DEPARTMENT OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT– NATIONAL GEOMATICS MANAGEMENT SERVICE

CRVMP_0003_DEV_Functional Requirements Specification Spatial

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Acting Chief Surveyor-General: Ms Rosalind Mdubeki (Executive Project Sponsor)	Date
Director: Cadastral Spatial Information - Mr. Sibusiso Dlamini	Date

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1. Configuration Management

1.1 Document Audience and Distribution

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Rosalind Mdubeki	NGMS	Acting Chief Surveyor-General	Rosalind.Mdubeki@drdlr.gov.za	AP
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#NOTE

Categories of level of responsibility as determined below:

W	Document Author	Author of the document
RV	Review	Reviewer of the document (Could form one of the signatories)
C	Must be consulted	Contributes content
I	Must be informed	Person whom this document needs to be distributed to
RC	Recommender	Recommends approval of the document (One of the signatories)
AP	Approver	Approves document (One of the signatories)

1.2 Version History

Date	Author	Version	Changes made
16/03/2020	Rajesh Nooka	1.0	First Release
15/05/2020	Phila Dlamini and Adhir Nursayhe	1.1	Updated with feedback from the following provinces: i. Kwa Zulu Natal ii. Eastern Cape iii. Gauteng iv. NGI v. Free State (the detailed feedback and resolutions are in the feedback document CRVMP_0003_DEV_FRS_REVIEW_FEEDBACK 15052020)
25/05/2020	Phila Dlamini	1.2	Updated with feedback from Sibusiso Dlamini (The detailed feedback and resolutions are in the feedback document CRVMP_0003_DEV_FRS_REVIEW_FEEDBACK _SP_25052020)
26/06/2020	Phila Dlamini	1.3	Updated with feedback from the following provinces: i. Kwa Zulu Natal ii. Free State iii. Gauteng iv. Eastern Cape (The detailed feedback and resolutions are in the feedback document CRVMP_0003_DEV_FRS_REVIEW_FEEDBACK _SP_26062020)
07/07/2020	Phila Dlamini	1.4	Updated with feedback from the following provinces: i. Kwa Zulu Natal ii. Gauteng (The detailed feedback and resolutions are in the feedback document CRVMP_0003_DEV_FRS_REVIEW_FEEDBACK _SP_08072020)
08/08/2020	Phila Dlamini	1.5	Updated with feedback from Mice Caister and NGI (The detailed feedback and resolutions are in the feedback document CRVMP_0003_DEV_FRS_REVIEW_FEEDBACK _SP_08082020)

1.3 Acronyms and Descriptions

Abbreviation	Description
BRS	Business Requirements Specification
CIS	Cadastral Information System
CRE	Certificate of Remaining Extent
CSF	Critical Success Factor
CSG	Chief Surveyor General
CSV	Comma-separated values
DALRRD	Department of Agriculture, Land Reform and Rural Development
DBF	Data Base File
DSG	Deputy Surveyor General
DXF	Drawing exchange Format
EPSG	European Petroleum Survey Group
FRS	Functional Requirements Specification
FTP	File Transfer Protocol
GIS	Geographic Information System
GUI	Graphical User Interface
ISO	International Organization for Standardization
JPEG	Joint Photographic Experts Group
KML	Keyhole Mark-up Language
LPI	Land Parcel Indicator
MIOS	Minimum Interoperability Standards
Munsys	A third-party system used by the Department
NGI	National Geo-spatial Information
NGMS	National Geomatics Management Service
PCRS	projected coordinate reference systems
PDF	Portable Document Format

Abbreviation	Description
PNG	Portable Network Graphics
POPI	Protection of Personal Information Act
SG	Surveyor General
SMS	Short Messaging Service
WGS	World Geodetic System
WMS	Web Map Service

1.4 Terminology and Definitions

Term	Definition
Bulk Request	A Request for data where the configurable threshold for automated data provision is surpassed, currently set as 5 MB or 5 items from the GIS Viewer As well as other services where human intervention is required
Erf	An urban land parcel (This piece of land may be registered in a deed's registry as an erf, lot, plot or stand.)
Farm	Rural Land parcel/ A piece of land registered in a deed's registry as a farm and generally (but not exclusively) representing land used for agricultural purposes
GeoServer	GeoServer is an open source server for sharing geospatial data. Designed for interoperability, it publishes data from any major spatial data source using open standards.
Inbox	Refers to the system inbox task list
Land Parcel	Unit of land in the form of a polygon delineated according to land ownership or land use. And includes real rights in land.
LO	The general name of the South African Projected Coordinate Reference System (SAPCRS). The SAPCRS uses the Gauss Conformal Projection, which is a transverse Mercator projection, and has two degrees wide zones, centred on the odd numbered meridians. Its coordinates are westings (y), measured from the central meridians, positive westwards, and southings (x), measured from the equator, positive southwards. Coordinates published prior to 1 January 1999 were referenced to the Cape Datum. Coordinates published after 1 January 1999 are referenced to the Hartebeesthoek94 Datum.
Coordinate System	A coordinate system is a reference system used to represent the locations of geographic features, imagery, and observations, such as Global Positioning System (GPS) locations, within a common geographic framework
Parametrised Viewer	The integrated and search result contextualized Spatial Viewer which will be accessible from the Information Provisioning Module's search results grid.
Portion	Part or portion or subdivision of a parcel
Projected coordinate system	Mathematical transformation that take spherical coordinates (latitude and longitude) and transform them to an XY (planar) coordinate system. This enables you to create a map that accurately shows distances, areas, or directions
Single Request	A Request for data where the configurable threshold for automated data provision is not surpassed, currently set as 5 MB or 5 items from the GIS Viewer
Shapefile	A geospatial vector data format for geographic information system (GIS) software. It is developed and regulated by Esri as a mostly open specification for data interoperability among Esri and other GIS software products. The shapefile format can spatially describe vector features: points, lines, and polygons, representing, for example, water wells, rivers, and lakes. Each item usually has attributes that describe it,
SG Number	Surveyor- General Document Number

SMS Gateway	Short Message Service or Multimedia Messaging Service transmissions to or from a telecommunications network.
Spatial Viewer	The Geographical Information System (GIS) spatial data viewer which is developed as part of the CIS Revamp Project
WMS	provides a standard interface for requesting a geospatial map image. The benefit of this is that WMS clients can request images from multiple WMS servers, and then combine them into a single view for the user. The standard guarantees that these images can all be overlaid on one another as they actually would be in reality. Numerous servers and clients support WMS.

1.5 References

Document Name	Document Description	Author	Version/ID	Status
Business Case for Cadastral Information System Upgrade	Information System Upgrade	Sibongile Masungini	0.3	Final
CIS Revamp Terms of Reference Ref: 5-2-2-1 RDLR-0010 (2016/2017)	Terms of Reference for the appointment of a Service Provider for the provision of a Cadastral Information System Revamp service for a period of 5 years renewal after successful implementation of every milestone.	Phindi Nkosi	1.10	Final
Vision and Scope Document for CIS Revamp Project	Vision and Scope Document for CIS Revamp Project	Phindi Nkosi	2.0	Final
CRVMP_0004_DDP_Business Requirements Specification_07012019_V1.2_PD	Business Requirements Specification	Phila Dlamini	1.2	Final
CRVMP_0003_DEV_Functional Requirements Specification_23052019_V1.3_PD	Functional Requirements Specifications	Phila Dlamini & Boipelo Gaanakgomo	1.3	Final
CRVMP_DEV_0001_Functional Requirement Specification _Web Portal_V1.3_23052019_PD	Functional Requirements Specifications	Phila Dlamini	1.3	Final
CRVMP_0002_Dev_Functional Requirements Specification User Access Management– v1.3_PD_23052019	Functional Requirements Specifications	Phila Dlamini	1.3	Final

2. Purpose of the Document

The purpose of the CIS Revamp Functional Requirements Specification is to define the business processes that are involved in the CIS Revamp Project, The Functional Requirements Specification (FRS) will be used to write the software to manage the revamped CIS. This document details the spatial requirements.

3. Document Overview

This document has the sections as stated below;

a) **Purpose of Document** – This section outlines why the FRS is written;

b) **Background and Rationale** - This section sets the scene towards the inception of the CIS revamp project; it further justifies the reasoning behind executing the project

c) **Business Requirements –** This section outlines the business need that is being addressed by the document

d) **Inclusions –** This section specifies what will be delivered as part of this business need or module. The section sets the expectations for delivery for the envisaged module

e) **Exclusions –** This section categorically states what items will not be part of the delivery of this module or even items that for the delivery on this module are segregated

f) **Assumptions –** This section sets out the norms and expectations for the delivery of the envisaged

g) **Module Interfaces impacting on the module –** This section identifies what other module interfaces are dependent on this module. It can also identify other modules that this module feeds into

h) **Legislation and Standards Impacting on Module** – This section lists the regulations and ideals that the module hinges on.

i) **Notation**: This section describes the notation used in to describe the business processes;

j) **Spatial Requirements Overview –** This section describes an engineering diagram that defines the boundary between the module and its environment, showing the entities that interact with it. This diagram is a high-level view of a system.

k) **Process Flows –** This section is a graphical representation of the general flow of work and the relationship between major and minor processes of work. It further shows the decision points and some artefacts generated within the Information Management Module.

l) **Action Node Description –** This section further decomposes the process flows and describes in a narrative way what happens in each step/node of the process flow

m) **Business Rules –** This section depicts all the rules that govern the operation of each process flow within a module.

n) **Use Case Diagrams –** This section describes in a diagrammatic fashion the interaction between the actor on the system, their actions, and the inheritances of the actors in the process

o) **Reports –** This section shows what management information can be generated from the system in terms of statistics.

p) **System Administration –** This section shows what the system administrator can do to upkeep the CIS

q) **Map Configurations –** This section shows what aspects of the spatial viewer can be configured on the GeoServer with some examples of steps and screenshots.

r) **Integration –** This section shows the touch points for sending services payload structures and data between components.

s) **Annexures -** This section shows some artefacts that will be taken into consideration when developing the spatial module.

4. Background and Rationale

The National Geomatics Management Service (NGMS) is a branch in the Department of Rural Development and Land Reform (DRDLR) whose primary objective is to provide efficient cadastral survey management services, to provide cadastral survey information services in support of land delivery and orderly land development.

The objectives of NGMS is to regulate the survey of land in the Republic of South Africa; and to provide for matters connected therewith by means of approval, maintenance and archiving of Cadastral Survey documents submitted by Land Surveyors; supplying cadastral information and facilitating the regulation of cadastral surveys in order to support land and economic development with special emphasis on Land Tenure Reform.

The Branch is mandated to perform its functions through the Land Survey Act, 1997 (Act No. 8 of 1997). This branch is responsible for the following:

- Regulation of Surveyor-General's offices;
- Examining and approving all surveys for the registration of land and real rights;
- Maintaining cadastral documents;
- Archiving all cadastral surveys;
- Compiling, maintaining, and revising maps of property boundaries;
- Providing cadastral advisory and spatial information services.

To fulfil the above mandate, the branch uses a Cadastral Information System (CIS). However, this current system is antiquated due to technology platform limitations; lack of source code, maintenance issues etc., and needs overhauling. Considering the challenges, the CIS Revamp project is initiated by NGMS.

5. Spatial Business Requirements

5.1 Scope

5.1.1 Inclusions

The following aspects have been included in the business requirements for the Spatial Module with regards to Information Provisioning;

a) Development of a **Spatial Viewer** that will be accessed by registered and unregistered user through the Web Portal. The user access shall be controlled via the User Access Management Module.
b) Development of a **Spatial Viewer** with **Search Tools**;(the detail relating to search tools will be defined in the business rules section of the document.
    i. Attribute Search
    ii. Search by Graphics
    iii. Search by Street Address
c) Development of a Spatial Viewer with **Map Navigation Tools**.
d) Provision of an **Identify Tool** which will have the following

i. Standard Identify Function
ii. Get More Attributes Function (envisaged attributes)
iii. Attribute Table related to the identify function
iv. Attribute data related to the attribute table

e) Development of a **Share View Tool**.
f) Implementation of a **Print and Export Tool** which will have the following:
   i. Print to scale
   ii. Export
   iii. Print in Projected Coordinate System Tool
g) Implementation of a **Bookmark Tool.**
h) Development of the **Refresh Data Sources Tool**
i) Development of a **Reset Map Tool**
j) Development of a **Measure Tool**
k) Development of a **Layer Manager** Tool
l) Development of a **Map Legend** Tool
m) Development of an Alpha Numeric **Data Extraction Tool**
n) Integration with the **User Access Management Module** to detail the following in terms of access rights and permissions:
   i. Unregistered Users
   ii. Registered Users
   iii. System Administrators
o) The items in **n)** above will be further substantiated with a User Access Matrix/Actor Profile Specification to detail what function and tool each user can access.
p) Unregistered Users will be prompted to register from the Spatial viewer if they want to download.
q) Provision of a platform that will allow Registered Users trigger **Information Provision** Requests or extract information from the spatial viewer. The Information Provision process should cover the following;
   i. Spatial Viewer Single Requests
   ii. Spatial Viewer Bulk Requests
r) Integration of the Spatial viewer with the Information Management Module through a **Parametrised Viewer** from the search results executed in the Information Management Module.
s) Provision of Pre-packaged Data.
t) Keeping track of all information that is downloaded from the Spatial Viewer. This information shall be made available on the reports which are in the Information Management Module.
u) The System Administration function is detailed from a spatial perspective.
v) Map configurations will be listed which will be then consumed by the spatial module:
w) The Integration Mechanisms and touch points will be detailed.

x) This Spatial Viewer shall be compatible to all leading browsers and on certain mobile devices such as Tablets, Smartphones.

5.1.2 Exclusions

The following aspects are excluded from the business requirements for the spatial component:

a) Clean up of the old data that is currently housed in the existing CIS;
b) Migration of Data;
c) Procurement of SMS gateway for sending short messaging services to users for Bulk Information requests that are triggered from the spatial.

5.2 Assumptions

The Following aspects have been taken into consideration for the development of the spatial module:

a) The Spatial Module cuts across the entire CIS as such this document will get updated as each module is executed.
b) The Map Configurations will be done on Geo-server and will be consumed by the spatial module of the CIS once published
c) The System Administration will be done on the Information Management Module.
d) The Integration between the web portal, user access module and the information management module with the spatial should be a seamless and online integration.
e) Once a bulk request (Information Provisioning) task is initiated the system will route that task to the Information Manager's inbox so that the task is allocated.
f) For all single requests, the system shall check if the data is available and if that data is available then the system shall provide the data to the requestor to download;
g) An assumption is that both internal and external clients will access NGI Data through the NGI web portal. However, in a case of walk-in clients an information officer will be able to process NGI data request on the NGI web portal on behalf of the walk-in client. In this regard the information officer will be able to produce and deliver the information request according to the walk-in client's specification.
h) Fields marked with an asterisk **(*)** are not mandatory.
i) The Spatial viewer is a browser-based map viewer and will be accessible to both registered and unregistered users of the CIS Portal.
j) Certain functionality will be available to registered users only.
k) Functionality for registered users will be available to both internal and external registered user groups.
l) User registration for spatial viewer access will be handled by the User Access Management Module, meaning no separate registration process will be utilised for users of the spatial viewer.
m) The Spatial viewer and related Spatial Database will communicate with the Alphanumeric database using web services.
n) The spatial viewer is built on Open Source technologies, as agreed in the approved technical solution for the CIS Revamp project.

o) Map Publishing and associated cartography are to be done via GeoServer and will not be done via the spatial viewer itself.

p) Configuration of parameters defining maximum file size and maximum record counts for single or bulk information requests initiated via the spatial viewer will be managed and configured by the System Administrator in the User Access Management module.

q) The viewer shall have the following backdrop maps subject to compatibility of these web map services
   i. Open Street Map
   ii. Aerial Imagery (Bing)
   iii. Base Map

r) NGI Imagery – it is assumed that access to an existing published WMS service will be provided, the CIS Spatial Viewer will consume this service for NGI Imagery to be displayed.

s) The WMS services from NGI (such as trig data), if provided will be consumed as is to be displayed on the Spatial Viewer. No import into the CIS Spatial database will be done if these services do not exist.

t) In the absence of WMS service, the imagery will be imported into the database. What this means is that if no WMS services are provided by NGI for Imagery to be consumed by the CIS application, the NGI Imagery will need to be imported into the CIS database and published into the CIS GeoServer

u) Spatial data which is displayed in the spatial viewer is a published version or view of the CIS Spatial database, accessed via Geo Server.

v) The table populated on approval – shall be viewable to relevant users when the relevant module (Examination) has been completed.

w) The table below shows output formats and format conversions types for Spatial Data, Print and Export Function and Attribute Data:

Conversion Type	Output
Spatial	kml dxf wkt Shapefile
Print and Export	png jpeg pdf
Attribute data	csv, excel dbf

Table 1 : Output and Conversion Types

x) The map template annexed to this document is as provided by the department. The service provider will attempt to replicate this template as best as possible, utilizing the agreed open source technology stack.

5.3 Module Interfaces Impacting on the Module

The following have been identified as module interfaces that impact on the module:

a) Web Portal;
b) Examination;
c) Maintenance;
d) Archives;
e) User Access Management;
f) Reservations;
g) Document Management System;

5.4 Legislation and Standards Impacting on Module

The Following legislation and standards have been taken into consideration for the development of the information management

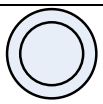
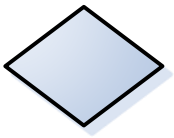
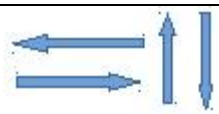
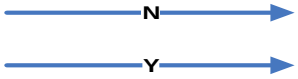
a) NGMS Circulars, Manuals, published decisions and Guidelines;
b) Land Survey Act (Act No. 8 of 1997) and Regulations;
c) COBIT;
d) MIOS;
e) ISO9126;
f) Electronic Communications and Transactions Act No. 25 of 2002;
g) Minimum Information Security Standards (MISS);
h) State Information Technology Agency Act, 1998 (Act no. 88 of 1998);
i) SACSA/090/1(4) “Communication Security in the RSA”;
j) Protection of Information Act, 1982 (Act no. 84 of 1982);
k) Information Act, 2002 (Act no. 70 of 2002);
l) Promotion of Access to Information Act, 2000 (Act no. 2 of 2000);
m) Electronic Communication and Transaction Act, 2002 (Act no. 25 of 2002);
n) National Strategic Intelligence Act, 1994 (Act no. 39 of 1994);
o) National Archives of SA Act, 1996 (Act no. 43 of 1996);
p) Protection of Personal Information (POPI)Act, 2013 (Act no. 4 of 2013);
q) Spatial Data Infrastructure (SDI) Act, (Act no. 54 of 2003);
r) Fees of Office as published from time to time in the Government Gazette. (the current fees are published in Government Gazette, Vol. 42861 dated 29 November 2019 under Gazette Notice No. 1541).
s) Promotion of Administrative Justice Act 3 of 2000.
t) Sectional Titles Act (Act No. 95 of 1986) and Regulations.
u) ISO TC211.

5.5 Notations

The following section describes the notation or symbols that have been used on the document to represent the different processes and actions within the Spatial Module. The Notations have been given for the following since they are used to illustrate business requirements:

a) Process Flow
b) Use Case Diagram

5.5.1 Process Flow Notation

Notation Name	Notation Representation	Notation Description
Process Flow Notation (Start)		This notation represents the beginning of the flow chart
Process Flow Notation (Processing)		This notation represents a process within a workflow that will be performed by a user
Process Flow Notation (Decision making/Checking)		This notation represents the logical checking to decide the flow of the sequence.
Process Flow Notation (Flow Lines)		This notation represents the direction of the flow
Process Flow Notation (Sub Process)		This notation represents a sub process or an activity that will be done outside of the system
Process Flow Notation (Content Pointer)		This notation represents the information inside the process notation
Process Flow Notation (Documents)		This notation represents the documents included in the process notation
Process Flow Notation (Decision pointers)		This notation represents the direction of the flow based on the decision

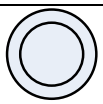
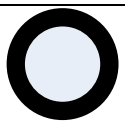
Notation Name	Notation Representation	Notation Description
Process Flow Notation (Start)		This notation represents the beginning of the flow chart
Action Node Number		This notation represents the sequence of activities on the process flow
Process Flow Notation (End)		This notation represents the end of the flow chart

Table 2: Process Flow Notation

5.5.2 Use Case Diagram Notation

Node Name	Node Representation	Node Description
Use Case diagram node (Actor)		This node represents a coherent set of roles that users play when interacting with the use cases.
Use Case diagram node (Use Case)		This notation represents a sequence of transactions by a system that produces a measurable result for a particular actor.
Use Case diagram node (Association)		This notation links an actor with the use case(s) with which it interacts
Use Case diagram node (Association Indicator)		This notation links an actor with other actor(s) with the same attribute. This represents inheritance of permissions for users.

Table 3: Use Case Diagram Notation

5.6 Spatial Requirements Overview

The insert below depicts the relevant processes and sub-processes where spatial functionality is required. The subprocesses are highlighted in yellow.

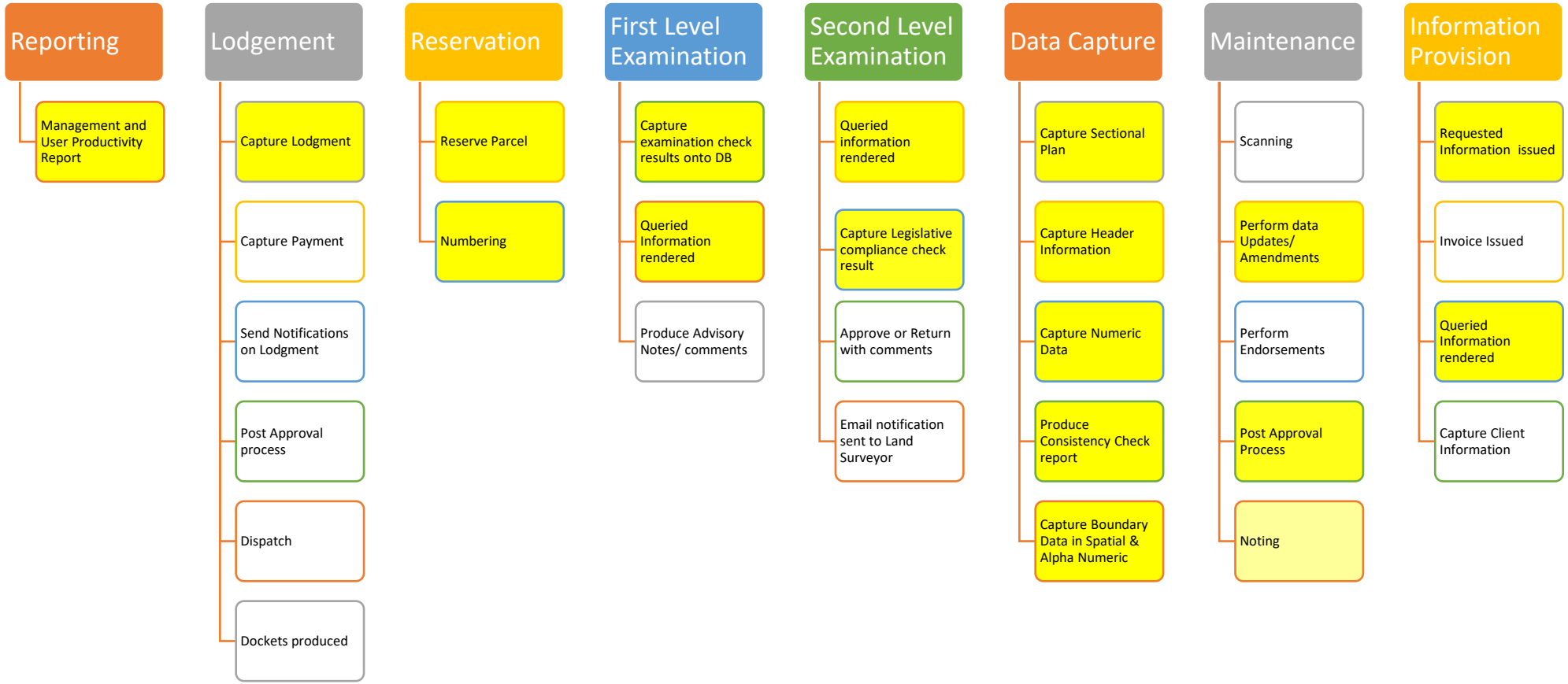


Figure 1: Spatial Requirements Overview

5.7 The Spatial Viewer

The insert below is the sample of the spatial viewer that will be developed as part of the CIS.

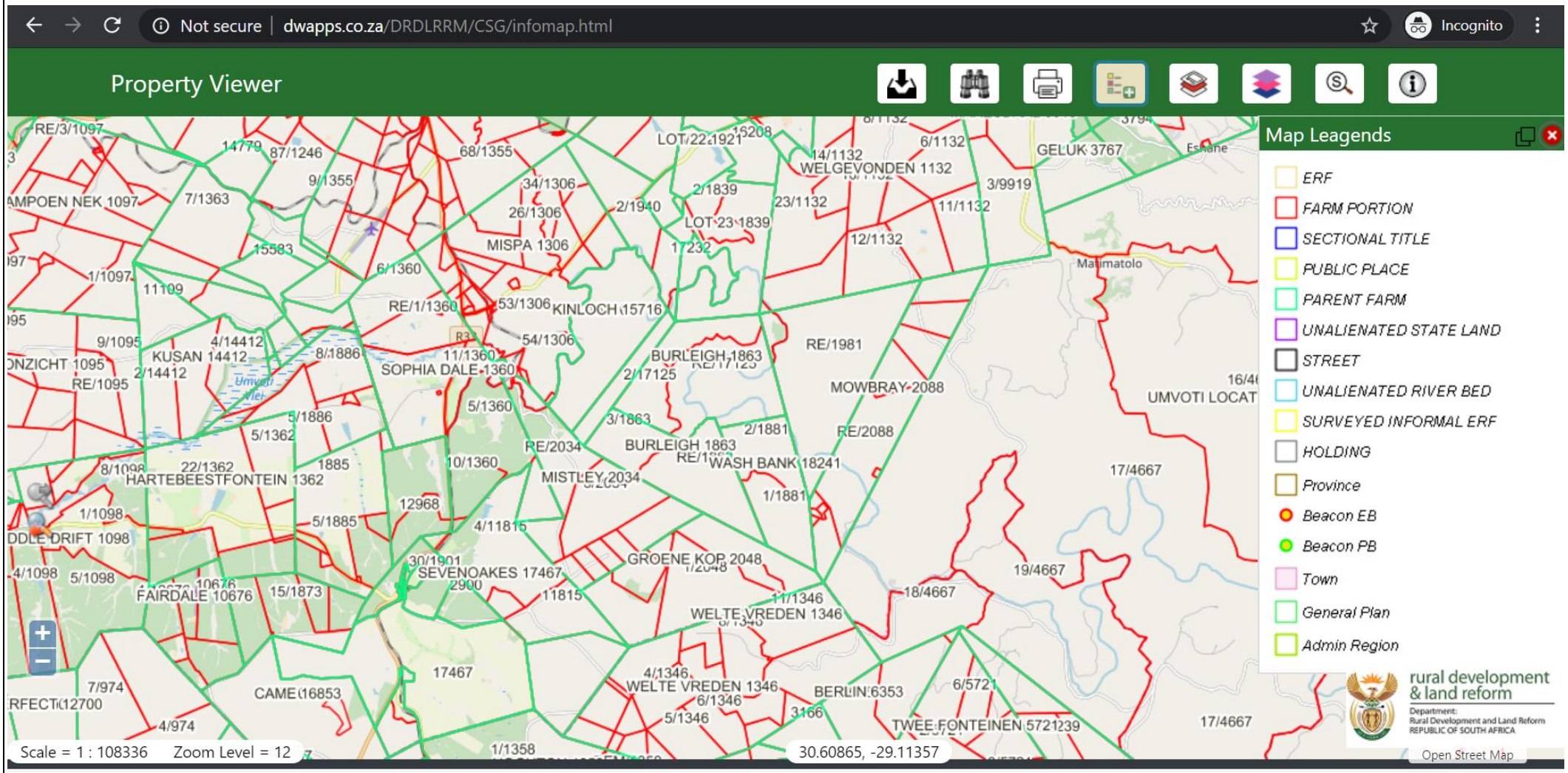


Figure 2: The Spatial Viewer

6. Functional Requirement 1 - Spatial Viewer

The sections below detail all the functional requirements of the Spatial viewer as previously listed on the Business Requirement Section on Section 4 above.

6.1 Search Tool

a) The Spatial Viewer shall have the following search types:

1. Attribute Search
2. Search by Graphics
3. Search by Street Address

b) The table below shows the search types from the spatial component and what search types the user can have access to including what information the user can get. The Unregistered user will be able to search and view information but NOT download.

Province	Municipality*	Search Type	Search Filter	Images	Spatial	Alpha Numeric	Registered User	Unregistered User
X	(as per selected) province, not mandatory)	Number	SG Number	**X**	**X**	**X**	**X**	**X**
X		Number	Compilation	**X**		**X**	**X**	
X		Parcel Description	Farm	**X**	**X**	**X**	**X**	**X**
X			Erf/Holdings	**X**	**X**	**X**	**X**	**X**
			LPI	**X**	**X**	**X**	**X**	**X**
X		Graphics		**X**	**X**		**X**	
X		Street Address					**X**	**X**
X		Alpha Numeric Tool	LPI Code Allotment/Township General Plan Coordinate Sectional Title Farm Parcel			**X** **X** **X** **X** **X** **X** **X**	**X** **X** **X** **X** **X** **X** **X**	

Table 4 : Spatial Search Criteria

The following sections give details of how each of the search types will work.

6.1.1 Attribute Search Business Rules

a) The Attribute Search functionality allows the user to find the desired feature(s) based on a selected criterion. When the user clicks on the search button, it opens a small window with two tabs, tasks, and results. Tasks tab allows the user to set the selection criteria, results tab allows the user to view the search outcome. This selection can be made using multiple parameters as well. Once the user selects Province, the user will have two options:
   i. Municipality
   ii. Administrative District/Registration Division.

b) The Municipality dropdown will have all the Local, District and Metropolitan municipalities in the selected Province.

c) The Administrative District/Registration Division will have all the Administrative Districts/Registration Divisions in the selected Province

d) The following is the sequence of these parameters/attributes search in a Province, (please not the Municipality field will be included in the search parameters but made optional):
   1. Region, Parcel, Portion
   2. Farm Name
   3. Allotment Area, Erf, Portion
   4. SG #
   5. LPI Code

e) Once the user selects Province, the subsequent dropdown will have all the Administrative Districts/Registration Divisions in the selected Province. If the user conducting the search is unsure of the Municipality or Administrative District/Registration Division, the search result will have all the records in the entire province.

   i. Administrative District/Registration Division
      1. Region, Parcel, Portion
      2. Farm Name
      3. Allotment Area, Erf, Portion
      4. SG #
      5. LPI Code

f) The Administrative District/Registration Division should not be mandatory.

g) In a case where the user only enters the numbers without preceding zeros for ERF/Farm/Portion, the system will automatically pad them to perform the search.

h) Upon successful retrieval of search results the system shall present a results grid.

i) The user should select an item from the result grid so that they can get more download or view information regarding that selected item.

j) The system will have a button on the result table that will allow the user to get more attributes

k) The system shall present the following as part of the get more attributes, web services, which will return data from views in the Alphanumeric database
   i. Spatial Data

ii. Alpha Numeric Data

iii. Image Links

l) The system will check if any of the items in (j) above are within the configurable size/feature count limit.

m) If the items are below the threshold the system shall allow the user to download that as a single request.

n) If the items are above the threshold the system shall allow the user to initiate a bulk request.

6.1.2 Attribute Search Process Flow

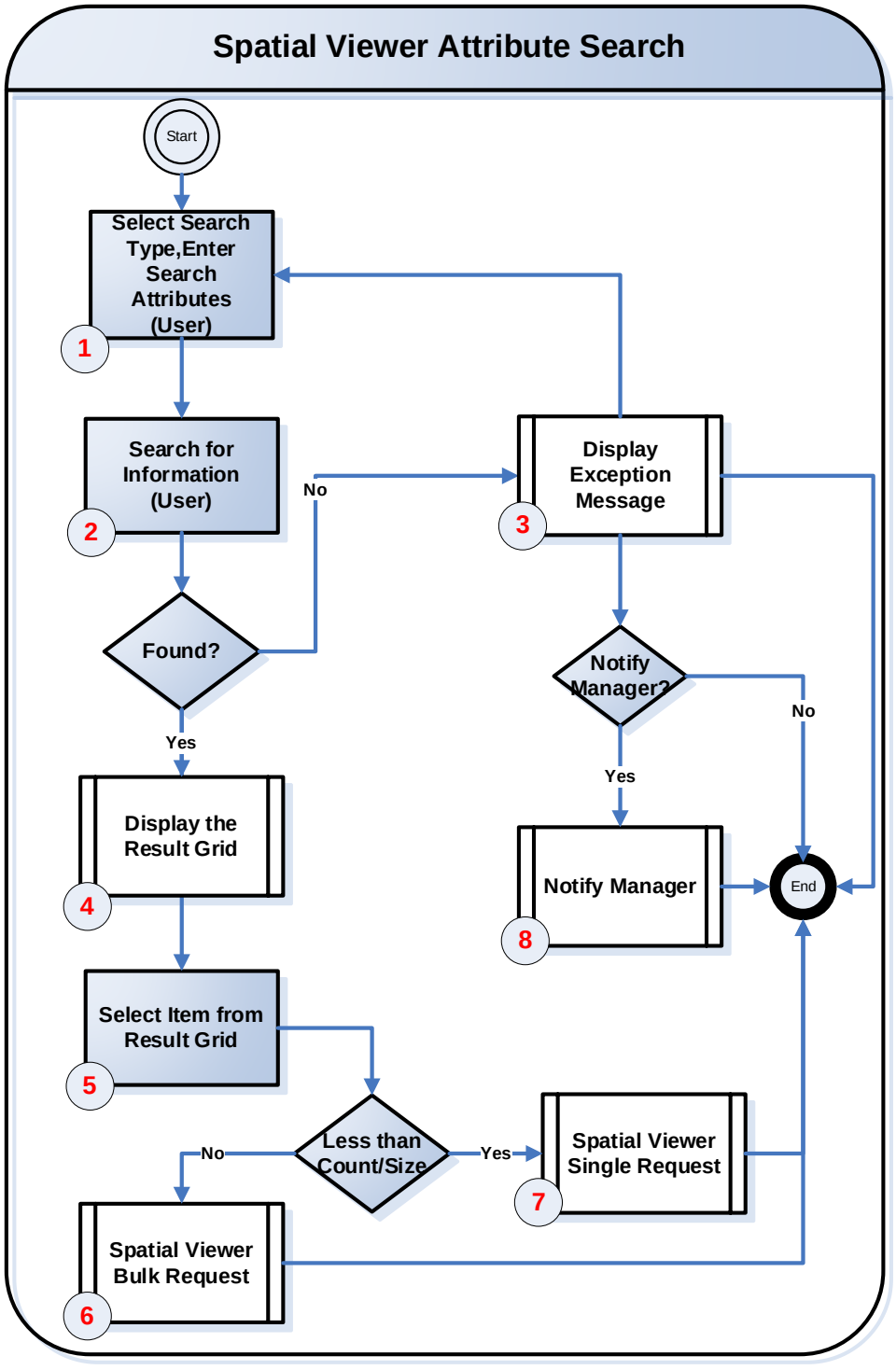


Figure 3: Attribute Search Process Flow

6.1.3 Attribute Search Action Node Description

Node #	Description	Information to Capture	User
1	At this node, the user shall select the search by attributes search type. The user shall enter the search attributes.	i. Province ii. Municipality iii. Region, Parcel, Portion iv. Farm Name v. Allotment Area, Erf, Portion vi. SG # vii. LPI Code	User
2	At this point the user shall click on the search button to submit the search attributes so they can be queried by the system. The system shall check if there is any information from the search criteria.	Search ()	User
3	At this node, the information that the user was looking for cannot be found. The system shall display the relevant information not found message that is configured for exception handling at this point. At this node, the system should allow the user to choose to go back to node 1, to restart the search.		System
4	At this node, the information that the user searched for can be found on the system. The system shall display the search results on the result grid.		System

Node #	Description	Information to Capture	User
5	The user shall select an item from the search result grid that they want information for. The user can be able to click on the **get more attributes** icon from the search results. This function will bring more information about the item like, Alpha Numeric Data and the Image Links. The system checks the size/count.	i. Select Item () ii. Spatial Data iii. Get More Attributes Click () iv. Alpha Numeric Data* v. Image Links*	Registered User
6	At this node, the size/count of the output is more than the configured size on the system. The user will click on the option to initiate a bulk request. The system shall redirect the registered user to the Information Management Module screen to trigger bulk request.	Bulk Request ()	Registered User
7	At this node, the size/count of the output is less than the configured size on the system. The user will be given the option to download the data.	Download ()	Registered User
8	At this the system shall ask the user if the input data is correct. If the user insists that the input data is correct, then the system shall prompt the user to notify the Manager. The user shall click on the option to notify The Manager. If no is selected the process shall end. The user can go back to node 1 from here.	i. Are You sure your input data is correct? **Yes/No** ii. Do you want to notify The Manager? Yes/No	Registered User

Table 5: Attribute Search Action Node Description

6.1.4 Attribute Search Use Case Diagram

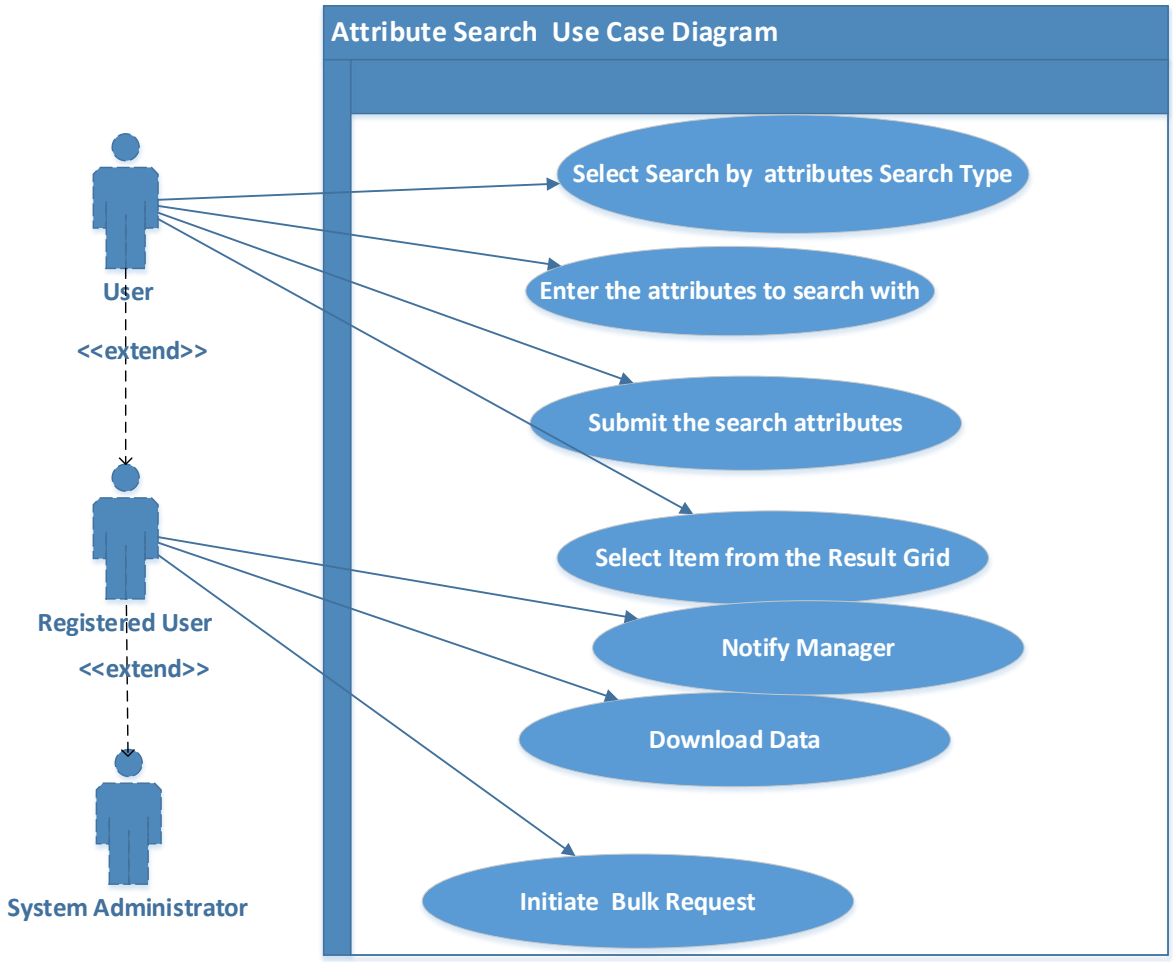


Figure 4: Attribute Search Use Case Diagram

6.1.5 Attribute Search Use Case Description

USE CASE 1.1	
Search by Attributes	
	System
	Unregistered User
	Registered User
	National System Administrator
	Provincial System Administrator
Preconditions	a) The Registered Users have email addresses. b) The network and database are up. c) The user has some information request they want to view or download. d) The user wants to search the system using the search by attributes.
Business Rules	a) The system will keep a log for all activity happening on the Spatial Viewer

	b) Both Internal and external registered users will access the same tools on the Spatial Viewer c) Data validation and completeness rules will be applied by the system and relevant messages displayed should there be any disparities. d) The system will not allow the user to submit an information request if the data validation rules were violated. e) The database is updated all the time when a change happens.	
Process	Search by Attributes	
Sub Process	Select Search by Attributes Type	
	Select Attributes	
	Search with the Attributes	
	Validate data availability	
	Display Results on the Grid	
	Select Item from the Grid	
	Validation of configured size and count	
	Download Information	
	Trigger Bulk Request	
Basic Flow of Events	**User**	**System**
	1) Click on attributes search 2) Enter the attributes to search with 3) Click on the search button to submit the search	
		4) Validate the data entered by the user 5) If there is not data or an error in the input, display the relevant message 6) Save the query as entered by the user, fetch the query results,
		7) Display the result Grid
	8) Select an item from the result grid	
		9) Check size or count of features compared to the configured values
	10) Click on the download button to download the data	
		11) Download the data

		12) Populate Information on the reports
Alternative Flow of Events	5.a) There is no data from the search query i. The system shows the relevant message to the user (exception handling) ii. The user will also be presented with an option to validate of the data they entered is correct. (if correct the user will be given an option to notify the Manager) 10.a) The information is above the configured size iii. The download option is disabled iv. The user can only submit a bulk request v. The user clicks submit bulk request vi. The system triggers a bulk request on the Information Management Module and passes the parameters below i. Requestor Information ii. Request Information iii. Search Parameters (LPI code, output type, Layer name, Province, List of Coordinates)	
Notes	**Document upload functionality will be a common feature for all processes where necessary** **Comment Text Box shall be a common feature throughout the system**	

Table 6: Attribute Search Use Case Description

The Insert overleaf is a sample of the attribute search on the CIS.

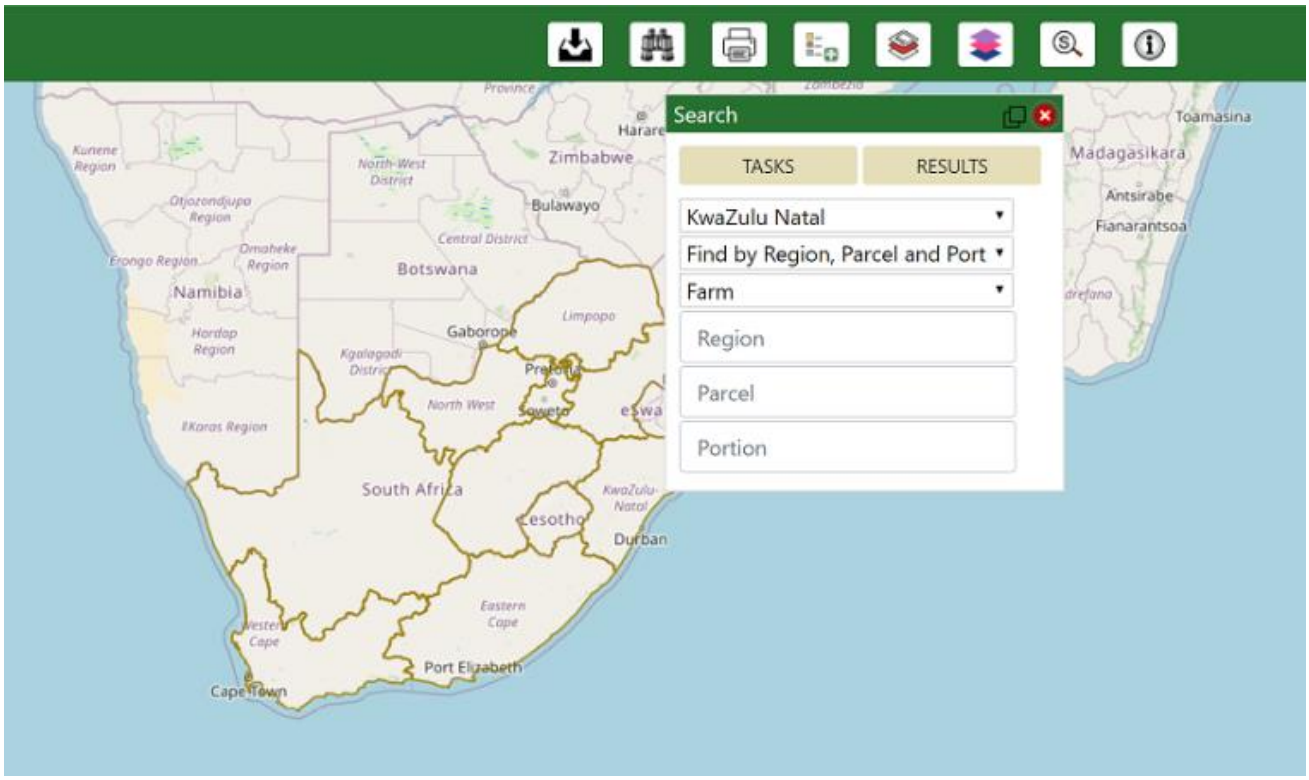


Figure 5: Sample Attribute Search Screen

6.1.6 Search by Graphic Business Rules

a) This search shall be available to Registered Users.

b) For the users above they need to be logged in to the system so that they can access this functionality.

c) If they are not logged in, the system will treat them as unregistered.

d) This search should be executed within one Province.

e) The system will keep track of the downloads that the user fetches through this search interface. These downloads shall be put into the reports for Information which should be available through the Information Management Module reports.

f) The user will be given the following options for the graphic search to use;

   i. Polygon
   ii. Rectangle
   iii. Point
   iv. Circle

g) The system shall allow the user to draw the graphic on their area of interest

h) The system shall allow the user to select their output type which can be one of the following

   i. Shapefile
   ii. KML
   iii. WKT
   iv. Image(default)

v. DXF

i) The system will default the search output type to Images.

j) After the user has selected their output type as mentioned on h) above the system will do a Spatial query on the predefined set of layers;

i. Allotment/Township
ii. Beacon
iii. ERF
iv. ERF Portion
v. Farm
vi. Farm Portion
vii. General Plan
viii. Holding
ix. Holding Portion
x. Lease
xi. Local Municipality
xii. Parent Farm
xiii. Proclamation Boundary
xiv. Public Place
xv. Sectional Title
xvi. Servitude
xvii. Surveyed Informal ERF
xviii. Un-alienated Riverbed
xix. Un-alienated State Land

k) Not all the layers will result in image output

l) The user shall be able to select a radio button so that each spatial query can be run on a Layer.

m) The system will display the count against each layer within the graphic.

n) Once a user selects a radio button and the count is done, a checkbox will appear next to that specific layer for the user to tick.

o) Users will be able to tick multiple check boxes, to allow multiple layers to be requested

p) The system will allow the user to download the data if within the configurable size/count. (for downloads the user needs to be logged in)

q) If the data is within the configurable size/count the user can download the zip file.

r) If the data is more than the configured size/count limit, the system will do the following:

i. Initiate a bulk request, (to execute this the user needs to be logged in).
ii. Redirect the user to the Information Management Module.
iii. The request that will be passed over to the Information Management Module shall contain the following:

1) Requestor Information
2) Request Information
3) Search Parameters
    1. List of LPI code,
    2. Output type,
    3. Layer name,
    4. Province,
    5. List of Coordinates,

s) Should the user request the data in (r) above, the system shall do the following:
    i. Allow the user to initiate a bulk request through the Information Management Module
    ii. Allow the user to capture additional information about the request
    iii. Allow the user to initiate the bulk request to the Information Manager
    iv. Send a link to execute a service to generate a zip file with the submitted request.
    v. At the time of **effecting** the task, the Information Manager or the Information Officer shall click on this link to generate the zip file with the requested data.

6.1.7 Search by Graphic Process Flow

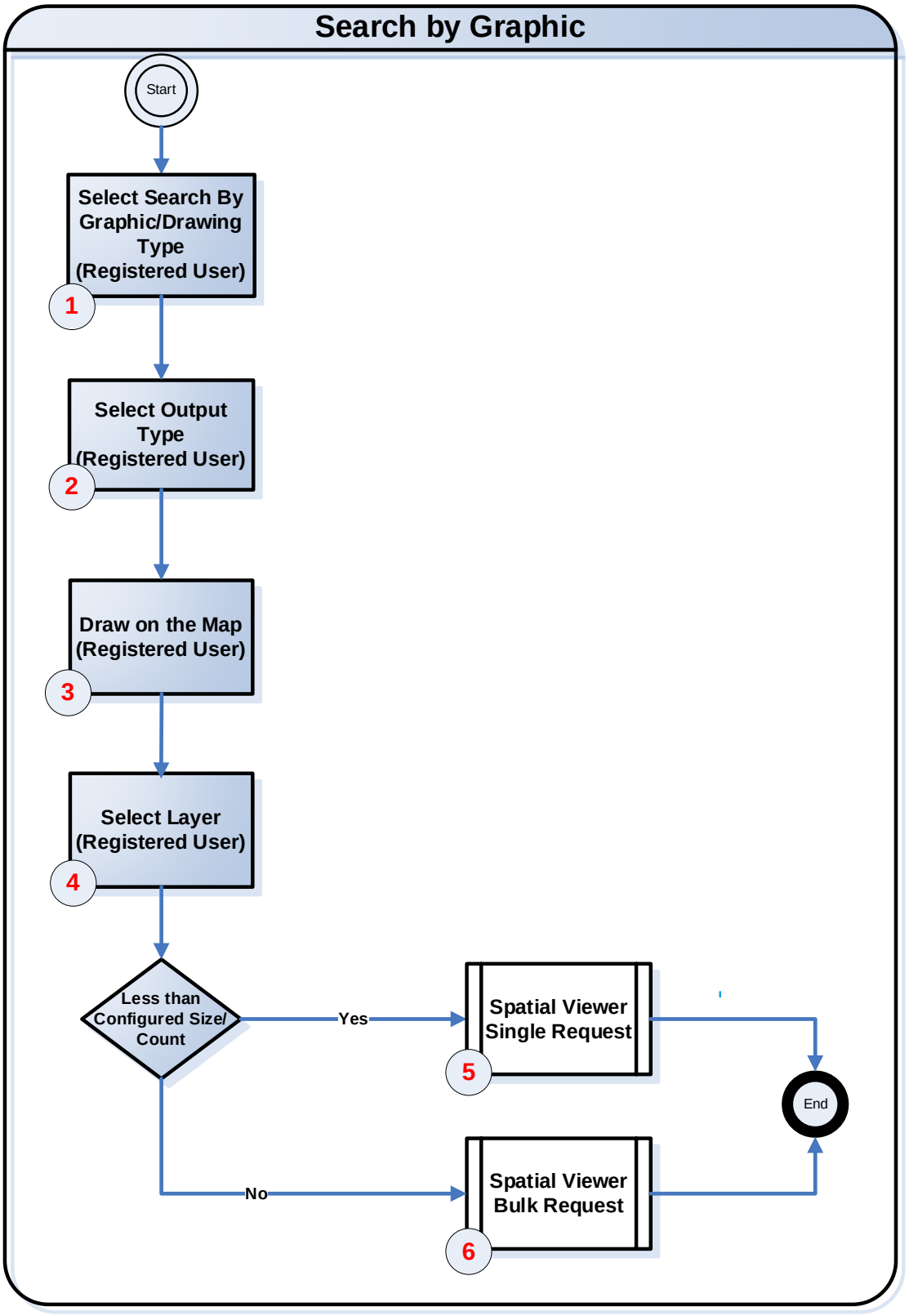


Figure 6: Search by Graphic Process Flow

6.1.8 Search by Graphic Action Node Description

Node #	Description	Information to Capture	User
1	At this node, the registered user shall select the search by graphic tool. The user will also select the drawing that they want to use for searching on the spatial viewer	i. Polygon ii. Rectangle iii. Circle iv. Point	Registered User
2	The user shall select the desired output type for the search criteria.	i. Shapefile ii. KML iii. WKT iv. Image v. DXF	Registered User
3	At this node, the user shall search by physically drawing on the spatial viewer on the area of interest.	i. Area of Interest ii. Polygon iii. Rectangle iv. Circle v. Point	Registered User
4	At this node, the user shall select the layers that they want information for from the layer list. The system will display the number of records in the layer selected. The user can select one radio button at a time to return the results. The system shall check the selection against the configured size/count. The user can also select the checkbox to request multiple layers.	i. Layer Radio Button ii. Layer Checkbox	Registered User
5	At this node, the size/count of the output is less than the configured size on the system. The user will be given the option to download the data.	Download ()	Registered User

Node #	Description	Information to Capture	User
6	At this node, the size/count of the output is more than the configured size on the system. The user will click on the option to trigger bulk request. The system shall redirect the user to the Information Management Module screen to trigger bulk request.	Bulk Request ()	Registered User

Table 7: Search by Graphic Action Node Description

6.1.9 Search by Graphic Use Case Diagram

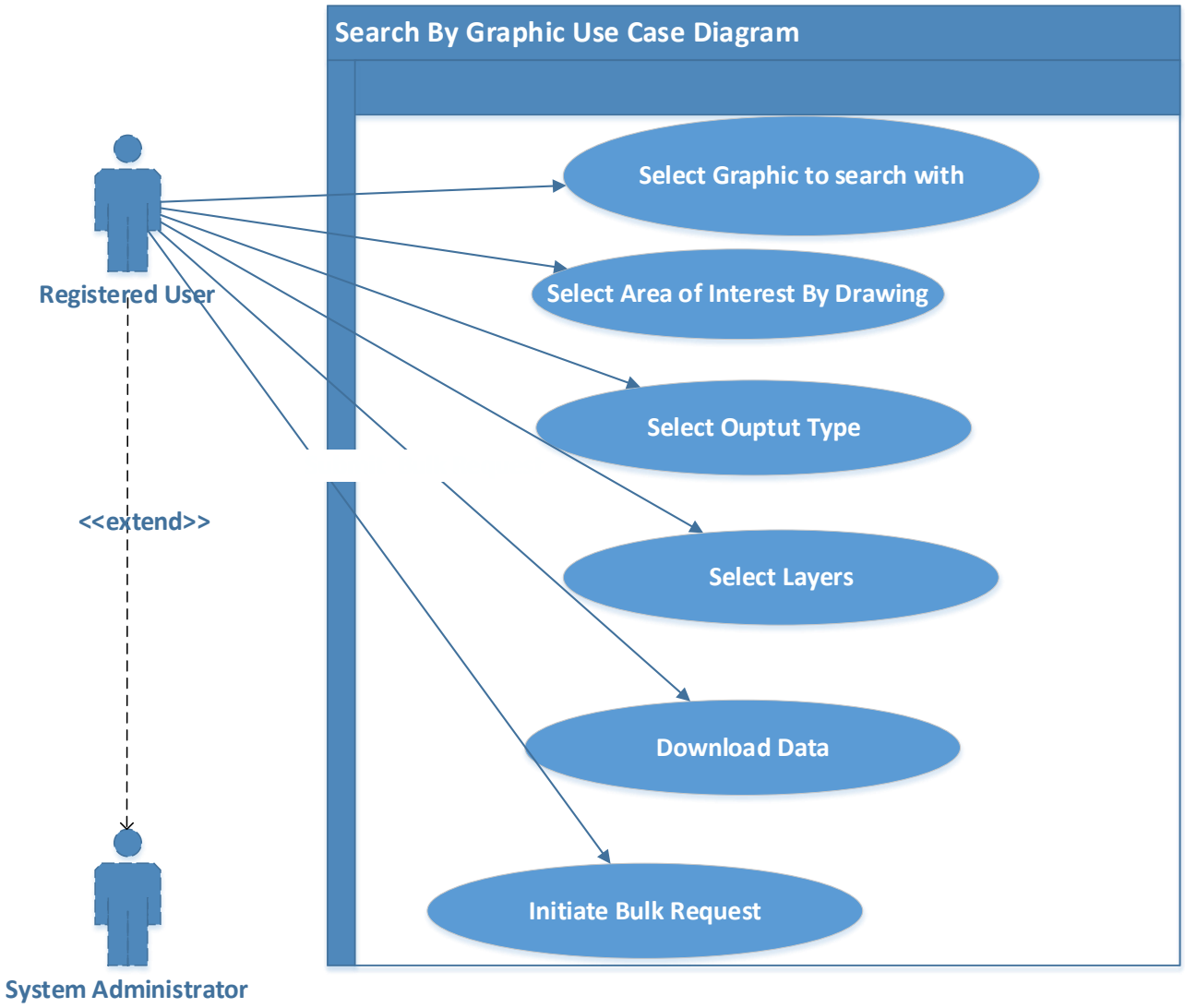


Figure 7: Search by Graphic Use Case Diagram

6.1.10 Search by Graphic Use Case Description

USE CASE 1.2		
Search by Graphic		
	System	
	Registered User	
	National System Administrator	
	Provincial System Administrator	
Preconditions	a) The Registered Users have email addresses. b) The network and database are up. c) The user has some information request they want to view or download. d) The user wants to search the system using the search by graphic tool.	
Business Rules	a) The system will keep a log for all activity happening on the Spatial Viewer b) Both Internal and external registered users will access the same tools on the Spatial Viewer c) Data validation and completeness rules will be applied by the system and relevant messages displayed should there be any disparities. d) The system will not allow the user to submit an information request if the data validation rules were violated. e) The database is updated all the time when a change happens.	
Process	Search by Graphic	
Sub Process	Select Graphic	
	Select Output Type	
	Select Area of Interest by Drawing	
	Display Layers and Count	
	Validation of configured size and count	
	Download Information	
	Trigger Bulk Request	
Basic Flow of Events	**User**	**System**
	1) Click on graphic use for searching the system i. Polygon ii. Rectangle iii. Circle iv. Point	
		2) Enable search using that graphic.
	3) Select the desired output type:	

	i. Shapefile ii. KML iii. WKT iv. Image v. DXF	
		4) Save the selected output type as entered by the user.
	5) Draw using the selected graphic on the area of interest	
		6) Save the query as entered by the user, fetch the query results, check if size or count of features compared to the configured values
	7) Select the layers to download and click on the download button to download the data; i. Layer Radio Button ii. Layer Checkbox	
		8) Download the data
		9) Populate Information on the reports
Alternative Flow of Events	7.a) The information is above the configured size i. The download option is disabled ii. The user can only submit a bulk request iii. The user clicks submit bulk request iv. The system triggers a bulk request on the Information Management Module and passes the parameters below i. Requestor Information ii. Request Information iii. Search Parameters (LPI code, output type, Layer name, Province, List of Coordinates) iv. Link for data download (zip file)	
Notes	**Document upload functionality will be a common feature for all processes where necessary** **Comment Text Box shall be a common feature throughout the system**	

Table 8: Search by Graphics Use Case Description

The insert below is the sample screen of the Search by Graphic Tool.

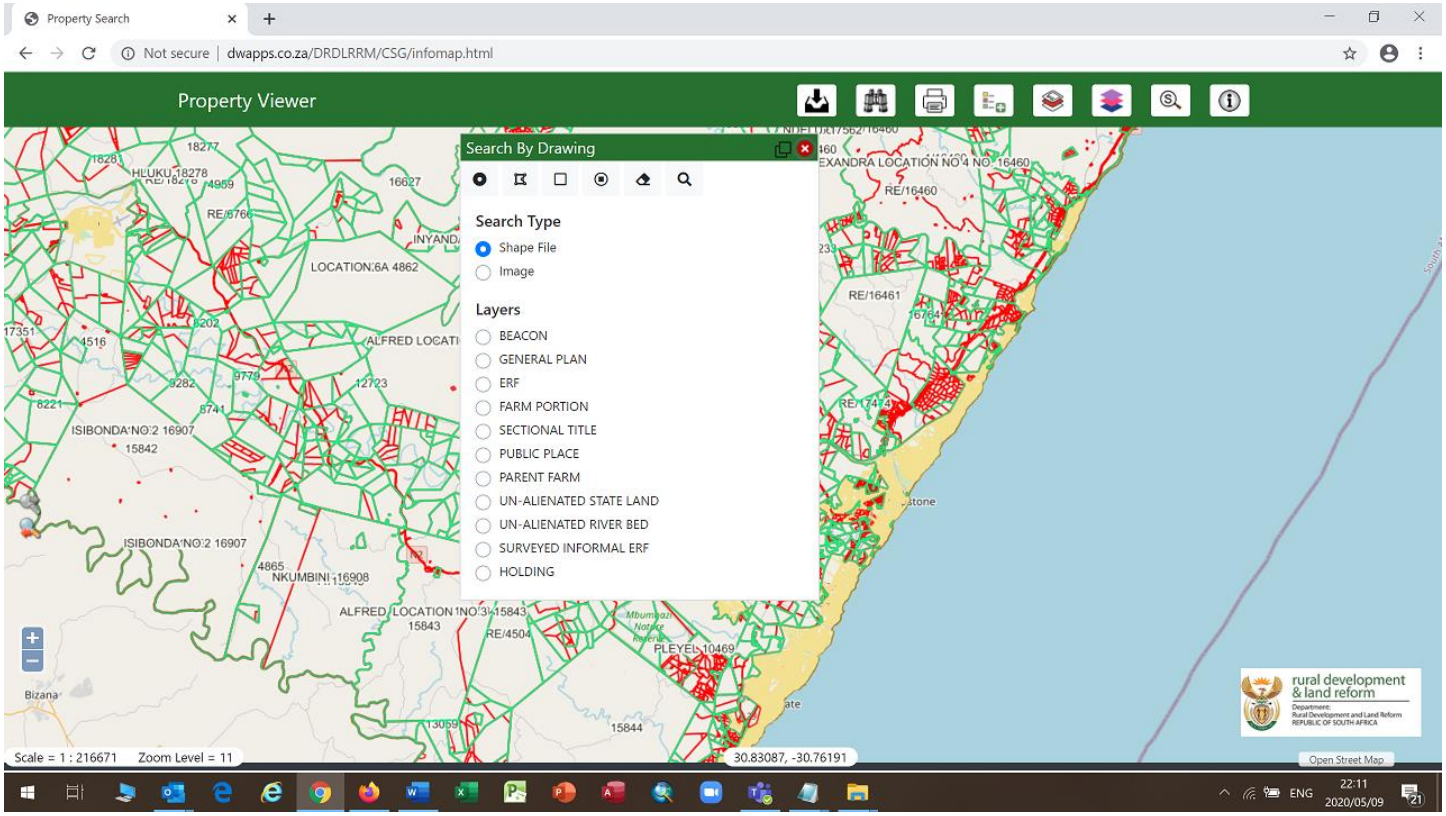


Figure 8 : Sample Search by Graphics

6.1.11 Street Address Search – Business Rules

a) The Street Address Search will be executed using Bing which is a web search engine owned and operated by Microsoft.

b) The system will allow the user to enter the street number and name for example: 5 Rivonia Road

c) If the system finds only one result the system will zoom to that address on the map.

d) If there are more than one search results found, the system will return a collection of the top 10 results.

   i. The User shall select the one appropriate to them.

   ii. The System shall zoom to that address.

e) Using the identify tool the user can find information from the area of interest

f) If there is no address found, the system shall display the appropriate message to the user (exception handling).

g) This enabling/disabling address search should be configurable.

h) This search will also cater for finding places by name.

The insert below is a sample screen for the Street Address Search using Bing

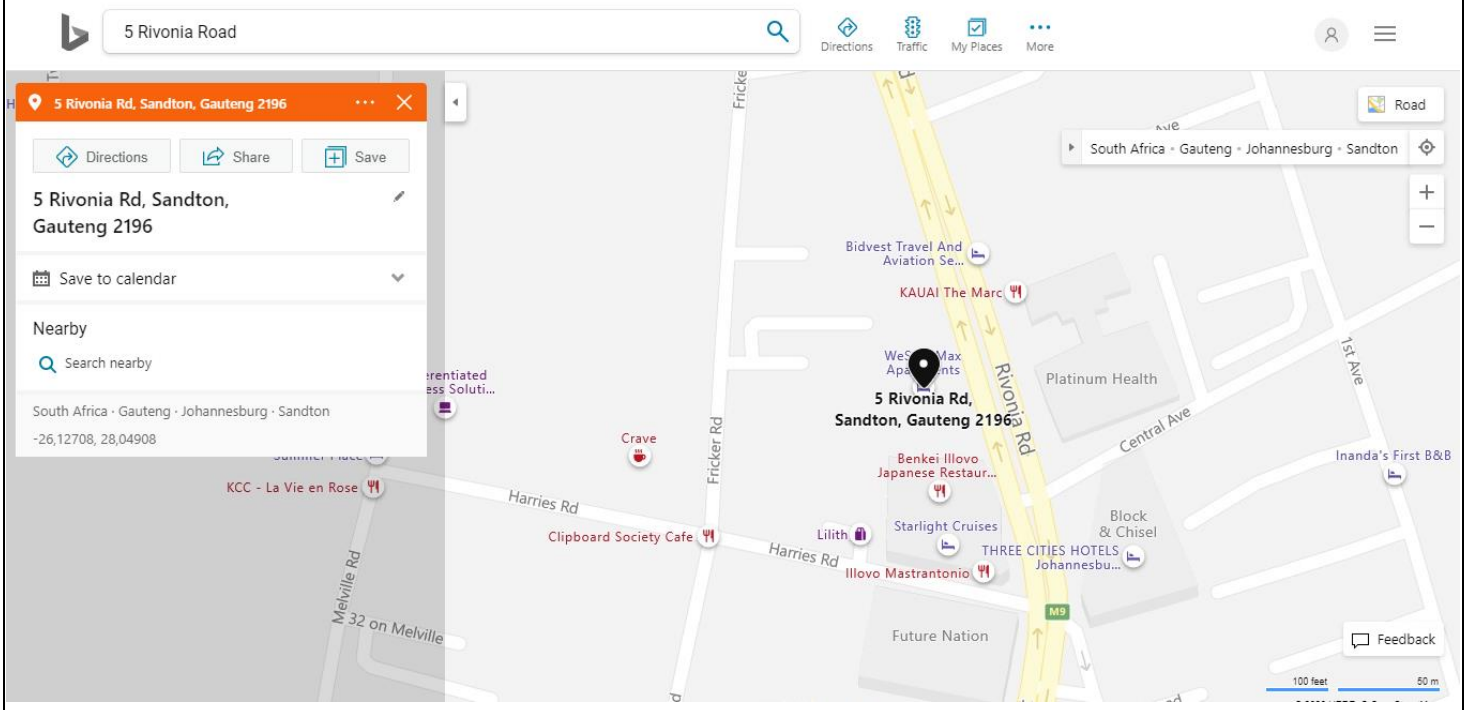


Figure 9: Sample Big Street Address Search Screen

6.2 Map Navigation Tools – Business Rules

a) The Map **Navigation Tools** will have the following functions.

i. Zoom to Previous

1) Zoom to Previous always active even in first time load because default map extent is the world boundary envelope and the we need to zoom to the country boundary.
2) Clicking on Zoom to Previous will then re-zoom the map window such that it zooms to the previous map extent.

ii. Zoom to Next

1) Is only active once a user has already performed a “Zoom to Previous” operation in the viewer.
2) Clicking on Zoom to Next will then re-zoom the map window such that it zooms to the next map extent

iii. Zoom to Full extent

1) A user will click on Zoom to full extent to have the map zoom to its full viewing area (in this case it should be the full spatial extent of South Africa).

iv. Zoom Using Bounding Box

1) A user will click the shift key on the keyboard and draw a bounding box by keeping the left mouse button held down until they have completed the drawing
2) The four vertices of the drawn rectangle will be used to resize and re-render the map, such that the map will now be zoomed in to the level of the drawn rectangle
3) When the zoom to bounding box tool is used, the longer edge of the drawn rectangle will be used to compute the new map view/ map extent

v. **Zoom by Mouse Scroll**

1) A user will be able to zoom in and out of the map by scrolling their mouse (using either the mouse wheel or similar).
2) Each scroll of the mouse will typically result in a change of a single fixed zoom level

vi. **Fixed Zoom**

1) Fixed zoom refers to the fixed zoom levels as per the published map in GeoServer
2) Each fixed zoom clicks **(+ or -)** will either zoom the map in or out by a single zoom level respectively

vii. **Zoom to Coordinates**

1) A user will enter a set of geographical co-ordinates (Single y,x point, Lat Long, or D.ddd) into the co-ordinate text boxes which appear when activating the Zoom to co-ordinates tool)
2) The map window will then re-center and re-render based on the center point of the map now being the co-ordinates specified by the user
3) A user will enter the desired coordinates they wish to zoom to. The Zoom to coordinates tool will also contain an editable text box which shows the current scale of the map. The user will be allowed to modify or change this scale, such that the map will re-center based on the user-input co-ordinates, at the scale specified by the user

viii. Zoom to Scale

1) A user will enter a specified scale into the text box which will appear when activating the Zoom to Scale tool
2) The map viewer will then re-render and display at the user specified scale
3) The centre of the map will remain as it was prior to the zoom to scale operation

ix. Pan Tool

1) A user will use the pan tool to navigate and move the map either left, right, up, or down (West, East, North, South)
2) The scale or zoom level of the map will not change during this operation

b) The User will be able to increment/decrement a fixed zoom level by operating **+/-** buttons.

The insert below shows a typical **Map Navigation Tool** using the function of **Zoom to Scale Function**

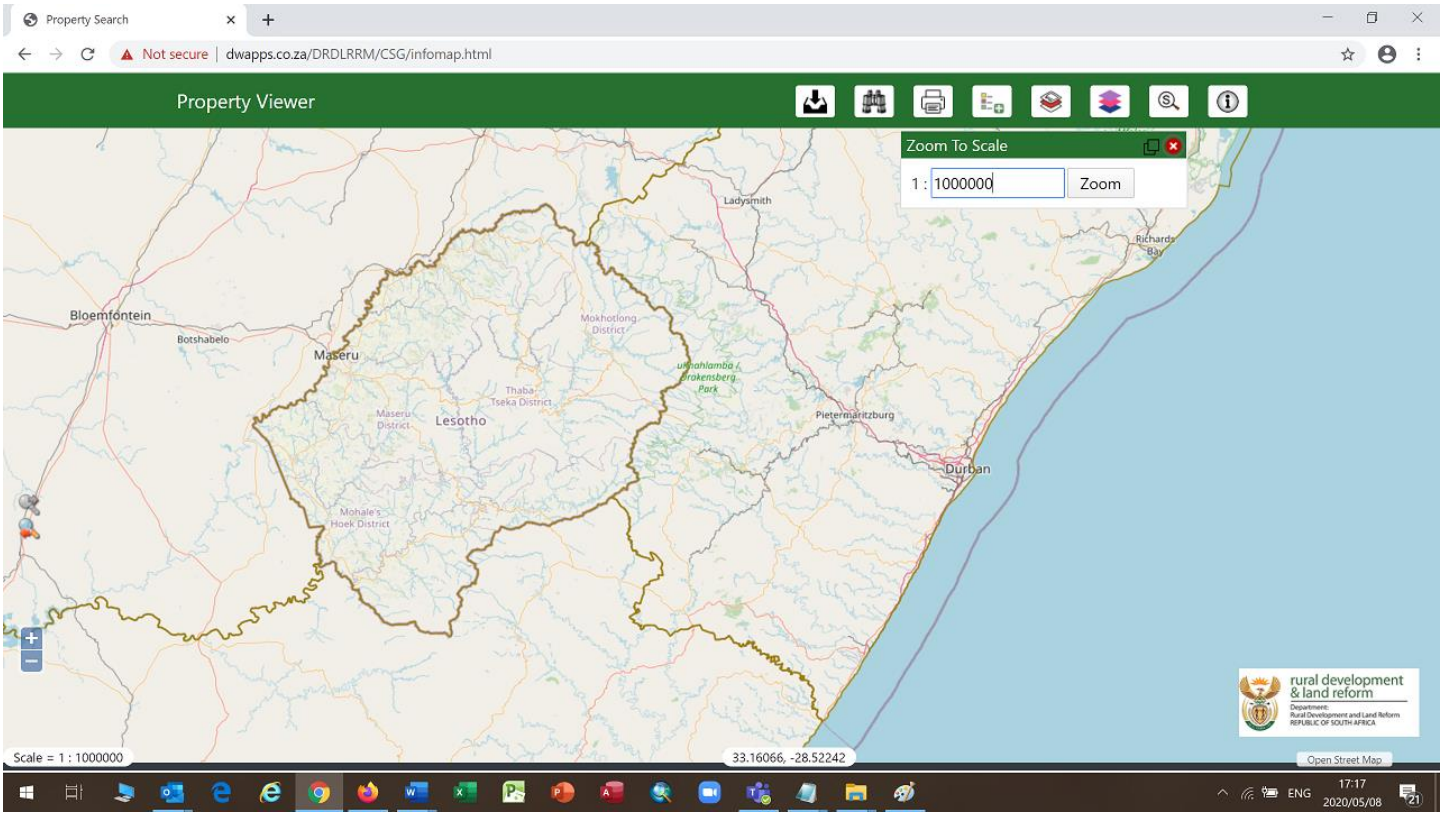


Figure 10: Sample Map Navigation Tool Screen

6.3 Identify Tool Business Rules

a) The identify function can be described as a tool to select a feature/features and retrieve all the associated attribute information of the identified feature(s). It displays the information in a table that appears once the user clicks on a feature on the map using the identify tool.

b) In a case where the tool selects multiple features/layers, the information can be seen by selecting the feature number (Select 1,2, 3...).

c) The Identify Tool will have the following:

   i. Standard Identify Function
   ii. Get More Attributes Function (envisaged attributes)
   iii. Attribute Table related to the identify function
   iv. Attribute data related to the attribute table

d) Primarily, a few attributes such as LPI Key, Parcel Type Description are displayed, (the comprehensive list is being finalised).

e) There will be a button to get “Additional Attributes” from the alpha data.

f) The set of additional attributes for the identified record will be returned from a web service which will query the alpha data, utilizing the LPI Key as the primary query indicator.

g) It is anticipated that a series of queries or a view will need to be executed on the alpha database, searching for information corresponding to the respective LPI Key across various tables. As per current known requirements, the additional attributes to be fetched via the web service will be:

i. Sectional Titles
ii. Servitudes
iii. Lease
iv. Survey records
v. Subdivision Diagram
vi. Consolidation Diagram
vii. Substitution Diagram
viii. Sect/Art 16 Diagram
ix. General Plan
x. Sub divisional General Plan
xi. Curvilinear Boundary Diagram
xii. Beacon Agreement
xiii. Servitude Plans
xiv. Proclamation Diagram
xv. Mining Diagram
xvi. International Boundary Diagram
xvii. Dummy Diagram
xviii. Compilation Sheet
xix. Correspondence File
xx. Farm Comp
xxi. Miscellaneous Plan

h) There will be a link to download the image for each record (where available).

i) There will be multiple links to Images of records linked to a parcel or Servitude. It must be noted that there is a one to many relationships between a parcel/spatial object and images.

The insert below depicts the typical Identify Tool with a Table showing the attributes

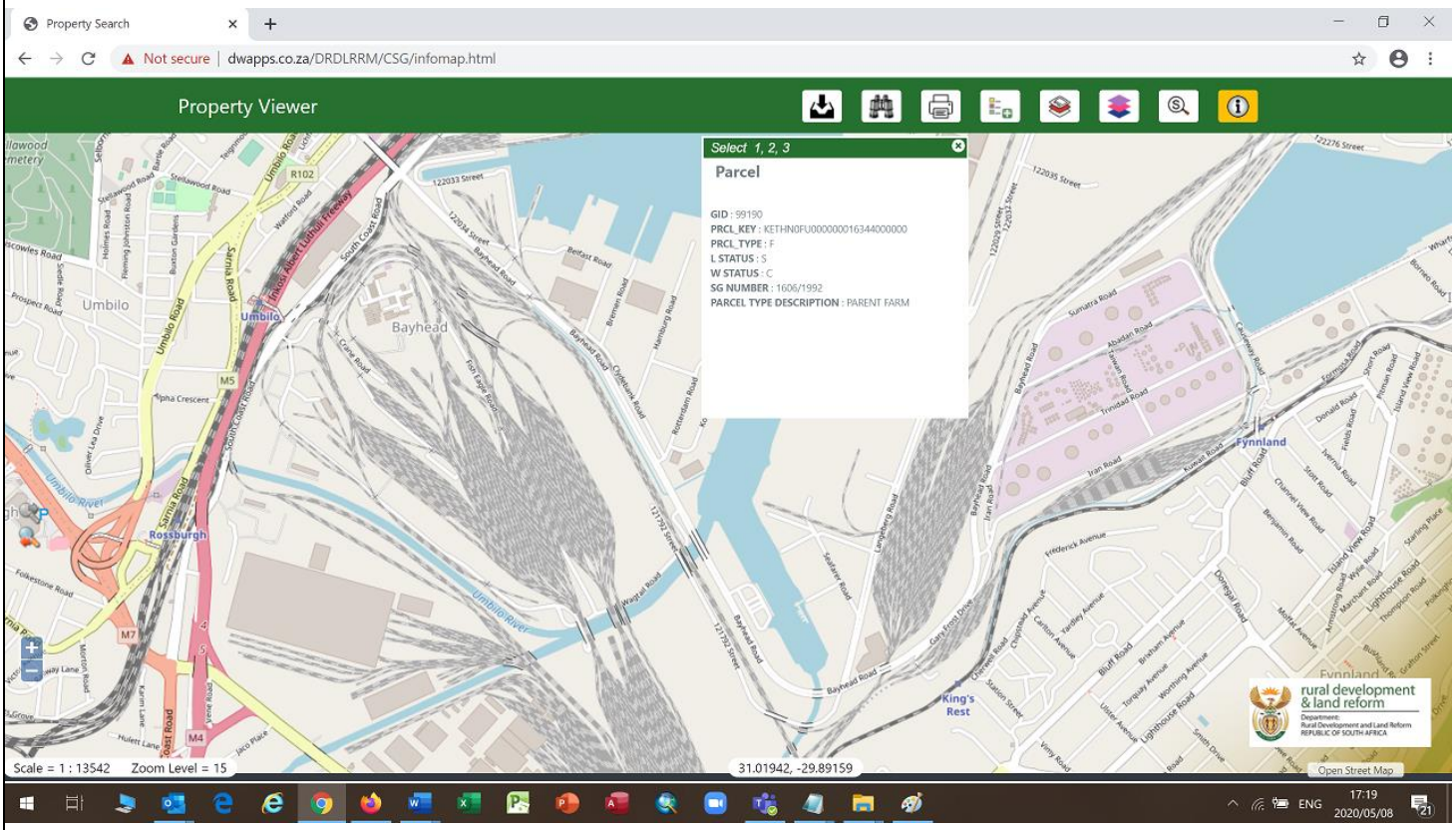


Figure 11: Sample Identity Tool

6.4 Share View Tool Business Rules

The **Share View Tool** will be developed with the following rules:

a) Share – Ability to share the map through a link to other users via email with the state of the map i.e. extent, display of layers based on the selection

b) A user will use the “Share View” tool to share a hyperlink with other users.

c) This hyperlink will be generated by the Spatial Viewer and will be used to maintain and recreate the state of the map view as at the point at which the hyperlink was shared.

d) Items which will be maintained will be the map extent/ map envelope position and scale, as well as the layers which are toggled on/ off at the point of hyperlink creation.

e) It should be noted that whilst the hyperlink will be generated at a specified time, if there have been any data changes after the sharing of the hyperlink, the latest available version of the data will be displayed when the hyperlink is used.

f) The user will click “Share View” to enable the Share view tool.

g) The user will enter the email address of the user whom they want to share the created hyperlink with, and then click “Share”

h) The hyperlink will be sent from the Information Management Module as a notification.

i) The recipient of the email notification will be able to click the hyperlink as received in the email, and the Spatial Viewer will then be opened and focused to the same map envelope and layer selection as per the generated hyperlink.

6.5 Print and Export Tool Business Rules

6.5.1 Standard Map Print

The print and export tool will be implemented with the following functional areas:

a) The system will support the following 3 key functionalities for the print and export tool
   i. Print to scale
   ii. Export
   iii. Print Tool ((projected)
b) The Print Pages Sizes will be:
   i. A4
   ii. A3
   iii. A2
   iv. A1
   v. A0
c) The Orientation shall be
   i. Landscape
   ii. Portrait
d) The Formats shall be
   i. PDF
   ii. PNG
   iii. JPG
e) The system will allow the user to input a Map Title – A text box to type in a desired title for the map
f) The Map will have a scale.
g) The map will also have an Orientation of True North.

6.5.2 Print in Projected Coordinate System

a) The Print in Coordinate System Tool - will work as per below:
   i. There will be an option to print the projected map.
   ii. User can select the desired Lo band.
   iii. The print output will only contain the features/parcels and will not have any backdrop layers such as Open Street Map, Aerial Imagery.
b) The purpose of the “Print in Lo Coordinate system tool” is for a registered user to print what are known as Layoff maps utilizing the Spatial Viewer.
c) The user will have already zoomed to their area of interest on the map viewer and will then click the “Print in Lo Coordinate system tool” icon.
d) The user will then click on the provided dropdown menu and will get a list of Lo bands from which they will need to select their respective Lo band. A tooltip to remind the user to select their correct LO Band will be provided. The Lo Band List will always be the full list.
e) The user will be allowed to print or export the Layoff map which will utilize this re-projected data.
f) Data in the map view will be restricted to the selected Lo band only.

g) The user will also be able to enter a specified scale at which they require the map print to be generated, as well as enter a map title.

h) This print tool will also have a "print to scale" option, as the standard print and export tool does

h) The system will support the following 3 key functionalities for the print and export tool

   i. Print to scale
   ii. Export
   iii. Print Tool (projected)

i) The Print Pages Sizes will be:

   i. A4
   ii. A3
   iii. A2
   iv. A1
   v. A0

j) The Orientation shall be

   iii. Landscape
   iv. Portrait

k) The Formats shall be

   iv. PDF
   v. PNG
   vi. JPG

l) The system will allow the user to input a Map Title – A text box to type in a desired title for the map

m) The Map will have a Scale

n) The map will also have an Orientation of True North

o) NGIS dataset should be projectable.

The screen below depicts a sample print Tool

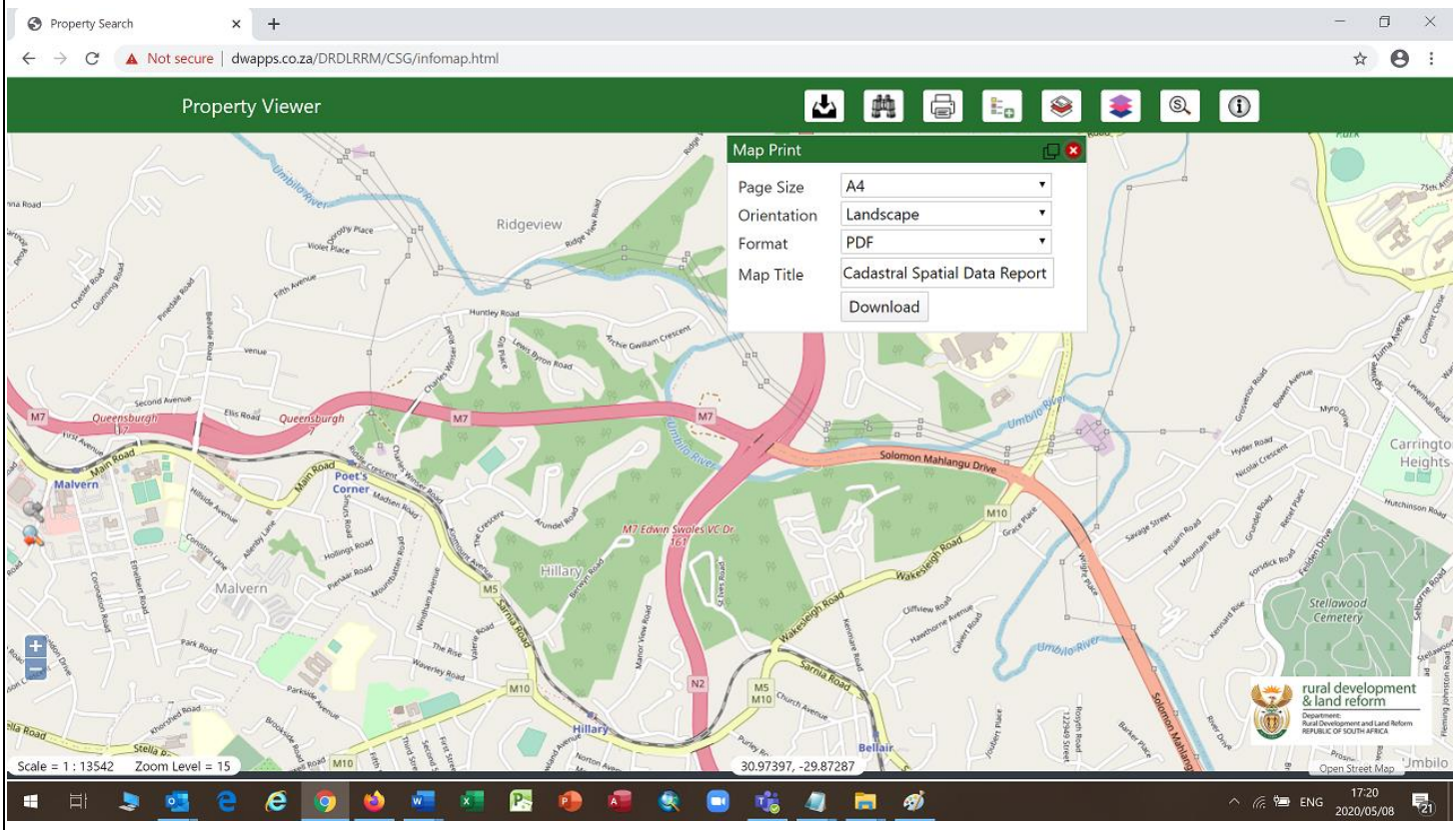


Figure 12: Sample Print Screen

6.6 Bookmark Tool Business Rules

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a) The bookmark function allows a registered user to save various map extents for later use.
b) The tool allows users to zoom to an area and type in the name of the bookmark.
c) The bookmark is then saved and can be retrieved by clicking on the bookmark name.
d) Registered users will save their own bookmark of a map for future use.
e) The system needs to store the bookmarks.
f) The Bookmarks can be deleted by the user.
g) The system will allow the user to save as many bookmarks as they want.

6.7 Layer Manager Tool Business Rules

a) Layer Manager lists all the layers that are available to view.
b) User can switch on/off the layers as required.
c) Two or more layers can be grouped together thereby allowing the user to switch on/off all the layers within the group with a single check.
d) Only the administrator can do the configuration of these layers/groups.
e) By default, certain layers are switched on.
f) Dynamically switching on a layer at a pre-defined scale is also achieved through the configuration changes on the GeoServer by the administrator.

6.8 Refresh Data Sources Tool Business Rules

The Development of the **Refresh Data Sources Tool will be governed by the following business rules**

a) A user will click on the "Refresh Data Sources" button for the map window to have its data re-read from the spatial database.
b) This action should maintain same envelope, same layers toggled as per the user's map state prior to clicking on the Refresh Data Sources button
c) Data sources will be re-read so that the map reloads and showing the latest version of the data as available in GeoServer.
d) There is a possibility of latency with GeoServer and the handling of the data sources between the source database and GeoServer.

6.9 Reset Map Tool Business Rules

a) **Development o**f a **Reset Map Tool** will have the following business rules:
b) This tool/ button will reset the map view/ window to its default state, so that the map envelope and layers displayed appear as they did when the map was first loaded. *(this is the same as entering "CTRL-F5 on your keyboard)*

6.10 Measure Tool Business Rules

Development of a **Measure Tool will take into consideration the following functionalities.**

a) The measure tools allow the users to calculate:
    i. distances,
    ii. areas,
    iii. perimeters.
b) A User can click on the tool and select either area or distance.
c) The line and area measurement tools provide segment information as well as total length and area information.
d) The measure results are displayed on the screen.
e) It may be noted that the accuracy of the results is limited by the National Control Survey System (WGS84 Coordinate system) and the accuracy of the spatial data.

6.11 Map Legend Tool Business Rules

a. Development of a **Map Legend** Tool
b. Map legend displays the symbols that represent various features on the map.
c. These symbols are patches (examples) of the features along with the feature name. E.g., A small red rectangle with a text: Provincial Boundary. This represents the provincial boundary on the map. These symbols are for all feature types i.e. Polygons, Lines and Points.

6.12 Alpha Numeric Data Tool Business Rules

a. Development of a standalone Alpha Numeric Data Tool for Registered Logged in users only
b. Using this tool above the users can directly download alpha numeric data from the system without having to go through the generic search criterion which has been tabulated in this document
c. The system will allow the user to download the alpha numeric data to csv or excel.
d. Through the Alpha Numeric Data Tool, the user should be able to search with the following filters the following within a Province.
    i. Municipality
    ii. Region, Parcel, Portion
    iii. Farm Name
    iv. Allotment Area, Erf, Portion
    v. SG #
    vi. LPI Code
e. This tool will allow the user to get the following information
    i. Coordinate lists
    ii. LPI Code List
    iii. Allotment/Township List
    iv. General Plan List
    v. Sectional Title List
    vi. Farm List
    vii. Parcel List

7. Functional Requirement 2 - Spatial Viewer UAM

a) The users will access the Spatial Viewer through the **Web Portal** interface of the CIS.

b) It is worth noting that there will be no separate registration for access to the Spatial Viewer. The **User Access Management Module** shall be used to grant access and permissions to users once they register.

c) Unregistered users will have access to the web portal.

d) The Spatial Viewer will have the following user groupings.

   i. Unregistered Users

   ii. Registered Users

   iii. System Administrators

The following table specifies all the functionalities and access to be granted to users

Spatial Viewer Function	Unregistered User	Registered User	System Administrator
Read/View	X	X	X
Download		X	X
Register	X	X	X
Attribute Search	X	X	X
Street Search	X	X	X
Search by Graphics		X	X
Map Navigation Tools	X	X	X
Identify Tool	X	X	X
Share View Tool		X	X
Print and Export Tool	X	X	X
Print in Projected Coordinate System		X	X
Bookmark Tool.		X	X
Refresh Data Sources Tool	X	X	X
Reset Map Tool	X	X	X
Measure Tool	X	X	X
Layer Manager **Tool**	X	X	X
Map Legend **Tool**	X	X	X
Alpha Numeric Data Tool		X	X
Single Requests		X	X
Bulk Requests		X	X
Spatial Data Extracts (Boundary Data)		X	X
Parametrized Viewer		X	X
System Administration			X
Map Configurations			X

Table 9: User Functionalities and Access

e) The icons to access the tools listed above will be visible to all users who access the Spatial Viewer, however functionality for registered user components will only be enabled for logged in users. If user is not logged in, these registered user buttons will be greyed out. A tooltip will appear when the un-logged in user clicks on a registered user function, indicating that the user needs to register and login to access these tools.

8. Functional Requirement 3 - Spatial Viewer Information Management

The Spatial Viewer will be an application to view Information and query for the spatial information, the spatial viewer will also be used as a trigger point for some Information Requests. These requests can either be single requests or bulk requests.

8.1 Spatial Viewer Single Requests

8.1.1 Spatial Viewer Single Requests – Business Rules

a) Only Registered Users will be able to execute Single Requests from the Spatial Viewer
b) The system will prompt users to register if they are not registered.
c) The system will prompt users to log in if they are not logged in.
d) The Single Requests would be for the following Information:
    i. Cadastral Documents/Images
    ii. Spatial Data
    iii. Alpha Numeric Data
e) The System Administrator will configure the number of features and the size for single request downloads.
f) The configuration above shall be done on the Information Management Module of the CIS and not on the Spatial Viewer.
g) The user will be able to use all the search criteria named on the search tools section (5.1) of this document to trigger the Single Requests.
    i. **Attribute Search** – The system will present an option for the user to download the Information once the result has been found. There will be an icon next to the result set for download if the data is within the threshold.
    ii. **Search by Graphics** - The system will present an option for the user to download the Information once the result has been found and the user has selected the radio button for the layers they want. There will be an icon next to the result set for download if the data is within the threshold.
    iii. **Street Address Search** - The system allows the user to use the identify tool or the other search criteria so that the user can get to the information to download.
h) Should the system not find the data that the user is searching for, an appropriate message will be displayed to the user.

i) Should the system find the data that the user is searching for it shall enable the download button for the user to download the data (if within the threshold)

j) The system will keep track of the Information that is downloaded via the Spatial Viewer

k) This information on (j) above will be shown on the Statistical Report on the Information Management Module

l) Pre-packaged data will not be downloaded via the Spatial Viewer but from a webpage created on the Information Management Module

m) The spatial module will however trigger routines/services to update the pre-packaged data on daily intervals.

8.1.2 Spatial Viewer Single Request Process Flow

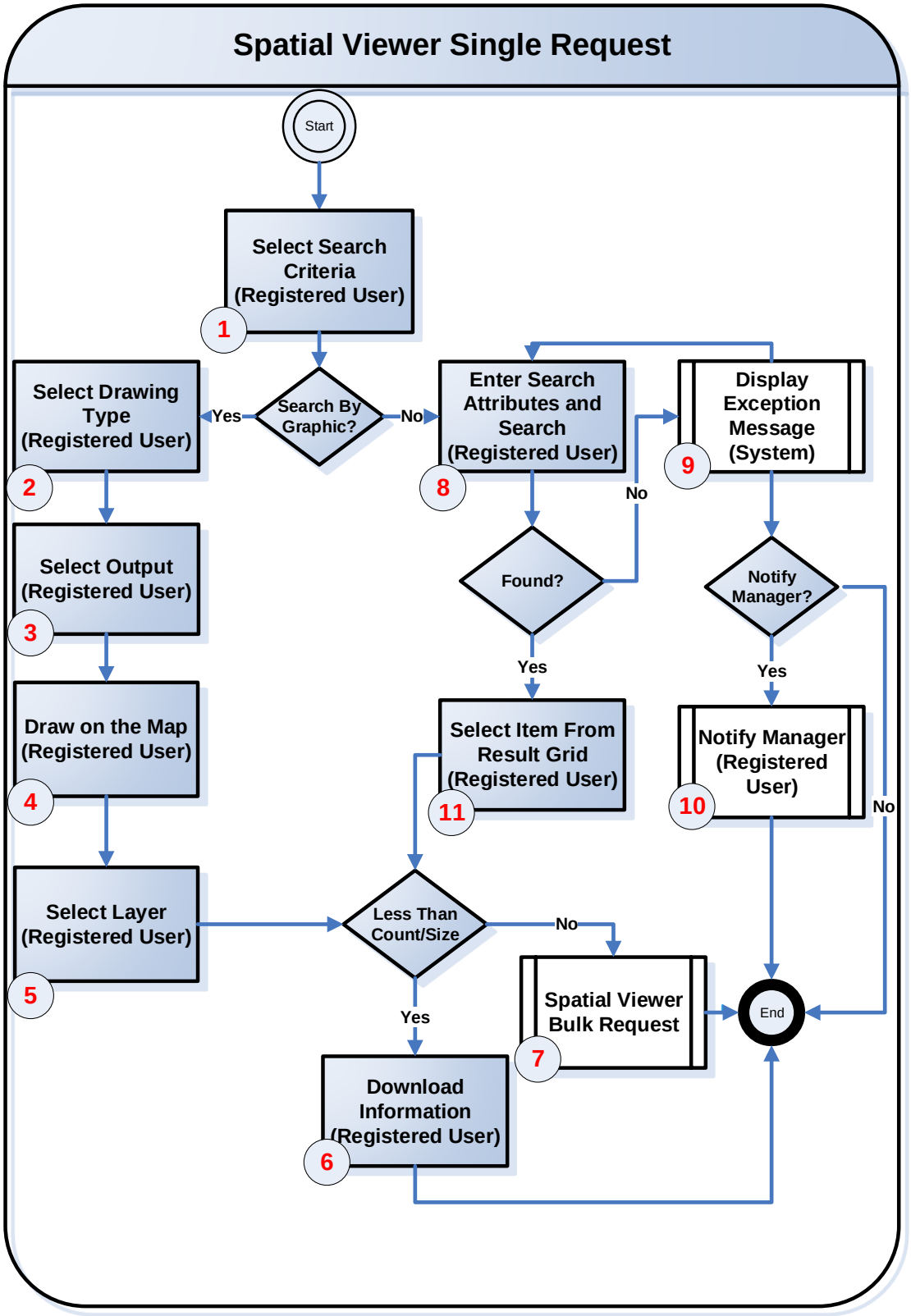

Figure 13: Spatial Viewer Single Request Process Flow

8.1.3 Spatial Viewer Single Request Action Node Description

Node #	Description	Information to Capture	User
1	At this node, the registered user shall select the search criteria they want to search with.	i. Attribute Search ii. Search by Graphic	Registered User
2	At this node, the user selected the search by graphic option. The user will have to select the drawing type.	i. Polygon ii. Rectangle iii. Circle iv. Point	Registered User
3	The user shall select the desired output type for the search criteria.	i. Shapefile ii. KML iii. WKT iv. Image v. DXF	Registered User
4	At this node, the user shall search by physically drawing on the spatial viewer on the area of interest.	i. Area of Interest ii. Polygon iii. Rectangle iv. Circle v. Point	Registered User
5	At this node, the user shall select the layers that they want information for from the layer list. The system will display the number of records in the layer selected. The user can select one radio button at a time to return the results. The system shall check the selection against the configured size/count.	Layer Select ()	Registered User
6	At this node, the size/count of the output is less than the configured size on the system. The user will be given the option to download the data.	Download ()	Registered User

Node #	Description	Information to Capture	User
7	At this node, the size/count of the output is more than the configured size on the system. The user will click on the option to trigger a bulk request. The system shall redirect the user to the Information Management Module screen to trigger a bulk request.	Bulk Request ()	Registered User
8	At this node, the user has selected the search by attributes search type. The user shall enter the search attributes. At this point the user shall click on the search button to submit the search attributes so they can be queried by the system. The system shall check if there is any information from the search criteria	i. Province ii. Municipality iii. Region, Parcel, Portion iv. Farm Name v. Allotment Area, Erf, Portion vi. SG # vii. LPI Code	Registered User
9	At this node, the information that the user was looking for cannot be found. The system shall display the relevant information not found message that is configured for exception handling at this point. The user can go back to the node 1 from here.		System
10	At this node the system shall ask the user if the input data is correct. If the user insists that the input data is correct, then the system shall prompt the user to notify the Manager. The user shall click on the option to notify The Manager. If no is selected the process shall end. The user can go back to node 1 from here.	i. Are You sure your input data is correct? **Yes/No** ii. Do you want to notify The Manager? **Yes/No**	Registered User

Node #	Description	Information to Capture	User
11	At this node, the information that the user searched for is found on the system. The system shall display the search results on the result grid. The user shall select an item from the search result grid. The user can be able to click on the **get more attributes** icon from the search results. This function will bring more information about the item like, Alpha Numeric Data and the Image Links. The system checks the size/count.	i. Select Item () ii. Spatial Data iii. Get More Attributes Click () iv. Alpha Numeric Data* v. Image Links* vi. csv* vii. dbf* viii. excel*	Registered User

Table 10: Spatial Viewer Single Request Action Node Description

8.1.4 Spatial Viewer Single Request Use Case Diagram

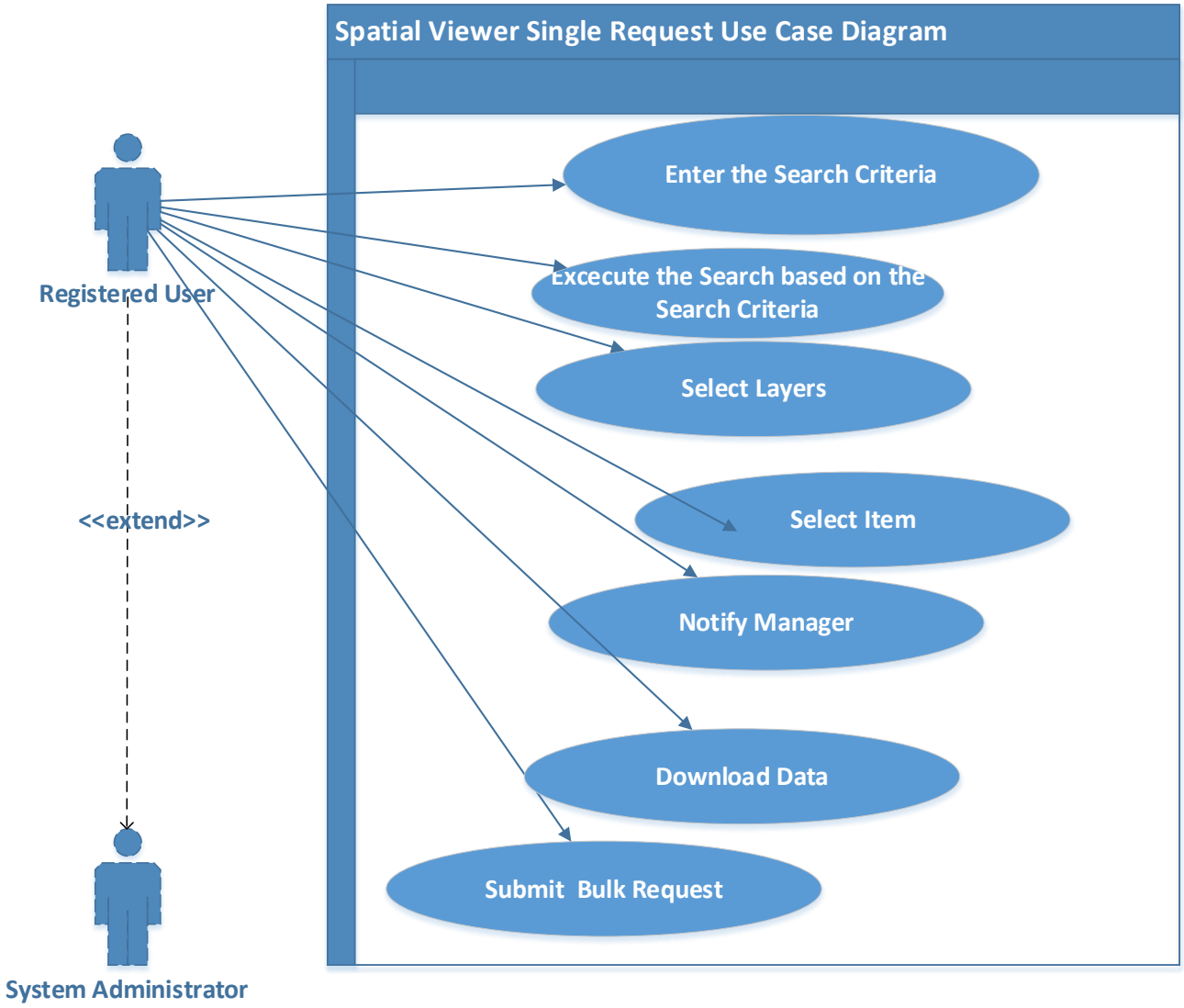

Figure 14: Spatial Viewer Single Request Use Case Diagram

8.1.5 Spatial Viewer Single Request Use Case Description

USE CASE 1.3	
Spatial Viewer Single Request	
	System
	Registered User
	National System Administrator
	Provincial System Administrator
Preconditions	a) The Registered Users have email addresses. b) The user is logged on c) The network and database are up. d) The user has some information request they want to view or download. e) The user wants to search the system using the search by graphics tool.

	f) The user wants to search the system using the search by Street Address. g) The user wants to search the system using the search by Attributes Search.	
Business Rules	a) The system will keep a log for all activity happening on the Spatial Viewer b) Both Internal and external registered users will access the same tools on the Spatial Viewer c) Data validation and completeness rules will be applied by the system and relevant messages displayed should there be any disparities. d) The system will not allow the user to submit an information request if the data validation rules were violated. e) The database is updated all the time when a change happens.	
Process	Spatial Viewer Single Request	
Sub Process	Select Search Criteria	
	Search	
	Select Area of Interest by Drawing	
	Select the Layer	
	Select the Search Result	
	Validation of configured size and count	
	Download Information	
	Trigger Bulk Request	
Basic Flow of Events	**User**	**System**
	1) Select the Search Criteria to execute i. Attribute ii. Graphics	
		2) Enable search using that search criteria.
	3) Select Graphic to draw with i. Polygon ii. Rectangle iii. Circle iv. Point	
	4) Enter the output for search i. Shapefile ii. KML	.

	iii. WKT iv. Image v. DXF	
	5) Draw on the Map using i. Polygon ii. Rectangle iii. Circle iv. Point	
	6) Select the Layer to get information from using the radio buttons. i. Beacon ii. General Plan iii. ERF iv. ERF Holdings v. Farm Portion vi. Public Place vii. Parent Farm viii. Un-alienated State Land ix. Un-alienated Riverbed x. Surveyed Informal ERF xi. Holding xii. ERF portions xiii. Farm Portions xiv. Sectional Titles xv. Local Municipality	
		7) Check the size/count of the information on the layer selected.
	8) Click on the link to download data	
		9) Download the data

		10) Populate Information on the reports
Alternative Flow of Events	3.a) The user selected the attribute search i. The user enters the attributes to search with 1. Province 2. Municipality 3. Region, Parcel, Portion 4. Farm Name 5. Allotment Area, Erf, Portion 6. SG # 7. LPI Code ii. The user clicks on the search button iii. The system validates the data entered iv. The user selects the item from the result grid v. The system validates the size/count vi. The Result Item was less than the size/count vii. The system enables the download icon viii. The user downloads the Information ix. The system populates the reports of these requests. 3. a) iii) a) The Search query cannot be found i. The system displays an exception message. ii. The system prompts for data validation iii. The system prompts for notification of the Manager. 8.a) The information is above the configured size i. The download option is disabled ii. The user can only submit a bulk request iii. The user clicks submit bulk request iv. The system triggers a bulk request on the Information Management Module and passes the parameters below i. Requestor Information ii. Request Information iii. Search Parameters (LPI code, output type, Layer name, Province, List of Coordinates) 3.a) iv) The user selects the get more attributes function 1) The system prompts the user to select format (dbf, csv, excel)	
Notes	**Document upload functionality will be a common feature for all processes where necessary**	

	Comment Text Box shall be a common feature throughout the system

Table 11: Spatial Viewer Single Request Use Case Description

8.2 Spatial Viewer Bulk Requests

8.2.1 Spatial Viewer Bulk Requests - Business Rules

a) Through the spatial viewer registered users shall be able to trigger requests for the following Information: (a detail of this is attached on annexure – Product and Services of this document)

b) The table below shows the Information requests that will be initiated from the Spatial Viewer. This table is based on the scale of fees.

SQ#	Request Category	Request Subcategory	Items
1.	Cadastral Documents	Images	1. Sectional Title Plans 2. General Plans 3. Diagrams
2.	Spatial Data	Extraction of Data	1. Shapefile 2. KML 3. WKT 4. DXF
3	Alpha Numeric Data	Coordinate List	

Table 12 : Spatial Viewer Triggered Information Requests

c) The table below shows the Information requests that will be triggered from the Information Management Module (However the Spatial Module needs to show a contextualised/parametrised view of these). This table is based on the scale of fees.

SQ#	Request Category	Request Subcategory	Items
1	**Certificates**	**1) Certificate of Remainder** **2) Confirmation of Jurisdictional Boundaries**	**1. Shape Files** **2. Shape Files**
2	Professional Services	1) Images Images Images 2) Extraction of Data Extraction of Data Extraction of Data Extraction of Data 3) Coordinate List 4) Certificate of Remainder 5) Confirmation of Jurisdictional Boundaries	1. Sectional Title Plans 2. General Plans 3. Diagrams 1. Shapefile 2. KML 3. WKT 4. DXF 1. Shape Files 2. Shape Files
3	NGI Data	Vector Data	1. Grids 2. Roads 3. Railway 4. 25 Mint Interval

			5. 5M Contours 6. Projected 5M contours
		Trig and Town Survey Marks	1. TSM 2. TRIG
		DEM (Digital Elevation Model)	1. 50M and 100M interval

Table 13: Information Management Module Triggered Requests

d) The NGI data will be for only the offices that provide NGI data;

e) The Category for professional services will automatically mean that this request needs to be treated as a bulk request and posted onto the Information Management Module for processing

f) The Sequence for triggering bulk requests through the spatial viewer shall be as follows

i. The User searches with the predefined search criteria;

ii. The user selects the output

iii. The system performs the search and returns the results

iv. The user selects the layers that they want information for

v. The system validates the size/count based on the configuration (In a scenario where the size/count is more than the configured)

i. The system presents an option to trigger a bulk request

ii. The user is redirected to the Information Management Module to capture more details about the bulk request

iii. The request that will be passed over to the Information Management Module shall contain the following:

1. Requestor Information
2. Request Information
3. Search Parameters
   - List of LPI codes,
   - Output type,
   - Layer name,
   - Province,
   - List of Coordinates,

g) From the Spatial Module the system will **send** a **link** to execute a **service** to generate the zip file should the user want the data .At the time of effecting the task, the Information Officer can **click** on this **link** to generate the zip file which will have the Information requested by the user through the spatial viewer..

h) Once the request has been passed over to the Information Management Module, the normal bulk process shall ensue from the Information Management Module, until the request is dispatched.

i) Alpha Numeric Data should be for Coordinate List and can be exported to the following:

i. csv

ii. excel

iii. dbf

j) These requests shall form part of the reports on the Information Management Module reports.

8.2.2 Spatial Viewer Bulk Requests – Process Flow

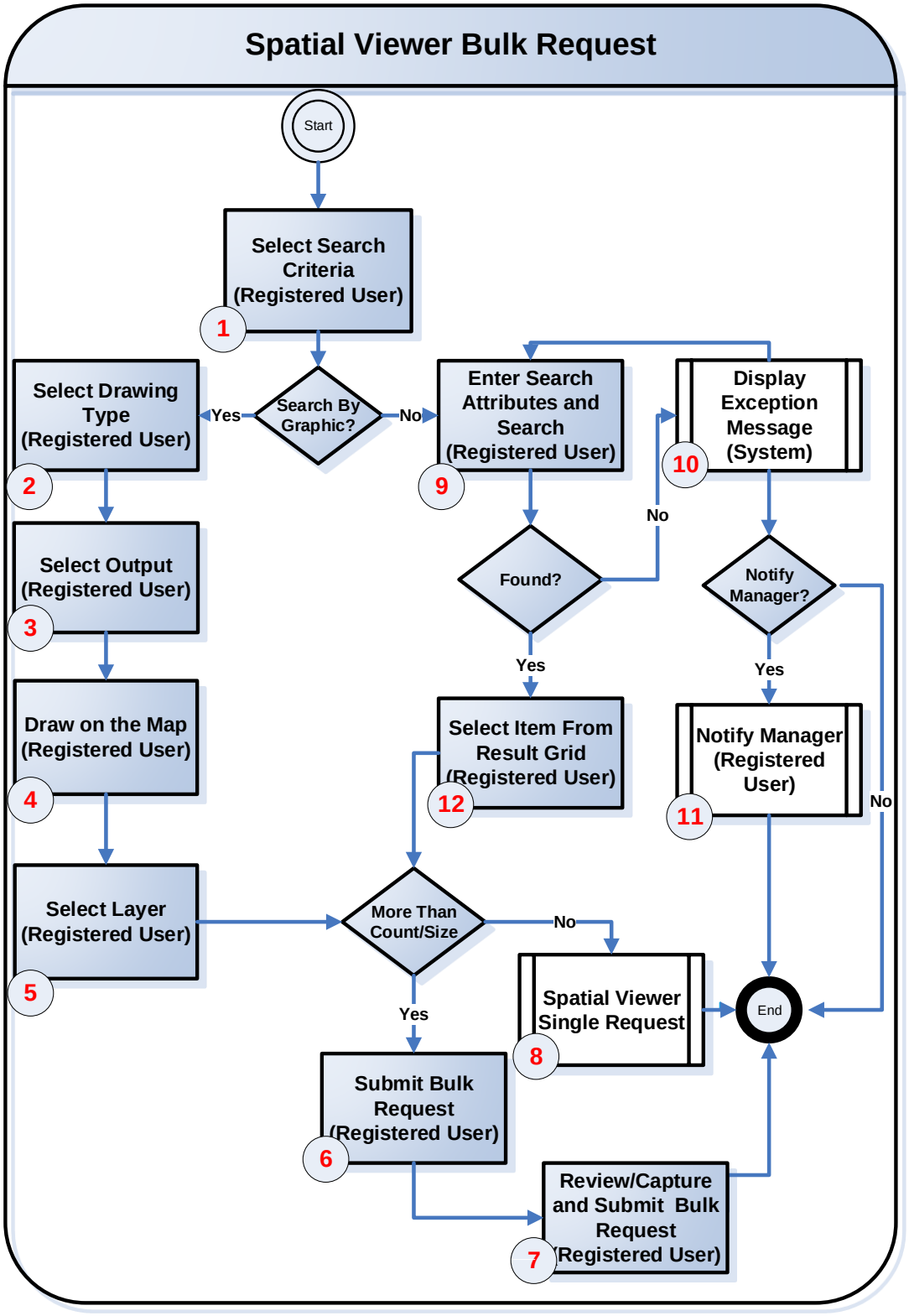

Figure 15: Spatial Viewer Bulk Requests – Process Flow

8.2.3 Spatial Viewer Bulk Requests – Action Node Description

Node #	Description	Information to Capture	User
1	At this node, the registered user shall select the search criteria they want to search with.	i. Attribute Search ii. Search by Graphic	Registered User
2	At this node, the user selected the search by graphic option. The user will have to select the drawing type.	i. Polygon ii. Rectangle iii. Circle iv. Point	Registered User
3	The user shall select the desired output type for the search criteria.	i. Shapefile ii. KML iii. WKT iv. Image v. DXF	Registered User
4	At this node, the user shall search by physically drawing on the spatial viewer on the area of interest.	i. Area of Interest ii. Polygon iii. Rectangle iv. Circle v. Point	Registered User
5	At this node, the user shall select the layers that they want information for from the layer list. The system will display the number of records in the layer selected. The user can select one radio button at a time to return the results. A Checkbox option shall be available for multiple selection of layers. The system shall check the selection against the configured size/count.	Select Layer () i. Layer Radio Button ii. Layer Checkbox	Registered User

Node #	Description	Information to Capture	User
6	At this node, the size/count of the output is less than the configured size on the system. The user will be given the option to download the data.	Download ()	Registered User
7	At this node, the size/count of the output is more than the configured size on the system. The user will click on the option to trigger a bulk request. The system shall redirect the user to the Information Management Module screen to trigger a bulk request.	Bulk Request ()	Registered User
8	At this node, the registered user shall be on the Information Management Module as redirected from the spatial viewer. The user can view the request information in addition the user can enter more information about the request. The user can then submit the bulk request at this point.	i. Packaging* ii. Delivery Mode iii. Submit ()	Registered User
9	At this node, the user has selected the search by attributes search type. The user shall enter the search attributes. At this point the user shall click on the search button to submit the search attributes so they can be queried by the system. The system shall check if there is any information from the search criteria	i. Province ii. Municipality iii. Region, Parcel, Portion iv. Farm Name v. Allotment Area, Erf, Portion vi. SG # vii. LPI Code	Registered User

Node #	Description	Information to Capture	User
10	At this node, the information that the user was looking for cannot be found. The system shall display the relevant information not found message that is configured for exception handling at this point. The user can have the option of going to node 1.		System
11	At this the system shall ask the user if the input data is correct. If the user insists that the input data is correct, then the system shall prompt the user to notify the Manager. The user shall click on the option to notify The Manager. If no is selected the process shall end. The user can go back to node 1 from here.	i. Are You sure your input data is correct? **Yes/No** ii. Do you want to notify The Manager? Yes/No	Registered User
12	At this node, the information that the user searched for is found on the system. The system shall display the search results on the result grid. The user shall select an item from the search result grid that. The user can be able to click on the **get more attributes** icon from the search results. This function will bring more information about the item like, Alpha Numeric Data and the Image Links. The system checks the size/count. The user can select the format if get more attributes is chosen.	i. Select Item () ii. Spatial Data iii. Get More Attributes Click () iv. Alpha Numeric Data* v. Image Links* vi. Csv* vii. Excel* viii. Dbf*	Registered User

Table 14: Spatial Viewer Bulk Requests – Action Node Description

8.2.4 Spatial Viewer Bulk Requests – Use Case Diagram

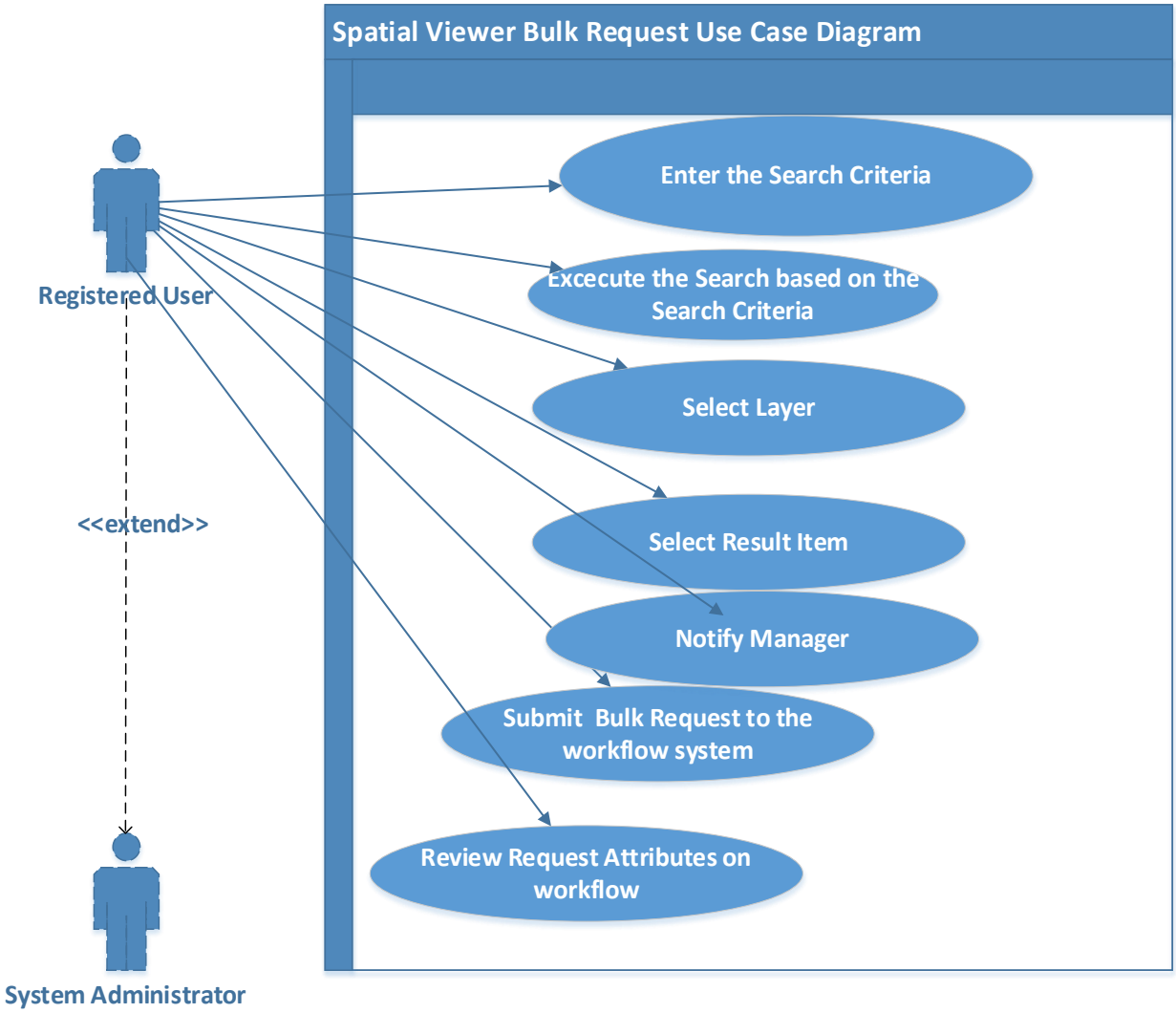

Figure 16: Spatial Viewer Bulk Requests – Use Case Diagram

8.2.5 Spatial Viewer Bulk Requests – Use Case Description

USE CASE 1.4	
Spatial Viewer Single Request	
	System
	Registered User
	National System Administrator
	Provincial System Administrator
Preconditions	a) The Registered Users have email addresses. b) The user is logged on. c) The network and database are up. d) The user has some information request they want to view or download. e) The user wants to search the system using the search by graphics tool. f) The user wants to search the system using the search by Street Address.

	g) The user wants to search the system using the search by Attributes Search. h) The user wants to submit a request to the office for processing this can be f i) The request is above the number of features configured on the system j) The request is above the size configured on the system	
Business Rules	a) The system will keep a log for all activity happening on the Spatial Viewer b) Both Internal and external registered users will access the same tools on the Spatial Viewer c) Data validation and completeness rules will be applied by the system and relevant messages displayed should there be any disparities. d) The system will not allow the user to submit an information request if the data validation rules were violated. e) The database is updated all the time when a change happens.	
Process	Spatial Viewer Bulk Request	
Sub Process	Select Search Criteria	
	Search	
	Select Area of Interest by Drawing	
	Validation of Information Availability	
	Select Layer	
	Select Output Item from Result Grid	
	Validation of configured size and count	
	Single Request(download)	
	Submit Bulk Request to Information Management Module	
	Review/Capture/Submit Bulk Request on Information Management Module	
Basic Flow of Events	**User**	**System**
	1) Select the Search Criteria to execute i. Attribute ii. Graphics	
		2) Enable search using that search criteria.
	3) Select Graphic to draw with i. Polygon ii. Rectangle iii. Circle iv. Point	
	4) Enter the output for search	.

	i. Shapefile ii. KML iii. WKT iv. Image v. DXF	
	5) Draw on the Map using i. Polygon ii. Rectangle iii. Circle iv. Point	
	6) Select the Layer to get information from using the radio buttons. i. Beacon ii. General Plan iii. ERF iv. Farm Portion v. Public Place vi. Parent Farm vii. Un-alienated State Land viii. Un-alienated Riverbed ix. Surveyed Informal ERF x. Holding xi. ERF portions xii. Farm Portions xiii. Sectional Titles xiv. Local Municipality 7) Select Layer Checkbox	
		8) Check the size/count of the information on the layer selected.

	9) Click on the icon to submit bulk Request	
		10) Redirect user to the Information Management Module Capture Request Screen
	11) Review Request and capture other information related to the request like: i. Dissemination Medium ii. Packaging and submit the bulk Request	
		12) Trigger Bulk Request on the Information Managers Inbox
Alternative Flow of Events	3.a) The user selected the attribute search i. The user enters the attributes to search with 1. Province 2. Municipality 3. Region, Parcel, Portion 4. Farm Name 5. Allotment Area, Erf, Portion 6. SG # 7. LPI Code ii. The user clicks on the search button iii. The system validates the data entered iv. The user selects the item from the Result Grid v. The system validates the size/count vi. The Result Item was more than the size/count vii. The system triggers a bulk request viii. The user submits the bulk request to the Information Management Module ix. The user fills in more information about the request and submits the bulk request. 5. a) iii) a) The Search query cannot be found i. The system displays an exception message. 8.a) The information is below the configured size i. The download option is enabled ii. The user can download the information	

	iii. The system should populate this information on the reports 3.a) iv) The user selects the get more attributes function i. The system prompts the user to select format (dbf, csv, excel)
Notes	**Document upload functionality will be a common feature for all processes where necessary** **Comment Text Box shall be a common feature throughout the system**

Table 15: Spatial Viewer Bulk Requests – Use Case Description

8.3 Parametrised Viewer

8.3.1 Parametrised Viewer Business Rules

a) The system shall display a parametrised spatial viewer for logged in registered users based on the following events:
   i. The User Searches for a parcel from the Information Management Module.
   ii. The system displays the results set.
   iii. The system displays a Globe Icon next to the result set that has spatial data.
   iv. Upon clicking on the globe, the system zooms to that parcel.

b) The View map icon/globe will be shown where there is spatial data

c) If there is no corresponding spatial data, the system will not show the globe icon.

d) The user needs to view map and the system will:
   i. Pop up window viewer of the spatial data.
   ii. Zoom to the corresponding spatial record

e) Standard Spatial tools will be available with the spatial view like those for the unregistered user.

f) The user should be View /Download the spatial data

g) Logged on report

h) The Screen below shows the sample of the search results as per business rule a) above.

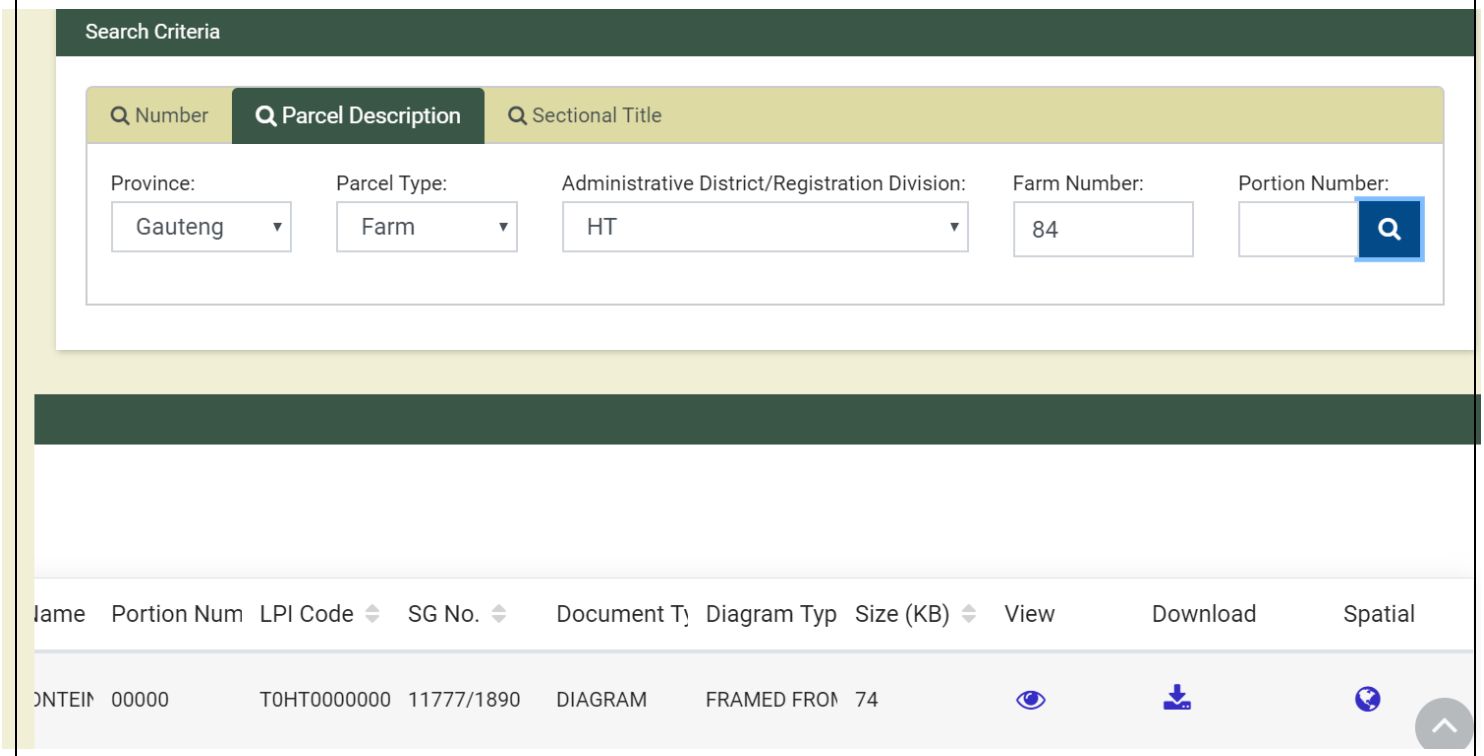

Figure 17: Search Screen and Search Results with Spatial Icon

i) The screen below shows the parametrised viewer having zoom onto the parcel that was selected

j) Users should be able see other spatial data layers around and/or over the parcel of interest.

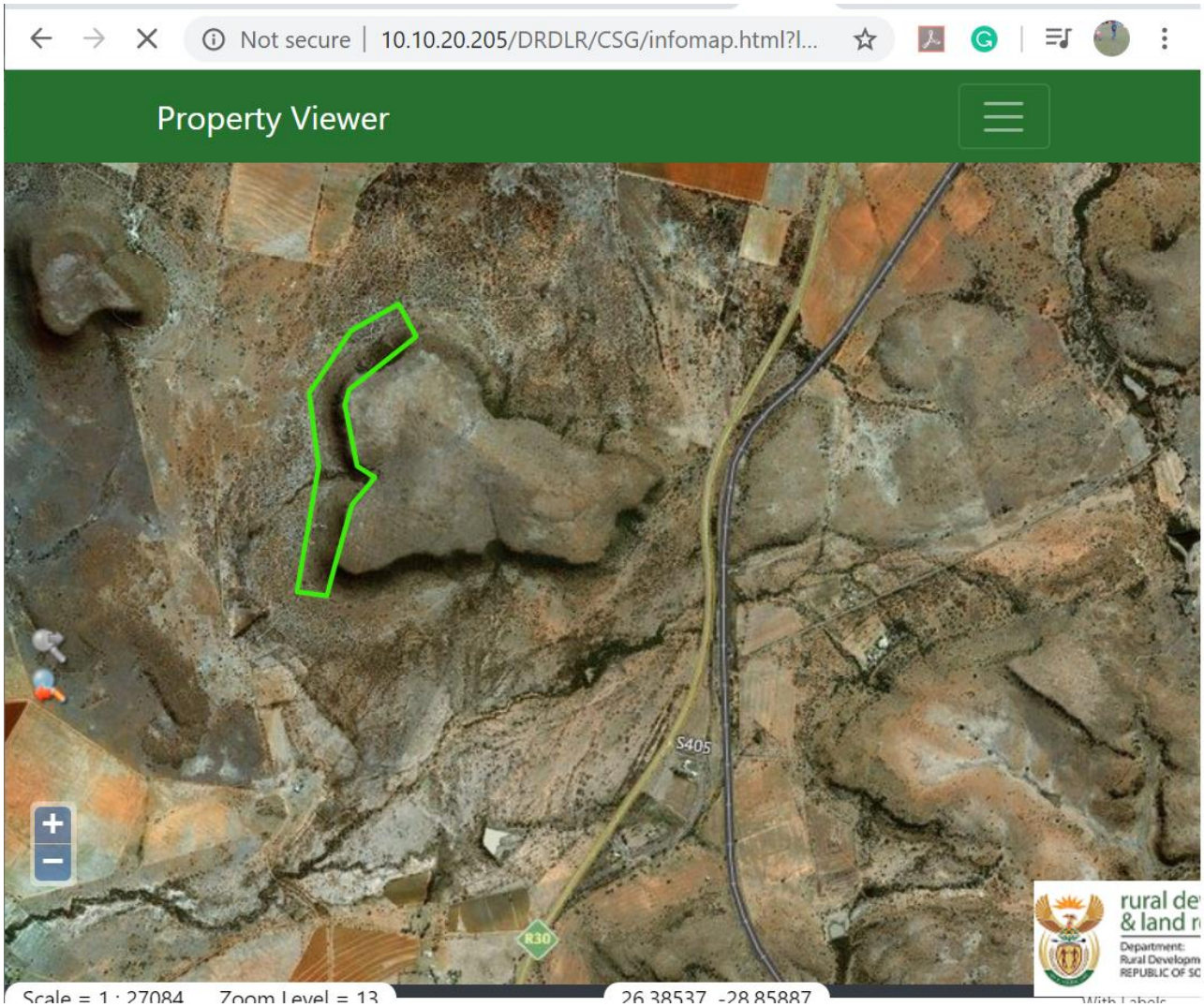

Figure 18: The Screen Zoomed To

8.3.2 Parametrised Viewer Process Flow

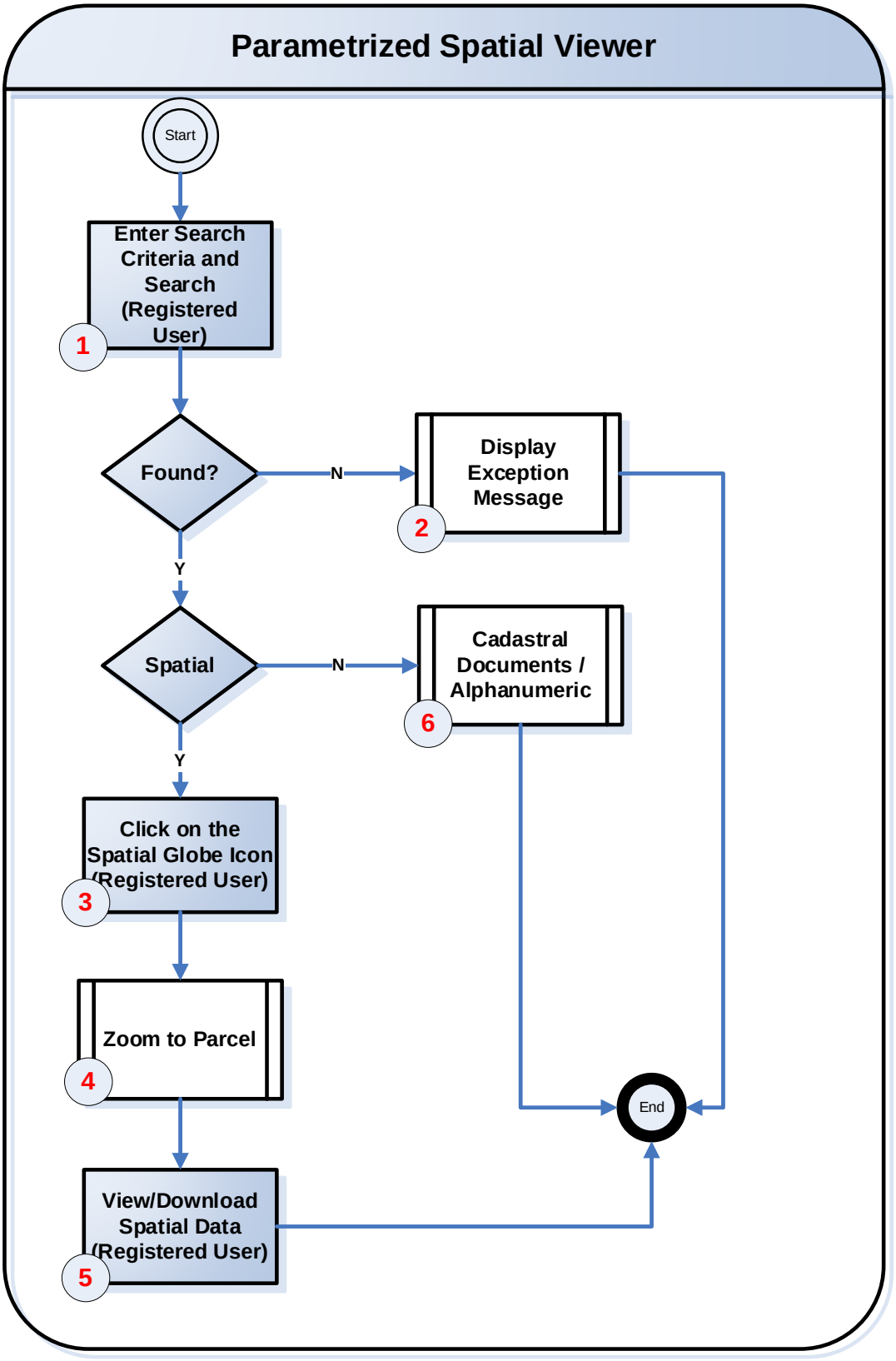

Figure 19: Parametrized Spatial Viewer Process Flow

8.3.3 Parametrised Viewer Action Node Description

Node #	Description	Information to Capture	User
1	At this node, the registered user shall select the search criteria they want to search with and enter the search parameters. This search shall be executed on the Information Management Module of the CIS. The system shall check if the information is available.	i. Number Search ii. Parcel Description iii. Sectional Title Search	Registered User
2	At this node, the information that the user was looking for cannot be found. The system shall display the relevant "information not found message" that is configured for exception handling at this point.		System
3	At this node, the system has identified that the record has spatial data. The system shows the search result on the search results table. The system also shows a globe icon against the record. The user needs to click on the globe icon to view the parcel from the spatial viewer.	Globe Icon (Click)	Registered User
4	The system would redirect the user to the spatial viewer. At this step, the system shall zoom to the parcel.		System
5	At this node, the registered user shall be on the spatial Viewer. as redirected from the Information Management Module. The user can view the information, use the spatial tools, and even download the spatial information if within the threshold.		Registered User
6	At this node, the information was cadastral documents or alpha numeric data. The user can download or view information if within the threshold.	View () * Download () *	Registered User

Table 16: Parametrised Viewer Action Node Description

8.4 Pre-packaged Data

8.4.1 Pre-packaged Data business rules

a) Pre-packaged data from a spatial perspective will be only shapefiles as per the scale of fees.
b) The process will not be the same as the one from the Information Management Module.
c) The pre-packaged data will not be downloaded from the Spatial but from the Information Management Module
d) The spatial component shall only run queries to
    i. Create
    ii. Update Spatial Data
    iii. Send Data based on Subscription timelines
e) The updates can be sent;
    i. Quarterly
    ii. Monthly
    iii. Weekly
    iv. Daily.
f) The pre-packaged data will be for the following.
    i. Images (cadastral documents based on type)
    ii. Spatial Data in shape file format
    iii. Alpha Numeric (Major Regions, Township Lists, Sectional Title Lists, General Plan Lists, Coordinate Lists, Farm name Lists.)
g) The data will be pre-packaged at the following spatial levels:
    i. National
    ii. Province
    iii. Admin District/Registration District
    iv. Municipality
    v. Township/Allotment
h) The pre-packaged data will be available for only registered users.
i) The system will apply the predefined size/count limit to restrict users from downloading the pre-packaged based on what was configured by the System Administrator.
j) Should the fee change the system will send the invoice to the user together with the Information, the offices will have to send a consolidated invoice at the end of the month to the subscribed users. However, the system will keep reports of all the Information that has been provided to clients.
k) The system shall prompt the user to subscribe to notification about updates on the data sets that they have requested. A User should be able to unsubscribe, A System administrator should be able to unsubscribe a user
l) The user will have to select the notification period for the updates.

9. Map Configurations

a) The Spatial Viewer Configurations will not be done via the spatial viewer/Information Management Module but will be done on GeoServer.

b) Below is an example of functions that can be configured by the relevant, technical user on GeoServer

i. Add layers

ii. Layer Grouping

iii. Cartography

c) The Administrative user that will do the map configurations needs extensive training on GeoServer Management.

d) The Screens below shows the typical Configuration steps on GeoServer

Step 1: Log In Screen

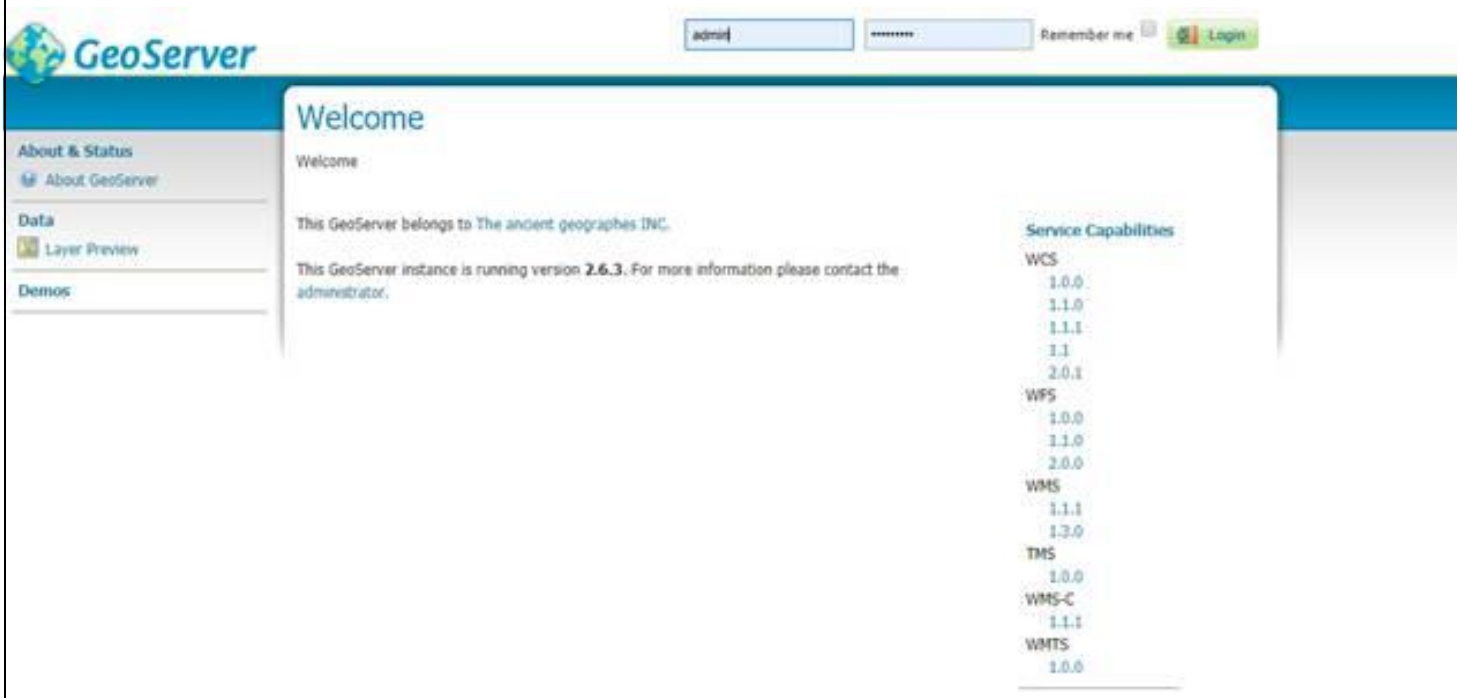

Figure 20 : Sample Configuration Log in Screen

Step 2: The Welcome Screen

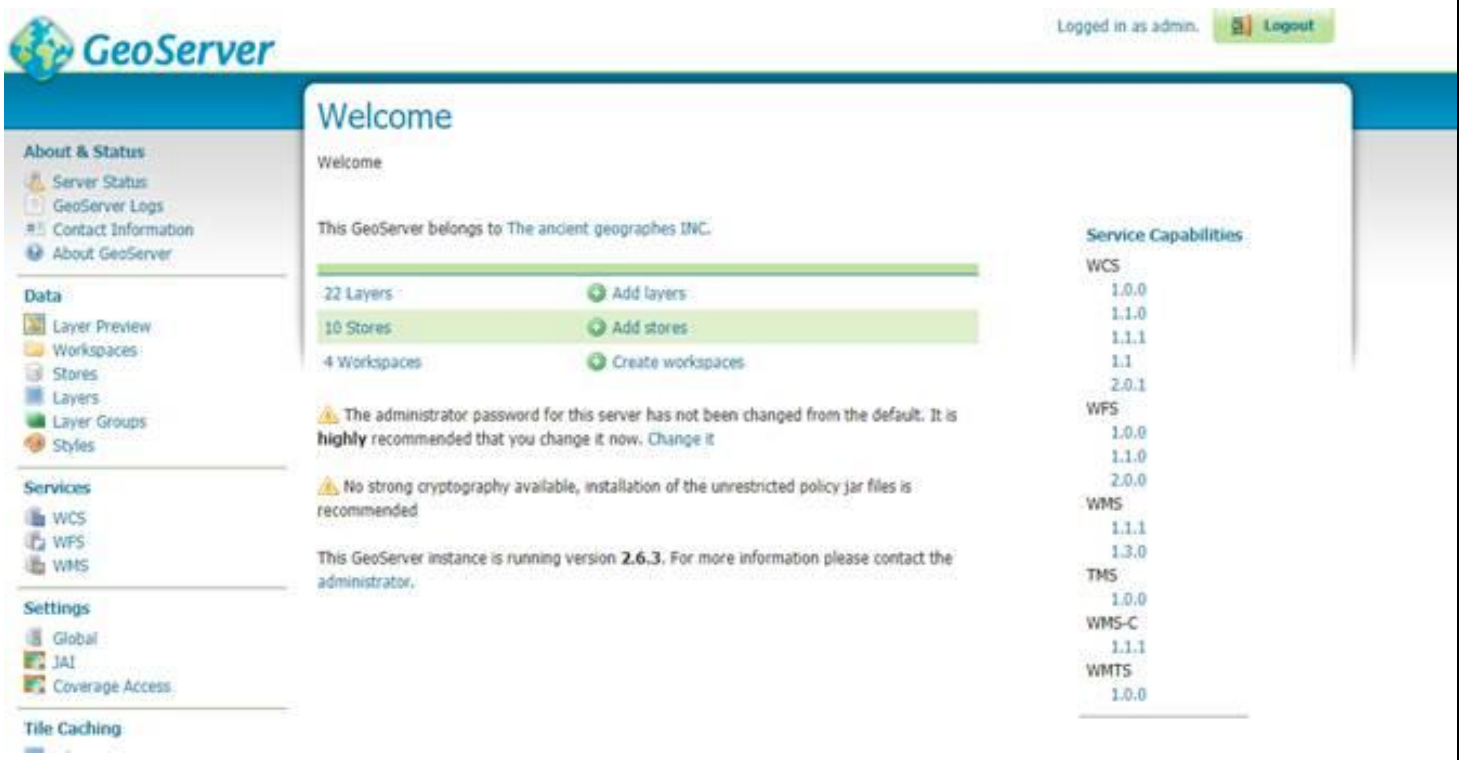

Figure 21: Sample Configuration Welcome Screen

Step 3: The Data Menu

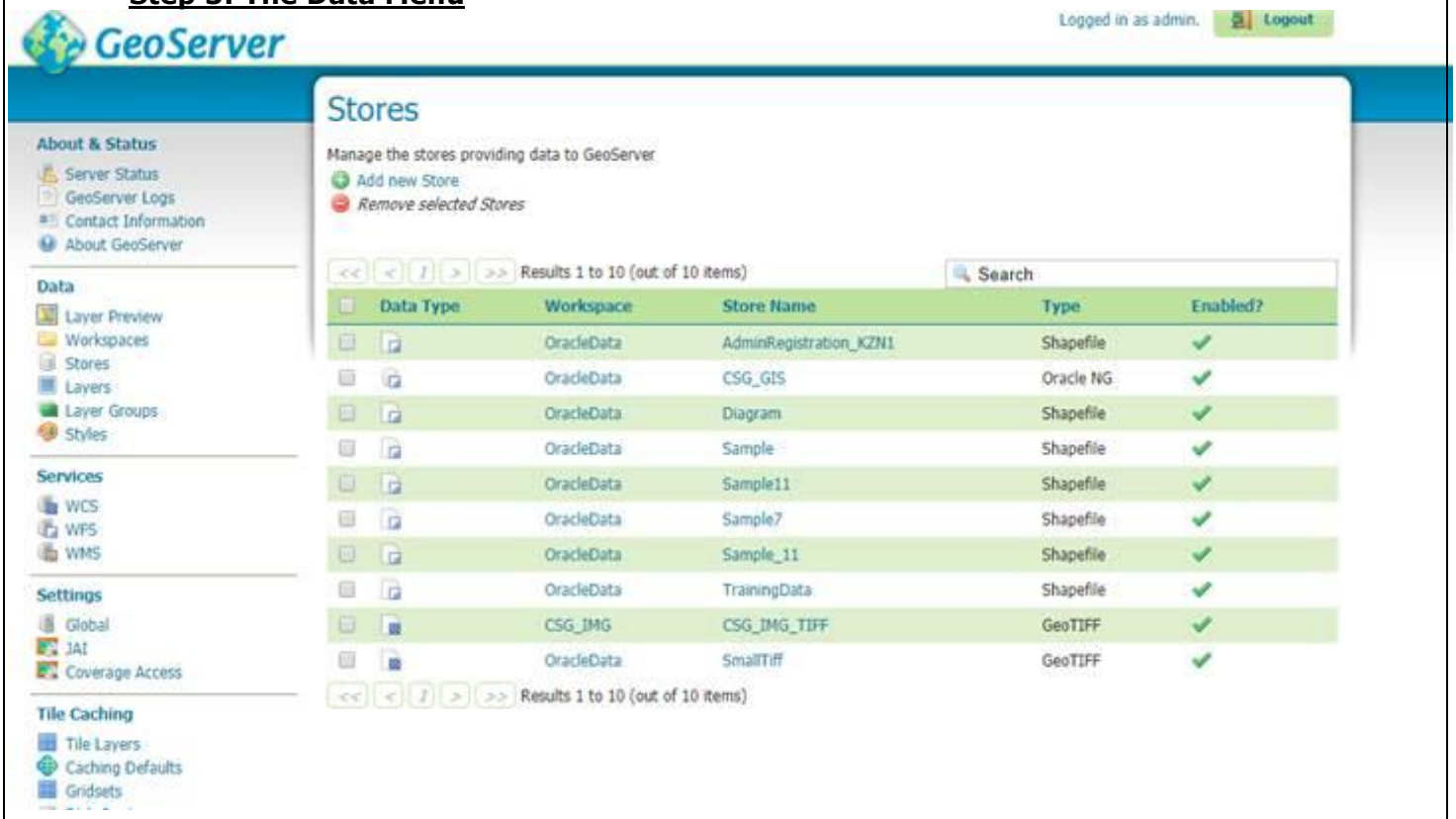

Figure 22:Sample Configuration Data Menu Screen

Step 4: Add New Data Menu

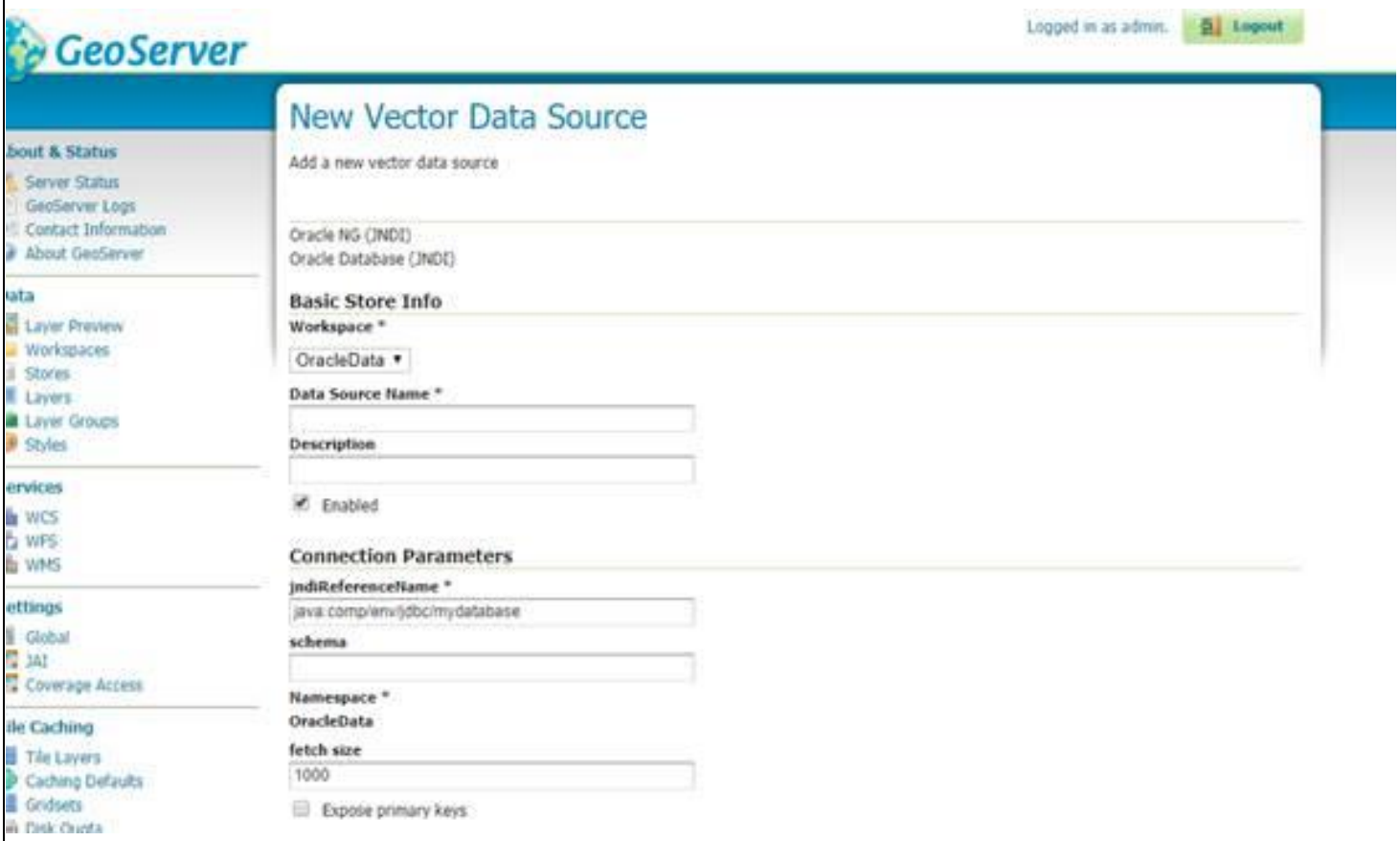

Figure 23:Sample Configuration Add New Data Menu

Step 5: View Published Layer

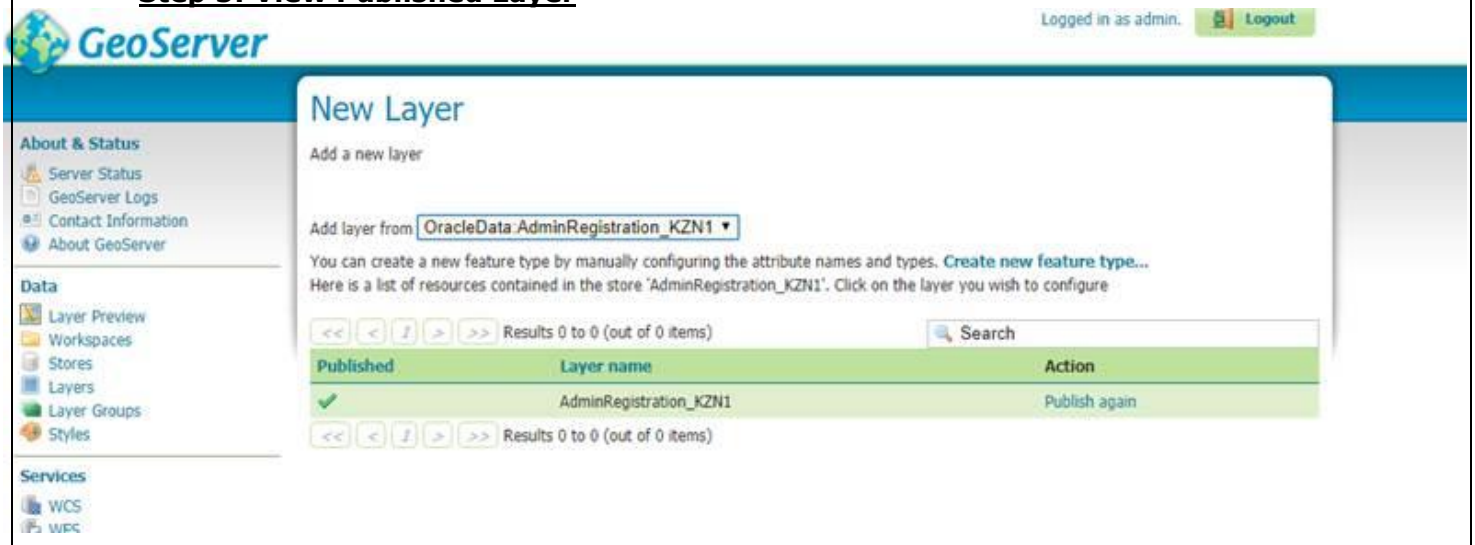

Figure 24:Sample Configuration View Published Layer

Step 6: Layer Styles

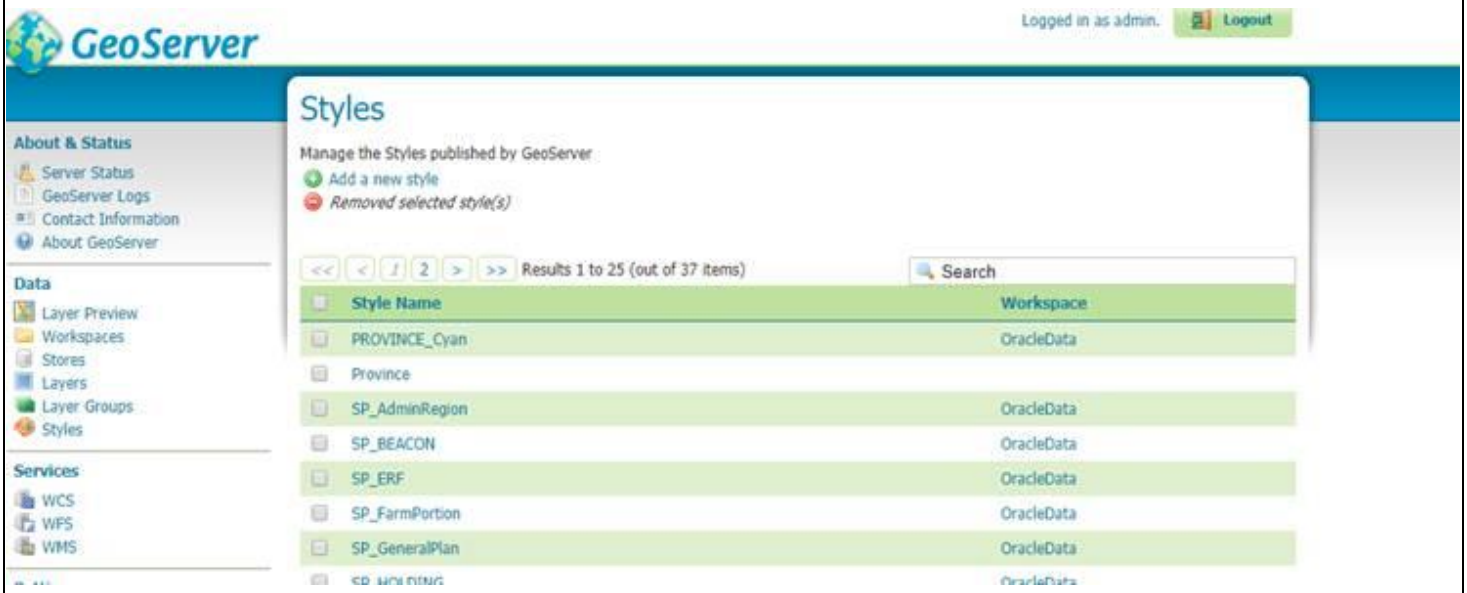

Figure 25:Sample Configuration Layer Styles

Step 7: Add New Layer Styles

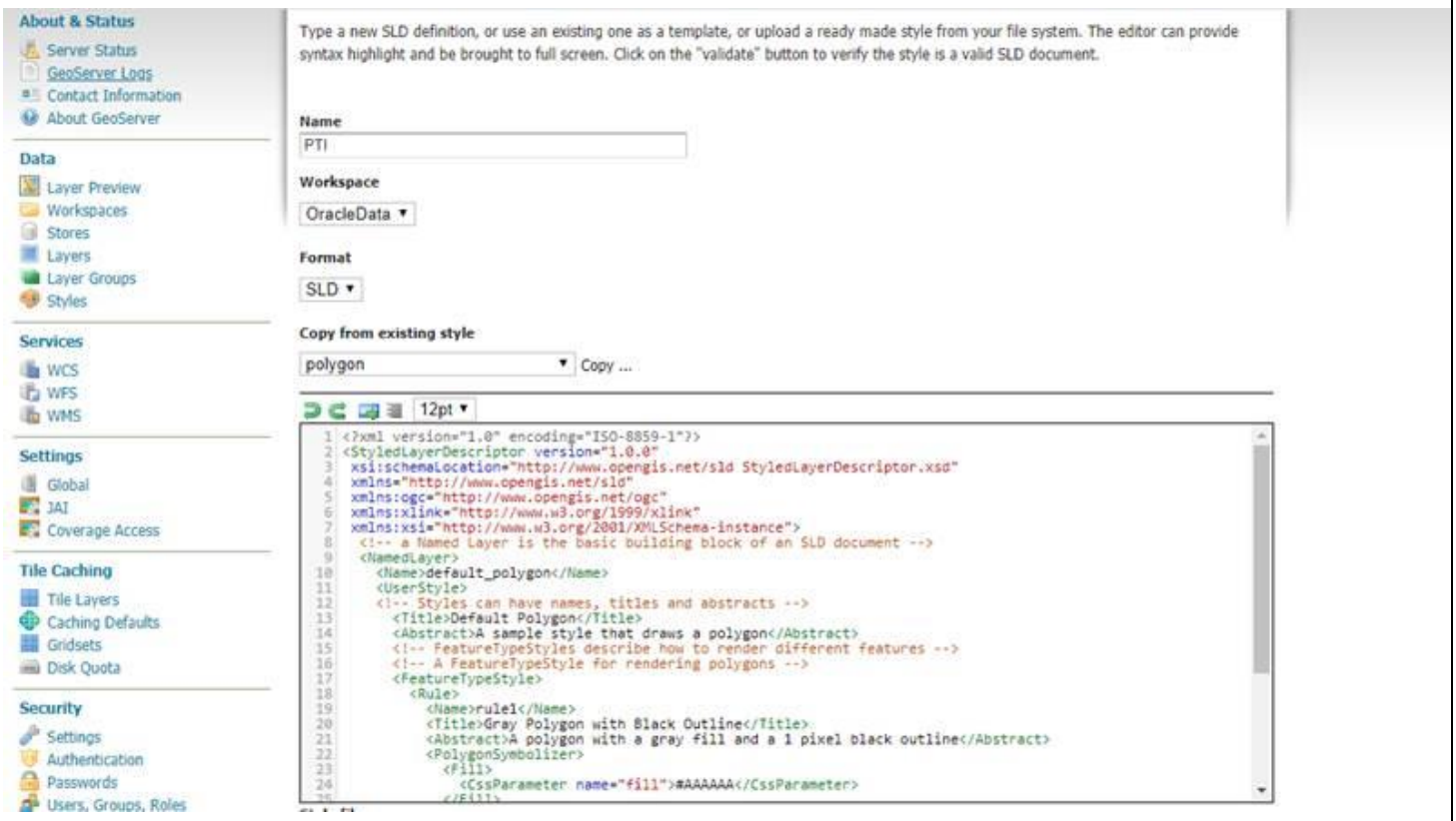

Figure 26:Sample Configuration Add New Layer Styles

Step 7: Preview of Layers click on Layers Preview in Data Menu: -

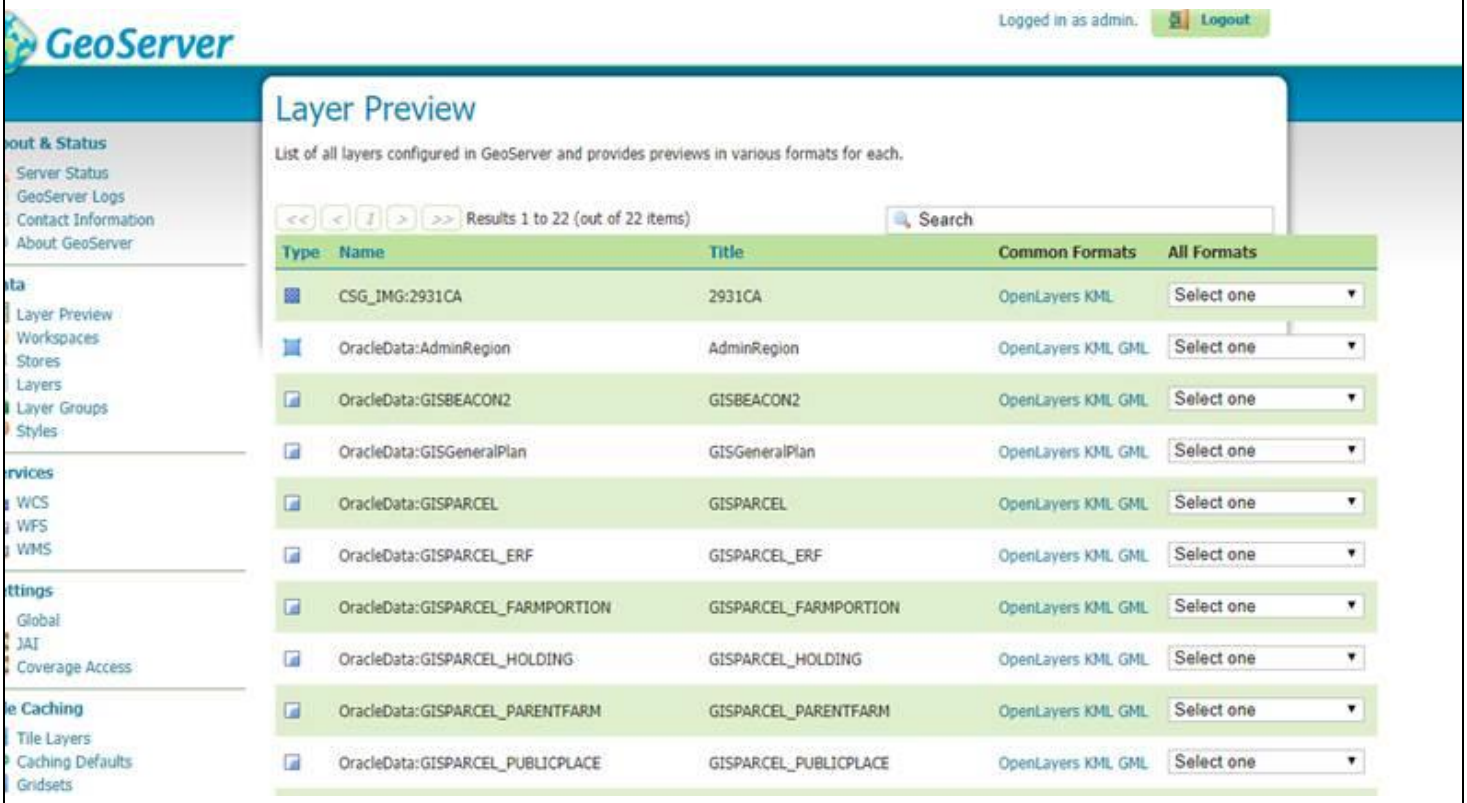

Figure 27:Sample Configuration Preview Layers in Data Menu

10. Integration

a) System integration is defined as the process of bringing together the component sub-systems into one system and ensuring that the subsystems function together. Below are the 3 critical subsystems that will be integrated with the Spatial Module:

i. Web Portal
ii. User Access Module
iii. Information Management Module (IM)

b) The subsystems mentioned above will be seamlessly integrated such that services shall be running in between them. Horizontal and online integration shall be used to achieve the communication between these systems listed above. The integration envisaged shall be bidirectional in nature. The following table enlists the various events that will be propagated through this integration.

Event Name	Source	Destination	Description
USER_INFO	User Access Management (UAM)	Web Portal IM Spatial Viewer	The event that is triggered to initiate get user information
SPATIAL_INFO	Spatial Viewer	Information Management	The events that will be triggered when a user interacts with the Spatial Viewer
SPATIAL_SINGLE	Spatial Viewer	Information Management UAM	The events that will be triggered when a user executes/ downloads information from the spatial
SPATIAL_BULK	Spatial Viewer	Information Management UAM	The events that will be triggered when a user executes bulk requests from spatial.
PARA_VIEW	Information Management	Spatial Viewer UAM	The events that will be triggered when a user executes searchers with spatial data from Information Management Module
SINGE_REQ	Information Management	Spatial Viewer UAM	The event triggered from the Information Management Modulefor single requests
BULK_REQ	Information Management	UAM Spatial Viewer	The event triggered from the Information Management Module for bulk requests

Table 17: Integration Touch Points

c) The typical information that will be sent between the subsystems will be the following :(although these still need to be unpacked on the integration document which is mostly done towards the end of a successful Implementation)

i. Requestor Information

ii. Request Category

iii. Request Subcategory

iv. Items*

v. LPI code(s),

vi. Output type,

vii. Layer name,

viii. Province,

d) Munsys Integration still needs to be further unpacked but it does not affect anything on the current release. The envisaged integration at that point can be one of the following:

1. **Option 1**

Oracle data tables that store spatial data will be made available to the Munsys software in a read-only mode.

2. **Option 2**

Data can be exchanged through services between two components

3. **Option 3**

Fully integrated solution with seamless interaction between two systems

This section will be updated based on further interactions with the project team and the technical team of MunSys.

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11. Reports

This section will detail what reports will be generated from Spatial Component. However, it is worth noting that the reports at spatial will be the same as the reports on the Information, User Access, and Web portal. There will be no standalone reports on the Spatial Viewer

a) **Statistical Report:** This is a report that shows all systems statistical data in terms of what data was requested by the users and the count thereof.

The template overleaf is a sample Statistical Report:

All the reports can be exported to the following document types as per the discretion of the user.

- Excel
- PDF

11.1.1 Sample Statistical Report

Statistical Report

Date: (01/11/2018-31/11/2018)
Province: (All)
Municipality: (All)

Job Description/Category	Province	Municipality	Sub divisional/ Unit	Number of requests
Preparation of certificates, Reports to court, Affidavits and Alphabetical Lists	Mpumalanga	All	Information Provision	10
Maps of the National Series	Mpumalanga	All	Information Provision	25
Digital Cadastral and Related Information	Mpumalanga	Emakhazeni Municipality	Information Provision	2
General plan list	Mpumalanga	All	Information Provision	40
Coordinate list	Eastern Cape	All	Spatial	20
Diagrams	Western Cape	All	Spatial	56
Arial Map	Eastern Cape	Alfred Nzo Municipality	Spatial	2

Sub Directorate / Unit: (All)
Type of Stats: Request
Request Category: (All)
Task Status: (All)

12. System Administration Module

System Administration refers to the upkeep, configuration, and reliable operation of computer systems; especially multi-user systems. The system administrator seeks to ensure that the uptime, performance, resources, and security of the computers they manage meet the needs of the users. To meet these needs, a system administrator may acquire, install, or upgrade computer components and software; provide routine automation; maintain security policies; troubleshoot; train or supervise staff; or offer technical support for projects. This section below will list the components of the system that the system Administrator should be able to configure and update. This will be done on the Information Management Module administration and not on the Spatial Component

Please note in the table below configure includes the following;

a. Create
b. Edit
c. Delete (soft delete)

Process(s)	Function	Process
Single Request	Configure Number of Features	1. Select the Category 2. Select Subcategory 3. Set Maximum Feature Count 4. Save
Bulk Request	Configure email content – e.g. Share View	1. Access the email configuration 2. Select the process node 3. Enter the email Content 4. Save

13. Annexures

13.1

Following are the attributes of the projected coordinate system (LO/WG):

Unit	Metre
Geodetic CRS	. ***Hartebeesthoek94*** – ***LatLon***
Datum	***Hartebeesthoek94*** *Datum*
Ellipsoid	WGS 84
Prime meridian	Greenwich

13.2 PROJ.4 Definitions used in this project

Band	Definition
Hartebeesthoek94 /Lo15	var LO15 = new ProjectedCoordinateSystem('LO15', 'EPSG:2046', '+proj=tmerc +lat_0=0 +lon_0=15 +k=1 +x_0=0 +y_0=0 +axis=wsu +ellps=WGS84 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs');
Hartebeesthoek94 / Lo 17	var LO17 = new ProjectedCoordinateSystem('LO17', 'EPSG:2047', '+proj=tmerc +lat_0=0 +lon_0=17 +k=1 +x_0=0 +y_0=0 +axis=wsu +ellps=WGS84 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs');
Hartebeesthoek94 / Lo 19	var LO19 = new ProjectedCoordinateSystem('LO19', 'EPSG:2048', '+proj=tmerc +lat_0=0 +lon_0=19 +k=1 +x_0=0 +y_0=0 +axis=wsu +ellps=WGS84 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs');
Hartebeesthoek94 / Lo 21	var LO21 = new ProjectedCoordinateSystem('LO21', 'EPSG:2049', '+proj=tmerc +lat_0=0 +lon_0=21 +k=1 +x_0=0 +y_0=0 +axis=wsu +ellps=WGS84 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs');
Hartebeesthoek94 / Lo 23	var LO23 = new ProjectedCoordinateSystem('LO23', 'EPSG:2050', '+proj=tmerc +lat_0=0 +lon_0=23 +k=1 +x_0=0 +y_0=0 +axis=wsu +ellps=WGS84 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs');
Hartebeesthoek94 / Lo 25	var LO25 = new ProjectedCoordinateSystem('LO25', 'EPSG:2051', '+proj=tmerc +lat_0=0 +lon_0=25 +k=1 +x_0=0 +y_0=0 +axis=wsu +ellps=WGS84 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs');
Hartebeesthoek94 / Lo 27	var LO27 = new ProjectedCoordinateSystem('LO27', 'EPSG:2052', '+proj=tmerc +lat_0=0 +lon_0=27 +k=1 +x_0=0 +y_0=0 +axis=wsu +ellps=WGS84 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs');
Hartebeesthoek94 / Lo 29	var LO29 = new ProjectedCoordinateSystem('LO29', 'EPSG:2053', '+proj=tmerc +lat_0=0 +lon_0=29 +k=1 +x_0=0 +y_0=0 +axis=wsu +ellps=WGS84 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs');

Hartebeesthoek94 / Lo 31	var LO31 = new ProjectedCoordinateSystem('LO31', 'EPSG:2054', '+proj=tmerc +lat_0=0 +lon_0=31 +k=1 +x_0=0 +y_0=0 +axis=wsu +ellps=WGS84 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs');
Hartebeesthoek94 / Lo 33	var LO33 = new ProjectedCoordinateSystem('LO33', 'EPSG:2055', '+proj=tmerc +lat_0=0 +lon_0=33 +k=1 +x_0=0 +y_0=0 +axis=wsu +ellps=WGS84 +towgs84=0,0,0,0,0,0,0 +units=m +no_defs');

13.3 Attributes and defining parameters of Projected Coordinate Reference Systems

The attributes and defining parameters for the projected coordinate reference systems (PCRS), referenced to the European Petroleum Survey Group (EPSG) Geodetic Parameter Registry, are as follows. Proj4 is the open-source library utilized for this project. The references below are included in this document to confirm that there are no material differences between Proj4 and the EPSG Geodetic Parameter Registry.

PCRS Name	**Hartebeesthoek94 / / Lo15**				
Identifier	EPSG::2046				
Aliases	Alias		Naming System	Remarks	
	New S African CS zone 15		EPSG alias		
Scope	Large and medium scale topographic mapping, cadastral and engineering survey.				
Remarks					
Area Description	Namibia - Walvis Bay.				
Derived From	*Base CRS Name*	Projected coordinate system			
	Base CRS Type	geographic 2D			
	Geodetic Datum	Projected coordinate system			
		Prime Meridian	Greenwich	0°E	degree
		Ellipsoid	WGS 84 — Alias(es): [WGS84]		
			Semi-Major Axis (a)	6378137	metre
			Inverse flattening	298.257223563	unity
Map Projection	*Name*	South African Survey Grid zone 15 — Alias(es): [S. African Grid zone 15, Lo15]			
	Operation Method	Transverse Mercator (South Orientated)			
		Is the operation reversible?	Yes		
	Conversion Parameters	Parameter Name	Parameter Value or Parameter File	Unit of Measure	Sign Reversal
		Latitude of natural origin	0°N	degree	No
		Longitude of natural	15°E	degree	No

		origin			
		Scale factor at natural origin	1	unity	No
		False easting	0	metre	No
		False northing	0	metre	No
Coordinate Axes	Order	Axis Name	Abbrev.	Unit of Measure	Orientation
	1	Westing	Y	metre	west
	2	Southing	X	metre	south

PCRS Name	**Hartebeesthoek94 / Lo17**				
Identifier	EPSG::2047				
Aliases	Alias			Naming System	Remarks
	New S African CS zone 17			EPSG alias	
Scope	Large and medium scale topographic mapping, cadastral and engineering survey.				
Remarks					
Area Description	South Africa - onshore west of 18°E.				
Derived From	*Base CRS Name*	Projected coordinate system			
	Base CRS Type	geographic 2D			
	Geodetic Datum	Projected coordinate system			
		Prime Meridian	Greenwich	0°E	degree
		Ellipsoid	WGS 84 — Alias(es): [WGS84]		
			Semi-Major Axis (a)	6378137	metre
			Inverse flattening	298.257223563	unity
Map Projection	*Name*	South African Survey Grid zone 17 — Alias(es): [S. African Grid zone 17, Lo17]			
	Operation Method	Transverse Mercator (South Orientated)			
		Is the operation reversible?	Yes		
	Conversion Parameters	Parameter Name	Parameter Value or Parameter File	Unit of Measure	Sign Reversal
		Latitude of natural origin	0°N	degree	No
		Longitude of natural origin	17°E	degree	No
		Scale factor at natural origin	1	unity	No
		False easting	0	metre	No
		False northing	0	metre	No
Coordinate Axes	Order	Axis Name	Abbrev.	Unit of Measure	Orientation
	1	Westing	Y	metre	west
	2	Southing	X	metre	south

PCRS Name	**Hartebeesthoek94 / / Lo19**			
Identifier	EPSG::2048			
Aliases	Alias	Naming System	Remarks	
	New S African CS zone 19	EPSG alias		
Scope	Large and medium scale topographic mapping, cadastral and engineering survey.			
Remarks				

Area Description	South Africa - onshore between 18°E and 20°E.				
Derived From	*Base CRS Name*	Projected coordinate system			
	Base CRS Type	geographic 2D			
	Geodetic Datum	Projected coordinate system			
		Prime Meridian	Greenwich	0°E	degree
		Ellipsoid	WGS 84 — Alias(es): [WGS84]		
			Semi-Major Axis (a)	6378137	metre
			Inverse flattening	298.257223563	unity
Map Projection	*Name*	South African Survey Grid zone 19 — Alias(es): [S. African Grid zone 19, Lo19]			
	Operation Method	Transverse Mercator (South Orientated)			
		Is the operation reversible?	Yes		
	Conversion Parameters	Parameter Name	Parameter Value or Parameter File	Unit of Measure	Sign Reversal
		Latitude of natural origin	0°N	degree	No
		Longitude of natural origin	19°E	degree	No
		Scale factor at natural origin	1	unity	No
		False easting	0	metre	No
		False northing	0	metre	No
Coordinate Axes	Order	Axis Name	Abbrev.	Unit of Measure	Orientation
	1	Westing	Y	metre	west
	2	Southing	X	metre	south

PCRS Name	**Hartebeesthoek94 / / Lo21**				
Identifier	EPSG::2049				
Aliases	Alias			Naming System	Remarks
	New S African CS zone 21			EPSG alias	
Scope	Large and medium scale topographic mapping, cadastral and engineering survey.				
Remarks					
Area Description	South Africa - onshore between 20°E and 22°E.				
Derived From	*Base CRS Name*	Projected coordinate system			
	Base CRS Type	geographic 2D			
	Geodetic Datum	Projected coordinate system			
		Prime Meridian	Greenwich	0°E	degree
		Ellipsoid	WGS 84 — Alias(es): [WGS84]		
			Semi-Major Axis (a)	6378137	metre
			Inverse flattening	298.257223563	unity
Map Projection	*Name*	South African Survey Grid zone 21 — Alias(es): [S. African Grid zone 21, Lo21]			
	Operation Method	Transverse Mercator (South Orientated)			
		Is the operation reversible?	Yes		
	Conversion Parameters	Parameter Name	Parameter Value or Parameter File	Unit of Measure	Sign Reversal
		Latitude of natural origin	0°N	degree	No

		Longitude of natural origin	21°E	degree	No
		Scale factor at natural origin	1	unity	No
		False easting	0	metre	No
		False northing	0	metre	No
Coordinate Axes	Order	Axis Name	Abbrev.	Unit of Measure	Orientation
	1	Westing	Y	metre	west
	2	Southing	X	metre	south

PCRS Name	**Hartebeesthoek94 / / Lo23**				
Identifier	EPSG::2050				
Aliases	Alias			Naming System	Remarks
	New S African CS zone 23			EPSG alias	
Scope	Large and medium scale topographic mapping, cadastral and engineering survey.				
Remarks					
Area Description	South Africa - onshore between 22°E and 24°E.				
Derived From	*Base CRS Name*	Projected coordinate system			
	Base CRS Type	geographic 2D			
	Geodetic Datum	Projected coordinate system			
		Prime Meridian	Greenwich	0°E	degree
		Ellipsoid	WGS 84 — Alias(es): [WGS84]		
			Semi-Major Axis (a)	6378137	metre
			Inverse flattening	298.257223563	unity
Map Projection	*Name*	South African Survey Grid zone 23 — Alias(es): [S. African Grid zone 23, Lo23]			
	Operation Method	Transverse Mercator (South Orientated)			
		Is the operation reversible?	Yes		
	Conversion Parameters	Parameter Name	Parameter Value or Parameter File	Unit of Measure	Sign Reversal
		Latitude of natural origin	0°N	degree	No
		Longitude of natural origin	23°E	degree	No
		Scale factor at natural origin	1	unity	No
		False easting	0	metre	No
		False northing	0	metre	No
Coordinate Axes	Order	Axis Name	Abbrev.	Unit of Measure	Orientation
	1	Westing	Y	metre	west
	2	Southing	X	metre	south

PCRS Name	**Hartebeesthoek94 / Lo25**				
Identifier	EPSG::2051				
Aliases	Alias			Naming System	Remarks
	New S African CS zone 25			EPSG alias	
Scope	Large and medium scale topographic mapping, cadastral and engineering survey.				
Remarks					
Area Description	South Africa - onshore between 24°E and 26°E.				
Derived From	*Base CRS Name*	Projected coordinate system			
	Base CRS Type	geographic 2D			
	Geodetic Datum	Projected coordinate system			
		Prime Meridian	Greenwich	0°E	degree
		Ellipsoid	WGS 84 — Alias(es): [WGS84]		
			Semi-Major Axis (a)	6378137	metre
			Inverse flattening	298.257223563	unity
Map Projection	*Name*	South African Survey Grid zone 25 — Alias(es): [S. African Grid zone 25, Lo25]			
	Operation Method	Transverse Mercator (South Orientated)			

		Is the operation reversible?	Yes		
	Conversion Parameters	Parameter Name	Parameter Value or Parameter File	Unit of Measure	Sign Reversal
		Latitude of natural origin	0°N	degree	No
		Longitude of natural origin	25°E	degree	No
		Scale factor at natural origin	1	unity	No
		False easting	0	metre	No
		False northing	0	metre	No
Coordinate Axes	Order	Axis Name	Abbrev.	Unit of Measure	Orientation
	1	Westing	Y	metre	west
	2	Southing	X	metre	south

PCRS Name	**Hartebeesthoek94 / Lo27**				
Identifier	EPSG::2052				
Aliases	Alias			Naming System	Remarks
	New S African CS zone 27			EPSG alias	
Scope	Large and medium scale topographic mapping, cadastral and engineering survey.				
Remarks					
Area Description	South Africa - onshore between 26°E and 28°E.				
Derived From	*Base CRS Name*	Projected coordinate system			
	Base CRS Type	geographic 2D			
	Geodetic Datum	Projected coordinate system			
		Prime Meridian	Greenwich	0°E	degree
		Ellipsoid	WGS 84 — Alias(es): [WGS84]		
			Semi-Major Axis (a)	6378137	metre
			Inverse flattening	298.257223563	unity
Map Projection	*Name*	South African Survey Grid zone 27 — Alias(es): [S. African Grid zone 27, Lo27]			
	Operation Method	Transverse Mercator (South Orientated)			
		Is the operation reversible?	Yes		
	Conversion Parameters	Parameter Name	Parameter Value or Parameter File	Unit of Measure	Sign Reversal
		Latitude of natural origin	0°N	degree	No
		Longitude of natural origin	27°E	degree	No
		Scale factor at natural origin	1	unity	No
		False easting	0	metre	No
		False northing	0	metre	No
Coordinate Axes	Order	Axis Name	Abbrev.	Unit of Measure	Orientation
	1	Westing	Y	metre	west
	2	Southing	X	metre	south

PCRS Name	**Hartebeesthoek94 / Lo29**			
Identifier	EPSG::2053			
Aliases	Alias		Naming System	Remarks
	New S African CS zone 29		EPSG alias	
Scope	Large and medium scale topographic mapping, cadastral and engineering survey.			
Remarks				
Area Description	South Africa - onshore between 28°E and 30°E.			
Derived From	*Base CRS Name*	Projected coordinate system		
	Base CRS Type	geographic 2D		

	Geodetic Datum	Projected coordinate system				
		Prime Meridian	Greenwich		0°E	degree
		Ellipsoid	WGS 84 — Alias(es): [WGS84]			
			Semi-Major Axis (a)	6378137		metre
			Inverse flattening	298.257223563		unity
Map Projection	*Name*	South African Survey Grid zone 29 — Alias(es): [S. African Grid zone 29, Lo29]				
	Operation Method	Transverse Mercator (South Orientated)				
		Is the operation reversible?		Yes		
	Conversion Parameters	Parameter Name		Parameter Value or Parameter File	Unit of Measure	Sign Reversal
		Latitude of natural origin		0°N	degree	No
		Longitude of natural origin		29°E	degree	No
		Scale factor at natural origin		1	unity	No
		False easting		0	metre	No
		False northing		0	metre	No
Coordinate Axes	Order	Axis Name		Abbrev.	Unit of Measure	Orientation
	1	Westing		Y	metre	west
	2	Southing		X	metre	south

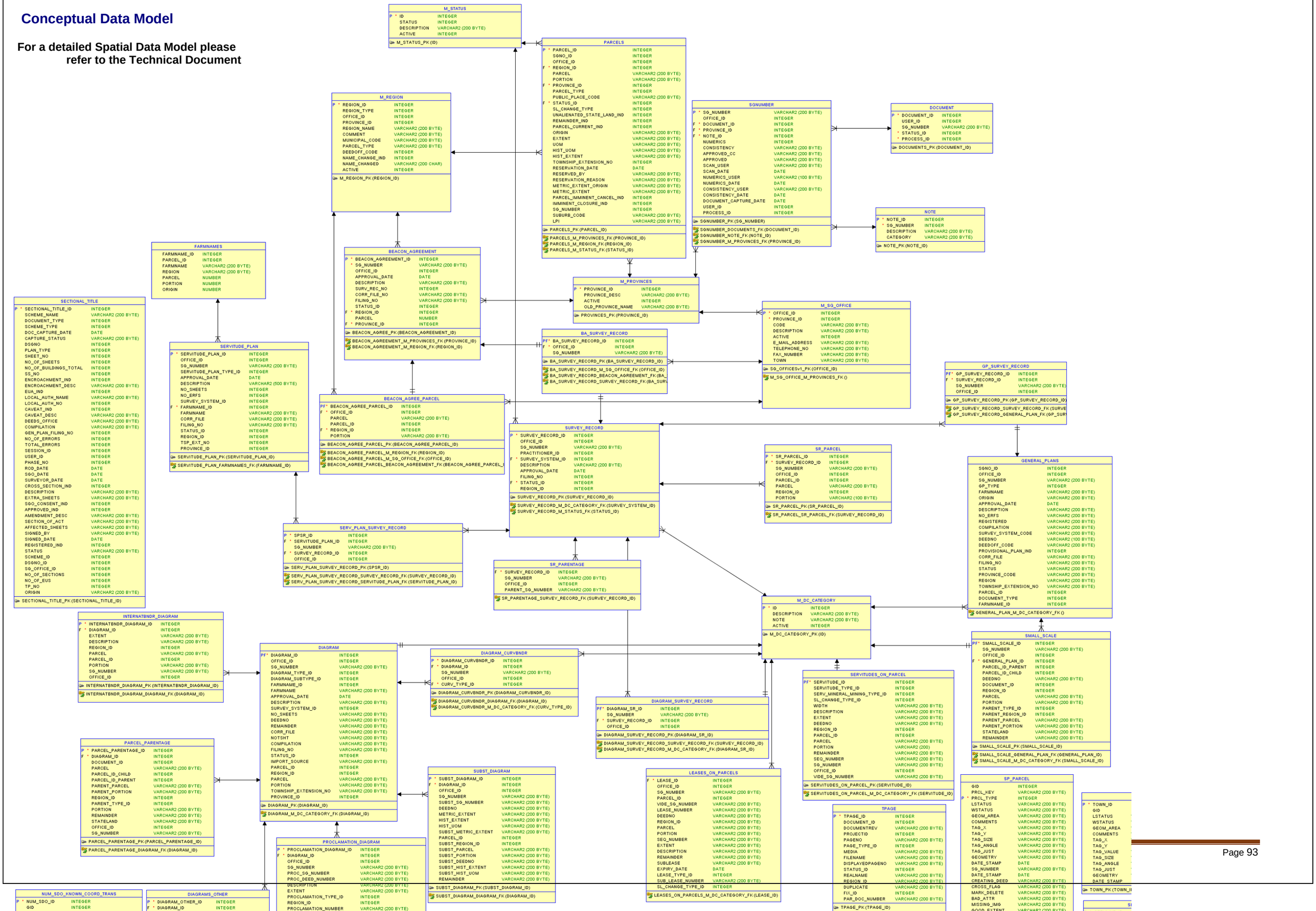
PCRS Name	**Hartebeesthoek94 / Lo31**				
Identifier	EPSG::2054				
Aliases	Alias		Naming System	Remarks	
	New S African CS zone 31		EPSG alias		
Scope	Large and medium scale topographic mapping, cadastral and engineering survey.				
Remarks					
Area Description	South Africa - onshore between 30°E and 32°E.				
Derived From	*Base CRS Name*	Projected coordinate system			
	Base CRS Type	geographic 2D			
	Geodetic Datum	Projected coordinate system			
		Prime Meridian	Greenwich	0°E	degree
		Ellipsoid	WGS 84 — Alias(es): [WGS84]		
			Semi-Major Axis (a)	6378137	metre
			Inverse flattening	298.257223563	unity
Map Projection	*Name*	South African Survey Grid zone 31 — Alias(es): [S. African Grid zone 31, Lo31]			
	Operation Method	Transverse Mercator (South Orientated)			
		Is the operation reversible?		Yes	
	Conversion Parameters	Parameter Name	Parameter Value or Parameter File	Unit of Measure	Sign Reversal
		Latitude of natural origin	0°N	degree	No
		Longitude of natural origin	31°E	degree	No
		Scale factor at natural origin	1	unity	No
		False easting	0	metre	No
		False northing	0	metre	No
Coordinate Axes	Order	Axis Name	Abbrev.	Unit of Measure	Orientation
	1	Westing	Y	metre	west
	2	Southing	X	metre	south

PCRS Name	**Hartebeesthoek94 / / Lo33**		
Identifier	EPSG::2055		
Aliases	Alias	Naming System	Remarks
	New S African CS zone 33	EPSG alias	

Scope	Large and medium scale topographic mapping, cadastral and engineering survey.					
Remarks						
Area Description	South Africa - east of 32°E.					
Derived From	*Base CRS Name*	Projected coordinate system				
	Base CRS Type	geographic 2D				
	Geodetic Datum	Projected coordinate system				
		Prime Meridian	Greenwich	0°E	degree	
		Ellipsoid	WGS 84 — Alias(es): [WGS84]			
			Semi-Major Axis (a)	6378137	metre	
			Inverse flattening	298.257223563	unity	
Map Projection	*Name*	South African Survey Grid zone 33 — Alias(es): [S. African Grid zone 29, Lo33]				
	Operation Method	Transverse Mercator (South Orientated)				
		Is the operation reversible?	Yes			
	Conversion Parameters	Parameter Name	Parameter Value or Parameter File	Unit of Measure	Sign Reversal	
		Latitude of natural origin	0°N	degree	No	
		Longitude of natural origin	33°E	degree	No	
		Scale factor at natural origin	1	unity	No	
		False easting	0	metre	No	
		False northing	0	metre	No	
Coordinate Axes	Order	Axis Name	Abbrev.	Unit of Measure	Orientation	
	1	Westing	Y	metre	west	
	2	Southing	X	metre	south	

Conceptual Data Model

For a detailed Spatial Data Model please refer to the Technical Document



13.4 Product and Services Mapping

Information Managmenet Services			Requestor								Search Criteria				Work flow			Paper Printing size			Format (Coversions)														Package						Delivery mode				
Category	Sub Category	Linked Sub Category	Internal user	Property Owner	General Public	Land Surveyors	3 Parties (Data Ver	Court of Order	Conveyensors	Town Planners	Filter	GIS Layers	Free Text	Supporting Docume	Division	Automated	Back office	A0	A3	A4	Excel	CSV	TXT file	JPEG	TIF	PDF	Shape file	DXF	DWG	KML	KMZ	Laminate	CD	DVD	CD-R	Hard Drive	SD card	e-mail (FTP)	e-mail attachment	Ordinary Mail	Courier	Collection
Images	images	Image links	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	IM	Y	Y							Y	Y	Y							Y	Y	Y	Y	Y	Y		Y	Y	Y
Spatial Data	Extraction of Data		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	IM	Y	Y										Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y		Y	Y	Y
Alpha Numeric	LPI Code & Town/Allotments list	General Plan List	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	IM	Y	Y			Y	Y	Y	Y			Y						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	General Plan List		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	IM	Y	Y			Y	Y	Y	Y			Y						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Cordinate List??			Y	X	Y	Y	Y	Y	Y	Y	Y	Y	Y	IM	Y	Y			Y	Y	Y	Y			Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Sectional Title List		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	IM	Y	Y			Y	Y	Y	Y			Y						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Parcel list		Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	IM	Y	Y				Y	Y	Y									Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Certificates	Certified Copies	registration copy and true copy		X		Y		Y	Y	Y			Y	Y	IM		Y		Y	Y						Y												Y	Y	Y		
	Closure	Park Closure		Y		Y			Y	Y			Y	Y	IM		Y			Y				Y	Y	Y						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Street Closure		Y		Y			Y	Y			Y	Y	IM		Y			Y				Y	Y	Y						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Status Report(white,pink and final certificate)		Y		Y			Y	Y			Y	Y	IM		Y			Y				Y	Y	Y						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Certificate of remainder	GIS view (shape file) Less than 5MB		Y		Y		Y	Y	Y		Y	Y	Y	IM	Y	Y			Y						Y	Y	Y	Y	Y	Y							Y	Y	Y	Y	Y
	Confirmation of Jurisduction Boundaries	GIS view (shape file) Less than 5MB	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	IM		Y			Y						Y	Y	Y	Y	Y	Y							Y	Y	Y	Y	Y
Proffessional Services	Advisory Services	All of the above		Y		Y		Y	Y	Y		Y	Y	Y	PA's		Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
NGI DATA:																																											
	Hard copy	Maps	Y	Y	Y	Y	Y	Y	Y	Y					MS		Y	Y	Y	Y												Y								Y	Y	
		Imagery (aerial photos etc)	Y	Y	Y	Y	Y	Y	Y	Y					MS		Y	Y	Y	Y												y								y	y	
	Digital copies	Image Less than 5MB	Y	Y	Y	Y	Y	Y	Y	Y					MS		Y							Y	Y	Y			Y	Y			Y	Y	Y	Y	Y	Y	Y		Y	Y	
		Bulk Images	Y	Y	Y	Y	Y	Y	Y	Y					MS		Y							Y	Y	Y							Y	Y	Y	Y	Y	Y	Y		Y	Y	
	Vector Data	Grids	Y	Y	Y	Y	Y		Y	Y		Y			IM								Y				Y	Y	Y	Y		Y	Y	Y	Y	Y			Y	Y	Y
		roads,railways	Y	Y	Y	Y	Y		Y	Y		Y			IM						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		25M interval	Y	Y	Y	Y	Y		Y	Y		Y			IM						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		5M contours (geographical,projection)	Y	Y	Y	Y	Y		Y	Y		Y			IM						Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		Projected 5M contours (charges per degree square on DXF)	Y	Y	Y	Y	Y		Y	Y		Y			IM												Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Trigs and Town Survey Mark(TSM) list	TSM	Y	Y	Y	Y	Y		Y	Y		Y			IM												Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
		TRIG	Y	Y	Y	Y	Y		Y	Y		Y			IM												Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	DEM (Digital Elevation Model)	50 M and 100M interval	Y	Y	Y	Y	Y		Y	Y		Y			IM						Y	Y		Y	Y	Y	Y	Y	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Red: To be Confirmed
Green: Mandatory
Yellow Highlight: Updat
Embor: Frequent User
X: Restricted
Y: Yes Applicable
MS:MAP SALES

Filtters
Province
Municipality
Town
Images: Document Sub-type

GIS Layers
Servitudes
Registered
State Land
Farms
Portions
etc.

13.5 Sample Map Template

(This a department provided template and will be replicated as best as possible utilizing the open source technology stack available to this project)