Marcelle Hattingh  
Director: Corporate Geo-Informatics  
City of Johannesburg  
South Africa  
http://www.joburg.org.za
PROPERTY INFORMATION

If everybody does what they are supposed to do, is it enough?
Background

Development Goals

- Spatial Planning
- Income Generation
  - Property Lifecycle
  - Land Information System

Current Challenges

Proposed Improvements

Conclusion
BACKGROUND

International context

South Africa
Located within Gauteng Province

the economic hub with:

• 19.7% of SA’s population
• almost 40% of SA’s GDP
One of 8 metropolitan municipalities as defined by the Municipal Structures Act (1998)
## BACKGROUND

Metropolitan context

<table>
<thead>
<tr>
<th>Metro</th>
<th>Area $\text{km}^2$</th>
<th>Population</th>
<th>Wards</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Cape Town</td>
<td>2 460.00</td>
<td>3 740 026</td>
<td>111</td>
</tr>
<tr>
<td>eThekwini (Durban)</td>
<td>2 291.65</td>
<td>3 090 121</td>
<td>100</td>
</tr>
<tr>
<td>Nelson Mandela (P.E.)</td>
<td>1 959.00</td>
<td>1 152 115</td>
<td>60</td>
</tr>
<tr>
<td>Ekurhuleni (East Rand)</td>
<td>1 923.56</td>
<td>3 178 470</td>
<td>101</td>
</tr>
<tr>
<td>City of Tshwane</td>
<td>6 345.00</td>
<td>2 921 488</td>
<td>105</td>
</tr>
<tr>
<td>Buffalo City (East London)</td>
<td>2 536.00</td>
<td>755 200</td>
<td>50</td>
</tr>
<tr>
<td>Mangaung (Bloemfontein)</td>
<td>6 284.00</td>
<td>747 431</td>
<td>49</td>
</tr>
<tr>
<td>City of Johannesburg</td>
<td>1 644.09</td>
<td>4 434 827</td>
<td>130</td>
</tr>
</tbody>
</table>
• Area = 1644 km²
• Stands (properties) = ± 850 000
• Formal Households = 780 017
• Informal Households = 212 408

More than 1 million of the city’s residents live in Soweto.

Of the more than 1 million households in Johannesburg, some 33% are estimated to be housed in informal settlements or in backyard shacks.
BACKGROUND

City Organisational Structure
CGIS Organisational Structure

DEVELOPMENT PLANNING AND URBAN MANAGEMENT

CORPORATE GEO-INFORMATICS

DATA ADMIN. & MAPPING
  CADASTRAL DATA CAPTURE AND MAINTENANCE
  STREET ADDRESSES
  ZONING

SYSTEM ADMIN. & DEVELOPMENT
  - SERVER & W/S ADMIN.
  - DATABASE ADMIN. & DEVELOPMENT
  - GIS WEBSITE DEVELOPMENT
  - GIS SUPPORT

PROJECTS
  - MAP PRODUCTION
  - DATA SUPPLY
  - PROJECTS
    e.g. Lids
    Social Facilities
    Town Name Zones
  - DATA PACKAGING

INFORMATION COUNTER
Development Planning is the custodian of space in the City.

The building block of space is a property (cadastre or erf).

Planning manages the lifecycle of a property.

The City needs property information for:

- Income generation (rates and taxes / billing)
- Spatial planning (city transformation)
DEVELOPMENT GOALS

National context

Spatial planning (city transformation)

Income generation (rates & taxes / billing)

NATIONAL DEVELOPMENT PLAN 2030

Objectives & actions

Chapters

12
NATIONAL DEVELOPMENT PLAN 2030
Objectives & actions

Chapters

3 Economy and Employment
4 Economic infrastructure
5 Environmental sustainability and resilience
6 Inclusive rural economy
7 South Africa in the region and the world
8 Transforming Human Settlements
9 Improving education, training and innovation
10 Health care for all
11 Social protection
12 Building Safer Communities
13 Building a capable and developmental state
14 Fighting corruption
15 Nation building and social cohesion
NATIONAL DEVELOPMENT PLAN

Chapter 8: Transforming Human Settlements

Objectives

- Strong and efficient spatial planning system, well integrated across the spheres of government.
- Upgrade all informal settlements on suitable, well located land by 2030.
- More people living closer to their places of work.
- Better quality public transport.
- More jobs in or close to dense, urban townships.
SPATIAL PLANNING

Disparities in the City

SÃO PAULO
peak 29,704 pp/km²

JOHANNESBURG
peak 42,398 pp/km²
Disparities in the City
Nodes

**Municipal Boundary**

**Wetland**

**Open Spaces**

**Mine Dumps**

**Urban Area**

**SDF Industrial Nodes**

**SDF Mixed Use Nodes**
SPATIAL PLANNING

Disparities in the City

Managing space: Linking through Corridor development
SPATIAL PLANNING
Disparities in the City

RANDBURG TO ALEXANDRA CORRIDOR
SPATIAL PLANNING
Randburg to Alexandria Corridor
Decade 0
SPATIAL PLANNING

Randburg to Alexandria Corridor

Decade 1
SPATIAL PLANNING
Randburg to Alexandria Corridor
Decade 3
Poor spaces: Deprivation mapping

- Income
- Employment
- Health
- Education
- Living Environment
SPATIAL PLANNING

Nodal development
DEVELOPMENT GOALS

National context

NATIONAL DEVELOPMENT PLAN 2030

Objectives & actions

3  Economy and Employment
4  Economic infrastructure
5  Environmental sustainability and resilience
6  Inclusive rural economy
7  South Africa in the region and the world
8  Transforming Human Settlements
9  Improving education, training and innovation
10 Health care for all
11 Social protection
12 Building Safer Communities
13 **Building a capable and developmental state**
14 Fighting corruption
15 Nation building and social cohesion

Spatial planning (city transformation)

Income generation (rates & taxes / billing)
Development Planning is the custodian of space in the City.

The building block of space is a property (cadastre or erf).

Planning manages the lifecycle of a property.

The City needs property information for:

- Income generation (rates and taxes / billing)
- Spatial planning (city transformation)
INCOME GENERATION

Lifecycle of a property

Apply

Development application:
Township/
Consolidation/
Subdivision

Deeds Registration:
Township register
Property register

Surveyor General Approval:
SG Plan/
SG Diagram

Approve

Legalise
PROPERTY LIFECYCLE

Proposed Township
PROPERTY LIFECYCLE
Surveyor General Approved
PROPERTY LIFECYCLE

Registration at Registrar of Deeds

Property Information

Ownership Information
Development application:
Township/
Consolidation/
Subdivision

Surveyor General Approval:
SG Plan/
SG Diagram

Deeds Registration:
Township register
Property register

Legalise

Apply

Private Developer

Approve

Local municipality

Roleplayers

National Registrar of Deeds

National Surveyor General

PROPERTY LIFECYCLE
Establishment of Properties

National Surveyor General

Township Application
Town Planning Department to evaluate/process application.
Approval on draft layout plan in consultation with UAC’s.

General Plan (GP)
Applicant to submit GP to Surveyor General for approval.
GP indicates stand boundary dimensions and co-ordinates for township boundary.

GIS
Capture layout approved by Surveyor General to inform users of proposed development.

Diagram
Applicant to submit diagram to Surveyor General for approval.

Deeds Registration
Deeds Township Register
Township owner requests opening of Township Register after compliance with Council conditions.

Deeds Property Register
Owner requests registration of property after compliance with Council conditions.

Council to issue Clearance Certificate (Regulation 82 Certificate)
Council to issue Clearance Certificate (Section 38 Certificate)

LIS

National Registrar of Deeds

Obtain list of registered stands.
Match list with existing GIS stands.
Identify new stands for capture.

GIS

Valuation Department

MOE

General Public

Billing Department

Establishment of Properties

Subdivision or Consolidation within existing township
Town Planning department to evaluate/process application.
Approval on draft layout plan in consultation with UAC’s.

Deeds Property Register
Owner requests registration of property after compliance with Council conditions.

Council to issue Clearance Certificate (Section 38 Certificate)
Workflow processes

Development management & CGIS
Valuations
Rates and Utilities
Customer Care Collections
Revenue

PROPERTY LIFECYCLE
Value chain
LAND INFORMATION SYSTEM

Why LIS was developed

The City realised that:

Reliable property information is a prerequisite for a credible billing process

Various stand alone property databases existed (GIS, Valuations, Planning, Billing, Deeds)

Fragmentation, incompatibility, various data formats, unsynchronised data, data discrepancies and overall poor data management
# LAND INFORMATION SYSTEM

**Mission critical**

---

**TAX INVOICE**

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Account Balance</td>
<td>R 920.10</td>
</tr>
<tr>
<td>Less Payments (Thank You)</td>
<td>- R 900.00</td>
</tr>
<tr>
<td>Sub Total</td>
<td>R 20.10</td>
</tr>
<tr>
<td>Current Charges (see reverse for detail)</td>
<td>R 821.56</td>
</tr>
</tbody>
</table>

**Installment Plan**

- **Original Installment Plan**: R 4290.10
- **Amount paid to date**: R 736.40
- **Current month installment**: R 226.90
- **Amount installment outstanding**: R 3099.70

**Remittance Advice**

- **Date**: 2005/02/02
- **Invoice Number**: 503717235
- **Client No**: 503717235

**Client Account**: 503717235

**City of Johannesburg**

- **EasyPay**: 9 1196 5037 17235
- **ADBAS**: 406 439 8463
- **Branch Code**: 43265
- **Client Account No**: 503717235

**Total Due**: R 1041.66

---

*Message*

---

*Remittance Advice*

- **Date**: 2005/02/02
- **Invoice Number**: 503717235
- **Client No**: 503717235
- **City of Johannesburg**

---

**Remittance Advice**

- **Date**: 2005/02/02
- **Invoice Number**: 503717235
- **Client No**: 503717235
- **City of Johannesburg**

---

**Remittance Advice**

- **Date**: 2005/02/02
- **Invoice Number**: 503717235
- **Client No**: 503717235
- **City of Johannesburg**

---

**Remittance Advice**

- **Date**: 2005/02/02
- **Invoice Number**: 503717235
- **Client No**: 503717235
- **City of Johannesburg**
LAND INFORMATION SYSTEM

Property Value Chain (high level view)
LAND INFORMATION SYSTEM
Township application workflow

- Applicant
  - Submit application
- TAS
  - Capture Application
  - Confirm Application
  - Notify (external)
  - Workflow task (internal)
  - Notify of confirmed application
  - Provide evidence
- GIS
  - Reserve Township Name
    - Refer to 3.5
  - TAS verifies on GIS if township name has been reserved. This can be filled up using the same form.
  - TAS also does a geospatial lookup on the properties being linked to the application.
  - If no valid SG_ID is found, refer back to Applicant
- GIS W/F
  - TAS verifies on GIS if township name has been reserved. This can be filled up using the same form.
  - TAS also does a geospatial lookup on the properties being linked to the application.
  - If no valid SG_ID is found, refer back to Applicant
- LIS W/F
  - TAS verifies on GIS if township name has been reserved. This can be filled up using the same form.
  - TAS also does a geospatial lookup on the properties being linked to the application.
  - If no valid SG_ID is found, refer back to Applicant
- VAL
- VAL W/F
- UACs
- Deeds
- SG
LAND INFORMATION SYSTEM

Workflow across organisational boundaries
(triggers, tracking, tracing)
LAND INFORMATION SYSTEM

Business context

LIS Business Context

Surveyor General
  SG Diagrams

Deeds
  Ownership Info
  Development Applications Info
  Building Info

Town Planning
  Cadastre, addresses, Zoning

Building Control

CGIS

Valuations
  Land values

Land Information System

Billing System
  Property and Address
  Land Values, Zoning, Land Use
  Land Ownership
LAND INFORMATION SYSTEM

Billing related property information
LAND INFORMATION SYSTEM

Property at its core

Single data source for property information in the City
SAP ISU feeds off the LIS
LAND INFORMATION SYSTEM

Old operating model

Deeds

Deeds

Deeds

GIS

Valuations

Venus
LAND INFORMATION SYSTEM

New operating model

Deeds

LIS (Master)

SAP (Revenue/CRM)

No duplication!
No mismatch!
LAND INFORMATION SYSTEM

Data management

Data Governance

• Data Champions meetings and PVC Steering Committee
• Data matrix (ownership/ custodianship)

Data verification and cleansing

• Cadastre alignment project
• Property Fix project

Access to data/information

• Online mapping website
• LIS Admin Client
LAND INFORMATION SYSTEM

Data verification

BILLING
634591 Unique PI

GIS
643096 Unique PI

DEEDS
616214 Unique PI

VALUATIONS
583818 Unique PI

96547 in Billing not in Valuations
101596 in Deeds not in Valuations
69200 in Valuations not in Deeds

91863 in Billing not in GIS
100368 in GIS not in Billing
101596 in Deeds not in Valuations
69200 in Valuations not in Deeds

90910 in Deeds not in Billing
69200 in Valuations not in Deeds
111889 in GIS not in Valuations
52611 in Valuations not in GIS

45774 in Valuations not in Billing
350 in Valuations not in Billing

Match: 538044 – 21% mismatch (40% ECD)
Match: 524336 – 29% mismatch (29% ECD)
Match: 538044 – 21% mismatch (40% ECD)
Match: 531207 – 24% mismatch (24% ECD)
LIS is spatially enabled
Integrated with the GIS
Data can be presented on a map
Spatial analysis is possible

LAND INFORMATION SYSTEM

Geodatabase

Strategic

Managerial

Operational

Identify & manage development trends
Track and trace development applications
Obtain stand numbers, street addresses, etc.
LAND INFORMATION SYSTEM

Benefits to the City

New way of operating:
- Silo vs. enterprise (across org. boundaries), EIM, MDM
- QA part of operations (spatial verifications (lineage, area)

Optimisation of resources (systems and people)
  Single source of property information
  Data matching between systems eliminated
  Basis for fieldwork and verification
  Auditor General queries dealt with efficiently

Duplication eliminated (e.g. Planner system obsolete)

Knowledge management (documentation of processes)
Accurate billing

Access to integrated, quality information

Quicker query resolution

Empowered frontline staff
What about the other 343 municipalities? (Capacity? Duplication?)

Auditor General Audit

- Does the City bill all its properties?
- Are all properties that exist on LIS?
- Balance sheet?
## CURRENT CHALLENGES

Property balance sheet

<table>
<thead>
<tr>
<th>AC</th>
<th>Name</th>
<th>Opening</th>
<th>Debits</th>
<th>Credits</th>
<th>Closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>Cash in Bank</td>
<td>42500.00</td>
<td>17120.00</td>
<td>10102.10</td>
<td>49517.90</td>
</tr>
<tr>
<td>1200</td>
<td>Accounts Receivable</td>
<td>51000.00</td>
<td>17120.00</td>
<td>17120.00</td>
<td>51000.00</td>
</tr>
<tr>
<td>1500</td>
<td>Fixed Assets - Buildings</td>
<td>310000.00</td>
<td>0.00</td>
<td>0.00</td>
<td>310000.00</td>
</tr>
<tr>
<td>1501</td>
<td>Accum Depr - Buildings</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1600</td>
<td>Fixed Assets - Furniture</td>
<td>10000.00</td>
<td>0.00</td>
<td>0.00</td>
<td>10000.00</td>
</tr>
<tr>
<td>1601</td>
<td>Accum Depr - Furniture</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1700</td>
<td>Fixed Assets - Automotive</td>
<td>50000.00</td>
<td>0.00</td>
<td>0.00</td>
<td>50000.00</td>
</tr>
<tr>
<td>1701</td>
<td>Accum Depr - Automotive</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1800</td>
<td>Fixed Assets - Computers</td>
<td>80000.00</td>
<td>0.00</td>
<td>0.00</td>
<td>80000.00</td>
</tr>
<tr>
<td>1801</td>
<td>Accum Depr - Computers</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1900</td>
<td>Fixed Assets - Art</td>
<td>510380.00</td>
<td>0.00</td>
<td>0.00</td>
<td>510380.00</td>
</tr>
<tr>
<td>1901</td>
<td>Accum Depr - Art</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1999</td>
<td>Inventory</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2000</td>
<td>Accounts Payable - Trade</td>
<td>18200.00</td>
<td>246.10</td>
<td>246.10</td>
<td>18200.00</td>
</tr>
<tr>
<td>2100</td>
<td>Loans Payable</td>
<td>100000.00</td>
<td>5000.00</td>
<td>0.00</td>
<td>95000.00</td>
</tr>
<tr>
<td>2200</td>
<td>Payroll Payable</td>
<td>0.00</td>
<td>4856.00</td>
<td>4856.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2250</td>
<td>GST Payable</td>
<td>5000.00</td>
<td>16.10</td>
<td>1120.00</td>
<td>6103.90</td>
</tr>
<tr>
<td>3000</td>
<td>Common Shares</td>
<td>100000.00</td>
<td>0.00</td>
<td>0.00</td>
<td>100000.00</td>
</tr>
<tr>
<td>3100</td>
<td>Current Year Net Profit/Loss</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>3500</td>
<td>Retained Earnings</td>
<td>830680.00</td>
<td>0.00</td>
<td>0.00</td>
<td>830680.00</td>
</tr>
<tr>
<td>4000</td>
<td>Sales - Software</td>
<td>0.00</td>
<td>0.00</td>
<td>16000.00</td>
<td>16000.00</td>
</tr>
<tr>
<td>4100</td>
<td>Sales - Computer Equipment</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>4500</td>
<td>Cost of Sales - Computer Equip.</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5000</td>
<td>Salaries</td>
<td>0.00</td>
<td>4856.00</td>
<td>0.00</td>
<td>4856.00</td>
</tr>
<tr>
<td>5100</td>
<td>Office Expenses</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5150</td>
<td>Computer Expenses</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5199</td>
<td>Art Expenses</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5200</td>
<td>Building Expenses</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5250</td>
<td>Furniture Expenses</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5300</td>
<td>Automotive Expenses</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5400</td>
<td>Telephone</td>
<td>0.00</td>
<td>70.00</td>
<td>0.00</td>
<td>70.00</td>
</tr>
<tr>
<td>5500</td>
<td>Rentals</td>
<td>0.00</td>
<td>160.00</td>
<td>0.00</td>
<td>160.00</td>
</tr>
<tr>
<td>7000</td>
<td>Bad Debt</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>7500</td>
<td>Professional Fees</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>8000</td>
<td>Donations</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Totals - Head Office: 0.00, 49444.20, 49444.20, -0.00

Totals - ALL Cost Centres: 0.00, 49444.20, 49444.20, -0.00
PROPOSED IMPROVEMENTS

What can be improved?

Integration at all levels of government

Standardisation

Data quality

Spatial enablement
136/407-JR of the farm Zeefontein 407-JR
37/407-JR of the farm Zeefontein 407-JR (before)
a world class African city 37/407-JR of the farm Zevefontein 407-JR (after)
A seamless, spatially enabled value chain with quality property information.
If we all do what we are supposed to do, is it enough?

No, we need to do more

... collectively!