

5. DEVELOPMENT OF A HEALTH CARE RISK WASTE INCINERATOR INFORMATION SYSTEM (IIMS) FOR GAUTENG DEPARTMENT OF AGRICULTURE, CONSERVATION, ENVIRONMENT AND LAND AFFAIRS (DACEL)

5.1 Background

The purpose of this chapter is to outline the development of a:

- Health Care Risk Waste (HCRW) Incinerator Information Management System (IIMS) module as part of the existing Environmental Management System of the Gauteng Department of Agriculture, Conservation, Environment and Land Affairs (DACEL);
- Customised user-friendly module of the EIMS for accessing and maintaining the incinerator data in the form of maps, graphs and reports;
- Spatial representation of both the sources of HCRW generation and treatment/disposal facilities on DACEL's EIMS within a Geographical Information System (GIS). The key issues to be considered were:
 - GPS readings and/or address Geocoding of the HCRW treatment facilities to spatially reference the sites;
 - Design and development of the attribute database.

A total of 70 incinerator units were captured in the IIMS, from 58 incinerator facilities throughout the Gauteng Province. Of these, 9 incinerators are not currently operational. The only information which could be captured within the IIMS, included:

- General facility information, e.g. Name, location, operation status, registration number;
- Incinerator details, e.g. Incinerator type, fuel type, incinerator capacity, scrubber information, burner temperatures, waste types incinerated; and
- Information and handling, e.g. Packaging material, mass incinerated. This field allows for the recording of detailed information, which was not captured during the Phase 1 project, but which will form part of the information requirements under the National Waste Management Strategy. Such information includes monthly reporting on needle stick injuries, downtime, mass incinerated and operational hours.

A comparison of theoretical incinerator capacity, based on incinerator unit information, against calculated mass incinerated (operation hours multiplied by recorded mass), shows a number of discrepancies in recording. In many instances, recorded mass incinerated far out-weight theoretical incinerator capacities, as shown in *Table 4.10*. In most cases however, the recorded mass incinerated are below the theoretical capacities, suggesting available spare capacity at these incinerators. Such information will need to be verified by DACEL staff during future data captures.

5.2 Incinerator Information Management System (IIMS)

The HCRW Incinerator Information Management System (IIMS) has been developed for the Gauteng Provincial Government to aid in the effective management, updating, representation and reporting of HCRW Incinerator Facilities throughout the Gauteng Province. The system was developed to capture specifically HCRW incinerator information, although additional incinerator and waste types may be added to the system.

The IIMS has been designed to link to, compliment and form part of the existing Environmental Information Management System (EIMS) already implemented at the Department of Agriculture, Conservation, Environment and Land Affairs (DACEL). As such it incorporates the same database format, the same look and feel and the same user functionality as the three administration components already linked to the EIMS, namely the EIA Administration System, the Waste Information Management System and the Environmental Complaints Register. The IIMS however does incorporate an upgrade in reporting functionality from within the administration component. This is due to the fact that the other components to the EIMS are very reliant on the GIS system for reporting and graphing of information gathered. It was felt during the course of the development of the IIMS that the system should be an effective management tool with GIS support and representation as opposed to a data capture tool with GIS reporting. This reduces the training necessary for managers and system administrators using the IIMS.

The IIMS uses the latest in Microsoft's Data Access technology to communicate with a centralized Access database over the DACEL network. This database is accessible from any workstation within the department and as such, the IIMS Administration and GIS components may be installed at any node of the network. All users authorised and connected to the system will see updates and changes made by other users.

The IIMS is in effect an addition to the EIMS system already operational within the Department. However, the IIMS has been designed in such a way that it may be installed on any stand-alone computer as well as on any network as it is not dependant on any of the EIMS features to function.

A summary of the IIMS is given in *Annexure 5.1*, a training manual developed for DACEL staff involved in capturing information into the IIMS. Screen captures are included in this manual, which shows the design and layout, graphing, data capture and reporting.

5.3 Geographical Information System

Based on the information captured within the IIMS, all incinerator units were captured in a Geographical Information System (GIS). This included both HCRW generators and HCRW incinerators. All spatial coverages were developed within ArcView 3.1.

The GIS system links via Open Database Connectivity (ODBC) to this common data store in order to access spatial information for each incinerator facility (latitude and longitude) and display the facility as an on-screen icon. The icon is colour co-ordinated depending on the registration status of the facility. In this manner the users to the EIMS will be able to view the entire Gauteng region with all captured provincial incinerator facilities.

Spatial coverages of HCRW generators and incinerator facilities is given in *Figures 5.1-5.5* as follows:

5.4 Data Accuracy

Data captured within the IIMS is based upon information supplied by incinerator operators during interviews and through questionnaires. The data currently stored within the IIMS should be treated with caution as much of the data was not readily available from operators and has been captured for the first time. This data should be reviewed, verified and updated with more accurate information as it becomes available.

Many of the incinerator's spatial positioning, is based upon information obtained from DACEL. This information was checked and verified where possible against HCRW generator information, as in many instances the incinerator units correspond with waste generators, e.g. hospitals. As new information becomes available from incinerator operators, the positioning of incinerators should be verified.

GIS coverages prepared of HCRW generators, was based on information obtained from directories of medical services. Coordinates of these generators were obtained from street addresses and where this was not possible, from postal code areas. The accuracy of these coordinates needs to be verified and updated by either DACEL or Department of Health.

5.5 Installation and Training

DACEL staff were given the opportunity to review the draft IIMS on a number of occasions, during which time, modifications and corrections were made to the system. The final version of the IIMS, version 2000.1 was installed within DACEL during the week of the 7-11 August 2000. Training of DACEL staff on the use and operation of the IIMS was conducted as per the training manual.

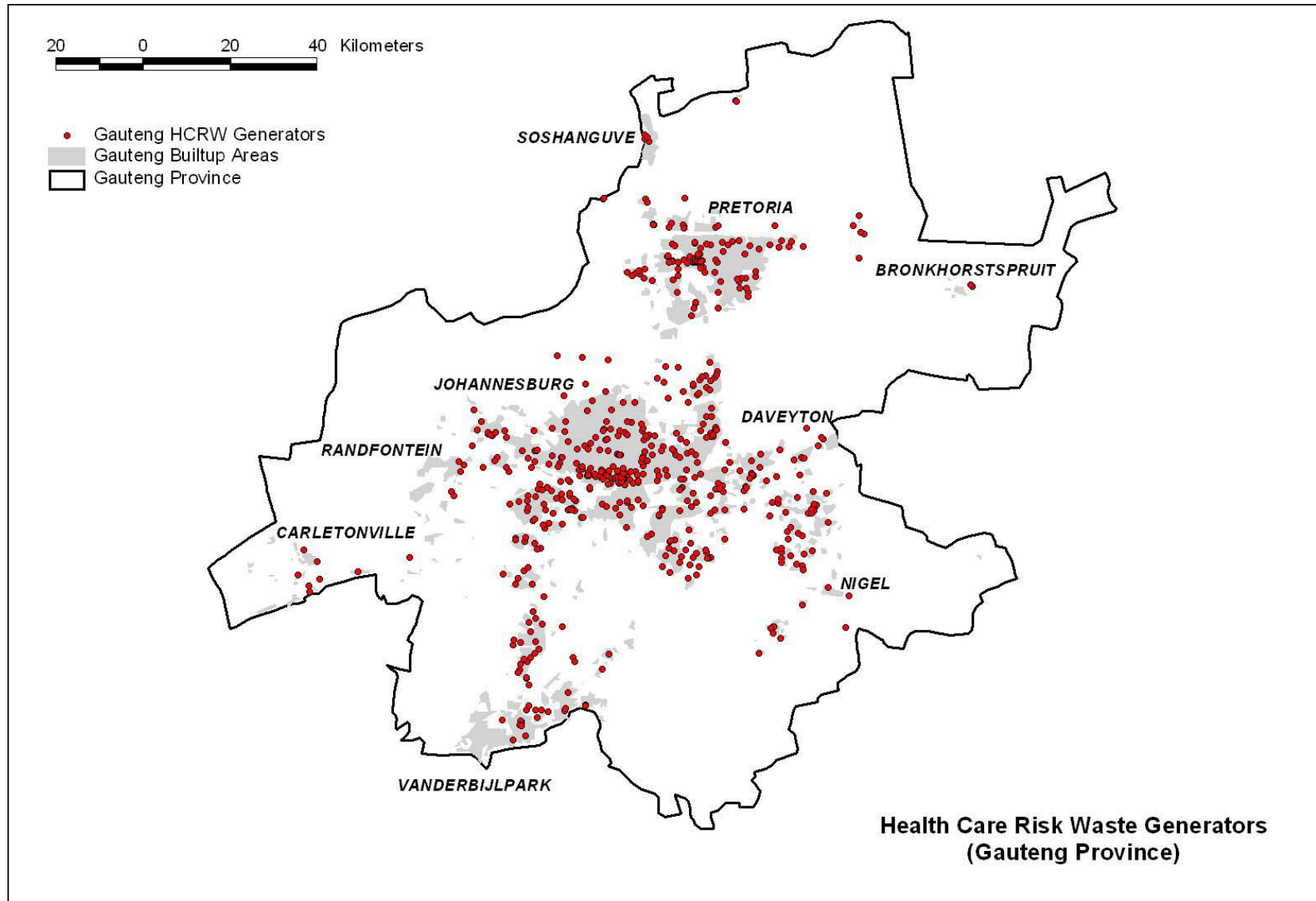


Figure 5.1: All captured HCRW generators. As expected, generators cluster around built up areas.

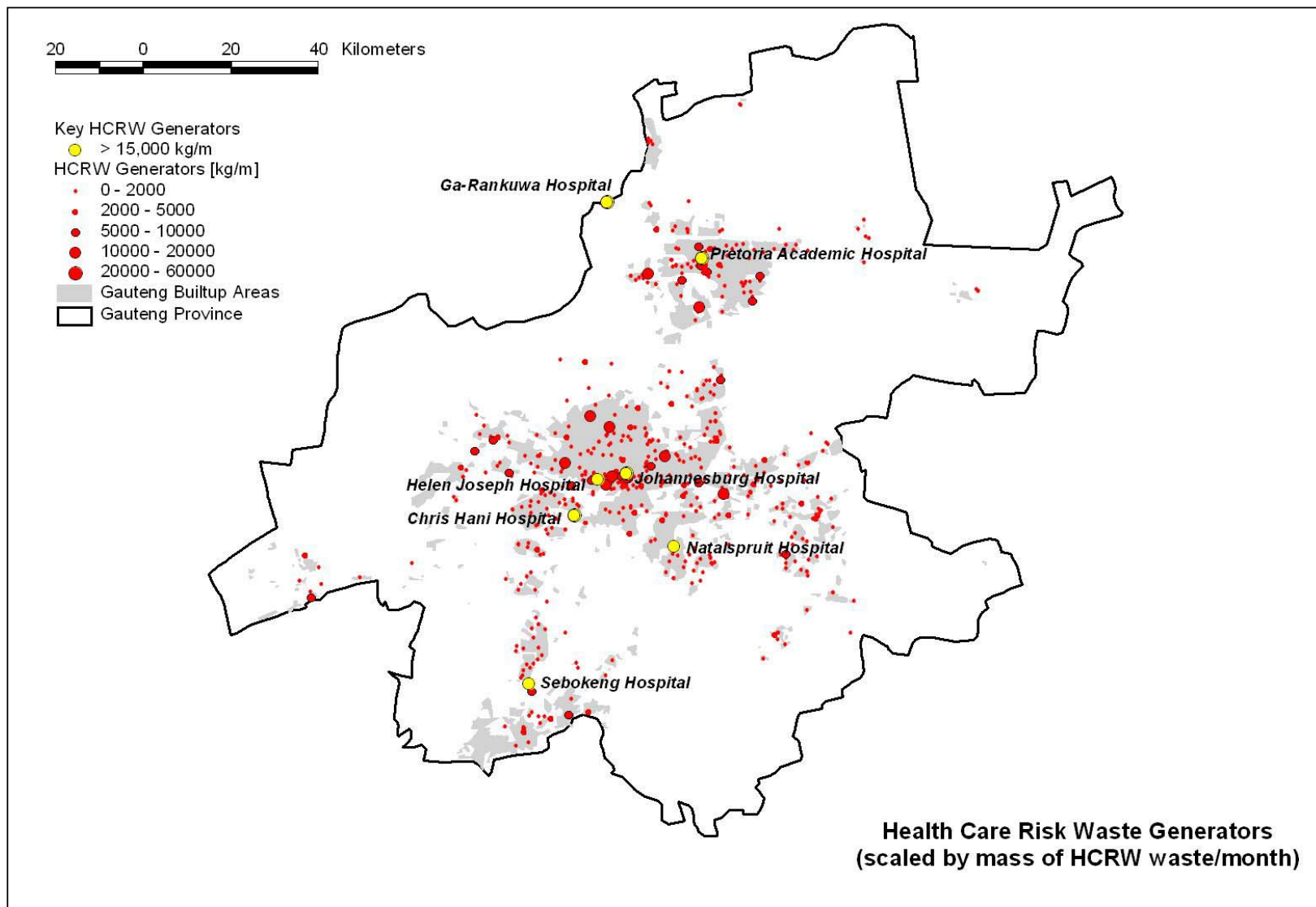


Figure 5.2: HCRW generators scaled by mass of HCRW generated (kg). Large generators, such as Johannesburg Hospital, Chris Hani (Baragwanath) Hospital and Pretoria Academic Hospital are evident.

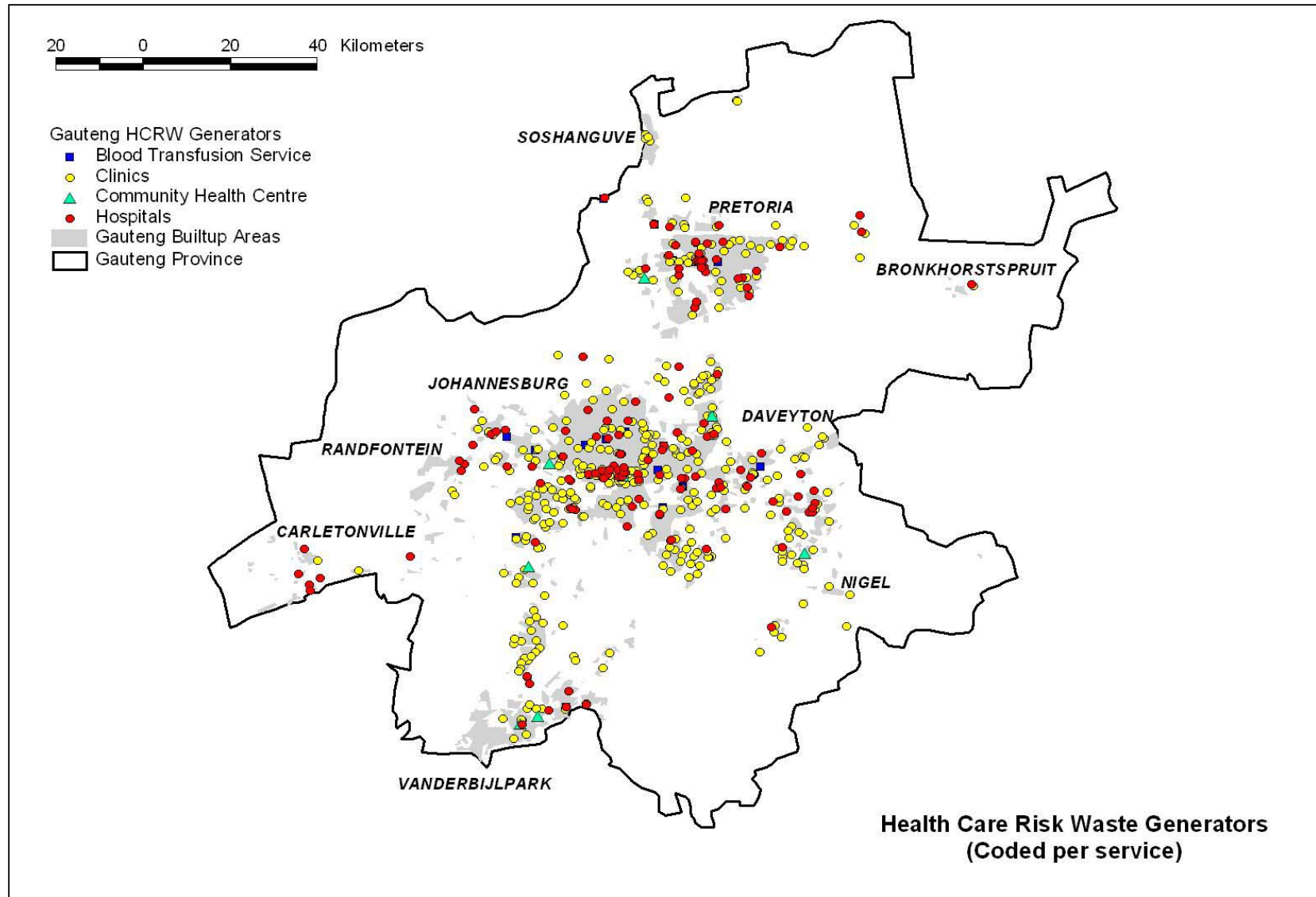


Figure 5.3: HCRW generators, coded by service, i.e. Blood Transfusion Services, Clinics, Community Health Centres, and Hospitals.

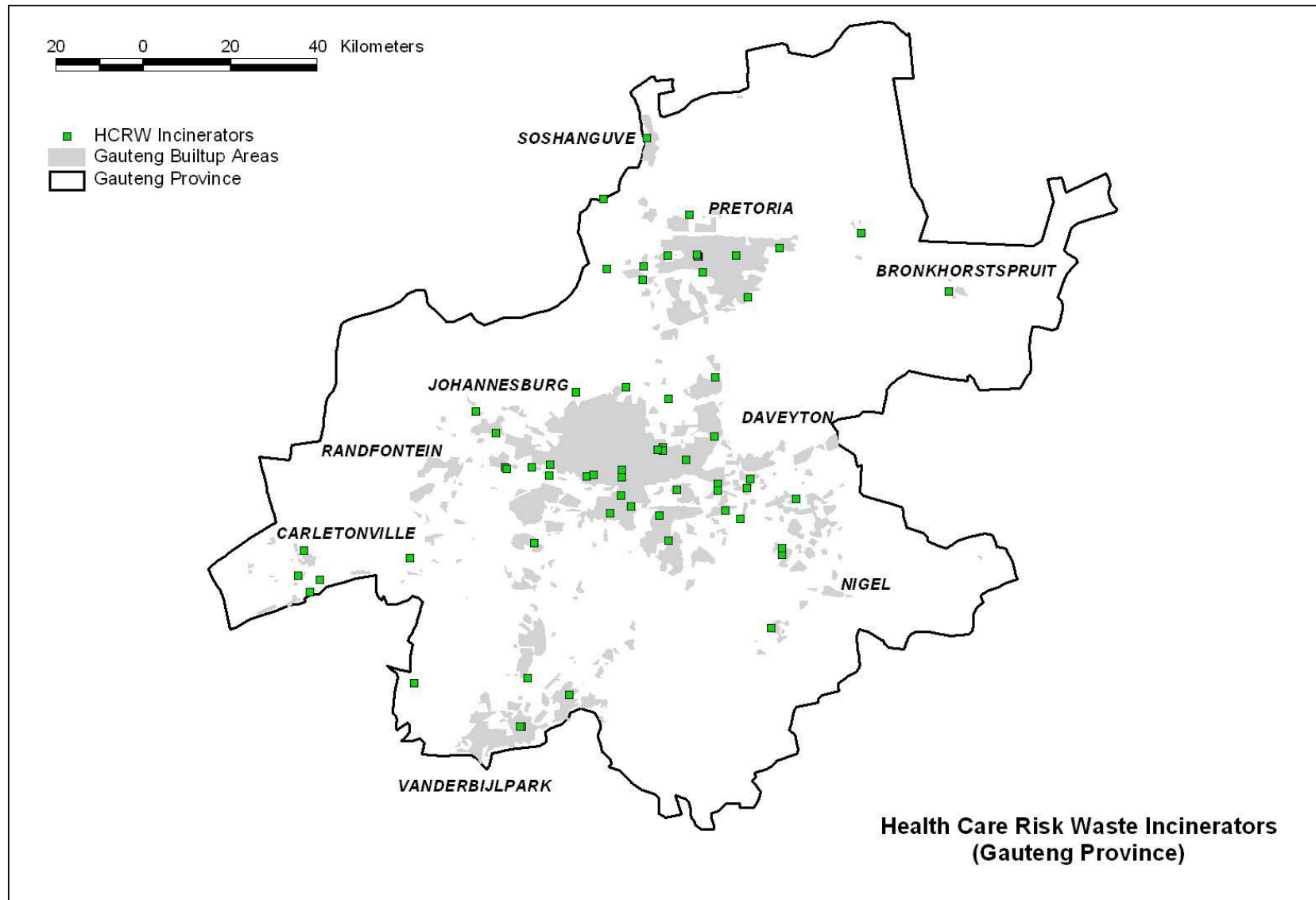


Figure 5.4: Location of HCRW incinerators

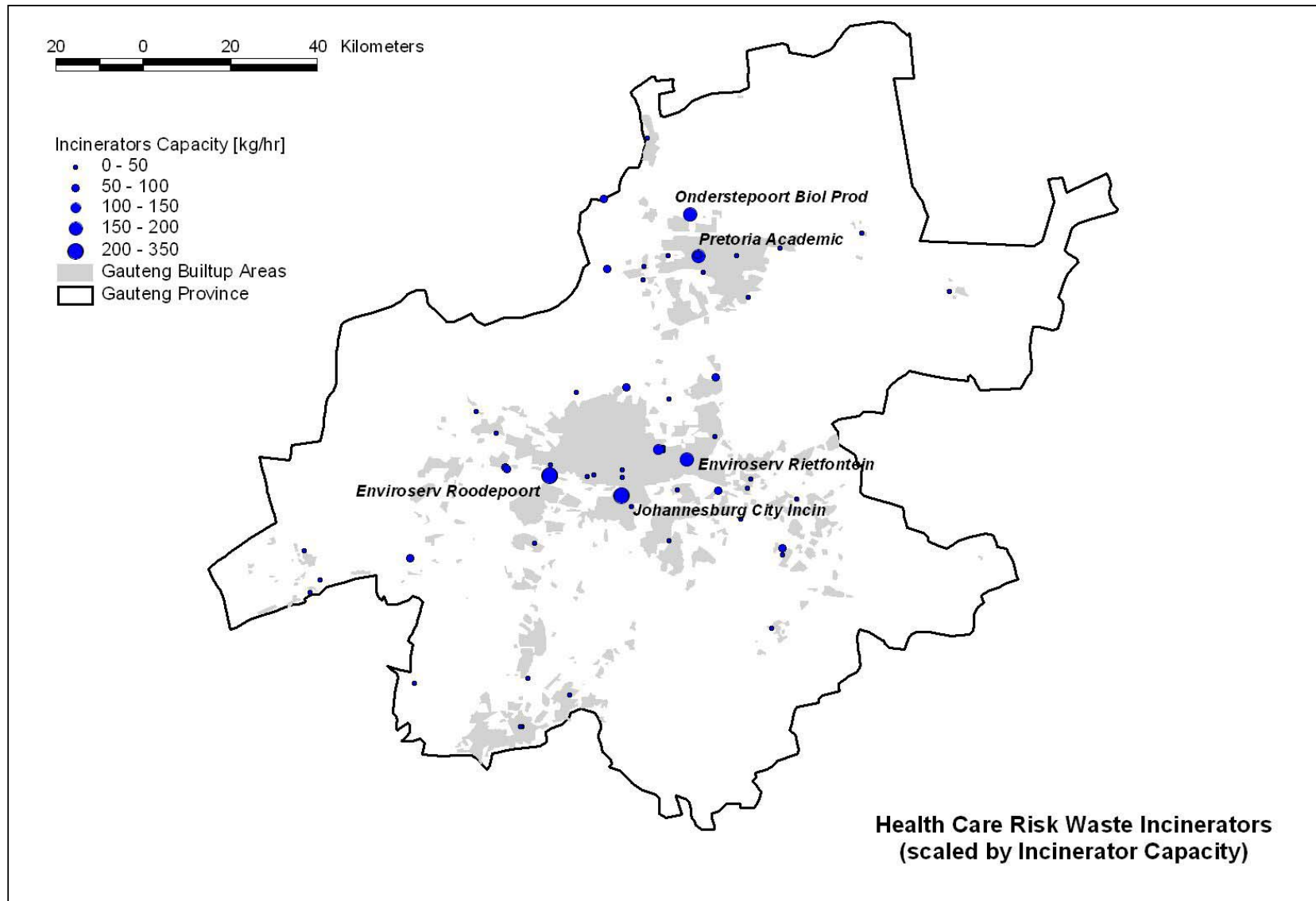


Figure 5.5: HCRW incinerator capacity, scaled by theoretical capacity, based on incinerator unit type.