Control Points for Landsat 7 Imagery, Canada, Level 1 Product Specifications

Edition 1.0.1

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REVISION HISTORY

Date	Version	Description
March 2004	1.0	Original Version
August 2005	1.0.1	New values for attribute Planimetric Source Type

FUTURE WORK

Keyword	Description

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ACRONYMS AND ABBREVIATIONS

CDED	Canadian Digital Elevation Data
CPLIC1	Control Points for Landsat 7 Imagery, Canada, Level 1
CTI	Centre for Topographic Information
GDAL	GeoBase Data Alignment Layer
GML	Geography Markup Language
NTDB	National Topographic Data Base
NTS	National Topographic System
UML	Unified Modeling Language
URN	Updated Road Network
UTF-8	Unicode Transformation Format - 8 Bits
UUID	Universal Unique Identifier

TERMS AND DEFINITIONS

Centre of mass

The centre of gravity (centre of mass) of a surface is the planimetric position defined as the mathematical centre of gravity of a closed surface. By definition, this point can be located outside the polygon it represents (e.g.: centre of gravity of a lake or island).

Control point context

Entity serving as a reference for the control point resulting from vectorization of a topographic feature or of a physical phenomenon on a raw Landsat 7 image. This entity makes it possible to rapidly locate the control point.

Control data

The data as a whole (control points and control point context) that constitute the Control Points for Landsat 7 Imagery, Canada, Level 1, product.

Intersection

Location (position) at which two or more topographic features intersect.

Control point

Point whose geographic coordinates derive from an intersection of two linear topographic features or a centre of mass of a surficial topographic feature and that was used for the geometric correction of Landsat 7 satellite imagery. The control points come from different data sources; priority in selection is given to:

- entity types yielding the best outcome;
- the most accurate data sources.

1 Overview

Control Points for Landsat 7 Imagery, Canada, Level 1 (CPLIC1) consist of a set of georeferenced points that are readily identifiable at various map scales. Along with the Landsat 7 orthoimages, they comprise one of the two components of the GeoBase Data Alignment Layer (GDAL).

The control points were used for the geometric correction of Landsat 7 satellite imagery. They can also be used to correct vector data and for simultaneously displaying data from several sources prepared at different scales or resolutions.

The control data come from different sources; selection priority is given to the most accurate sources. The normal ranking in decreasing order is: Updated Road Network (URN) vector data, provincial vector data, accurate National Topographic Data Base (NTDB) data, federal aerotriangulation data, and other sources. Accuracy is assessed for each control point. The control data, which have been extracted from the sources indicated above, can be comprised of vector data from road intersections or centres of gravity of lakes and islands. In some cases, the centre line of a river represented as a surface may have been used.

Each control point is unique and its position is determined to simultaneously cover the greatest possible number of Landsat 7 images (location in areas of image overlap). Control points are distributed homogeneously within the image depending on specific sectors. The sectors are located around the image perimeter, in the image's areas of lowest and highest elevation, as well as the areas in which adjacent images overlap.

A map context is also associated with each control point (control point context). The intersections of linear topographic features (road, railway, watercourse, etc.) and the perimeters of lakes and islands are extracted in order to facilitate identification of control points. The reference entities result from vectorization of perceptible topographic features extracted from Landsat 7 source images.

The control points will cover the entire Canadian landmass. Control point availability is directly related to the production of Landsat 7 orthoimages, which began in 1999 and will be completed in spring 2005.

Control data are distributed as geographic coordinates. The product is available in these file formats: GML (*Geography Markup Language*) ASCII and SHAPE (ESRI™).

2 Data Identification

2.1 Spatial resolution (scale)

The control points are generated from different data sources that have different spatial resolutions: provincial data at the 1:10 000 and 1:20 000 scales, and federal data mainly at the 1:50 000 scale.

The control point contexts (reference geometries) result from the digitization of topographic features detected in Landsat 7 satellite imagery with a spatial resolution of 15 m.

2.2 Language

The CPLIC1 data and related documentation are available in French and English.

2.3 Character set

The character encoding standard used for data in GML is UTF-8 (*Unicode Transformation Format - 8 Bits*).

2.4 Topic category

The main data themes are vector data, control points, reference points, geometric correction, satellite imagery, planimetry, topography, location, and the GeoBase Data Alignment Layer (GDAL).

2.5 Geographic box

The encompassing geographic rectangle or minimum bounding rectangle (MBR) delimiting coverage of all existing and planned CPLIC1s in Canada:

- West bounding longitude: 141° West (or -141°)
- East bounding longitude: 52° West (or -52°)
- North bounding latitude: 83° North (or 83°)
- South bounding latitude: 41° North (or 41°)

2.6 Geographic description

The control points will cover the entire Canadian landmass. The availability of control points is directly related to the production of Landsat 7 orthoimages, which will be completed in spring 2005

2.7 Extent

The temporal domain covered by control data content extends from 1999 to 2003.

The elevation interval (minimum and maximum values) for control points is expressed with respect to mean sea level:

- The minimum elevation value is 0.
- The maximum elevation value is 2576.
- The unit of measure for elevation is the metre (m).
- The altimetric reference system used is the Canadian Geodetic Vertical Datum 1928 (CGVD28).

3 Geospatial Features

3.1 Spatial representation type

The spatial representation used to represent control data is the vector.

3.2 Spatial representation

The control point is a two-dimensional (2-D) point entity. The control point elevation (height) is not represented in entity geometry, but is stored as an attribute.

The control point context is composed of two linear features (segments) or a two-dimensional surficial entity.

3.3 Coverage and continuity

The control data cover the entire Canadian landmass south of the 83rd parallel. They are used to generate Landsat 7 orthoimages , which is the second component of the GeoBase Data Alignment Layer. Each control point is unique and its position is determined to simultaneously cover the greatest possible number of Landsat 7 images (location in areas of image overlap).

3.4 Data segmentation

NOT APPLICABLE

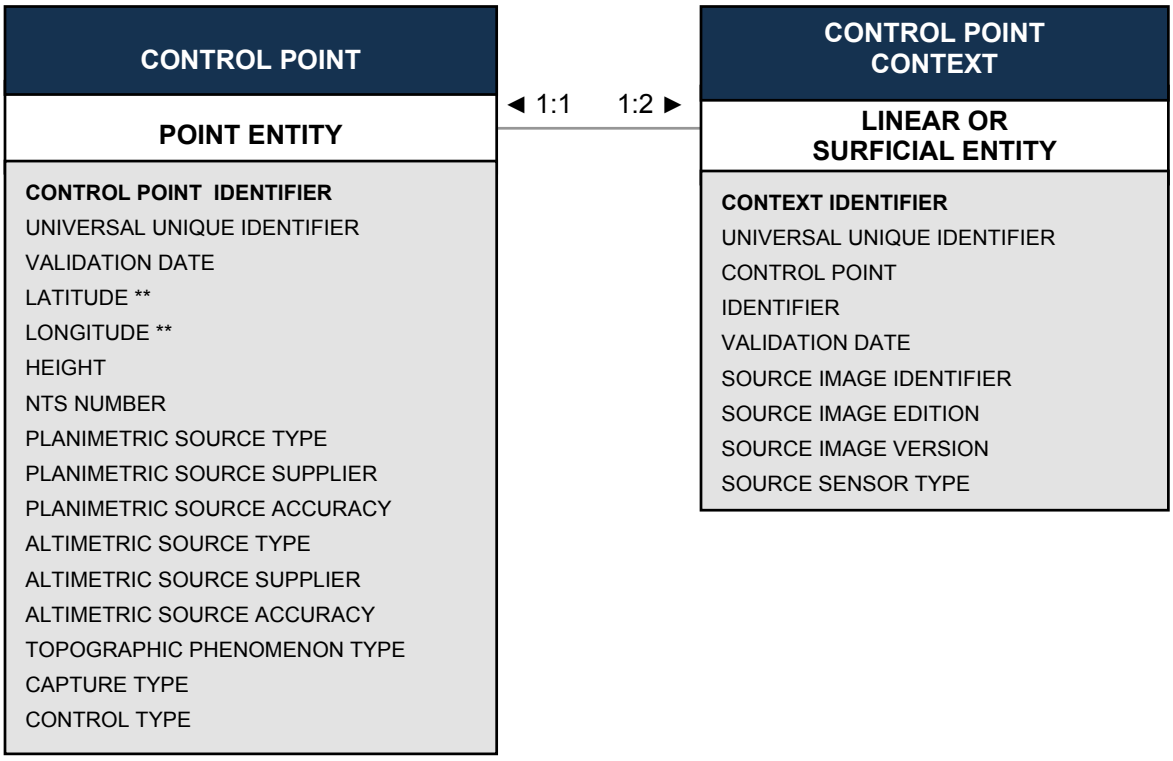
4 Data Model

4.1 Data modelling schema used

The data modelling schema used is in the UML (*Unified Modeling Language*) format.

4.2 Application schema (conceptual model)

The following diagram illustrates the data model that applies to the product. The Control Points for Landsat 7 Imagery, Canada, Level 1 (CPLIC1) are represented in GeoBase by point entities (*Control point*) and control point reference entities (*Control point context*). The entity *Control point* can either be an intersection point or a centre of mass. The entity *Control point context* represents two types of vector features: intersection of two straight-line segments (road, railway, river, etc.) or a surface, that is, the delimitation of a surficial entity (lake, island, etc.). The entity *Control point context* results from vectorization of topographic features extracted from Landsat 7 source images.



NOTE: ** This attribute is generally part of the entity's geometry.

Each occurrence of the entity *Control point* is unique and independent. There is no relationship or association between occurrences of the entity *Control point* or with other external entities. The same holds for the entity *Control point context*. Even if the data model does not show the relationship between the two entities, each occurrence of entity *Control point* is associated with one or two occurrences of the entity *Control point context* via the attribute *Identifier point control* in order to facilitate localization. The entity *Control point* (type: intersection point) is superimposed (touches) on the intersection of the linear occurrences of the entity *Control point context*. The entity *Control point* (control type: centre of mass) is included in the surficial entity *Control point context*.

5 Data Dictionary / Entity Catalogue

5.1 Control point

ATTRIBUTE NAME	DATA TYPE (OUTPUT FORMAT)	DESCRIPTION
CONTROL POINT IDENTIFIER	STRING	Unique identifier of the control point. The 14-digit number is determined from the time and date of its insertion in the database.
UNIVERSAL UNIQUE IDENTIFIER	STRING	The Universal Unique Identifier (UUID) of the control point. The 32-character string is determined with a universal unique code generation procedure.
VALIDATION DATE	STRING (9999/99/99)	The date on which the entity was entered in the control point database.
LATITUDE	NUMBER (99.9999999)	The latitude of the entity expressed in decimal degrees.
LONGITUDE	NUMBER (-999.9999999)	The longitude of the entity expressed in decimal degrees.
HEIGHT	NUMBER (9999)	The elevation in metres above mean sea level. Height is determined from the most accurate data source used.
NTS NUMBER	STRING (999A99)	The identifier for the National Topographic System (NTS) map at the 1:50 000 scale on which the control point is located.
PLANIMETRIC SOURCE TYPE	STRING	The identification of the planimetric data source used in creating the control point. The list of codes is given in Section 5.3.
PLANIMETRIC SOURCE SUPPLIER	STRING	The name of the supplier of the planimetric source data used in creating the control point. This name identifies the organization that produced the data. The list of names is given in Section 5.3.
PLANIMETRIC SOURCE ACCURACY	NUMBER (999)	The accuracy of the planimetric data source used to locate the control point. The accuracy value is expressed in metres.

ATTRIBUTE NAME	DATA TYPE (OUTPUT FORMAT)	DESCRIPTION
ALTIMETRIC SOURCE TYPE	STRING	Identification of the altimetric data source used in creating the control point. The list of codes is given in Section 5.3.
ALTIMETRIC SOURCE SUPPLIER	STRING	The name of the supplier of the altimetric data source used in creating the control point. This name identifies the organization that produced the data. The list of names is given in Section 5.3.
ALTIMETRIC SOURCE ACCURACY	NUMBER (999)	The accuracy of the altimetric data source used to locate the control point. The accuracy value is expressed in metres.
TOPOGRAPHIC PHENOMENON TYPE	STRING	The type of topographic phenomenon represented by the control point. The list of codes is given in Section 5.3.
CAPTURE TYPE	NUMBER (9)	The capture code that qualifies the entity type (data source) used in generating the control point. The list of codes and descriptions of capture types is described in Section 5.3.
CONTROL TYPE	STRING	The description of the control type. The control point corresponds to one of the data types identified in Section 5.3.

5.2 Control point context

ATTRIBUTE NAME	DATA TYPE (OUTPUT FORMAT)	DESCRIPTION
CONTEXT IDENTIFIER	STRING	The unique identifier for the entity occurrence (reference geometry) of the control point context.
UNIVERSAL UNIQUE IDENTIFIER	STRING	The Universal Unique Identifier (UUID) of the control point context. The 32-character string is determined with a universal unique code generation procedure.
CONTROL POINT IDENTIFIER	STRING	The identifier of the control point represented by the control point context. The 14-digit number is determined from the time and date of its insertion in the database.
VALIDATION DATE	STRING (9999/99/99)	The date on which the entity was entered in the control point database.
IMAGE SOURCE IDENTIFIER	STRING (999999)	The identifier of the Landsat 7 source image used to generate the reference topographic vector entity at the control point. The identifier results from concatenating the image's track and frame numbers and takes the form: <track><frame>.
IMAGE SOURCE EDITION	NUMBER (99)	The edition of the Landsat 7 source image used to generate the reference topographic vector entity at the control point.
IMAGE SOURCE VERSION	NUMBER (99)	The version of the Landsat 7 source image used to generate the reference topographic vector entity at the control point.
SOURCE SENSOR TYPE	STRING	The type of Landsat 7 sensor used in generating the source image. The list of sensor types is described in Section 5.3.

5.3 Values of attributes with defined domains

Altimetric Source Supplier and Planimetric Source Supplier

AB	Alberta
BC	British Columbia
MB	Manitoba
NB	New Brunswick
NF	Newfoundland and Labrador
NS	Nova Scotia
NT	Northwest Territories
NU	Nunavut
ON	Ontario
PE	Prince Edward Island
PQ	Quebec
SK	Saskatchewan
YT	Yukon Territory
GC	Geomatics Canada, Natural Resources Canada

Altimetric Source Type

AEROTRIANGULATION	Aerotriangulation data
CDED 50K	Canadian Digital Elevation Data at the 1:50 000 scale
CDED 250K	Canadian Digital Elevation Data at the 1:250 000 scale
DEM	Digital Elevation Model
SCHUTT ORTHOPHOTO	Orthophoto according to Schutt's compensation

Capture Type

1 Capture type 1 is associated with the entities that can be easily delimited from the data source used, such as road intersections and lakes/islands.

Lakes/islands must comply with the following criteria:

- Minimum size of 22 500 m^2;
- Completely contained within the source used;
- Width greater than 60 m, or width less than 60 m and length less than 60 m of the overall area if the lake includes a bay (cove, river branch).
- Exclusions: Lake/island with dam, intermittent lake, lake/island adjacent to a wetland or sand, lake with an island with less than 60 m of shoreline, lake/island with less than 60 m of shoreline with another lake/island.

2 Capture type 2 is associated with entities that do not yield good accuracy; the entity selection priority that follows is in decreasing order:

- Lake/island meeting minimum size requirements and touching, or within a swamp, an area of sand, or touching a dam;

- Lake/island meeting minimum size requirements and less than 60 m from another lake/island.
- Lake/island not meeting minimum size requirements but not touching a swamp, an area of sand, or touching a dam.
- Lake/island not meeting minimum size requirements and less than 60 m from another lake/island.
- Intersection of a road or railway with a watercourse.
- Lake/island not meeting minimum size requirements and touching or within a swamp.
- Intermittent lake meeting or not meeting minimum size requirements.
- Intersection of 2 watercourses.

Capture type 2 entities are used only when there are not enough capture type 1 entities.

3 Capture type 3 is entirely different from the other two types.

Capture type 3 entities are used only when there are not enough capture type 2 entities.

Control Type

CM	Centre of mass
INT	Intersection

Planimetric Source Type

AEROTRIANGULATION	Aerotriangulation data
GPS	Global Positioning System (GPS) in dynamic/active mode
IKONOS ORTHOIMAGE	IKONOS orthoimage
IKONOS STEREO IMAGERY	IKONOS stereoscopy imagery
LANDSAT 7 ORTHOIMAGE	Landsat 7 orthoimage
LANDSAT 7 SWATH	Swath of Landsat 7 image(s)
NTDB	National Topographic Data Base (1:50 000)
ORTHOPHOTO	Orthophoto
SCHUTT ORTHOPHOTO	Orthophoto according to Schutt's compensation
SPOT ORTHOIMAGE	SPOT orthoimage
URN	Updated Road Network
VECTOR	Vector data

Source Sensor Type

L7PAN	Landsat 7, panchromatic band, 15-m spatial resolution

Topographic Phenomenon Type

INT1	Intersection - watercourse/watercourse	**CM1**	Centre of mass - waterbody
INT2	Intersection - watercourse/road or watercourse/railway	**CM2**	Centre of mass - island
		CMA	Centre of mass - other
INT3	Intersection - road/road or road/railway		
INTA	Intersection - other		

6 Coordinate Reference System

6.1 Horizontal reference system

The spatial data are expressed in accordance with the North American Datum of 1983 Canadian Spatial Reference System (NAD83CSRS).

6.1.1 Horizontal coordinate system

The data are stored in geographic coordinates of latitude (ϕ) and longitude (λ).

6.1.2 Unit of measure (coordinate system axial units)

The measuring unit for storing geographic coordinates is the decimal degree, the mantissa comprising 6 significant digits (1×10^{-6}).

6.2 Vertical reference system

Spatial data are two-dimensional. Control point elevation (height) is provided as an attribute. Elevation is orthometric and expressed in reference to mean sea level (Canadian Geodetic Vertical Datum 1928).

6.2.1 Unit of measure (coordinate system axial units)

The unit of measure for storing the *height* attribute is the metre (m). The coordinate is expressed as in integers.

7 Data Quality

7.1 Scope

Data quality information applies to all control points and control point contexts (reference geometries) in the GeoBase Data Alignment Layer (GDAL). Nevertheless, each control point has different characteristics depending on the data source used to generate it.

7.2 Lineage

Control Point

The main steps in generating control points are:

- Select each control point to be generated in accordance with the appropriate data acquisition rules (based on predetermined control sectors for carrying out geometric correction of Landsat 7 images). The selection of control points also depends on the availability of the source control data used (Updated Road Network (URN), provincial vector data, National Topographic Data Base (NTDB), aerotriangulation data, other sources).
- Extract the control entities from the most accurate vector data source available.
- Extract the location (x, y) of the control point corresponding to an intersection of source linear entities (Road, Watercourse, Railway, etc.) or calculate the centre of mass for a source surficial entity (Lake, Island, etc.).
- Assign a unique identifier to each control point and store it in the control point database.
- Assign the elevation value as an attribute to the entity. Control point elevation (height) is extracted from the most accurate data source available at the time of capture: provincial Digital Elevation Model (DEM) at the 1:20 000 scale, Canadian Digital Elevation Data at the 1:50 000 and 1:250 000 scales, photogrammetric model (aerotriangulation).

Control Point Context

The main steps leading to the generation of the reference geometry are:

- Digitize (vectorize) the control point contexts in image coordinates (pixel, line) from the Landsat 7 source image.
- Transform the projection by quadratic regression from the reference entity's image coordinates (pixel, line) to geographic coordinates.
- Displacement (or translation) of the reference entity's geographic coordinates in order to superimpose it on the position of the corresponding control point (intersection point or centre of mass).

7.3 Completeness

All the valid control points are available. For every control point, a control point context (reference geometry) is produced for each Landsat 7 source image which is orthorectified by the Centre for Topographic Information in Sherbrooke. One of the contexts available for each control point is distributed and is randomly selected.

7.4 Logical consistency

NOT APPLICABLE

7.5 Positional accuracy

Control Point

The position of the control point is extracted from the most accurate data source available when the point is created. The planimetric accuracy of the source data is identified as an attribute for each entity occurrence. A certain number of data sources have been used to create the control points: provincial vector data, roads from the Updated Road Network (URN), National Topographic Data Base (NTDB) data, and geometrically rectified aerial photos (orthophotos).

The control point elevation (height) is extracted from available digital elevation models (DEM): provincial DEMs and Canadian Digital Elevation Data (CDED) at the 1:50 000 and 1:250 000 scales. The value of the source data's altimetric accuracy is attributed to the control point.

Control Point Context

The planimetric accuracy of the control point context's geometry cannot be determined. It consists of an entity produced solely for visual reference.

7.6 Temporal accuracy

Control Point

The capture date of the source data used to generate the control point is unknown.

Control Point Context

The capture date of the Landsat 7 source image used to generate the geometry of the control point context makes it possible to determine the feature's temporal reference. Given the cartographic nature of this information, the date is not distributed with the product. It can be accessed through the metadata of GeoBase Landsat 7 Orthorectified Imagery over Canada.

7.7 Thematic (attributes) accuracy

NOT APPLICABLE

8 Metadata

There are normally two levels of metadata to describe a product as illustrated in the figure below: *collection* and *product/dataset*. The higher level of metadata covers the entire data collection: it applies to the available series of datasets available (groups of entities), to the database, and so on. The other level, called the *product or dataset,* contains information specific of each dataset.

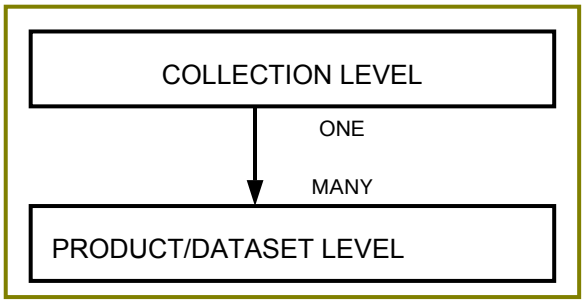


Figure 1: Metadata level

In the case of Control Points for Landsat 7 Imagery, Canada, Level 1 (CPLIC1), metadata exist only for the entire collection. There are no metadata at the product level because all CPLIC1 entities belong to the same database.

CPLIC1 metadata are available at the GeoBase portal (http://www.geobase.ca in the data section) and at the GeoConnections discovery portal (http://geodiscover.cgdi.ac in the data section).

9 Data Presentation / Data Transfer Format / Physical Model

9.1 Conversion process

CPLIC1 data are stored in a Oracle/SDE database and converted in GML or SHAPE format.

9.2 Files

Each compressed file for delivery contains two datasets: control points and control point context, in addition to metadata in XML format. Both datasets are available according to the following three spatial coverages: Canada, province/territory, and Landsat 7 image.

9.3 Directories

NOT APPLICABLE

9.4 Point entities

NOT APPLICABLE

9.5 Linear entities

NOT APPLICABLE

9.6 Surficial entities

NOT APPLICABLE

10 Data Delivery

10.1 Format information

The file formats available for the data are GML *(Geography Markup Language*) ASCII and SHAPE (ESRI™). Appendix A contains the name and type of data for each attribute in both formats. Appendix B contains a sample CPLIC1 dataset in GML (ASCII) format.

The dataset is delivered in a compressed format (zip).

The compressed file (zip) contains ESRI Shape or GML ASCII files.

10.2 Medium information

The datasets are available online from an FTP site. The customer is notified by e-mail when the order has been processed and the file is available for transfer.

10.3 Constraints information

The information related to constraints applying to data access and use is provided in the *GeoBase Unrestricted Use Licence Agreement* (http://www.geobase.ca/ in the Data section).

11 Data Capture and Maintenance

The product has a biannual maintenance interval (every six months). Moreover, no additional maintenance is planned after the product's completion date of spring 2005.

APPENDIX A Data Attributes in GML and SHAPE Format

CONTROL POINT

CPLIC1 ATTRIBUTE NAME	GML[1] ATTRIBUTE NAME	SHAPE ATTRIBUTE NAME	SHAPE DATA TYPE
CONTROL POINT IDENTIFIER	**controlPointIdentifier**	**CTRL_PT_ID**	char(14)
UNIVERSAL UNIQUE IDENTIFIER	universalUniqueIdentifier	UUID	char(32)
VALIDATION DATE	validationDate	VALID_DATE	char(10)
LATITUDE	latitude	LATITUDE	number(10,7)
LONGITUDE	longitude	LONGITUDE	number(12,7)
HEIGHT	height	HEIGHT	number(4,0)
NTS NUMBER	NTSNumber	NTS	char(6)
PLANIMETRIC SOURCE TYPE	planimetricSourceType	PLANI_TYPE	char(32)
PLANIMETRIC SOURCE SUPPLIER	planimetricSourceSupplier	PLANI_SUPP	char(2)
PLANIMETRIC SOURCE ACCURACY	planimetricSourceAccuracy	PLANI_ACCU	number(3,0)
ALTIMETRIC SOURCE TYPE	altimetricSourceType	ALTI_TYPE	char(32)
ALTIMETRIC SOURCE SUPPLIER	altimetricSourceSupplier	ALTI_SUPP	char(2)
ALTIMETRIC SOURCE ACCURACY	altimetricSourceAccuracy	ALTI_ACCU	number(3,0)
TOPOGRAPHIC PHENOMENON TYPE	topographicPhenomenonType	TOPO_TYPE	char(4)
CAPTURE TYPE	captureType	CAPTURE_TY	number(1,0)
CONTROL TYPE	controlType	CTRL_TYPE	char(3)

CONTROL POINT CONTEXT

CPLIC1 ATTRIBUTE NAME	GML[1] ATTRIBUTE NAME	SHAPE ATTRIBUTE NAME	SHAPE DATA TYPE
CONTEXT IDENTIFIER	**contextIdentifier**	**CONTEXT_ID**	char(32)
UNIVERSAL UNIQUE IDENTIFIER	universalUniqueIdentifier	UUID	char(32)
CONTROL POINT IDENTIFIER	controlPointIdentifier	CTRL_PT_ID	char(14)
VALIDATION DATE	validationDate	VALID_DATE	char(10)
SOURCE IMAGE IDENTIFIER	sourceImageIdentifier	SRC_IMG_ID	char(6)
SOURCE IMAGE EDITION	sourceImageEdition	SRC_IMG_ED	number(2,0)
SOURCE IMAGE VERSION	sourceImageVersion	SRC_IMG_VE	number(2,0)
SOURCE SENSOR TYPE	sourceSensorType	SRC_SENSOR	char(8)

[1] For GML format data type is always TEXT (STRING).

APPENDIX B Example of a CPLIC1 Dataset in GML Format

Extract from a CPLIC1 GML file –Control Point 20021029211712

```
<?xml version="1.0" encoding="UTF-8"?>
<CPLIC1:FeatureCollection xmlns:CPLIC1="http://www.geobase.ca/CPLIC1"
xmlns:gml="http://www.opengis.net/gml"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.geobase.ca/CPLIC1 CPLIC1.xsd">
<gml:boundedBy>
<gml:Box srsName="LL-83"><gml:coordinates>-140.9908142,41.7382254 -
52.727759,82.6032486</gml:coordinates></gml:Box>
</gml:boundedBy>
<gml:featureMember>
. . .
<CPLIC1:ControlPoint>
<CPLIC1:controlPointIdentifier>20021029211712</CPLIC1:controlPointIdentifier>
<CPLIC1:universalUniqueIdentifier>ea6b851ccd0849c09f42b06642ae9468</CPLIC1:uni
versalUniqueIdentifier>
<CPLIC1:validationDate>2002/10/29</CPLIC1:validationDate>
<CPLIC1:latitude>65.76881568</CPLIC1:latitude>
<CPLIC1:longitude>-134.3145183</CPLIC1:longitude>
<CPLIC1:height>393</CPLIC1:height>
<CPLIC1:NTSNumber>106E16</CPLIC1:NTSNumber>
<CPLIC1:planimetricSourceType>AEROTRIANGULATION</CPLIC1:planimetricSourceType>
<CPLIC1:planimetricSourceSupplier>GC</CPLIC1:planimetricSourceSupplier>
<CPLIC1:planimetricSourceAccuracy>5</CPLIC1:planimetricSourceAccuracy>
<CPLIC1:altimetricSourceType>AEROTRIANGULATION</CPLIC1:altimetricSourceType>
<CPLIC1:altimetricSourceSupplier>GC</CPLIC1:altimetricSourceSupplier>
<CPLIC1:altimetricSourceAccuracy>5</CPLIC1:altimetricSourceAccuracy>
<CPLIC1:topographicPhenomenonType>CM1</CPLIC1:topographicPhenomenonType>
<CPLIC1:captureType>1</CPLIC1:captureType>
<CPLIC1:controlType>CM</CPLIC1:controlType>
<gml:pointProperty>
<gml:Point srsName="LL-83"><gml:coordinates>-
134.3145183,65.7688157</gml:coordinates></gml:Point>
</gml:pointProperty>
</CPLIC1:ControlPoint>
. . .
</gml:featureMember>
</CPLIC1:FeatureCollection>
```

Extract from a CPLIC1 GML file –Control Point Context Area

```
<?xml version="1.0" encoding="UTF-8"?>
<CPLIC1:FeatureCollection xmlns:CPLIC1="http://www.geobase.ca/CPLIC1"
xmlns:gml="http://www.opengis.net/gml"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.geobase.ca/CPLIC1 CPLIC1.xsd">
<gml:boundedBy>
<gml:Box srsName="LL-83"><gml:coordinates>-140.9988937,41.73606 -
52.7232386,82.6047081</gml:coordinates></gml:Box>
</gml:boundedBy>
<gml:featureMember>
. . .
<CPLIC1:ControlPointContextArea>
<CPLIC1:contextIdentifier>11276</CPLIC1:contextIdentifier>
<CPLIC1:universalUniqueIdentifier>75bf030aaa4e4e019e50276d9d3756b0</CPLIC1:uni
versalUniqueIdentifier>
<CPLIC1:controlPointIdentifier>20021029211712</CPLIC1:controlPointIdentifier>
<CPLIC1:validationDate>2002/10/29</CPLIC1:validationDate>
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<CPLIC1:sourceImageEdition>1</CPLIC1:sourceImageEdition>
<CPLIC1:sourceImageVersion>0</CPLIC1:sourceImageVersion>
<CPLIC1:sourceSensorType>L7PAN</CPLIC1:sourceSensorType>
<gml:polygonProperty>
<gml:Polygon srsName="LL-83">
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