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Spatial property registers, the way forward for valuation roll accuracy and revenue management

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Abstract

The Local Government: Municipal Property Rates Act, No 6 of 2004 (MPRA) provides for the preparation and establishment of a spatial register of properties. Service providers to local government are required to prepare and maintain valuation rolls for municipalities to platform their property taxes on.

This deliverable is interpreted loosely by GIS practitioners. There are no benchmarks nor standards for the evaluation of this deliverable. The purpose of this paper is to call on industry to collaborate and make relevant and appropriate inputs towards a clear set of guidelines for the preparation and maintenance of spatial property registers.

The initial deliverable for a general valuation roll project is the spatial register of properties. Common practice is to use the deeds data as the platform for the property register. This is premised by the provision that registered property owners are liable for the payment of property rates. Financial systems within municipalities may not be perfect. They are, through ratepayer queries and the need for billing currency, generally “cleaner” than the data received in bulk deeds downloads.

The paper will focus on what is meant by a spatial register of properties and what component parts constitute the register. We will consider the benefits of having an accurate property register and the risk of inaccuracies if the requisite maintenance is not implemented. There are certain provisions in the MPRA Amendments which prompt a “real time” updating of valuation rolls. This is premised by the necessary changes in the municipal register.

There needs to be industry guidelines regarding the methodology to compile and maintain a property register, in terms of chronological steps and quality assurance. The spatial register has the most benefit to the organisation if it is integrated into the property management system where there are benefits from viewing the data spatially. The final focus of the presentation is on explaining and clarifying the revenue management aspects of an accurate spatial property register.

Keywords

local municipality, Deeds Office, DCOGTA, Surveyor Generals Office, valuation category

Definitions

Source	Term	Definition
Local municipality	Land audit	An audit to ensure all registered properties within a municipality are present in a spatial format
	Spatial property register	A register (spatial database) of all registered properties within a municipality
	Municipal financial file	Files contained in the municipal finance system
	Registered and unregistered layers	The municipal financial file can also contain unregistered properties that are being billed separately for services.

Deeds Office	Deeds register	Details of all registered properties in a municipality – owners and transfer details																		
DCOGTA	DCOGTA	Department of Co-operative Governance and Traditional Affairs																		
Surveyor Generals Office	SG 21-digit code	Unique property code: Example: Portion 1 of Erf 1234 Pietermaritzburg (N0FT02580000123400001)																		
		<table border="1"> <thead> <tr> <th>Component</th> <th>Digits</th> <th>Example</th> </tr> </thead> <tbody> <tr> <td>Province</td> <td>1</td> <td>N</td> </tr> <tr> <td>Administrative district / registration division</td> <td>3</td> <td>0FT</td> </tr> <tr> <td>Town</td> <td>4</td> <td>0258</td> </tr> <tr> <td>Farm/erf</td> <td>8</td> <td>00001234</td> </tr> <tr> <td>Portion</td> <td>5</td> <td>00001</td> </tr> </tbody> </table>	Component	Digits	Example	Province	1	N	Administrative district / registration division	3	0FT	Town	4	0258	Farm/erf	8	00001234	Portion	5	00001
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	Farm/erf	8	00001234																	
Portion	5	00001																		
SGO	Surveyor Generals Office																			
Subdivision	A property is split into two or more parcels																			
Consolidation	Two or more properties are joined to create one																			
Sectional title	A person or body only owns a portion of one entity																			
Other (valuation category purposes)	Virtual sectionalisation	A single property is split up for administration purposes only (split remainder/multi-purpose)																		
	26-Digit code	The SG 21-digit code with an extra five digits at the end containing leading zeroes and the unit number of a sectional title scheme; or for the purpose of virtual sectionalisation																		

Table 1: Definitions.

Introduction: Purpose of the proposed guidelines

Municipalities have followed different processes over the past ten years to establish and maintain a spatial property register in compliance with the provisions of the Municipal Property Rates Act (MPRA) No. 6 of 2004. In terms of the MPRA, general valuation rolls must be prepared and maintained at least every five years (local municipality) or four years (metropolitan municipality). Roll updating must follow a “real time” process to enable municipalities to realise revenue for any supplementary valuations. A supplementary roll must be published each year. Most municipalities outsource this function to external valuation service providers. A lack of municipal capacity often leaves valuation contracts under-managed.

By standardising the methodology, the following will be achieved:

- Globally accepted principles and definitions will be identified or developed.
- Procedures for the undertaking of and reporting on municipal registers will be documented and disseminated.
- Municipalities will be assured that their registers are an accurate platform for their valuation roll preparation.

Standardisation will also bring about more price consistency in procurement processes. Currently, there are large variances in bid prices submitted to municipalities. Accurate property valuation requires correct, complete, and up-to-date property data as a base.

Effective procedures for collecting and maintaining property data must be established. Property data changes frequently so datasets such as the valuation roll, financial records and deeds information must regularly be aligned with the spatial property register. Maintenance of the spatial property register will support the financial

success of a municipality between valuation rolls through the effective management of billing and revenue collection (rates, water, electricity, sanitation and other services).

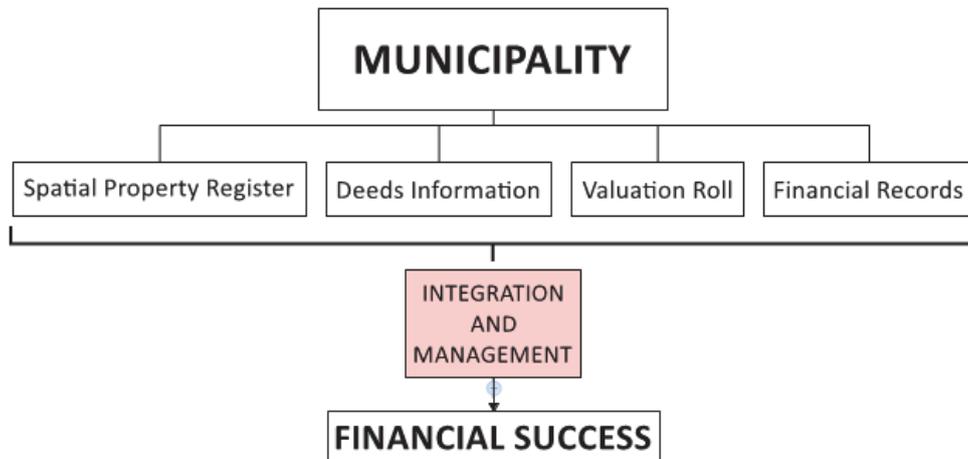


Fig. 1: Municipal revenue.

Legislative framework

The Municipal Property Rates Act, 2004 (Act No. 6 of 2004) as amended by the Municipal Property Rates Amendment Act, 2014 (Act No. 29 of 2014) legalises the power of a municipality to impose rates on properties. It makes provision for fair and equitable valuation methods and aims to ensure that municipalities implement a transparent and fair system of exemptions, reductions and rebates through their respective rates policies. The MPRA also sets out the way in which people may object and appeal against their property valuation.

Section 32(1)(b) of the MPRA has been amended to increase the validity of a General Valuation Roll for a local municipality to five years. This validity period may be extended through condonation by the MEC for local government to seven years in exceptional circumstances.

In terms of Section 23(1) of the MPRA, each municipality also has to draw up and maintain a municipal register of properties. The appointed municipal valuator uses this property register as the platform for the preparation of the general valuation roll and the subsequent maintenance of the supplementary valuations. The amendments make significant changes to the way in which valuation rolls are updated. The role of the property register is integral to the “real time” updating processes.

Revenue from property rates constitutes about 25 – 30% of municipal revenues. It is imperative that this database be correctly compiled and maintained.

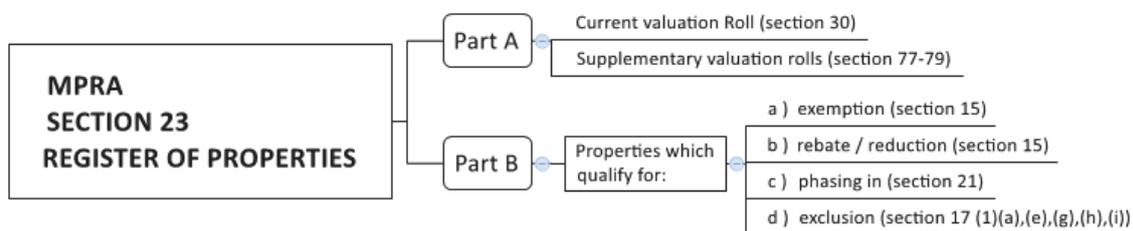


Fig. 2: MPRA Section 23.

A municipal property register is generally considered to include:

- Valuation rolls (Section 30, 77-79 of the MPRA)
- Valuation roll property database/cadastral layer (including ownership)
- Aerial photography
- Financial system data

To ensure that municipalities update their property information with new developments, ownership and other

changes, supplementary property valuation rolls are required annually. These updates may also include an adjustment in one or more property valuations, changes to land usage or zoning or the nature of municipal services provided - all of which may have a financial impact.

It is strongly suggested that the property register be maintained continuously for larger municipalities, and at least monthly for smaller municipalities in order to comply with the provisions of sections 23 and 78 of the Municipal Property Rates Act, 2004 (Act No. 6 of 2004). Section 8 provides for categories of rateable property which are determined by the actual use or permitted use of the property. The Municipal Property Rates Amendment Act, 2014 (Act No. 29 of 2014) prescribes these categories and has allowed seven years for the change to be implemented (section 93B.)

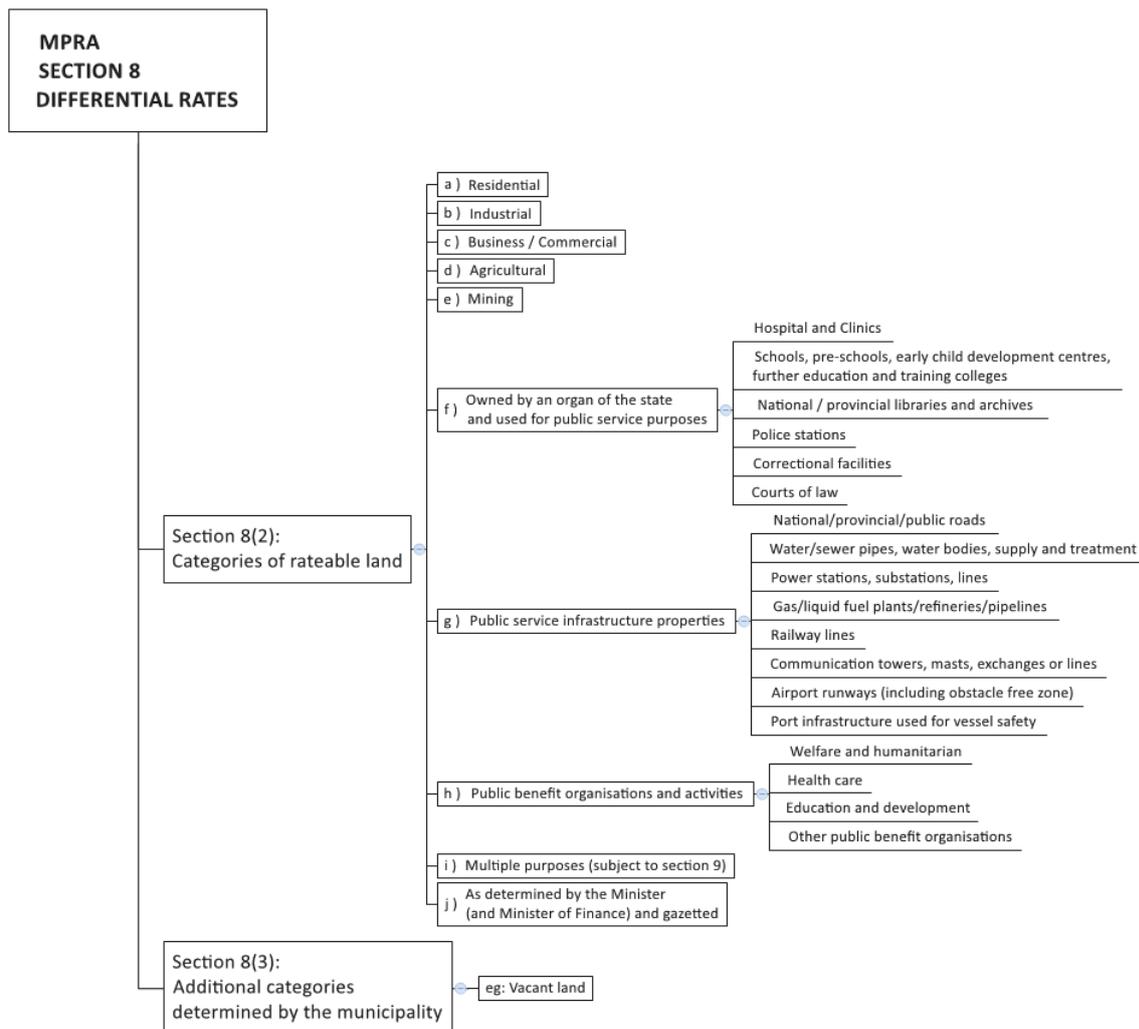


Fig. 3: MPRA rates categories.

Responsibility

Under the terms of the MPRA, it is the responsibility of the municipal valuer to maintain the property register on a regular basis. This includes regular checking against deeds office data, billing and other financial information, and the valuation roll, and the updating of the spatial property register. Routine reconciliation of billing information to other systems or functions within a municipality is crucial so that the municipality can maximise the current billing and collection of property rates revenue.

The municipal valuer will need to manage a number of different resources in order to maintain the property register.



Fig. 4: MPRA responsibilities.

The municipal valuer must work with the latest municipal property register. Every property record must be represented and have complete and current attribute details. Spatial data capture and database manipulation is not the core function of a valuer. It is recommended that the municipal valuer engage the services of a competent GIS specialist to support this function. The establishment of the municipal register of properties is considered a preparatory project, separate from the preparation of the General Valuation Roll. Appointed service providers will have to demonstrate the necessary data base experience and GIS qualifications to secure the contract award. Ideally the completed property register will be handed to the appointed municipal valuer upon project inception.

Planning

Dependant on the size of a municipality, planning for a new general valuation roll must commence at least a year before it is required.

Vector datasets

- All datasets (billing extracts, last valuation roll) must be acquired in a usable flat file format (CSV/XLS/XLSX/TXT).
- The most recent spatial property register in SHP or geodatabase (PGDB/FGDB) format.
- Each dataset should be converted/imported into geodatabase or any other format where analysis can be done to compare the data.
- If not present, the 21-digit SG Code must be created in each dataset for use as a common link so that queries can be run on the data.
- For sectional titles all units also have a 26-digit code which is created from the 21-digit SG Code plus five digits which comprise of leading zeroes and the unit number (must be created).

Raster datasets (imagery)

Municipalities must ensure that a new set of aerial imagery is flown at least a year before a new general valuation roll is required. Aerial photographs are generally classified as being vertical or oblique:

- *Vertical/orthogonal*

This imagery is taken as close to the vertical as possible. Orthophotos are then created and geographically aligned to be viewed spatially as a backdrop to other datasets.

Orthophotos are used as a backdrop to the spatial property register to inform the valuer as to the extent of (and existence of) the building footprint on a property.



Source: www.eagleview.com/Products/ImageSolutionsAnalytics/PictometryImagery.aspx

Fig. 5: Vertical/orthogonal imagery.

- *Oblique*
 - Photographs taken at an angle are called oblique photographs and are normally taken at an angle of 45° to the horizontal or vertical. This allows for easier interpretation and recognition of structures.
 - Oblique imagery captures the front and sides of the exterior of buildings, making it possible to more accurately identify, and measure the area, distance, height and elevation of a structure.
 - Value added to land by improvements such as buildings, structures or modifications to the land, of a lasting nature, and intended to enhance the worth or utility of the property can then be reviewed in an office as desk top exercise.
 - Conventionally this process involves extensive fieldwork using valuers and data collectors with large cost implications in terms of time and money.



Source: www.eagleview.com/Products/ImageSolutionsAnalytics/PictometryImagery.aspx

Fig. 6: Oblique imagery.

The normal specifications for vertical imagery require colour imagery at 1:10 000 scale with a ground pixel size of 0,25 m.

Processes

Section 23(1) of the MPRA specifies that “a municipality must draw up and maintain a register in respect of properties situated within that municipality, consisting of a Part A and a Part B.”

- Part A consists of the current valuation roll (including supplementary rolls).
- Part B is an annual project that specifies exemptions, rebates, phasing-in and exclusions in the valuation roll and must be updated at regular intervals. This should also be aligned with budget processes each financial year.

To assist the requirements for Part A and B have been shown in Table 2 and 3.

Step	Process	Comment
Aerial photography	Procure at least one year before a new general valuation roll is required	Set of imagery for use by municipality, GIS specialist and valuer
Spatial property register	Perform partial land audit (if spatial property register exists)	See Section 6 in this document
	Add occupancy	Use orthophotos to record occupancy against each cadastral property to identify vacant land
	Add indigent owners	Link to cadastral and compare to billing records
	Add debtor types and tariff codes	Compare existing billing and valuation roll
	Maintain spatial property register	Ongoing subdivisions, consolidations, sectional titles, changes in ownership and other amendments
Valuation roll	Attachment of categories	See Fig. 4: MPRA rates categories
	Market value assessment	According to valuation principles and the relevant acts
	Create supplementary rolls	According to valuation principles and the relevant acts

Table 2: Part A: Valuation roll establishment and maintenance.

Step	Process	Output
Spatial property register maintenance	Maintain spatial property register as a base for valuation	Ongoing subdivisions, consolidations, sectional titles, changes in ownership and other amendments
Valuation	Exemption/rebate/reduction (section 15), as detailed in the Municipal Rates Policy and by laws	Including but not limited to: <ul style="list-style-type: none"> • Indigent owners as per the Municipal Indigent Register • Dependant on social grants/pensions as per application • Property owners temporarily without income • Affected by disaster (Act 57/2002) • Farmers on agricultural properties wo

		<p>have applied for relief</p> <ul style="list-style-type: none"> Public benefit organisations (Schedule 9 of the Income Tax Act)
	Phasing in (section 21)	<p>Including:</p> <ul style="list-style-type: none"> Newly rateable property (three years) Land reform beneficiary (three years after ten years exemption has lapsed) Public benefit activities (four years)
	Phasing out (section 93A)	<p>Including:</p> <ul style="list-style-type: none"> Various categories of public service infrastructure
	Exclusions/impermissible (section 17 (1) (a), (e), (g), (h), (i))	<p>Including:</p> <ul style="list-style-type: none"> Nature reserve or national park (Act 57/2003) Mining (Act 28/2002) Land reform beneficiary (10 years) Residential (first R15000) Places of public worship

Table 3: Part B: Valuation roll exceptions (annual project).

Establishment of a spatial property register

This document is a guide to support the successful project management of the establishment and maintenance of their spatial property register. Before a general valuation or update can take place, it is recommended that a land audit is done. There are two types of land audit – a full land audit (this is only essential if there is little or no information available) and a partial land audit (usual method used.)

Full land audit

A land audit is extremely expensive and lengthy process. The end product is a precise base to establish a spatial property register. It is done under the supervision of a professional land surveyor and comprises the physical checking and validation of every single property within the municipality as registered in both the Deeds Office and Surveyor Generals Office.

Using land survey guidelines, survey data is converted and plotted, attribute information built, and land use classified; to create a digital spatial property register that serves the municipality as a base for a land information system. Where there is problematic information; field inspections, beacon identification and/or replacement and cadastral surveys by a professional land surveyor may need to be undertaken, adding to the cost.

Partial land audit

A partial land audit is a less expensive method and this option may be completed in significantly less time. It is required for the creation of a spatial property register.

It is achieved by determining which properties are missing from the spatial data as well as the financial file and only correcting/capturing these. Existing errors in the spatial data are then corrected on a monthly basis during the register maintenance phase.

- The following two files are merged using the 21-digit SG Code to compile the initial draft property register:
 - Financial file – used as the base for the property register and accepted as correct. This file contains all property and ownership details within the municipal boundary.
 - Deeds Register – ownership and property details but can contain errors, duplicates, and changes daily so is quickly out of date. This data can be sourced from:
 - Directly from Deeds Office in a prescribed text file format – consists of an initial data dump plus weekly updates.

- DeedsWeb – online Deeds information
www.deeds.gov.za/ITSODEedsWebB/deedsweb/welcome.jsp
- Windeed – online deeds information (private company) www.windeed.co.za/
- Other reliable sources where available e.g.: CoGTA

- The next step is to link the initial draft property register to the existing municipal spatial property register.

Queries are run to determine: Properties in the GIS layer that are not in the draft property register, and Properties in the draft property register that are not in the GIS layer.

- All anomalies are investigated and corrected in the relevant dataset until both datasets match.
- After this process the draft spatial property register consists of two parts:
 - *Spatial Component*: SG 21-digit code, township, erf, portion, area, zoning (optional).
 - *Attribute Component*: SG 21-digit code, township, erf, portion, ownership details, deeds information, account number, rates and use categories, etc.

(Note that certain fields are repeated to allow for separate analysis and use by the valuer.)

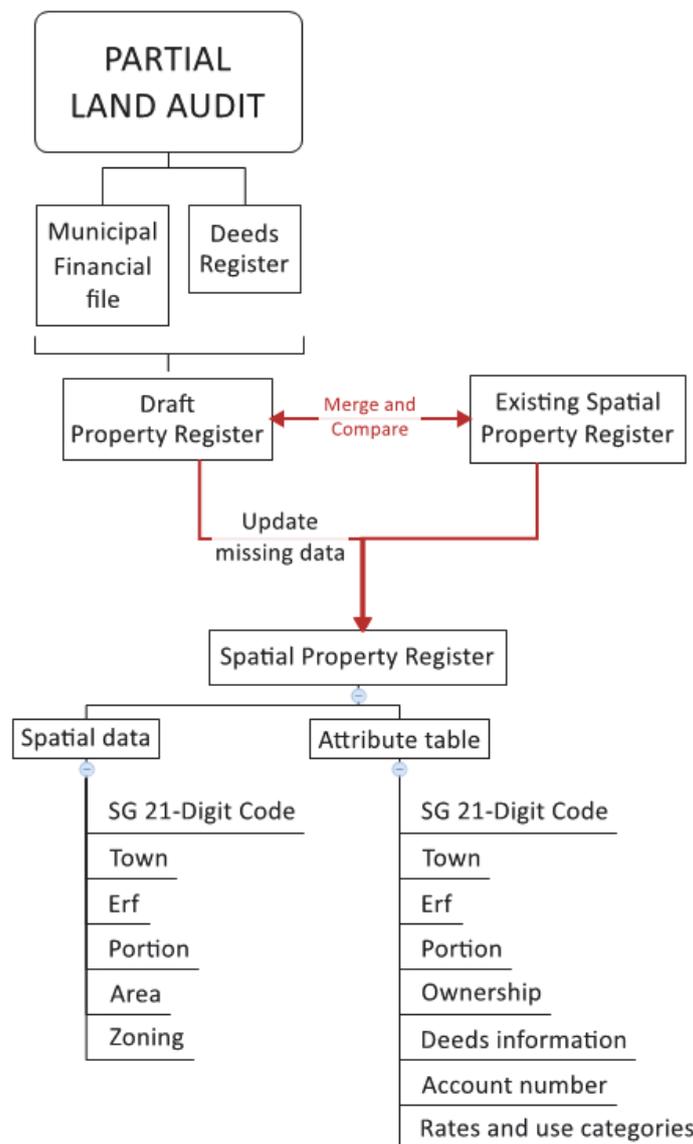


Fig. 3: Partial land audit process.

Data cleansing

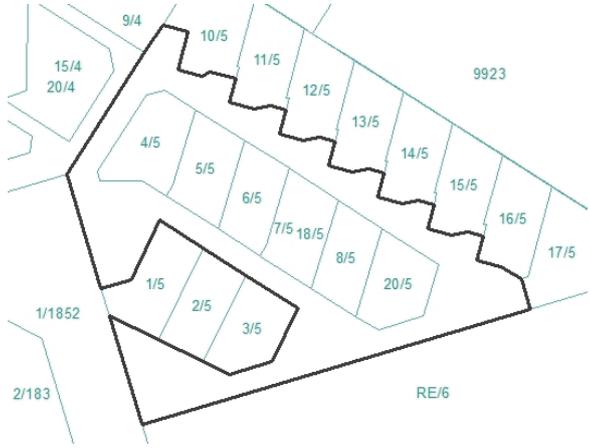
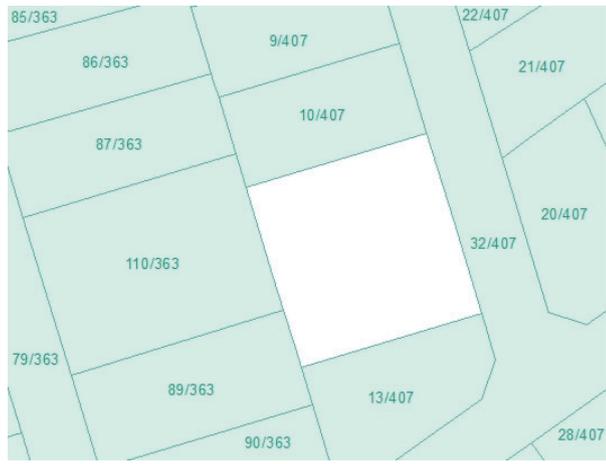
In summary, the land audit creates the spatial property register through the following process:

- Identify mismatches between the financial file and draft spatial property register.
- Identify registered and unregistered properties in the draft spatial property register.
- Capture missing properties (generally 10 – 15% of the total draft spatial property register).
- Compile final spatial property register.

Data cleansing issues

- Linking issues due to problems in the creation of the 21-digit SG Code in the financial files (difficulty matching town names, invalid erf/portion numbers).
- Geographically corresponding properties in the financial files (properties not removed after being consolidated, cancelled, or fully subdivided).
- Incorrect SG codes in the spatial property register.

Common errors that must be fixed:

<p>Overlapping properties</p> <p><i>In this example portion 18 is the access road and should exclude portions 4 – 8 and 20.</i></p> <p><i>Area comparison (diagram or deed vs calculated area should identify these properties)</i></p>	
<p>Missing properties</p> <p><i>Portions 11 and 12 are missing and must be downloaded and captured.</i></p>	

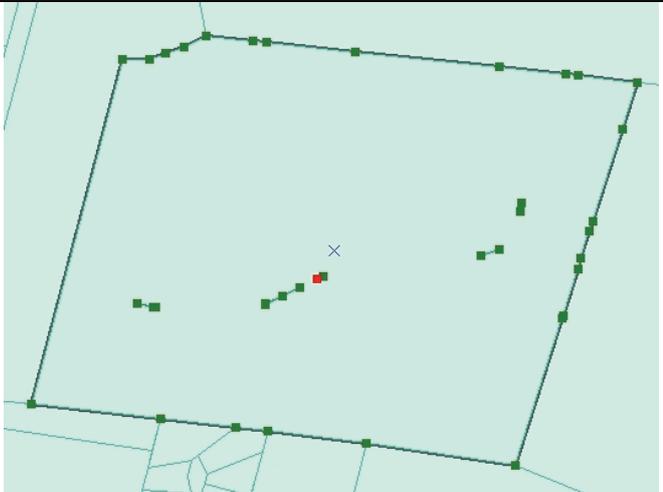
<p>Gaps and overlaps between properties (slivers)</p> <p><i>In this example there is a gap between erven 393 and 402 – this could be from:</i></p> <ul style="list-style-type: none"> • A missing property • A missing co-ordinate on erf 393, or • An extra co-ordinate on erf 402. <p><i>Both diagrams need to be downloaded and checked in order to amend the data.</i></p>	
<p>Slivers inside property boundaries</p> <p><i>If gaps and overlaps are not dealt with, merging properties for a consolidation can result in slivers within a property that then need to be removed.</i></p> <p><i>Topology checks should be done to ensure a clean property dataset.</i></p>	
<p>Spatial record but no ownership details in deeds records</p> <p><i>By linking the deeds data to the spatial property dataset, properties without owners can be identified. (green = has owner; red = no link in deeds dataset)</i></p> <p><i>For all properties with no link in the deeds dataset:</i></p> <ul style="list-style-type: none"> • Check the correctness of the 21-digit SG Code • Check the diagram to ensure the property still exists (could be consolidated, fully subdivided or cancelled) • Check parent property information 	

Fig. 8: Common errors that must be fixed.

The final spatial property register forms the platform for the compilation of the valuation roll.

Quality assurance of a spatial property register

Before the valuer starts the valuation process, it is essential that the municipality has performed quality assurance tests on the spatial property register. The following procedure should be undertaken by a GIS specialist:

- Extract 10% of the spatial property register (geographically at random).
- All SG diagrams for these properties must be downloaded from <http://csg.dla.gov.za/> (scanned images) if they have not been downloaded during the initial data capture phase.
- Every diagram must be checked against the spatial component of the spatial property register in terms of co-ordinate accuracy and SG 21-digit code.

Following this methodology, it will soon become evident if there is a high incident rate of errors in the spatial property register which needs to be addressed.

If this process is not done before the valuer starts the valuation process, it can mean a serious loss of income for the municipality if properties are missing or incorrectly captured and consequently not rated correctly.

Maintenance of a spatial property register

Municipalities must maximise all potential revenue sources and ensure that all properties are correctly charged for property rates and municipal services rendered to the property. It is vital that accurate billing information is regularly maintained.

Property is an immovable asset but it is not static. Property is bought, sold, subdivided, consolidated, and re-zoned. Vacant land is improved, and existing buildings are demolished. All these triggers must be captured and processed through the spatial property register to ensure that the data base remains accurate and up-to-date. The once off establishment of the spatial property register is not adequate and the register must be maintained by the municipality and regular reconciliations made to the billing and valuation databases.

It is also essential that municipalities ensure accurate billing information before following credit control measures such as disconnection of electricity.

In order to maintain the spatial property register, systematic updates must be done on a regular basis. The time interval is dependent on staffing and municipality's size. There is an out-source option. In most cases, an average size municipality would be updated on a monthly basis. These changes would include the following:

- Property changes – new records must be created and old data removed.
- Deeds information/ownership changes updated.
- Improvements to properties.
- Land use and zoning changes.

Sectionalisation

<p>1.1.1 Virtual: split remainder</p> <p>Each property in the spatial property register has a 21-digit SG Code that should be unique. If there is a split remainder, there are two or more separate properties that do not share a common boundary, but have the same 21-digit SG code. In order for these properties to be uniquely identified, a five digit number is added to the 21-digit SG code starting with 00001, 00002, etc.</p> <p><i>For example:</i></p> <p><i>NOFT02580000188700000<u>00001</u></i></p> <p><i>NOFT02580000188700000<u>00002</u></i></p> <p><i>NOFT02580000188700000<u>00003</u></i></p> <p><i>NOFT02580000188700000<u>00004</u></i></p>	
<p>1.1.2 Virtual: multi-purpose property</p> <p>If a property has multiple uses that need to be recognized for rating purposes (for example: a shopping centre with residential flats above); then the same process is followed (a five digit number is added to the 21-digit SG code starting with 00001, 00002, etc.)</p> <p><i>For example:</i></p> <p><i>NOFT02580000019100379<u>00001</u>: Commercial</i></p> <p><i>NOFT02580000019100379<u>00002</u>: Residential</i></p>	
<p>1.1.3 Sectional titles</p> <p>Sectional title units are separately rated in terms of the MPRA therefore must be separately numbered. The floorplan could be used to demarcate units if the sectional title is single story. Again the 21-digit SG code is used, followed by a five digit number including the unit number and leading zeros.</p> <p><i>For example:</i></p> <p><i>NOFT01320000001900000<u>00001</u></i></p> <p><i>to</i></p> <p><i>NOFT01320000001900000<u>00025</u></i></p>	

Fig. 9: Sectionalisation.

Additional revenue enhancement benefits

If the spatial property register is correctly maintained and used as a central database, further benefits may be realised by the municipality:

Issue	Process	Output
Occupancy	Use recent orthophotos to record occupancy against each cadastral property	Add yes/no field to spatial property register
Billing investigation	Properties in the cadastral that are not in billing (and vice versa)	List of records to be amended in billing by the municipality and in the valuation roll by the valuer
Valuation roll investigation	Properties in the cadastral that are not in the valuation roll (and vice versa)	
Billing comparison to valuation roll	Properties in billing that are not in the valuation roll (and vice versa)	
Verify service coverage	Map services (electricity, water, refuse removal and sanitation) – identify areas with non-existent or problematic service delivery	Map/list of areas for planning
Map electricity and water consumption	Identify patterns of: Non-technical losses, Excessive use or Below average consumption	Map/list for further investigation
Map indigent data	Assess spatial distribution	Assists with new applications/maintenance
Map aging debtors	Identify patterns of non-payment and group geographically	Revenue management
Call centre management	Identify clusters of calls	Better response times
Map tariff codes, land use, zoning	Visually understand debtor types, tariff codes, land use or zoning using thematic mapping	Layer for use by planning
Map valuation roll	Comparison and analysis of property valuation values	Validation of valuations/ identification of anomalies

Table 4: Benefits of correctly maintained spatial property register.

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