



InterPARES 2 Project

International Research on Permanent Authentic Records in Electronic Systems

Title: Case Study 24 Final Report:
City of Vancouver Geographic Information
System (VanMap)

Status: Final (public)

Version: 3.0

Submission Date: September 2005

Release Date: September 2007

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Project Unit: Focus 3

URL: http://www.interpares.org/display_file.cfm?doc=ip2_cs24_final_report.pdf

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Version Control

Date	Version	Notes	Individual
2004 Sep 20	Draft, v1.0	Interim report	Evelyn McLellan
2005 Sep 08	Final, v2.0	Final report	Evelyn McLellan
2006 Aug	Final, v3.0	Review and edit; addition of section G	Randy Preston

A. Case Study Overview

Case study team

The VanMap case study, approved by the InterPARES 2 International Team at its meeting in March, 2004, is led by Evelyn McLellan, formerly an archivist at the City of Vancouver Archives.¹ The following individuals comprised the case study team:

From the City of Vancouver:

- Jonathan Mark, Manager of GIS, Information Technology Department
- Reuben Ware, Director, Records and Archives Division
- Liz Wright and Glenn Dingwall, Corporate Records Administrators, Records and Archives Division
- Andrew Power, Corporate Information Analyst, Records and Archives Division
- Sue Bigelow, Conservator, Records and Archives Division

From the InterPARES Project:

- Luciana Duranti, Project Director
- Eleanor Kleiber, Research Assistant
- Catherine Miller, Research Assistant

From Artefactual Systems, Inc.:

- Peter Van Garderen, President/Consultant

Introduction to VanMap

VanMap is a Web-based map system maintained by the City of Vancouver's Information Technology Department. The VanMap data are supplied and updated on a regular basis by various City departments and to a much lesser extent by other government agencies and utility companies. Nearly all of the data in VanMap are made accessible to City staff in all departments via the City's intranet. A subset of the data is also made directly available to the public via the City's Web site; however, the fundamental purpose of VanMap is to meet the needs of internal users in providing services to Vancouver's citizens and businesses. Please note that unless otherwise stated, the features described in this report refer to the internal version (or "staff version") of VanMap.

VanMap is used to support a variety of core functions of City departments, particularly related to zoning, development permit approval and other city planning activities; business license approval; emergency planning; water service and sewer management; utilities management; traffic control; designation of heritage areas; management of city-owned properties; street maintenance; and numerous other functions. VanMap is an interface that connects and integrates discrete departmental activities into a useable whole. It is essentially a reference tool, created for the purpose of allowing staff to have a detailed visual realization of the City at their fingertips as they carry out a variety of business tasks.

The data in VanMap are constantly being updated, with the frequency of the updates varying

¹ As of July, 2005, Corporate Information Analyst at the Insurance Corporation of British Columbia.

considerably, and interaction with the system by the end user is dynamic and experiential. These aspects present significant conceptual and technical challenges relating to the need both to ensure that the City government can be held accountable for the way in which the data are used, and to preserve the authenticity of the data and the experience of accessing them in the form of interactive maps.

B. Statement of Methodology

Documentation relating to the VanMap project was gathered and analyzed to gain an understanding of how the system was developed, why certain data are included, which data are used to support specific City functions, what rights and security issues affect dissemination and use of the data, and what metadata are used. The documentation included reports to City Council; implementation plans; VanMap Team meeting minutes; consultants' usability studies and training materials; and information about the data from VanMap's data sheets.

The primary information gathering method was a series of interviews of the system's creators (the VanMapTeam), training personnel and users. The VanMap Team consists of Jonathan Mark, Head of GIS; Meng Li, Computer Programmer/Analyst; Dan Campbell, Graphics Planner, Community Services Group (CSG); Kimberley Shield, Systems Coordinator, Community Services Group; and Martin Tilt, Analyst, GIS Support, Engineering Services. The users interviewed were staff in the Community Services Group Enquiry Centre; these users deal extensively with permit and license applications and respond to requests for property information from the public.

The interview questions were based on the 23 InterPARES 2 research questions. They were formulated by Evelyn McLellan, Eleanor Kleiber and Catherine Miller and were reviewed and approved by Luciana Duranti and Jonathan Mark. The interviews were all conducted on-site at the City of Vancouver and recorded onto digital audiotape. The tapes were then transcribed by Eleanor Kleiber and Catherine Miller. Analysis of the interview transcripts is complete and responses to the 23 questions have been prepared for this report.

C. Context of Digital Entity Creation and Management

Provenancial context

The creating body is the City of Vancouver, a municipal corporation governed by an elected mayor and council. The civic administration consists of various departments, agencies, boards and commissions² responsible for delivering government services to citizens living within the geographical boundaries of the City of Vancouver. Responsibility for VanMap rests with the Manager of GIS in the Application Development Division of the Information Technology Department, which is part of the Corporate Services Group.

Most of the responsibilities of the City, which are reflected in VanMap or which are affected by the use of VanMap, are listed below under the departments or service groups that administer them:

² See Appendix 3 for selected organizational charts for the City of Vancouver.

Community Services Group (CSG)

- planning and zoning functions
- building permit approval
- licenses and inspections
- animal control
- administration of community and youth centres
- administration of civic theatres and other cultural facilities
- acquisition and maintenance of public artworks
- building and maintaining non-market (social) housing

Engineering Services

- maintenance of roads, traffic signs and lights, water mains, sewers, electrical systems and street lighting, and other infrastructure
- utilities management
- transportation planning
- solid waste collection and disposal
- regulation of parking

Corporate Services Group (Real Estate Services, Facility Design and Management, Risk and Emergency Management)

- administration of civic properties
- property tax collection
- emergency preparedness planning

Board of Parks and Recreation

- acquisition and administration of parks and recreational facilities

Vancouver Police Department

- provision of police services

Fire and Rescue Services

- provision of fire prevention and suppression services and other emergency services

Juridical-administrative context

The City's authority is derived from the *Vancouver Charter* [SBC 1953, chapter 55], a provincial statute establishing the City as a corporate body and delegating most of its powers. Certain of the City's activities and agencies are also subject to other provincial legislation, including the following:

- *Assessment Act* [RSBC 1996 chapter 20]. This Act mandates the procedures by which the BC Assessment Authority produces property assessments in the province. The City of Vancouver collects property taxes based on these assessments.
- *Emergency Program Act* [RSBC 1996 chapter 11]. This Act sets out the role of local governments in emergency preparedness and delegates authority to provide for the necessary procedures to plan and respond to emergencies and disasters.

- *Freedom of Information and Protection of Privacy Act* [RSBC 1996 chapter 165].
- *Police Act* [RSBC 1996 chapter 367]. This Act makes municipalities with populations over 5,000 responsible for policing and provides for the establishment of municipal police boards.
- *Waste Management Act* [RSBC 1996 chapter 482]. This Act sets the standards and regulations for sewage treatment, contaminated sites, biomedical wastes and the management of solid wastes in the province.
- *Water Act* [RSBC 1996 chapter 483]. This Act can place restrictions on the construction or operation of a Municipal Water Utility.
- Vancouver City Council exercises authority by passing resolutions and by-laws.³ The latter, which can only be amended by other by-laws, may be used to govern the activities of Vancouver's citizens in certain matters. For example, failure to apply for a permit for a house renovation may be an infraction of the Building By-law or the Zoning By-law, and cutting down a tree may be an infraction of the Private Property Tree By-law.
- The City of Vancouver Archives, part of the Records and Archives Division within the Office of the City Clerk, is the official repository for records created and received by the City in the course of carrying out its mandated functions. The Archives' authority to acquire and preserve the City's records is established by By-law 9067 (Records Management By-law).

Procedural context

The VanMap Team, headed by the Manager of GIS, is the body that makes decisions about VanMap's content. The VanMap team includes two representatives from the Community Services Group and one from Engineering Services, the two largest contributors to VanMap. Departmental requests for adding data to VanMap from Community Services and Engineering Services are funnelled through their representatives on the VanMap Team. Inclusion of other data occurs through a process of negotiation with the departments involved. In some cases, the initiative for including new data (or new functionalities) comes from the department, while in others it comes from the VanMap Team.

Because the data are supplied by City departments rather than by external agencies,⁴ there are no legal agreements covering which data are included in VanMap. The decision to include data is usually an informal process, and is often the result of verbal communications with the VanMap Team.

The VanMap Team establishes, in negotiation with the departments, the administrative and technological processes by which the data will be included in VanMap. The Team also decides how the data will be organized and presented in VanMap, and what new functionalities may be

³ The Board of Parks and Recreation, a locally elected public body deriving its authority from the Vancouver Charter, also passes by-laws.

⁴ In cases where external data are included in VanMap, the data are originally supplied from the external agency to a City department, and the department in question is considered the data owner, holder and/or supplier for VanMap purposes. See section D, questions 10 and 21.

incorporated into the system to allow the data to be viewed and manipulated in different ways by end users.

Documentary context

Because VanMap is the responsibility of the Information Technology Department, technically the records should belong to the Corporate Services Group funds. However, VanMap does not simply draw on one pool of data that is administered by the IT Department. Some of the data are in fact viewed within systems that are created and administered by other departments, with the GIS viewing software acting as a portal.

Fortunately, the VanMap Web site includes data sheets listing, at varying levels of detail, the types of data, their origins and the means by which they are included in VanMap. These metadata are discussed later in this report.

There is as yet no classification scheme applied to the City's electronic records. In fact, the classification scheme to be applied to paper records is still under development.

Technological context

VanMap is a Web-based system that enables GIS and other data on the City of Vancouver to be presented to the end user in the form of interactive maps. Most of the geospatial data reside in a central Oracle9i Spatial database (hereafter referred to as Oracle Spatial), the corporate GIS; the textual data, viewed by the end user as labels, pop-up text boxes and tabular reports, reside partly within Oracle Spatial and partly within distributed systems administered by various departments of the City. All the data are drawn together to present highly detailed visualizations of the City's geography and infrastructure. The technical components of VanMap are discussed in detail in section D, particularly in questions 4 and 5.

D. Addressing the 23 Core Research Questions

1. What activities of the creator have you investigated?

The activities investigated were mainly related to the creation of VanMap and its use by City staff and the public. The activities that created the data themselves were investigated only to a very limited extent, and only to determine such matters as why certain data are included in VanMap or whether the data might be considered by the VanMap Team to be accurate and reliable.

2. Which of these activities generate the digital entities that are the objects of your case study?

The administrative processes of deciding which data to include, how to group and present them and which technical processes to use, determine the final form of VanMap. If the interactive maps and reports are considered to be the digital entities, then these are the activities that can be said to generate the digital entities. If the digital entities are defined as the data themselves, however, then the activities that generated them have not been studied.

3. For what purposes(s) are the digital entities you have examined been created?

The main purpose of VanMap is to pull together a diverse array of data relating to the geography, streets, parks, infrastructure and public and private properties in Vancouver to provide an interactive, graphical representation of the data that allows the end user to see how the various features of the City relate to one another. The purpose is to provide the user with instant access to this information to support various functions of the civic government, such as permit and license administration, by-law enforcement, property tax collection, management of civic properties, infrastructure planning and maintenance, utilities management, traffic control, emergency planning, and provision of property-related information to citizens.

4. What form do these digital entities take?

VanMap home page

The VanMap home page (Figure 1) is the main page from which VanMap is launched, and also includes links to the data sheets ("About the Data" and "Layers"), information for first time users, and announcements (clicking on this feature opens a list of announcements of new features and functionalities going back to January, 2003).

Data sheets

The data sheets, which can be reached from the home page or from the VanMap toolbar, contain information about layers, layer groups, reports and functionalities (Figure 2.). Links to the departments responsible for the data are also provided.

VanMap staff edition

Contact Us

VanMap Home Start VanMap First Time Users Announcements

Documentation Index

ABCDEFGHIJKLMNOPQRSTUVWXYZ

About the Data

Layers

Join the VanMap Staff Users list

Welcome to VanMap Staff Edition v5!

VanMap now includes the proposed ward boundaries and the voting places for the October 16 vote.

VanMap is the City's answer to providing staff with quick and easy access to Vancouver's map based information. You can view, query, print, annotate, view reports, copy and even e-mail a map!

Use the alphabetical list on the left to help you use VanMap. For example, if you would like to know more about owner/address notification reports, click on R then reports or, click on O and then owner/address notification report. Everything you need is contained in this list.

VanMap is updated weekly. Click [here](#) to go to the **About the Data** page for more information or click the link in the sidebar.

Note: VanMap shows a snapshot of the City's geographic data maintained by other applications; it also includes data owned and maintained by other agencies, including City of Burnaby, First Nations, Provincial government, Federal government, or Crown agencies.

[\[top\]](#)

Figure 1. VanMap Web site home page

VanMap staff edition

Contact Us

VanMap Home Start VanMap First Time Users Announcements

Documentation Index

ABCDEFGHIJKLMNOPQRSTUVWXYZ

About the Data

Layers

Water Hydrants, Water Hydrant Labels

Layer name:	Water Hydrants, Water Hydrant Labels
Group name:	Water
Scale:	1:10,000 Labels at 1:5000
Data currency status:	Data is updated on an ongoing basis in Oracle Spatial. These changes are reflected immediately in VanMap.
Responsible department/branch:	Engineering, Waterworks
Definition:	Hydrants are all fire hydrants (except the Dedicated Fire Protection System) that are connected to the City of Vancouver's water network. The VanMap label for Hydrants displays the Hydrant Number (Old Map Number + Hydrant Number), Hydrant Type, and the Offset in metres from the hydrant to its control valve. Hydrant types include COMPRESSION, FLUSH, SLIDE GATE and STANDPIPE. For more Waterworks information, click here .

Figure 2. VanMap data sheet example

Interactive maps

The maps appear in .mwf or “map window files.” When the user zooms into a specific scale, the legend shows the user all the data layers available at that scale. The map, plus the list of layers, constitutes the map window file, a sort of container that defines which layers are to be included in that particular instantiation of VanMap.

Initial view

Figure 3 shows the initial view of the staff version of VanMap, before any zooming or selecting of layers has taken place.

Legend

The user may then zoom into specific areas of the map and select which layers to turn on or off by clicking in the appropriate boxes in the legend. The further the user zooms in, the more layers become available. Figure 4 shows an excerpt of the legend that appears on the left margin of the page whenever VanMap is being used.

The user may choose to view all Public Places layers by clicking on Public Places, or may choose instead to click on and view only one or several layers in the list. The layer groups in the legend can be collapsed and expanded by double-clicking the image of the stack of pages.

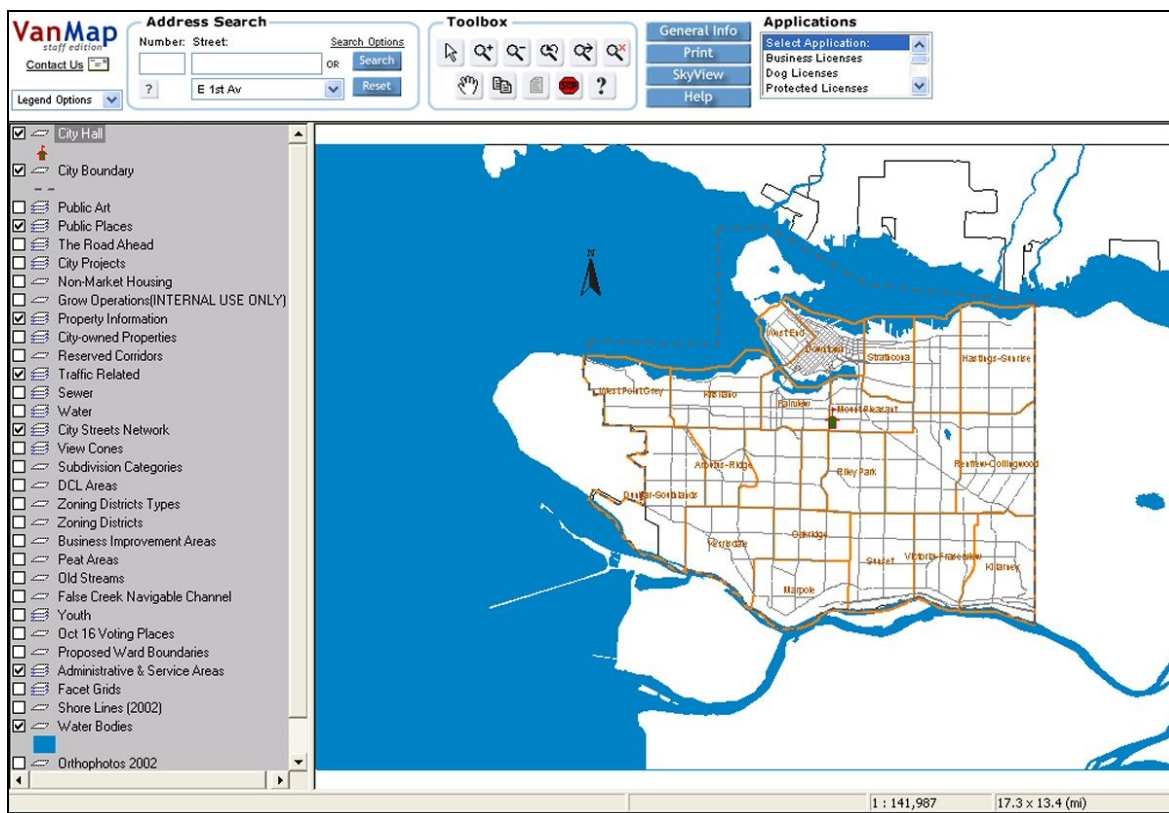


Figure 3. VanMap map viewer page



Figure 4. VanMap legend excerpt

Toolbar

The user clicks on various features of the toolbar (Figure 5) to zoom in and out, move to other map locations and copy and print maps. The user may also use the Address Search screen to move the map view to a certain address. The Applications scroll-box on the right hand side opens up reports on specific addresses or features (the same can be accomplished by double-clicking a centroid, icon or other feature on the map).

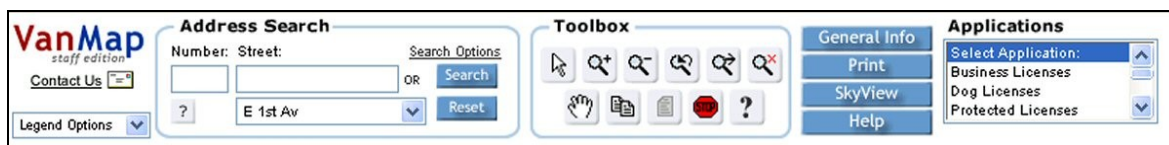


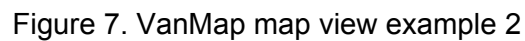
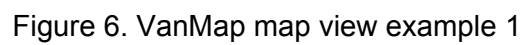
Figure 5. VanMap toolbar

Map views

On a map view, a layer is represented by a single spatial feature such as a line, point, polygon or icon. Layers are like transparencies that can be stacked on top of each other to render a detailed visualization of a given area of the City. Figure 6 shows an example of a map view with the Shorelines, City Streets Network, Public Places, Property Information and Bikeways layers turned on (Sept. 10, 2004, 4:23 p.m.). Figure 7 shows a segment of the same map at greater magnification and with the orthophotos layer added (Sept. 10, 2004, 4:29 p.m.).

Reports

Address, permit, license, tax and other report information appears in a tabular format through a “reportal,” opened either by double-clicking a symbol (i.e., icon or centroid) on the map or selecting from a list of applications in the scroll-down box on the toolbar. (A limited amount of textual information, such as the name of a housing unit or a property address, will appear in a pop-up report, called a MapTip, when the cursor is passed over an icon or a point.) Figure 8 provides a very basic CSG report showing the addresses associated with a given point on the map. The addresses in the report are hypertext links to more detailed reports on various features of the property, such as permits.








Available Information 453 W 12TH AV Report Name Links City-Owned Properties  Address Relationships and CSG Information  Dog Licenses  Owner Notification  Tax Attributes  ?		VanMap staff edition Print date: 13-Sep-04, 11:01 AM Address Relationships and CSG Information Report Click the address for links to CSG information For internal staff use only Source: Online GIS Database (see About Data for the latest update.)																						
		<table> <tr> <th>RECORD</th><th>ADDRESS</th><th>ADDRESS TYPE</th><th>RELATED ADDRESS</th><th>ADDRESS STATUS</th></tr> <tr> <td>1</td><td>2699 YUKON ST</td><td>Project</td><td></td><td>Active</td></tr> <tr> <td>2</td><td>2675 YUKON ST</td><td>Main</td><td>2699 YUKON ST</td><td>Active</td></tr> <tr> <td>3</td><td>453 W 12TH AV</td><td>Main</td><td>2699 YUKON ST</td><td>Active</td></tr> </table>			RECORD	ADDRESS	ADDRESS TYPE	RELATED ADDRESS	ADDRESS STATUS	1	2699 YUKON ST	Project		Active	2	2675 YUKON ST	Main	2699 YUKON ST	Active	3	453 W 12TH AV	Main	2699 YUKON ST	Active
RECORD	ADDRESS	ADDRESS TYPE	RELATED ADDRESS	ADDRESS STATUS																				
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3	453 W 12TH AV	Main	2699 YUKON ST	Active																				
		City of Vancouver																						

Figure 8. VanMap CSG report example

4a. What are the key formal elements, attributes, and behaviour (if any) of the digital entities?

Element is not defined in the InterPARES 2 Terminology Database, but is understood in the context of this report to refer, in general diplomatic terms, to “a constituent part of a record’s documentary form,” and, in particular, to an entity’s *extrinsic elements* (i.e., the elements of a record that constitute its external appearance) and *intrinsic elements* (i.e., the elements of a record that convey the action in which the record participates and its immediate context).⁵

Attribute is defined in diplomatic terms in the Terminology Database as “a characteristic that uniquely identifies a record or a record element.” Elements and attributes are combined for the purpose of this report. There is no definition of *behaviour* in the Terminology Database, but it is defined here to mean the ways in which the entity allows the user to identify, retrieve and access the data in VanMap.

VanMap home page

Elements and attributes

As shown in Figure 9, there are a number of intrinsic elements and attributes that are considered integral to the validity and completeness of this entity, including:

⁵ *Record element* has been accepted as a term in the Terminology Database but has not yet been defined. The definition of *element* that appears here was taken from an earlier draft version of the Database. The definitions of *extrinsic element* and *intrinsic element* are taken from the InterPARES Terminology Database (Accessed 2006 Aug 22).

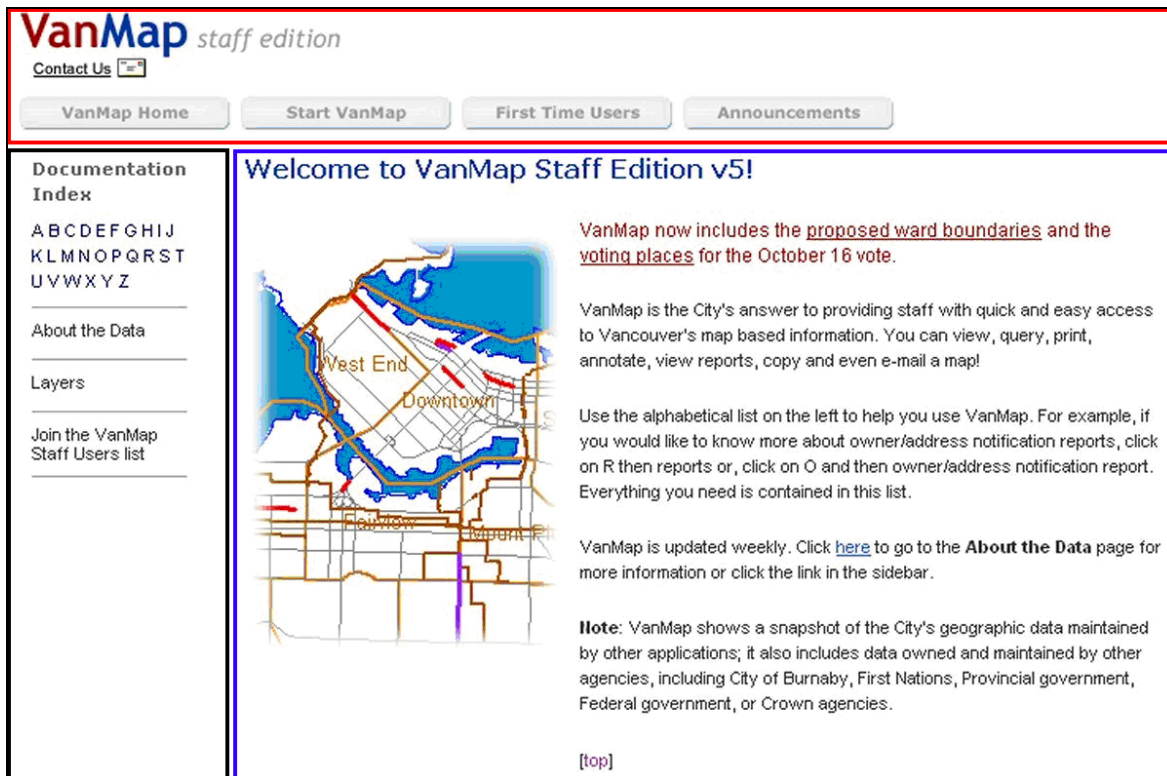


Figure 9. VanMap Web site home page with key intrinsic element sections outlined

- Header ‘toolbar’ section (red outline) with a logo (“VanMap staff edition”), a “Contact Us” link and icon, and a row of clickable navigation buttons;
- Sidebar section (black outline) with links to data sheets and other HTML pages; and
- Body section (blue outline) comprised of a graphic element and text containing introductory information about VanMap. Links to other HTML pages are embedded in the text.

The key extrinsic elements that constitute the material make-up and external appearance of the home page include:

- A standard Web page layout (i.e., the specific layout of each of the key intrinsic element sections on the page, a layout that is repeated on certain other VanMap pages, such as data sheet pages);
- The Hyper-Text Markup Language (HTML), specification 4.01 Transitional, encoded in Western ISO standard, in which the page is constructed; and
- The various cascading style sheets (CSS)⁶ that control the styling of some or all of the HTML elements on the page.

⁶ See question 4b for further information about CSS.

Behaviour

In addition to providing introductory information about VanMap in the body section, the home page serves as a portal to further information resources about certain VanMap components (e.g., data and layers), as well as to the VanMap application itself. The home page uses a combination of stand-alone and embedded hyperlinks as well as buttons to provide access to these functions. The behaviour of the hyperlinks and buttons is controlled via the page's underlying HTML code, which, for some functions, also involves call-outs to GIF⁷ image files and JavaScript⁸ 1.2 and CGI⁹ script files. As is true of any Web page, both the overall rendering of the page and the execution of its specific functional components depends, to some degree, on the way the user's browser interacts with the underlying HTML coding, including the various image, script and CSS call-outs.

Data sheets

Elements and attributes

As shown in Figure 10, the intrinsic elements and attributes of the data sheets are nearly identical to those of the home page, lacking only the graphic element present in the body section of the home page. The extrinsic elements are identical as well, which, together with the shared intrinsic elements, results in a page that is very similar in overall appearance and layout to the home page.

The data sheets describe VanMap's data layers, features and functionalities. The body of a data sheet describing a layer typically contains some or all of the following information:

- Layer name;
- Group name;
- Scale (the scale at which the data become available);
- Data currency status (how and when the data are uploaded to VanMap);
- Responsible department/branch (provided as a link – for example, “Engineering, Waterworks”); and
- Definition (may contain definition and information about context and use of the data).

Behaviour

The data sheets constitute an on-line VanMap user manual, complete with textual information and links to Web pages of the originating departments and to other data sheets when necessary.. The actual interactive behaviour of the data sheets is achieved using the same combination of stand-alone and embedded hyperlinks and JavaScript-enabled buttons that is described above for the home page.

⁷ Graphics Interchange Format. See question 4b for further information about GIF.

⁸ JavaScript is the name of Netscape Communications Corporation's cross-platform, object-based scripting language implementation of the scripting programming language, ECMAScript.

⁹ Common Gateway Interface. See question 4b for further information about CGI.

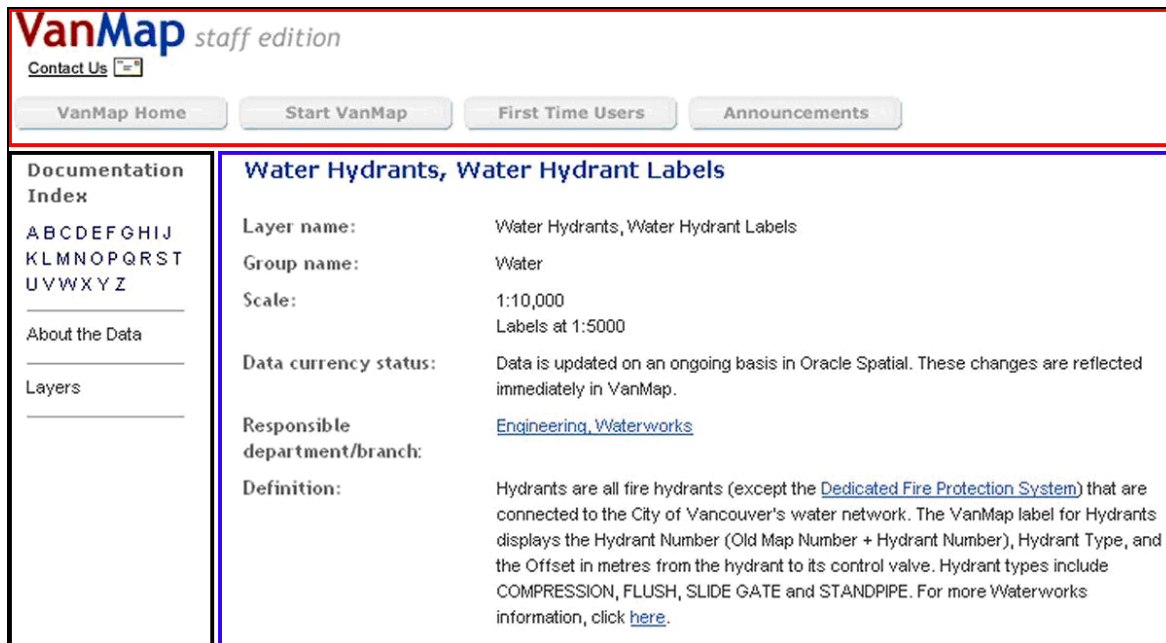


Figure 10. Data sheet example with key intrinsic element sections outlined

Map viewer

Elements and attributes

As can be seen in Figure 11, the map viewer is a more complex digital entity than either the home page or the data sheets. While it shares some of the same intrinsic elements and attributes as the home page and data sheets, it also exhibits a number of unique elements and attributes. The key intrinsic elements and attributes of the map viewer are as follows:

- Header 'toolbar' section (red outline) with:
 - VanMap logo ("VanMap staff edition");
 - "Contact Us" link and icon;
 - "Legend Options" drop-down menu providing users with the ability to Hide/Show the legend and Expand/Collapse layers;
 - "Address Search" component comprised of various individual functional elements (including fill-in text fields, JavaScript-controlled buttons, a drop-down menu box and a hyperlink) designed to help users quickly retrieve map data related to a specific City address;
 - "Toolbox" component comprised of various JavaScript-controlled buttons that allow users to perform certain map and data manipulation functions (e.g., zoom in/out, pan, copy/paste, select, view reports);
 - Miscellaneous buttons sub-section comprised of "General Info," "Print," "SkyView," (clicking on the SkyView button generates a small pop-up map showing the location of the currently selected map relative to the entire City map) and "Help" buttons; and
 - "Applications" component consisting of a scrollable list box providing users with access to specialized functions (e.g., built-in queries to look at specific data types);

- Sidebar or side margin section (black outline) containing an interactive map legend;
- Map interface section (blue outline) used to display the selected geospatial data in graphic form; and
- Footer section (purple outline), which includes a status bar that can be configured by the user to display various types of map-specific attributes, such as the current map's scale, ground dimensions (width x height), coordinates, feature labels, etc.

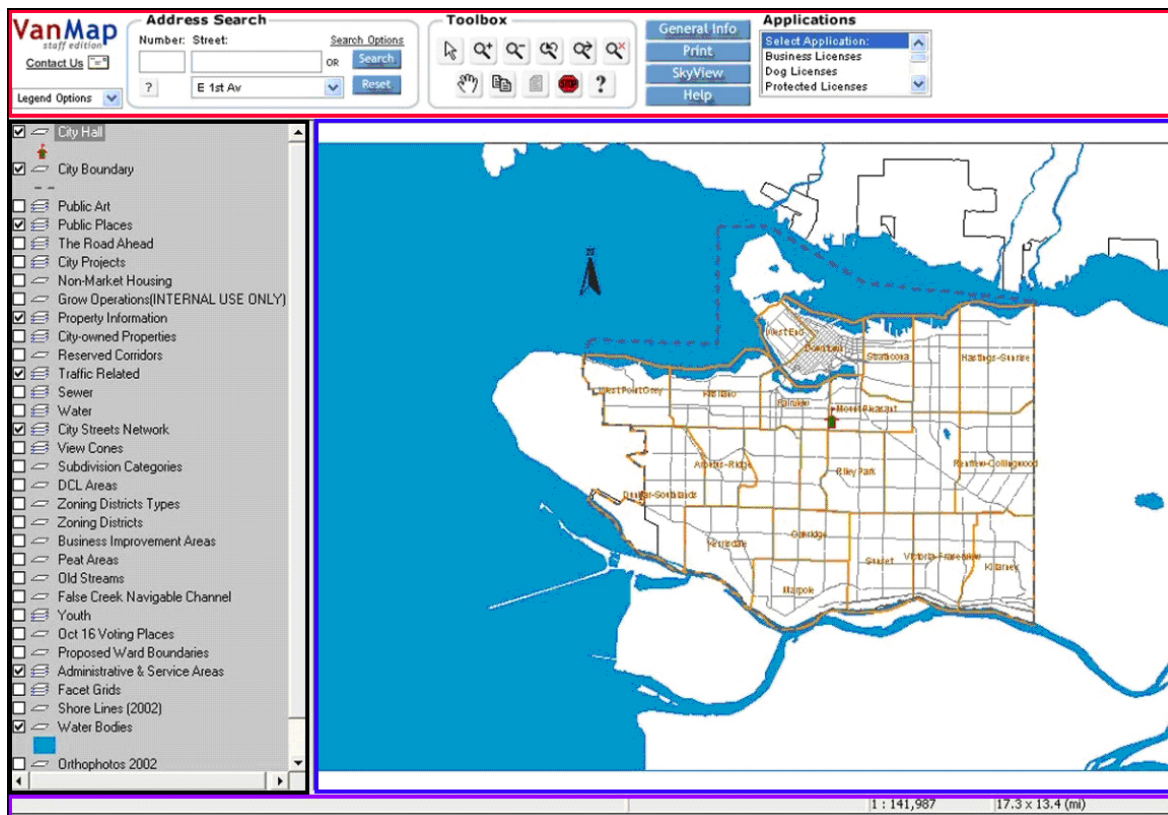


Figure 11. Map viewer page with key intrinsic element sections outlined

Unlike the previous two entities, the map viewer is a customized version of the Autodesk MapGuide Viewer,¹⁰ which, depending on the type and version of a user's browser, may consist of either a Java or a ActiveX Control edition of the application. Autodesk MapGuide Viewer allows users to interface with maps that are created in Autodesk MapGuide Author.¹¹ Consequently, the extrinsic elements that constitute the material make-up of the map viewer and its external appearance are, for the most part, limited to, and controlled by, the underlying, proprietary application code, as modified by the City to meet its VanMap requirements.

Behaviour

The individual toolbar and legend components are used together in varying combinations to allow users to select specific data to display and/or to manipulate the various map display

¹⁰ See <http://www.autodesk.ca/adsk/servlet/item?siteID=604374&id=5549451>.

¹¹ See question 5a for more information about these Autodesk MapGuide applications.

features and functions noted above. Additional user-controlled customizations are available via a “Preferences” dialogue box that is accessed by right-clicking anywhere in the map area and choosing ‘Preferences...’ from the right-click menu. These settings affect the information that is displayed in the status bar of the footer section.

Maps

Elements and attributes

As can be seen in Figures 6 and 7, the intrinsic elements and attributes that are considered integral to the validity and completeness of the maps include all of the variously-coloured lines, areas, numbers, text labels, points, colour photographs and symbols that are displayed in response to a user’s specific toolbar and legend commands and selections. By and large, the exact nature and configuration of each of these elements for any given map depends primarily on what scale is being used and what data layers are turned on. The types of data that can be viewed on the maps are listed in Appendix 1.

Again, because the maps are rendered via a proprietary software application, the extrinsic elements that constitute the material make-up of the maps and their external appearance are, for the most part, limited to, and controlled by, the underlying, proprietary application code, as modified by the City to meet its VanMap requirements, and as manipulated by end users via the application’s toolbar, legend and preferences dialogue box commands.

Behaviour

The map views can be altered to show different types of information based on which data layers are turned on, and can be viewed at different scales with the use of zoom-in and zoom-out functions on the toolbar. Passing the cursor over map features produces pop-up text boxes (MapTips) with information about those features, and, depending on the preferences selected, triggers dynamic and/or static information to be displayed in the status bar. In addition, double-clicking certain features results in linked Web pages or reports opening up in new browser windows.

Reports

Elements and attributes

As is shown in Figure 12, there are a number of intrinsic elements and attributes that are considered integral to the validity and completeness of these entities, including:



- Header section (red outline) containing:
 - VanMap logo;
 - Report ‘print’ date and time field, which is an automatically generated data field containing the date and time the report was generated;
 - Report title;
 - General instructions information;
 - Use restriction information; and
 - Source information, with an embedded link to additional information;
- Body section (blue outline) containing specific information (in the form of text, hyperlinks and/or graphics) about various aspects of each of the objects or features selected;


- Sidebar section (black outline) containing links to other types of reports, links to related departmental Web pages, and a help button; and
- Footer section (purple outline) containing the author's name (i.e., City of Vancouver).


Available Information


453 W 12TH AV


Report Name **Links**


City-Owned Properties  

Address Relationships and CSG Information 

Dog Licenses 

Owner Notification 

Tax Attributes 



VanMap
staff edition

Print date: 13-Sep-04, 11:01 AM

Address Relationships and CSG Information Report

Click the address for links to CSG information

For internal staff use only
Source: Online GIS Database (see [About Data](#) for the latest update.)

RECORD	ADDRESS	ADDRESS TYPE	RELATED ADDRESS	ADDRESS STATUS
1	2699 YUKON ST	Project		Active
2	2675 YUKON ST	Main	2699 YUKON ST	Active
3	453 W 12TH AV	Main	2699 YUKON ST	Active

City of Vancouver

Figure 12. Report example with key intrinsic element sections outlined

The body of a report is tabular in format and, depending on which report is displayed, contains varying combinations of the following fields:

- address status
- address type
- big improvement year
- civic number
- current assessed value
- current improvement value
- date license(s) issued
- date permit(s) issued
- legal description
- property owner
- record
- related address(es)
- license type(s) (and details such as name of business, type of dog, etc.)
- owner address
- permit number(s)
- permit type(s)
- permit work completion date(s)
- previous improvement value
- previously assessed value
- property address
- status of license(s)
- tax coordinate number
- year built

The key extrinsic elements that constitute the material make-up and external appearance of the reports page include:

- A standard Web page layout (i.e., the specific layout of each of the key intrinsic element sections on the report page, a layout that is repeated for each report);
- The HTML, specification 4.01 Transitional, encoded in Western ISO standard, in which the report page is constructed; and
- The CSS (/reports/template/vmStyles.css) that controls the styling of some or all of the HTML elements on the report page.

Behaviour

The reports allow the user to obtain detailed information about specific properties and to link to other reports and related departmental Web pages. In similar fashion to the home and data sheet pages, the reports pages use a combination of stand-alone and embedded hyperlinks as well as buttons to provide access to any linked information resources. Again, the behaviour of the hyperlinks and buttons is controlled via a page's underlying HTML code, which, in some cases, also involves call-outs to GIF image files (for icons) and JavaScript 1.2 files.

4b. What are the digital components of which they consist and their specifications?

The internal components used to view VanMap consist of the following:

- HTML Web page files
 - Created using HTML 4.01 and encoded to Western ISO standard. The files incorporate the following:
 - GIF (Graphics Interchange Format)¹² files;
 - CFML files (see below);
 - CGI (Common Gateway Interface)¹³ script, which is a standard for interfacing external applications with information servers, such as HTTP or Web servers;
 - DWT (Dynamic Web Template)¹⁴ files created using Macromedia DreamWeaver; and
 - CSS (Cascading Style Sheet)¹⁵ files, which are HTML style sheets created, in this case, using Macromedia DreamWeaver.
- CMFL (ColdFusion Markup Language) files
 - CMFL is a server-side scripting language for dynamic generation of Web content.¹⁶ The files are created with Macromedia ColdFusion MX and used to support Web-enabled database search functionalities. The tabular reports opened in the VanMap reportal windows are CFML files.
- Spatial geometry layers in Oracle9i Spatial database¹⁷

¹² Format by CompuServe Incorporated. See <http://www.astronomy.swin.edu.au/~pbourke/dataformats/gif/>.

¹³ Specifications available at <http://hoohoo.ncsa.uiuc.edu/cgi/interface.html>.

¹⁴ See Dynamic Web Template Interchange Guidelines at <http://dwitig.com/>.

¹⁵ Style sheets specification available at <http://www.w3.org/TR/REC-CSS1>.

¹⁶ See the MacroMedia Livedocs page *Elements of CFML* at

<http://livedocs.macromedia.com/coldfusion/6.1/html/docs/elements.htm#wp2689636>.

¹⁷ See data sheet for Oracle9i Spatial Option: Location-Based Services for Oracle at http://www.oracle.com/technology/products/Oracle/data_sheets/spatial/spatial.html.

- Points, representing objects residing at single XY coordinates;
- Lines, representing roads, water mains and other linear objects; and
- Polygons, representing areas such as zoning districts and local service and administration areas. A polygon is a shape formed by line segments that are placed end to end, creating a continuous closed path.

Within Oracle Spatial, the location data are modeled in layers, located in a common database or a single table, sharing a common coordinate system. Oracle Spatial employs the open standards Open GIS Consortium Simple Features Guidelines; OGC Geographic Markup Language (GML) and Open Location Service Interfaces.¹⁸

- SDF files: (Autodesk MapGuide Spatial Data Files)¹⁹
 - Static images created for viewing through a Web browser. These are used to view drawings that will not change or will seldom change in the future, such as the City boundary.
- DWF files (Design Web Format files)
 - Compressed 2D vector files that allow CAD (Computer Aided Design) and other drawings to be viewed over the Internet or Intranet. Converted from CAD files created in Autodesk Map and stored in Oracle Spatial. The DWF file format was developed by Autodesk and can be viewed independently of other applications through Autodesk DWF Viewer, a free application.²⁰ DWF files also conform to Open GIS Consortium standards.
- JPEG files (Joint Photographic Experts Group image format)
 - An open-source, lossy compression format for images.²¹ The 1999 orthophotos appear in JPEG format.
- ECW files (Enhanced Compression Wavelet images)
 - An open-source, lossy compression format for very large images, developed more recently than the JPEG format.²² Used for the 2002 and 2004 orthophotos.

4c. What is the relationship between the intellectual aspects and the technical components?

Geographic or geospatial information appears as Oracle Spatial lines, points and symbols, or as DWF or SDF graphics files. Textual information, such as information about business licenses, mainly appears in tabular format (CFML files), but is linked to the spatial objects. Thus, double-clicking on a point representing a property will lead the user to a table containing business license information about that property.

¹⁸ See the OGC Web page at <http://www.opengeospatial.org/>.

¹⁹ Specifications for SDF files not found. For information on Autodesk MapGuide go to <http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=2995517>.

²⁰ See <http://usa.autodesk.com/adsk/servlet/index?siteID=123112&id=2787358> for information about DWF files and Autodesk DWF Viewer.

²¹ Specifications available at <http://netghost.narod.ru/gff/graphics/summary/jfif.htm>.

²² Specifications available at http://www.ermapper.com/products/ecw/ecw_body.htm.

The orthophotos (JPEGs and ECW files) are designed to overlay the maps precisely, so that the photographic representations of streets and buildings will match the map lines representing streets and properties.

The user's browser type, version and configuration settings can significantly affect what of the content, structure and/or context provided by the VanMap system is actually accessible or rendered as intended by the creator. For example, when using the MapGuide ActiveX Control Viewer with a browser that is not officially supported by VanMap, such as Mozilla Firefox, Opera or Netscape 7, users may find that some VanMap functions do not work, such as the report function. In such cases, however, users can elect to download and install an alternative, platform-independent VanMap application (i.e., the Java Edition Viewer rather than the ActiveX Control Viewer). Certain VanMap functions (e.g., Address Search) utilize pop-up windows. If a user's browser is not configured to allow pop-ups, an 'error on page' message will appear in the status bar whenever attempting to access a pop-up function.

4d. How are the digital entities identified (e.g., is there a [persistent] unique identifier)?

Certain of the HTML and CFML pages and embedded GIF images are identified by unique URLs. The data fields, layers and groups are also identified by field names, layer names and group names, respectively (it is not possible to view field names from VanMap).

More research will need to be done to determine whether any of these identifiers can be considered persistent.

Reports are identified by type – for example, "Tax Attributes Report" or "Dog Licenses Report," but the particular address a report is about is not included in the title. As well, it is noted that the URL associated with a report's CFML page is only unique to the report type, not to the particular object or feature that is the subject of the report. Thus, for example, the URL for any Youth Organizations Report will end in /reports/vmpe_YouthOrgs.cfm, regardless of the particular youth organization chosen for the report. Finally, it is important to emphasize that whenever map or report screens are exited those maps or reports no longer exist (although they can be re-created as long as the underlying data upon which the original maps/reports were generated have not changed in the interim), unless they have been deliberately saved outside of the VanMap system (e.g., on the user's computer).

4e. In the organization of the digital entities, what kind of aggregation levels exist, if any?

The various HTML and related pages are grouped into folders for storage, identification and retrieval purposes.

The data are organized into layers, with each layer including a single data source or multiple data sources.

Some layers may be organized into layer groups consisting of two or more layers. For example, the Public Places layer group contains the following layers: Community Centres, Fire halls, Libraries, Parks, Schools. Each of these layers may be viewed separately or in combination with the other layers.

The report and map data are granular and are grouped only ephemerally in the form of reports and maps viewed through the MapGuide reportals and viewer, respectively.

4f. What determines the way in which the digital entities are organized?

The VanMap Team, with input from users, determines the presentation of the Web site and the ways in which the various elements of VanMap are organized, linked and presented. Defaults of the Autodesk MapGuide application (see question 5a) also determine some of the elements and characteristics of the layout and structure of VanMap.

5. How are those digital entities created?

This question will focus on the data themselves, since the ways in which they are aggregated and assembled into maps and tables are reported elsewhere.

Internal data

The internal data are created in various ways by the originating departments. The Engineering Services data are created from plans used to build the infrastructure. This means that when a structure is built, for example a water main or a traffic signal, the plans for building the structure are used to create CAD drawings in Autodesk Map or to key or draw the information in the Oracle Spatial database. This process normally takes place soon after the structure is completed.

The CSG graphics, such as zoning or business improvement areas, are created as CAD drawings in Autodesk Map and stored in Oracle Spatial.

The CSG property address, permit and license data and other textual data are created as part of the process of accepting, processing and approving applications for permits and licenses. The data are keyed into departmental databases such as PRISM (Permit Review and Inspection System Manager) and License+ and are extracted to an SQL server for inclusion in VanMap.

Data pertaining to property tax assessments are generated by the Property Tax System, an SQL database maintained by Revenue Services (part of the Corporate Services Group). The data are extracted on a regular basis for inclusion in VanMap.

Some data are drawn from small departmental databases. For example, some of the Public Art layer resides in an Access database that generates an HTML page using CGI scripts, and is accessed by the user by double-clicking a public art icon in VanMap. It is likely that these isolated systems will disappear over time, as more data are entered directly into Oracle Spatial.

External data

The external agencies providing data to the City are the Land Titles Office, the British Columbia Assessment Authority and utilities such as BC Hydro. Of these, the first two supply data for the purpose of assisting the City to do its work (for example, to administer building permits or levy taxes). BC Hydro supplies the data to obtain approval for construction projects and also in exchange for data from the City. Engineering Services has data exchange agreements in place with other utilities.

5a. What is the nature of the system(s) with which they are created? (e.g., functionality, software, hardware, peripherals, etc.)

These are the main technical components of the VanMap system:

1. Oracle Spatial database
 2. SQL server and CSG Web application server
 3. Other databases
 4. Autodesk MapGuide
 5. ColdFusion MX
 6. Autodesk MapGuide ActiveX Control/Java Edition Viewers
 7. Microsoft Windows 2003 server (Web server)
-
1. Oracle9i Spatial database. This database is the repository for most of the geospatial data accessed by VanMap and is the corporate GIS. Geospatial data are any data that are related to spatial coordinates (i.e., locations). Not all data entered into Oracle Spatial are made available to VanMap. The database server is an IBM Unix Server.
 2. SQL server and CSG Web application server. Data from PRISM and License+ are extracted into this server, so that when users are viewing the data they are actually looking at an extract of it on the SQL server. The server is administered by the Community Services Group. The CSG Web application server hosts an in-house Web application that is linked to the SQL server, making the data on the SQL server available on VanMap.
 3. Other databases. A small amount of data is read live from isolated databases residing in proprietary software such as Microsoft Access.
 4. Autodesk MapGuide. This is a Web GIS product that assembles the geospatial data into maps for viewing through a Web browser. It functions as an application server (the "MapGuide server") for the data in Oracle Spatial.
 5. Autodesk MapGuide ActiveX Control/Java Edition Viewers. VanMap supports to versions of the Autodesk MapGuide 6.5 Viewer, including MapGuide 6.5 ActiveX Control Viewer (for Windows users only), and MapGuide 6.5 Java Edition Viewer, which is a platform-independent viewer that can be used with both Windows and Macintosh systems. Both viewers provide access to the maps through a Web interface, and are freely available for downloading directly from the VanMap Web site, or from other Web sites via links provided on the VanMap Web site. In cases where a Windows user is using an officially supported browser, the viewer is automatically installed in the user's browser simply by clicking on the 'Start VanMap' link.
 6. ColdFusion MX. ColdFusion is a Web application development tool that functions as the application server for the textual data in License+ and PRISM, scripting the data for viewing through a Web browser.
 7. Microsoft Windows Server 2003. This is the Web server that hosts all the City's Web pages.

5b. Does the system manage the complete range of digital entities created in the identified activity or activities for the organization (or part of it) in which they operate?

To the extent that the VanMap Team manages the complete range of activities that results in data being included in VanMap (with the various departments being responsible for supplying the data), it could be argued that the system does manage the complete range of digital entities created by those activities. On the other hand, one could also argue that the system only 'partially' or 'temporarily' manages certain digital entities; like maps and reports, for example, both of which are ephemeral and only 'exist' in the system temporarily as the result of user-initiated actions. However, to the extent that these entities exist and reside in the system, it seems reasonable to say that the system does, indeed, 'manage' them (at least in the sense that the system acts to reconcile the user's commands with the appropriate data and mediate the resulting output).

6. From what precise process(es) or procedure(s), or part thereof, do the digital entities result?

This answer will focus on the data themselves, rather than the entities per se, particularly from the perspective of identifying those groups responsible for deciding which data to include in VanMap (and why), since the ways in which the data are aggregated and assembled into maps, tables, reports and other digital entities are reported elsewhere.

Two groups of people report to the Manager of GIS: the GIS Sustainment Team and the VanMap Team. The GIS Sustainment Team consists of staff responsible for the technical development of VanMap. The VanMap Team is a broader group that includes some of the members of the Sustainment Team, several staff members from IT and representatives from departments that provide the data. The VanMap Team guides the overall development of VanMap.

Departmental representatives on the VanMap team are largely responsible for determining which data are included in VanMap. Decisions may be based on their perceptions of how City workflow and business processes might be enhanced by the inclusion of certain data. An example of this was the decision to include the View Cones data layer. View Cones refer to the views that may be obtained from certain points in the City and the maximum height a building can be before it obstructs the view. The VanMap representative took the initiative to have the view cone data included because he felt that staff were repetitiously calculating the maximum heights, and that easy access to geospatial representations of the cones would make the process quicker and less likely to result in calculation errors.

In other cases it is department heads or other managers or IT support personnel who suggest that a layer be included.

Data are usually included because it is felt that users would benefit from having them placed in the context of the other data provided by VanMap. The department supplying the data may feel that there is a cross-corporate need to view specific data, but even if only one department or business unit within a department needs access to the data in the context of VanMap, then the data typically are included.

There has been a high level of corporate acceptance of VanMap, in part as a result of demonstrations to Council and members of the Corporate Management Team (department heads). Some departments that have not been suppliers of data in the past are now interested

in becoming involved. For example, the Board of Parks of Recreation has recently added a representative to the VanMap Team, which likely means that there will be more parks-related data layers added in the not-too-distant future.

7. To what other digital or non-digital entities are they connected in either a conceptual or a technical way? Is such documentation captured?

Technical connections

Web pages linked to VanMap

Many of the digital entities created in VanMap include numerous explicit links to departmental Web pages. For example, the data sheets include links to the departments responsible for the data being described. Links are also embedded in the Oracle Spatial features and the DWF files, allowing users to double-click map features to open the linked pages.

Conceptual connections

Electronic records in departmental systems

Community Services Group

Rezoning changes are mandated by Council through amendments to the Zoning By-law. These changes are graphically represented by CAD drawings created by the Planning Department; the drawings are printed out on mylar and kept in the Planning Department and are also loaded into Oracle Spatial and converted to DWF files to be viewed by VanMap. Thus, the zoning maps being viewed by the VanMap user are actually copies of the official Zoning By-law amendment drawings.²³

Incremental CAD drawings of zoning changes for the past three years have been kept on a CSG server.

Some of the zoning, subdivision and business improvement area CAD files have contextual layers that are part of the original creation process but are not included within VanMap. The view cone CAD files also contain data that are not included in VanMap, such as sketches of building footprints.

The PRISM information that is extracted to VanMap is generated in part by a CSG workflow system called DOMINO, which manages scanned images of the original permit applications and all related correspondence. The paper originals are destroyed.

Engineering Services

Not all data entered into Oracle Spatial by Engineering Services are part of VanMap. The totality of the Engineering Services GIS data stored in Oracle Spatial is known as ENGIS Map, and while much of the data are viewed through VanMap, some of the more highly detailed data relating to infrastructure are viewed in another Autodesk MapGuide system called ENGIS Web.

²³ It is expected that the mylar hardcopy versions of the drawings will not be created for much longer, especially since Engineering Services is planning to load comprehensive sectional maps into VanMap in the near future. This would mean that users could view zoning drawings superimposed over sectional maps, which would be more useful than looking at the zoning drawings alone.

Although VanMap and ENGIS Web both draw on data stored in Oracle Spatial, the data viewed through ENGIS Web are more detailed and may be presented and combined in different ways. ENGIS Web is designed to accommodate users in Engineering for whom the VanMap data are not considered sufficiently detailed.

Corporate Services Group

The Revenue Services Division of the Corporate Services Group maintains the Property Tax System, a mainframe system that controls all details pertaining to tax accounts for current and prior years, including those pertaining to billing, penalties, arrears, actual values, assessed values, local improvement values and other property tax related activities. Only a portion of these data is extracted for use in VanMap.

The orthophotos in VanMap are JPEG and ECW files produced from the original TIFF files. The TIFF files from all the flights (1999, 2002, 2004) are kept on a Corporate Services Group network drive.

Audit Log Files

As is more fully discussed in question 18e, certain activities of VanMap users are captured in system log files, primarily for the purpose of generating overall user statistics reports and to determine patterns of use.

8. What are the documentary and technological processes or procedures that the creator follows to identify, retrieve and access the digital entities?

The data layers, layer groups and reports all have names designed to convey their content, and the data themselves are defined on the data sheets. Certain entities (e.g., reports) also include a 'creation' date/time field. The technological processes used by the viewer include clicking on navigational and data links, clicking on data layers to turn them on or off, selecting areas of the map using the mouse, using zoom-in and zoom-out functions, double-clicking on map objects, and turning on report layers by selecting them from a scroll-down box in the toolbar. Finally, as is more fully described in the answer to question 18e below, access activities are captured in log files.

9. Are those processes and procedures documented? How? In what form?

Instructions on how to download the ActiveX Viewer and how to use VanMap are available on the VanMap Web site. System requirements are also provided.

The procedures for viewing certain types of data are documented in the data sheets, in the form of instructions to users. Also, whenever a new layer or functionality is added, City staff are informed via an announcement on the home page of the City's intranet.

10. What measures does the creator take to ensure quality, reliability and authenticity of the digital entities and their documentation?

Internal data

Data quality is not the responsibility of the VanMap developers but rather of the originating departments. The Engineering Services representative on the VanMap Team stated that "each data layer is signed off by the data owner. I don't proceed with moving anything into VanMap

unless I have a commitment from the data owner that the data is as complete as we can make it, and as accurate as we can make it.” These commitments are not formalized, however, but are either agreed to verbally or through e-mail (the City has no e-mail management policy). The CSG representative noted that there’s an element of trust between the VanMap Team and the departments – the Team trusts that when a department says the data are reliable, they are in fact reliable. As she put it, “we all work for the City.”

In most cases, the departments consider themselves the authoritative sources of the information. For example, decisions about zoning are made by City Council through amendments to the Zoning By-law, but the responsibility for creating the zoning maps based on these amendments lies with CSG, which assumes responsibility for the accuracy of the work. CSG considers itself the authoritative source for information about licenses, and takes steps to ensure that very few staff are able to change the data. Preventing unauthorized access to License+ is one of the reasons for sending an extract to a separate server for inclusion in VanMap.

If there is a complaint made to the VanMap developers about the accuracy of the data, the developers will refer the complaint to the originating department. Also, if data supplied by one department do not match up with data from another, the VanMap developers will ask the originating departments to verify or fix the data. Examples of these types of mismatches might occur with misspelled street names, address typos and similar errors.

External data

When data are supplied from external agencies, the agencies include disclaimers about the accuracy and reliability of the data. For the data supplied by utility companies, VanMap adds a special disclaimer:

Disclaimer for Non-City Utility Company Data:

The City of Vancouver assumes no responsibility for the accuracy or completeness of the field information shown in VanMap. All work carried out is done wholly at the risk of the party undertaking the work who agrees, as a condition of such undertaking, to release the City of Vancouver from all liability. Location of underground utilities should always be confirmed by manual digging. For contact information specific to each Non-City utility company please see the [VanMap definitions page](#).

Various departments are responsible for supplying the external data to VanMap, according to the data sheets, but in this case responsibility for supplying data does not translate into responsibility for ensuring data quality.

One problem with external data is that there may be a delay in getting it to the City. For example, changes to the Cassiar Corridor were never registered with the Land Titles Office, and therefore the pertinent data have never been supplied to the City. However, the City’s orthophotos show the changes. This means that if the user is viewing the orthophotos for that area and superimposes them over the street plan, there is an obvious visual mismatch.

The VanMap Team will guarantee that the information that appears in VanMap is as good as the original source. In other words, when they are added to VanMap the data are not altered in such a manner as to affect their accuracy and reliability.

11. Does the creator think that the authenticity of his digital entities is assured, and if so, why?

VanMap will guarantee that the data are as authentic as the data provided by the original source. Only a limited number of people within the departments are able to update data, staff entering the data are well trained, and the data entry formats are strictly controlled: according to one interview subject, “It’s mostly all list driven now. You don’t have opportunities to type in whatever you want. You are forced to input specific information that is based on the requirements of the branch themselves.”

Once the data are input by specified staff they are not modified by the way they are used in VanMap, since VanMap is a read-only system.

See also the discussion of job competencies/responsibilities and access rights provided in the answers to questions 15 and 16, below.

12. How does the creator use the digital entities under examination?

For the purposes of this question, the “creator” is defined broadly as the City of Vancouver, or all City staff.

Support for decision-making

VanMap, by itself, is not generally used to make decisions. It is instead a reference tool, a first stop for information. Some staff cut and paste maps, using them like a clip-art source file for the data they need to use in day-to-day tasks. They may cut and paste them into reports, such as reports to Council or scoping reports (development permit application reports). In this way, data from VanMap may be used in the process of making decisions, although they are likely to be used to graphically illustrate a point using data obtained originally from VanMap but verified and possibly added to from other sources.

The data in VanMap may be too general to be used for purposes other than preliminary reference. For example, staff may note in VanMap that there is a water main in a specific place, but go to other information sources in Engineering Services to get details on its diameter, valve size and other physical characteristics.

Accuracy and reliability

If there are decisions to be made, the information from VanMap is verified or added to by information from other sources. For example, Engineering Services staff may find in VanMap that there is a gas main at a specific location, but will get independent verification from other data sources, or even go to the site with equipment and physically test the area, before making a decision based on that information. On the other hand, the business unit responsible for supplying certain data may feel confident that the data are accurate. For example, the Traffic Management Division tends to view the traffic count data it supplies to VanMap as being accurate and reliable. Staff may be more reluctant to rely on data supplied by other departments.

Enhanced efficiency

The interview subjects agreed that VanMap is used to streamline functions that have traditionally been carried out by other means, rather than supporting entirely new functions. For example, CSG Enquiry Centre staff have always assisted the public to obtain information on their properties, but in the past this involved time-consuming research carried out by consulting paper and microform records and isolated repositories of digital information. The information may now be obtained almost immediately, often with the citizen viewing the VanMap screen along with the Enquiry Centre staff member.

One Enquiry Centre staff member relies heavily on the orthophotos to find out whether a proposed property renovation threatens any private or street trees. Although use of the orthophotos alone is not enough to reject a renovation permit application, it may prompt the applicant to modify the application prior to submission, or it may indicate that a visit to the site is warranted to verify a potential violation.

VanMap is used extensively by the City's project scopers, staff members responsible for conducting in-depth research into whether a development permit should be rejected or modified because it may violate zoning, planning or other by-laws. The scopers use VanMap to obtain information on zoning areas, building types and density, setbacks and other features relevant to the determination of whether a development should proceed. Again, however, once obtained quickly from VanMap, the information is usually verified by consulting other sources.

VanMap is used whenever traditional maps would have been consulted in the past, and has enhanced the efficiency of such activities as infrastructure development, neighbourhood planning, provision of police and fire protection services, emergency response planning and numerous other activities conducted by City staff.

13. How are changes to the digital entities made and recorded?

Different data are updated at different times, either on a regular basis (such as the data from PRISM and License+, which are extracted to the SQL server each week), or as needed. In most cases, the updating process physically overwrites (replaces) any existing data with the new data. However, in PRISM data are typically added, so that if a property has a new permit the information will be entered into the database as a new entry; thus, the VanMap viewer will be able to see information about all permits in chronological order in a tabular format. The data in License+ are overwritten, however, so that the user only sees licenses for the current year.

For data that are overwritten, there is no way to track updates over time or to access previous instantiations of the data since copies of overwritten data are not routinely kept.

14. Do external users have access to the digital entities in question? If so, how, and what kind of uses do they make of the entities?

See Appendix 2 for the list of layers made available on the public version of VanMap.

Before layers are added to the public version of VanMap, they may be made accessible only on the internal version for a test period to determine whether there are problems using or understanding the data. For some types of data, however, there may be a rush to get them to the public Web site. This happened with the Bike Routes layer, which was put on the public site for Bike Month. Another example was the Proposed Ward Boundaries layer, which came with a

disclaimer stating that that boundaries were only proposed, not confirmed, and had been placed on the site in advance of the upcoming referendum on wards. The layer was removed after the referendum resulted in a ward system being rejected. Layers, such as Public Art, that pose little risk of their data being misused or misinterpreted, and that offer little or no potential for damage being done by any inaccurate data, are almost immediately made available on the public site.

Detailed statistics are not kept on public use of VanMap, but anecdotal evidence suggests that the primary users of VanMap are developers, architects and others involved in the development and construction industry in Vancouver, and citizens wishing to obtain information on their own properties.

Two public kiosks are available for use in the Community Services Group Enquiry Centre, and staff assist members of the public to use VanMap at these kiosks. VanMap is also used to assist members of the public over the telephone, in which case the staff member and the citizen will be viewing the same data at the same time to facilitate communication about a specific property or area.

15. Are there specific job competencies (or responsibilities) with respect to the creation, maintenance and/or use of the digital entities? If yes, what are they?

The Manager of GIS oversees and coordinates all aspects of producing VanMap and has final say over which data are included and how they are presented.

The main GIS developer, a computer programmer/analyst on the GIS Sustainment Team, has access to all the data, as does the database administrator responsible for maintaining the database system (that is, ensuring that it functions properly).

In the Graphics and Communications Division of CSG there are two staff dedicated to GIS and CAD functions who are responsible for the technical aspects of the graphics-based data (such as the zoning maps). The person responsible for including the data in VanMap is the Graphics Planner, the head of that Division. The person responsible for including the non-graphic data is the CSG Systems Coordinator. The Graphics Planner and the CSG Systems Coordinator are members of the VanMap Team.

Only two individuals from CSG have direct access to the Autodesk MapGuide server, the CSG VanMap representative and a GIS technician. This means that they control the data that are entered directly into MapGuide.

Numerous staff members in Engineering Services, CSG and Corporate Services are able to input and modify the data in Oracle Spatial, PRISM, License+ and other databases. However, these access rights are monitored by Information Technology Security, a division of the Corporate Services Group, which supplies user IDs and passwords at the request of departmental managers.

16. Are the access rights (to objects and/or systems) connected to the job competence of the responsible person? If yes, what are they?

Data input and modification access rights are connected to the job competences of the participating individuals described in question 15. The individuals involved are either responsible for data creation and updating (that is, keying or drawing information included in VanMap), or for

making the data accessible by VanMap. Access rights are controlled by Information Technology Security.

17. Among its digital entities, which ones does the creator consider to be records and why?

This is a very difficult question to answer, and was addressed during the interviews in the context of what aspects of VanMap the creators, trainers and users thought should be preserved. One interview subject felt that the static (SDF) files that can be generated by MapGuide could constitute the records produced by VanMap. The same subject suggested that snapshots of the database might be preserved because this would allow the relationships between the spatial and non-spatial objects to be retained.

Some interview subjects felt that some of the CAD drawings might also be considered records, particularly the zoning drawings, since they graphically represent by-law amendments.

The interview subjects felt that the orthophotos were particularly important and worthy of preservation: "Obviously the orthophotos are an extremely valuable, archival sort of object. I like it from a GIS standpoint, because you can do things like raster overlays, where you can stick two views of the same thing over on top of each other and see where changes have occurred."

One subject felt that "date stamped" data could be preserved as records. By date stamped he meant that the data included a date. This would include information on activities like sewer main installation, or permit approvals or dates of construction. "We can do a query to show us all the sewer mains that were constructed between 1950 and 1960." These types of data typically are not overwritten but rather added to. For example, a PRISM report of building permits will show all the permits issued for a particular property.

18. Does the creator keep the digital entities that are currently being examined? That is, are these digital entities part of a recordkeeping system? If so, what are its features?

The digital entities cannot be said to form part of a recordkeeping system. The data pertaining to properties, such as address and owner, tax coordinate numbers and permit and license information, are generated as part of the DOMINO, PRISM, Property Tax System and License+ systems, but are copied from those recordkeeping systems for inclusion in VanMap. The geospatial data generally are not "kept" but rather are overwritten as needed (although in many cases the information can stay the same for decades). If the digital entities are defined as the reports and the interactive maps, these are only instances or representations of data and are not kept.

18a. Do the recordkeeping system(s) (or processes) routinely capture all digital entities within the scope of the activity it covers?

The InterPARES 2 Terminology Database defines capture as "the act of recording or saving a particular instantiation of a digital object."²⁴ If the digital entities are considered to be the interactive maps and reports, then routine capture cannot be said to take place. The data and the HTML pages are recorded and saved but are overwritten as needed, and previous versions are not captured within a recordkeeping system.

²⁴ InterPARES 2 Terminology Database, available at http://www.interpares.org/ip2/ip2_terminology_db.cfm.

18b. From what applications do the recordkeeping system(s) inherit or capture the digital entities and the related metadata (e.g., e-mail, tracking systems, workflow systems, office systems, databases, etc.)?

See questions 5 and 7 for descriptions of the DOMINO, PRISM, License+ and other systems that produce the data.

18c. Are the digital entities organized in a way that reflects the creation processes? What is the schema, if any, for organising the digital entities?

The organization and schema are dictated by the nature of the activities used to produce the data. For example, processing a building permit application requires that data about property address, property features, property owner, type of business, type of permit, permit number, date of completion and other details pertaining to the permit application and approval process be recorded and maintained together. When the data are extracted for inclusion in VanMap they are kept in this logical grouping, and the reports generated in VanMap are designed to provide access to the data in the same logical grouping.

The geospatial information is organized by or linked to location information, since the purpose of VanMap is to provide information linked to the geography and physical features of the City. Thus, two disparate objects, such as a sewer main and a tree, might be linked technically and conceptually to the same geospatial location.

18d. Does the recordkeeping system provide ready access to all relevant digital entities and related metadata?

VanMap is designed to provide ready access to the data it includes and it does this well. Metadata in the form of data sheets is also readily available. This study has not investigated the types of metadata that may be generated automatically by the various technological processes used to create VanMap. The lack of a recordkeeping system and consistent recordkeeping processes related specifically to VanMap activities, including the updating of data sets and the generation of interactive maps and reports, means that the concept of 'ready access' to all relevant digital entities and related metadata is, for the most part, limited in scope to the ability of the system to create new digital entities on an as-needed basis only (as opposed to providing access to previously created and kept versions of these entities).

18e. Does the recordkeeping system document all actions/transactions that take place in the system re: the digital entities? If so, what are the metadata captured?

Use of the data can be tracked by unique client IDs randomly generated when users download the MapGuide ActiveX Viewer to their workstations. Whenever a user accesses VanMap and issues a request for data (for example, by selecting a layer or by double-clicking an icon to get a tax attributes report) the transaction results in a log file record containing his or her ID, the date and time of access, and strings of numbers representing specific data layers used. This allows the VanMap Team to generate overall user statistics reports and to determine patterns of use, such as what percentage of users have the orthophotos layer turned on at a given time. This is not a means of tracking *how* the information is used, but it does show *what* information is being used and *when*.

19. How does the creator maintain its digital entities through technological change?

The VanMap Team uses technological change to enhance the City's ability to create, maintain and use GIS data. The most significant recent example of this was the introduction of Oracle Spatial, which replaced a system called VISION* GIS as the corporate GIS. Not only have the existing data been migrated to Oracle Spatial, but use of the new system is expected to streamline the processes that produce the data and allow VanMap users to view mainly live data instead of static image (SDF) files. The purpose of migration was thus not to preserve the entities as archival records, but to improve VanMap.

19a. What preservation strategies and/or methods are implemented and how?

No preservation strategies in the archival sense are currently being employed.

19b. Are these strategies or methods determined by the type of digital entities (in a technical sense) or by other criteria? If the latter, what criteria?

N/A

20. To what extent do policies, procedures and standards currently control records creation, maintenance, preservation and use in the context of the creator's activity? Do these policies, procedures and standards need to be modified or augmented?

The departments produce documentation, mainly in the form of manuals, pertaining to the creation of data. The largest body of documentation is produced by Engineering Services and pertains to the creation and use of data in ENGIS Map and ENGIS Web. IT Security also has written policies and procedures on security protocols relating to access and use of the City's data systems. The policies, procedures and standards used to determine how to include and present data in VanMap are not extensively documented.

21. What legal, moral (e.g., control over artistic expression) or ethical obligations, concerns or issues exist regarding the creation, maintenance, preservation and use of the records in the context of the creator's activity?**Internal version**

All City staff have access to all the data layers, with one exception, Protected Business Licenses. This is a small set of business licenses for organizations such as women's crisis centres, which are not publicized for security reasons. If staff attempt to turn on this layer, a pop-up screen requesting a password appears.

Whenever the staff version of VanMap is opened by the end user a disclaimer appears, reading in part: "The City makes no warranty as to the accuracy or completeness of the information." The user is required to click OK to use VanMap.

Public version

The public have viewing access to a subset of the staff version data, made available via the City's public Web site.

In the past, the VanMap Team tended to be very inclusive in terms of what data they made available on the public version of VanMap. Although questions of security and potential liability were considered, there was no corporate standard used to guide decisions on which data to include. However, the City is in the process of determining what constitutes “sensitive data,” and this will have an impact on how these decisions are made in the future. The policy will be formulated by the City Manager’s Office and/or the Corporate Management Team, in conjunction with staff from IT Security, Legal Services and other City staff, and presented to City Council for approval. The policy may also result in some data being taken off the public site, particularly with the approach of the 2010 Olympic Games. An example of the type of data that might be taken off is water mains.

There are other concerns about making certain data or functionalities available to the public, particularly relating to how citizens might interpret and attempt to use the information. For example, survey lot dimensions are provided, but the measuring functionality included in the staff version is not, because “the City Surveyor wasn’t comfortable enough that the information would be used properly.” For example, property owners might obtain inaccurate measurements indicating that their lot size does not match the measurement used for taxation purposes, which might result in a flurry of complaints to the City. The public version of VanMap also originally included survey monument data, but this layer was subsequently removed because members of the public thought it was more accurate than it actually was. Survey monuments are precise coordinates, but in VanMap, because of limitations in the way the data are presented, the coordinates are in fact not entirely precise. However, surveyors were using the data in their survey reports and providing the City with property measurements that were not properly aligned. When this problem was discovered, the City Surveyor requested that the layer be removed, a request with which the VanMap Team immediately complied.

Because of limitations in the viewing software and because users may not be familiar with all the functionalities of VanMap, some information may not be represented accurately when it is viewed by the user, even if the data themselves are accurate. For example, depending on which scale the user is using, zoning labels may appear in the wrong area. The zoning information should be viewed at a lower scale and exact information may not be obtained unless the user clicks on the property centroid, but the user may not know this and thus obtain inaccurate information.

Whenever the public version of VanMap is opened, a disclaimer appears reading in part:

VanMap is supplied on an ‘as is, where is’ basis. The City assumes no obligation or liability for the use of VanMap by any person and makes no representations or promises regarding the completeness or accuracy of VanMap or its fitness for a particular purpose. VanMap represents a one-time capture of information as it exists at the time the information is transferred to VanMap and does not necessarily include the ongoing updates or corrections to the source databases maintained by the City or other agencies and included for the City’s internal purposes.

The user is required to click OK to use VanMap.

Data supplied by external agencies

The City has formal written agreements with the BC Assessment Authority and the Land Titles Office to obtain and use their data for administrative purposes. Other agreements are less

formalized. The City's Legal Services Department has asked that official agreements be reached and documented, but this is still in process.

Where the data are used only on the internal version of VanMap, dissemination of externally supplied data probably does not present any legal difficulties, since this is considered strictly administrative use of the data. The public version of VanMap includes only a very small amount of externally supplied data, consisting of some address information supplied by the Land Titles Office and sewer trunk data obtained from build designs provided by the Greater Vancouver Regional District.

Research by the City of Vancouver Archives will be required to determine the legal and/or moral obligations associated with preserving externally supplied data and eventually making those data available to the public.

22. What descriptive or other metadata schema or standards are currently being used in the creation, maintenance, use and preservation of the recordkeeping system or environment being studied?

The metadata applied by the VanMap developers include layer name; group name; scale at which the data become available; data currency status; responsible department, branch or division; and definition. Not all of these metadata are applied to all of the data layers.

Metadata generated automatically upon creation of the data have not yet been investigated.

23. What is the source of these descriptive metadata schema or standards (institutional convention, professional body, international standard, individual practice, etc.?)

The metadata are based on what the VanMap Team thinks will be useful information for the end user.

E. Glossary of Terms

This glossary is provided mainly for the purpose of reading and understanding this report, not necessarily because the terms can be added to the InterPARES 2 Glossary of Terms.

Centroid: A point to which information related to a polygon is attached. All polygons have centroids, although they may not always be visible. For example, an address is the kind of information that is attached to the centroid of a site polygon.

CSG: Community Services Group. A service grouping within the City of Vancouver that includes the following departments: Planning, Development Services, Licenses and Inspections, Social Planning, Non-Market Operations, Housing Centre, Office of Cultural Affairs. See organization chart in Appendix 3.

Data sheets: HTML pages created to explain the various features of VanMap, including the data layers.

DOMINO: A CSG scanning and workflow application used to process permit applications. Data are extracted from the workflow process and stored in PRISM.

GIS Sustainment Team: A unit within the City's Information Technology Department responsible for the technical aspects of producing VanMap.

Layer: An aggregation of data arranged in a logical grouping and given a name, such as "Peat Areas" or "2-Meter Contour Lines."

Layer Group: An aggregation of layers. For example, the layer group Street Lighting contains the layers named Junction Boxes, Poles, Service Panels, and Conduits.

License+: Business, dog, and vehicle license issuance system used by Community Services. Some of the data generated by this system are extracted to VanMap on a weekly basis.

Orthographic photograph (orthophoto): An aerial photograph that has been processed (via a scanning and rectification process) in such a way as to eliminate image displacement due to camera tilt and terrain relief, so that it represents every object as if viewed directly from above.

Polygon: A shape formed by line segments that are placed end to end, creating a continuous closed path. Examples of VanMap polygons are zoning areas and local areas.

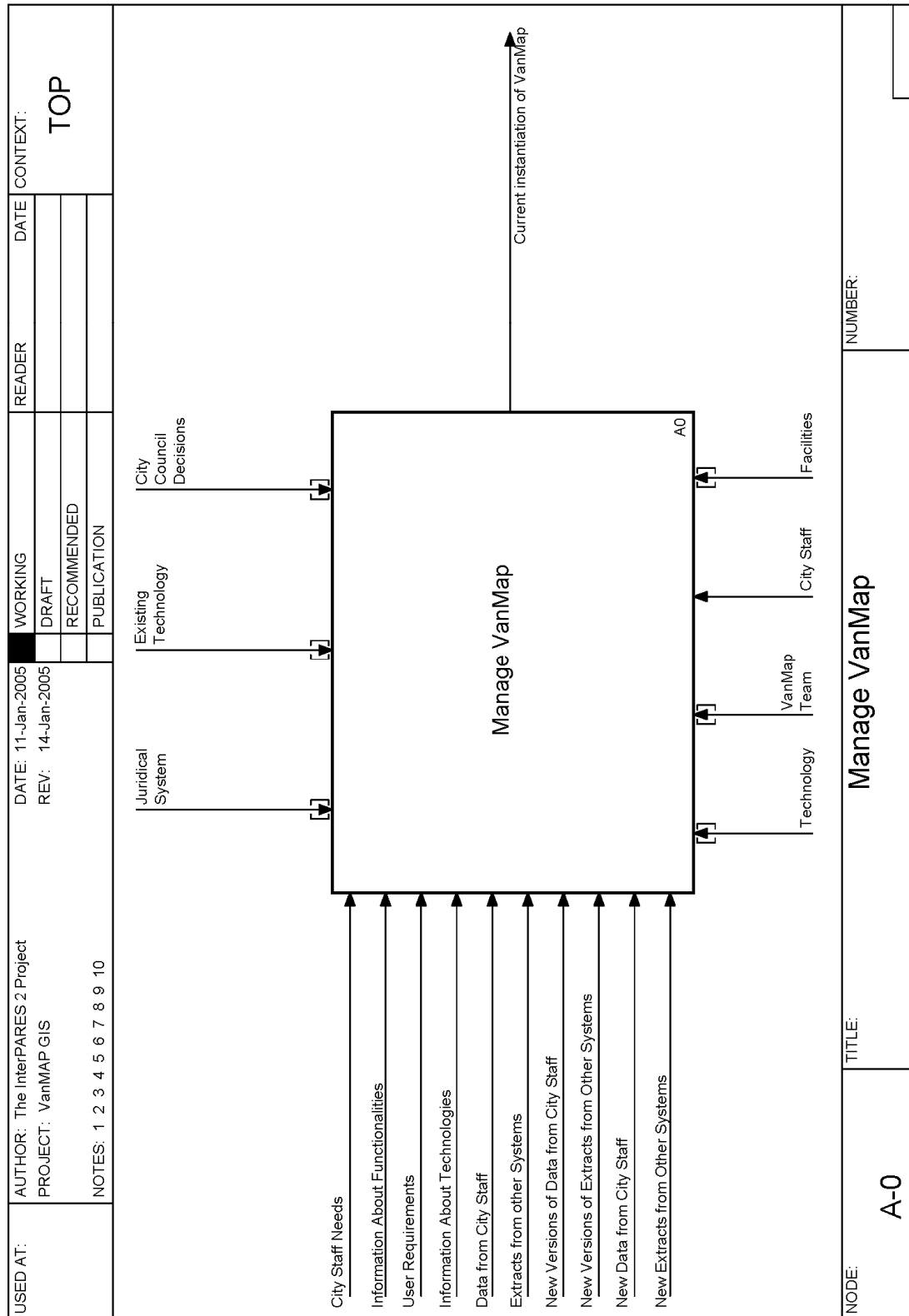
PRISM: Permit Review and Inspection System Manager. A mainframe system used by CSG to maintain property-related information by address. Includes permits applied for and issued, conditions that may affect the issuance of a permit, building attributes, applicant information, fees and other data pertaining to permits. Some of the data are extracted to VanMap on a weekly basis.

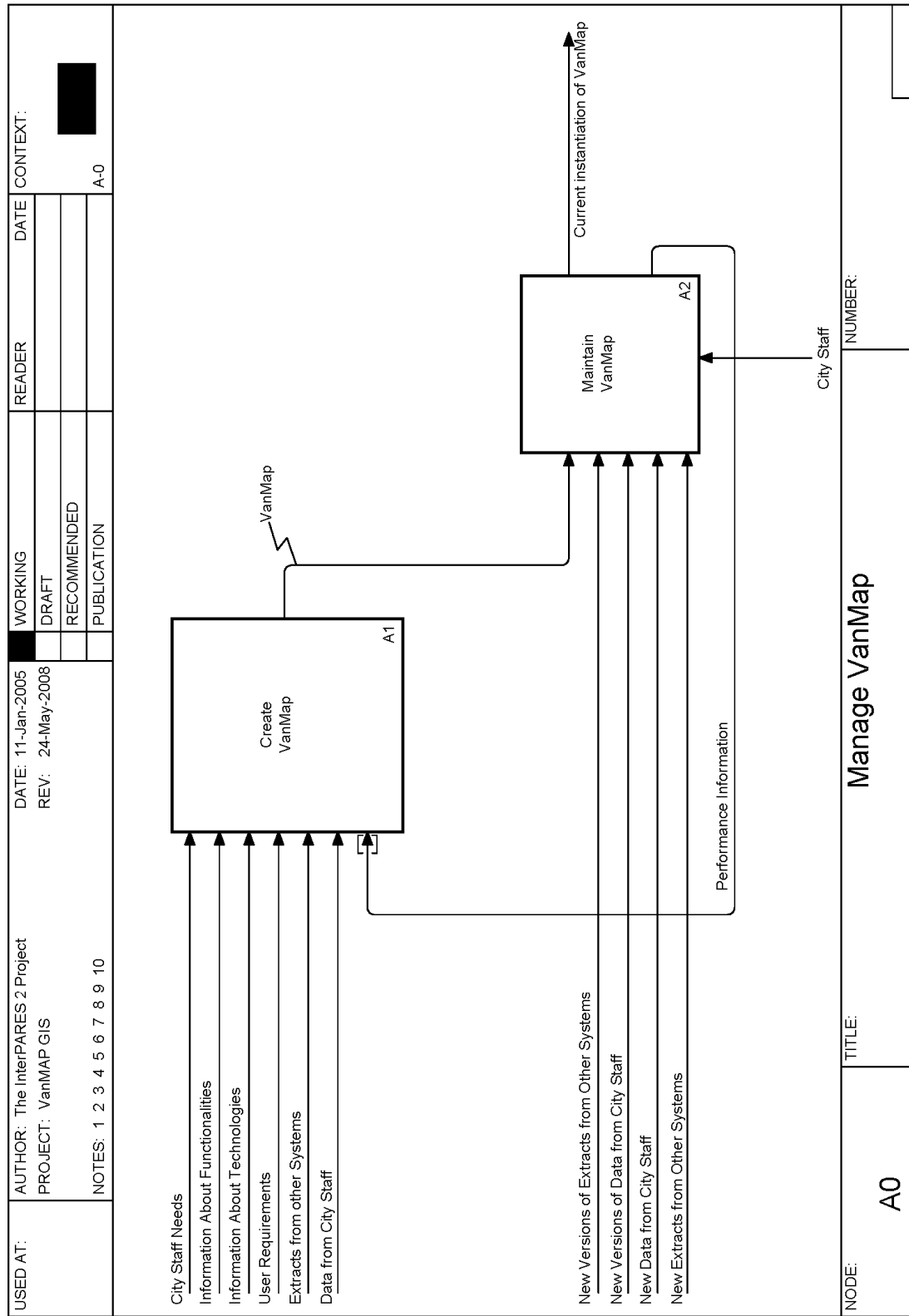
Reportal: A window used for viewing reports in VanMap. To open a reportal, the user double-clicks on a map feature, usually a centroid.

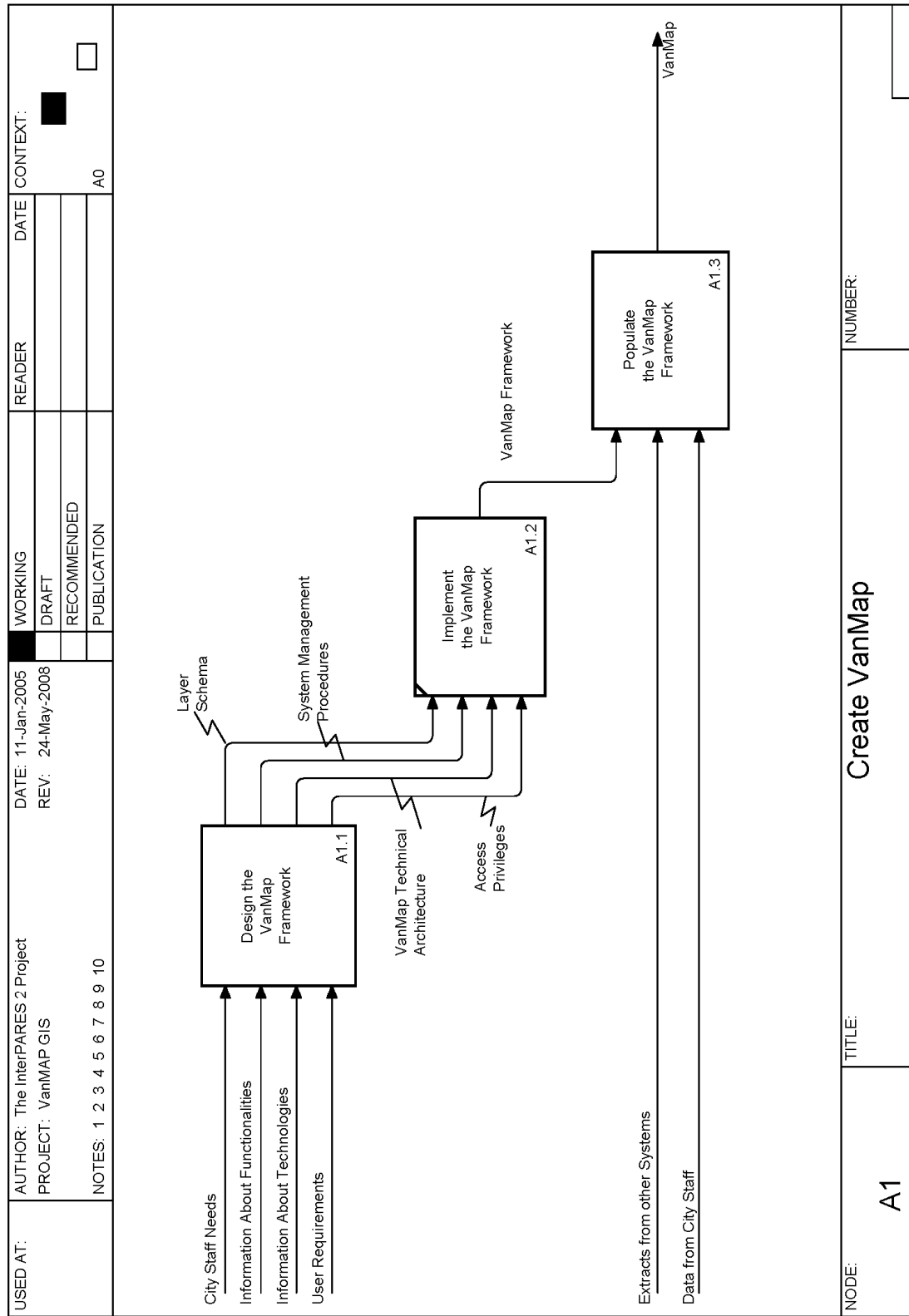
Map window file: A MapGuide ActiveX Viewer window comprising the VanMap toolbar, legend and interactive maps.

VanMap Team: A unit within the City's Information Technology Department responsible for the overall development and direction of VanMap. The Team includes members of the GIS Sustainment Team, representatives from other divisions of the Information Technology Department, and representatives from the departments supplying the data.

F. IDEF0 Activity Model





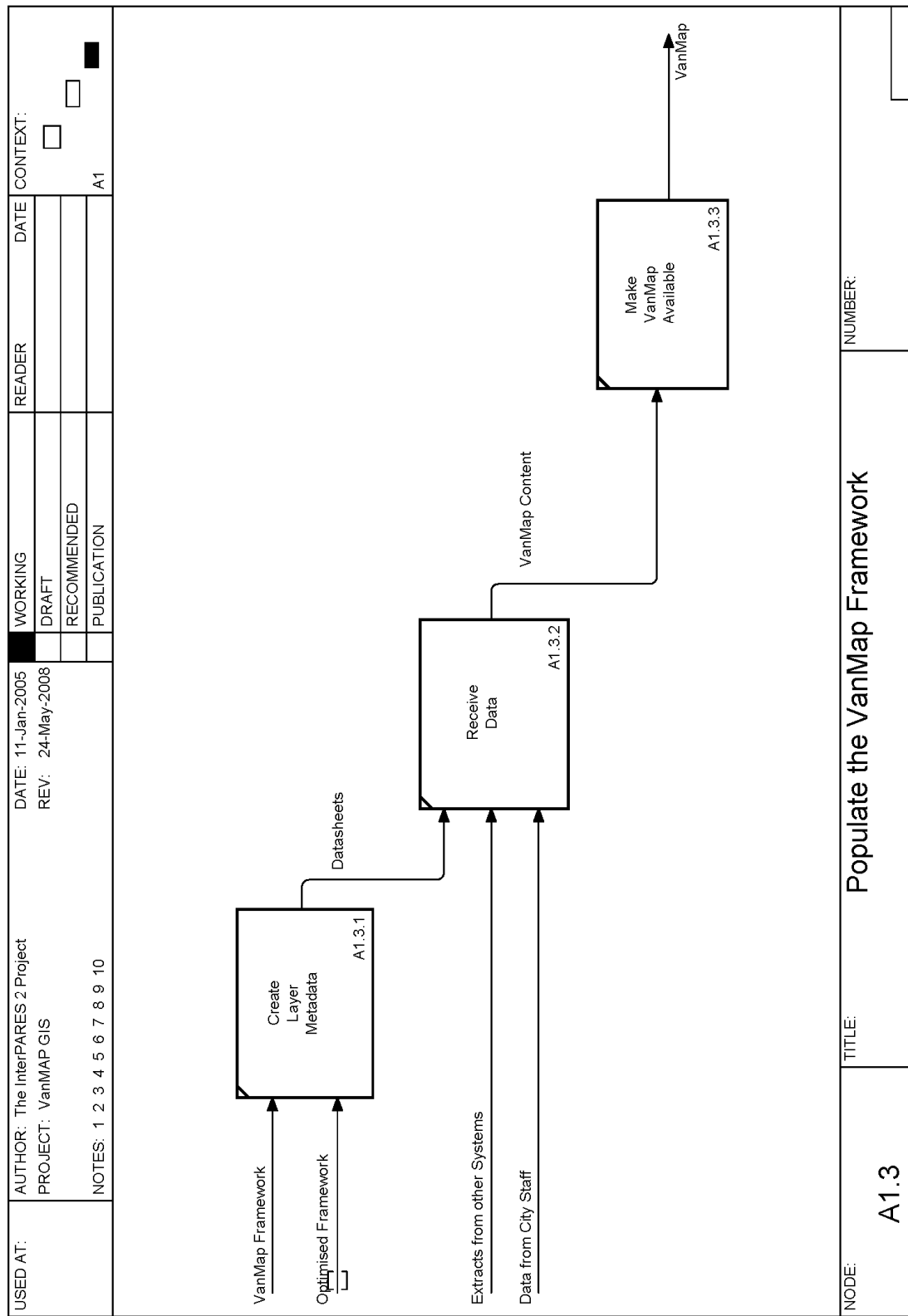


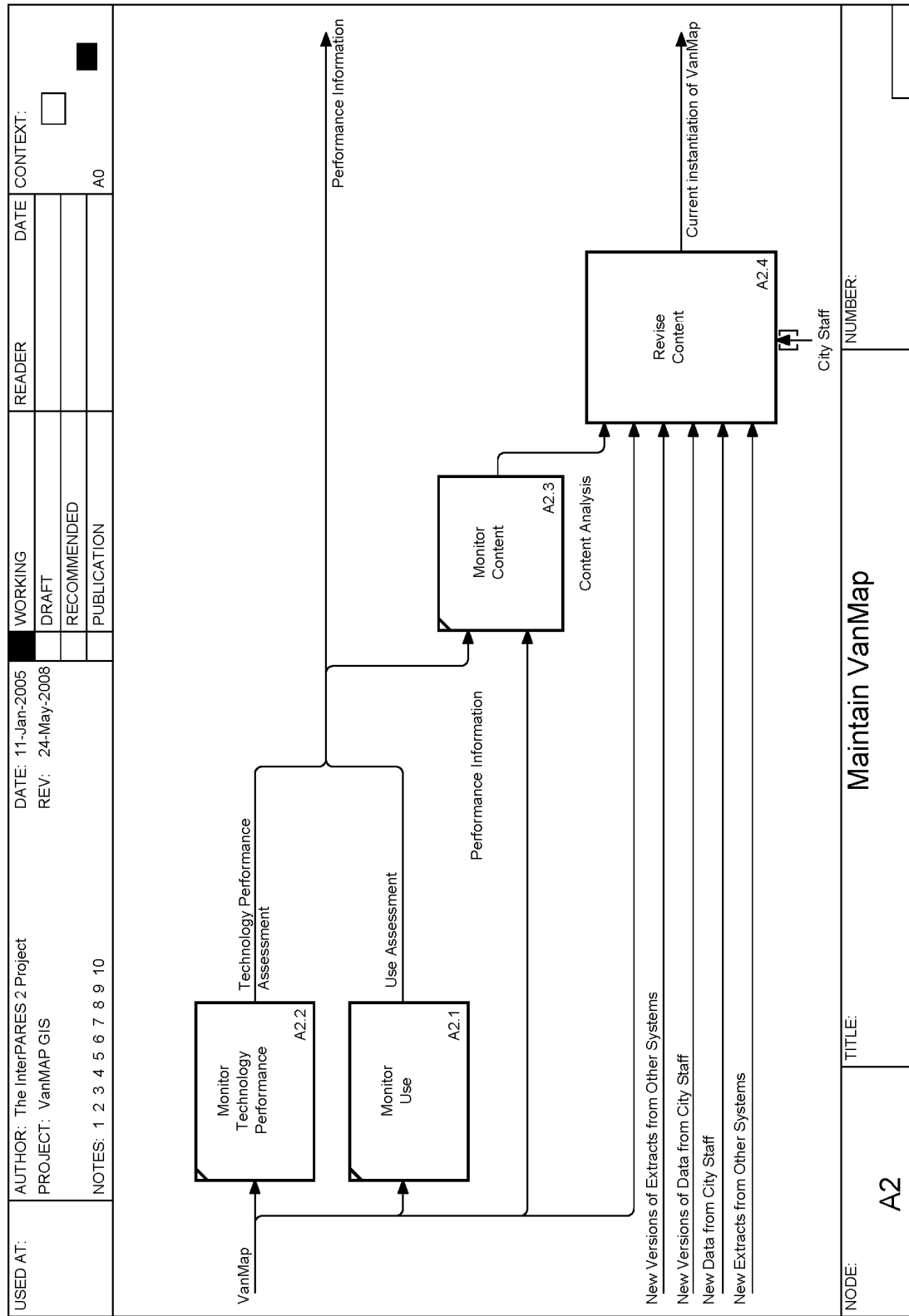
USED AT:	AUTHOR: The InterPARES 2 Project PROJECT: VanMAP GIS	DATE: 11-Jan-2005 REV: 24-May-2008	WORKING DRAFT RECOMMENDED PUBLICATION	READER	DATE	CONTEXT:
	NOTES: 1 2 3 4 5 6 7 8 9 10					A1


```

graph TD
    CSN[City Staff Needs] --> DL[Determine Layers A1.1.1]
    DL --> DF[Determine Functionality A1.1.2]
    DF --> ST[Select Technology A1.1.3]
    ST --> DP[Develop Procedures A1.1.4]
    DP --> AP[Access Privileges]
    DP --> SMP[System Management Procedures]
    
    LS[Layer Schema] --> DL
    SR[System Requirements] --> DF
    VTA[VanMap Technical Architecture] --> ST
    UR[User Requirements] --> DP
  
```


NODE: A1.1	TITLE: Design the VanMap Framework	NUMBER:
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USED AT:	AUTHOR: The InterPARES 2 Project PROJECT: VanMAP GIS	DATE: 14-Jan-2005 REV: 24-May-2008	WORKING	READER	DATE	CONTEXT:
			DRAFT			<input type="checkbox"/>
			RECOMMENDED			<input type="checkbox"/>
			PUBLICATION			A2

<p>Content Analysis</p> <p>VanMap</p> <p>New Versions of Extracts from Other Systems</p> <p>New Versions of Data from City Staff</p> <p>New Data from City Staff</p> <p>New Extracts from Other Systems</p>	<p>Correct Data A2.4.3</p> <p>Update Data and Extracts A2.4.2</p> <p>Add Data and Extracts A2.4.1</p>	<p>Corrected Data</p> <p>Updated Data</p> <p>Added Data</p> <p>Current instantiation of VanMap</p>
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<p>NODE: A2.4</p>	<p>TITLE: Revise Content</p>	<p>NUMBER:</p>
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USED AT:	AUTHOR: The InterPARES 2 Project PROJECT: VanMAP GIS	DATE: 11-Jan-2005 REV: 24-May-2008	WORKING DRAFT RECOMMENDED PUBLICATION	READER	DATE	CONTEXT: TOP
<p>NOTES: 1 2 3 4 5 6 7 8 9 10</p> <div style="text-align: center;"> <pre> graph TD A0[Manage VanMap A0] --> A1[Create VanMap A1] A0 --> A2[Maintain VanMap A2] A1 --> A1_1[Design the VanMap Framework A1.1] A1 --> A1_2[Implement the VanMap Framework A1.2] A1 --> A1_3[Populate the VanMap Framework A1.3] A2 --> A2_1[Monitor Use A2.1] A2 --> A2_2[Monitor Technology Performance A2.2] A2 --> A2_3[Monitor Content A2.3] A2 --> A2_4[Revise Content A2.4] </pre> </div>						
NODE: A0		TITLE: Manage VanMap			NUMBER:	

CS24 – VanMap, IDEF0 Model Activity Definitions (20050605)			
Activity No.	Activity Name	Activity Definition	Activity Note
A2.4.3	Add Data and Extracts	To input new data produced by departmental business activities and new extracts from external systems.	
A2.4.1	Correct Data	Edit data that are found to be inaccurate in the course of conducting business activities.	
A1.3.1	Create Layer Metadata	To input the data that identify and provide information about the layers.	
A1	Create VanMap	To design, implement and maintain the VanMap framework	
A1.1	Design the VanMap Framework	Defines the layer schema, system management procedures, VanMap technical architecture, and access privileges.	
A1.1.2	Determine Functionality	To establish the ways in which data can be input, accessed, manipulated, and represented.	
A1.1.1	Determine Layers	To identify the groupings of data that are necessary to support the business activities of the City.	
A1.1.4	Develop Procedures	To determine how new layers are designed, how and how often the extraction from others systems takes place, how and what the staff will input directly, and how the monitoring will take place. To delegate responsibility for carrying out these activities.	
A1.2	Implement the VanMap Framework	Build and deploy a data-ready system, system management procedures, access privileges	
A2	Maintain VanMap	To monitor the technology performance, the use and content of VanMap, and to revise the content.	
A1.3.3	Make VanMap Available	To publish VanMap to the City of Vancouver Intranet.	
A0	Manage VanMap	To manage the VanMap framework, issue VanMap and maintain VanMap.	
A2.3	Monitor Content	To examine content data to establish continuing relevance and existence of gaps.	
A2.2	Monitor Technology Performance	To keep track of the ability of the technology to support the required functionalities.	
A2.1	Monitor Use	To keep track of users activities and identify problems.	
A1.3	Populate the VanMap Framework	To evaluate performance, revise technology and functionality, and revise layers and procedures.	
A1.3.2	Receive Data	To accept data input by City staff, extracts from other systems and datasheets.	
A2.4	Revise Content	To correct, update and add data.	
A1.1.3	Select Technology	To choose hardware and software to support the system requirements.	
A2.4.2	Update Data and Extracts	To replace data with up-to-date information.	

CS24 – VanMap, IDEF0 Model Arrow Definitions (20050605)		
Arrow Name	Arrow Definition	Arrow Note
Access Privileges	The permissions (including the capability) given to users to input, modify, delete, and access data.	
Added Data	New data produced by departmental business activities and new extracts from external systems.	
City Council Decisions	Decisions taken by the city council about overall development of VanMap and the financial resources supporting it.	
City Staff	City departments personnel authorised to input and correct data within VanMap.	
City Staff Needs	The data reference requirements of City business units.	
Content Analysis	An examination of content data to establish continuing relevance and existence of gaps.	
Corrected Data	Data that have been edited to eliminate inaccuracies.	
Current instantiation of VanMap	The version of VanMap that is active at any given time.	
Data from City Staff	Data keyed in or drawn directly into the GIS database by city staff.	Traffic counts and CAD drawings are examples of information inputted into the GIS database.
Datasheets	HTML pages created to explain the various layers of VanMap, in the form of metadata.	
Existing Technology	The state of technology used for creating, storing, and rendering geo-spatial data.	
Extracts from other Systems	Subsets of data assembled by the VanMap team from the content of external systems.	
Facilities	Offices of the City of Vancouver	
Information About Functionalities	Information about current capabilities of GIS.	
Information About Technologies	Information about available hardware and software.	
Juridical System	The regulatory environment in which VanMap is generated, maintained, and made accessible. It includes City by-laws and policies, and relevant provincial and federal legislation.	
Layer Schema	The list of layers (sets of data arranged in a logical grouping on the basis of the business process) including their relationships.	
New Data from City Staff	Data resulting from new activities or information.	
New Extracts from Other Systems	Subsets of data imported from external systems resulting from new activities or information.	
New Versions of Data from City Staff	The most recent import of data entered by City staff.	
New Versions of Extracts from Other Systems	The most recent import of data extracted from other systems.	
Optimised Framework	The VanMap framework as revised after its assessment.	
Performance Information	Feedback provided by the users and the system on the ability of VanMap to fulfil its	

CS24 – VanMap, IDEF0 Model Arrow Definitions (20050605)		
Arrow Name	Arrow Definition	Arrow Note
	purposes.	
System Management Procedures	Procedures for inputting, updating, making available and maintaining the data, and procedures for updating the system.	
System Requirements	The capabilities that system must have.	
Technology	The hardware and software used to create, store, and disseminate VanMap.	
Technology Performance Assessment	Evaluation of the ability of the technology to support the required functionalities.	
Updated Data	Data that have replaced out-of-date data.	
Use Assessment	The evaluation of use and identification of problems.	
User Requirements	The needs of those who contribute data. These include, but are not limited to, budget allocations and technological resources.	
VanMap	A web-based map system managed by the City of Vancouver Information Technology Department.	
VanMap Content	All of the data included within VanMap.	
VanMap Framework	The data-ready architecture, including software and hardware, access privileges, system management and data input procedures, and related responsibilities.	
VanMap Team	The team responsible for managing VanMap. It consists of the head of GIS, programmer/analysis, graphics planner, systems co-ordinator, GIS support analyst.	
VanMap Technical Architecture	The sum of the layer schema, functionalities and technologies, constituting VanMap.	

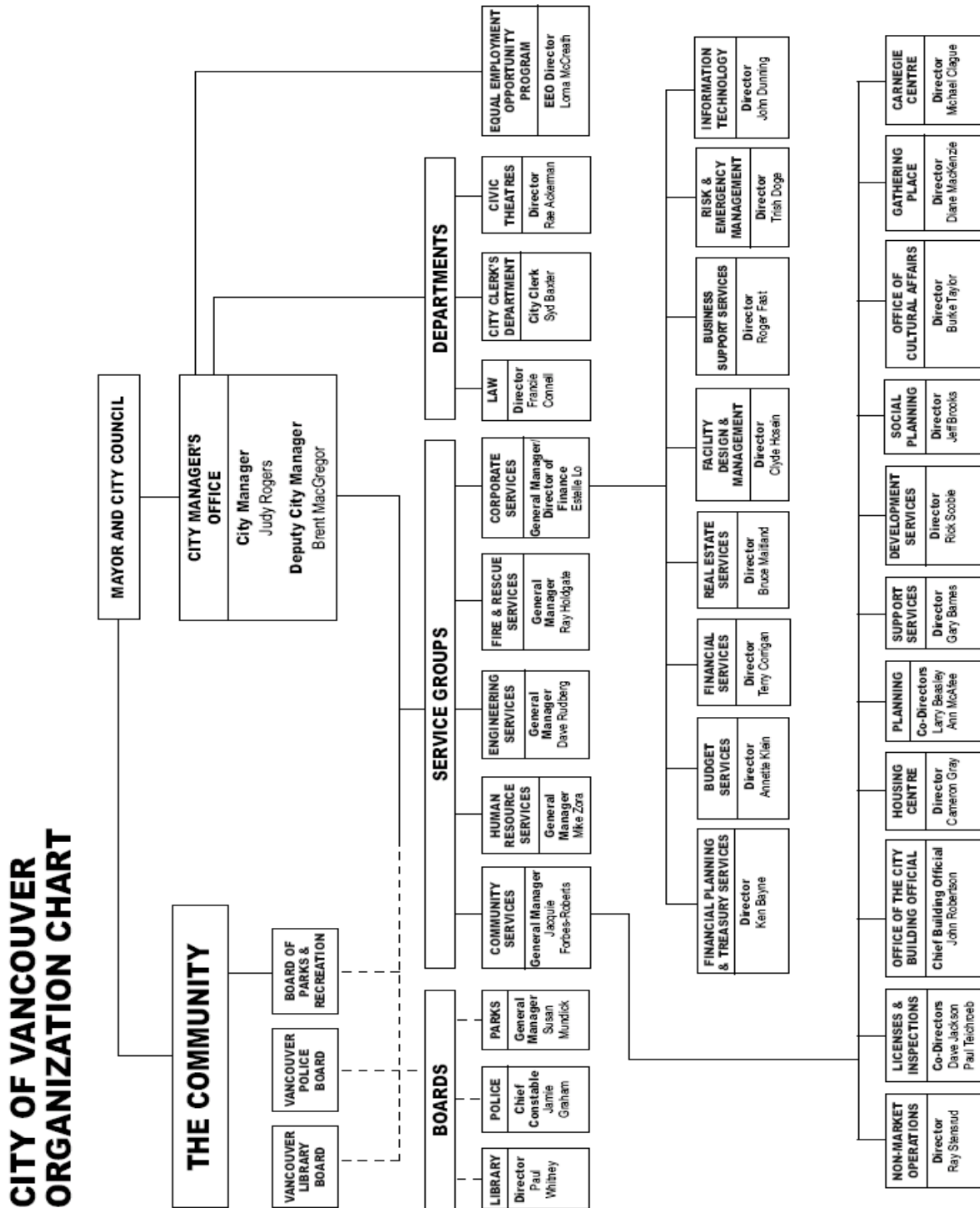
Appendix 1: List of layers in internal version of VanMap (as of Sept. 2004)

360 Networks Duct	Private Streets
AT & T Cables	Property Addresses, Property Address Number
AT&T Manholes	Property Information
BC Gas, now Terasen Gas	Property Dimensions
BC Hydro – Pole, Stub, Distribution Box, Distribution Duct, Transmission Duct, Duct Label, Manhole	Property Endowment Fund
Bikeways	Property Use Inspection Districts
Block Outlines	Proposed Ward Boundaries
Building Footprints	Protected Licenses
Business Improvement Areas	Public Art
Building Lines	Public Housing Fund
Business License Sites	Public Places
Cadastral Boundaries (property/lot lines)	Public Streets
Central Heat Steam Pipe, Manhole	Public Street Names
City Boundary	Reference Streets
City-Owned Properties	Right-of-Way Widths
City Projects	Road Closures
Conduits, Street Lighting	Service Panels, Street Lighting
Contour Lines	Sewer Mains
DCL Areas	Sewer Manholes
Dedicated Fire Protection System Hydrants	Shaw Cable Duct, Shaw Cable Pole
Dedicated Fire Protection System Mains	Shore Lines (1999) and Sea Shore Lines (2002)
Dedicated Fire Protection System Valves	Split Zones
Dog License Sites	Street Furniture
Dog Off-leash Areas	Street Intersections
Downstream Inverts	Street Lighting
Facet Grid Layout	Street Operations District Foreman's Areas
Facet Grid Polygons	Subdivision Categories
False Creek Navigable Channel	Survey Control Monuments
Film Office Work Areas	Telus Box, Duct, Pole, Stub
Grow Operations	TeraSpan Duct
GT Duct	Tie Lines
GVRD Trunk Sewers	Traffic Circle
Heritage	Traffic Counts
Hooked Sites	Traffic Signals
Junction Boxes, Street Lighting	Under Construction
Land Purchase Fund	Upcoming Projects
Lanes	Upstream Inverts
Local areas	View Cones
Lot Numbers	Water Bodies
Multiple Buildings	Water Distribution Mains
Non-City Streets	Water Hydrants
Non-Market Housing	Water Hydrant Labels
Novus Duct	Water Large Valves
October 16 Voting Places	Water Large Valve Labels
Orthophotos	Water Pressure Zones
Parks	Water PRV Stations
Parks Fund	Water PRV Station Labels
Peat Areas	Water Transmission Mains
Pole, Street Lighting	Youth driven organizations
Pop-Growth 91-96	Zoning Districts (with CD-1 numbers and thematic mapping)
Private Encroachment	

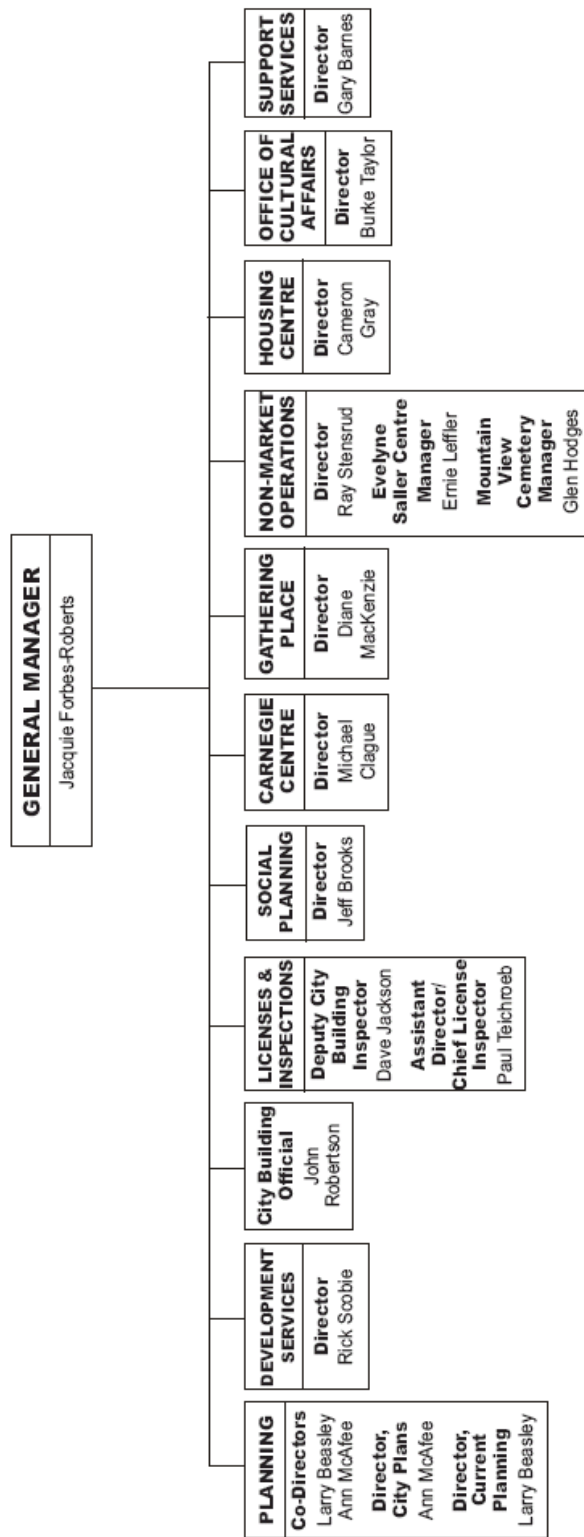
Appendix 2: List of layers in public version of VanMap (as of Sept. 2004)

Bikeways	Property/Lot Lines (Cadastral Boundaries)
Block Outlines	Property Use Inspection Districts
Building Footprints (Downtown only)	Proposed Ward Boundaries
Building Lines	Public Art
Business Improvement Areas	Public Places
City Boundary	Public Street Names
City Projects (Street-based)	Public Streets
Community Centres	Reference Streets
Conduits, Street Lighting	Right-of-Way Widths
Contour Lines	Road Closures
DCL Areas	Service Panels, Street Lighting
Dedicated Fire Protection System Hydrants	Sewer Mains
Dedicated Fire Protection System Mains	Sewer Manholes
Dedicated Fire Protection System Valves	Shore Lines (1999) and Sea Shore lines
Dog Off-leash Parks	Shore Lines 2002
Facet Grid Layout	Split Zones (Property Information)
Facet Grid Polygons	Street Intersections
False Creek Navigable Channel	Street Operations District Foreman's Areas
Film Office Work Areas	Subdivision Categories
GVRD Trunk Sewers	Tie Lines
Heritage	Traffic Circles
Hooked Sites	Traffic Counts
Junction Boxes, Street Lighting	Traffic Signals
Lanes	Under Construction
Local Areas	Upcoming Projects
Lot Numbers	View Cones
Multiple Buildings	Water Bodies
Non-City Streets	Water Distribution Mains
Non-Market Housing	Water Hydrant Labels
October 16 Voting Places	Water Hydrants
Orthophotos 2002	Water Large Valves
Parks	Water Pressure Zones
Poles, Street Lighting	Water Transmission Mains
Private Streets	Youth Driven Organizations
Property Addresses	Zoning Districts (with CD-1 numbers and thematic mapping)
Property Dimensions	

Appendix 3: City of Vancouver Organizational Charts (2004 and 2005)



COMMUNITY SERVICES GROUP



ENGINEERING SERVICES ORGANIZATION CHART

