

## **APPENDIX B**

### **ISP RELATED INFORMATION**

## AMATOLE – KEI ISP

## RIVERS, DAMS AND TOWNS IN THE ISP AREA

| QUATS                            | RIVERS/RIVER REACHES                     | DAMS                                                                                    | TOWNS/SUBURBS          |
|----------------------------------|------------------------------------------|-----------------------------------------------------------------------------------------|------------------------|
| <b><u>Amatole Catchments</u></b> |                                          |                                                                                         |                        |
| R10A                             | Keiskamma                                |                                                                                         |                        |
| R10B                             | Keiskamma<br>Cata<br>Wolf                | Sandile<br>Cata<br>Mnyameni                                                             | Keiskammahoek          |
| R10C                             | Keiskamma<br>Rabula                      |                                                                                         |                        |
| R10D                             | Keiskamma                                |                                                                                         |                        |
| R10E                             | Keiskamma<br>Debe                        | Debe                                                                                    | Middledrift            |
| R10F                             | Tyume                                    |                                                                                         |                        |
| R10G                             | Tyume                                    | Binfield Park<br>Pleasant View                                                          |                        |
| R10H                             | Tyume                                    |                                                                                         | Alice                  |
| R10J                             | Keiskamma                                |                                                                                         |                        |
| R10K                             | Keiskamma<br>Zalara                      | Dimbaza                                                                                 | Dimbaza                |
| R10L                             | Keiskamma                                |                                                                                         |                        |
| R10M                             | Keiskamma                                |                                                                                         | Hamburg                |
|                                  |                                          |                                                                                         |                        |
| R20A                             | Buffalo<br>Cwengcwe                      | Rooikrantz, Maden                                                                       |                        |
| R20B                             | Buffalo<br>Zeze                          |                                                                                         |                        |
| R20C                             | Mgqakwebe                                |                                                                                         |                        |
| R20D                             | Buffalo<br>Ngqokweni                     |                                                                                         | King William's Town    |
| R20E                             | Buffalo<br>Yellowwoods                   | Laing                                                                                   | Bisho                  |
| R20F                             | Buffalo                                  |                                                                                         | Mdantsane              |
| R20G                             | Buffalo<br>Amalinda<br>Mzonyana          | Bridle Drift<br>Amalinda<br>Umzoniana                                                   | East London            |
|                                  |                                          |                                                                                         |                        |
| R30A                             | Kwenxura                                 |                                                                                         | Morgan Bay             |
| R30B                             | Kwelera<br>Kwamehlwenyoka                | Amberdene<br>Bideford<br>Sun Rise, Magazo Park                                          | Cintsa East            |
| R30C                             | Gqunube<br><br>Tanga<br><br>Ngculu       | Windmill, The Lake, Queens<br>Court Big Fairview Farm,<br>Sunnyside Irrigation Kentbury | Sunrise-on-Sea         |
| R30D                             | Gqunube                                  |                                                                                         | Gonubie                |
| R30E                             | Nahoon<br>Nkobongo<br>Qoqongwane<br>Xolo | Partners Valley<br>Lyndhurst<br>Conrad Swart<br>Ossie, Lillystone                       |                        |
| R30F                             | Nahoon                                   | Nahoon                                                                                  | East London/Beacon Bay |

| QUATS                              | RIVERS/RIVER REACHES                 | DAMS                                                  | TOWNS/SUBURBS             |
|------------------------------------|--------------------------------------|-------------------------------------------------------|---------------------------|
| R40A                               | Gxulu                                | Rockcliff                                             | East London, Kidd's Beach |
| R40B                               | Tyolomnqa                            |                                                       |                           |
| R40C                               | Tyolomnqa                            |                                                       | Kayser's Beach            |
|                                    |                                      |                                                       |                           |
| R50A                               | Bira                                 |                                                       | Bira, Wesley              |
| R50B                               | Magwalana<br>Mtati<br>Mpekweni       |                                                       |                           |
| <b><u>White Kei Catchments</u></b> |                                      |                                                       |                           |
| S10A                               | Grootvleispruit<br>Kleinvlei         | Glen Wallace<br>Kleinvlei B, Park, Kleinvlei T        |                           |
| S10B                               | White Kei<br><br>Sidwadwa<br>Birds   | Rietfontein,<br>Above Huts<br><br>Birds River         |                           |
| S10C                               | White Kei<br>Lemoenfontein           |                                                       |                           |
| S10D                               | White Kei<br>Qoqodala                |                                                       |                           |
| S10E                               | White Kei                            | Xonxa                                                 |                           |
| S10F                               | Cacadu<br>Hol                        | Macubeni<br>Glen Doris                                |                           |
| S10G                               | Cacadu                               |                                                       | Lady Frere                |
| S10H                               | White Kei                            |                                                       |                           |
| S10J                               | White Kei                            |                                                       |                           |
|                                    |                                      |                                                       |                           |
| S20A                               | Doring                               | Blaauwkrantz                                          | Indwe                     |
| S20B                               | Doring<br>Indwe                      | Doring River,<br>Rustdal, Redlands                    |                           |
| S20C                               | Indwe                                | Lubisi                                                |                           |
| S20D                               | Indwe                                |                                                       | Qamata                    |
| <b><u>Black Kei Catchments</u></b> |                                      |                                                       |                           |
| S31A                               | Hex                                  | Lismore                                               | Sterkstroom               |
| S31B                               | Klaas Smits                          |                                                       |                           |
| S31C                               | Heuningklip                          | Varkenskuilen, Spes Bona L,<br>Lekkerlag, Glen Torret |                           |
| S31D                               | Lesseyton                            | Vaalkrantz                                            |                           |
| S31E                               | Klaas Smits<br>Bonkolo               | Skietfontein<br>Oakleigh                              |                           |
| S31F                               | Bonkolo                              | Bongolo                                               | Queenstown, Ezibeleni     |
| S31G                               | Klaas Smits<br><br>Bonkolo<br>Komani | Western Essex Prospect<br><br>Rathwick                |                           |
|                                    |                                      |                                                       |                           |
| S32A                               | Black Kei                            | Thrift<br>Limietskloof                                |                           |
| S32B                               | Black Kei                            | Tentergate,<br>McEwan                                 |                           |

| QUATS                                                                                | RIVERS/RIVER REACHES                   | DAMS                                              | TOWNS/SUBURBS         |
|--------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------|-----------------------|
| S32C                                                                                 | Black Kei<br>Bulhoekspuit<br>KuZitungu | Sherwood Forest<br><br>Mitford, Glenbrook         | Thornhill, Mitford    |
| S32D                                                                                 | Klipplaat                              | Winston                                           |                       |
| S32E                                                                                 | Klipplaat<br>Krom                      | Waterdown, Lowestoffe                             |                       |
| S32F                                                                                 | Oxkraal                                | Oxkraal, Bushmanskranz                            |                       |
| S32G                                                                                 | Klipplaat<br>Oxkraal                   | <br>Shiloh                                        | Sada, Whittlesea      |
| S32H                                                                                 | Black Kei<br>Klipplaat                 |                                                   |                       |
| S32J                                                                                 | Imvani                                 |                                                   | Ilinge                |
| S32K                                                                                 | Black Kei                              |                                                   |                       |
| S32L                                                                                 | Waqu                                   |                                                   |                       |
| S32M                                                                                 | Black Kei                              |                                                   |                       |
| <b>Great Kei Catchments (downstream of confluence of White and Black Kei Rivers)</b> |                                        |                                                   |                       |
| S40A                                                                                 | Thorn                                  | Sam Meyer, Meentgrond<br>Cathcart Koch            | Cathcart              |
| S40B                                                                                 | Thomas<br>Little Thomas                | Reigate<br>Ailsa Farm Irrigation                  |                       |
| S40C                                                                                 | Thomas                                 |                                                   |                       |
| S40D                                                                                 | Kei                                    |                                                   |                       |
| S40E                                                                                 | Kei<br>Qwanti                          |                                                   |                       |
| S40F                                                                                 | Kei                                    |                                                   |                       |
|                                                                                      |                                        |                                                   |                       |
| S50A                                                                                 | Tsomo                                  |                                                   |                       |
| S50B                                                                                 | Xentu                                  |                                                   |                       |
| S50C                                                                                 | Tsomo<br>Mbokotwa<br>Mzwazwa           | <br>Crossmalooft                                  |                       |
| S50D                                                                                 | Tsomo                                  |                                                   | Cala                  |
| S50E                                                                                 | Tsomo                                  | Ncora                                             |                       |
| S50F                                                                                 | Tsojana<br>Ncuncuzo                    | Tsojana                                           |                       |
| S50G                                                                                 | Tsomo<br>Tsojana                       |                                                   |                       |
| S50H                                                                                 | Ngcongcolora                           |                                                   | Cofimvaba             |
| S50J                                                                                 | Tsomo                                  |                                                   | Tsomo                 |
|                                                                                      |                                        |                                                   |                       |
| S60A                                                                                 | Gubu<br>Ndakana<br>Kubusi              | Gubu<br>Waterfall                                 | Stutterheim, Mlungisi |
| S60B                                                                                 | Kubusi<br>Kubusi<br>Gqunube            | Wiggleswade, Leonard's Valley<br>Big Red, Deemies |                       |
| S60C                                                                                 | Gqolonci<br>Toise                      |                                                   |                       |
| S60D                                                                                 | Gqolonci<br>Mgwali                     | Boord                                             |                       |
| S60E                                                                                 | Kubusi                                 |                                                   |                       |
| S70A                                                                                 | Kei                                    |                                                   | Komga                 |

| QUATS | RIVERS/RIVER REACHES | DAMS    | TOWNS/SUBURBS |
|-------|----------------------|---------|---------------|
| S70B  | Kei<br>Toleni        | Toleni  |               |
| S70C  | Gcuwa<br>Xilinxá     | Xilinxá |               |
| S70D  | Gcuwa<br>Mtwá        |         | Nqamakwe      |
| S70E  | Gcuwa<br>Cegcuwana   | Gcuwa   | Butterworth   |
| S70F  | Kei<br>Tyityaba      |         | Kei Mouth     |

## AMATOLE - KEI ISP

### WATER AND WASTE WATER TREATMENT WORKS IN THE AMATOLE SYSTEM

#### WATER TREATMENT WORKS (Ref. 5 and 24)

| TREATMENT WORKS                   |                    |                    | RAW WATER SOURCE*                              |                             |        |                                                                                   |                            |
|-----------------------------------|--------------------|--------------------|------------------------------------------------|-----------------------------|--------|-----------------------------------------------------------------------------------|----------------------------|
| NAME                              | CAPACITY<br>(MI/d) | OWNER/<br>OPERATOR | NAME                                           | 1 in 50 YEAR YIELD**        |        | ADDITIONAL<br>YIELD<br>ALLOCATED TO<br>OTHER USERS<br>(million m <sup>3</sup> /a) | OWNER/<br>OPERATOR         |
|                                   |                    |                    |                                                | (million m <sup>3</sup> /a) | (MI/d) |                                                                                   |                            |
| Rooikrantz<br>King William's Town | 1,2<br>7,0         | DWAF/AW<br>BCM     | Rooikrantz Dam<br>Rooikrantz and<br>Maden Dams | 3,10                        | 8,5    | None                                                                              | DWAF/AW<br>DWAF/AW/<br>BCM |
| Laing Dam                         | 27,3               | DWAF/AW            | Laing Dam                                      | 14,90                       | 45,0   | None                                                                              | DWAF/AW                    |
| Umzoniana                         | 120,0              | BCM                | Bridle Drift Dam                               | 30,70                       | 79,0   | None                                                                              | BCM                        |
| Nahoon                            | 33,0               | DWAF/AW            | Nahoon Dam                                     | 5,60                        | 15,0   | 1,3 Irrigation<br>0,9 Environmental                                               | DWAF/AW                    |
| Stutterheim                       | 2,5                | Amahlati LM        | Gubu Dam<br>Kubusi River<br>Boreholes          | 2,27                        | 6,3    | 0,63 Irrigation                                                                   | DWAF/AW                    |
| Kei Road                          | 0,3                | Amahlati LM        | Wriggleswade Dam                               | 0,10                        | 0,3    | 16,8 Future urban<br>3,0 Irrigation<br>5,5 Environmental                          | DWAF/AW                    |
| Needs Camp                        | 0,8                | BCM                | Buffalo River                                  | ***                         | ***    | None                                                                              | BCM                        |
|                                   | 192,1              |                    |                                                | 56,67                       | 154,1  | 28,13                                                                             |                            |

\* Includes effluent return flows for expected level of development in the year 2010.

\*\* Yields from individual dams vary depending on how the system is operated.

\*\*\* Included in firm yield of Laing Dam.

### WASTE WATER TREATMENT WORKS (Ref. 5)

| SCHEME NAME                  | SOURCE                                             | TYPE OF TREATMENT                                        | DESIGN CAPACITY MI/d | UTILISATION | EFFLUENT DISPOSAL                                            | QUATS | COMPLIANCE                                                        | POTENTIAL IMPACT TO RESOURCES                                                                              |
|------------------------------|----------------------------------------------------|----------------------------------------------------------|----------------------|-------------|--------------------------------------------------------------|-------|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| Bisho STW                    | Domestic sewage                                    | Oxidation ponds                                          | 1.75                 | 200%        | Irrigation storage dam for pasture                           | R20E  | Not compliant with General Standard or Special Phosphate Standard | Overflows directly into Yellowwoods River                                                                  |
| Stutterheim STW              | Domestic sewage                                    | Activated sludge reactor & a clarifier, Maturation ponds | 0,7                  | Unknown     | Cumakala River                                               | S60C  | Compliant with General Standard                                   | Effluent from the abattoir affects the quality of the final effluent. Overflow if tanker is not available. |
| Mdantsane STW                | Domestic sewage & industrial from chicken abattoir | Biofilters                                               | 24.0                 | 122%        | Buffalo River downstream of East London WTW offtake          | R20F  | 60% compliant                                                     | Requires upgrading                                                                                         |
| Potsdam STW                  | Potsdam & Mdantsane West (Domestic and industrial) | Trickling Filters                                        | 9.24                 | 73%         | Buffalo River downstream of East London WTW offtake          | R20F  | Compliant with General Standard                                   | Works has additional capacity to divert Mdantsane sewage                                                   |
| King Tanning Company         | Industrial (Tanning factory)                       | Closed                                                   | 1,8                  | N/A         | Irrigation of kikuyu pasture at Bidhli Farm                  | R20D  | Not operational                                                   | High salinity runoff from the irrigation lands during high rainfall                                        |
| King William's Town STW      | Domestic and industrial effluent                   | 60% by Activated sludge, & 40% Biofilter                 | 4, 8                 | 108%        | 80% into Buffalo River, 20% for irrigation purposes and golf | R20D  | 70% compliant                                                     |                                                                                                            |
| Da Gama Textiles (Zwelitsha) | Industrial Effluent                                |                                                          |                      |             | Infiltration, and irrigation                                 | R20D  | 95% compliant                                                     | Area for irrigation cannot cope with volume – Plans for recycling                                          |

| SCHEME NAME            | SOURCE                                        | TYPE OF TREATMENT                     | DESIGN CAPACITY MI/d | UTILISATION | EFFLUENT DISPOSAL                                                                            | QUATS | COMPLIANCE                      | POTENTIAL IMPACT TO RESOURCES                                                        |
|------------------------|-----------------------------------------------|---------------------------------------|----------------------|-------------|----------------------------------------------------------------------------------------------|-------|---------------------------------|--------------------------------------------------------------------------------------|
| Zwelitsha STW          | Domestic sewage & some industrial wastewater  | Trickling filter                      | 7.7                  | 76%         | Buffalo River                                                                                | R20D  | 95% compliant                   | Works is immediately upstream of Laing Dam – Eutrophication taking place in the dam. |
| East Bank STW          | Domestic & some industrial effluent           | Activated sludge modules & clarifiers | 40                   | 75%         | Irrigation at East London Golf Club, sea outfall and sludge discharge into sea at Hood Point | R30F  | 85% compliance (not phosphates) | Potential for industrial use                                                         |
| Central (Amalinda) STW | 65% industrial effluent & 35% domestic sewage | Biofilters & maturation ponds         | 5.0                  | 90%         | Buffalo River via Umzoniana stream                                                           | R30F  | 60% compliance                  | Overloaded resulting in overflow of sewage into the Buffalo River                    |
| Gonubie STW            | Domestic from Beacon Bay & Gonubie            | Activated sludge & clarifiers         | 5.0 (12)             | 140%        | Klokha River & irrigation at Gonubie Golf Course                                             | R30D  | 90% compliance                  | Drip irrigation system for tomato farming                                            |
| Breidbach STW          | Domestic sewage                               | Oxidation Ponds                       | 0,8                  | N/A         | Irrigation of kikuyu pastures                                                                | R20E  | Unknown                         | Periodic overflows. Seepage from the ponds into Yellowwoods River                    |

## AMATOLE – KEI ISP

### SOLID WASTE DISPOSAL SITES

| SOLID WASTE SITE     | SIZE | STATUS OF APPLICATION | OWNERSHIP          | COMMENTS                                             |
|----------------------|------|-----------------------|--------------------|------------------------------------------------------|
| East London Regional | L    | PERMITS ISSUED        | Local Municipality | G:L:B+                                               |
| King William's Town  | M    | Processing            | Local Municipality | Well managed                                         |
| Second Creek         | M    | To be closed          | Local Municipality | To be rehabilitated                                  |
| Gonubie              | C    | To be closed          | Local Municipality | To establish transfer station                        |
| Mdantsane            | S    | To be closed          | Local Municipality | To be rehabilitated                                  |
| Ducats B/Bay         | S    | CLOSED DOWN           | Local Municipality | To be rehabilitated                                  |
| Dimbaza              | S    | CLOSED DOWN           | Local Municipality | To be rehabilitated                                  |
| Butterworth          | S    | Not Permitted         | Local Municipality | New Regional Site being studied                      |
| Idutywa              | S    | Not Permitted         | Local Municipality | Will link in with the above Reg Site                 |
| Nqamakwe             | C    | Not Permitted         | Local Municipality | Will link in with the above Reg Site                 |
| Tsomo                | C    | Not Permitted         | Local Municipality | Will link in with the above Reg Site                 |
| Willowvale           | C    | Not Permitted         | Local Municipality | Will link in with the above Reg Site                 |
| Kentani              | C    | Not Permitted         | Local Municipality | Will link in with the above Reg Site                 |
| Queenstown           | S    | New site identified   | Local Municipality | Municipality to close & rehab existing site          |
| Whittlesea           | C    | Not Permitted         | Local Municipality | Consultants appointed                                |
| Lady Frere           | C    | Not Permitted         | Local Municipality |                                                      |
| Cofimvaba            | C    | Not Permitted         | Local Municipality | Poor management                                      |
| Alice                | C    | Permit issued         | Local Municipality |                                                      |
| Middledrift          | C    | Permit issued         | Local Municipality |                                                      |
| Seymour              | C    | Not permitted         | Local Municipality | Will link in with Queenstown -proposed regional site |

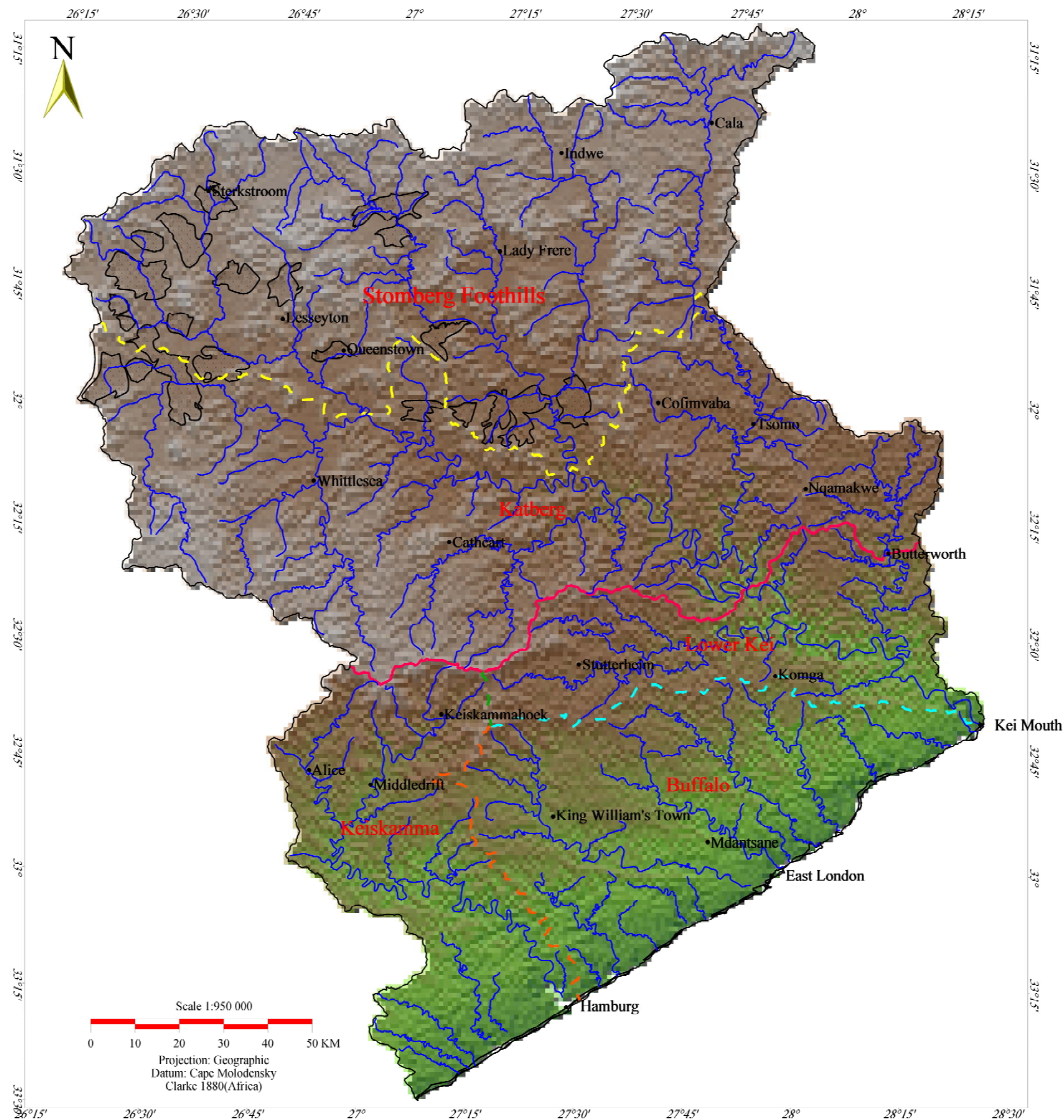
| SOLID WASTE SITE         | SIZE | STATUS OF APPLICATION  | OWNERSHIP          | COMMENTS                                                |
|--------------------------|------|------------------------|--------------------|---------------------------------------------------------|
| Cala                     | C    | Permit issued          | Local Municipality | Poorly managed                                          |
| Cathcart                 | C    | Not permitted          | Local Municipality | To issue directions                                     |
| Stutterheim              | GSB+ | Consultants appointed  | Local Municipality | Consultants investigating                               |
| Keiskammahoek            | C    | Permit issue           | Local Municipality | Permit issued                                           |
| Cintsa West              | C    |                        | Private            |                                                         |
| Cosy Corner              | C    |                        | Private            |                                                         |
| Fish River Sun           | C    | To be closed           | Private            | Will link with the Peddie Regional Site                 |
| Haga Haga                | C    |                        | Private            |                                                         |
| Hamburg Transfer Station | C    | Processing Direction   | Local Municipality | With final disposal at Peddie regional solid waste site |
| Peddie                   | C    | Proposed regional site | Local Municipality | To be a regional site for Ngqushwa Municipality         |
| Indwe                    | C    | Not permitted          | Local Municipality | To issue directions                                     |
| Kayser's Beach           | C    | Closed                 | ADM/BCM            | All waste taken by ADM to Second Creek                  |
| Kei Mouth                | C    | Not Permitted          | Local Municipality | Poor State - need to identify new site                  |
| Morgan Bay               | C    | Not permitted          | Local Municipality |                                                         |
| Kidds Beach              | C    | To be closed           | ADM/BCM            | To be rehabilitated                                     |
| Komga                    | C    | Not permitted          | Local Municipality | Poor state - need to identify new site                  |
| Macleantown              | C    | Not permitted          | ADM                |                                                         |
| Seavale                  | C    | To issue directions    | Private            |                                                         |
| Sterkstroom              | C    | Processing Direction   | Local Municipality | Construction to start soon                              |
| Christmas Rock           | C    | Processing             | Private            | Well managed                                            |

**Total No of sites**        =        **42**  
**Permitted**                        =        **5**  
**Processing**                        =        **3**  
**Sites to Close(d)**            =        **14**

## **APPENDIX B4**

### **GROUNDWATER MAPS**

|                      |                                       |
|----------------------|---------------------------------------|
| <b>Appendix B4.1</b> | <b>Study area and topography</b>      |
| <b>Appendix B4.2</b> | <b>Aquifer type</b>                   |
| <b>Appendix B4.3</b> | <b>NGDB and DWAF monitoring sites</b> |
| <b>Appendix B4.4</b> | <b>Groundwater occurrence</b>         |
| <b>Appendix B4.5</b> | <b>Recharge to groundwater</b>        |
| <b>Appendix B4.6</b> | <b>Aquifer vulnerability</b>          |



## LEGEND

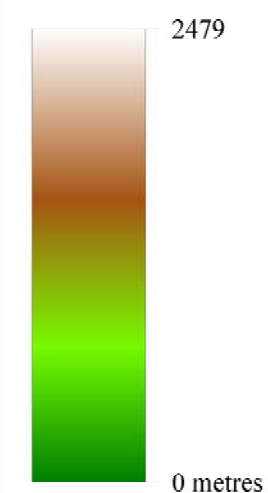
- Towns

- High level alluvial deposits

### Proposed Hydrogeological Provinces

- Southern boundary of Stormberg Foothills
- Southern boundary of Katberg
- Keiskamma - Buffalo
- Keiskamma - Lower Kei
- Lower Kei - Buffalo

### Elevation



## PROJECT NAME

INTERNAL STRATEGIC  
PERSPECTIVE (AMATOLE-KEI)

## CLIENT



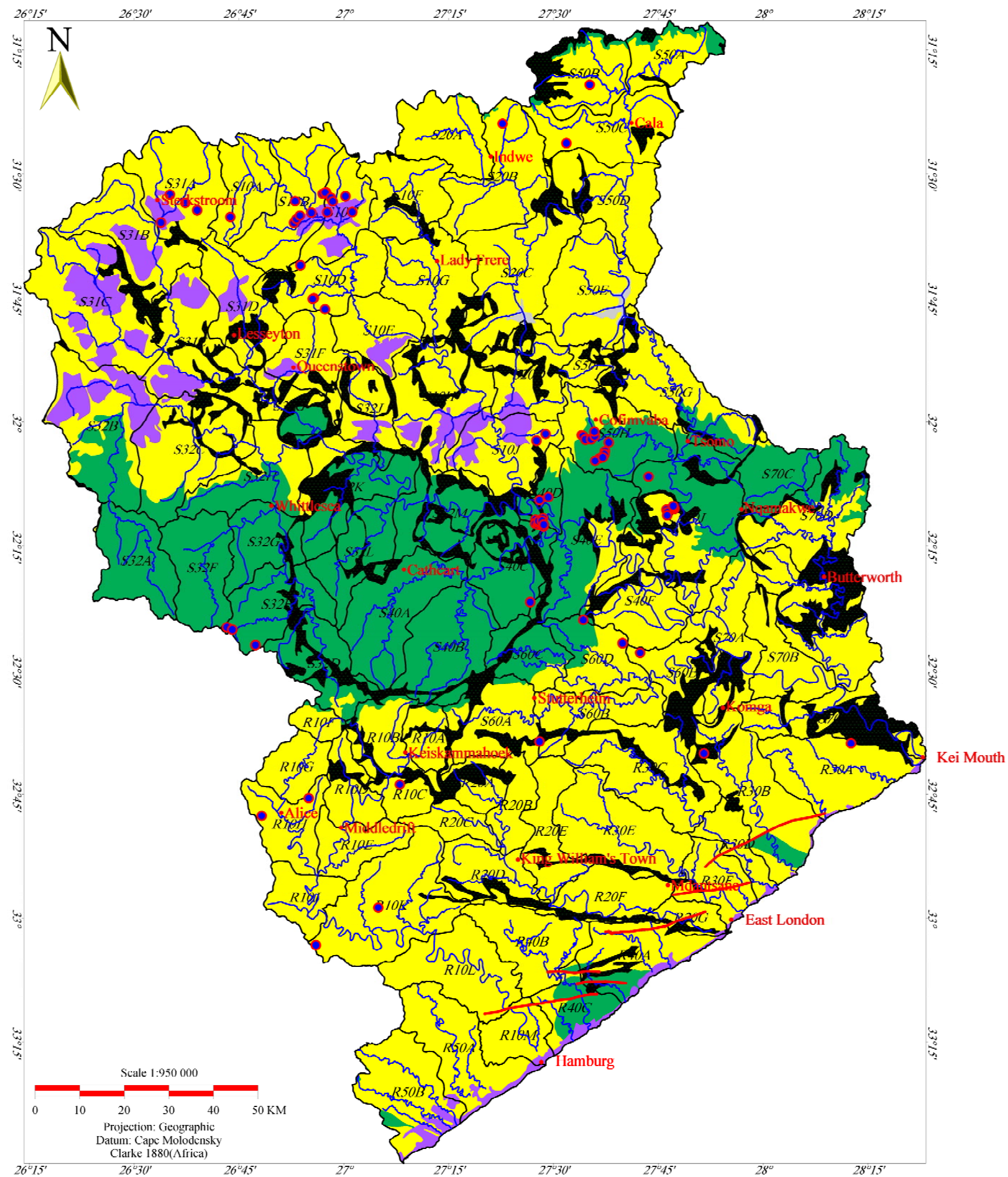
## CONSULTANT

UMVOTO

## TITLE

STUDY AREA AND  
TOPOGRAPHY

FIGURE B4.1



## LEGEND

- Towns
  - Springs
  - Rivers
  - Quaternary Catchments
- Aquifer Types (revised)
- Intergranular
  - Fractured
  - Fractured (dolerite & basalt)
  - Intergranular (weathered) & fractured
  - Faults

## PROJECT NAME

INTERNAL STRATEGIC  
PERSPECTIVE (AMATOLE-KEI)

## CLIENT



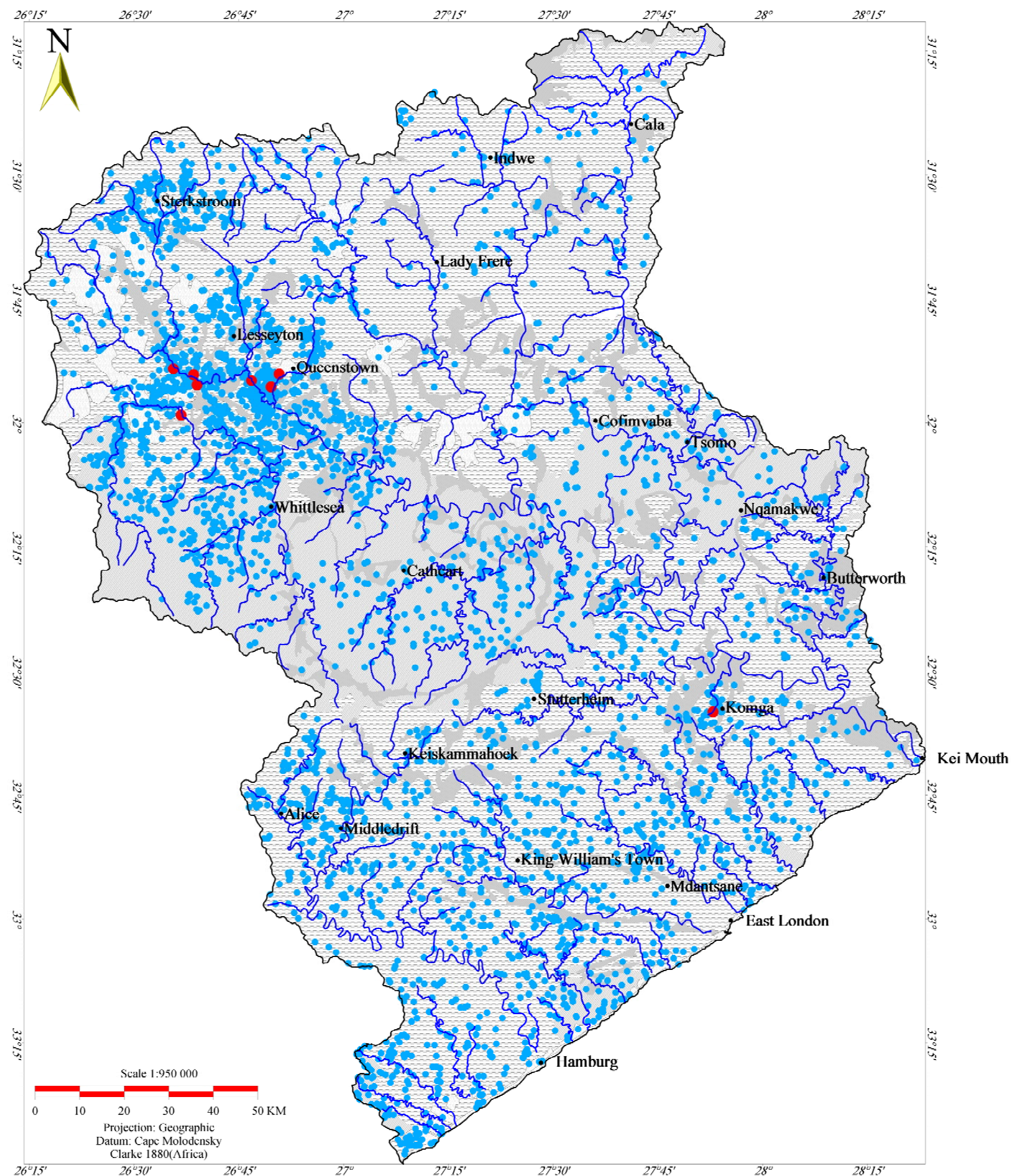
## CONSULTANT

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## TITLE

AQUIFER TYPE (REVISED)

FIGURE B4.2



## LEGEND

- Towns
- National Geohydrological Database (NGDB) boreholes
- DWAF Geohydro-Monitoring Sites
- Rivers

### Aquifer Types (revised)

- Intergranular
- Fractured
- Fractured (dolerite)
- Intergranular (weathered) & fractured

## PROJECT NAME

INTERNAL STRATEGIC  
PERSPECTIVE (AMATOLE-KEI)

## CLIENT



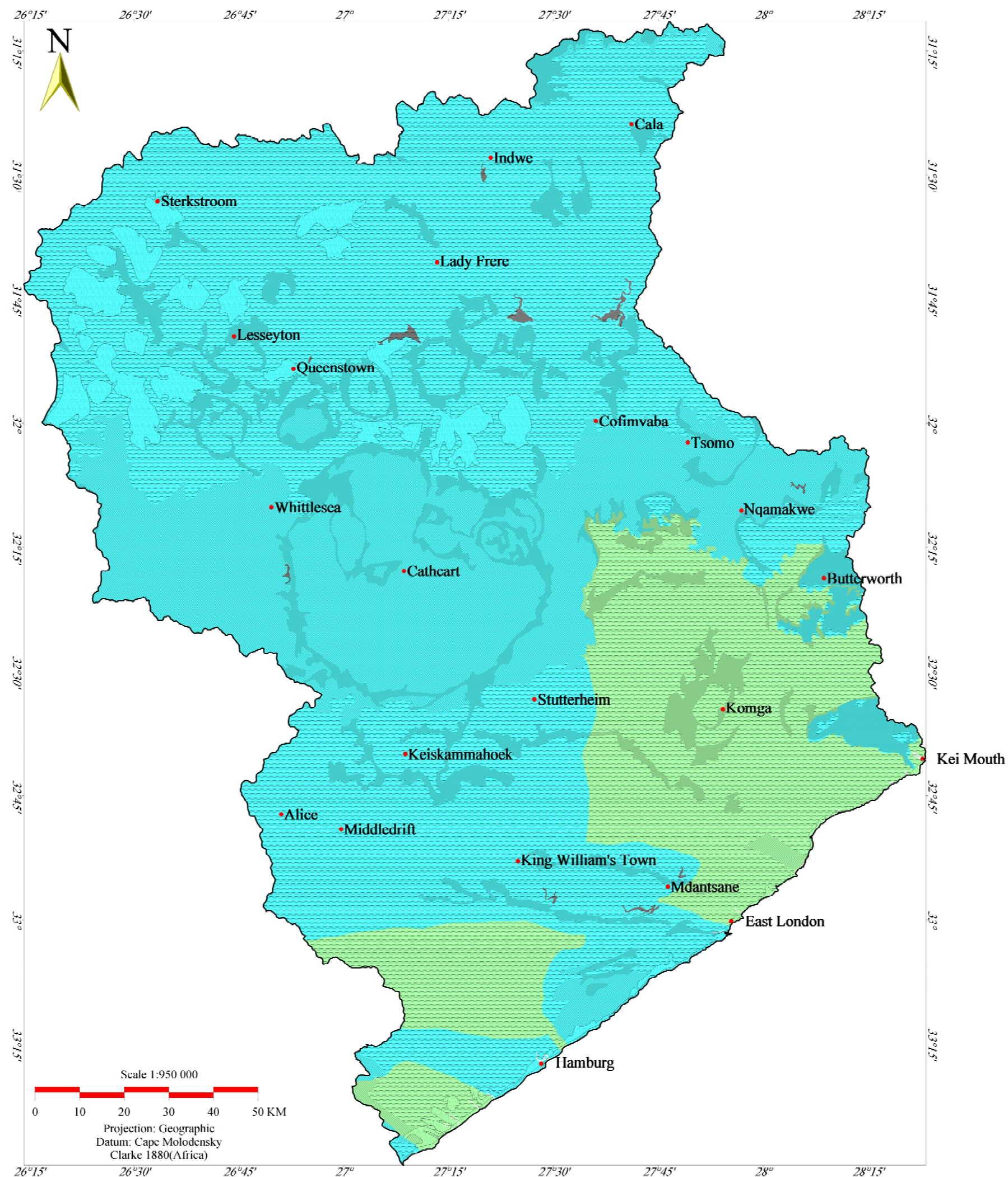
## CONSULTANT

**UMVOTO**

## TITLE

NGDB BOREHOLES  
AND  
DWAF MONITORING SITES

FIGURE B4.3



## LEGEND

• Towns

Intergranular

Fractured

Fractured (dolerite)

Intergranular (weatherd) & fractured

Yield (median l/s)

0.1 - 0.5

0.5 - 2.0

## PROJECT NAME

INTERNAL STRATEGIC  
PERSPECTIVE (AMATOLE-KEI)

## CLIENT



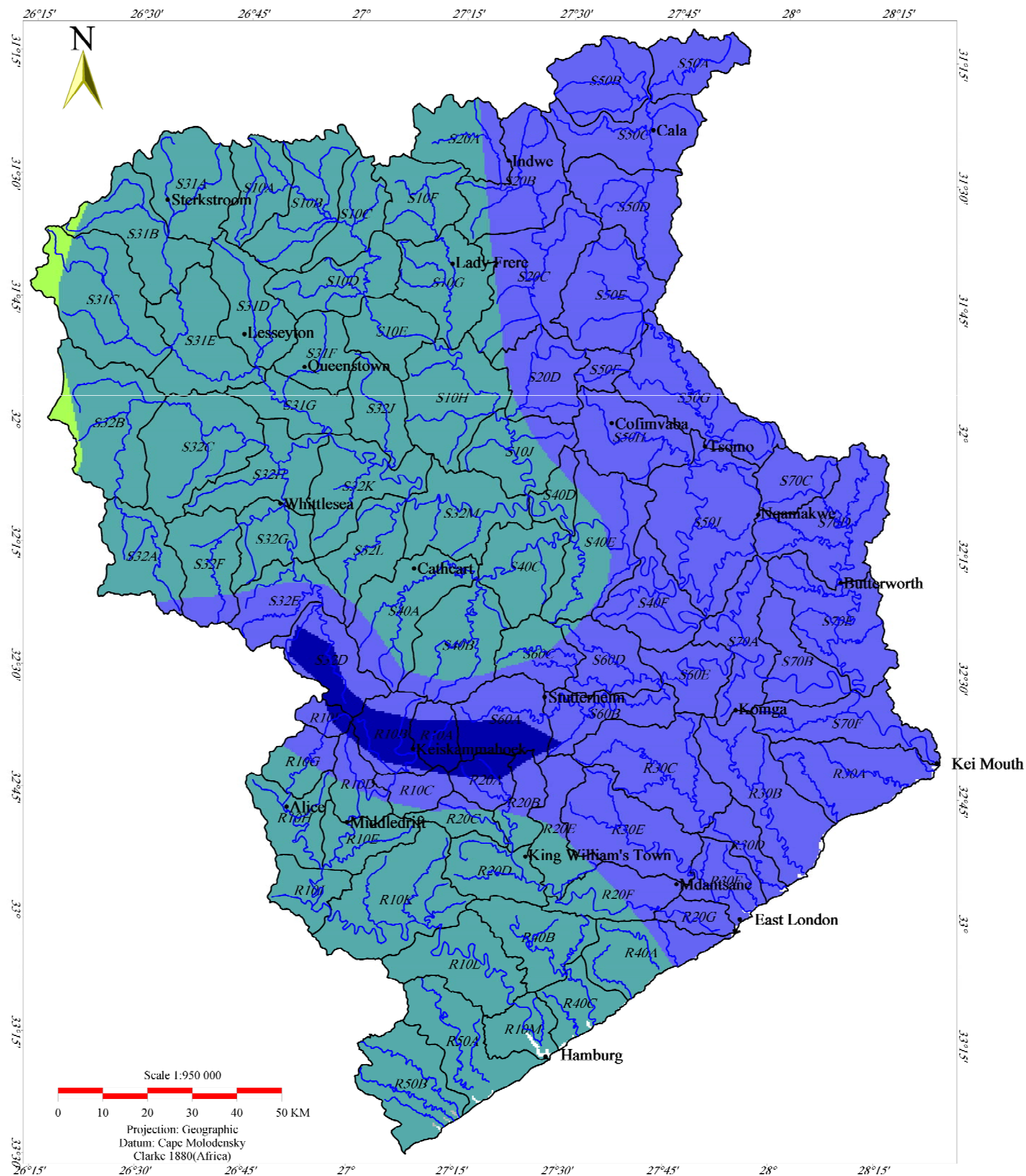
## CONSULTANT

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## TITLE

GROUNDWATER OCCURRENCE  
AND  
MEDIAN YIELD

FIGURE B4.4



## LEGEND

- Towns
  - Rivers
  - Quaternary Catchments
- Rate of recharge (mm per annum)
- 10 - 25
  - 25 - 37
  - 37 - 50
  - 50 - 75

## PROJECT NAME

INTERNAL STRATEGIC  
PERSPECTIVE (AMATOLE-KEI)

## CLIENT



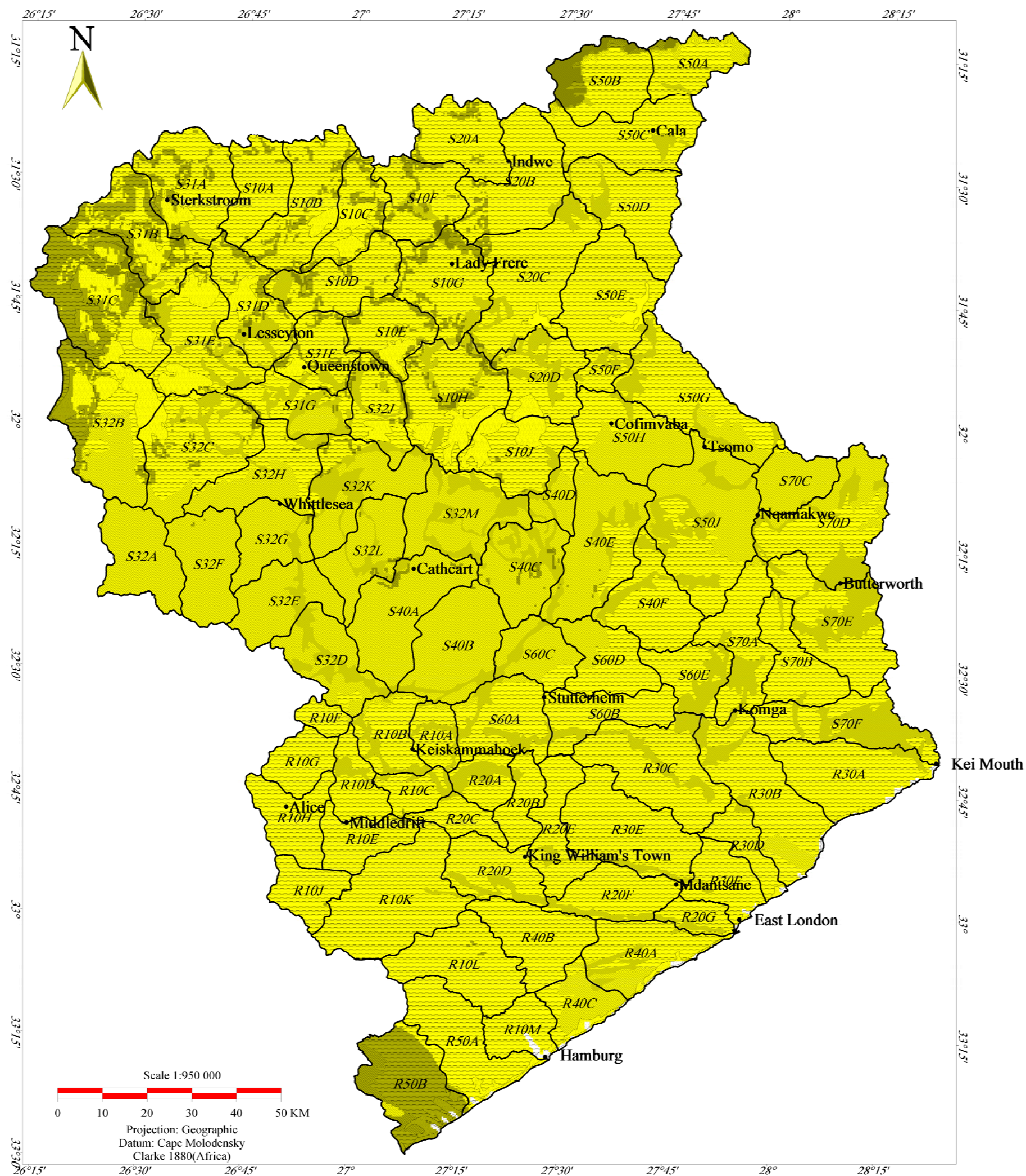
## CONSULTANT



## TITLE

RECHARGE TO GROUNDWATER

## FIGURE B4.5



## LEGEND

- Towns

### Aquifer Types (revised)

- Intergranular
- Fractured
- Fractured (dolerite)
- Intergranular (weathered) & fractured

### Aquifer Vulnerability

- Least

## AMATOLE - KEI ISP

## DWAf TARIFF TABLE FOR RAW WATER USE CHARGES FOR GOVERNMENT WATER SCHEMES FOR 2003-2004 (excl. VAT)

| Government Water Scheme / Irrigation District<br>(1)                                                                                 | Region<br>(2) | WMA<br>(see<br>(3) | Charges for irrigation purposes    |                         |                 |                                                |                         | Charges for domestic and industrial use |             |                  |                    |                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------|------------------------------------|-------------------------|-----------------|------------------------------------------------|-------------------------|-----------------------------------------|-------------|------------------|--------------------|-------------------------------------------------|
|                                                                                                                                      |               |                    | m <sup>3</sup> quota per ha<br>(4) | Cent per m <sup>3</sup> |                 | Total tariff<br>cent per m <sup>3</sup><br>(7) | Payment<br>dates<br>(8) | Cent per m <sup>3</sup>                 |             |                  |                    | Total tariff Cent per<br>m <sup>3</sup><br>(13) |
|                                                                                                                                      |               |                    |                                    | O & M<br>(5)            | Deprec'n<br>(6) |                                                |                         | O & M<br>(9)                            | ROA<br>(10) | Deprec'n<br>(11) | Input cost<br>(12) |                                                 |
| AMATOLA (WRIGGLESWADE DAM)<br>(a) From the Dam and Kubusi River<br>(b) From Yellowwoods & Nahoon Rivers & from<br>Wriggleswade canal | EC            | 12                 |                                    |                         |                 |                                                |                         |                                         |             |                  |                    | 53.99<br>95.62                                  |
| BINFIELD PARK DAM                                                                                                                    | EC            | 12                 | 6 100                              | 2.46                    | 1.00            | 3.46                                           | 31/07<br>31/01          |                                         |             |                  |                    | 60.19                                           |
| BUSHMANSKRANTZ DAM (Zweledinga)                                                                                                      | EC            | 12                 |                                    |                         |                 |                                                |                         |                                         |             |                  |                    | 67.40                                           |
| DEBE DAM                                                                                                                             | EC            | 12                 |                                    |                         |                 |                                                |                         |                                         |             |                  |                    | 67.40                                           |
| DORING RIVER (DORING RIVER DAM)                                                                                                      | EC            | 12                 | 6 100                              | 13.50                   | 1.00            | 14.50                                          | 31/07<br>31/01          |                                         |             |                  |                    | 40.81                                           |
| KEISKAMMAHOEK (CATA DAM)                                                                                                             | EC            | 12                 | 6 100                              | 5.08                    | 1.00            | 6.08                                           | 31/07<br>31/01          |                                         |             |                  |                    |                                                 |
| KEISKAMMAHOEK (MNYAMENI DAM)                                                                                                         | EC            | 12                 | 6 100                              | 4.86                    | 1.00            | 5.86                                           | 31/07<br>31/01          |                                         |             |                  |                    | 67.40                                           |
| KLIPLAAT RIVER (WATERDOWN DAM)<br>Raw water from the dam                                                                             | EC            | 12                 | 6 100                              | 2.33                    | 1.00            | 3.33                                           | 31/07<br>31/01          |                                         |             |                  |                    | 10.54                                           |
| KUBUSI RIVER (GUBU DAM)                                                                                                              | EC            | 12                 |                                    |                         |                 |                                                |                         |                                         |             |                  |                    | 23.19                                           |
| LAING DAM                                                                                                                            | EC            | 12                 |                                    |                         |                 |                                                |                         |                                         |             |                  |                    | 30.80                                           |
| MACUBENI DAM                                                                                                                         | EC            | 12                 |                                    |                         |                 |                                                |                         |                                         |             |                  |                    | 67.40                                           |
| NAHOON RIVER (NAHOON DAM)                                                                                                            | EC            | 12                 |                                    |                         |                 |                                                |                         |                                         |             |                  |                    | 107.99                                          |
| NCORA GWS                                                                                                                            | EC            | 15                 |                                    | 2.11                    | 1.00            | 3.11                                           | 31/07<br>31/01          |                                         |             |                  |                    | 44.01                                           |
| PLEASANT VIEW DAM                                                                                                                    | EC            | 12                 |                                    |                         |                 |                                                |                         |                                         |             |                  |                    | 38.45                                           |
| QAMATA (Lanti Weir)                                                                                                                  | EC            | 12                 | 6 100                              | 7.52                    | 1.00            | 8.52                                           | 31/07<br>31/01          |                                         |             |                  |                    |                                                 |
| ROOIKRANTZ DAM                                                                                                                       | EC            | 12                 | 6 100                              | 5.19                    | 1.00            | 6.19                                           | 31/07<br>31/01          |                                         |             |                  |                    | 35.68                                           |
| TOLENI (TOLENI DAM)                                                                                                                  | EC            | 12                 |                                    |                         |                 |                                                |                         |                                         |             |                  |                    | 48.39                                           |
| TSOJANA DAM<br>Raw water from the dam                                                                                                | EC            | 12                 | 6 100                              | 7.82                    | 1.00            | 8.82                                           | 31/07<br>31/01          |                                         |             |                  |                    | 36.77                                           |
| XILINXA DAM (and Gcuwa weir)<br>From weir                                                                                            | EC            | 12                 |                                    |                         |                 |                                                |                         |                                         |             |                  |                    | 27.69<br>40.36                                  |
| XONXA GWS                                                                                                                            | EC            | 12                 | 6 100                              | 0.65                    | 0.85            | 1.50                                           |                         |                                         |             |                  |                    |                                                 |
| ZANYOKWE (SANDILE DAM)<br>From the dam and the main pipeline                                                                         | EC            | 12                 | 6 100                              | 2.24                    | 1.00            | 3.24                                           | 31/07<br>31/01          |                                         |             |                  |                    | 67.40                                           |

NB: VAT SHOULD BE ADDED TO CHARGES

Ref : DWAF

## AMATOLE - KEI ISP

## CONTROLLED AND MAJOR IRRIGATION SCHEMES (1995)

(Ref. 24)

| SCHEME NAME                       | SCHEDULED IRRIGATION (Ha) | IRRIGATED AREA IN 1995 (Ha) | CROPS IRRIGATED             | SUPPLY SOURCE                                                                | QUATS                            | WATER USE* (x 10 <sup>6</sup> /a) | ALLOCATION (x 10 <sup>6</sup> /a) | AVAILABLE WATER @ 90% ASSURANCE (x 10 <sup>6</sup> /a) |
|-----------------------------------|---------------------------|-----------------------------|-----------------------------|------------------------------------------------------------------------------|----------------------------------|-----------------------------------|-----------------------------------|--------------------------------------------------------|
| Klipplaat Government Water Scheme | 2 060<br>(Section 63)     | 1820                        | Lucerne, maize and pastures | Waterdown Dam                                                                | S32G,<br>H<br>S31G<br>S32K,<br>M | 18,0                              | 14,83                             | 7,2                                                    |
| Oxkraal Irrigation Scheme         | 0                         | 0                           | Land has not been developed | Shiloh Dam<br>Oxkraal Dam                                                    | S32G                             | 1,7                               | 6,18**                            | 0,4<br>7,9                                             |
| Nthabethemba Irrigation Scheme    | 1 200                     | 720                         | Maize and mixed vegetables  | Thrift, Limietskloof<br>Tentergate, Mitford<br>Glenbrock dams &<br>Black Kei | S32A,<br>S32B,<br>S32C           | Unknown                           |                                   | 2,52                                                   |
| Zweledinga Irrigation Scheme      | 239                       | 239                         | Maize                       | Bushmanskrantz Dam                                                           | S32F                             | Unknown                           |                                   | 2,26                                                   |
| Doring River                      | 513<br>(Section 63)       | 180                         | Lucerne, maize and pastures | Doring River Dam                                                             | S20B                             | 1,8                               | 3,13                              | 1,8                                                    |
| Qamata Irrigation Scheme          | 2 600                     | 650                         | Lucerne, maize and pastures | Lubisi Dam                                                                   | S20D                             | Unknown                           |                                   | 30,5                                                   |
| Xonxa Irrigation Scheme           | 1 643                     | 60                          | Lucerne, maize and pastures | Xonxa Dam                                                                    | S10H                             | Unknown                           |                                   | 33,0                                                   |
| Zanyokwe Irrigation Scheme        | 47                        | 90                          | Mixed vegetables            | Sandile Dam                                                                  | R10C,<br>D                       | 1,0                               |                                   | 5,18                                                   |
| Keiskammahoek Irrigation Scheme   | 854                       | 744                         | Dairy Farming               | Mnyameni & Cata Dams                                                         | R10G,<br>H                       | 6,02                              |                                   | 9,86                                                   |
| Tyume Irrigation Scheme           | 231                       | 114                         | Citrus                      | Binfield Park Dam                                                            | R10G                             | 0,7                               |                                   | 17,36                                                  |
| Ncora Irrigation Scheme           | 2 600                     | 750                         | Dairy, vegetables and maize | Ncora Dam                                                                    | T12C,<br>D                       | Unknown                           |                                   | 35,0                                                   |
| Rooikrantz                        |                           |                             |                             | Rooikrantz Dam                                                               | R20A                             |                                   |                                   |                                                        |

\* Field edge water requirements (no water losses taken into account).

\*\* 566 ha planned under the Oxkraal Scheme but not developed. The dam releases water for irrigators under the Klipplaat Government Water Scheme.

## AMATOLE - KEI ISP

## WATER MANAGEMENT INSTITUTIONS

| ORGANISATION                                                                                                                                                                                                                                         | RESPONSIBILITY                                                                                                                         | AREA                                   | COMMENT                                                                                                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Department of Water Affairs and Forestry                                                                                                                                                                                                             | Overall responsibility for and authority over the nation's water resources and their use                                               | Entire ISP Area                        | At present DWAF is filling the role of Water Services Authority and Provider in certain instances until hand over of assets to the District Municipalities and establishment of CMA's |
| Amatole District Municipality                                                                                                                                                                                                                        | Water Service Authority (WSA) for ensuring an equitable supply of water to all consumers within its boundary                           | Amatole District Municipal area        |                                                                                                                                                                                       |
| Chris Hani District Municipality                                                                                                                                                                                                                     | Water Service Authority for ensuring an equitable supply of water to all consumers within its boundary                                 | Chris Hani District Municipal area     |                                                                                                                                                                                       |
| Buffalo City Municipality                                                                                                                                                                                                                            | Water Service Provider (WSP) for ensuring and delivering an equitable supply of water to all consumers within its boundary             | Buffalo City Municipal area            | Exact role of the BCM needs to be clarified. Should the BCM become a Metropolitan it will then become a WSA.                                                                          |
| Local Municipalities <ul style="list-style-type: none"> <li>▪ Great Kei</li> <li>▪ Amahlati</li> <li>▪ Nkonkobe</li> <li>▪ Ngqushwa</li> <li>▪ Mquma</li> <li>▪ Lukanji</li> <li>▪ Inkwanca</li> <li>▪ Intsika Yethu</li> <li>▪ Emalaheni</li> </ul> | Water Service Provider responsible for delivering an equitable supply of water to all consumers within the local municipality boundary | Local Municipal boundary areas         | This role is to change for some municipalities due to a lack of resources. To be handed to DM's.                                                                                      |
| Amatola Water Board                                                                                                                                                                                                                                  | Water Service Provider. Provides a service to DWAF and the WSA's where the Local Municipalities cannot fulfill role of WSP             |                                        | Contracts with the relevant Water Services Authority, DWAF or the relevant Local Municipality                                                                                         |
| Kubusi Irrigation Board                                                                                                                                                                                                                              |                                                                                                                                        |                                        |                                                                                                                                                                                       |
| Village Water Committees                                                                                                                                                                                                                             | Water Service Provider responsible for delivering an equitable supply of water to all consumers within the village boundary            | Rural villages throughout the ISP area |                                                                                                                                                                                       |
| Forums                                                                                                                                                                                                                                               | Unknown                                                                                                                                |                                        |                                                                                                                                                                                       |

## AMATOLE – KEI ISP AREA

## MUNICIPALITIES (refer Appendix C2 for map)

| Old Transitional Local Council Name                  | New Local Municipality Name                              | New District Municipality Name      |
|------------------------------------------------------|----------------------------------------------------------|-------------------------------------|
| East London / Mdantsane /<br>Gonubie / Beacon Bay    | Buffalo City<br>(moving towards<br>becoming a Metropole) | Amatole District<br>Municipality    |
| King William's Town / Bisho /<br>Dimbaza / Zwelitsha |                                                          |                                     |
| Amatola Coastal Local Council                        |                                                          |                                     |
| Komga                                                | Great Kei                                                |                                     |
| Kei Mouth                                            |                                                          |                                     |
| Amatola Coastal Local Council                        |                                                          |                                     |
| Stutterheim                                          | Amahlati                                                 |                                     |
| Keiskammahoek                                        |                                                          |                                     |
| Kei Road                                             |                                                          |                                     |
| Cathcart                                             |                                                          |                                     |
| Alice                                                | Nkonkobe                                                 |                                     |
| Middledrift                                          |                                                          |                                     |
| Hamburg                                              | Ngqushwa                                                 |                                     |
| Butterworth                                          | Mnquma                                                   |                                     |
| Nqamakwe                                             |                                                          |                                     |
| Queenstown / Ezibeleni / Ilinge                      | Lukanji                                                  | Chris Hani District<br>Municipality |
| Whittlesea / Sada                                    |                                                          |                                     |
| Sterkstroom                                          | Inkwanca                                                 |                                     |
| Tsomo                                                | Intsika Yethu                                            |                                     |
| Cofimvaba                                            |                                                          |                                     |
| Lady Frere                                           | Emalahleni                                               |                                     |
| Indwe                                                |                                                          |                                     |

## AMATOLE - KEI ISP

## POSSIBLE FUTURE BULK WATER SUPPLY SCHEMES

| ISP AREA | CATCHMENT | SCHEME                                                                                                                                                                                                | ESTIMATED YIELD                           |
|----------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| AMATOLE  | R10       | Extension of rural water supply schemes. Possible future raw water supply from Keiskamma River to Buffalo River (Buffalo City). Potential = 37 million m <sup>3</sup> /a                              |                                           |
|          | R20       | Mainly rehabilitation and upgrading of existing infrastructure to balance demand. Extension of rural water supply schemes. Extensions of supply to coastal resorts both east and west of East London. |                                           |
|          | R30       | Extension of rural water supply schemes. Future potential raw water supplies to Buffalo City from the Nahoon, Gqunube and Kwelera Rivers                                                              |                                           |
|          | R40       | Extension of urban supply from Buffalo City to coastal resorts                                                                                                                                        |                                           |
|          | R50       | Extension of rural water supply schemes from existing Peddie RWSS. Source from Keiskamma River.                                                                                                       |                                           |
| KEI      | S10       | Extension of rural water supply schemes. Possible future bulk supply from Xonxa Dam to Queenstown (8 million m <sup>3</sup> /a)                                                                       |                                           |
|          | S20       | Extension of rural water supply schemes                                                                                                                                                               |                                           |
|          | S31       | Bulk supply from Xonxa Dam to Queenstown                                                                                                                                                              | Requirement = 8 million m <sup>3</sup> /a |
|          | S32       | Extension of rural water supply schemes                                                                                                                                                               |                                           |
|          | S40       | Extension of rural water supply schemes                                                                                                                                                               |                                           |
|          | S50       | Extension of rural water supply schemes                                                                                                                                                               |                                           |
|          | S70       | Extension of rural water supply schemes. Possible supply from Great Kei River to Wavecrest for mining purposes (project on hold)                                                                      |                                           |

## AMATOLE - KEI ISP

## MAJOR DAMS (Ref. 24)

| Name              | Live Storage Capacity<br>(million m <sup>3</sup> ) | Yield*<br>(million m <sup>3</sup> /a) | Purpose                        | Catchment | Owner/operator |
|-------------------|----------------------------------------------------|---------------------------------------|--------------------------------|-----------|----------------|
| Maden             | 0,22                                               | 3,1                                   | Domestic water use             | R20A      | BCM            |
| Rooikrantz Dam    | 4,9                                                |                                       | Irrigation                     | R20A      | DWAF/AW        |
| Laing Dam         | 21,0                                               | 14,9                                  | Domestic water use             | R20E      | DWAF/AW        |
| Bridle Drift Dam  | 101,7                                              | 30,7                                  | Domestic water use             | R20F      | BCM            |
| Nahoon Dam        | 20,7                                               | 7,8                                   | Domestic water use, irrigation | R30E      | DWAF/AW        |
| Gubu Dam          | 8,8                                                | 2,9                                   | Domestic water use, irrigation | S60A      | DWAF/AW        |
| Wiggleswade Dam   | 91,2                                               | 25,4                                  | Domestic water use, irrigation | S60B      | DWAF/AW        |
| Sandile Dam       | 30,9                                               | 18,0                                  | Irrigation/<br>Domestic        | R10B      | DWAF/AW        |
| Binfield Park Dam | 36,8                                               | 16,5                                  | Irrigation/<br>Domestic        | R10G      | DWAF/AW        |
| Pleasant View Dam | 2,0                                                | 1,5                                   | Irrigation                     | R10G      | DWAF           |
| Debe Dam          | 6,0                                                | 2,2                                   | Domestic water use             | R10E      | DWAF           |
| Mnyameni Dam      | 2,0                                                | 2,3                                   | Domestic water use             | R10B      | DWAF/AW        |
| Cata Dam          | 12,1                                               | 6,2                                   | Irrigation                     | R10B      | DWAF/AW        |
| Waterdown Dam     | 36,6                                               | 16,5                                  | Domestic supply & irrigation   | S32E      | DWAF           |
| Bongolo Dam       | 6,95                                               | 0,7                                   | Domestic Queenstown            | S31F      | Lukhanji LM    |

| Name               | Live Storage Capacity<br>(million m <sup>3</sup> ) | Yield*<br>(million m <sup>3</sup> /a) | Purpose                                    | Catchment | Owner/operator |
|--------------------|----------------------------------------------------|---------------------------------------|--------------------------------------------|-----------|----------------|
| Bushmanskrantz Dam | 4,62                                               | 2,1                                   | Irrigation                                 | S32F      | DWAF           |
| Oxkraal Dam        | 17,8                                               | 6,2                                   | Irrigation                                 | S32G      | DWAF           |
| Shiloh Dam         | 0,52                                               | 0,3                                   | Irrigation                                 | S32G      | DWAF           |
| Thrift Dam         | 2,6                                                | 0,6                                   | Irrigation                                 | S32A      | DWAF           |
| Limietskloof       | 0,78                                               | 0,1                                   | Irrigation                                 | S32A      | DWAF           |
| Tentergate Dam     | 1,72                                               | 0,3                                   | Irrigation                                 | S32B      | DWAF           |
| Mitford Dam        | 0,89                                               | 0,1                                   | Irrigation                                 | S32C      | DWAF           |
| Glenbrock Dam      | 0,41                                               | 0,1                                   | Irrigation                                 | S32C      | DWAF           |
| Macubeni           | 1,85                                               | 1,5                                   | Domestic                                   | S10F      | DWAF           |
| Xonxa Dam          | 126,0                                              | 27,6                                  | Irrigation                                 | S10E      | DWAF           |
| Doring River Dam   | 17,84                                              | 3,4                                   | Domestic water use, irrigation             | S20A      | DWAF           |
| Lubisi Dam         | 135,0                                              | 28,5                                  | Irrigation                                 | S20C      | DWAF           |
| Ncora Dam          | 120,0                                              | 98,0                                  | Hydropower<br>Irrigation<br>Small Domestic | S50E      | DWAF           |
| Tsojana            | 9,35                                               | 3,2                                   | Domestic                                   | S50F      | DWAF           |
| Sam Meyer Dam      | 0.608                                              |                                       | Domestic/<br>Leisure                       | S40A      | Amahlati LM    |
| Xilinx Dam         | 14.5                                               | 9.4                                   | Domestic Water Use                         | S70C      | DWAF           |

\* Yields are at a reliability of 1 in 50 years (98% assurance).

## AMATOLE - KEI ISP

## LIST OF FLOW GAUGING STATIONS

Data Types

E = Electronic Data

C = Chart (Week Gear)

Cm = Chart (Month Gear)

R = Return

WQ = Water Quality Sample (analysed at IWQS)

DC = Data Collector

| Station no.   | Station Name                               | Data collected | Data processed | Data collector | Latitude  | Longitude |
|---------------|--------------------------------------------|----------------|----------------|----------------|-----------|-----------|
| R1H014 -A01   | Tyume at Khayaletu - Yantola's Location    | C+E+R+Q        | C              | Craddock DC    | 32°38'24" | 26°56'10" |
| R 1H015 -A01  | Keiskamma at Farm no.7                     | Cm + E + Q     | E              | Craddock DC    | 33°11'09" | 27°23'27" |
| R 1H017 -A01  | Keiskamma at Sandile Dam                   | C+ E + Q       | C              | Craddock DC    | 32°43'06" | 27°05'56" |
| R 1H019 - M01 | Pipeline from Sandile Dam                  | R              | R              | Sandile Dam    | 32°43'07" | 27°06'24" |
| R 1H020 - M01 | Pipeline from Binfield Park Dam            | R              | None           | Craddock DC    | 32°41'13" | 26°53'59" |
| R 1R001 - A01 | Sandile Dam                                | C + E + R      | C              | Craddock DC    | 32°43'05" | 27°06'23" |
| R 1R003 - A01 | Binfield Park Dam                          | C + E + Q      | C              | Craddock DC    | 32°40'47" | 26°54'13" |
| R 2H001 - A01 | Buffels at Pirie Main Bos Res.             | C + E + Q      | C              | Craddock DC    | 34°43'55" | 27°17'37" |
| R 2H005 - A01 | Buffels at King William's Town             | C + E + Q      | E              | Craddock DC    | 32°52'30" | 27°22'59" |
| R 2H006 - A06 | Mqqakwebe at Msenge Ridge                  | C + E + Q      | C              | Craddock DC    | 32°51'24" | 27°22'35" |
| R 2H008 - A01 | Quencwe at Braunschweig (Edendale)         | C + E + Q      | C              | Craddock DC    | 32°46'05" | 27°22'27" |
| R 2H009 - A01 | Mqqokweni at Sheshegu (Nqqokweni Loc)      | C + E + Q      | C              | Craddock DC    | 32°55'00" | 27°22'23" |
| R 2H010 - A01 | Buffels at 135 K.W.T.Q. (Macintyre Bridge) | C + E + Q      | E              | Craddock DC    | 32°56'26" | 27°27'41" |
| R 2H015 - A01 | Yellowwoods at Fort Murray                 | C + E + Q      | C              | Craddock DC    | 32°55'54" | 27°28'21" |
| R 2H016 - A01 | Zwelitsha slood at Malakalaka              | C + E + Q      | E              | Craddock DC    | 32°56'05" | 27°28'45" |
| R 2H017 - M01 | Pipeline to purification works (Laing Dam) | R + Q          | R              | Laing Dam      | 32°58'04" | 27°29'33" |

| Station no.   | Station Name                                     | Data collected | Data processed | Data collector   | Latitude  | Longitude |
|---------------|--------------------------------------------------|----------------|----------------|------------------|-----------|-----------|
| R 2H020 -M01  | Main pipeline from Rooikrantz Dam - right        | R              | R              | Rooikrantz Dam   | 32°45'19" | 27°19'41" |
| R 2H024 -M01  | Pipeline to Trout Farm at Rooikrantz Dam         | R              | R              | Rooikrantz Dam   | 32°45'19" | 27°19'32" |
| R 2H025 -A01  | Canal before Yellowwoods (Wriggleswade Dam)      | C + E          | C              | Wriggleswade Dam | 32°42'52" | 27°33'15" |
| R 2H 027 -A01 | Buffels at Bridledrift                           | Cm + E + Q     | E              | Cradock DC       | 32°59'37" | 27°38'24" |
| R 2H029 -A01  | Buffalo at Bridledrift Dam                       | E              | E              | Cradock IT       | 32°59'29" | 27°43'45" |
| R 2R001 - A01 | Laing Dam                                        | C + E + R + Q  | C              | Cradock DC       | 32°58'05" | 27°29'39" |
| R 2R001 - K01 | River outlet from Laing Dam                      | R              | R              | Laing Dam        | 32°58'05" | 27°29'39" |
| R 2R001 - K02 | River outlet from Laing Dam                      | R              | R              | Laing Dam        | 32°58'05" | 27°29'39" |
| R 2R002 - A01 | Rooikrantz Dam                                   | C + E + R + Q  | C              | Cradock DC       | 32°45'19" | 27°19'41" |
| R 2R003 - A01 | Bridle Drift Dam                                 | E + R + Q      | E              | Bridledrift Dam  | 32°59'24" | 27°43'57" |
| R 3H001 - A01 | Gqunube at Outspan                               | Cm + E + Q     | E              | Cradock DC       | 32°48'07" | 27°51'21" |
| R 3H003 - A01 | Nahoon River at Farm 305 (Nahoon Dam)            | C + E + Q      | C              | Nahoon Dam       | 32°45'34" | 27°48'41" |
| R 3H004 - M01 | Pipeline to purification works Nahoon Dam        | R + Q          | R              | Nahoon Dam       | 32°45'34" | 27°48'41" |
| R 3H005 - A01 | Canal from Wriggleswade Dam before Nahoon outlet | C + E          | C              | Wriggleswade Dam | 32°41'55" | 27°33'54" |
| R 3H006 - A06 | Tunnel from Wriggleswade Dam                     | C + E + Q      | C              | Wriggleswade Dam | 32°38'43" | 27°34'54" |
| R 3R001 - A01 | Nahoon Dam                                       | C + E + R + Q  | C              | Nahoon Dam       | 32°54'35" | 27°48'41" |
|               |                                                  |                |                |                  |           |           |
| S 1R001 - A01 | Xonxa Dam                                        | R + E + Q      | E              | Cradock DC       | 31°50'17" | 27°10'03" |
| S 2H005 -A01  | Indwe at Mote Farm (Lubisi Dam)                  | C + E + R + Q  | C              | Dept. Observer   | 31°47'45" | 27°25'52" |
| S 2H006 - A01 | Doring River Dam at Indwe (Doring River Dam)     | C + E + Q      | C              | Doring River Dam | 31°30'47" | 27°20'05" |
| S 2H007 - M01 | Pipeline to Indwe at Doring River Dam            | R              | R              | Doring River Dam | 31°30'47" | 27°20'05" |
| S 2H008 - M01 | Pipeline to dam terrain at Doring River Dam      | R              | R              | Doring River Dam | 31°30'47" | 27°20'05" |
| S 2R001 - A01 | Lubisi Dam                                       | C + E + R + Q  | C              | Dept. Observer   | 31°47'45" | 27°25'52" |
| S 2R002 - A01 | Doring River Dam                                 | C + R + Q      | C              | Doring River Dam | 31°30'47" | 27°20'05" |
| S 3H002 - Q01 | Klaas Smits at Weltevreden (Grobbelaar)          | Q              | None           | Cradock DC       | 31°44'39" | 26°35'04" |

| Station no.   | Station Name                                              | Data collected | Data processed | Data collector   | Latitude  | Longitude |
|---------------|-----------------------------------------------------------|----------------|----------------|------------------|-----------|-----------|
| S 3H003 - Q01 | Black Kei at Doornkraal                                   | Q              | None           | Craddock DC      | 32°12'00" | 26°29'00" |
| S 3H004 - A01 | Black Kei Cathcarts Gift (Endwell)                        | C + E + Q      | C              | Craddock DC      | 32°03'00" | 26°47'23" |
| S 3H005 - A01 | Oxkraal at Whittlesea                                     | Q              | -              | Craddock DC      | 32°10'52" | 26°49'15" |
| S 3H006 - A06 | Klaas Smits at Weltevreden (Queenstown)                   | C + E + Q      | C              | Craddock DC      | 31°55'24" | 26°47'11" |
| S 3H008 - Q01 | Black Kei at Doornkraal                                   | Q              | None           | Craddock DC      | 32°12'00" | 28°29'00" |
| S 3H010 - A01 | Klipplaat River at Waterdown Dam                          | C + E + Q      | C              | Craddock DC      | 32°17'06" | 24°51'37" |
| S 3H011 - M03 | Pipeline from Waterdown Dam                               | R              | R              | Waterdown Dam    | 32°17'06" | 26°51'37" |
| S 3H011 - M04 | Pipeline from Waterdown Dam                               | R              | R              | Waterdam Dam     | 32°17'16" | 26°51'37" |
| S 3H012 - A01 | Oxkraal at Oxkraal Dam                                    | C + E + Q      | C              | Craddock DC      | 32°12'37" | 26°44'02" |
| S 3R001 - A01 | Waterdown Dam                                             | C + E + R + Q  | C              | Waterdown Dam    | 32°17'06" | 26°51'37" |
| S 3R003 - A01 | Oxkraal Dam                                               | C + E + Q      | C              | Craddock DC      | 32°12'20" | 26°45'31" |
| S 5H002 - A02 | Tsomo at Wyk Maduma                                       | E + R + Q      | E              | Dept. Observer   | 32°02'36" | 27°49'22" |
| S 5H004 - A01 | Tsomo at Famini Loc. (Ncora Dam)                          | C + E + R + Q  | C              | Dept. Observer   | 31°47'37" | 27°41'12" |
| S 5R001 - A01 | Ncora Dam                                                 | E + R + Q      | R              | Dept. Observer   | 31°47'15" | 27°40'45" |
| S 6H001 - A01 | Kubusi at Stutterheim                                     | C + E + Q      | C              | Craddock DC      | 32°34'45" | 27°22'00" |
| S 6H003 - A01 | Toise at Forkroad                                         | Cm + E + Q     | E              | Craddock DC      | 32°30'58" | 27°31'25" |
| S 6H004 - A01 | Gubu at Farm 253 (Gubu Dam)                               | C + E + Q      | C              | Gubu Dam         | 32°34'37" | 27°16'46" |
| S 6H005 - A01 | Kubusi at Wriggleswade                                    | C + E + Q      | C              | Wriggleswade Dam | 32°34'34" | 27°33'57" |
| S 6H005 - B01 | Kubusi at Wriggleswade Dam                                | C + E          | C              | Wriggleswade Dam | 32°34'34" | 27°35'57" |
| S 6R001 - A01 | Gubu Dam                                                  | C + E + R + Q  | C              | Gubu Dam         | 32°34'37" | 27°16'46" |
| S 6R002 - A01 | Wriggleswade Dam                                          | C + E + R + Q  | C              | Wriggleswade Dam | 32°34'44" | 27°33'40" |
| S7H00? - M01  | Pipeline to purification Works at Butterworth (Gcuwa Dam) | R              | R              | Dept. observer   | 32°34'44" | 27°33'40" |
| S 7H001 - A01 | Gcuwa at Butterworth                                      | E + R + Q      | E              | Dept observer    | 32°19'39" | 28°08'41" |
| S 7R001 - A01 | Gcuwa Dam                                                 | R + Q          | R              | Dept. Observer   | 32°19'26" | 28°08'26" |
| S 7R002 - A01 | Xilinxha Dam (to be closed)                               | R              | None           | Dept. Observer   | 32°08'23" | 28°05'53" |
| S 7H004 - A01 | Groot Kei at Springs B                                    | Cm + E + Q     | E              | Craddock DC      | 32°31'00" | 28°01'07" |
| S 7H004 - B01 | Groot Kei Springs at B                                    | Cm + E         | Cm             | Craddock DC      | 32°31'00" | 28°01'07" |

## AMATOLE KEI ISP MAJOR INFRASTRUCTURE AND TRANSFER SCHEMES

### WATER TREATMENT WORKS (Ref. 5 and 24)

| ISP AREA | QUATS | NAME                                        | OWNER/OPERATOR                                   | CAPACITY (Ml/d)    |
|----------|-------|---------------------------------------------|--------------------------------------------------|--------------------|
| AMATOLE  |       |                                             |                                                  |                    |
|          | R10B  | Keiskammahoek                               | Amatole DM / Amatole Water                       | 2.2                |
|          | R10C  | Sandile RWSS                                | DWAF / Amatola Water                             | 18                 |
|          | R10E  | Debe                                        | Amatole DM                                       | 1.5                |
|          | R10G  | Alice<br>Binfield Park Dam<br>Pleasant View | Amatole DM<br>DWAF / Amatola Water<br>Amatole DM | 3.8<br>4.8<br>0.75 |
|          | R10L  | Peddie RWSS                                 | Amatole DM / Amatola Water                       | 6.6                |
|          |       |                                             |                                                  |                    |
|          | R20A  | Rooikrantz                                  | DWAF / Amatola Water                             | 1.2                |
|          | R20B  | King William's Town                         | DWAF / Amatola Water/Buffalo City Municipality   | 7.0/13?            |
|          | R20E  | Laing Dam                                   | DWAF / Amatola Water                             | 27.3               |
|          | R20F  | Ncera Coastal / Needs Camp                  | Amatole DM ?                                     | 0.8                |
|          | R20G  | Umzoniana                                   | Buffalo City Municipality                        | 120                |
|          |       |                                             |                                                  |                    |
|          | R30B  | Cintsa                                      | Amatole DM                                       | 0.48               |
|          | R30E  | Kei Road                                    | DWAF / Amatola Water                             | 0.30               |
|          | R30F  | Nahoon                                      | DWAF / Amatola Water                             | 33.7               |
|          |       |                                             |                                                  |                    |
|          | R50A  | Wesley                                      | Amatole DM                                       | 3.8                |

| ISP AREA | QUATS  | NAME              | OWNER/OPERATOR                       | CAPACITY (MI/d) |
|----------|--------|-------------------|--------------------------------------|-----------------|
| KEI      |        |                   |                                      |                 |
|          | S10F/G | Cacadu            | DWAF (?)                             | 3.5             |
|          |        |                   |                                      |                 |
|          | S20A   | Indwe             | Lukhanji LM                          | ?               |
|          |        |                   |                                      |                 |
|          | S31F   | Queenstown        | Chris Hani DM / Lukanji Municipality | 40              |
|          | S32G   | Sada              | Chris Hani DM / Lukanji Municipality | 11.25           |
|          |        |                   |                                      |                 |
|          | S40A   | Cathcart          | Amatole DM / Amahlati Municipality   | ?               |
|          |        |                   |                                      |                 |
|          | S50C   | Cala              | Sakhisizwe Municipality              | 1.8             |
|          | S50E   | Ncora             | DWAF (?)                             | ?               |
|          | S50F   | Tsojana           | DWAF/ Intsika Yethu (?)              | 0.47            |
|          | S50J   | Tsomo             | Chris Hani / Intsika Yethu           | 0.50            |
|          |        |                   |                                      |                 |
|          | S60A   | Stutterheim       | Amahlati LM                          | 2.5             |
|          |        |                   |                                      |                 |
|          | S70A   | Kei River (Komga) | Amatole DM / Great Kei Municipality  | 1.2             |
|          | S70C   | Xilinxha          | Amatole DM / Mnquma Municipality     | ?               |
|          | S70E   | Butterworth       | Amatole DM / Mnquma Municipality     | 18              |

**BOREHOLE SUPPLIES**

| ISP AREA       | QUATS      | SCHEME NAME        | TOWN                            |
|----------------|------------|--------------------|---------------------------------|
| <b>AMATOLE</b> |            |                    |                                 |
|                | R10M       | Hamburg            | Hamburg                         |
|                | R30A/B/D   | East Coast Resorts | Between Gonubie & Cefane        |
|                | R30A/B     | Mooiplaas          | 15 Rural villages               |
|                | R30B/D     | Kwelera            | 7 Rural villages                |
|                | R30E       | Macleantown        | Macleantown                     |
|                | R40A       | West Coast Resorts | Between Cove Rock & Gxulu River |
| <b>KEI</b>     |            |                    |                                 |
|                | S31A       | Sterkstroom        | Sterkstroom                     |
|                | S32B/C/F/H | Hewu               | 48 Rural villages               |
|                | S32J       | Ilinge             | Ilinge and rural villages       |
|                | S60C       | Wartburg           | 6 Rural villages                |
|                | S60D       | Mgwali Heckel      | 6 Rural villages                |
|                | S70D/S50J  | Nqamakwe           | Nqamakwe                        |

**TRANSFER SCHEMES (Raw Water)**

| ISP AREA | QUATS        | SOURCE TO SUPPLY END                                                       |
|----------|--------------|----------------------------------------------------------------------------|
| AMATOLE  |              |                                                                            |
|          | R10L to R50A | Keiskamma River to Birha River (Wesley Scheme now replaced by Peddie RWSS) |
| KEI      |              |                                                                            |
|          | S32E to S31F | Waterdown Dam to Queenstown                                                |
|          | S50E         | Ncora Dam to Mbashe Catchment (Eskom)                                      |
|          | S50F to S50H | Tsojana Dam to Cofimvaba                                                   |
|          | S60B to R20B | Wriggleswade Dam to Buffalo River (or Nahoon River)                        |

**PIPELINES**

Waterdown Dam to Queenstown. Pumped line with a present capacity of 0,265m<sup>3</sup>/s (23MI/d).

**CANALS**

| ISP AREA | QUATERNARY   | SOURCE TO SUPPLY END                                                        |
|----------|--------------|-----------------------------------------------------------------------------|
| AMATOLE  |              |                                                                             |
| KEI      |              |                                                                             |
|          | S20D         | Lubisi Dam – Qamata Irrigation Scheme<br>28.5 km long canal from Lanti weir |
|          | S60B to R20B | Wriggleswade Canal                                                          |

# **POTABLE WATER SUPPLY SCHEMES (1995) (Ref. 24)**

| SCHEME NAME                          | RAW WATER SOURCE                                                   | POPULATION SUPPLIED | SCHEME CAPACITY             |         |                    | CATCHMENT No.                        |
|--------------------------------------|--------------------------------------------------------------------|---------------------|-----------------------------|---------|--------------------|--------------------------------------|
|                                      |                                                                    |                     | (million m <sup>3</sup> /a) | (l/c/d) | Limiting Factor    |                                      |
| Amatole System                       | Bridle Drift, Nahoon, Laing, Rooikrantz, Maden, Gubu, Wriggleswade | 725 000             | 57,0                        | 215     | Treatment capacity | R20A, B, C, D, E, F, G<br>R30D, E, F |
| Komga                                | Boreholes, Kei River                                               | 5 100               | 0,50                        | 268     | Treatment capacity | S70A                                 |
| Butterworth                          | Xilinx Dam                                                         | 36 450              | 5,45                        | 188     | Treatment capacity | S70E                                 |
| Tsomo                                | Tsomo River                                                        | 2 050               | 0,12                        | 160     | Treatment capacity | S50J                                 |
| Ngamakwe                             | Boreholes                                                          | 2 050               | 0,05                        | 66      | Source             | S50J                                 |
| Cathcart                             | Sam Meyer Dam                                                      | 8 000               | 0,50                        | 172     | Source             | S40A                                 |
| Mgwali Heckel Scheme                 | Boreholes                                                          | 4 500               | 0,42                        | 255     | Source             | S60D                                 |
| Wartburg Scheme                      | Boreholes                                                          | 5 000               | 0,27                        | 148     | Source             | S60C                                 |
| Kwelera Scheme                       | Boreholes                                                          | 18 000              | 0,88                        | 133     | Source             | R30B, D                              |
| Mooiplaas Scheme                     | Boreholes                                                          | 30 000              | 0,60                        | 55      | Source             | R30A, B                              |
| Alice (Tyume Valley Scheme)          | Binfield Park Dam                                                  | 15 300              | 1,1                         | 195     | Treatment capacity | R10H                                 |
| Debe Regional Water Supply Scheme    | Debe Dam                                                           | 29 000              | 0,45                        | 43      | Treatment capacity | R10E, J ,K                           |
| Keiskammahoek Water Supply Scheme    | Mnyameni Dam                                                       | 12 000              | 0,88                        | 200     | Treatment capacity | R10B                                 |
| Wesley Regional Water Supply Scheme  | Keiskamma River                                                    | 700                 | 1,15                        | N/A     | Treatment capacity | R10M<br>R50A, B                      |
| Sandile Regional Water Supply Scheme | Sandile Dam                                                        | 104 000             | 5,4                         | 142     | Treatment capacity | R10D, E, K<br>R20C, D                |
| Hamburg                              | Boreholes                                                          | 1 700               | Unknown                     |         |                    | R10M                                 |
| Indwe                                | Doring River Dam                                                   | 6 350               | 0,35                        | 151     | Treatment capacity | S20A                                 |
| Cala                                 | Tsomo River, Boreholes                                             | 13 350              | 0,55                        | 111     | Treatment capacity | S50A                                 |
| Queenstown                           | Waterdown Dam,                                                     | 50 450              | 8,9                         | 483     | Source             | S31F                                 |

|                                  |                       |        |      |     |                               |                 |
|----------------------------------|-----------------------|--------|------|-----|-------------------------------|-----------------|
|                                  | Bongolo Dam           |        |      |     |                               |                 |
| Sada/Whittlesea                  | Waterdown Dam         | 50 400 | 3,4  | 185 | Treatment capacity            | S32G, H         |
| Yonda, Mbekweni                  | Bushmanskrantz Dam    | 9 200  | 0,10 | 30  | Treatment capacity            | S32F, G         |
| Cacadu Rural Water Supply Scheme | Macubeni Dam          | 64 000 | 1,06 | 45  | Source and Treatment capacity | S20A<br>S10F, G |
| Hewu Groundwater Scheme          | Boreholes and springs | 48 000 | 0,53 | 30  | Source                        | S32C, F         |
| Ilinge Scheme                    | Boreholes             | 13 000 | 1,3  | 274 | Source                        | S32J            |
| Tsojana Scheme                   | Tsojana Dam           | 5 000  | 0,14 | 79  | Treatment capacity            | S50H            |

**AMATOLE- KEI ISP**  
**URBAN WATER USE/ESTIMATED DEMAND AND SOURCES**  
(Ref. 2, 5 and 24)

[illegible]

[illegible]

| Towns                                                                | Water Consumption or Estimated Demand 2003 (million m <sup>3</sup> /a) | Assurance of Water Supply or Reliability of the Water Source | Current Supply Source                                                           | Problems with Current Supply | Need to Augment Current Supply | Comment on Demand Management Initiatives and its Results | Planned Water Schemes or Studies         |
|----------------------------------------------------------------------|------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------|--------------------------------|----------------------------------------------------------|------------------------------------------|
| - Sandile Regional (incl. Middeldrift, Dimbaza and some 50 villages) | 6,60                                                                   | Adequate                                                     | Sandile Dam                                                                     | Adequate                     | No                             | Unknown                                                  | No                                       |
| - Tyume Valley (inc. Alice and rural villages)                       | 1,30                                                                   | Adequate                                                     | Binfield Park Dam                                                               | Adequate                     | No                             | Unknown                                                  | No                                       |
| - Wesley Regional                                                    | 1,01                                                                   | Adequate (allocation not fixed)                              | Bulk water from Peddie RWSS                                                     | Adequate                     | No                             | Unknown                                                  | No                                       |
| - Tqolomna Regional                                                  | ?                                                                      |                                                              | Bulk water from Peddie RWSS                                                     | Problems with commissioning  |                                |                                                          | No                                       |
| Lady Frere (Cacadu)                                                  | 0,92                                                                   | Dam siltation reducing yield                                 | Macubeni Dam                                                                    | Adequate                     | Yes                            |                                                          | No                                       |
| Indwe                                                                | 0,40                                                                   | Adequate                                                     | Doring River Dam                                                                | Unknown                      | No                             |                                                          | No                                       |
| Sterkstroom                                                          | 0,06                                                                   | Inadequate                                                   | Boreholes/springs                                                               | Unknown                      | Yes                            |                                                          | Unknown                                  |
| Queenstown                                                           | 8,50                                                                   | Inadequate                                                   | Waterdown Dam (8,25 Mm <sup>3</sup> /a)<br>Bongolo Dam (0,6 Mm <sup>3</sup> /a) | Inadequate bulk supply       | Yes                            | Yes (?)                                                  | Feasibility Study 1997                   |
| Sada/Whittlesea                                                      | 1,97                                                                   | Adequate                                                     | Waterdown Dam                                                                   | None                         | No                             | Unknown                                                  | Ditto                                    |
| Cathcart                                                             | 0,78                                                                   | Unknown                                                      | Sam Meyer Dam                                                                   | Unknown                      | Dam recently raised            | Unknown                                                  | Unknown                                  |
| Cala (outside area)                                                  | 0,11                                                                   | Adequate                                                     | Tsomo River                                                                     | None (silt)                  | No                             | Unknown                                                  | No                                       |
| Cofimvaba                                                            | ?                                                                      | ?                                                            | Tsojana Dam                                                                     | Unknown                      | No                             | Unknown                                                  | Unknown                                  |
| Ncora                                                                | 0,80                                                                   | Adequate                                                     | Ncora Dam                                                                       | Unknown                      | No                             | Unknown                                                  | Unknown                                  |
| Tsomo                                                                | 0,0164                                                                 | Unknown                                                      | Tsomo River                                                                     | Unknown                      | Unknown                        | Unknown                                                  | Unknown                                  |
| Stutterheim                                                          | 1,38                                                                   | Adequate                                                     | Gubu Dam and River                                                              | None                         | No                             | Unknown                                                  | Proposed pipeline directly from Gubu Dam |
| Nqamakwe                                                             | 0,14                                                                   | Inadequate                                                   | Boreholes                                                                       | Inadequate                   | Yes                            | Unknown                                                  | Proposed regional study 2004             |
| Butterworth                                                          | 7,40                                                                   | Adequate                                                     | Xilinxha and Gcuwa Dams                                                         | Siltation of Gcuwa Dam       | No. Adequate until year 2009   | Unknown                                                  | Unknown                                  |

| Towns               | Water Consumption or Estimated Demand 2003 (million m <sup>3</sup> /a) | Assurance of Water Supply or Reliability of the Water Source | Current Supply Source      | Problems with Current Supply | Need to Augment Current Supply | Comment on Demand Management Initiatives and its Results | Planned Water Schemes or Studies |
|---------------------|------------------------------------------------------------------------|--------------------------------------------------------------|----------------------------|------------------------------|--------------------------------|----------------------------------------------------------|----------------------------------|
| Komga               | 0,34 -0,50                                                             | Adequate                                                     | Kei River Boreholes/spring | B/h & spring high nitrates   | No                             | Unknown                                                  | No                               |
| Rural Villages      |                                                                        |                                                              |                            |                              |                                |                                                          |                                  |
| - Mgwali/Heckel (7) | 0,054                                                                  | Adequate                                                     | Boreholes                  | None                         | No                             | Unknown                                                  | No                               |
| - Wartburg          | 0,092                                                                  | Adequate                                                     | Boreholes                  | None                         | No                             | Unknown                                                  | No                               |
| - Xilinxá           |                                                                        |                                                              |                            |                              |                                |                                                          |                                  |
| - Hewu              | 0,94                                                                   | Unknown                                                      | Boreholes                  | Unknown                      | Unknown                        | Unknown                                                  | Unknown                          |
| - Ilinge            | 0,68                                                                   | Adequate                                                     | Boreholes                  | None                         | No                             | Unknown                                                  | No                               |

## AMATOLE - KEI ISP

## GENERAL AUTHORISATIONS (SURFACE/GROUNDWATER)

**Purpose of General Authorisation:**

The purpose of general authorisation is the need to replace the necessity for a water user to apply for a licence in terms of the National Water Act for the abstraction or storage of water from a water resource, provided that the abstraction or storage is within the limits and conditions set out in this authorisation. The tables below indicate the areas in the Amatole - Kei catchments permitted in terms of Government Gazette No: 20626 of 8 October 1999.

**TABLE 1.1 Areas excluded from General Authorization for surface water abstraction**

| Primary | Secondary/Tertiary/Quaternary drainage                                                                                | Description of main river in drainage region                                                                                                                                                                                                                                                                                                                                                               |
|---------|-----------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| R       | R20<br>R30A, B, C & D<br>R30E & F                                                                                     | Buffalo River<br>Kwenxura, Kwelera, Gonubie Rivers<br>Nahoon River                                                                                                                                                                                                                                                                                                                                         |
| S       | S10 A & E<br>S20A to C<br>S32A to C<br>S32D & E<br>S32F<br>S40A, B & C<br>S50A, B & C<br>S60A & B<br>S60C & D<br>S70C | White Kei River upstream of the Xonxa Dam<br>Indwe River upstream of the Lubisi Dam<br>Black Kei River upstream of the Klipplaar confluence<br>Klipplaar River upstream of Waterdown Dam<br>Oxkraal River upstream of Oxkraal Dam<br>Thorn, Thomas Rivers<br>Tsomo, Kwa-Qokwama and Mbokotwa Rivers<br>Kubusi River upstream of Wriggleswade Dam<br>Toise River<br>Xilinx River upstream of the Xilinx Dam |

**TABLE 1.2 Groundwater Abstraction Zones: Tertiary and Quaternary Drainage Regions**

| ZONE A<br>No water may be abstracted from these drainage regions except as set out under Schedule 1 | ZONE B<br>45m <sup>3</sup> per hectare per annum may be abstracted from these drainage regions | ZONE C<br>75m <sup>3</sup> per hectare per annum may be abstracted from these drainage regions |
|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
|                                                                                                     | R10A, B & F                                                                                    | R10C-E, G, H, J-M                                                                              |
|                                                                                                     | R20A & C                                                                                       | R20B, D-G                                                                                      |
|                                                                                                     |                                                                                                | R30A-F                                                                                         |
|                                                                                                     |                                                                                                | R40A-C                                                                                         |
|                                                                                                     | R50B                                                                                           | R50A-H, J                                                                                      |
|                                                                                                     |                                                                                                |                                                                                                |
|                                                                                                     | S20A                                                                                           | S20B, D-G                                                                                      |
|                                                                                                     | S31B, C & E                                                                                    | S31A, D, F, G                                                                                  |
|                                                                                                     | S32D & E                                                                                       | S32A-C, F-H, J-M                                                                               |
|                                                                                                     |                                                                                                | S40A-F                                                                                         |
|                                                                                                     | S50D                                                                                           | S50A-C, E-H, J                                                                                 |
|                                                                                                     | S60A & B                                                                                       | S60C-E                                                                                         |
|                                                                                                     |                                                                                                | S70A-F                                                                                         |

**TABLE 1.3: Wastewater limit values applicable to discharge of wastewater into a water resource**

| SUBSTANCE/PARAMETER                                 | GENERAL LIMIT                               | SPECIAL LIMIT                                                     |
|-----------------------------------------------------|---------------------------------------------|-------------------------------------------------------------------|
| Faecal Coliforms (per 100ml)                        | 1000                                        | 0                                                                 |
| Chemical Oxygen Demand (mg/l)                       | 75*                                         | 30*                                                               |
| pH                                                  | 5,5-9,5                                     | 5,5-7,5                                                           |
| Ammonia (ionised and un-ionised) as Nitrogen (mg/l) | 3                                           | 2                                                                 |
| Nitrate/nitrite as Nitrogen (mg/l)                  | 15                                          | 1.5                                                               |
| Chlorine as Free Chlorine (mg/l)                    | 0.25                                        | 0                                                                 |
| Suspended Solids (mg/l)                             | 25                                          | 10                                                                |
| Electrical Conductivity (mS/m)                      | 70mS/m above intake to a maximum of 150mS/m | 50 mS/m above background receiving water, to a maximum of 100mS/m |
| Ortho-Phosphate as phosphorous (mg/l)               | 10                                          | 1(median) and 2,5 (maximum)                                       |
| Fluoride (mg/l)                                     | 1                                           | 1                                                                 |
| Soap, oil or grease (mg/l)                          | 2.5                                         | 0                                                                 |
| Dissolved Arsenic (mg/l)                            | 0.02                                        | 0.01                                                              |
| Dissolved Cadmium (mg/l)                            | 0.005                                       | 0.001                                                             |
| Dissolved Chromium (VI) (mg/l)                      | 0.05                                        | 0.02                                                              |
| Dissolved Copper (mg/l)                             | 0.01                                        | 0.002                                                             |
| Dissolved Cyanide (mg/l)                            | 0.02                                        | 0.01                                                              |
| Dissolved Iron (mg/l)                               | 0.3                                         | 0.3                                                               |
| Dissolved Lead (mg/l)                               | 0.01                                        | 0.006                                                             |
| Dissolved Manganese (mg/l)                          | 0.1                                         | 0.1                                                               |
| Mercury and its components (mg/l)                   | 0.005                                       | 0.001                                                             |
| Dissolved Selenium (mg/l)                           | 0.02                                        | 0.02                                                              |
| Dissolved Zinc (mg/l)                               | 0.1                                         | 0.04                                                              |
| Boron (mg/l)                                        | 1                                           | 0.5                                                               |

**TABLE 1.4: Listed water resource**

|    |                                                                     |
|----|---------------------------------------------------------------------|
| 14 | Buffalo River from its source to where it enters the municipal area |
| 15 | Klipplaat River from its source to Waterdown Dam                    |
| 16 | Black Kei River to its confluence with the Klipplaat River          |
| 18 | Bongola River to Bongola Dam                                        |
| 19 | Kubusi River to Stutterheim municipal boundary                      |
| 22 | Little Tsomo River                                                  |

## AMATOLE - KEI ISP

## ESTUARIES (Ref. 18 and 28)

| ESTUARY NAME    | CONDITION | CLASSIFICATION      | INFORMATION | COMMENTS                                                          |
|-----------------|-----------|---------------------|-------------|-------------------------------------------------------------------|
| Mpekweni        | Good      | Temp. open / closed | Poor        | Hotel manipulates estuary                                         |
| Mtati           | Excellent | Temp. open / closed | Poor        | New resort development at mouth                                   |
| Mgwalana        | Excellent | Temp. open / closed | Poor        | Small resort near mouth                                           |
| Bira            | Excellent | Temp. open / closed | Poor        | Northern bank artificially stabilized                             |
| Gqutywa         | Excellent | Temp. open / closed | Poor        | Declared conservation area                                        |
| Ngculura        | Good      | Temp. open / closed | Poor        | Catchment degradation                                             |
| Mtana           | Excellent | Temp. open / closed | Poor        | Vehicle access on estuary bank                                    |
| Keiskamma       | Fair      | Permanently open    | Moderate    | Increasing fresh water abstraction and human impacts in catchment |
| Ngqinisa        | Excellent | Temp. open / closed | Poor        | Undeveloped                                                       |
| Kiwane          | Excellent | Temp. open / closed | Poor        | Undeveloped                                                       |
| Tyolomnqa       | Good      | Temp. open / closed | Poor        | State forest reserve on western bank                              |
| Shelbertsstroom | Fair      | Temp. open / closed | Poor        | Floodplain disturbed by construction of car park                  |
| Lilyvale        | Good      | Temp. open / closed | Poor        | Resort development to east at Christmas Rock                      |
| Ross' Creek     | Good      | Temp. open / closed | Poor        | Farmlands and resort development to east                          |
| Ncera           | Excellent | Temp. open / closed | Poor        | Weir at head of estuary                                           |
| Mlele           | Good      | Temp. open / closed | Poor        | Weir at head of estuary                                           |
| Mcantsi         | Good      | Temp. open / closed | Poor        | Kidd's Beach on south bank                                        |
| Gxulu           | Fair      | Temp. open / closed | Poor        | Resort on floodplain                                              |
| Goda            | Excellent | Temp. open / closed | Poor        | Resort on northern bank                                           |
| Hlozi           | Good      | Temp. open / closed | Poor        | Farmlands in catchment                                            |
| Hickmans        | Fair      | Temp. open / closed | Poor        | Causeway and resort development in floodplain                     |
| Buffalo         | Poor      | Permanently open    | Poor        | Urban and rural pollution                                         |
| Blind           | Poor      | Temp. open / closed | Poor        | Serious urban pollution                                           |
| Hlaze           | Poor      | Temp. open / closed | Poor        | Serious urban pollution                                           |
| Nahoon          | Fair      | Permanently open    | Moderate    | NB environmental asset and recreation                             |

| ESTUARY NAME | CONDITION | CLASSIFICATION      | INFORMATION | COMMENTS                                     |
|--------------|-----------|---------------------|-------------|----------------------------------------------|
| Quinera      | Good      | Temp. open / closed | Poor        | NB environmental asset and recreation        |
| Gqunube      | Good      | Permanently open    | Poor        | NB environmental asset and recreation        |
| Kwelera      | Good      | Permanently open    | Poor        | Resorts on north bank                        |
| Bulura       | Good      | Temp. open / closed | Poor        | Resorts on north bank                        |
| Cunge        | Good      | Temp. open / closed | Poor        | Low Oxygen levels in bottom waters           |
| Cintsa       | Good      | Temp. open / closed | Poor        | Extensive resort development                 |
| Cefane       | Excellent | Temp. open / closed | Poor        | Possible coastal reserve                     |
| Kwenxura     | Excellent | Temp. open / closed | Poor        | Possible coastal reserve                     |
| Nyara        | Excellent | Temp. open / closed | Poor        | Possible coastal reserve                     |
| Haga Haga    | Excellent | Temp. open / closed | Poor        | Increased freshwater extraction for resort   |
| Mtendwe      | Excellent | Temp. open / closed | Poor        | Catchment and estuary in excellent condition |
| Quko         | Excellent | Temp. open / closed | Poor        | Conservation area                            |
| Morgan       | Good      | Temp. open / closed | Poor        | Increased freshwater extraction for resort   |
| Cwili        | Good      | Temp. open / closed | Poor        | Old bridge in estuary                        |
| Great Kei    | Fair      | Permanently open    | Moderate    | Heavy siltation due to catchment degradation |