



**Corporate Services for the Natural Resource  
Sector**

**Information Management Branch**

---

# **NRS Physical Data Modeling Standards**

**Last Updated:**  
**Version:**  
**Document:**

August 20<sup>th</sup>, 2015  
2.4  
NRS\_Phys\_Mod\_Std\_v2\_4

# Table of Contents

1.	VERSION CONTROL .....	4
2	PREFACE .....	5
3	CONTACTS .....	5
4	SCOPE AND EXCLUSIONS.....	5
5	WHAT IS OSDB? .....	5
6	CHARACTER SET STANDARDS .....	6
7	DATE AND TIME ZONE STANDARDS.....	6
8	ACCOUNT NAMING STANDARDS .....	6
9	DATATYPE STANDARDS .....	7
10	RESTRICTED DATATYPES AND OBJECTS.....	8
11	PHYSICAL NAMING AND DESCRIBING STANDARDS.....	9
12	KEYS, CONSTRAINTS AND RELATIONSHIPS.....	12
13	SPATIAL STANDARDS .....	13
14	LOGGING, AUDITING AND ARCHIVING STANDARDS.....	13
15	DATABASE SECURITY STANDARDS.....	13
16	REPLICATION STANDARDS .....	15
17	STORAGE AND PERFORMANCE STANDARDS .....	15
18	ORACLE FEATURE USAGE .....	16
19	ORACLE MULTITENANT CONSIDERATIONS .....	17
20	FLASHBACK DATA ARCHIVE (FBA) STANDARDS.....	17

**21 SPARX ENTERPRISE ARCHITECT ATTRIBUTES..... 18**

**22 APPENDIX A – STANDARD ABBREVIATIONS..... 18**

## 1. Version Control

Document Version	Date	Author(s)	Change Reference
1.0	20141223	Jeff Card	Initial Draft
1.1	20150227	John Lancaster	V1.1 Reviewed
1.1	20150305	Dave Skea	Input on spatial standards
1.2	20150326	John Lancaster	V1.2 reviewed
2.0	20150401	Jeff Card	V2.0 Created
2.1	20150408	Jeff Card	Additional updates, indexing, EA
2.1	20150413	Jeff Card	Comments from Kevin Guise
2.1	20150414	Jeff Card	Comments from Ron Robb
2.2	20150422	Jeff Card	V2.2 DA Comments, Additions and Document Reformatting
2.3	20150505	Jeff Card	More DA comments, Additions from Other Gov't agencies, Document reformatted and reordered
2.4	20150820	Jeff Card	Changed document name to NRS Physical Data Modeling Standards, changed spelling of 'modelling' to 'modeling'

## 2 Preface

This document is intended for NRS IMB technical staff and development teams working on behalf of the NRS to deliver database entities to the sector. The physical data model standards are designed to guide database development in the NRS Oracle Database environment and inform the physical modeling exercise within Sparx Enterprise Architect.

*The physical data modeling effort is only to proceed following the approval of the logical data model from the NRS [IMB Data Architecture](#) team.* NRS logical data modeling standards can be found [here](#).

## 3 Contacts

All inquiries should be directed to the Database Administrator (DBA) assigned to the project or contact the NRS IMB Database Administration group mailbox at [CSNRDBA@gov.bc.ca](mailto:CSNRDBA@gov.bc.ca)

## 4 Scope and Exclusions

The scope of this document covers all database physical models delivered or maintained by the sector and largely pertains to the database architecture for the Operational Spatial Temporal Database being delivered as part of the NRS ISSS Strategy. Where there are conflicts with previous or other existing documented standards, please consult with the Business Portfolio Manager assigned to your project. Developers are encouraged to provide feedback on these standards, and routinely check for updates to the NRS Physical Modeling Standards prior to commencing their project.

## 5 What is OSDB?

OSDB is an integrated, sector wide data store being referred to as the “Operational Spatial-Temporal Database”. It is a physical representation of Natural Resource Sector information using consistent and standardized spatial and temporal modeling techniques.

This document outlines several physical modeling standards to inform database and application development within the NRS. Note: the standards in this document are in reference to the Oracle database release 12C or greater.

## 6 Character Set Standards

- All NRS Oracle Databases are created using the AL32UTF8 (Unicode) Character Set and the AL16UTF16 National Character Set

## 7 Date and Time Zone Standards

- Database servers and databases will be configured to use the UTC time zone with no offset
  - The purpose of this configuration is to be agnostic to daylight savings time
  - Application developers must code accordingly and are discouraged from using Javascript date/time calculations
- DATE datatype should be used unless true timestamp (ie. sub-second granularity) is required.
  - In cases where sub second granularity is required **TIMESTAMP** is used
  - Columns using **DATE** are be suffixed with **\_DATE**
  - Columns using **TIMESTAMP** are suffixed with **\_TIMESTAMP**
- Effective/Expiry Date vs Valid Time Modeling
  - Depends on business requirements around data visibility
    - valid time modeling obscures historical data from the ‘current’ view but allows queries to be executed “AS OF” a point in time
    - effective/expiry date applies if the user requires current visibility into historical events
    - see entity naming standards
  - In some cases both scenarios apply

## 8 Account Naming Standards

- Application Schemas:
  - used to host business and/or application data
  - application schemas are prefixed with **APP\_<application\_acronym>**
  - application schema names do not include references to organization or business unit names
  - application schema names should reference business themes (e.g. **APP\_WATER**)
- Proxy Accounts:
  - used to connect application servers to database servers
  - account name prefixed with **PROXY\_<application\_acronym>\_<role>**
  - proxy accounts are configured from a single known source (i.e. OFM)
  - proxy accounts are not permitted to own database objects

- unless an exemption is issued, access to data for proxy accounts is done via RBAC (role based access control) – see Security Standards
- Named user accounts:
  - explicitly for use by a person/individual
  - must match IDIR or BCEID userid
  - are subject to password strength and expiry policies
- Distributed database accounts:
  - for use with Oracle database links to interconnect two or more databases
  - inbound database link access accounts – DBLINK\_<acronym>

## 9 Datatype Standards

- Strings and Characters:
  - represented using the VARCHAR2 datatype
  - string lengths must be appropriate for the described attribute
- Numbers and Integers:
  - represented using the NUMBER(<length>,<scale>) datatype
- Dates and Timestamps:
  - represented using the DATE and TIMESTAMP datatypes
  - DATE datatype should be used unless true timestamp (i.e. sub-second granularity) is required
- Boolean values (true/false):
  - represented using the VARCHAR2(1) datatype combined with a “Y/N” check constraint
  - in cases where a business rule allows NULL in a Boolean column consult with the IMB Data Architecture group to obtain an exception
- Spatial features:
  - represented using the SDO\_GEOMETRY datatype
  - contains point, line or polygon data
- Unstructured content:
  - represented using the BLOB datatype
  - used to store non-relational data in the database such as documents and images

- DBA approval is required before implementing any unstructured data and will be reviewed on a case by case basis
- file size thresholds and data retention limits will apply to unstructured content being stored in the database
- unstructured content stored in BLOB's may require a separate table with a 1:1 relationship to the business table
- GUID's (Globally Unique Identifiers):
  - represented using the RAW(16) datatype
  - column to be named with \_GUID suffix
  - GUID's may be used as a primary key or surrogate key
  - if used as a primary key, there must be another unique business constraint (unique business key)
  - records using GUID as the primary key must transfer the GUID as part of any data replication processes (if using FME, RAW support introduced in FME 2015)
- URI's (Uniform Resource Identifiers):
  - represented using the VARCHAR2(2000) datatype
  - column to be named with \_URI suffix
  - includes URI and URL
  - note: use discretion when storing URI/URL in the database such that schemas in the non-production environment can be refreshed from production

## 10 Restricted Datatypes and Objects

- Use of the following datatypes is not permitted without DBA approval. It is recommended to seek approval prior to generating physical DDL
  - BYTE
  - RAW and LONG RAW (exception: columns containing GUID are to be stored as RAW(16))
  - CHAR, NCHAR and NVARCHAR2
  - ST\_GEOMETRY
  - BINARY FLOAT and BINARY\_DOUBLE
  - CLOB, NCLOB and BFILE
  - ROWID, UROWID and ROWNUM
  - PUBLIC SYNONYMS
  - DIRECTORIES



## 11 Physical Naming and Describing Standards

- General Naming Standards:
  - names in the physical model are referenced as singular (not plural)
  - names in the physical model are as descriptive as possible (within prescribed character length limits)
  - names in the physical model are strictly alphanumeric (and do not include punctuation) and must begin with a letter
  - names in the physical model are not case sensitive
  - names in the physical model do not duplicate the name of existing database objects and do not use Oracle Reserved Words (see below)
  - underscore “\_” is used as a separator for nouns/adjectives used in object naming
  - the use of abbreviations in object names is permitted (to keep within the 25 character limit) in some cases provided they are widely recognized or documented within NRS standards (e.g. MANAGEMENT=MGT)
    - See Appendix A – Standard Abbreviations
  
- Object Naming:
  - The following naming standards are applicable to all database objects:

Type	Prefix	Suffix
Primary Key	<table_name>	_PK
Foreign Key	<child_alias>_<parent_alias>	_FK
Unique Constraint	<table_name>	_UK
B-Tree Index	<table_alias>_<column_alias>	_IDX
R-Tree (Domain) Index	<table_alias>_<column_alias>	_DDX
Bitmap Index	<table_alias>_<column_alias>	_BDX
Function Based Index	<table_alias>_<column_alias>_<function>	_FDX
Sequences	<table_name>	_SEQ
Synonyms	<table_name>	_SYN
Triggers	<table_name>_<b/a> <i/u/d>	_TRG
Packages	<package_name>	_PKG
Views	<view_name>	_VW
Materialized Views	<mview_name>	_MVW
Database Link	<target_db> <target_user>	_LNK

- <table\_name> may be abbreviated, if necessary
- <column\_name> may be abbreviated, if necessary
- <child\_alias> and <parent\_alias>
  - aliases to be tagged within Enterprise Architect Project
  - remove vowels and consonants and/or abbreviate where it makes sense to produce a legible alias
- <b/a> = before or after <i/u/d> = insert, update or delete

- Table Naming:
  - table names are not to be prefixed with the application acronym
  - table names are restricted to a maximum of 30 characters in length
  - table names are defined in the singular (i.e. CLIENT\_ADDRESS and not CLIENT\_ADDRESSES)
  - it is mandatory to define an alias for each table within the logical model in Enterprise Architect for the purposes of using in index and/or constraint naming
    - The alias is limited to 8 characters such that two entity names can be combined to form constraint names (foreign keys)
  
- Column Naming:
  - column names are restricted to a maximum of 30 characters in length (including standard naming suffixes e.g. \_PK, \_GUID, \_FK)
  - In most cases, column names are defined in the singular (i.e. STREET\_NAME and not STREET\_NAMES)
  - spatial columns are named GEOMETRY
    - Only one spatial column is to be modelled in each table
  
- Table and Column Comments:
  - table comments will be included in the DDL for all tables in the physical model
  - column comments will be included in the DDL for all non-standard columns in the physical model
  - table and column comments must be descriptive such that they can relate to the business process around the collection of the data
  
- Audit Columns:
  - used to record user and time information (where necessary) at the row level
  - standard audit columns:
    - CREATE\_USER, CREATE\_DATE, UPDATE\_USER, UPDATE\_DATE
    - If sub-second granularity is required, time tracking attributes may use the TIMESTAMP(6) datatype
    - If TIMESTAMP(6) is used, time tracking attributes become CREATE\_TIMESTAMP and UPDATE\_TIMESTAMP
    - CREATE\_USER and UPDATE\_USER are the BCEID or IDIR username propagated from the application tier
    - For business requirements that MUST identify an individual as unique for auditing purposes, the model can optionally include CREATE\_USER\_GUID and UPDATE\_USER\_GUID (using the RAW(16) datatype)

- Special Naming Considerations:
  - Effective and Expiry Date:
    - used when there is a business requirement to “expire” data but still have it visible to the user interface
    - standard naming for this scenario is EFFECTIVE\_DATE and EXPIRY\_DATE
    - EFFECTIVE\_DATE and EXPIRY\_DATE use the DATE datatype unless sub-second granularity is required
    - if sub-second granularity is required, time tracking attributes may use the TIMESTAMP(6) datatype
    - if TIMESTAMP(6) is used, effective and expiry attributes become EFFECTIVE\_TIMESTAMP and EXPIRY\_TIMESTAMP
  - Optimistic Locking:
    - used to facilitate “check out, check in” of data in order to manage concurrent DML operations (e.g. for example in an airline booking system when a user selects a seat within a transaction such that another user cannot select it concurrently resulting in a deadlock)
    - also known as write locking, allows unlimited read access to a given object, but allows a client to modify the object only if the object has not changed since the client last read it.
    - standard naming for this scenario is REVISION\_COUNT
    - REVISION\_COUNT uses the NUMBER(10) datatype
    - order before audit columns
  - Globally Unique Identifiers:
    - used in the physical model to uniquely identify an individual or asset
    - standard naming for this scenario is <context>\_GUID
    - <context\_GUID> uses the RAW(16) datatype
- Constraint Naming:
  - where possible, foreign key constraint names should closely match the referenced key name
  - primary keys:
    - <table\_alias>\_PK
  - surrogate keys:
    - <table\_alias>\_ID
  - business keys:
    - <table\_alias>\_<column\_alias>\_UK

- foreign keys:
  - <child\_alias>\_<parent\_alias>\_FK
- check constraints:
  - <table\_alias>\_CHK
- Column Order:
  - Columns in the physical model are ordered in a consistent, standardized fashion
    - First : primary identifier, unique business keys
    - Second : business attributes, foreign keys (order based on common sense groupings)
    - Third : spatial column (if present)
    - Fourth : logging, auditing and time tracking columns
      - CREATE\_USER, CREATE\_DATE, UPDATE\_USER, UPDATE\_DATE, VALID\_START, VALID\_END
- Oracle Reserved Words:
  - use of Oracle Reserved Words are not permitted within entity names
  - reserved words are specific to database version and release and can be found by querying v\$reserved\_words in the Oracle database
  - [https://docs.oracle.com/database/121/SQLRF/ap\\_keywd001.htm#SQLRF55621](https://docs.oracle.com/database/121/SQLRF/ap_keywd001.htm#SQLRF55621)

## 12 Keys, Constraints and Relationships

- the physical model must provide a means to uniquely identify any row in any table
- indexes are used to enforce business rules and constraints and/or uniqueness
- where a surrogate key is used as the primary key standard practice is to also define a unique business key to avoid duplicate records and where this practice cannot be met approval from DBA must be obtained.
- referential integrity constraints are not permitted cross schema or cross database
- not all foreign key columns require indexes – depends on data volume and cardinality – consult with DBA
- surrogate keys, if required, are defined as follows:
  - <table\_name>\_ID using NUMBER(15) datatype
  - <table\_name>\_GUID using RAW(16) datatype
- logical model subtypes cannot exist in the physical model; they are resolved into one or more tables during table generation.

## 13 Spatial Standards

- all spatial data will be stored the Oracle RDBMS using Oracle's SDO\_GEOMETRY data type
- all spatial data will be represented in the BC Albers coordinate reference system (Oracle implementation of Geographics limits the precision that can be used which is too large for many of our applications)
- spatial metadata in the SDO\_GEOM\_METADATA\_TABLE will use the Oracle supplied SRID EPSG 3005 (not 100003005)
- physical entities will only have a single spatial attribute (GEOMETRY)
- all spatial attributes will have a spatial R-Tree index
  - INDEXTYPE IS MDSYS.SPATIAL\_INDEX
  - the USER\_SDO\_GEOM\_METADATA view must contain an entry with the dimensions and coordinate boundary information for the table column to be spatially indexed
- R-Tree index creation will consider specialized parameters where applicable; such as: SDO\_DML\_BATCH\_SIZE, LAYER\_GTYPE, WORK\_TABLESPACE
- SDO\_GEOMETRY features are limited to 524288 vertices (in 2D)
- SDO\_GEOMETRY data will be stored with xxx precision
- Quad Tree indexes are not permitted

## 14 Logging, Auditing and Archiving Standards

- transaction time will be captured using Oracle's Flashback Data Archive feature
  - see Flashback Data Archive Standards
- valid time will be implemented using the PERIOD FOR feature of the SQL 2011 Standard and will be physically modelled using VALID\_START and VALID\_END attributes (with VALID\_TIME system generated pseudo column)
  - These attributes have a datatype of TIMESTAMP(6)
- all lookup or reference entities include CREATE\_USER, CREATE\_DATE, UPDATE\_USER, UPDATE\_DATE logging auto populated by using [Identity Columns](#) or the persistence (JPA) layer
  - auditing attributes should appear last in column order

## 15 Database Security Standards

- security in the database is controlled using RBAC (Role Based Access Control)
  - all explicit object grants (e.g. grant select on <table\_name> to <user>) must be approved by the NRS DBA team
  - role naming standards are as follows:

- <schema>\_VIEWER : select/read access on all tables, views, materialized views in the schema. Grants for this role are limited to a single schema.
  - <schema>\_ADMIN : select/insert/update/delete on all tables, views, materialized views in the schema. Grants for this role are limited to a single schema.
  - <application>\_USER : hybrid user role based on application requirements
  - <application>\_SUPERUSER : hybrid admin role based on application requirements
  - Note : in some cases, <schema> and <application> will be the same
- the following privileges are NOT to be included in any DDL delivered to the NRS Database Administration team (note: this list is not inclusive and all security related DDL is subject to review and refusal) :
  - select | read | insert | update | delete | drop | lock | alter | comment any... table | user | view
  - select any dictionary
  - grant any object privilege
  - grant any privilege
  - execute any procedure
  - create public synonym
  - become user
  - force any transaction
  - create any \*
  - drop any \*
  - grant any \*
  - alter any \*
  - create | alter | drop..... role | profile
  - alter system | database | tablespace
  - unlimited tablespace
- do not create public synonyms or grant any privileges to PUBLIC unless previously approved by the NRS DBA team
- do not create public database links
  - private database link are permitted but require approval from the NRS DBA team
  - FME may be encouraged as an alternative solution to the hard dependency of database links
- do not apply grants WITH ADMIN OPTION unless previously approved by the NRS DBA Team
- database password policies will be enforced
  - Named user accounts will be setup with a password expiry interval of 60 days
  - Mixed case and alpha/numeric passwords are required

- profiles will be used against named user and application accounts to limit resource consumption (e.g. sessions\_per\_user)
- writing content to a database server filesystem is strictly prohibited

## 16 Replication Standards

- datasets that are to be replicated from OSDB to other databases must be fully compatible with Safe Software’s Feature Manipulation Engine (FME)
- datasets with a replication component must be delivered with corresponding FMW (FME Workbench File)
- fast Refresh is the preferred method for refreshing Materialized Views
  - Full refresh is only acceptable in cases where incremental refresh is not available
  - Note: Safe Software FME is the sector standard for data replication
  - Materialized views are acceptable in certain situations (DBA to approve)
- unless technically restricted, incremental replication is to be used (rather than full refreshes)
- replication granularity is scheduled daily, weekly, monthly or annually
  - Hourly or sub-daily replication requirements to be approved by DBA on a case by case basis
- replicated datasets are not to be modelled with RI (referential integrity)
  - If RI is mandatory, review and approval is required by the NRS DA and DBA teams
  - RI in replicated datasets requires restrictive firing order of replications and can cause cascading failures

## 17 Storage and Performance Standards

- Tablespace Naming:
  - <application\_acronym> for data (i.e. TANTALIS)
  - < application\_acronym>\_IDX for indexes (i.e. TANTALIS\_IDX)
- Tablespace clause in Oracle DDL:
  - include “TABLESPACE=<user>” for tables
  - include “TABLESPACE=<user\_IDX>” for all indexes
  - e.g create table TANTALIS.<table\_name> tablespace TANTALIS...
  - e.g. create index TANTALIS.<table\_name>\_pk tablespace TANTALIS\_IDX
- Bigfile tablespaces are to be used with the autoextend option (Exadata only)
  - i.e. create bigfile tablespace...autoextend on;
- Oracle partitioning must be considered for high volume data sets
  - when tables are partitioned the indexes are equi-partitioned

- partition management (ADD, SPLIT, DROP, EXCHANGE, MAX\_VALUES) must be discussed with DBA during physical design
- Historical data must be stored using Oracle Flashback Data Archive (FDA) technology
  - see FDA standards below
- Compression techniques must be considered for online archiving (e.g. Hybrid Columnar Compression)
- Indexing
  - indexing on Oracle Exadata differs from traditional Oracle database technology in that Exadata supports an implicit technique called storage indexing on the Exadata storage cells, meaning some traditional indexing techniques may not provide performance benefit
  - all SDO\_GEOMETRY attributes are to be indexed with an R-Tree index
  - do not apply B-tree indexes to small tables (lookup tables, code tables etc) that have an estimated volume of 1,000 rows or less
  - do not, by default, index attributes used in foreign key constraints (as was the case with Oracle Designer by default)
  - apply B-tree indexes to attributes in large tables that are most commonly used in the WHERE clause of run time views and application queries

## 18 Oracle Feature Usage

- Information below is intended to inform database designers and developers what Oracle database features are available to exploit when designing and developing physical data models and line of business applications:
- NRS has licensed the following Oracle features:
  - Oracle Database 12c Enterprise Edition
  - Oracle Database 12c Multitenant Option
  - Oracle Database 12c Partitioning Option
  - Oracle Database 12c Real Application Clusters
  - Oracle X4-2 Database Machine (includes HCC – Hybrid Columnar Compression)
- NRS has not licensed and is not permitted to use the following Oracle features:
  - Oracle Database 12c Advanced Compression Option
  - Oracle Database 12c Advanced Security Option
  - Oracle Database 12c Spatial and Graph (Oracle Locator is part of 12c Enterprise Edition)
  - Oracle Database 12c Active Data Guard Option
  - Oracle Database 12c Real Application Testing



## 19 Oracle Multitenant Considerations

- Specify CONTAINER = CURRENT to locally grant a system privilege, object privilege, or role to a user or role. The privilege or role is granted to the user or role only in the current PDB
  - E.g. alter session set container=current

## 20 Flashback Data Archive (FBA) Standards

- Flashback Data Archive is used to automatically track and archive historical versions of changes to tables enabled for flashback archive, ensuring SQL-level access to the versions of database objects without getting a snapshot-too-old error
- DBA Standards:
  - run the dbms\_flashback\_archive.extend\_mappings procedure to allow the seeding of historical data by accommodating older SCN values
  - run 'alter database add supplemental log data;' to add user context data to FBA data
  - enable user context tracking for transaction and lookup tables using DBMS\_FLASHBACK\_ARCHIVE.SET\_CONTEXT\_LEVEL(LEVEL => 'TYPICAL')
  - tablespaces for Flashback Data Archive are created for each application
  - create bigfile tablespace <application>\_FDA datafile <file> size <size>G autoextend on;
    - e.g. create bigfile tablespace tantalis\_fba datafile <file> size 1G autoextend on;
  - flashback Data Archives are created using the following syntax:
    - create flashback archive <application>\_FBA tablespace <application>\_FBA quota 10g retention 999 year;
    - e.g. create flashback archive tantalis\_fba tablespace tantalis\_fba quota 10g retention 999 year optimize data;
  - after enabling Flashback Data Archive on a table, Oracle recommends waiting at least 20 seconds before inserting data into the table, and waiting up to 5 minutes before using Flashback Query on the table.
- Developer Standards:
  - associate application tables together using DBMS\_FLASHBACK\_ARCHIVE.REGISTER\_APPLICATION, and then enable Flashback Data Archive on all those tables with a single command
  - to enable Flashback Archive on a table:
    - Alter table <table\_name> flashback archive <fda\_name>;

## 21 Sparx Enterprise Architect Attributes

- The following metrics must be gathered and populated with each entity such that DBA's can design the physical database accordingly:
  - VolumeInitialRecords – number of records to be initially populated in the entity
  - StorageInitialRecords – storage amount (in GB) to be initially populated in the entity
  - VolumeAnnualGrowthPercent – estimated annual percentage of growth
  - VolumeMaxRecords – estimated maximum record count
  - VolumeAverageAnnualRecords – estimated average number of new records annually
  - UserEstConcurrentAccess – estimated number of concurrent users for the application
  - DataOnlineRetentionPeriod – if known, time period data must stay online in the database
  - DataArchiveRetentionPeriod – if known, time period data must remain archived offline

## 22 Appendix A – Standard Abbreviations

ADDRESS	ADDR
ADMINISTRATION	ADMIN
ALTERNATE	ALT
AMOUNT	AMT
AMERICAN	USA
APPLICATION	APPL
AUTHORITY	AUTH
AVERAGE	AVG
BREASTHEIGHT	BH
BUSINESS	BUS
CANADIAN	CDN
CATEGORY	CAT
CLASSIFICATION	CLASS
CLIENT	CLI
COLLECTION	CLCTN
COLUMN	COL
COMMENT	CMT
COMMISSION	COMM
COMMITTEE	CTTE
COMPANY	CO
CONDITION	CONDTN
CONTROL	CTL
CONVERSION	CNV
COORDINATE	COORD
CORPORATION	CORP
CORRECTION	CRCTN
COUNT	CNT

CREDIT	CR
CROSS REFERENCE	XREF
DATE (Gregorian Date)	DT
DAY	DY
DESCRIPTION	DESC
DESTINATION	DEST
DEPARTMENT	DEPT
DETAIL	DTL
DEVELOPMENT	DEV
DIAMETER	DIAM
DIAMETER AT BREAST HEIGHT	DBH
DIAMETER INSIDE BARK	DIB
DIAMETER OUTSIDE BARK	DOB
DISTURBANCE	DISTRB
DOUBLE BARK THICKNESS	DBT
DISTRICT	DIST
DIVISION	DIV
DOCUMENT	DOC
EFFECTIVE	EFF
ELEMENT	ELMNT
ERROR	ERR
ESTIMATE	EST
EXECUTIVE	EXEC
EXPIRY	EXP
FACTOR	FCTR
FEDERAL	FED
FORESTS LANDS AND NATURAL RESOURCE OPERATIONS	FLNRO
GROUP	GRP
HARVEST	HARV
HECTARES	HA
HEIGHT	HGHT
HOUR	HR
IDENTIFICATION	ID
INDEX	IDX
INDICATOR	IND
INITIAL	INIT
INVENTORY	INV
JURISDICTION	JURIS
LATITUDE	LAT
LENGTH	LEN

LETTER	LTR
LICENCE	LIC
LOAD	LD
LOCATION	LOCN
LONGITUDE	LONG
MANAGEMENT	MGT
MAXIMUM	MAX
METERS CUBED	M3
METERS SQUARED	M2
METHOD	MTHD
MINIMUM	MIN
MINUTE	MN
MONTH	MO
NAME	NM
NUMBER	NO
ORGANIZATION	ORG
PAYMENT	PAY
PERCENT	PCT
PERMIT	PRMT
PIECE	PCE
POSITION	POS
PREVIOUS	PREV
PRIMARY	PRI
PRODUCT	PROD
PROJECT	PROJ
QUANTITY	QTY
RECEIVED	RECV
REFERRED	REF
REGION	REG
REGISTRATION	REGN
RESPONSE CENTRE	RC
REQUEST	RQST
REQUIRED	REQ
REQUIREMENT	RQMT
RETURN	RET
REVENUE	REV
SCHEDULE	SCHED
SCREEN	SCR
SEARCH	SRCH
SECONDARY	SEC
SECTION	SECT

SEQUENCE	SEQ
SERVICE	SRVC
SILVICULTURE	SILV
SOURCE	SRCE
SPECIES	SPP
STATEMENT	STMT
STATUS	STS
STATUTORY	STAT
STATISTICS	STATS
TENURE	TENR
TEXT	TXT
TIMBER	TMBR
TIMBER SUPPLY AREA	TSA
TIMBER SUPPLY BLOCK	TSB
TIME	TM
TIMESTAMP	TS
TITLE	TTL
TOTAL	TOT
TRANSACTION	TXN
TREATMENT	TRTMT
TYPE	TYP
USERID	UID
VALUE	VAL
VERSION	VER
VISITATION	VISIT
VOLUME	VOL
WITHDRAWAL	WD
WEIGHT	WGT
YEAR	YR
YEAR-TO-DATE	YTD