830, 23.00	Static water level
2831CCAK030, 31.04167, 28.88750 No info	0.00, 19930831, 32.00	Static water level
2831CCAK031, 31.10500, 28.78167, Accurate to within 100 units,	475.00, 19930831, 34.40	Static water level
2831CCAK032, 31.10500, 28.78167, Accurate to within 100 units,	475.00, 19930831, 8.40	Static water level

2831CCAK033, 31.10389, 28.81611, Accurate to within 100 units, 363.00, 19930907, 31.10 Static water level

2831CCAK034, 31.14583, 28.76861, Accurate to within 100 units, 659.00, 19930908, 38.30 Static water level

2831CD00005, 31.44445, 28.86056, Accurate to within 10 000 units, 9999.99, 19700616, 21.33

2831CD00006, 31.44440, 28.86056, Accurate to within 10 000 units, 9999.99, 19000000, 38.10

2831CD00007, 31.36667, 28.86111, Accurate to within 10 000 units, 9999.99, 19711130, 58.52

2831CD00008, 31.28861, 28.92361, Accurate to within 10 000 units, 9999.99, 19830310, 36.00

2831CD00009, 31.43611, 28.85618, Accurate to within 100 units, 540.00, 19611114, 6.70

2831CD00010, 31.28833, 28.88028, Accurate to within 10 000 units, 9999.99, 19610530, 22.25

2831CD00012, 31.39527, 28.86945, Accurate to within 10 000 units, 9999.99, 19620228, 12.19

2831CD00013, 31.39528, 28.86945, Accurate to within 10 000 units, 9999.99, 19560208, 15.24

2831CD00014, 31.39527, 28.86946, Accurate to within 10 000 units, 9999.99, 19840511, 30.00

2831CD00015, 31.39027, 28.91167, Accurate to within 10 000 units, 9999.99, 19561129, 58.82

2831CD00016, 31.35278, 28.78361, Accurate to within 10 000 units, 9999.99, 19690212, 110.0

2831CD00017, 31.42445, 28.87250, Accurate to within 10 000 units, 9999.99, 19570202, 20.72

2831CD00018, 31.30250, 28.92223, Accurate to within 10 000 units, 9999.99, 19800723, 115.9

2831CD00019, 31.30251, 28.92223, Accurate to within 10 000 units, 9999.99, 19800717, 80.00

2831CD00022, 31.39027, 28.91168, Accurate to within 10 000 units, 9999.99, 19730424, 56.00

2831CD00023, 31.39028, 28.91167, Accurate to within 10 000 units, 9999.99, 19570109, 73.15

2831CD00024, 31.38722, 28.90000, Accurate to within 10 000 units, 9999.99, 19610902, 1.82

2831CD00025, 31.38723, 28.90000, Accurate to within 10 000 units, 9999.99, 19610817, 68.88

2831CD00026, 31.46389, 28.89694, Accurate to within 10 000 units, 9999.99, 19200507, 21.64

2831CD00028, 31.44444, 28.86057, Accurate to within 10 000 units, 9999.99, 19691209, 21.33

2831CD00029, 31.44446, 28.86056, Accurate to within 10 000 units, 9999.99, 19731211, 7.60

2831CD00030, 31.44250, 28.86583, Accurate to within 100 units, 505.00, 19560215, 25.29

2831CD00031, 31.39861, 28.84722, Accurate to within 10 000 units, 9999.99, 19551119, 15.54

2831CD00032, 31.39861, 28.84723, Accurate to within 10 000 units, 9999.99, 19551022, 16.15

2831CD00033, 31.42001, 28.88777, Accurate to within 10 000 units, 9999.99, 19690722, 16.76

2831CD00034, 31.44722, 28.87917, Accurate to within 10 000 units, 9999.99, 19701217, 10.33

2831CD00035, 31.44722, 28.87918, Accurate to within 10 000 units, 9999.99, 19701007, 10.97

2831CD00036, 31.44166, 28.91333, Accurate to within 10 000 units, 9999.99, 19610322, 45.11

2831CD00039, 31.43000, 28.86250, Accurate to within 10 000 units, 9999.99, 19560128, 36.57

2831CD00040, 31.43000, 28.86251, Accurate to within 10 000 units, 9999.99, 19670619, 39.31

2831CD00041, 31.42917, 28.84583, Accurate to within 10 000 units, 9999.99, 19840504, 70.00

2831CD00042, 31.28583, 28.86808, Accurate to within 10 000 units, 9999.99, 19830428, 135.0

2831CD00044, 31.36668, 28.86111, Accurate to within 10 000 units, 9999.99, 19720125, 52.12

2831CD00045, 31.46861, 28.76389, Accurate to within 10 000 units, 9999.99, 19560407, 9.14

2831CD00046, 31.46861, 28.76390, Accurate to within 10 000 units, 9999.99, 19560424, 48.76

2831CD00047, 31.33751, 28.87917, Accurate to within 10 000 units, 9999.99, 19590811, 21.33

2831CD00048, 31.28527, 28.89760, Accurate to within 100 units, 680.00, 19690828, 36.57

2831CD00049, 31.39583, 28.86667, Accurate to within 10 000 units, 9999.99, 19570221, 33.83

2831CD00050, 31.39862, 28.84722, Accurate to within 10 000 units, 9999.99, 19551017, 18.28

2831CD00052, 31.41946, 28.90556, Accurate to within 10 000 units, 9999.99, 19680301, 16.45

2831CD00053, 31.44389, 28.84806, Accurate to within 100 units, 570.00, 19721012, 27.00

2831CD00054, 31.44445, 28.84694, Accurate to within 10 000 units, 9999.99, 19611230, 86.56

2831CD00055, 31.47945, 28.86056, Accurate to within 10 000 units, 9999.99, 19760816, 60.00

2831CD00056, 31.49000, 28.85000, Accurate to within 10 000 units, 9999.99, 19750820, 48.00

2831CD00057, 31.45833, 28.85667, Accurate to within 10 000 units, 9999.99, 19610427, 24.99

2831CD00058, 31.37583, 28.88250, Accurate to within 100 units, 640.00, 19770513, 6.00

2831CD00058, 31.37583, 28.88250, Accurate to within 100 units, 640.00, 19940318, 42.00 Static water level

2831CD00059, 31.43944, 28.87000, Accurate to within 10 000 units, 9999.99, 19771014, 30.00

2831CD00060, 31.43945, 28.87000, Accurate to within 10 000 units, 9999.99, 19771026, 70.00

2831CD00062, 31.42000, 28.88778, Accurate to within 10 000 units, 9999.99, 19570314, 12.80

2831CD00064, 31.41250, 28.88862, Accurate to within 10 000 units, 9999.99, 19510719, 17.06

2831CD00066, 31.41250, 28.88863, Accurate to within 10 000 units, 9999.99, 19700717, 16.76

2831CD00067, 31.41252, 28.88861, Accurate to within 10 000 units, 9999.99, 19731107, 13.70
2831CD00068, 31.39583, 28.86945, Accurate to within 10 000 units, 9999.99, 19680717, 51.81
2831CD00069, 31.41389, 28.88056, Accurate to within 10 000 units, 9999.99, 19770516, 13.00
2831CD00070, 31.31806, 28.91361, Accurate to within 10 000 units, 9999.99, 19830528, 4.00
2831CD00071, 31.31806, 28.91362, Accurate to within 10 000 units, 9999.99, 19830413, 71.00
2831CD00072, 31.31807, 28.91361, Accurate to within 10 000 units, 9999.99, 19830323, 13.00
2831CD00073, 31.31806, 28.91363, Accurate to within 10 000 units, 9999.99, 19830328, 15.00
2831CD00078, 31.28777, 28.90334, Accurate to within 10 000 units, 9999.99, 19830907, 10.00
2831CD00079, 31.28862, 28.92361, Accurate to within 10 000 units, 9999.99, 19610117, 57.30
2831CD00080, 31.42002, 28.88777, Accurate to within 10 000 units, 9999.99, 19570305, 23.46
2831CD00081, 31.42000, 28.88779, Accurate to within 10 000 units, 9999.99, 19670908, 12.19
2831CD00082, 31.44447, 28.86056, Accurate to within 10 000 units, 9999.99, 19770308, 108.0
2831CD00083, 31.44222, 28.85279, Accurate to within 10 000 units, 9999.99, 19611005, 23.77
2831CD00084, 31.44444, 28.86059, Accurate to within 10 000 units, 9999.99, 19730220, 4.00
2831CD00085, 31.40000, 28.83889, Accurate to within 10 000 units, 9999.99, 19761209, 0.10
2831CD00086, 31.38333, 28.85000, Accurate to within 10 000 units, 9999.99, 19551215, 15.24
2831CD00087, 31.38333, 28.85001, Accurate to within 10 000 units, 9999.99, 19551208, 26.51
2831CD00088, 31.44444, 28.86856, Accurate to within 10 000 units, 9999.99, 19820909, 90.00
2831CD00089, 31.33094, 28.85611, Accurate to within 10 000 units, 9999.99, 19850307, 42.00
2831CD00091, 31.25854, 28.92001, Accurate to within 1 000 units, 540.00, 19890214, 6.00
2831CD00093, 31.48769, 28.81761, Accurate to within 1 000 units, 340.00, 19890130, 89.00
2831CD00097, 31.49087, 28.83056, Accurate to within 1 000 units, 340.00, 19890208, 86.00
2831CD00098, 31.46385, 28.79646, Accurate to within 1 000 units, 300.00, 19890209, 13.00
2831CD00114, 31.47361, 28.87361, Accurate to within 10 000 units, 500.00, 19901109, 15.50

APPENDIX 3

SITE_ID_NR, SITE_NAME, Y_COORD, X_COORD, COORD_ACC, DEPTH

SITE_ID_NR	SITE_NAME	Y_COORD	X_COORD	COORD_ACC	DEPTH
2831CC00001	MBONGOLWANE MISSION	31.19305	28.93722	Accurate to within 10 000 units	121.92
2831CC00002	FORD YOLLAND	31.21194	28.84527	Accurate to within 10 000 units	76.50
2831CC00003	FORD YOLLAND	31.22194	28.85111	Accurate to within 100 units	67.36
2831CC00004	SITILLO STORE - ENKANYEZI	31.12039	28.89564	Accurate to within 1 000 units	0.00
2831CC00005	SITILLO STORE - ENKANYEZI	31.12049	28.89743	Accurate to within 1 000 units	0.00
2831CC00006	MBONGOLWANE DIP - ENKANYEZI	31.20211	28.92453	Accurate to within 1 000 units	30.00
2831CC00007	TUGELA LOCATION GED KRANSKOP	31.03195	28.97167	Accurate to within 100 units	120.00
2831CC00008	EZILWENI	31.00639	28.85000	Accurate to within 10 000 units	44.19
2831CC00009	EZULWENI	31.00640	28.85000	Accurate to within 10 000 units	120.00
2831CC00010	MBANGALWANA HOSPITAAL	31.01362	28.93333	Accurate to within 10 000 units	89.00
2831CC00012	RESERVE - MAPUMULO	31.00839	28.99091	Accurate to within 1 000 units	100.00
2831CC00013	MAPUMULO	31.01027	28.90647	Accurate to within 1 000 units	100.00
2831CC00014	MAPUMULO	31.03168	28.97185	Accurate to within 1 000 units	90.00
2831CC00015	RESERVE - MAPUMULO	31.00992	28.97584	Accurate to within 1 000 units	100.00
2831CC00016	MAPUMULO	31.01774	28.90349	Accurate to within 1 000 units	100.00
2831CC00017	MAPUMULO	31.00771	28.90632	Accurate to within 1 000 units	102.00
2831CC00019	MAMBULU - ENKANYEZI	31.11601	28.90364	Accurate to within 1 000 units	0.00
2831CC00020	WOSHI - ENKANYEZI	31.21865	28.87395	Accurate to within 1 000 units	100.00
2831CC00021	SONANI - ENKANYEZI	31.08217	28.91565	Accurate to within 1 000 units	102.00
2831CC00022	ENKANYEZI	31.05713	28.89779	Accurate to within 1 000 units	120.00
2831CC00023	ENKANYEZI	31.05923	28.89868	Accurate to within 1 000 units	106.00
2831CC00024	ENKANYEZI	31.19169	28.92802	Accurate to within 1 000 units	70.00
2831CC00025	BHAMU - ENKANYEZI	31.06060	28.88945	Accurate to within 1 000 units	120.00
2831CC00026	MIN ZULU - ENKANYEZI	31.19519	28.93245	Accurate to within 1 000 units	90.00
2831CC00027	SITILLO DIP - ENKANYEZI	31.10237	28.87117	Accurate to within 1 000 units	30.00
2831CC00028	MAMBA - ENKANYEZI	31.15324	28.84073	Accurate to within 1 000 units	100.00
2831CC00029	MAMBA - ENKANYEZI	31.15220	28.83991	Accurate to within 1 000 units	100.00
2831CC00030	MAMBA - ENKANYEZI	31.15122	28.83896	Accurate to within 1 000 units	100.00
2831CC00031	MADAWA - ENKANYEZI	31.09790	28.88897	Accurate to within 1 000 units	66.00
2831CC00032	SITHILO - ENKANYEZI	31.10070	28.89005	Accurate to within 1 000 units	100.00
2831CC00033	SILAMBO MBONGOLWANA - ENKANYEZI	31.16345	28.96922	Accurate to within 1 000 units	8.00
2831CC00034	NDAYINI MBOLGOLWANE - ENKANYEZI	31.23027	28.92709	Accurate to within 1 000 units	42.00
2831CC00035	KOMO STORE - ENKANYEZI	31.16417	28.81977	Accurate to within 1 000 units	150.00
2831CC00036	OGWINI	31.09244	28.84385	Accurate to within 1 000 units	102.00
2831CC00037	OGWINI	31.08787	28.84507	Accurate to within 1 000 units	92.00
2831CC00038	OGWINI	31.09057	28.85053	Accurate to within 1 000 units	100.00
2831CC00039	OGWINI	31.10623	28.77454	Accurate to within 1 000 units	51.00
2831CC00040	OGWINI	31.03368	28.82923	Accurate to within 1 000 units	100.00
2831CC00041	OGWINI	31.03548	28.83170	Accurate to within 1 000 units	100.00
2831CC00042	OGWINI	31.04388	28.82710	Accurate to within 1 000 units	100.00
2831CC00043	OGWINI	31.02928	28.83116	Accurate to within 1 000 units	80.00
2831CC00044	OGWINI	31.04846	28.87908	Accurate to within 1 000 units	75.00
2831CC00045	KWATEMA	31.17295	28.81452	Accurate to within 1 000 units	100.00
2831CC00046	KWATEMA	31.16814	28.81783	Accurate to within 1 000 units	72.00
2831CC00047	OGWINI	31.09583	28.84666	Accurate to within 1 000 units	126.00
2831CC00048	OGWINI	31.04722	28.87111	Accurate to within 1 000 units	126.00

2831CC00049, OGWINI	, 31.12250, 28.82806, Accurate to within 100 units,	90.00
2831CC00050, MANDABA	, 31.09566, 28.84219, Accurate to within 1 000 units,	120.00
2831CC00051, EMAHLAZENI	, 31.05628, 28.82558, Accurate to within 1 000 units,	100.00
2831CC00052, EMAHLAZENI	, 31.14306, 28.82694, Accurate to within 100 units,	48.00
2831CC00053, NKANDLA	, 31.16243, 28.83790, Accurate to within 1 000 units,	100.00
2831CC00054, NKANDLA	, 31.16175, 28.83485, Accurate to within 1 000 units,	120.00
2831CC00055, NKANDLA	, 31.16032, 28.83256, Accurate to within 1 000 units,	100.00
2831CC00056, ITEMA	, 31.16417, 28.82611, Accurate to within 100 units,	100.00
2831CC00057, ITEMA	, 31.09173, 28.90947, Accurate to within 1 000 units,	100.00
2831CC00058, OGWINI	, 31.03750, 28.82695, Accurate to within 1 000 units,	106.00
2831CC00059, OGWINI	, 31.03666, 28.82639, Accurate to within 1 000 units,	100.00
2831CC00060, TUGELA LOCATION	, 31.03306, 28.97223, Accurate to within 100 units,	102.00
2831CC50001,	, 31.16282, 28.84200, Accurate to within 100 units,	0.00
2831CC50002,	, 31.23253, 28.81840, Accurate to within 100 units,	0.00
2831CC50003,	, 31.17196, 28.83891, Accurate to within 100 units,	0.00
2831CC50004,	, 31.12307, 28.82752, Accurate to within 100 units,	0.00
2831CC50005,	, 31.22383, 28.82242, Accurate to within 100 units,	0.00
2831CC50006,	, 31.19978, 28.83077, Accurate to within 100 units,	0.00
2831CC50007,	, 31.24080, 28.81639, Accurate to within 100 units,	0.00
2831CC50008,	, 31.15764, 28.84367, Accurate to within 100 units,	0.00
2831CC50009,	, 31.23823, 28.81692, Accurate to within 100 units,	0.00
2831CC50010,	, 31.16596, 28.84060, Accurate to within 100 units,	0.00
2831CC50011,	, 31.24228, 28.81641, Accurate to within 100 units,	0.00
2831CC50012,	, 31.17805, 28.83915, Accurate to within 100 units,	0.00
2831CC50013,	, 31.16135, 28.82021, Accurate to within 100 units,	0.00
2831CC50014,	, 31.23517, 28.81145, Accurate to within 100 units,	0.00
2831CC50015,	, 31.15754, 28.82424, Accurate to within 100 units,	0.00
2831CC50016,	, 31.24628, 28.80814, Accurate to within 100 units,	0.00
2831CC50017,	, 31.15088, 28.82567, Accurate to within 100 units,	0.00
2831CC50018,	, 31.15402, 28.82400, Accurate to within 100 units,	0.00
2831CC50019,	, 31.16455, 28.82239, Accurate to within 100 units,	0.00
2831CC50020,	, 31.17016, 28.82234, Accurate to within 100 units,	0.00
2831CC50021,	, 31.16054, 28.82254, Accurate to within 100 units,	0.00
2831CCA0001, MBONGOLWANE (NEAR POLICE STATION),	31.20167, 28.93750, Accurate to within 100 units,	0.00
2831CCA0002, MBONGOLWANE HOSPITAL	, 31.19861, 28.93278, Accurate to within 100 units,	0.00
2831CCA0003, MBONGOLWANE MISSION	, 31.19611, 28.93278, Accurate to within 100 units,	0.00
2831CCA0005, MBONGOLWANE MISSION	, 31.19778, 28.92861, Accurate to within 100 units,	36.00
2831CCA0006, OLD BOREHOLE FOR HOSPITAL	, 31.20250, 28.93139, Accurate to within 100 units,	0.00
2831CCA0007, TUGELA VALLEY	, 31.10472, 28.90472, Accurate to within 100 units,	0.00
2831CCA0008, TUGELA VALLEY (NEW SCHOOL YARD)	, 31.10778, 28.84611, Accurate to within 100 units,	75.00
2831CCA0010, KWASHANGE (SOUTH OF KOMO STORE),	31.17667, 28.82667, Accurate to within 100 units,	102.00
2831CCA0011, OSUNGULWENI CLINIC	, 31.20500, 28.84167, Accurate to within 100 units,	0.00
2831CCA0014, ESIBUDENI CLINIC	, 31.16778, 28.75361, Accurate to within 100 units,	0.00
2831CCA0015, MTUNGWENI	, 31.03889, 28.83222, Accurate to within 100 units,	108.00
2831CCA0016, MBONGOLWANE MISSION	, 31.19417, 28.93139, Accurate to within 100 units,	0.00
2831CCA0017, MBONGOLWANE MISSION	, 31.19500, 28.93167, Accurate to within 100 units,	42.00
2831CCA0018, MBONGOLWANE MISSION	, 31.20056, 28.92944, Accurate to within 100 units,	42.00
2831CCA0020, NR KWAKOMO	, 31.17861, 28.78528, Accurate to within 100 units,	0.00
2831CCA0022, MAMABA	, 31.15550, 28.83639, Accurate to within 100 units,	126.00
2831CCA0023, NQUMIZWE SCHOOL	, 31.14472, 28.83778, Accurate to within 100 units,	121.00
2831CCA0024, NR NTOLWANE	, 31.13722, 28.83583, Accurate to within 100 units,	0.00

2831CCA0028, NR. TOLWANE	, 31.11083, 28.84750, Accurate to within 100 units,	0.00
2831CCA0029, MAMBA (TUGELA VALLEY)	, 31.11361, 28.86111, Accurate to within 100 units,	0.00
2831CCA0031, NR. MBONGOLWANE	, 31.19611, 28.92306, Accurate to within 100 units,	0.00
2831CCA0032, VULINGQONDO	, 31.22694, 28.92611, Accurate to within 100 units,	0.00
2831CCA0033, TUGELA VALLEY	, 31.04222, 28.83083, Accurate to within 100 units,	0.00
2831CCA0034, TUGELA VALLEY (NR. NSUZE RIVER)	, 31.02167, 28.82055, Accurate to within 100 units,	0.00
2831CCA0035, TUGELA VALLEY - MAPUMULO	, 31.01583, 28.91222, Accurate to within 100 units,	0.00
2831CCA0036, SHU-SHU HOT SPRINGS	, 31.00083, 28.85750, Accurate to within 100 units,	0.00
2831CCAK001, OSGUNGWENI	, 31.20194, 28.83611, Accurate to within 100 units,	48.00
2831CCAK002, MBONGOLWANE HOSPITAL	, 31.19861, 28.93611, Accurate to within 100 units,	96.00
2831CCAK003, MBONGOLWANE HOSPITAL	, 31.20194, 28.93583 No info	120.00
2831CCAK004, MBONGOLWANE G ZULU	, 31.23472, 28.92694 No info	78.00
2831CCAK005, MVUZANE	, 31.23333, 28.80444, Accurate to within 100 units,	110.00
2831CCAK006, MANZAMNYAMA SCHOOL	, 31.08528, 28.92972, Accurate to within 100 units,	138.00
2831CCAK007, SITHILO	, 31.11861, 28.92139 No info	154.00
2831CCAK008, MPULUNGENI	, 31.09806, 28.92139 No info	132.00
2831CCAK009, MADIDIMA	, 31.16250, 28.89389, Accurate to within 100 units,	66.00
2831CCAK010, MAGUQA	, 31.18083, 28.89806, Accurate to within 100 units,	120.00
2831CCAK011, MBONGLWANE	, 31.21333, 28.92500 No info	60.00
2831CCAK012, SOUTH OF MBONGOLWANE	, 31.22083, 28.94972, Accurate to within 100 units,	60.00
2831CCAK013,	, 31.22500, 28.91861 No info	30.00
2831CCAK014,	, 31.15944, 28.84500 No info	120.00
2831CCAK015,	, 31.15861, 28.84389 No info	120.00
2831CCAK016,	, 31.16806, 28.84139 No info	48.00
2831CCAK017, MAQADINI	, 31.23583, 28.80111, Accurate to within 100 units,	42.00
2831CCAK018, MAQADINI	, 31.23750, 28.79111 No info	120.00
2831CCAK019, MAQADINI	, 31.23694, 28.78972 No info	150.00
2831CCAK020, TOLWANE	, 31.11056, 28.81694, Accurate to within 100 units,	120.00
2831CCAK021, MDINELA	, 31.10528, 28.80167, Accurate to within 100 units,	102.00
2831CCAK022, NTALAMBO SCHOOL	, 31.11194, 28.77889, Accurate to within 100 units,	84.00
2831CCAK023, BHEBHE	, 31.12556, 28.80583 No info	144.00
2831CCAK024, MDIMELA	, 31.12083, 28.79444, Accurate to within 100 units,	42.00
2831CCAK025, EZITEZE	, 31.09639, 28.84111, Accurate to within 100 units,	72.00
2831CCAK026, MAGWAZA COURT HOUSE	, 31.08278, 28.86028 No info	120.00
2831CCAK027, MAGWAZA COURT HOUSE	, 31.09944, 28.86000, Accurate to within 100 units,	150.00
2831CCAK029,	, 31.01250, 28.82306 No info	60.00
2831CCAK030,	, 31.04167, 28.88750 No info	120.00
2831CCAK031, MDIMELA	, 31.10500, 28.78167, Accurate to within 100 units,	75.00
2831CCAK032,	, 31.10500, 28.78167, Accurate to within 100 units,	30.00
2831CCAK033,	, 31.10389, 28.81611, Accurate to within 100 units,	60.00
2831CCAK034,	, 31.14583, 28.76861, Accurate to within 100 units,	70.00
2831CCAK035,	, 31.02917, 28.82444 No info	100.00
2831CCAK036, MABULU	, 31.01889, 28.91944 No info	102.00
2831CCAK037, MAMBULU	, 31.01944, 28.91917 No info	114.00
2831CCAK038, KWASHUSHU	, 31.00833, 28.88056 No info	150.00
2831CCA040, MBONGOLWANE - MAVUMENGWANE H/S	, 31.22806, 28.92806, Accurate to within 100 units,	100.00
2831CCAK041, NTUMENI - MANAHEIM L/P SCHOOL	, 31.24000, 28.86861, Accurate to within 100 units,	100.00

2831CCA042, NTUMENI - THEMBALESIZWE CP	, 31.25000, 28.91861, Accurate to within 100 units, 100.00
2831CD00001, AMATIKULU	, 31.44441, 28.86056, Accurate to within 10 000 units, 54.00
2831CD00002, AMATIKULU	, 31.44444, 28.86056, Accurate to within 10 000 units, 140.00
2831CD00003, AMATIKULU	, 31.39250, 28.88333, Accurate to within 10 000 units, 152.00
2831CD00004, AMATIKULU	, 31.36667, 28.90000, Accurate to within 10 000 units, 126.00
2831CD00005, AMATIKULU INRIGTING	, 31.44445, 28.86056, Accurate to within 10 000 units, 108.20
2831CD00006, MOBENI	, 31.44440, 28.86056, Accurate to within 10 000 units, 62.48
2831CD00007, NORSE MOUNT	, 31.36667, 28.86111, Accurate to within 10 000 units, 134.72
2831CD00008, GLENORA	, 31.28861, 28.92361, Accurate to within 10 000 units, 72.00
2831CD00009, SUNSET	, 31.43611, 28.85618, Accurate to within 100 units, 127.10
2831CD00010, ROCKY RIDGE	, 31.28833, 28.88028, Accurate to within 10 000 units, 71.01
2831CD00011, RIVERS BEND	, 31.33750, 28.87917, Accurate to within 10 000 units, 32.00
2831CD00012, SUTTON	, 31.39527, 28.86945, Accurate to within 10 000 units, 45.72
2831CD00013, SUTTON EXTENDED	, 31.39528, 28.86945, Accurate to within 10 000 units, 63.70
2831CD00014, SUTTON	, 31.39527, 28.86946, Accurate to within 10 000 units, 105.00
2831CD00015, WHITFIELD	, 31.39027, 28.91167, Accurate to within 10 000 units, 80.16
2831CD00016, AMATIKULU	, 31.35278, 28.78361, Accurate to within 10 000 units, 142.34
2831CD00017, GRAMOND	, 31.42445, 28.87250, Accurate to within 10 000 units, 58.52
2831CD00018, KAI DOWNS	, 31.30250, 28.92223, Accurate to within 10 000 units, 128.10
2831CD00019, KAI DOWNS	, 31.30251, 28.92223, Accurate to within 10 000 units, 140.30
2831CD00020, GLENORA	, 31.28861, 28.92362, Accurate to within 10 000 units, 40.53
2831CD00021, FAIRFIELD	, 31.42000, 28.88777, Accurate to within 10 000 units, 114.00
2831CD00022, WHITFIELD	, 31.39027, 28.91168, Accurate to within 10 000 units, 123.00
2831CD00023, WHITFIELD	, 31.39028, 28.91167, Accurate to within 10 000 units, 122.83
2831CD00024, WINDY RIDGE	, 31.38722, 28.90000, Accurate to within 10 000 units, 90.83
2831CD00025, WINDY RIDGE	, 31.38723, 28.90000, Accurate to within 10 000 units, 131.67
2831CD00026, ESHOWE POLICE CAMP	, 31.46389, 28.89694, Accurate to within 10 000 units, 44.19
2831CD00027, AMATIKULU SUB 1 OF LOT 14	, 31.28833, 28.86250, Accurate to within 10 000 units, 126.00
2831CD00028, AMATIKULU INRIGTING	, 31.44444, 28.86057, Accurate to within 10 000 units, 112.16
2831CD00029, AMATIKULU	, 31.44446, 28.86056, Accurate to within 10 000 units, 45.00
2831CD00030, BELMONT	, 31.44250, 28.86583, Accurate to within 100 units, 58.82
2831CD00031, SUNRISE	, 31.39861, 28.84722, Accurate to within 10 000 units, 75.28
2831CD00032, SUNRISE	, 31.39861, 28.84723, Accurate to within 10 000 units, 23.77
2831CD00033, FAIRFIELD	, 31.42001, 28.88777, Accurate to within 10 000 units, 98.14
2831CD00034, NETHERLEY	, 31.44722, 28.87917, Accurate to within 10 000 units, 116.43
2831CD00035, NETHERLEY	, 31.44722, 28.87918, Accurate to within 10 000 units, 119.78
2831CD00036, POOK'S MILL	, 31.44166, 28.91333, Accurate to within 10 000 units, 128.62
2831CD00038, RIVER BEND LOT 55	, 31.33750, 28.87918, Accurate to within 10 000 units, 29.56
2831CD00039, FAIRBREEZE	, 31.43000, 28.86250, Accurate to within 10 000 units, 113.99
2831CD00040, FAIR BREEZE	, 31.43000, 28.86251, Accurate to within 10 000 units, 147.52
2831CD00041, MOBENI	, 31.42917, 28.84583, Accurate to within 10 000 units, 128.00
2831CD00042, AMATIKULU	, 31.28583, 28.86808, Accurate to within 10 000 units, 180.00
2831CD00043, AMATIKULU INRIGTING	, 31.44444, 28.86058, Accurate to within 10 000 units, 39.62
2831CD00044, NORSE MOUNT	, 31.36668, 28.86111, Accurate to within 10 000 units, 137.16
2831CD00045, UMHLATUZI LOT 1,2,3,4	, 31.46861, 28.76389, Accurate to within 10 000 units, 38.10
2831CD00046, UMHLATUZI LOT 1,2,3,4	, 31.46861, 28.76390, Accurate to within 10 000 units, 61.26
2831CD00047, RIVERS BENT LOT 55	, 31.33751, 28.87917, Accurate to within 10 000 units, 29.56
2831CD00048, DEVONSHIRE	, 31.28527, 28.89760, Accurate to within 100 units, 80.16
2831CD00049, MIDWAY	, 31.39583, 28.86667, Accurate to within 10 000 units, 96.01
2831CD00050, SUNRISE	, 31.39862, 28.84722, Accurate to within 10 000 units, 59.13
2831CD00051, KWA MHALEKA	, 31.41945, 28.90556, Accurate to within 10 000 units, 92.65
2831CD00052, KWA MAHLEKA	, 31.41946, 28.90556, Accurate to within 10 000 units, 82.27
2831CD00053, THE EYRIE	, 31.44389, 28.84806, Accurate to within 100 units, 96.00
2831CD00054, THE EYRIE	, 31.44445, 28.84694, Accurate to within 10 000 units, 152.70

2831CD00055, GRATTON	, 31.47945, 28.86056, Accurate to within 10 000 units, 128.00
2831CD00056, THE MILL	, 31.49000, 28.85000, Accurate to within 10 000 units, 156.10
2831CD00057, KNOCKING GLASS	, 31.45833, 28.85667, Accurate to within 10 000 units, 96.01
2831CD00058, CLOUD HILL	, 31.37583, 28.88250, Accurate to within 100 units, 70.00
2831CD00059, CHATWALL	, 31.43944, 28.87000, Accurate to within 10 000 units, 132.00
2831CD00060, CHATWALL	, 31.43945, 28.87000, Accurate to within 10 000 units, 109.00
2831CD00061, SUNRISE	, 31.39861, 28.84724, Accurate to within 10 000 units, 36.57
2831CD00062, FAIR FIELD	, 31.42000, 28.88778, Accurate to within 10 000 units, 41.45
2831CD00063, DAPLEMERE	, 31.41250, 28.88861, Accurate to within 10 000 units, 120.00
2831CD00064, DAPLEMERE	, 31.41250, 28.88862, Accurate to within 10 000 units, 106.68
2831CD00065, DAPLEMERE	, 31.41251, 28.88861, Accurate to within 10 000 units, 108.00
2831CD00066, DAPLEMERE	, 31.41250, 28.88863, Accurate to within 10 000 units, 128.93
2831CD00067, DAPLEMERE	, 31.41252, 28.88861, Accurate to within 10 000 units, 108.00
2831CD00068, CROISDALE	, 31.39583, 28.86945, Accurate to within 10 000 units, 83.51
2831CD00069, PENHARRY	, 31.41389, 28.88056, Accurate to within 10 000 units, 75.00
2831CD00070, ARUMVALE	, 31.31806, 28.91361, Accurate to within 10 000 units, 90.00
2831CD00071, ARUMVALE	, 31.31806, 28.91362, Accurate to within 10 000 units, 130.00
2831CD00072, ARUMVALE	, 31.31807, 28.91361, Accurate to within 10 000 units, 90.00
2831CD00073, ARUMVALE	, 31.31806, 28.91363, Accurate to within 10 000 units, 60.00
2831CD00074, BROCKLEE	, 31.40000, 28.87584, Accurate to within 10 000 units, 152.00
2831CD00075, MHLATUZI	, 31.46862, 28.76389, Accurate to within 10 000 units, 25.90
2831CD00076, AMATIKULU	, 31.29416, 28.88028, Accurate to within 10 000 units, 150.00
2831CD00077, AMATIKULU SUB 2 OF LOT 23	, 31.28777, 28.90333, Accurate to within 10 000 units, 38.00
2831CD00078, AMATIKULU	, 31.28777, 28.90334, Accurate to within 10 000 units, 30.00
2831CD00079, GLENORA	, 31.28862, 28.92361, Accurate to within 10 000 units, 75.59
2831CD00080, FAIR FIELD	, 31.42002, 28.88777, Accurate to within 10 000 units, 54.25
2831CD00081, FAIR FEILD	, 31.42000, 28.88779, Accurate to within 10 000 units, 76.20
2831CD00082, AMATIKULU	, 31.44447, 28.86056, Accurate to within 10 000 units, 149.00
2831CD00083, SUNSET	, 31.44222, 28.85279, Accurate to within 10 000 units, 140.51
2831CD00084, AMATIKULU	, 31.44444, 28.86059, Accurate to within 10 000 units, 107.00
2831CD00085, AMATIKULU	, 31.40000, 28.83889, Accurate to within 10 000 units, 120.00
2831CD00086, EZULWENI	, 31.38333, 28.85000, Accurate to within 10 000 units, 53.64
2831CD00087, EZULWENI	, 31.38333, 28.85001, Accurate to within 10 000 units, 79.24
2831CD00088, AMATIKULU	, 31.44444, 28.86856, Accurate to within 10 000 units, 121.00
2831CD00089, ENTUMENI NATURE RESERVE	, 31.33094, 28.85611, Accurate to within 10 000 units, 187.00
2831CD00090, ENKANYEZI	, 31.48616, 28.89161, Accurate to within 1 000 units, 0.00
2831CD00091, ENKANYEZI (OGWINI)	, 31.25854, 28.92001, Accurate to within 1 000 units, 50.00
2831CD00092, ENKANYEZI (OGWINI)	, 31.25678, 28.91837, Accurate to within 1 000 units, 120.00
2831CD00093, ENKANYEZI (OGWINI)	, 31.48769, 28.81761, Accurate to within 1 000 units, 108.00
2831CD00094, VUMA - ENKANYEZI	, 31.36067, 28.80949, Accurate to within 1 000 units, 0.00
2831CD00095, DANGWENI EAST - ENKANYEZI	, 31.49078, 28.82678, Accurate to within 1 000 units, 54.00
2831CD00096, ENKANYEZI (OGWINI)	, 31.49205, 28.82853, Accurate to within 1 000 units, 78.00
2831CD00097, ENKANYEZI	, 31.49087, 28.83056, Accurate to within 1 000 units, 113.00
2831CD00098, ENKANYEZI	, 31.46385, 28.79646, Accurate to within 1 000 units, 82.00
2831CD00099, GUNIANLIZIYO - ENKANYEZI	, 31.33842, 28.80512, Accurate to within 1 000 units, 35.00
2831CD00100, NHUSA - ENKANYEZI	, 31.48592, 28.81595, Accurate to within 1 000 units, 120.00
2831CD00101, DANGWINI - ENKANYEZI	, 31.48733, 28.82590, Accurate to within 1 000 units, 0.00
2831CD00102, DANGWINI - ENKANYEZI	, 31.48512, 28.84097, Accurate to within 1 000 units, 120.00
2831CD00103, OGWINI - ENKANYEZI	, 31.48974, 28.82211, Accurate to within 1 000 units, 70.00
2831CD00104, NTIMKNABA - ENKANYEZI	, 31.46463, 28.83224, Accurate to within 1 000 units, 120.00
2831CD00105, GELEJA DIP - ENKANYEZI	, 31.40486, 28.83423, Accurate to within 1 000 units, 102.00
2831CD00106, GELEJA DIP - ENKANYEZI	, 31.40256, 28.83374, Accurate to within 1 000 units, 120.00
2831CD00107, RESERVE - ENKANYEZI	, 31.36668, 28.82123, Accurate to within 1 000 units, 100.00

2831CD00108, RESERVE - ENKANYEZI	, 31.37211, 28.82089, Accurate to within 1 000 units,	100.00
2831CD00109, KWA MPOFU SCHOOL - ENKANYEZI	, 31.42788, 28.84159, Accurate to within 1 000 units,	120.00
2831CD00110, VUTSINI - ENKANYEZI	, 31.47803, 28.83174, Accurate to within 1 000 units,	100.00
2831CD00111, DANGWENI EAST - ENKANYEZI	, 31.49228, 28.83020, Accurate to within 1 000 units,	100.00
2831CD00112, MLALAZI - ENKANYEZI	, 31.48948, 28.85477, Accurate to within 1 000 units,	120.00
2831CD00114, ESHOWE GEVANGENIS	, 31.47361, 28.87361, Accurate to within 10 000 units,	140.00
2831CD00115, EMATIKULU	, 31.40417, 28.87500, Accurate to within 100 units,	0.00
2831CD00116, BROCKLEE	, 31.40278, 28.87361, Accurate to within 100 units,	0.00
2831CD00117, AMATIKULU	, 31.40139, 28.87444, Accurate to within 100 units,	0.00
2831CD00118, AMATIKULU	, 31.40472, 28.88889, Accurate to within 100 units,	0.00
2831CD00119, AMATIKULU	, 31.39167, 28.89167, Accurate to within 100 units,	0.00
2831CD00120, MBELESI	, 31.41250, 28.85278, Accurate to within 100 units,	0.00
2831CD00121, EKAMAZI	, 31.41500, 28.84583, Accurate to within 100 units,	0.00
2831CD00122, EKAMAZI.	, 31.41583, 28.84444, Accurate to within 100 units,	0.00
2831CD00123, SUNRISE	, 31.40417, 28.85278, Accurate to within 100 units,	0.00
2831CD00124, EZULWENI	, 31.38278, 28.85194, Accurate to within 100 units,	0.00
2831CD00125, VUMA	, 31.38000, 28.84917, Accurate to within 100 units,	0.00
2831CD00126, MISTY ACRES	, 31.37222, 28.86389, Accurate to within 100 units,	0.00
2831CD00127, NORSE MOUNT.	, 31.36750, 28.86722, Accurate to within 100 units,	0.00
2831CD00128, HOPEWELL	, 31.31111, 28.89722, Accurate to within 100 units,	0.00
2831CD00129, DEVONSHIRE	, 31.28611, 28.89583, Accurate to within 100 units,	0.00
2831CD00130, AMATIKULU	, 31.28250, 28.88889, Accurate to within 100 units,	0.00
2831CD00131, KWASIQANDAQANDA.	, 31.34028, 28.81111, Accurate to within 1 000 units,	0.00
2831CD00132, SIZABANTU	, 31.35556, 28.84167, Accurate to within 1 000 units,	0.00
2831CD00133, KWANONKOLOMBELANA.	, 31.33250, 28.84583, Accurate to within 1 000 units,	0.00
2831CD00134, VULA MEHLO	, 31.38611, 28.79861, Accurate to within 1 000 units,	0.00
2831CD00135, MISTY RIDGE	, 31.36250, 28.88056, Accurate to within 100 units,	0.00
2831CD00136, STERLING	, 31.36389, 28.88194, Accurate to within 100 units,	0.00
2831CD00137, ARCADIA.	, 31.32083, 28.88194, Accurate to within 1 000 units,	0.00
2831CD00138, ARCADIA.	, 31.32222, 28.88278, Accurate to within 1 000 units,	0.00
2831CD00139, BEYOSHINE.	, 31.27222, 28.94167, Accurate to within 1 000 units,	0.00
2831CD00140, MASUNDWINI.	, 31.26754, 28.94583, Accurate to within 1 000 units,	0.00
2831CD00141, 2KMNORTH,AWAY FROM MASUNDWINI.	, 31.26750, 28.93750, Accurate to within 1 000 units,	0.00
2831CD00142, 1.8KM NORTH,AWAY FROM MASUNDWINI,	31.26861, 28.93611, Accurate to within 1 000 units,	0.00
2831CD00143, 1.8KM NORTH EAST FROM MASUNDWINI,	31.28250, 28.93750, Accurate to within 1 000 units,	0.00
2831CD00144,	, 31.30278, 28.95972, Accurate to within 1 000 units,	0.00
2831CD00145, KWANGILANDELE.	, 31.28167, 28.94583, Accurate to within 1 000 units,	0.00
2831CD00146, KWANGILANDELE.	, 31.30972, 28.95556, Accurate to within 1 000 units,	0.00
2831CD00147, KWANGILANDELE.	, 31.28194, 28.94861, Accurate to within 1 000 units,	0.00

APPENDIX 4

SITE_ID_NR , X_COORD, Y_COORD, AQUIFER DEPTH TO TOP, AQUIFER DEPTH TO BOTTOM, YIELD
(l/s)

2831CC00001	-18822.53	3202073.40	25.90	0.00	0.71
2831CC00002	-20682.54	3191885.88	70.10	0.00	0.91
2831CC00003	-21657.20	3192534.90	4.57	0.00	0.98
2831CC00006	-19708.29	3200668.46	26.00	0.00	0.67
2831CC00008	-623.55	3192391.66	18.28	0.00	0.89
2831CC00009	-624.53	3192391.66	102.00	0.00	0.45
2831CC00010	-1328.01	3201627.01	23.77	0.00	0.20
2831CC00012	-817.61	3208008.51	75.00	0.00	0.50
2831CC00013	-1001.63	3198650.13	0.00	0.00	0.50
2831CC00015	-966.85	3206338.32	70.00	0.00	0.17
2831CC00021	-8013.29	3199670.27	0.00	0.00	1.67
2831CC00023	-5777.10	3197788.18	60.00	0.00	0.19
2831CC00024	-18691.58	3201053.56	21.00	0.00	0.17
2831CC00026	-19032.06	3201545.09	0.00	0.00	0.14
2831CC00027	-9987.47	3194742.17	26.00	0.00	6.67
2831CC00031	-9549.74	3196714.53	60.00	0.00	0.83
2831CC00033	-15931.61	3205615.60	6.00	0.00	3.33
2831CC00034	-22453.71	3200957.19	26.00	0.00	0.19
2831CC00039	-10373.64	3184033.29	45.00	0.00	0.80
2831CC00044	-4727.52	3195615.47	42.00	0.00	0.57
2831CC00046	-16412.54	3188837.94	66.00	0.00	0.27
2831CC00048	-4606.90	3194732.12	42.00	0.00	0.13
2831CC00048	-4606.90	3194732.12	108.00	0.00	0.13
2831CC00049	-11956.33	3189966.26	50.00	0.00	0.83
2831CC00051	-5493.21	3189686.54	72.00	0.00	0.69
2831CC00052	-13963.20	3189844.37	36.00	0.00	2.77
2831CC00060	-3222.29	3205938.64	90.00	0.00	0.28
2831CCA0001	-19662.94	3202105.84	18.00	22.00	0.17
2831CCA0005	-19285.31	3201119.93	24.00	30.00	2.85
2831CCA0011	-20005.98	3191485.71	0.00	0.00	0.19
2831CCA0016	-18932.79	3201427.45	30.00	36.00	0.44
2831CCA0017	-19013.67	3201458.61	25.00	36.00	1.00
2831CCA0018	-19556.23	3201212.37	40.00	42.00	0.67
2831CCA0032	-22129.21	3200847.95	86.00	0.00	0.42
2831CCA0002	-19364.85	3201951.28	30.00	82.00	0.17
2831CCA0003	-19689.58	3201920.80	18.00	22.00	0.17
2831CCA0004	-22887.66	3200941.42	36.00	60.00	1.10
2831CCA0005	-22778.82	3187364.71	67.00	0.00	0.14
2831CCA0006	-8315.46	3201229.84	125.00	0.00	0.21
2831CCA0009	-15850.46	3197266.73	60.00	0.00	0.14
2831CCA0010	-17637.69	3197731.47	96.00	0.00	0.17
2831CCA0011	-20802.30	3200722.46	16.00	60.00	0.22
2831CCA0012	-21528.53	3203463.50	52.00	0.00	0.17
2831CCA0013	-21941.61	3200016.37	26.00	0.00	0.25
2831CCA0017	-23023.61	3186996.14	38.00	0.00	2.86
2831CCA0020	-10792.10	3188732.72	114.00	0.00	0.33
2831CCA0021	-10278.20	3187039.93	96.00	0.00	0.25
2831CCA0022	-10930.78	3184515.89	62.00	0.00	0.18
2831CCA0024	-11797.12	3186240.09	36.00	0.00	0.42
2831CCA0025	-9406.75	3191410.20	67.00	0.00	0.18

2831CCAK027	-9702.65	3193503.98	144.00	0.00	0.08
2831CCAK029	-1220.09	3189406.02	50.00	0.00	0.67
2831CCAK030	-4064.79	3196548.39	111.00	0.00	0.25
2831CCAK031	-10252.83	3184823.37	70.00	0.00	0.33
2831CCAK032	-10252.83	3184823.37	24.00	0.00	0.33
2831CCAK033	-10141.10	3188640.14	52.00	0.00	0.67
2831CCAK034	-14241.49	3183380.18	60.00	0.00	2.00
2831CCAK036	-1842.10	3200087.67	0.00	0.00	0.17
2831CCAK037	-1895.74	3200057.76	0.00	0.00	0.22
2831CCAK040	-22238.00	3201064.28	86.00	0.00	0.42

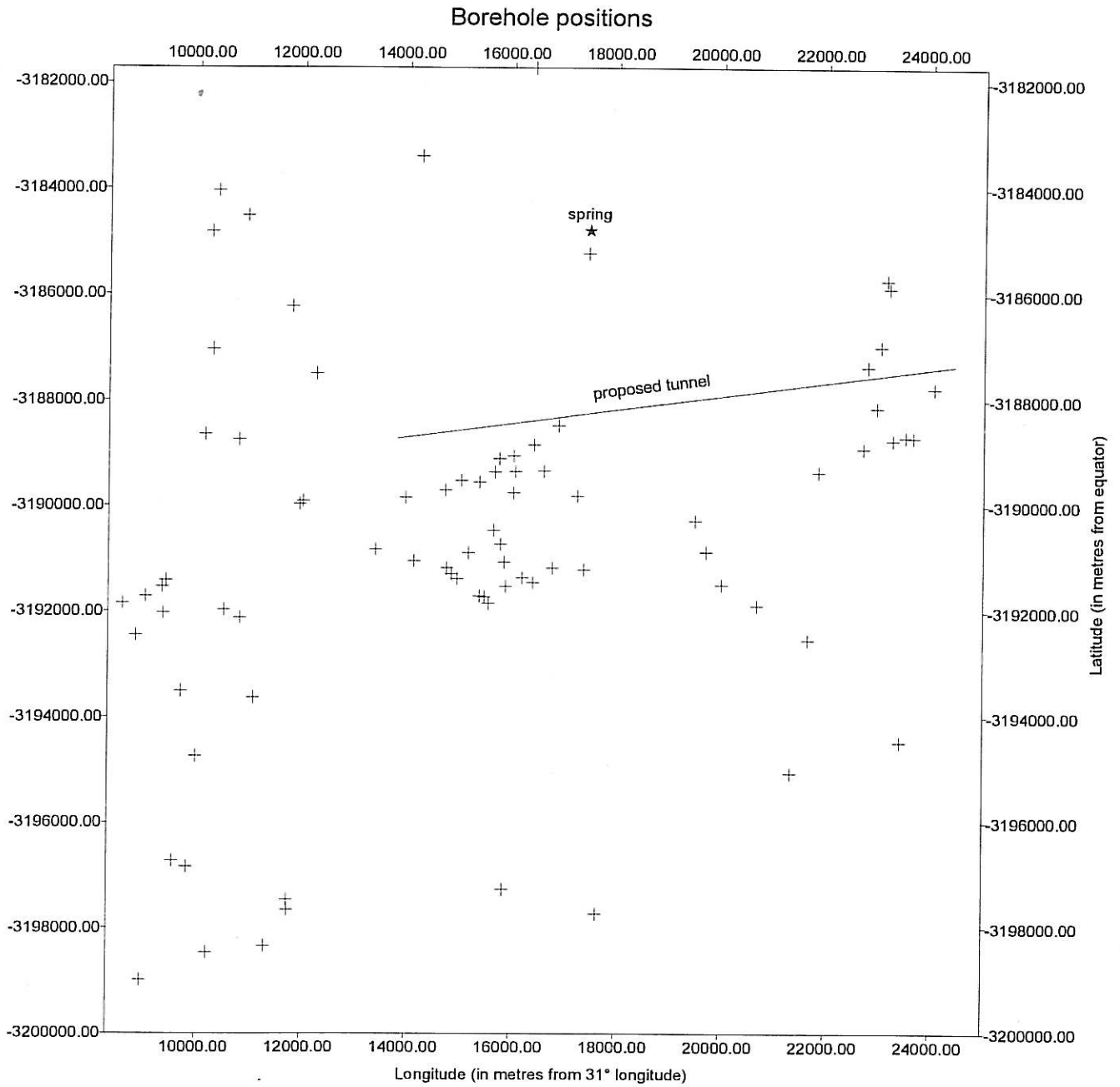


Figure 1
Borehole positions

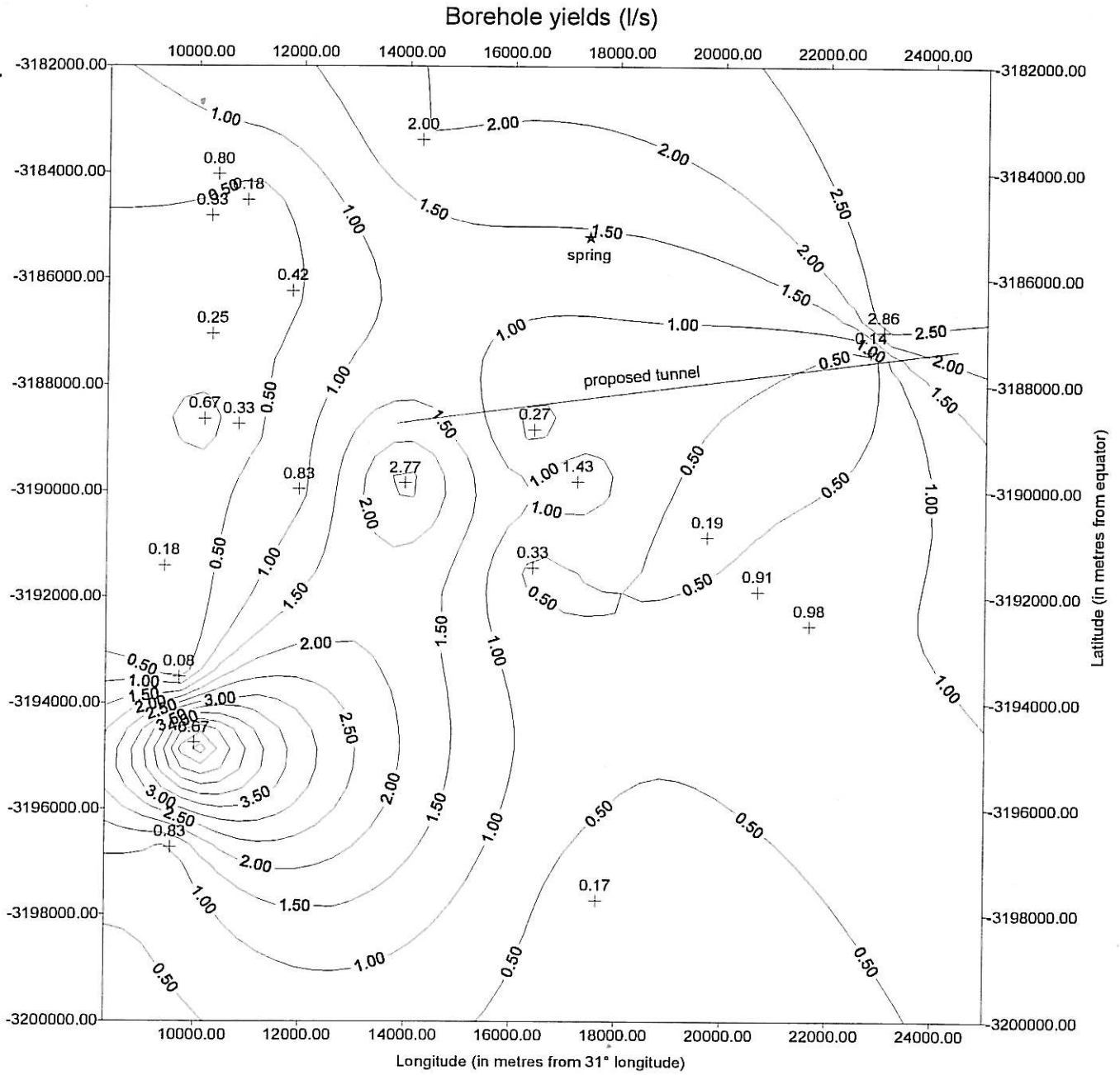


Figure 4
Borehole yield