Munsys 14

ADMINISTRATOR'S REFERENCE GUIDE

Munsys® Administrator's Reference Guide

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Chapter 1
Introduction

Overview

Welcome to the Munsys Administrator's Reference Guide. This guide is organized as follows:

- **Chapter 1: Introduction**, provides a brief introduction to each of the Munsys applications. You will be familiarized with the Munsys data security policy (this will be discussed in more detail in chapters to follow). The Munsys architecture section provides information about how Munsys®, Autodesk® and Oracle® fit together.
- **Chapter 2: Configuration**, provides information about simplifying the task of configuring a new or upgraded system. Licensing information about both server and client is provided. The process to configure a user environment, which includes the definition of the geographical area of interest, is explained.
- **Chapter 3: Application make-up**, introduces you to the "building blocks" of a Munsys application and how they fit together. The client and database components are discussed separately.
- **Chapter 4: Munsys Management Console**, provides information about the configuration of the Munsys schema, which forms the basis of the system. Once you have studied this chapter, you will know about the Munsys system tables, roles that are granted during a schema creation and conventions that are followed when naming the various tables.
- **Chapter 5: Munsys Administration**, provides recommendations on how to schedule the backup process. This chapter also introduces the data validation utilities that are available in the Munsys Management Console to optimize the data set. In addition, you will also be familiarized with the simplified migration of database structures when upgrading to a new release.
- **Chapter 6: Data Management**, introduces the core data management functions that Munsys offers, which include features such as user and access privileges. You will be familiarized with the attribute data types that Munsys supports. Configuration of custom views allows the database administrator to seamlessly control access to the database and external data sources.
- **Chapter 7: Spatial Objects**, introduces the various spatial objects that the Munsys product range supports.
- **Chapter 8: Munsys Applications**, describes the specific spatial objects for the Cadastral, Drainage, Electricity, Roads, Sewer, Water and Spatial Data Manager applications. You are also introduced to Query Categories and the various types of queries that are available in Munsys. The integrity rules that are applied to the various applications are listed in the

order that they will be performed. A list of the predefined capture settings is also provided for these applications.

- **Appendices A to J**, provide a list of general predefined capture settings, known as application settings, as well as capture settings for the Cadastral, Drainage, Electricity, Roads, Sewer, Water, Map Books, Cable Fiber and Cable Route applications.
- **Appendices K**, provide a Entity Relationship (ER) Diagram for the Cadastral, Drainage, Electricity, Roads, Sewer, Water, Map Books, Cable Fiber and Cable Route applications.

The Munsys Environment

The Munsys product family offers a complete solution for the management of spatial information in the utility and government environments. The applications are integrated with a central database, allowing information to be shared throughout the organization. The system is open and based on industry standards, offering maximum benefits from the organization's data investment.

Munsys consists of a set of applications that utilizes both Autodesk and Oracle technologies whereby Autodesk products are used for the accurate creation of assets, and Oracle is used for the storage and integration with other systems. Based on OpenGIS standards, Munsys stores all spatial information in Oracle Spatial or Locator.

Munsys product family consist of the following applications:

System Administration

- **Munsys Management Console** – central administrator tools that simplify a variety of database management tasks.
- **Munsys Export Administrator** – exports geometry and attribute data to various industry and vendor-related formats.

Asset Creation and Management

- **Munsys Cadastral** – facilitates the capture and maintenance of urban planning and parcel base data with ease and accuracy
- **Munsys Drainage** – facilitates the capture and maintenance of stormwater and drainage objects to build a stormwater network
- **Munsys Electricity** – facilitates the capture and maintenance of low and high voltage electricity networks.
- **Munsys Roads** – facilitates the capture and maintenance of roads and intersections which form a road network
- **Munsys Sewer** – facilitates the capture and maintenance of all the objects in a sewer network
- **Munsys Water** – facilitates the capture and maintenance of all the objects in a water network
- **Munsys Cable Fiber**– facilitates the capture and maintenance of all the objects in a cable fiber network
- **Munsys Cable Route**– facilitates the capture and maintenance of all the objects in a cable route network

- **Munsys Map Books** – generates map book pages based on the various spatial layers of data that are available in the database.
- **Munsys Spatial Data Manager** – allows an organization to define its own set of spatial data with the necessary objects and rules. Spatial Data Manager comprises functionality that enables an organization to capture, maintain, export and manage non-industry related data. The application also allows the user to customize the data views on existing application objects. Munsys Geo-Scan Tools provide a set of functions to capture previously scanned images (for example as-built survey plans) as part of the Munsys data model.

Information Distribution

- **Munsys Query** – gives non-editing users direct access to the latest GIS information from within a familiar CAD environment.

Applications are executed from a desktop environment using an Autodesk product. All actions from the desktop require that a user log on to a central Oracle database. Data security is enforced at all times, ensuring that user access is controlled by database privileges.

Data Security and Roles

While ensuring high data quality, Munsys also encourages organizations to implement strict data security policies. Privileges and roles granted to users therefore have an impact on the visibility and manipulation of data. This is enforceable by Oracle's password control, which influences the objects that the user can view or edit.

Furthermore, spatial objects may be locked at record level, ensuring that one user may not alter an object while another user has already performed a lock on that object.

Passwords, user privileges and record locking activation are all controlled by the database administrator. To assist in simplifying this task, Munsys maintains a set of roles that allows an administrator to grant or revoke privileges to users on an application-specific basis.

Munsys Architecture

When a Munsys application is launched from within AutoCAD Map, a Munsys menu, which replaces the standard AutoCAD Map menu, is displayed.

Spatial objects are retrieved from the database and are displayed as Munsys objects, inheriting all AutoCAD object characteristics. The user may manipulate these objects as required, using standard AutoCAD or Munsys functions. When editing objects, the user may be required to lock such objects to ensure that no other user makes changes simultaneously.

Munsys capture and change operations are executed using the various Munsys menus and toolbars. All new objects and modifications to existing spatial objects are done in the AutoCAD Map environment. When an integrity check procedure verifies that the new and modified spatial objects conform to database and application rules, these objects may be posted to the Oracle database.

The following figure provides a graphic overview of the Munsys architecture:

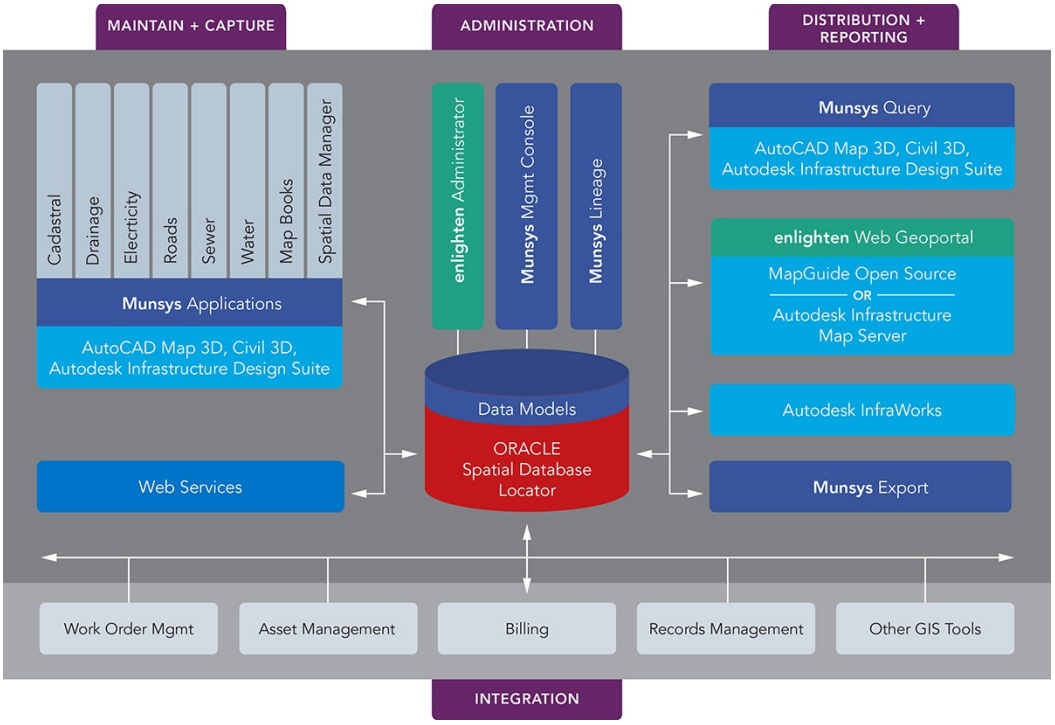


Figure 1 Munsys Architecture

Data Capture and Maintenance

The capture and maintenance functionality is structured logically, aligning the process as would typically be encountered in an organization for that application.

Predefined settings are applied during capture, facilitating and speeding up the overall capture process. These settings consist of attribute values and spatial object defaults set by the database administrator using Munsys Management Console. The administrator controls whether a user may be allowed to change such settings during a Munsys session.

Attribute templates may be used to customize the view of information. An attribute template determines which columns are viewable and/or editable, presenting optional formatting information to facilitate in data validation.

Link templates facilitate in allowing the user to edit non-Munsys linked table attributes.

Data storage and Management

Munsys stores spatial data in an open format in the Oracle database. This means that the data is stored in a non-proprietary format, allowing other mechanisms to gain access to and manipulate Munsys data.

The Munsys Management Console is used to assist in various database-related operations. Such operations include the creating of custom spatial objects, validating of object geometries, altering of tables by adding custom columns, customizing lookup values, creating query categories, managing user queries, reporting on record locking status, etc.

Munsys Export Administrator is used to export geometry and attribute data to various industry and vendor-related formats.

Chapter 2
Configuration

Overview

Configuration of a new or upgraded system can be time-consuming. This chapter provides all the information that is required to simplify this task. Licensing information pertaining to the server and client are provided. The process to configure a user environment, which includes the definition of the geographical area of interest, is explained.

Server Configuration

Oracle Licensing Information

Oracle License Types

Oracle License Types outline the restrictions on customer's usage.

- Full Use license is without restrictions and allows usage that is full functionality.
- Application Specific Full Use is specific to run only with the defined application and may come with additional restrictions.
- Embedded License is limited to embed Oracle technology with defined application and has further restrictions on install, package, configure and access.

Oracle License Metrics

Oracle License Metrics determine how software usage is measured.

- Per Named User Plus
- Application User
- Processor metric

Oracle License Terms

Perpetual License

A perpetual license allows continual use of Oracle products and services within your agreement for a one-time fee. And, provided that you pay your annual technical support fee (approximately 22% of the perpetual license cost), you will continue to receive updates and patches.

Unlimited License Agreement (ULA)

An Unlimited License Agreement (ULA) allows for the unlimited use of agreed Oracle products and services, designated over a specified period of time. At the end of this period, Oracle will quote the user with the number of licenses required for the continued use of these respective services.

Perpetual Unlimited License Agreement (PULA)

PULA (Perpetual Unlimited License Agreement) differs from the standard ULA by the fact that there is no specified end to the agreement.

Note We recommend that you contact Open Spatial Sales team to advise you on the best fit for your Organisations needs.

Recommended Oracle System Parameter

Oracle Spatial Vector Acceleration Setting

During the database instance installation Oracle has made improvements to the Spatial Vector Acceleration parameter, which is turned off by default (Parameter is FALSE by default). It is recommended that customers have this setting turned on (Parameter should be TRUE), to ensure that maximum usage and benefit is gained from this provision offered by Oracle.

This setting can be turned on by the Database Administrator (DBA) upon request which will be executed within the SQL*Plus interface. The DBA will run the following command within the SQL*Plus interface: *Alter system set SPATIAL_VECTOR_ACCELERATION = TRUE;*

The Oracle Spatial Vector Acceleration parameter essentially allows for:

- Improved spatial algorithms for spatial operators and functions.
- Metadata caching for all spatial operators and functions, which improves their overall performance.
- Metadata caching for all DML operations, which makes insert, update, and delete operations on spatial tables run faster.

Oracle Compatibility

Munsys 14 is compatible with the following Oracle releases:

- Oracle 12c Release 2
- Oracle 18c Release 3
- Oracle 19c Release 3

Client Configuration

Oracle

Refer to the Oracle documentation for client installation and setup. Ensure that the Oracle client is the same version as that of your Oracle Server and has the same patch-set installed.

Autodesk Compatibility

Munsys 14 is compatible with the following Autodesk products:

- AutoCAD® 2021, 2022 and 2023(now includes AutoCAD toolsets for architecture & Map 3D)
- AutoCAD® Map 3D 2021, 2022 and 2023
- AutoCAD® Civil 3D® 2021, 2022 and 2023
- Architecture, Engineering & Construction Collection ® 2021, 2022 and 2023

Autodesk Patch-sets

The latest Autodesk service packs and upgrades are available from the support section on the Autodesk main website, www.autodesk.com.

User Environment

Before a Munsys schema is created, it is important to acquire critical information about the coordinate system, projection, area to be covered, etc. This information is necessary for the creation of a new schema.

Defining Database Extents

The extents of the database should cover the area of interest and provide some flexibility. The Minimum X, Maximum X, Minimum Y, Maximum Y coordinates provides the extents of the database as well as the extents of the spatial indexes when they are created.

Defining Coordinate Systems for the Autodesk Environment (Client)

The coordinate system allows you to transform data from one coordinate system to another. The coordinate code that you need to provide is the same coordinate system that your Autodesk product uses when assigning a global coordinate system to a drawing. The AutoCAD coordinate system may be obtained by running the following command in your Autodesk product:

`"Command:` **_MAPCSASSIGN"**

SRID for the Oracle Environment (Server)

The Munsys Spatial Reference Identification (SRID) utility solves problems that might occur as a result of sharing spatial data in Oracle across coordinate systems. The SRID utility enables Munsys users to spatially reference each Munsys object in the database. This allows other spatial applications that access the same Oracle data set to identify the coordinate system used to store the Munsys data, as well as to transform data across different coordinate systems if required.

If the SRID value of a spatial record is null, no coordinate system is associated with the geometry and it is considered as Cartesian coordinates (not referenced). To make sure that the Munsys spatial data is referenced, the SRID value has to be populated with the appropriate coordinate system code. The Oracle SRID value is obtained from the MDSYS.CS_SRS table. Once the spatial objects are referenced using the SRID utility, the SRID code is associated with the schema. All new objects will then automatically be referenced using the SRID code.

The Munsys SRID utility is installed with Munsys Management Console and can be located under **C:\Program Files\Open Spatial\MunConsole14.2\Utilities\SRID.**

Security

In order to configure Munsys correctly, an understanding of the user roles and privileges in the organization must be taken into consideration when assigning Munsys roles to individual users.

Depending on the organizational environment, record locking may either be enabled or disabled using Munsys Management Console.

Checklist

The following is a basic checklist that should be adhered to when Munsys is configured:

Server

✔	Check that the latest service packs have been installed for the operating system.
✔	Check that enough free disk space exists on the installation and data drive for the Oracle database.
✔	Check that Oracle has been installed and is running correctly – you may achieve this by logging onto the database using the “SYS” or “SYSTEM” user.
✔	Check that the latest Oracle patchset has been installed (remember to check post-installation tasks in the Readme file, for example: Have you run “catpatch.sql”?)
✔	Check that the database has been updated correctly if any service packs have been installed

Client

✔	Check that the latest service packs have been installed for the operating system
✔	Check that the latest service packs have been installed for the Autodesk product and that the Autodesk product is running properly
✔	Check that the latest patchset for the Oracle client has been installed and that it matches the version and patchset installed on the Oracle Server
✔	Install Munsys and ensure that the latest service packs have been installed

Chapter 3
Application Make-up

Application Overview

By combining technologies from Oracle and Autodesk and enforcing industry-related business rules, Munsys offers a best-of-breed application, allowing organizations to capture and maintain their utility assets with ease, accuracy and speed.

A Munsys application comprises various components. While the bulk storage of data exists in Oracle tables, temporary storage occurs in Autodesk drawings.

An application may only be executed from within AutoCAD Map-based products. Munsys creates an AutoCAD Map profile which is activated when the application is launched. The profile contains the necessary support paths that will be used by AutoCAD Map when executing various Munsys-induced operations.

With each application, the following is installed: a Munsys menu, a set of routines, libraries, symbols, drawings and various documents. These items are all installed on the client PC that hosts the AutoCAD Map-based product.

In the Oracle database, various tables exist within the Munsys schema, forming the back tier of a Munsys application. Some tables are used to store spatial object data, while others are used to store settings.

Client Components

The items in this section are installed when a Munsys application is installed on a client PC. These components are installed to operate in the AutoCAD Map-based product environment.

Although Munsys does not prohibit a user to do so, it is highly recommended that these items are left unchanged. Munsys does not verify whether any items have been modified and when an upgrade occurs, these items are replaced irrespectively. Should this be unavoidable, and it is inevitable for a symbol or routine to be changed, it is recommended that the user make backups of the folders mentioned below prior to upgrading the latest release of Munsys.

Customization Files

Based on the Autodesk menu structure, the Munsys application customizations files are located in the **[Install Path]\Open Spatial\MunApps14.2\UserData\Cache**\ folder for United States Locale or **[Install Path]\Open Spatial\MunApps14.2\UserData\Cache\Locale\Int**\ for International Locale – one menu per application.

Munsys application customization files are named according to the application they represent: cms.cuix, ems.cuix, etc.

Lisp Routines

The Munsys menus call various lisp routines that contain the rules of an application. The lisp source is installed as part of Munsys, allowing users to customize when necessary.

The main lisp routines are found in the **[Install Path]\Open Spatial\MunApps14.2\Apps\...** folder, and branching off into each application folder are the various dedicated application routines.

Symbols

When querying point objects, symbols are drawings that are inserted as blocks to represent the objects. The names and contents of the symbols are related to the various application object types.

The Munsys symbols are located in the
[Install Path]\Open Spatial\MunApps14.2\Symbols\Feet or
[Install Path]\Open Spatial\MunApps14.2\Symbols\Meters folders.

The name of the symbol (without the **.dwg** extension) is stored in the **SYM_NAME** column of a Munsys point type spatial table.

When querying objects with symbols, it is important that the symbol exists in this folder or, if not, in a folder that is recognized as part of the Autodesk support path.

Database Components

The items in this section refer to tables, views, sequences and other database objects that are created in a Munsys schema when the database is initialized. Each application has a number of associated database objects.

Spatial Tables

A Munsys spatial table has a standard layout that must not be deviated from in order for an application to operate properly.

A set of spatial tables exists for each application. Spatial tables are clearly distinguishable by their names, in that the prefix and the first few characters denote the application with which the table is associated, for example, SP_WAT… denotes that this is a spatial table and contains water objects.

Munsys also maintains an index to its spatial tables through the MUNSYS_SP_TABLES table. Every spatial table to be recognized as a Munsys table must have a corresponding entry in this table.

A unique ID (known as a MUNID) is assigned to each spatial table. The MUNID is used throughout the Munsys applications and the Munsys schema when referring to a particular spatial table.

To clearly identify that the table is a Munsys spatial table, an entry will be entered into the MUNSYS_SP_TABLES table, with an appropriate MUNID, description and object type. MUNIDs below the value of 1000 are reserved for Munsys use only. MUNIDs greater than or equal to 1000 are for custom use.

When a spatial table exists, other tables and entries into Munsys system tables will also be created to reflect the characteristics of the spatial object that this collection of items resembles.

For more information about spatial tables, refer to Chapter 4: Naming conventions: Spatial Tables.

Indexes

Multiple indexes may be created for each spatial table to ensure that searches are conducted with appropriate speed.

Some indexes are mandatory and if absent will cause queries to fail. These indexes are the geometry index and the GID index.

Other indexes may also exist, depending on the nature of the spatial object.

For information about index tables, refer to Chapter 5: Indexes/Re-Index.

Query Categories

Query categories are set in the Munsys Management Console and are used to group queries and data into the recognized data categories of an organization. Munsys provides default custom categories as part of a new schema. The power user has the ability to customize these and/or add personal categories

Queries

At least one query for every spatial object is created in the MUNSYS_QUERY table by default and is associated to a query category by the CAT_ID column. These queries are seen as the default queries associated with the spatial objects and have a system query status. This means that it can only be modified by the Munsys administrator.

Each query is assigned a query priority which in effect is similar to the draw order in AutoCAD. A low priority number means that the query will be executed before queries with higher numbers. This means that queries with a higher priority will be executed towards the end of the query process, causing the objects with a higher priority to be placed on top of the objects queried from queries with a low query priority.

It is also not uncommon to encounter multiple queries for one spatial object. When a user creates a user query they can elect to save it under their own <<User Queries>> category or in a category to which they have permissions. The new query is stored in the MUNSYS_QUERY table with their user name, category ID and query priority.

Lookup Tables

Where values are represented as codes to economize storage space, or where data entry is to be simplified by means of a drop-down list, it is common practice to use a lookup table.

Munsys implements several lookup tables throughout all applications. These tables are prefixed with LU_, followed by the application prefix (WMS, CMS, etc.), for example the table LU_WMS_PIPEDIA is a lookup table used in the Munsys Water application.

When codes are used for storage, it is imperative that the lookup tables do not contain duplicate code entries.

For information about Munsys lookup table structures, refer to Chapter 4: Naming conventions: Lookup Tables.

Attribute Tables

Attribute tables can be linked to spatial tables. Attribute tables follow the convention of AT_ for example AT_BUILDING_FLOOR. Existing tables can be added or new tables created with the Munsys Management Console. The tables are Managed in THE MUNSYS_AT Tables and MUNSYS_AT_COLUMNS system tables.

Application Settings

Munsys provides a set of application settings used for default value assignment during the capture process. These settings are categorized by application and stored in the MUNSYS_AP_SETTINGS table.

One category of settings, the General category, is used throughout all the applications and are not application-specific.

Custom application settings may be added to this table, but it should be noted that Munsys will not recognize these setting during an application's capture process. In order to do so, the lisp routines will have to be customized to recognize this.

For information on individual application settings, refer to the appendices that contain the various application settings.

Integrity Rules

Applications in Munsys may be grouped into two main categories: network and non-network.

Integrity rules are enforced during the integrity check phase, once a user has completed the capture or maintenance process.

Whether the application is used to host a network or not will determine what type of integrity rules are applied. Munsys caters for the following integrity rules:

- **Definition of network objects** – these rules are stored in the MUNSYS_INTEG_OBJECTS table, defining what relationship the object has to the network.
- **Definition of network node characteristics**– these rules are applied when checking the topology of a network in determining how node types should be handled when network links are attached to them or not. These rules are stored in the MUNSYS_INTEG_NODES table.
- **Attribute characteristics** – these are applied when checking whether an attribute has been assigned a value or not. These characteristics are applicable to all object types, irrespective of application type. The rules are stored in the MUNSYS_INTEG_ATTR table.

Integrity rules should be used with caution, as adding too many rules may over- complicate the process and become time-consuming.

For details on integrity rules, refer to Chapter 8: Integrity Rules.

Chapter 4
The Munsys Management Console

Administrative Tools

The Munsys Management Console is a standalone application that allows users with relevant privileges to manipulate objects and components within a Munsys schema in a structured and user-friendly way.

The Munsys Management Console can be activated by any authorized database user, but the functionality that will be available to a user is dependent on the roles that have been assigned to the user.

The following components can be managed from the Munsys Management Console:

- **The Munsys Schema** – creating, dropping, exporting, importing and validating a schema. This section also looks at the defaults installed when a new schema is created.
- **Applications** – used to manage Munsys application settings
- **Locks** – used to maintain record/object locking
- **Query Categories** – used to maintain query categories and query privileges
- **Security** – used to manage users and roles
- **Privilege** – used to assign Munsys roles to tables and views
- **Tables/Views** – maintenance of Munsys-related spatial tables, lookup tables and indexes
- **Lineage** – used as a data management tool to track and archive changes made to records in spatial tables.

The Munsys Schema

With the Munsys Management Console, the database administrator can perform the following schema management functions:

- create a new schema
- drop an existing schema
- export a schema
- validate a schema
- install available data models in a schema
- change properties of a schema

Creating a New Schema

To be able to create a new schema, you will need to have the following roles assigned:

- Munsys role: MUNSYS_ADMIN
- database privileges: CREATE USER, CREATE TABLESPACE, GRANT ANY ROLE, GRANT ANY PRIVILEGE

Note You will need to log in as SYSTEM with DBA privileges

Schema Name

The schema name is the owner or default user that is used to connect and manipulate the contents of the schema.

Defining Extents

The extents of the database should cover the area of interest and provide some flexibility. The Minimum X, Maximum X, Minimum Y, Maximum Y coordinates provides the extents of the database as well as the extents of the spatial indexes when they are created.

Locale and Units

There are two locales to select from when initially creating the Munsys schema, namely United States or International. The units can be set to either Feet or Meters which determine the symbols to be used when using the Munsys applications.

Defining Coordinate Systems

The coordinate system allows you to transform data from one coordinate system to another. The coordinate code that you need to provide is the same coordinate system that your Autodesk product uses. The Autodesk coordinate system may be obtained by running the following command in your Autodesk product:
`"Command: MAPCSASSIGN"`

The Oracle SRID is not currently used by the Munsys system; however, other systems require an SRID stored as part of the geometry. The SRID value is used when posting new objects or updating others to the database from the AutoCAD environment, where every geometry record includes the SRID as one of the elements. The SRID is obtained from the Oracle list.

Data Models

The user must select the data models that are to be installed when creating the new Munsys schema. All models can be installed, or individual data models selected. The Cadastral data model is installed by default.

Table Spaces

The following tablespaces are created in the default Oracle directory if they do not already exist when creating a new Munsys Schema:

- MUNDATA with a size of 500MB (used for storing data)
- MUNINDEX with a size of 250MB (used for storing indexes)
- The temporary tablespace is set to TEMP.

Defaults Installed with a New Munsys Schema

Scripts Executed

Munsys Management Console executes the SQL script files located in the following directory when creating a new Munsys Schema:

[Install Path]\Open Spatial\MunConsole14.2\DBScripts

There are script files per application data model selected to install. All scripts with the prefix Mun_% are executed when a new schema is created. The cadastral data model is also installed by default using the scripts prefixed with Cms_%. If the user selects to install the water model then all scripts prefixed with Wms_% are executed.

Default Roles and Grants for the Schema Owner

The following roles are granted to a newly created Munsys Schema:

- connect
- munsys_admin
- select_catalog_role

The following privileges are granted to a newly created Munsys Schema:

- quota unlimited on MUNDATA
- quota unlimited on MUNINDEX
- alter user
- create procedure
- create role
- create sequence
- create table
- create user
- create view
- drop user

Refer to the following script files located in the **[Munsys Management Console Install Path]\MunConsole14.2\DBScripts** path for detailed information on the grants assigned to the Munsys roles:

- CreateSchema.sql
- Mun_roles.sql
- Gen_roles
- Cfs_roles
- Cms_roles
- Crs_roles
- Dms_roles
- Ems_roles

- Mbk_roles
- Rms_roles
- Sms_roles
- Wms_roles

Default Munsys Roles Created

The following roles are created by the CreateSchema.sql when a new Munsys schema is created:

- MUNSYS_ADMIN
- MUNSYS_POWER
- MUNSYS_LICENSE
- MUNSYS_ALL_QUERY
- MUNSYS_ALL_EDIT
- MUNSYS_SDM_QUERY
- MUNSYS_SDM_EDIT
- MUNSYS_QUERY

The following roles are created when the various Munsys data models are installed:

- **Munsys Cable Fiber data model**
  - MUNSYS_CFS_EDIT
  - MUNSYS_CFS_QUERY
- **Munsys Cadastral data model** (Installed by default with all data models)
  - MUNSYS_CMS_EDIT
  - MUNSYS_CMS_QUERY
- **Munsys Cable Route data model**
  - MUNSYS_CRS_EDIT
  - MUNSYS_CRS_QUER
- **Munsys Drainage data model**
  - MUNSYS_DMS_EDIT
  - MUNSYS_DMS_QUERY
- **Munsys Electricity data model**
  - MUNSYS_EMS_EDIT
  - MUNSYS_EMS_QUERY
- **Munsys Map Books data model**
  - MUNSYS_MBK_EDIT
  - MUNSYS_MBK_QUERY

- **Munsys Roads data model**
  - MUNSYS_RMS_EDIT
  - MUNSYS_RMS_QUERY
- **Munsys Sewer data model**
  - MUNSYS_SMS_EDIT
  - MUNSYS_SMS_QUERY
- **Munsys Water data model**
  - MUNSYS_WMS_EDIT
  - MUNSYS_WMS_QUERY

Munsys System Tables

The system tables, which act as the Munsys data dictionary, contain information related to the applications as well as the structure of the database. All system tables start with the prefix **MUNSYS_** followed by the table name.

Any views that are defined on the system tables start with the prefix ***ALL_MUNSYS_*** followed by the view name. These views are typically joined with Oracle data dictionary tables that follow the same naming conventions.

The system tables are maintained by Munsys and require a fixed structure for the system to function. They should therefore never be modified. The data in these tables is also controlled through the Munsys applications and should never be edited using other applications.

The system tables contain information about the database design, as well as various settings for the applications. The following system tables are defined:

Table Name	Description
GEN_DWGCAT	This table stores drawing information for drawings that are saved and catalogued.
MUNSYS_AP_SETTINGS	This tables stores the settings related to all the applications.
MUNSYS_APPLICATION	This table stores the list of applications used in the Munsys system.
MUNSYS_AT_COLUMNS	This table defines all the attribute columns that are being used in Attribute tables managed by Munsys. This table relates to MUNSYS_AT_TABLES
MUNSYS_AT_CONTROL	This table stores the attribute template control definitions regarding columns to display for the attribute templates
MUNSYS_AT_DEF	This table stores the attribute template definitions
MUNSYS_AT_TABLES	This table is a list of the attribute tables that are being managed by Munsys.
MUNSYS_DB_SETTINGS	Stores global database settings such as database extents and coordinate system.
MUNSYS_GEOM_VAL	This table is used to store results from validating spatial tables.
MUNSYS_GSC	Is used to store the user defined Geographic Search Criteria (GSCs) used during queries.
MUNSYS_INTEG_ATTR	This table is used during an Object Integrity check and is used to describe the columns/attributes that must be verified for authentication.
MUNSYS_INTEG_NODES	This table describes additional node rules used by an application during a Network Integrity

MUNSYS_INTEG_OBJECTS	This table describes additional object rules used by an application during an Object Integrity
MUNSYS_INTEG_RESULTS	This table stores information about the objects that caused errors during the network quality check.
MUNSYS_LINEAGE_COLUMNS	This table defines all the spatial columns that are managed by Munsys lineage.
MUNSYS_LINEAGE_CONFIG	This table is used to define the relationships between spatial and lineage tables and triggers.
MUNSYS_LNK_TABLES	This table is used to define the relationships between spatial and attribute tables (link templates).
MUNSYS_LOCKED_OBJECTS	Used to store information about which objects are currently locked within the system if record locking is enabled
MUNSYS_LU_TABLES	This table is used to define the relationship between spatial and lookup tables.
MUNSYS_MD_CONTACT	This table stores contact information associated with the metadata.
MUNSYS_MD_SPTABLE	This table store metadata concerning spatial tables.
MUNSYS_MONITOR_LOG	This table stores all historical spatial/attributes changes for spatial tables
MUNSYS_MONITOR_REPORT	This table contains Munsys report description and back-end query statements of the reports.
MUNSYS_PRIV	Contains the privileges associated with Munsys objects, which database roles have access to which queries etc.
MUNSYS_PRIV_ROLE	Contains the roles associated with Munsys objects, which database roles have access to which queries etc.
MUNSYS_QUERY	Is used to store all the pre-defined queries used by the applications.
MUNSYS_QUERY_CAT	This table is used to store all the query categories
MUNSYS_SCHEDULED_TASKS	This table stores all Munsys tasks specification and description.
MUNSYS_SP_COLUMNS	This table defines all the spatial columns that are being used by Munsys and relates to MUNSYS-_SP_TABLES.
MUNSYS_SP_TABLES	This table defines all the spatial tables that are being used by Munsys. It also contains information regarding the spatial object types allowed in the table.

MUNSYS_USAGE_LOG	This tables stores information about the applications specific users have logged into.
MUNSYS_USER_LOG	This table stores information about the users that have logged onto Munsys.

Table 2 *Munsys system tables*

Stored Procedures

- MUN_CABLE_FIBER_PACKAGE
- MUN_LOCKMANAGER_PACKAGE
- MUN_SCHEDULED_TASKS_PACKAGE

The Munsys record locking package consists of multiple stored procedures. The procedures can be called not only by Munsys itself, but by any other external applications.

The package is granted to PUBLIC and is available to any user logged onto the database. The Munsys record locking package is named **MUN_LOCKMANAGER_PACKAGE**, and consists of the following procedures:

- MP_VERIFYLOCKED
- MP_LOCKRECORDS
- MP_UNLOCKRECORDS

Logon Defaults

During the schema creation process, you have to specify the logon user name and password.

System Default Settings

Munsys database settings are applied when the database administrator creates a new schema. The database settings define the geographical area of interest that includes the extent of the database, snap tolerance, spatial index levels and the database coordinate system that is used to store spatial data.

The following table lists the fields that are populated when the database settings are defined:

Column Name	Type	Description
MUN_TYPE	CHAR(1)	Data type of the variable in AutoCAD. R = Real, I = Integer, A = Angle, C = char, S = Symbol (T=True and F=False)
MUN_VARIABLE	VARCHAR2(20)	A unique name identifying the variable.
MUN_VALUE	VARCHAR2(40)	The value of the variable. Values are converted to the format specified in MUN_TYPE column.
DESCRIPTION	VARCHAR2(40)	A string value describing the variable.

Figure 3 MUNSYS_DB_SETTINGS

The following database settings may need to be configured in MUNSYS_DB_SETTINGS table:

- **LOCALE** (valid values are DEFAULT/ INT/AUS/AUS2)
  - **DEFAULT** represents the United States locale
  - **INT** represents the International Locale
  - **AUS** represents the Australian Locale using "/" for Lot/DP
  - **AUS2** represents the Australian Locale using "//" for Lot//DP

  If you are not based in Australia then this setting should be set to "DEFAULT"
- SDO_PRECISION represents the precision at which the system will store and manage coordinates in the database
- SRID_CODE. (Refer to Chapter 2: SRID for the Oracle environment.)

The default values for the system settings are as follows:

MUN_TYPE	MUN_VARIABLE	MUN_VALUE	DESCRIPTION
R	MINX	*	Minimum X Value
R	MAXX	*	Maximum X Value
R	MINY	*	Minimum Y Value
R	MAXY	*	Maximum Y Value
R	TOLERANCE	*	Snap Tolerance
C	DBCOORDSYS	*	Database Coordinate System
C	LOCALE	*DEFAULT	Country Locale Settings. DEFAULT=US
C	DBUNITS	*FEET	Database units (Feet or Meters) of which Feet is the default
S	LOCKING_ENABLED	F	Is Locking Enabled
S	REMIND_LOGON	F	Notify user if records locked at logon
S	REMIND_LOGOFF	F	Notify user if records locked at logoff
I	SRID_CODE	*0	Oracle SRID from MDSYS.CS_SRS
R	SDO_PRECISION	*0.01	Precision used with Oracle SDO functions
C	VERSION	14	Munsys schema version
S	MUNSYS_EE	**F	T = Munsys Enterprise Edition.
S	SDO_BUFFER_DISABLED	***F	T = Oracle Buffer disabled.
I	SCHEDULEDTASKS_ENABLED	0	Scheduled Tasks Enabled

*** Input is specified during the schema creation process**

**** By default this variable is not defined and Munsys Standard Edition licenses are installed. Input is required if Munsys Enterprise Edition licenses are purchased.**

*****By default this variable is not defined and the Oracle Buffer enabled. Input is required if the Oracle Buffer is to be disabled for Oracle 10g, 11g or 12c Locator Licenses.**

Table 4 *Default values for system settings*

Naming Conventions

Views

The Munsys system views are based on a combination of the Munsys system tables and the Oracle data dictionary. These views allow you to see only data that the user has access to within the database. These views are granted to PUBLIC and are available to any user logged onto the database.

The following system views are defined:

- ALL_MUNSYS_QUERY – system queries
- ALL_MUNSYS_SP_TABLES – Munsys spatial tables
- ALL_MUNSYS_SP_COLUMNS – spatial table column description
- ALL_MUNSYS_APPLICATION – Munsys applications
- ALL_MUNSYS_AT – attribute templates
- ALL_MUNSYS_AT_COLUMNS – non-spatial attribute table column descriptions
- ALL_MUNSYS_AT_TABLES – non-spatial attribute tables

Refer to the User privileges section in **Chapter 6** for more information.

Spatial Tables (MUNSYS_SP_TABLES)

The Munsys spatial tables use a specific convention for all spatial tables in the database. The unique object identifier is always stored in the GID (Geometry ID) column, and generated using a database sequence. The spatial object itself is always stored in a single GEOMETRY column based on the Oracle 9i spatial structures.

In addition, Munsys uses six columns to store display information related to the object. These columns store information such as text size, symbol angle, etc.

Refer to Table Structure in the **Table Conventions** section in **Chapter 7** for spatial table structures.

All tables that contain spatial data are prefixed with **SP_** followed by the table name, for example:

- SP_RDCL
- SP_WATPIPE
- SP_WATNODE etc.

All spatial tables must have an index defined on the key column (GID) to ensure that they key values are unique. The naming conventions for these indexes are:

- SP_RDCL_KEY
- TP_DATA_KEY etc.

All spatial tables must also have a geometry index so that spatial search queries may be executed.

Spatial Indexes on the **GEOMETRY** columns for each spatial table will be created as an **R-TREE**R-TREE Index and will have the following format *TABLENAME*_**$X**.

- SP_RDCL_$X

- SP_WATPIPE_$X
- SP_WATNODE_$X etc.

Indexes are automatically created when using Munsys Management Console to create spatial objects. These may be rebuilt should the user be required to do so, also using Munsys Management Console.

Please be aware that the length of the spatial table name is not restricted to the Oracle length of 30 characters but rather to 17 characters.

Drop-down lists can be used when editing attributes in Munsys Applications. The MUNSYS_LU_TABLES tables should be populated with an appropriated record in order to display a drop-down list from where the user can select a lookup value.

The following table contains the columns and descriptions of MUNSYS_SP_TABLES table that has to be populated when a lookup table is used:

:

Column Name	Type	Description
MUN_ID	NUMBER(10)	A unique ID for each spatial layer. IDs less than 1000 are reserved for Munsys layers. New IDs are assigned using the sequence MUNSEQ_SP_ID.
MUN_TYPE	NUMBER(1)	Type of entity stored in the spatial layer. 1 – MUNLABEL 2 – MUNPOINT 3 – MUNLINE 4 – MUNPOLY
DESCRIPTION	VARCHAR2(40)	The name describing the spatial layer.
TABLE_NAME	VARCHAR2(30)	A string indicating which spatial table the layer refers to.

Table 5 *MUNSYS_SP_TABLES*

Attribute Tables (MUNSYS_AT_TABLES)

Attribute tables can be managed via the Munsys management Console. Existing tables can be added, or new tables created. If a new table is created a Unique Identifier (ID) is automatically created with a Primary key constraint. When adding an existing table, the ID field will not be created as there may already be a Unique Identifier. The following table contains the columns and descriptions of MUNSYS_AT_TABLES

Attribute tables can be linked to spatial tables with a link to the GID that can be stored in the attribute table and can be linked vie a link template or when creating a query.

Lookup Tables

The lookup tables are used to store data specific to the client and applications. These tables are used to update specific fields in the spatial tables. Lookup tables are always prefixed with **LU_**, followed by the application name, such as **CMS_**, followed by the lookup table name. For example:

- LU_CMS_STRNAME
- LU_RMS_SURF
- LU_SMS_PIPEMATRL etc.

Munsys lookup tables are used to display text values for selection by the user. The corresponding lookup code is then inserted into the table. Lookup tables always consist of two columns namely **LCODE** and **LVALUE**. The structure of these tables is dependent on the applicable master table.

The following table contains the appropriate fields required to define a lookup value:

Column Name	Type	Description
SP_TABLE	VARCHAR2(30)	The name of the spatial table.
LU_TABLE	VARCHAR2(30)	The name of the table that links to the spatial table.
SP_JOIN_COL	VARCHAR2(80)	The name of the column in the spatial table that needs to be joined to the lookup table.
LU_JOIN_COL	VARCHAR2(80)	The name of the column in the lookup table that needs to be joined to the spatial table.

Table 6 *MUNSYS_LU_TABLES*

Dropping an Existing Schema

In order to drop a schema from the database, you will need to have the MUNSYS_ADMIN role assigned, as well as the DROP USER and DROP TABLESPACE database privileges. A list of all the schemas in the database is displayed on the Drop Schema dialog box, from where the user can select the schema that you want to drop.

If the user is logged on as a schema owner, the name of that schema will not be displayed in the list of schemas that can be dropped, as an owner cannot drop their own schema.

Exporting a Schema

This function is used to export the entire contents of a schema to a dump file. To be able to export a schema, the user must have the MUNSYS_ADMIN role assigned, as well as the EXP_FULL_DATABASE database privilege.The system uses the Oracle Data Pump utility, and this should therefore also be fully configured.

Validating a Schema

The schema validation function validates the Munsys system model tables against rules defined to ensure the integrity of Munsys system tables. You need to have the MUNSYS_ADMIN role assigned and be logged in as the schema owner to be able to validate a schema. The results of the validation are shown on the Schema Validation Results dialog box.

Installing Available Data Models in a Schema

The administrator can install additional data models in a Munsys schema. The Cadastral model is installed by default with any of the other Munsys application models. The user will need the following roles/privileges assigned to be able to execute this function:

- Munsys Role: MUNSYS_ADMIN
- Database Privileges: CREATE ANY TABLE, ANY VIEW, ANY SEQUENCE and CREATE TABLE, CREATE VIEW

Changing Properties of a Schema

The user can change basic properties of a Munsys schema, which are generally stored in the MUNSYS_DB_SETTINGS table. The user will need the MUNSYS_ADMIN role assigned to be able to change schema properties.

Changes that are made on the Schema tab (the database extents and the Oracle coordinate system) have a direct effect on spatial indexing, and therefore the indexes will have to be rebuilt if any changes are made. The Rebuild Spatial Indexes button becomes available once changes have been made.

Applications

Each Munsys application has its own default capture settings that are set by the database administrator in the Munsys Management Console. In the Munsys Management Console, the Applications tree contains a list of all the available Munsys applications and their respective application settings.

The following functions can be performed from the Applications tree:

- Adding a new application setting
- Changing an existing application setting
- Deleting an application setting

Adding a New Application Setting

Each Munsys application has its own default settings that are used when data is captured, for example the snap tolerance, tag and symbol scale, node types, etc. Application settings are stored in the MUNSYS_AP_SETTING table. When a new setting is created, its inherits the category from the current application and a new record is inserted in the MUNSYS_AP_SETTING table.

- **Munsys role:** MUNSYS_POWER or MUNSYS_ADMIN

Changing an Existing Application Setting

The user will need the MUNSYS_POWER or MUNSYS_ADMIN roles assigned to be able to change the properties of an application setting. Application settings are changed using the Modify Application Setting dialog box.

Deleting an Application Setting

Application setting can be deleted from a Munsys application. Each Munsys application has its own default settings that are used when data is captured, for example the snap tolerance, tag and symbol scale, node types, etc. Application settings are stored in the MUNSYS_AP_SETTING table.

- **Munsys role:** MUNSYS_POWER or MUNSYS_ADMIN

Integrity Settings

Munsys allows for a wide range of integrity rules to validate the quality of data being captured.

- **Munsys role:** MUNSYS_POWER or MUNSYS_ADMIN

The following functions can be performed from the Applications tree:

- Adding a new Integrity Rule
- Manage the properties of Integrity Rule
- Deleting an Integrity Rule

For details on integrity rules, refer to Chapter 8: Integrity Rules.

Locks

Munsys record locking is activated by default, ensuring data integrity within the working environment and restricting the editing of a spatial object to one user at a time.

Enabling and Disabling Locks

Record locking is activated by default in any Munsys schema. From the Locks tree in the Munsys Management Console, you can change record locking properties by disabling or enabling record locking in a schema, or by changing the record locking status reminders for users.

To be able to work with record locking properties, you need to have the following roles/privileges assigned:

- **Munsys role:** MUNSYS_ADMIN
- **Database privileges:** SELECT, INSERT, UPDATE and DELETE on MUNSYS_DB_SETTINGS
- **License:**Administrator

Clearing Locks

Using the Clear Locks menu item, the database administrator can clear all the locks in the database. Please note that unlocking all locked records could result in the loss of data.

To be able to clear all the locks in the database, you need to have the following roles/privileges assigned:

- **Munsys role:** MUNSYS_ADMIN
- **Database privileges:** SELECT, INSERT, UPDATE and DELETE on MUNSYS_LOCKED_OBJECTS
- **License:**Administrator

Query Categories

Query categories are used to group queries and data into recognized data categories. Query categories are maintained from the Query Categories tree in the Munsys Management Console (MMC). You need to have the MUNSYS_POWER or MUNSYS_ADMIN roles assigned to be able to manipulate query categories.

Munsys recognizes the following types of query categories:

- **Uncategorized** – by default any new query (not a user query) is seen as being uncategorized until it has been allocated to a category. Queries may be moved to or from the uncategorized group, but the category itself is a special case whereby the name may not be changed – only the content. The uncategorized group may also not be granted other roles – all queries in this group are seen to be granted the MUNSYS_ALL_QUERY role. As soon as a query is moved to a category or as a user query, it cannot also belong to the uncategorized group – the query no longer has this status.
- **User** – whenever a user creates a new query, it is automatically seen as a personal query, hence called a User query. Other users cannot see any other user's queries until they are shared in the pool of Uncategorized or Categorized queries.
- **Custom Categories** – each category is provided with a unique name. When a new category is created, it is automatically granted the MUNSYS_ALL_QUERY role. A category may be granted multiple roles.

Munsys provides default custom categories as part of a new Munsys schema. The administrator or power user can customize these and/or add personal categories. The following categories are created in a new schema, synonymous with the Munsys applications and the default roles will be granted to these categories:

- **Cable Fiber** – MUNSYS_CFS_QUERY
- **Cadastral** – MUNSYS_CMS_QUERY
- **Cable Route** – MUNSYS_CRS_QUERY
- **Drainage** – MUNSYS_DMS_QUERY
- **Electricity** – MUNSYS_EMS_QUERY
- **Roads** – MUNSYS_RMS_QUERY
- **Sewer** – MUNSYS_SMS_QUERY
- **Water** – MUNSYS_WMS_QUERY

Creating a New Query Category

To be able to create a new query category, the user needs to have the following roles/privileges assigned:

- **Munsys role:** MUNSYS_POWER or MUNSYS_ADMIN
- **Database privileges:** UPDATE on query-related tables
- **License:** Administrator

Renaming a Query Category

To be able to rename a query category, the user needs to have the following roles/privileges assigned:

- **Munsys role:** MUNSYS_POWER or MUNSYS_ADMIN
- **Database privileges:** UPDATE on MUNSYS_QUERY_CAT
- **License:** Administrator

Changing Access to a Query Category

The administrator or power user can view or modify the access to a selected query category. The user will need to have the following roles/privileges assigned:

- **Munsys role:** MUNSYS_POWER or MUNSYS_ADMIN
- **Database privileges:** UPDATE on MUNSYS_QUERY_CAT, MUNSYS_PRIV
- **License:** Administrator

Deleting a Query Category

When a query category is deleted, all the references to the queries in that category are removed and the queries are marked as Uncategorized. To be able to delete a query category, the user needs to have the following roles/privileges assigned:

- **Munsys role:** MUNSYS_POWER or MUNSYS_ADMIN
- **Database privileges:** UPDATE on MUNSYS_QUERY_CAT, MUNSYS_PRIV
- **License:** Administrator

Working with Queries

Whenever a new custom spatial table is created in Munsys Management Console, a default system query is created in the query category <<Uncategorized Queries>> where the query description defaults to the description for the table in MUNSYS_SP_TABLES. The query can be renamed by a power user or administrator in Munsys Management Console. The following roles are assigned to each new custom spatial table:

- MUNSYS_ADMIN
- MUNSYS_ALL_QUERY
- MUNSYS_ALL_EDIT
- MUNSYS_POWER
- MUNSYS_SDM_EDIT
- MUNSYS_SDM_QUERY

Default queries are also created per query category when the various Munsys data models are installed. These queries are stored in MUNSYS_QUERY and link to MUNSYS_QUERY_CAT by means of the CAT_ID column.

New queries are created in the various Munsys applications by the users and the user name and query priority are stored with the query name in the MUNSYS_QUERY table. A user with administration or power user roles can copy, move, rename or delete queries using the Munsys Management Console application.

Security

In the Munsys Management Console, security management consists of the creation and maintenance of database users and roles and are managed on the Security tree. Roles place users in a "category" where certain responsibilities are associated with these roles. Depending on the role of a user, varying components and/or menu items in the console will be available for manipulation. The Munsys Management Console recognizes the following roles:

- ***MUNSYS_ADMIN:** – this role is reserved for users who have the authority to change structure such as creating, dropping or validating schemas, tables or views, re-indexing tables, overriding object locking status, or manipulating database users and the roles or privileges that may be assigned to them.
- **MUNSYS_POWER:** – this role is reserved for users who have the authority to change the content of items such as rules, lookup tables and application settings.
- **MUNSYS_*APP*_EDIT** – users with this role assigned can create and modify objects in a specified Munsys application only (where *APP* is the relevant application, for example MUNSYS_CMS_EDIT or MUNSYS_DMS_EDIT)
- **MUNSYS_ALL_EDIT** – users with this role assigned can create and modify objects in all of the Munsys applications
- **MUNSYS_*APP*_QUERY** – users with this role assigned can query objects from a specific Munsys application only (where *APP* is the relevant application, for example MUNSYS_CMS_QUERY or MUNSYS_DMS_QUERY)
- **MUNSYS_ALL_QUERY** – users with this role assigned can query objects from all the query categories in the Munsys applications.

Creating a New Munsys Role

Only users with the privilege CREATE ROLE can create a new Munsys role. The new role is prefixed with MUNSYS_%. The new role is automatically assigned to the user creating the role, so if MCITY14US creates a new role called MUNSYS_HELPDESK, this role is assigned.

Creating a New User

When a new user is created in Munsys Management Console the following roles are automatically assigned:

- CONNECT
- MUNSYS_ALL_QUERY

Only users with the privilege CREATE USER can revoke or assign roles to users in the Munsys Management Console.

Dropping a User

When a user is dropped in Munsys Management Console, the objects owned by that user are also discarded. The user is dropped using the Cascade option.

Tables and Views

Creating Custom Spatial Tables

Spatial table names and descriptions have to be unique; when a new table is created in the database, the system checks whether the name or description is not yet present. If this is the case, the table will not be created. A custom spatial table is always assigned a MUNID of >1000.

Note Please refer to the Munsys14_2_MMCUserManual.pdf for details on the columns created for the various object types.

When a new spatial table is created from an existing spatial table, the following happens:

- The default columns are added to the table
- Columns are created in the new spatial table that exist in the old table but not in the new one
- Columns with the prefix OLD_ in are created in the new table for all columns that exist in both the old and new tables.
- All the data from the original table is copied into new table into the corresponding 'OLD_' columns
- The table is inserted into MUNSYS_SP_TABLES
- The table is inserted into MUNSYS_SP_COLUMNS
- The Geometry Metadata (USER_SDO_GEOM_METADATA) is updated
- A default query is created (MUNSYS_QUERY)
- Roles are assigned to the table (MUNSYS_SDM_QUERY, MUNSYS_ALL_QUERY, MUNSYS_SDM_EDIT, MUNSYS_ALL_EDIT, MUNSYS_POWER, MUNSYS_ADMIN)
- Indexes are created on the GID and Geometry columns of the new table.

Dropping Spatial Tables

Only custom spatial tables can be dropped through the Munsys Management Console interface. All tables with a MUN_ID less than 1000 are filtered out from the drop table option.

When a table is dropped from the database, all references to the table are deleted from:

- The system query table (MUNSYS_ QUERY)
- MUNSYS_SP_TABLES
- USER_SDO_GEOM_METADATA
- MUNSYS_SP_COLUMNS

Validating Spatial Tables

The Spatial Table Validation function validates the geometry of spatial tables. The user must have the MUNSYS_ADMIN role assigned and be logged in as the schema owner to be able to validate a spatial table.

Munsys Lineage

Introduction

Munsys Lineage is primarily used as a data management tool to track and archive changes made to records in spatial tables. This is achieved through the implementation of database triggers which populate Munsys system tables based on the preferences selected when Lineage is added to a spatial table. Reports can also be generated to query the database for monitor or usage purposes.

Working with Munsys Lineage

Munsys Lineage can be used to:

- **Monitor** changes to records made in a specified table.
- **Archive** deleted or updated records into an archive table.
- **Report** according to specific monitor and usage requirements.

Monitor

Munsys Lineage can be use to log and monitor the following information about operations done on a table:

- the type of operation
- the date and time of the operation
- the table on which the operation was done
- the user who executed the operation

Logging is done during insert, update, and delete operations on a specified table in the Oracle schema. Updates are classified based on the columns updated, and as Spatial or Attribute, for example if the geometry of an object has been changed, it can be classified as a spatial update. Logging information is stored in the MUNSYS_MONITOR_LOG and is maintained by the administrator to prevent logs from growing too big.

Lineage date is important, especially if you want to be able to supply incremental updates to other customers, for example if the county wants to supply changes to the municipality based on a specific date.

Note The **Show Info** function in Munsys Applications shows the history of the object on the **Linked Tables** tab. This is done by inserting a record into the **MUNSYS_LNK_TABLES** table.

Archive

Munsys Lineage can be used to archive deleted or updated records into an archive table associated with a specified spatial table. This requires the creation of an archive table (SP_AD_tablename) and an associated archive trigger for a selected spatial table in the

database.The archive trigger is implemented in such a way that all the columns in a specified

spatial table are archived. When Lineage is added to a spatial table, the structure of that spatial table is duplicated to create an archive table. The archive table is populated with records that

meet archive requirements as specified when Lineage is added or edited. Three extra columns are added to the archive table to keep track of the following information:

- the type of operation performed which resulted in the record being archived: An operation type column (ARCHIVE_OPERATION) is added to the archive table, which can be populated with the operation types DEL (delete) and UPD (update).
- the date and time of the archive: A date stamp column (ARCHIVE_DATE) is added to the archive table, which is populated with the date and time that the archive operation occurred.
- the archived ID: A unique ID column (ARCHIVE_ID) of the archived record is added.

The archive table is also inserted into the Munsys system tables, enabling users to query deleted records from an archive table using Munsys Applications.

The database administrator maintains the records in the archive tables to prevent the tables from growing too big. Records are deleted from the archive table based on the time stamp of the deleted record.

Reports

Reports can also be generated from spatial tables to which Lineage is applied. Administrator can generate monitor and usage reports to provide basic or detailed reporting based on predefined or customised requirements.

Munsys Lineage also reports on user logon/logoff and license usage, based on the entries in the MUNSYS_USAGE_LOG table.

Enabling or disabling Linage

Lineage can be enabled and disabled from within the schema Properties dialog box. The Lineage tree branch only becomes active and functional once it has been enabled for a schema. Alternatively, when Lineage is not enabled, all Lineage functionality is disabled and cannot be modified in the Lineage tree branch of the Munsys Management Console.

To enable / disable Lineage and for more information, please refer to the chapter on Schema management: “The Lineage Tab”.

Adding Lineage

Adding Lineage to a spatial table will create the necessary tables and triggers in the database to monitor and archive operations for the selected spatial table. The administrator will also be able to customise how and when Lineage should monitor and archive records.

Three types of triggers are created when Lineage is added to a spatial table, two for logging purposes and one for archiving. These triggers populate Munsys system tables based on the preference selected when Lineage is added or edited.

- MMA_tablename (for example MMA_SP_PARCEL) – this trigger name contains the prefix MMA_(Munsys Monitor Attribute columns) to indicate that the primary function is to log attribute updates. This trigger populates the MUNSYS_MONITOR_LOG table with the following operations:
  - INS – Insert operations
  - UPD – Update operations, based on the columns selected during the implementation
  - DEL – Delete operations
- MMS_tablename (for example MMS_SP_PARCEL)– this trigger name contains the prefix MMS_(Munsys Monitor Spatial update) to indicate that the primary function is to log spatial updates that occurred in the GEOMETRY column. This trigger populates the MUNSYS_MONITOR_LOG table with spatial updates only. This trigger is only created if the user selects the option to log spatial updates explicitly when the Lineage is added or edited.

  In this case, the SPA (spatial update) operation will be used in the case of a spatial update.

MARC_tablename (for example MARC_tablename) – this trigger name contains the prefix MARC_(Munsys Archive columns) to indicate that the primary function is to archive records. The MARC trigger populates the archive table associated with a spatial table (for example SP_AD_WATERPIPE) with the archived records. The MARC_tablename trigger populates the SP_AD_tablename with the operations update or delete (as preferenced when Lineage is added or edited).

To add Lineage to a spatial table

Note :The Lineage function now has a Geometry entry in the list of columns, that can be included/excluded based on the users preference.

Select the **Spatial Tables** branch in the **Lineage** tree to view spatial tables with triggers already implemented.

To add lineage to a spatial table, select the **Add Lineage**... option that is displayed when you right click the **Spatial Tables** branch of the **Lineage** tree.

The Add Lineage dialog will appear.

In the **Table Name** drop down of the **Add Lineage** dialog box, select a table for which Lineage will be applied. The table selection does not include tables to which Lineage is already applied.

In the Monitor area, select one or more of the following check boxes (all operations are selected by default):

- Log Insert, Delete and Update Operations – This option logs insert, update and delete operations. Selecting this option creates the MMA_tablename trigger in the database.
- Log Spatial Updates Explicitly – Log Spatial Updates this option logs updates on the GEOMETRY column as an additional operation. The MMS_tablename trigger is created, firing only on the GEOMETRY column when an update occurs.
  The trigger logs an operation of SPA (spatial update) in the monitor log.

In the **Archive** area, select one or more of the following check boxes (all operations are selected by default):

- Archive on Update Operations – this option archives records that have been updated. The MARC_tablename trigger will populate the SP_AD_tablename for update operations. The trigger logs an operation of UPD in the monitor log.
- Archive on Delete Operations – this option archives records that have been deleted. The MARC_tablename trigger will populate the SP_AD_tablename for delete operations. The trigger logs an operation of DEL in the monitor log.

Specify the **Columns** that will be monitored and archived in the Lineage.

- All Columns – when this option is selected, all columns will be used, which means that the trigger is not dependent on the structure of the table. The trigger will also fire on the GEOMETRY column (for spatial updates). The All Columns option is the default option.
- Specific Columns – when this option is selected, the Available Columns and Monitored Columns lists, as well as their associated options, become available. The arrow options are used to add or remove columns from the two lists. The columns on which the trigger should fire are moved from the Available Columns list to the Monitored Columns list, as seen in the example below. Note that, the GEOMETRY column is not listed as an available column but the MARC_tablename trigger will automatically fire on this column when a spatial update is made.

Note If a new column is added to a spatial table that has Lineage applied, that column will not automatically be added to the **Monitored Columns** list. It will have to be manually shifted to from **Available Columns** list to the **Monitored Columns** in the **Edit Lineage** dialog box. The new column will then be added to the specified database trigger(s). The column will also automatically be added to the associated archive table.

Click **OK**.

The spatial table will be added to the Spatial Tables branch of the Lineage tree. The necessary triggers will also be created in the database to log and archive operations for the selected spatial table. Triggers will be customised to track Lineage only for selected operations and columns as defined in the Add Lineage dialog box upon implementation.

Disabling triggers

Disabling all triggers on a spatial table

To disable all triggers on a spatial table, select the Disable All Triggers option on the context-sensitive (right-click) menu that is displayed when you right click on a spatial table in the Spatial Tables branch of the Lineage tree.

All triggers for the selected spatial table will be disabled.

Disabling a selected trigger

To disable only a selected trigger on a spatial table, right click the trigger and select Disable Trigger in the right click menu that appears. The selected trigger will be disabled.

Enabling triggers

Enabling all triggers on a spatial table

To enable ALL triggers on a spatial table, select the Enable All Triggers option on the context-sensitive (right-click) menu that is displayed when you right click on a spatial table in the Spatial Tables branch of the Lineage tree.

All triggers for the selected spatial table will be enabled.

Enabling a selected trigger

To enable only a selected trigger on a spatial table, right click the trigger and select Enable Trigger in the right click menu that appears.

The selected trigger will be enabled.

Editing Lineage

To edit the Lineage of a spatial table, select the **Edit Lineage**... option on the context-sensitive (right-click) menu that is displayed when you right click on a spatial table in the **Spatial Tables** branch of the **Lineage** tree.

The Edit Lineage dialog box will appear which allows modification of the configurations defined when Lineage was added to a spatial table.

Lineage preferences can be edited for the selected spatial table by selecting the **Monitor** and **Archive** check boxes and specifying the **Columns** to which Lineage will apply.

Click **OK** to apply any changes.

Removing Lineage

To remove the Lineage of a spatial table, select the **Remove Lineage**... option on the context-sensitive (right-click) menu that is displayed when you right click on a spatial table in the **Spatial Tables** branch of the **Lineage** tree.

The Remove Lineage Confirmation dialog box will appear.

Select the check boxes to also remove the monitor logs and associated archive table for the selected spatial table.
Click **Remove**.

Recompiling triggers

To recompile a trigger, select the **Recompile Trigger** option on the context-sensitive (right-click) menu that is displayed when you right click on a trigger that belongs to spatial table in the **Spatial Tables** branch of the **Lineage** tree.

This option will recompile the currently selected trigger. This is useful if the structure of the related table has changed and the trigger needs to be recompiled.

Rebuilding triggers

To rebuild a trigger, select the **Rebuild Trigger** option on the context-sensitive (right-click) menu that is displayed when you right click on a trigger that belongs to spatial table in the **Spatial Tables** branch of the **Lineage** tree.

Rebuild Trigger will rebuild and compile the trigger and associated views. The trigger will be rebuilt using the same process as when creating a new trigger.

Deleting monitor logs

The delete logs function can be used to maintain the amount of records in the MUNSYS_MONITOR_LOG. Different options are available to filter the records in this table before they are deleted. Records can be deleted from specific tables, by specific operations, according to specific dates and by specific user.

To delete monitor logs, select the **Delete Logs**... option on the context-sensitive (right-click) menu that is displayed when you right click the **Spatial Tables** branch of the **Lineage** tree.

The **Delete Logs** dialog box will appear.

In the **Table** area, do one of the following:

- **Select the All Tables option to delete all the records for all the tables**
- **Select a spatial table name from the Specific Table drop down list to delete records for a specific spatial table.**

In the **Operation** area, select one or more of the following check boxes (all operations are selected by default):

- **Insert – deletes all operations of the type INS (Insert)**
- **Delete – deletes all operations of the type DEL (Delete)**
- **Update – deletes all operations of the type UPD (Update)**
- **Spatial Update – deletes all operations of the type SPA (spatial update)**

In the **Date** area, do one of the following:

- **Select the All Dates option to delete records from all dates**
- **Select the Specific Date option to apply one of the following date filters:**
  - **Older than 6 months – will select logs older than 6 months from the current date.**
  - **Older than 12 months – will select logs older than 12 months from the current date.**
  - **Custom – specify your own dates by clicking on the calender drop down and navigating to a desired From and To date. The default From and To dates are set to the current system date.**

In the **User** area, do one of the following:

- **Select the All Users option to delete records of all users**
- **To delete records for a specific user, select the Specific User option, and then select a user from the list.**

When you have selected all the appropriate filters, click **Delete**.

The Log delete confirmation dialog box is displayed, prompting for confirmation to delete the records as specified.

Click Yes.

The Logs Deleted dialog box will appear when the selected logs have been successfully deleted.

Running reports

Reports can be run to query the database for monitor or usage purposes:

- Reports of type monitor can be used to provide basic or detailed reporting, based on operation type, user, table name and date of the operation.
- Reports of Type usage can be used to show the license usage of the complete range of Munsys applications, providing the administrator with the necessary records to evaluate the license usage and detail of users logging on to the Oracle database and using any of the Munsys applications.

All report queries are stored in the MUNSYS_MONITOR_REPORT table in the database. Once a report has been run, the results can be saved to a CSV or text file.

Note The number of records output to the Munsys Management Console display for any of the monitor or usage reports is limited to 10,000. If any of the reports return more than 10,000 records, a message is produced indicating that the report process has stopped. The Administrator can continue to execute the report directly from the database from the SQL command prompt and spool it to a file.

To run a report

Select the **Reports** branch of the **Lineage** tree to view the available reports.

A list of **Monitor** and **Usage** reports are displayed. The **Description** field is generally descriptive of the specific query operation.

To run a report, **right click** on an available report and select the **Run Reports** option that appears on the context-sensitive (right-click) menu.

A dialog box will appear for the selected report displaying the results of the query.

For example, the report dialog box below displays Report Details for the total number of Records recorded in the MUNSYS_MONITOR_LOG grouped by each OPEPRATION.

Once the report has been run, the results can be saved.

Click Save... to save the results to a folder of your choice. Results can be saved as a CSV or text file.

Editing reports

Reports can be edited to specific user requirements so that only the desired information is queried from the database.

To edit a report, **right click** on an available report and select the **Edit Reports** option that appears on the context-sensitive (right-click) menu.

The Edit Report dialog box will appear displaying the Report Type, Report Description and Report SQL (statement) for the current report.

In the **Edit Report** dialog box, the **Report Type**, **Report Description** and **Report SQL** are editable.

- **Report Type**: Click on the drop down menu to change the report type.
- **Report Description:** Click inside the text box to edit or change the report description.
- **Report SQL:** Click inside the text box to edit or change the report SQL statement.

If the **Report SQL** is modified the statement will need to pass the **Validate** test before the changes can be applied in the **Edit Report** dialog.

- Click **Validate** to test the changes.

If the SQL is valid, the **Report Validate Success** dialog box will appear.

- Click **OK** to return to the **Edit Report** dialog box.

The Click OK button in the Edit Report dialog box is now active again.

- Click **OK** in the **Edit Report** dialog box to apply any SQL statement changes, or continue making edits in the **Edit Report** dialog box.

Adding reports

Reports can be created to query the database according to customised requirements.

To add a new report, select the Add Report... option that is displayed when you right click the Reports branch of the Lineage tree.

The Add Report dialog box will appear

In the Report Type drop down of the Add Report dialog box, select a report type or create a new report type/category by typing in the drop down area.

In the Report Description area, briefly describe the report. For example, “Grouped by Month and Operation”.

In the Report SQL area, include the SQL statement that will be used to generate the report.

The OK button in the Add Report dialog box will only become available once the Report SQL statement has passed the Validate text.

Click on the Validate button to test the validity of the SQL statement in the Report SQL field.

If the SQL statement is valid, the **Report Validate Success** dialog box will appear.

Click OK in the Report Validate Success dialog box.

Click OK in the Add Report dialog box to create the report.

The report will appear in the right hand side window when the **Reports** branch of the **Lineage** tree is selected.

Deleting reports

Reports can be deleted if they are unused or no longer required.

To Delete a report, right click on a report and select the Delete Report option that appears on the context-sensitive (right-click) menu.

The **Report delete confirmation** dialog box will appear.

Click Yes in the Report delete confirmation dialog box to delete the selected report.

The selected report will be deleted.

Chapter 5
Munsys Administration

Introduction

This chapter provides recommendations on how to schedule the backup process, and introduces the data validation utilities available in Munsys Management Console to optimize the dataset. You will also be familiarized with the simplified migration of database structures when upgrading to a new release.

Backups

Create a batch file to export your schema to a dump file every day – schedule it during the night at 21:00

Create a batch file to export your schema to a dump file at least once a week – schedule it during the night, Saturday at 21:00

Create scheduled tasks to execute the batch files at the scheduled times.

Example **D:\app\oracle\product\19.0.0\dbhome_1\BIN\exp mcity14int/mcity14int file=mcity14int.dmp**

Exporting a Schema

The Export Schema function in the Munsys Management Console application is used to export the contents of a schema to a dump file. To be able to export a schema, you will need to have the MUNSYS_ADMIN role assigned, as well as the EXP_FULL_DATABASE database privilege.

Schema Validation

Whenever you make any changes to your database structure or make any changes to the Munsys system tables, it is advisable to run the Munsys Schema Validation function from the Munsys Management Console application. It is, in fact, strongly advised that you run this function on a regular basis as part of your database maintenance procedure.

Refer to the **Munsys Management Console** User Manual for further information about this functionality.

Table Privileges

Whenever creating a new spatial table or linking to attribute tables or views, please ensure that the tables or views have been granted the necessary rights to the applicable Munsys roles otherwise these tables will not be accessible by the logged on user. Also ensure that the user

has been granted the necessary Munsys roles. Refer to Chapter 4: Default roles created for a list of all the Munsys default roles.

Table Validation

Whenever new data is imported into the Munsys Schema, it is advisable that the "Munsys Spatial Table" validation be run on the applicable spatial table.

Refer to the **Munsys Management Console** User Manual for further information about this function. The manual can be located in [**Munsys Management Console Installation Folder**] \Docs.

Default Settings

After creating a new Munsys schema, the following information will need to be updated on a per organization level:

- Application settings need to be configured for the organization
- The default lookup values may need to be updated
- The record locking mechanism may need to be enabled/disabled

Indexes/Re-Index

The Munsys Management Console application allows the following indexes to be created or dropped on any Munsys spatial tables:

- **GID** – a unique index on the GID column of your spatial table. You may want to drop this index when importing a large amount of data into the table. Do not forget to recreate this index after importing your data. It is not advisable to drop this index as it will have a huge performance impact on the Oracle database.
- **Spatial** – represents the index on your spatial data located in the GEOMETRY column and is used when querying any objects by GSC. It is advisable to drop this index when importing a large amount of data into your spatial table. Remember to recreate the index after importing your data.

Munsys have supplied a re-indexing SQL utility that is installed when the Munsys Management Console application is installed. This utility can be found in the default installation path **C:\Program Files\Open Spatial\MunConsole14.2\Utilities\Reindex**

Refer to the Munsys Management Console User Manual for further information on this function. This document can be located in the default installation path C:\Program Files\Open Spatial\MunConsole14\Docs

Export

Munsys has the ability to export to different formats directly from the database using its DOS-based utility MunXport. Formats supported are:

- MIF/MID (MapInfo format)
- SHP (ESRI shape file format)
- SDF (Autodesk MapGuide SDF format)

Refer to the **MunXport User Manual** for further information on this function. The manual can be located in **C:\Program Files\Open Spatial\MunConsole14.2\Docs.**

Chapter 6
Data Management

Introduction

Data is one of the most important assets of any organization. Munsys not only opens up an organization's spatial data component, but also strives to support and integrate the organization's existing, non-spatial data.

Munsys provides a mechanism to seamlessly integrate the organization's non-spatial data. Using Oracle's power, this may extend beyond the borders of the Oracle database.

Once the source has been identified, this data may be edited or viewed via Munsys.

User Privileges

Security is always of the highest concern when data is opened up for viewing or editing by multiple users.

Oracle's database privileges apply to almost any database object, thinkable. When a user is identified to have access to the database, the user is also assigned some privileges. Privileges may vary from a single record to a specific column or extend to a whole table or view.

Munsys will always present only those objects to the user to which they have appropriate privileges. This is often done directly through Oracle and, at other times, through Munsys views.

To assist in obtaining the objects to which a user has appropriate rights, the following views have been implemented as part of the Munsys schema:

ALL_MUNSYS_AT	Provides an account of all attribute templates available to the user
ALL_MUNSYS_AT_COLUMNS	Provides the column descriptions for the non-spatial attribute tables to which the user has access
ALL_MUNSYS_AT_TABLES	Provides a list of non-spatial attribute tables to which the user has access
ALL_MUNSYS_QUERY	Provides an account of all system queries available to the user for querying spatial objects
ALL_MUNSYS_SP_COLUMNS	Provides the column descriptions for those tables to which the user has access privileges
ALL_MUNSYS_SP_TABLES	Provides a list of spatial tables to which the user has access
ALL_MUNSYS_APPLICATION	Provides a list of applications used in the Munsys system to which the user has access (MUNSYS_XXX_EDIT)

Table 7 *Views implemented as part of the Munsys schema*

Custom Attribute Views

Munsys presents information through various functions, for example **Show Info** and **Edit Attributes**.

By default, all columns in the table are displayed and formatting is restricted to system defaults. It is often also a requirement to view attributes from a linked table simultaneously.

This section describes the various ways that Munsys offers to customize the view and/or edit spatial and linked tables.

Default Attribute Views

When a Munsys schema is created, default column descriptions and formatting parameters are supplied with each Munsys spatial table. This information is stored in the **MUNSYS_SP_COLUMNS** table.

When a user indicates an object using the **Info Palette**, functions like **Show Info** will obtain the column descriptions and formatting parameters associated with the spatial object (and

table) from **MUNSYS_SP_COLUMNS**. If no related entries exist, then the raw table column names are presented.

When creating a custom spatial table, consideration should be given to the possibility of adding column information to **MUNSYS_SP_COLUMNS**. The Munsys Management console does not do this automatically.

Inserting Default Column Information

To insert column information into the **MUNSYS_SP_COLUMNS** table, the user requires the associated **MUN_ID** assigned to the spatial object. This may be obtained from **MUNSYS_SP_COLUMNS** by searching for the appropriate spatial table. The exact column name as identified in the spatial table must be used and inserted into **COLUMN_NAME**.

A description must be inserted into COLUMN_DESC. This description is displayed as the alternative name.

The **DIALOG_DATA_TYPE** may contain **NULL**, or an '**A**', which signifies that the numeric data type resembles an angle, or a '**T**', which signifies that a data type of **DATE** should display the date and time. When encountered in the application, the current angle units in the AutoCAD drawing is used to format an angle value and in the case of the date, the current operating system local settings for date and time are used to format the date and time values. To indicate whether the user is allowed to edit a column, insert a '**Y**' into **IS_EDITABLE**.

COLUMN_MINVAL and **COLUMN_MAXVAL** columns are used when the column is a numeric column – provide the minimum and maximum values if needed.

Note MUNSYS_SP_COLUMNS only applies to spatial tables and has no effect on non-spatial tables.

Attribute Templates

An alternative, recommended way to customize attribute views is through the **Munsys attribute templates**.

This provides a controlled mechanism, allowing the view to include columns from a linked table as well as restricting the view of certain columns.

The administrator may create and customize attribute templates for any spatial table. This is done in the **Spatial Data Manager** application and a user must have the MUNSYS_ADMIN role assigned in order to do so.

The MUNSYS_AT_DEF and MUNSYS_AT_CONTROL tables are used to store attribute template definitions.

Refer to the **Munsys Concepts User Manual** and the Online Help about how to create an attribute template.

Supported Data Types

Database Types

Munsys supports the most common Oracle database types. In the event that a data type is encountered which is unsupported, Munsys will continue to display the remaining information, ignoring that which it does not recognize.

The following data types are supported:

- CHAR
- VARCHAR2
- NUMBER
- MDSYS.SDO_GEOMETRY
- DATE

Data Formatting

When displaying information in an application, Munsys acknowledges some external factors that impact on the displaying of certain data types. These are:

- **Operating System Regional Settings** – date settings are used to format dates accordingly.
- **AutoCAD units** – Decimal Precision influences the number of digits displayed after the decimal point when a NUMBER data type is used that has no scale.
- **AutoCAD units** – Angle Type influences the display and editing of an angle, when the NUMBER type has been identified as that of type Angle.

Linking Tables

The mechanism to view and edit linked tables requires some knowledge of the tables being linked. A Munsys system table (MUNSYS_LNK_TABLES) is used to store linked table information.

This definition is known to the Munsys user as a **link template**. The Spatial Data Manager application allows the administrator to create, maintain and remove link templates.

With the link template mechanism, the user may view or edit asset properties or financial costs that do not form part of the standard Munsys environment.

Editing Linked Table Attributes

The administrator may create an attribute template for users with privileges to edit a linked table. By creating the attribute template for a spatial table and assigning a linked table, the user may use the **Edit Linked Table Attributes** function to edit the linked table attributes.

The attribute template must provide the appropriate columns available to the user for editing.

Showing Linked Table Attributes

An added advantage of creating an attribute template with a linked table is to allow the user to view the linked records using the **Info Palette**.

By selecting the object in the drawing, the user has the immediate feedback of whether the object has appropriate linked information or not.

Linking to Multiple Tables

Munsys does not provide a user interface to identify multiple linked tables.

To do so would require the creation of a view, selecting the appropriate columns from the multiple tables. The user would then be required to create the link template where the relationship is defined between the spatial table and the view.

Linking to External Tables

Oracle provides mechanisms to allow users to attach external data sources to a schema. This is especially handy when users have tables in non-Oracle databases, such as Microsoft SQL Server, which they would like to link to.

Referring to Oracle's "*Heterogeneous Connectivity Administrator's Guide*" will assist in this regard.

Chapter 7
Spatial Objects

Introduction

The Munsys schema contains various system tables that are used to inform Munsys about other objects in the schema. This is most applicable to the spatial objects recognized in Munsys.

To accept a spatial table as being "recognized" in the Munsys schema, the table must adhere to some standards with regard to naming and structure. Furthermore, to complete the picture, information must be added to Munsys system tables.

Object Types

When referring to a Munsys Spatial object, this refers to the total definition ranging from the representation in Autodesk Map through to the storage in the Oracle table.

Object Geometry

Munsys supports four basic geometry types to represent a spatial object:

- LABEL
- POINT
- LINE
- POLYGON

A spatial object type may only represent a **single geometry type**. More than one geometry type in a single table is not supported.

Munsys may **query 3D** geometry objects; however, it can only **post 2D** geometry back to the database.

The following table defines the characteristics of the various objects as encountered in the application and database.

Geometry Type	Munsys Object Type	Oracle Geometry Type	Autodesk Object	Description
Label	1	2001	MUNLABEL	An object containing text information representing a specified column in the database table. This text information is dynamic and changes according to the changes in the database.

Single Point	2	2001	MUNPOINT	An object containing single point information displayed as either a point or symbol.
Single Line	3	2002	MUNLINE	An object containing one line (polyline).
Single Polygon	4	2003	MUNPOLY	An object containing one boundary and possible multiple island polygons.
Multi-Point	2	2005	MUNPOINT	An object containing point information displayed as either a point or symbol. Each MUNPOINT object may optionally represent multiple points (or clusters of points).
Multi-Line	3	2006	MUNLINE	An object containing one or more multi-segmented lines (polylines). Each multi-segmented line may be joined by any combination of straight or curved lines.
Multi-Polygon	4	2007	MUNPOLY	An object containing one or more polygons in the form of closed polylines. Polygons may be contained as islands within a boundary polygon or may be disjoint in nature.

Table 8 *Object type characteristics*

A special kind of polygon object, which caters for simplistic polygon displays, has been introduced in Munsys. The Munsys Lightweight Polygon (MUNLWPOLY) enhances the speed with which polygon objects are queried. This object type was introduced purely for speed purposes and has restrictions in that a user may not edit any part of it – geometry or attributes. It has a further restriction in that it does not allow any fills to take place.

By changing the QRY_FMT in the MUNSYS_QUERY table from a 4 to a type 5, the user indicates that the polygon object is to be queried as a lightweight polygon. In Autodesk, the user may override this with the MUNLWPOLYMODE and switch this off, reverting back to being able to query it as a MUNPOLY object again.

From within the Munsys applications, using the Query Palette, polygon objects can be queried as MUNLWPOLY objects by setting the polygon properties **Polygon Type** to **Query as LW Polygon** and save the default query. This is a simpler way for users to change the QRY_FMT from 4 to 5.

MUNLWPOLY objects may only be substituted where a MUNTYPE 4 is applicable.

Object Formatting

When querying objects from the database to Autodesk, a Munsys query is used.

The query contains parameters regarding the spatial object's definition, filter information and display characteristics. Executing a query will automatically locate the correct spatial table, apply the filter (if any) to retrieve the data from the database, then create Munsys objects in the Autodesk drawing with appropriate layer and formatting information.

At least one query must exist for a spatial object in the MUNSYS_QUERY table – this is recognized as the system query for the spatial table. Users may create more queries that reference the same spatial table, but present this in the drawing by different display characteristics, filtering the data differently, etc.

Table Conventions

Naming Conventions

All Munsys spatial tables have the following naming conventions:

SP_XXXXXX

Every table name has the prefix of **SP_** to indicate that the table includes spatial geometry.

Some application spatial tables start with their respective application prefixes. This is not a prerequisite but assists when searching for a specific set of tables.

The table name (including the **SP_**) may not exceed a total length of 17 characters so as to allow for the creating of an equivalent spatial index table.

Characters used must conform to Oracle naming conventions for table names.

Table Structure

MunPoint

MunPoint is an object containing point information displayed as either a point or symbol, for example manholes or valves. Each MunPoint object may optionally represent multiple points (or clusters of points). A spatial table using the MunPoint object will have the following default columns when created using Munsys Manager Console:

MunPoint object type

Column Name	Data Type	Description
GID	NUMBER(10)	Geometry ID.
SYM_NAME	VARCHAR2(40)	Contains the string value of the symbol name (drawing name).
SYM_SCALE	NUMBER	Contains the scale factor of the symbol.
SYM_ANGLE	NUMBER	Contains the symbol angle in radians.
COMMENTS	VARCHAR2(150)	Contains optional comments.
TAG_X	NUMBER	Contains the X ordinate of the tag insertion point.
TAG_Y	NUMBER	Contains the Y ordinate of the tag insertion point.
TAG_VALUE	VARCHAR2(40)	Contains the tag text value.
TAG_SIZE	NUMBER	Contains the tag text size.
TAG_ANGLE	NUMBER	Contains the tag text angle in radians.
TAG_JUST	CHAR(2)	Contains the tag text justification.
GEOMETRY	SDO_GEOMETRY	Contains the MunPoint data.

MunLine

MunLine is an object containing one or more multi-segmented lines (polylines), for example water pipes or service connections. Each multi-segmented line may be joined by any combination of straight or curved lines. MunLine objects will have the following default columns when created using Munsys Management Console:

MunLine object type

Column Name	Data Type	Description
GID	NUMBER(10)	Geometry ID.
GEOM_LENGTH	NUMBER	Contains the length of the MunLine object. This column is automatically maintained by the Munsys system.
COMMENTS	VARCHAR2(150)	Contains optional comments.
TAG_X	NUMBER	Contains the X ordinate of the tag insertion point.
TAG_Y	NUMBER	Contains the Y ordinate of the tag insertion point.
TAG_VALUE	VARCHAR2(40)	Contains the tag text value.
TAG_SIZE	NUMBER	Contains the tag text size.
TAG_ANGLE	NUMBER	Contains the tag text angle in radians.
TAG_JUST	CHAR(2)	Contains the tag text justification.
GEOMETRY	SDO_GEOMETRY	Contains the MunLine data.

MunPoly

MunPoly is an object containing one or more polygons, for example parcels or water zones. Polygons may be contained as islands within a boundary polygon or may be disjoint in nature. MunPoly objects will have the following default columns when created using Munsys Management Console:

MunPoly Object Type

Column Name	Data Type	Description
GID	NUMBER(10)	Geometry ID.
GEOM_AREA	NUMBER	Contains the area of the MunPoly object. This column is automatically maintained by the Munsys system.
COMMENTS	VARCHAR2(150)	Contains optional comments.
TAG_X	NUMBER	Contains the X ordinate of the tag insertion point.
TAG_Y	NUMBER	Contains the Y ordinate of the tag insertion point.
TAG_VALUE	VARCHAR2(40)	Contains the tag text value.
TAG_SIZE	NUMBER	Contains the tag text size.
TAG_ANGLE	NUMBER	Contains the tag text angle in radians.
TAG_JUST	CHAR(2)	Contains the tag text justification.
GEOMETRY	SDO_GEOMETRY	Contains the MunPoly data.

MunLabel

MunLabel is an object containing text information representing a specified column in the database. This text information is dynamic and changes according to the updates made in the database. MunLabel object will have the following default columns when created using Munsys Management Console:

MunLabel object type

Column Name	Data Type	Description
GID	NUMBER(10)	Geometry ID.
COMMENTS	VARCHAR2(150)	Contains optional comments.
TAG_X	NUMBER	Contains the X ordinate of the tag insertion point.
TAG_Y	NUMBER	Contains the Y ordinate of the tag insertion point.
TAG_VALUE	VARCHAR2(40)	Contains the tag text value.
TAG_SIZE	NUMBER	Contains the tag text size.
TAG_ANGLE	NUMBER	Contains the tag text angle in radians.
TAG_JUST	CHAR(2)	Contains the tag text justification.
GEOMETRY	SDO_GEOMETRY	Contains the MunLabel data.

Refer to **Chapter 4**: Spatial tables for naming convention of indexes

Chapter 8
Munsys Applications

Introduction

The MunID is a unique identifier that references a spatial table within a Munsys schema. Each system table and user-defined spatial table has a MunID assigned when created using the Munsys Management Console. The MunIDs numbered from 1 to 999 are reserved for system spatial tables, and from 1000 onwards for user-defined spatial tables.

Spatial Table MunIDs

The MunIDs are also stored in other Munsys system tables instead of storing the full spatial table name, as indicated in the system tables below:

- MUNSYS_AT_DEF
- MUNSYS_INTEG_ATTR
- MUNSYS_INTEG_NODES
- MUNSYS_INTEG_OBJECTS
- MUNSYS_INTEG_RESULTS
- MUNSYS_LOCKED_OBJECTS
- MUNSYS_MD_SPTABLE
- MUNSYS_QUERY
- MUNSYS_SP_COLUMNS
- MUNSYS_SP_TABLES

The MunIDs with the associated table name is stored in the MUNSYS_SP_TABLES table. The following tables list the different MunIDs, their associated spatial table name and the Munsys Object type for the Cadastral, Drainage, Electricity, Roads, Sewer, Water, Cable Fiber and Cable Route applications. Refer to **Chapter 7**: Spatial Objects, for more information about the Munsys Object Type.

MunIDs for Cadastral spatial tables

Mun ID	Spatial Table Name	Munsys Object Type	Description
1	SP_TOWN - INT locale	4	Townships
3	SP_PARCEL	4	Land Parcels
5	SP_SUBURB - INT locale	4	Suburbs
6	SP_BLOCK - INT locale	4	Block Boundaries
7	SP_WARD - INT locale	4	Wards
8	SP_STRTXT	1	Street Names
9	SP_STRADDR	1	Street Addresses
10	SP_EASELINE	3	Easement Lines
11	SP_EASELINETXT	1	Easement Line Text
12	SP_TP_ZONING	4	TP Zoning
13	SP_TP_DENSITY	4	TP Density
14	SP_EASEPOLY	4	Easement Polygons
15	SP_EASEPOLYTXT	1	Easement Polygon Text
16	SP_BUILDING	4	Buildings
17	SP_CMSNOTE	1	Cadastral Notes
18	SP_MUNICIPALITY - US	4	Municipalities
19	SP_TP_LANDUSE	4	TP Land Use

MunIDs for Drainage spatial tables

Mun ID	Spatial Table Name	Munsys Object Type	Description
61	SP_SWDIM	2	Stormwater Dimensions
62	SP_SWCATCH	4	Stormwater Catchments
63	SP_SWNODE	2	Stormwater Nodes
64	SP_SWNOTE	1	Stormwater Notes
65	SP_SWPIPE	3	Stormwater Pipes
66	SP_SWCHANNEL	3	Stormwater Channels

67	SP_SWCULVERT	3	Stormwater Culverts
68	SP_RIVERLINE	3	River Lines
69	SP_RIVERPOLY	4	River Polygons
70	SP_FLOODLINE	4	Floodlines
71	SP_DAM	4	Dams
72	SP_DMSLABEL	1	Drainage Labels
73	SP_SWSERV	3	Stormwater Service Connections
74	SP_SWSYM	2	Stormwater Symbols

MunIDs for Electricity spatial tables

Mun ID	Spatial Table Name	Munsys Object Type	Description
101	SP_ELCABLE	3	Electricity Cables
102	SP_ELNODE	2	Electricity Nodes
103	SP_ELDUCT	3	Electricity Ducts
104	SP_ELZONE	4	Electricity Zones
105	SP_ELNOTE	1	Electricity Notes
106	SP_ELDIM	2	Electricity Dimensions
107	SP_ELSERV	3	Electricity SCs

MunIDs for Roads spatial tables

Mun ID	Spatial Table Name	Munsys Object Type	Description
81	SP_RDCL	3	Road Center Lines
82	SP_RDINT	2	Road Intersections
83	SP_RDWALK	3	Road Walkways
84	SP_RDAREA	4	Road Areas
85	SP_RDEDGE	3	Road Edges
86	SP_RDNOTE	1	Road Notes

MunIDs for Sewer spatial tables

Mun ID	Spatial Table Name	Munsys Object Type	Description
21	SP_SEWDIM	2	Sewer Dimensions
22	SP_SEWBASIN	4	Sewer Basins
23	SP_SEWNODE	2	Sewer Nodes
24	SP_SEWNOTE	1	Sewer Notes
25	SP_SEWGPIPE	3	Sewer Pipes (Gravity)
26	SP_SEWSERV	3	Sewer Service Connections
27	SP_SEWVPIPE	3	Sewer Pipes (Vacuum)
28	SP_SEWRPIPE	3	Sewer Pipes (Pressure)
29	SP_SEWRESPIPE	3	Sewer Residential Pipes
30	SP_SEWLABEL	1	Sewer Labels
31	SP_SEWSYM	2	Sewer Symbols
32	SP_SEWMAPPAGE	4	Sewer Map Page Grids

MunIDs for Water spatial tables

Mun ID	Spatial Table Name	Munsys Object Type	Description
41	SP_WATDIM	2	Water Dimensions
42	SP_WATZONE	4	Water Zones
43	SP_WATNODE	2	Water Nodes
44	SP_WATNOTE	1	Water Notes
45	SP_WATPIPE	3	Water Pipes
46	SP_WATSERV	3	Water Service Connections
47	SP_WATRESPIPE	3	Water Residential Pipes
48	SP_WATLABEL	1	Water Labels
49	SP_WATSYM	2	Water Symbols
50	SP_WATMAPPAGE	4	Water Map Page Grids

MunIDs for Cable Fiber spatial tables

Mun ID	Spatial Table Name	Munsys Object Type	Description
161	SP_FIBCABLE	3	Fiber Cables
162	SP_FIBPATH	3	Fiber Paths
163	SP_FIBNOTE	1	Cable Fiber Notes
164	SP_FIBDIM	2	Cable Fiber Dimensions
165	SP_FIBSYM	2	Cable Fiber Symbols
166	SP_FIBSERV	3	Cable Fiber Service Connection

MunIDs for Cable Route spatial tables

Mun ID	Spatial Table Name	Munsys Object Type	Description
141	SP_CRTLINK	3	Cable Route Links
142	SP_CRTNODE	2	Cable Route Nodes
143	SP_CRTNOTE	1	Cable Route Notes
144	SP_CRTDIM	2	Cable Route Dimensions
145	SP_CRTSYM	2	Cable Route Symbols
146	SP_CRTLABEL	1	Cable Route Labels
147	SP_CRTINFSTRUCT	1	Cable Route Infrastructure

Lookup Tables

Default lookup tables are automatically created when a new Munsys Schema is created and the various Munsys data models installed. These lookup tables are used to append predefined attribute data to spatial objects which describe the object such as pipe diameter, pipe material, pipe type etc. for water and sewer pipe objects. Data standards and integrity are enforced by the data capturer when they select the values from the lookup tables at the point of capture within the various Munsys Applications.

There are lookup tables linked to the various spatial tables for utility applications such as cadastral, drainage, electricity, roads, sewer and water. The tables below indicate the system generated lookup tables and show to which spatial table they are linked per application.

Cadastral lookup tables

Spatial Table	Lookup Table	Spatial Join Column	Lookup Join Column
SP_BUILDING	LU_CMS_BLDTYPE	BLD_TYPE	LCODE
SP_EASELINE	LU_CMS_EASETYPE	EASE_TYPE	LCODE
SP_EASELINETXT	LU_CMS_EASETYPE	EASE_TYPE	LCODE
SP_EASEPOLY	LU_CMS_EASETYPE	EASE_TYPE	LCODE
SP_EASEPOLYTXT	LU_CMS_EASETYPE	EASE_TYPE	LCODE
SP_MUNICIPALITY - US	LU_CMS_MUNINAME	MUNI_CODE	LCODE
SP_PARCEL	LU_CMS_LSTATUS	LSTATUS	LCODE
SP_PARCEL	LU_CMS_PRCLTYPE	PRCL_TYPE	LCODE
SP_PARCEL	LU_CMS_WSTATUS	WSTATUS	LCODE
SP_STRADDR - US	LU_CMS_MUNINAME	MUNI_NAME	LVALUE
SP_STRADDR	LU_CMS_STRNAME	STR_CODE	LCODE
SP_STRADDR	LU_CMS_STRNAME	STR_NAME	LVALUE
SP_STRADDR - INT	LU_CMS_SUBNAME	SUB_NAME	LVALUE
SP_SUBURB - INT	LU_CMS_SUBNAME	SUB_CODE	LCODE
SP_TOWN - INT	LU_CMS_LSTATUS	LSTATUS	LCODE
SP_TOWN - INT	LU_CMS_TOWNNAME	TOWN_CODE	LCODE
SP_TOWN - INT	LU_CMS_WSTATUS	WSTATUS	LCODE
SP_TP_DENSITY	LU_CMS_DENSITY	DENSITY	LCODE
SP_TP_LANDUSE	LU_CMS_LANDUSE	LANDUSE	LCODE
SP_TP_ZONING	LU_CMS_ZONING	ZONING	LCODE

Drainage lookup tables

Spatial Table	Lookup Table	Spatial Join Column	Lookup Join Column
SP_SWPIPE	LU_DMS_PIPEDIA	PIPE_DIA	LCODE
SP_SWPIPE	LU_DMS_PIPEMATRL	PIPE_MATRL	LCODE
SP_SWPIPE	LU_DMS_PIPETYPE	PIPE_TYPE	LCODE

Spatial Table	Lookup Table	Spatial Join Column	Lookup Join Column
SP_SWCHANNEL	LU_DMS_CHANNELTYPE	CHNL_TYPE	LCODE
SP_SWCHANNEL	LU_DMS_CHANNELMATRL	CHNL_MATRL	LCODE
SP_SWCULVERT	LU_DMS_CULVERTTYPE	CLVT_TYPE	LCODE
SP_SWCULVERT	LU_DMS_CULVERTMATRL	CLVT_MATRL	LCODE
SP_SWCULVERT	LU_DMS_CULVERTWIDTH	CLVT_WIDTH	LCODE
SP_SWCULVERT	LU_DMS_CULVERTDEPTH	CLVT_DEPTH	LCODE
SP_SWSERV	LU_DMS_SERVTYPE	SERV_TYPE	LCODE
SP_SWSYM	LU_DMD_SWSYM	SYM_NAME	LCODE
SP_RIVERLINE	LU_DMS_RIVERTYPE	RIV_TYPE	LCODE
SP_RIVERPOLY	LU_DMS_RIVERTYPE	RIV_TYPE	LCODE
SP_FLOODLINE	LU_DMS_FLOODTYPE	FLD_TYPE	LCODE
SP_DAM	LU_DMS_DAMTYPE	DAM_TYPE	LCODE

Electricity lookup tables

Spatial Table	Lookup Table	Spatial Join Column	Lookup Join Column
SP_ELCABLE	LU_EMS_CABLEMATRL	CBL_MATRL	LCODE
SP_ELCABLE	LU_EMS_CABLESIZE	CBL_SIZE	LCODE
SP_ELSERV	LU_EMS_CABLEMATRL	SERV_MATRL	LCODE
SP_ELSERV	LU_EMS_CABLESIZE	SERV_SIZE	LCODE
SP_ELDUCT	LU_EMS_DUCTSIZE	PIPE_SIZE	LCODE
SP_ELNODE	LU_EMS_SSTID_DESC	SST_ID	LVALUE
SP_ELNODE	LU_EMS_EALINKDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_EBBRDDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_EDBDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_EHMSLDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_EHVJUNCDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_EHVSWITCHDESC	NODE_DESC	LVALUE

Spatial Table	Lookup Table	Spatial Join Column	Lookup Join Column
SP_ELNODE	LU_EMS_EKIOSKDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_ELVJUNCDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_EMSUBDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_EPOLEDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_EPYLONDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_ESLDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_ESLJUNCDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_ESLPOLEDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_ESSTADESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_ESSUBDESC	NODE_DESC	LVALUE
SP_ELNODE	LU_EMS_ETRANSDESC	NODE_DESC	LVALUE

Roads lookup tables

Spatial Table	Lookup Table	Spatial Join Column	Lookup Join Column
SP_RDCL	LU_RMS_SURF	SEG_SURG	LCODE
SP_RDCL	LU_RMS_CLASS	SEG_CLASS	LCODE
SP_RDCL	LU_RMS_SEGOWNER	SEG_OWNER	LCODE
SP_RDCL	LU_RMS_SEGTYPE	SEG_TYPE	LCODE
SP_RDCL	LU_RMS_ROUTENUM	STR_RNAME	LCODE
SP_RDEGDE	LU_RMS_EDGETYPE	EDGE_TYPE	LCODE

Sewer lookup tables

Spatial Table	Lookup Table	Spatial Join Column	Lookup Join Column
SP_SEWGPIPE	LU_SMS_GPIPEDIA	PIPE_DIA	LCODE
SP_SEWGPIPE	LU_SMS_GPIPEMATRL	PIPE_MATRL	LCODE
SP_SEWGPIPE	LU_SMS_GPIPETYPE	PIPE_TYPE	LCODE
SP_SEWRPIPE	LU_SMS_RPIPEDIA	PIPE_DIA	LCODE
SP_SEWRPIPE	LU_SMS_RPIPEMATRL	PIPE_MATRL	LCODE
SP_SEWRPIPE	LU_SMS_RPIPETYPE	PIPE_TYPE	LCODE
SP_SEWSERV	LU_SMS_SERVTYPE	SERV_TYPE	LCODE
SP_SEWSYM	LU_SMD_SWSYM	SYM_NAME	LCODE
SP_SEWVPIPE	LU_SMS_VPIPEDIA	PIPE_DIA	LCODE
SP_SEWVPIPE	LU_SMS_VPIPEMATRL	PIPE_MATRL	LCODE
SP_SEWVPIPE	LU_SMS_VPIPETYPE	PIPE_TYPE	LCODE

Water lookup tables

Spatial Table	Lookup Table	Spatial Join Column	Lookup Join Column
SP_WATDIM	LU_WMS_WATCATEGORY	WAT_CATEGORY	LCODE
SP_WATLABEL	LU_WMS_WATCATEGORY	WAT_CATEGORY	LCODE
SP_WATNODE	LU_WMS_WATCATEGORY	WAT_CATEGORY	LCODE
SP_WATNOTE	LU_WMS_WATCATEGORY	WAT_CATEGORY	LCODE
SP_WATPIPE	LU_WMS_PIPEDIA	PIPE_DIA	LCODE
SP_WATPIPE	LU_WMS_PIPEMATRL	PIPE_MATRL	LCODE
SP_WATPIPE	LU_WMS_PIPETYPE	PIPE_TYPE	LCODE
SP_WATPIPE	LU_WMS_WATCATEGORY	WAT_CATEGORY	LCODE
SP_WATSERV	LU_WMS_WATCATEGORY	WAT_CATEGORY	LCODE
SP_WATSYM	LU_WMS_WATSYM	SYM_NAME	LCODE
SP_WATZONE	LU_WMS_WATCATEGORY	WAT_CATEGORY	LCODE

Cable Fiber lookup tables

Spatial Table	Lookup Table	Spatial Join Column	Lookup Join Column
	LU_CFS_CBLGROUP		LCODE
	LU_CFS_CBL_TYPE		LCODE
	LU_CFS_MUXTYPE		LCODE
SP_FIBSYM	LU_CFS_FIBSYM	SYM_NAME	LCODE
	LU_CFS_SERVSUBCAT		LCODE
	LU_CFS_SERVTYPE		LCODE
SP_FIBCABLE	LU_CFS_FIBOWNER	CABLE_OWNER	LCODE
	LU_CFS_FIBTENANCY		LCODE

Cable route lookup tables

Spatial Table	Lookup Table	Spatial Join Column	Lookup Join Column
AT_CRTDUCT	LU_CRS_CRTDUCTCOLOR	DUCT_COLOR	LCODE
AT_CRTDUCT	LU_CRS_CRTDUCTSIZE	DUCT_SIZE	LCODE
AT_CRTDUCT	LU_CRS_CRTDUCTTYPE	DUCT_TYPE	LCODE
SP_CRTLINK	LU_CRS_CRTOWNER	OWNER	LCODE
SP_CRTNODE	LU_CRS_CRTOWNER	OWNER	LCODE
SP_CRTLINK	LU_CRS_CRTSTATE	STATE	LCODE
SP_CRTNODE	LU_CRS_CRTSTATE	STATE	LCODE
SP_CRTLINK	LU_CRS_CRTSTATUS	STATUS	LCODE
SP_CRTNODE	LU_CRS_CRTSTATUS	STATUS	LCODE
SP_CRTSYM	LU_CRS_CRTSYM	SYM_NAME	LCODE
SP_CRTLINK	LU_CRS_CRTTYPE	ROUTE_TYPE	LCODE
SP_CRTINFSTRUCT	LU_CRS_INFTYPE	INF_TYPE	LCODE
SP_CRTNODE	LU_CRS_NODEFUNC	NODE_FUNC	LCODE

Query Categories

Query categories are created and maintained in the Munsys Management Console and are used to group queries and data into an organization's recognized data categories. The following category types are available:

- **Uncategorized** – by default, any new query (not a user query) is seen as being uncategorized until it has been allocated to a category. Queries can be moved to or from the uncategorized group, but the category itself is a special case whereby the name may not be changed – only the content.
- **User** – whenever a user creates a new query, it is automatically seen as a personal query, hence called a User query. Other users cannot see any other user's queries until they are shared in the pool of Uncategorized or Categorized queries.
- **Custom Categories** – each category is provided with a unique name. When a new category is created, it is automatically granted the MUNSYS_ALL_QUERY role. A category may be granted multiple roles.

Munsys provides default custom categories as part of a new schema when the various Munsys data models are installed. The power user has the ability to customize these and/or add personal categories. The following categories are created in a new schema, synonymous with the Munsys applications and the default roles are granted to these categories:

- **Cadastral** – MUNSYS_CMS_QUERY
- **Drainage** – MUNSYS_DMS_QUERY
- **Electricity** – MUNSYS_EMS_QUERY
- **Roads** – MUNSYS_RMS_QUERY
- **Sewer** – MUNSYS_SMS_QUERY
- **Water** – MUNSYS_WMS_QUERY
- **Cable Route**– MUNSYS_CRS_QUERY
- **Cable Fiber** – MUNSYS_CFS_QUERY

The following default query categories are created with the various Munsys data models when creating a new Munsys schema:

Category ID	Category Name	Description
1	<<Uncategorized Queries>>	Category contains all queries that have not been assigned
10	Cadastral	Category contains all cadastral base queries
20	Sewer	Category contains all sewer base queries
40	Water	Category contains all water base queries
41	Water (Potable)	Category contains all potable water queries
42	Water (Reclaimed)	Category contains all reclaimed water queries
43	Water (Abandoned)	Category contains all abandoned water queries
44	Water (Raw)	Category contains all raw water queries
60	Drainage	Category contains all drainage base queries
80	Roads	Category contains all roads base queries
100	Electricity	Category contains all electricity base queries
140	Cable Routes	Category contains all cable route queries
160	Cable Fibers	Category contains all cable fiber queries

Table 9 *Default query categories*

Queries

There are three types of queries in a Munsys schema; the system custom category queries, user-defined queries and uncategorized queries. All queries allow users to query spatial data from the database into the Autodesk Map drawing area. The user queries are only available to the user who created them.

Each query is assigned a query priority which in effect is similar to the draw order in AutoCAD. A low priority number means that the query will be executed before queries with higher numbers. This means that queries with a higher priority will be executed towards the end of the query process, causing the objects with a higher priority to be placed on top of the objects queried from queries with a low query priority.

A Munsys schema will have default system queries stored in the database. These can be viewed by selecting the contents of the MUNSYS_QUERY table. Users can define their own queries and these are also stored in the MUNSYS_QUERY table along with the table name, MunID, attribute conditions, query priority, category ID and the object format defined in the query. The user name is stored with a user-defined query in the MUNSYS_QUERY defining which queries are associated with which users.

The roles assigned to the user impact on which queries they can use. A user having the MUNSYS_SMS_QUERY role will only be able to see all system queries pertaining to the sewer

spatial tables whereas a user with the MUNSYS_ALL_QUERY role will be able to see all the system queries across all Munsys applications. A user-defined query is only visible to the user who created and saved the query.

The following default cadastral queries are created in MUNSYS_QUERY with **all** Munsys data models:

Query ID	Description	Spatial Table	Attribute Table	Category ID	Query Priority
1	Townships *INT locale	SP_TOWN	—	10	1.11
2	Townships (Archived) *INT locale	SP_TOWN	—	10	1.12
3	Parcels	SP_PARCEL	—	10	1.31
4	Parcels (Archived)	SP_PARCEL	—	10	1.32
5	Suburbs *INT locale	SP_SUBURB	—	10	1.02
6	Block Boundaries *INT locale	SP_BLOCK	—	10	1.21
7	Wards *INT locale	SP_WARD	—	10	1.03
8	Street Names	SP_STRTXT	—	10	1.41
9	Street Addresses	SP_STRADDR	—	10	1.42
10	Easement Lines	SP_EASELINE	—	10	1.34
11	Easement Line Text	SP_EASELINETXT	—	10	1.36
12	TP Zoning Polygons	SP_TP_ZONING	—	10	1.23
13	TP Density Polygons	SP_TP_DENSITY	—	10	1.24
14	Easement Polygons	SP_EASEPOLY	—	10	1.35
15	Easement Polygon Text	SP_EASEPOLYTXT	—	10	1.37
16	Buildings	SP_BUILDING	—	10	1.33
17	Cadastral Notes	SP_CMSNOTE	—	10	1.43
18	Municipalities *US	SP_MUNICIPAL-ITY	—	10	1.01
19	TP Land Use Polygons	SP_TP_LANDUSE	—	10	1.22

Table 10 *Default cadastral queries*

The following default drainage queries are created in MUNSYS_QUERY with the Munsys drainage data model:

Query ID	Description	Spatial Table	Attribute Table	Category ID	Query Priority
60	Stormwater Labels	SP_DMSLABEL	—	60	5.34
61	Stormwater Dimensions	SP_SWDIM	—	60	5.31
62	Stormwater Catchments	SP_SWCATCH	—	60	5.01
63	Stormwater Nodes	SP_SWNODE	—	60	5.24
64	Stormwater Notes	SP_SWNOTE	—	60	5.33
65	Stormwater Pipes	SP_SWPIPE	—	60	5.21
66	Stormwater Channels	SP_SWCHANNEL	—	60	5.22
67	Stormwater Culverts	SP_SWCULVERT	—	60	5.23
68	River Lines	SP_RIVERLINE	—	60	5.11
69	River Polygons	SP_RIVERPOLY	—	60	5.12
70	Floodlines	SP_FLOODLINE	—	60	5.13
71	Dams	SP_DAM	—	60	5.14
72	Stormwater Pipe Labels	SP_DMSLABEL	SP_SWPIPE	60	5.35
73	Stormwater Channel Labels	SP_DMSLABEL	SP_SWCHANNEL	60	5.36
74	Stormwater Culvert Labels	SP_DMSLABEL	SP_SWCULVERT	60	5.37
75	Stormwater Dimension Notes	SP_SWNOTE	—	60	5.32

Table 11 *Default drainage queries*

The following default electricity queries are created in MUNSYS_QUERY with the Munsys electricity data model:

Query ID	Description	Spatial Table	Attribute Table	Category ID	Query Priority
101	Electricity Cables	SP_ELCABLE	—	100	10.21
102	Electricity Nodes	SP_ELNODE	—	100	10.31
103	Electricity Ducts	SP_ELDUCT	—	100	10.11
104	Electricity Transformer Zones	SP_ELZONE	—	100	10.01
105	Electricity Notes	SP_ELNOTE	—	100	10.52
106	Electricity Dimensions	SP_ELDIM	—	100	10.41
107	Electricity SCs	SP_ELSERV	—	100	10.22
108	Electricity Dimension Notes	SP_ELNOTE	—	100	10.51
109	Electricity Cables (EHV)	SP_ELCABLE	—	100	10.23
110	Electricity Cables (HV)	SP_ELCABLE	—	100	10.24
111	Electricity Cables (LV)	SP_ELCABLE	—	100	10.25
112	Electricity Cables (SL)	SP_ELCABLE	—	100	10.26
113	Electricity Cables (SC)	SP_ELCABLE	—	100	10.27
114	Electricity Nodes (EHV)	SP_ELNODE	—	100	10.32
115	Electricity Nodes (HV)	SP_ELNODE	—	100	10.33
116	Electricity Nodes (LV)	SP_ELNODE	—	100	10.34
117	Electricity Nodes (SL)	SP_ELNODE	—	100	10.35
118	Electricity Nodes (SC)	SP_ELNODE	—	100	10.36

Table 12 *Default electricity queries*

The following default roads queries are created in MUNSYS_QUERY with the Munsys roads data model:

Query ID	Description	Spatial Table	Attribute Table	Category ID	Query Priority
81	Road Center Lines	SP_RDCL	—	80	15.11
82	Road Intersections	SP_RDINT	—	80	15.21
83	Road Walkways	SP_RDWALK	—	80	15.12
84	Road Areas	SP_RDAREA	—	80	15.01
85	Road Edges	SP_RDEDGE	—	80	15.02
86	Road Notes	SP_RDNOTE	—	80	15.31

Table 13 *Default roads queries*

The following default sewer queries are created in MUNSYS_QUERY with the Munsys sewer data model:

Query ID	Description	Spatial Table	Attribute Table	Category ID	Query Priority
20	SewerLabels	SP_SEWLABEL	—	20	20.51
21	Sewer Dimensions	SP_SEWDIM	—	20	20.31
22	Sewer Basins	SP_SEWBASIN	—	20	20.01
23	Sewer Nodes	SP_SEWNODE	—	20	20.21
24	Sewer Notes	SP_SEWNOTE	—	20	20.42
25	Sewer Pipes (Gravity)	SP_SEWGPIPE	—	20	20.11
26	Sewer SCs	SP_SEWSERV	—	20	20.14
27	Sewer Pipes (Vacuum)	SP_SEWVPIPE	—	20	20.12
28	Sewer Pipes (Pressure)	SP_SEWRPIPE	—	20	20.13
29	Sewer Residential Pipes	SP_SEWRESPIPE	—	20	20.15
30	Sewer Labels (Gravity)	SP_SEWLABEL	SP_SEWGPIPE	20	20.52
31	Sewer Labels (Vacuum)	SP_SEWLABEL	SP_SEWVPIPE	20	20.53

32	Sewer Labels (Pressure)	SP_SEWLABEL	SP_SEWRPIPE	20	20.54
33	Sewer Dimension Notes	SP_SEWNOTE	—	20	20.41
34	Sewer Symbols	SP_SEWSYM	—	20	20.22
35	Sewer Map Page Grid	SP_SEWMAPPAGE	—	20	20.61

Table 14 *Default sewer queries*

The following default water queries are created in MUNSYS_QUERY with the Munsys Water data model:

Query ID	Description	Spatial table	Attribute Table	Category ID	Query Priority
41	Water Dimensions	SP_WATDIM	—	40	25.31
42	Water Zones	SP_WATZONE	—	40	25.01
43	Water Nodes	SP_WATNODE	—	40	25.21
44	Water Note	SP_WATNOTE	—	40	25.42
45	Water Pipes	SP_WATPIPE	—	40	25.11
46	Water SCs	SP_WATSERV	—	40	25.12
47	Water Residential Pipes	SP_WATRESPIPE	—	40	25.13
48	Water Pipe Labels	SP_WATLABEL	SP_WATPIPE	40	25.51
49	Water Dimension Notes	SP_WATNOTE	—	40	25.41
50	Water Symbols	SP_WATSYM	—	40	25.22
51	Water Map Page Grid	SP_WATMAPPAGE	—	40	25.61

Table 15 *Default water queries*

The following default Abandoned water queries are created in MUNSYS_QUERY with the Munsys Water data model:

Query ID	Description	Spatial table	Attribute Table	Category ID	Query Priority
403	Water Dimensions (Abandoned)	SP_WATDIM	—	43	25.313
407	Water Zones (Abandoned)	SP_WATZONE	—	43	25.013
411	Water Nodes (Abandoned)	SP_WATNODE	—	43	25.213
415	Water Notes (Abandoned)	SP_WATNOTE	—	43	25.423
419	Water Pipes (Abandoned)	SP_WATPIPE	—	43	25.113
423	Water SCs (Abandoned)	SP_WATSERV	—	43	25.123
431	Water Pipe Labels (Abandoned)	SP_WATLABEL	SP_WATPIPE	43	25.513
435	Water Dimension Notes (Abandoned)	SP_WATNOTE	—	43	25.413
439	Water Symbols (Abandoned)	SP_WATSYM	—	43	25.223

Table 16 *Default abandoned water queries*

The following default Potable water queries are created in MUNSYS_QUERY with the Munsys Water data model:

Query ID	Description	Spatial table	Attribute Table	Category ID	Query Priority
401	Water Dimensions (Potable)	SP_WATDIM	—	41	25.311
405	Water Zones (Potable)	SP_WATZONE	—	41	25.011
409	Water Nodes (Potable)	SP_WATNODE	—	41	25.211
413	Water Notes (Potable)	SP_WATNOTE	—	41	25.421
417	Water Pipes (Potable)	SP_WATPIPE	—	41	25.111
421	Water SCs (Potable)	SP_WATSERV	—	41	25.121
429	Water Pipe Labels (Potable)	SP_WATLABEL	SP_WATPIPE	41	25.511
433	Water Dimension Notes (Potable)	SP_WATNOTE	—	41	25.411
437	Water Symbols (Potable)	SP_WATSYM	—	41	25.221

Table 17 *Default potable water queries*

The following default Raw water queries are created in MUNSYS_QUERY with the Munsys Water data model:

Query ID	Description	Spatial table	Attribute Table	Category ID	Query Priority
404	Water Dimensions (Raw)	SP_WATDIM	—	44	25.314
408	Water Zones (Raw)	SP_WATZONE	—	44	25.014
412	Water Nodes (Raw)	SP_WATNODE	—	44	25.214
416	Water Notes (Raw)	SP_WATNOTE	—	44	25.424
420	Water Pipes (Raw)	SP_WATPIPE	—	44	25.114
424	WaterSCs(Raw)	SP_WATSERV	—	44	25.124
432	Water Pipe Labels (Raw)	SP_WATLABEL	SP_WATPIPE	44	25.514
436	Water Dimension Notes (Raw)	SP_WATNOTE	—	44	25.414
440	Water Symbols (Raw)	SP_WATSYM	—	44	25.224

Table 18 *Default Raw water queries*

The following default Reclaimed water queries are created in MUNSYS_QUERY with the Munsys Water data model:

Query ID	Description	Spatial table	Attribute Table	Category ID	Query Priority
402	Water Dimensions (Reclaimed)	SP_WATDIM	—	42	25.312
406	Water Zones (Reclaimed)	SP_WATZONE	—	42	25.012
410	Water Nodes (Reclaimed)	SP_WATNODE	—	42	25.212
414	Water Notes (Reclaimed)	SP_WATNOTE	—	42	25.422
418	Water Pipes (Reclaimed)	SP_WATPIPE	—	42	25.112
422	Water SCs (Reclaimed)	SP_WATSERV	—	42	25.122
430	Water Pipe Labels (Reclaimed)	SP_WATLABEL	SP_WATPIPE	42	25.512
434	Water Dimension Notes (Reclaimed)	SP_WATNOTE	—	42	25.412
438	Water Symbols (Reclaimed)	SP_WATSYM	—	42	25.222

Table 19 *Default reclaimed water queries*

The following default cable route queries are created in MUNSYS_QUERY with the Munsys Cable Route data model:

Query ID	Description	Spatial table	Attribute Table	Category ID	Query Priority
141	Cable Route Links	SP_CRTLINK	—	140	55.21
142	Cable Route Nodes	SP_CRTNODE	—	140	55.24
143	Cable Route Notes	SP_CRTNODE	—	140	55.42
144	Cable Route Dimensions	SP_CRTDIM	—	140	55.31
145	Cable Route Symbols	SP_CRTSYM	—	140	55.22
146	Cable Route Labels	SP_CRTLABEL	SP_CRTLINK	140	55.51
147	Cable Route Dimension Notes	SP_CRTNOTE	—	140	55.41
148	Cable Route Infrastructure	SP_CRTINFST-RUCT	—	140	55.25

Table 20 *Default cable route queries*

The following default cable fiber queries are created in MUNSYS_QUERY with the Munsys Cable Fiber data model:

Query ID	Description	Spatial table	Attribute Table	Category ID	Query Priority
161	Fiber Cables	SP_FIBCABLE	—	42	56.1
162	Fiber Paths	SP_FIBPATH	—	42	56.2
163	Cable Fiber Notes	SP_FIBNOTE	—	42	56.3
164	Cable Fiber Dimensions	SP_FIBDIM	—	42	56.4
165	Cable Fiber Symbols	SP_FIBSYM	—	42	56.5
166	Cable Fiber Dimension Notes	SP_FIBNOTE	—	42	56.6
167	Cable Fiber Service Connections	SP_FIBSERV	—	160	56.7
171	Qry: Fiber Cable by Type	SP_FIBCABLE	—	42	56.21
172	Qry: Fiber Path by Service	SP_FIBPATH	—	42	56.22
173	Qry: Fiber Strand Count (In Use)	SP_FIBCABLE	FIBSTRAND_SERVINUSE_VW	42	56.23

Table 21 *Default cable fiber queries*

Integrity Rules

Each Munsys application has a pre-defined set of rules that must be adhered to for each spatial object before the object can be posted to the database. There are object integrity rules and network integrity rules for the various Munsys applications. The object integrity and network integrity checks enforce these rules and mark any errors with integrity markers. The user can then zoom to the marker, and mouse over on the object to see the integrity error message.

The rules for the spatial object integrity checks are stored in the MUNSYS_INTEG_ATTR table, whereas the network integrity rules are stored in the MUNSYS_INTEG_OBJECTS and MUNSYS_INTEG_NODES tables. The following sections contain integrity rules for the Cadastral, Drainage, Electricity, Roads, Sewer, Water, Cable Fiber and Cable Route applications. Refer to **Chapter 3**: Integrity rules for information about each of the integrity rule tables.

Configuring Munsys Integrity Rules

The Munsys Schema contains various tables that form a supporting role during the integrity check process, and which should be used to define integrity check rules.

Administrators can use the User Interface in Munsys Management Console under the Applications > Integrity in the Application Tree. An experienced administrator can use the information below to define additional rules directly in the database although this is not encouraged.

MUNSYS_INTEG_OBJECTS

This system table describes additional object rules used by the Munsys applications during the Object Integrity checks.

Column Name	Type	Description
MUN_CATEGORY	VARCHAR2(10)	Munsys Category. Valid values include: CMS, EMS, DMS, RMS, SMS, WMS, MBK, SDM, CRS and CFS
MUN_ID	NUMBER(10)	Munsys Spatial Table ID
IS_NETWORK_OBJ	CHAR(3)	Does this object form part of a network? Valid values are YES or NO
NETWORK_OBJ_TYPE	VARCHAR2(20)	Valid Values are: • NODE: determines that this object is a node. • LINK: determines that this object is either a pipe, road centerline or cable. • SC: determines that this object is a service connection.
NETWORK_COLUMNS	VARCHAR20(250)	This is a list of columns (comma delimited) informing the system that if any attributes appearing in this has changed, if affects the network's integrity and a check needs to be done.

Table 22 *Additional Object rules defined in MUNSYS_INTEG_OBJECTS*

MUNSYS_INTEG_ATTR

This system table describes the columns/attributes that must be verified for authentication during an Object Integrity check.

Column Name	Type	Description
MUN_CATEGORY	VARCHAR2(10)	Munsys Category. Valid values include: CMS, EMS, DMS, RMS, SMS, WMS, MBK, SDM, CRS and CFS
MUN_ID	NUMBER(10)	Munsys Spatial Table ID
COL_NAME	VARCHAR2(30)	Name of column to be verified
RULE_ORDER	NUMBER(10)	Starting with a value of 1, this column is used to determine the sequence of object integrity checks if more than one rule is to be applied to the same column.

Column Name	Type	Description
DESCRIPTION	VARCHAR2(60)	Describes the nature of the object integrity check.
RULE_TYPE	VARCHAR2(40)	Determines how the PARAMETERS column is interpreted. Valid values are either NOTNULL or SUBSTR. • NOTNULL means that the column specified in the COL_NAME may not be NULL. • SUBSTR informs the system to check a portion of the column to see if it is valid, The PARAMETERS specifies the details of this check.
PARAMETERS	VARCHAR2(500)	For the NOTNULL rule type, this column is blank and no parameters are necessary. For SUBSTR rule types, the following syntax applies: • STARTPOS - refers to the character position of where the substr must start (first character is 1). • SUBSTRLEN - refers to the length of the string. (a value of < 0 means that the remainder of the string will be extracted). • OPERATOR - EQ refers to equal, NEQ refers to not equal to, LT refers to less than, GT refers to greater than, LTE refers to less than and equal to, GTE refers to greater than and equal to. • VALUE - the string value to be compared to the substring portion of the column. • CASE_SENSITIVE where YES means that the string is handled with case sensitivity, and NO means that upper/lower characters are treated as being equal For example, the parameters (1,12,NEQ,"000000000000", YES) means that the first 12 characters of the column value may not be equal to 000000000000

Table 23 *MUNSYS_INTEG_ATTR describes the column/attribute verifications*

MUNSYS_INTEG_NODES

This table describes additional rules applied to node type objects captured by the Munsys applications during the Network Integrity checks.The checks ensure that each link (a pipe, cable or road centerline) is connected by a start and an end node.

Munsys Cadastral, Munsys Map Books and Munsys Spatial Data Manager applications do not have any networks defined and will therefore not use any of the rules defined in this table.

Column Name	Type	Description
MUN_CATEGORY	VARCHAR2(10)	Munsys Category. Valid values include: EMS, DMS, RMS, SMS, WMS, CRS or CFS
MUN_ID	NUMBER(10)	Munsys Spatial Table ID

Column Name	Type	Description
SYM_NAME	VARCHAR2(40)	The AutoCAD drawing name of the symbol associated to the node type
RULE_TYPE	VARCHAR2(20)	Type of rule to check for. The value determines what information is found in the PARAMETERS column. • INTERMEDIATE: A value of YES indicates that the node may be classified as being an intermediate node and does not have to be located at the start or end of a link. • LINKLIMITS: specifies that the node has a minimum and maximum number of links that may be connected to the node. In this instance the PARAMETERS will have two values (comma delimited) to specify the minimum and maximum number of links that may be connected to the node Values of < 0 indicate that there is no limit, which is the current default.
PARAMETERS	VARCHAR20(250)	This is dependent on the RULE_TYPE value.

Table 24 *Additional Node rules defined in MUNSYS_INTEG_NODES*

MUNSYS_INTEG_RESULTS

This table stores the results from running a network quality report from within the Munsys Applications.

Column Name	Type	Description
MUN_ID	NUMBER(10)	Munsys Spatial Table ID
SP_TABLE	VARCHAR2(30)	Spatial Table name related to the MUN_ID value
GID	NUMBER(10)	The unique number associated with the spatial object.
ERROR_MESSAGE	VARCHAR2(100)	A string indicating the error message.

Column Name	Type	Description
RULE_TYPE	VARCHAR2(20)	Type of rule to check for. The value determines what information is found in the PARAMETERS column. • INTERMEDIATE: A value of YES indicates that the node may be classified as being an intermediate node, and does not have to be located at the start or end of a link. • LINKLIMITS: specifies that the node has a minimum and maximum number of links that may be connected to the node. In this instance the PARAMETERS will have two values (comma delimited) to specify the minimum and maximum number of links that may be connected to the node Values of < 0 indicate that there is no limit, which is the current default.
PARAMETERS	VARCHAR20(250)	This is dependent on the RULE_TYPE value.

Table 25 *Results of network quality reports are stored in MUNSYS_INTEG_RESULTS*

Cadastral Integrity Rules

The following attribute rules are verified when an object integrity check is run for cadastral objects:

Note The table indicates which columns cannot contain null values and must be populated before the user can post to the database.

Spatial Table	MunID	Column Name	Rule Order	Description
SP_SUBURB - INT	5	SUB_CODE	1	Suburb Code
SP_TOWN - INT	1	TOWN_CODE	1	Town Code
SP_MUNICIPALITY - US	18	MUNI_CODE	1	Municipality Code
SP_PARCEL - INT	3	PRCL_KEY	1	Parcel Key
SP_PARCEL - INT	3	PRCL_KEY	2	Parcel Key Portion
SP_WARD - INT	7	TAG_VALUE	1	Ward Tag
SP_PARCEL	3	TAG_VALUE	1	Parcel Tag
SP_STRTXT	8	TAG_VALUE	1	Street Text Tag
SP_STRADDR	9	STR_CODE	1	Street Address Code
SP_STRADDR	9	STR_NAME	1	Street Address Name
SP_STRADDR	9	STR_NO	1	Street Address Number
SP_STRADDR - US	9	MUNI_NAME	1	Street Address Municipality Name
SP_STRADDR - INT	9	SUB_NAME	1	Street Address Suburb Name
SP_EASELINE	10	EASE_TYPE	1	Easement Line Type
SP_EASELINETXT	11	EASE_TYPE	1	Easement Line Text Type
SP_EASEPOLY	14	EASE_TYPE	1	Easement Polygon Type
SP_EASEPOLYTXT	15	EASE_TYPE	1	Easement Polygon Text Type
SP_TP_ZONING	12	ZONING	1	Zoning
SP_TP_DENSITY	13	DENSITY	1	Density
SP_TP_LANDUSE	19	LANDUSE	1	Landuse

Table 26 *Cadastral integrity rules in MUNSYS_INTEG_ATTR*

Drainage Integrity Rules

The following network integrity rules apply for drainage objects:

Spatial Table	MunID	Column Name	Description
SP_SWNODE	63	NODE	NODE_ID
SP_SWPIPE	65	LINK	START_NODE, END_NODE
SP_SWCHANNEL	66	LINK	START_NODE, END_NODE
SP_SWCULVERT	67	LINK	START_NODE, END_NODE

Table 27 *Network integrity rules for drainage objects in MUNSYS_INTEG_OBJECTS*

Electricity Integrity Rules

The following network integrity rules apply for electricity objects:

Spatial Table	MunID	Column Name	Description
SP_ELCABLE	101	LINK	START_NODE, END_NODE
SP_ELNODE	102	NODE	NODE_ID

Table 28 *Network integrity rules for electricity objects in MUNSYS_INTEG_OBJECTS*

The following attribute rules are verified when an object integrity check is run for electricity objects:

Spatial Table	MunID	Column Name	Rule Order	Description
SP_ELZONE	104	TAG_VALUE	1	Electricity Zone Tag

Table 29 *Attribute integrity rules for electricity objects in MUNSYS_INTEG_ATTR*

Note The table indicates which columns cannot contain null values and must be populated before the user can post to the database.

Roads Integrity Rules

The following network integrity rules apply for road objects:

Spatial Table	MunID	Column Name	Description
SP_RDCL	81	LINK	START_INT, END_INT, STR_CODE, STR_NAME
SP_RDINT	82	NODE	INT_ID

Table 30 *Network integrity rules for road objects in MUNSYS_INTEG_OBJECTS*

Sewer Integrity Rules

The following network integrity rules apply for sewer objects:

Spatial Table	MunID	Column Name	Description
SP_SEWNODE	23	NODE	NODE_ID
SP_SEWGPIPE	25	LINK	START_NODE,END_NODE, PIPE_ID
SP_SEWVPIPE	27	LINK	START_NODE,END_NODE, PIPE_ID
SP_SEWRPIPE	28	LINK	START_NODE,END_NODE, PIPE_ID

Table 31 *Sewer network integrity rules in MUNSYS_INTEG_OBJECTS*

Water Integrity Rules

The following network integrity rules apply for water objects:

Spatial Table	MunID	Column Name	Description
SP_WATNODE	43	NODE	NODE_ID
SP_WATPIPE	45	LINK	START_NODE, END_NODE, PIPE_ID

Table 32 *Network integrity rules for water objects in MUNSYS_INTEG_OBJECTS*

The following node integrity rules apply for water nodes:

Spatial Table	MunID	Symbol Name	Rule Type	Parameters
SP_WATNODE	43	_WHYDSGL	INTERMEDIATE	YES
SP_WATNODE	43	_WSPT	INTERMEDIATE	YES
SP_WATNODE	43	_WREDUCER	LINKLIMITS	2,2

Table 33 *Node integrity rules for water nodes in MUNSYS_INTEG_NODES*

The following attribute rules are verified when an object integrity check is run for water objects:

Spatial Table	MunID	Column Name	Rule Order	Description
SP_WATZONE	42	TAG_VALUE	1	Water Zone Tag

Table 34 *Attribute integrity rules for water objects in MUNSYS_INTEG_ATTR*

Note The table indicates which columns cannot contain null values and must be populated before the user can post to the database.

Cable Route Integrity Rules

The following attribute rules are verified when an object integrity check is run for water objects:

Spatial Table	MunID	Column Name	Rule Order	Description
SP_CRTLINK	141	START_NODE END_NODE ROUTE_ID	1	Cable Route Network Check
SP_CRTNODE	142	NODE_ID	1	Node ID
SP_CRTINFSTRUCT	147	INF_NAME	1	Infrastructure Name
SP_CRTINFSTRUCT	147	INF_NUM	1	Infrastructure Number
SP_CRTINFSTRUCT	147	INF_TYPE	1	Infrastructure Type

Table 35 *Attribute integrity rules for cable route objects in MUNSYS_INTEG_ATTR*

Note The table indicates which columns cannot contain null values and must be populated before the user can post to the database.

Application Settings

Each Munsys application has default settings which apply to the attribute and spatial data at the time of capture. Some of the settings are maintained by the Munsys administrator and other settings are changed by the users for the duration of the capture sessions.

The application settings enforce data standards and integrity by applying the same settings throughout the organization for all Munsys users. The administrator can at any stage reset the application settings to the default settings applied at the time the schema was created.

The system application settings can be changed using **Munsys Management Console** or from the [***Application***] **Settings** menu item on the **Capture** menu of each of the Munsys applications for those variables that are editable. These settings are stored in the MUNSYS_AP_SETTINGS table.

Each application setting has a unique variable prefixed by the application it is associated to, then the spatial object and then the setting name, i.e. *__CMS_BUILDING_TYPE__* indicates that the variable belongs to Munsys **Cadastral**, the **Building** spatial table and defines the **building type**.

Each Munsys application has different settings for the various spatial objects specific to that application. These application settings include attribute values, capture offset distances, text height, font styles, etc. to be attached to the various spatial objects. There are general application settings which apply to all the Munsys applications.

For each application setting variable, both the current assigned value and the system default value are stored, as well as the variable type. Each variable must be one of the following types:

- R = Real
- C = Character
- I = Integer
- A = Angle
- S = Symbol

Refer to **Chapter 3**: Application settings for more information about application settings.

The following appendices contain capture settings:

Appendix A: Munsys capture settings – general

Appendix B: Munsys Cadastral capture settings

Appendix C: Munsys Drainage capture settings

Appendix D: Munsys Electricity capture settings

Appendix E: Munsys Roads capture settings

Appendix F: Munsys Sewer capture settings

Appendix G: Munsys Water capture settings

Appendix H: Munsys Map Books settings

Appendix I: Munsys Cable Fiber capture settings

Appendix J: Munsys Cable Route capture settings

Application Roles

Every Oracle user has a name and a password and owns any tables, views, and other resources that they create. An Oracle role is a set of privileges. The schema name, for example MCITY14US or MCITY14INT is the owner of all the tables in the schema. In order for different users to interact with the schema data, those users must be assigned Munsys roles. Only a user with the MUNSYS_ADMIN role assigned can grant roles to other users.

Each Munsys schema has default roles created at the time of schema creation. These roles are assigned to the various users set up to have access to the database using the Munsys Management Console. The roles allow the users different access to the spatial and attribute tables stored in the database.

A user with only the MUNSYS_SMS_QUERY role assigned will only be able to run queries specific to the Munsys Sewer spatial objects. The user with only this role assigned will also not be allowed to edit any attribute of spatial data for any of the Munsys Sewer spatial objects or linked tables.

A user with the MUNSYS_SMS_EDIT role assigned has the select, insert, update and delete Oracle privileges applied to the role, allowing them to edit and post sewer data to the database.

The following default roles are created in a Munsys schema for the Cadastral, Drainage, Electricity, Roads, Sewer, Water, Cable Route, Cable Fiber, Map Books and Spatial Data Manager applications:

Role Name	Description
MUNSYS_ADMIN	This role allows the user access to the Munsys system tables in order to create new queries and spatial tables, or update lookup tables. *(For use by the administrator)*
MUNSYS_LICENSE	This role allows the user access to the Munsys License Schema in order to add new product licenses, or update existing licenses.
MUNSYS_POWER	This role allows the user access to the Munsys system tables in order to create new queries and spatial tables, or update lookup tables. *(For use by the System Administrator or Power User)*
MUNSYS_QRY	The Munsys Query application has been incorporated into the Munsys base applications. This role allows users to select the Munsys Query application from the list of available applications.
MUNSYS_ALL_EDIT	This role allows select, insert, update, and delete privileges on the tables for all applications. *(For use by the administrator)*
MUNSYS_CMS_EDIT	Allows select, insert, update, and delete on all CMS tables.
MUNSYS_DMS_EDIT	Allows select, insert, update, and delete on all DMS tables.
MUNSYS_EMS_EDIT	Allows select, insert, update, and delete on all EMS tables.
MUNSYS_RMS_EDIT	Allows select, insert, update, and delete on all RMS tables.
MUNSYS_MBK_EDIT	Allows select, insert, update, and delete on all MBK tables.
MUNSYS_SDM_EDIT	Allows select, insert, update, and delete on all SDM tables.
MUNSYS_SMS_EDIT	Allows select, insert, update, and delete on all SMS tables.

Role Name	Description
MUNSYS_WMS_EDIT	Allows select, insert, update, and delete on all WMS tables.
MUNSYS_CFS_EDIT	Allows select, insert, update, and delete on all CFS tables.
MUNSYS_CRS_EDIT	Allows select, insert, update, and delete on all CRS tables.
MUNSYS_ALL_QUERY	Allows select privileges on tables across all applications. *(Default role assigned to new users)*
MUNSYS_CMS_QUERY	Allows select privileges on CMS tables only. Used only if MUNSYS_ALL_QUERY role has been revoked from a user.
MUNSYS_SMS_QUERY	Allows select privileges on SMS tables only. Used only if MUNSYS_ALL_QUERY role has been revoked from a user.
MUNSYS_WMS_QUERY	Allows select privileges on WMS tables only. Used only if MUNSYS_ALL_QUERY role has been revoked from a user.
MUNSYS_DMS_QUERY	Allows select privileges on DMS tables only. Used only if MUNSYS_ALL_QUERY role has been revoked from a user.
MUNSYS_EMS_QUERY	Allows select privileges on EMS tables only. Used only if MUNSYS_ALL_QUERY role has been revoked from a user.
MUNSYS_RMS_QUERY	Allows select privileges on RMS tables only. Used only if MUNSYS_ALL_QUERY role has been revoked from a user.
MUNSYS_MBK_QUERY	Allows select privileges on MBK tables only. Used only if MUNSYS_ALL_QUERY role has been revoked from a user.
MUNSYS_SDM_QUERY	Allows select privileges on SDM tables only. Used only if MUNSYS_ALL_QUERY role has been revoked from a user.
MUNSYS_CFS_QUERY	Allows select privileges on CFS tables only. Used only if MUNSYS_ALL_QUERY role has been revoked from a user.
MUNSYS_CRS_QUERY	Allows select privileges on CRS tables only. Used only if MUNSYS_ALL_QUERY role has been revoked from a user.

Table 36 *Default roles for the Munsys applications*

Chapter 4: Default roles created provides a complete list of all the default roles.

Sequences

The Munsys applications use an Oracle sequence to assign the next available unique GID for each spatial object in the database. Sequences are also used to assign unique pipe IDs, Node IDs, Query IDs, User IDs, etc. These sequences are maintained by the database administrator at the SQL command prompt.

The following sequences are created for the Munsys applications:

Spatial Table	Description
MUNSEQ_ADLOG_ID	Munsys Archive Log IDs
MUNSEQ_ARCHIVE_ID	Munsys Archive IDs
MUNSEQ_AT_CTRL	Munsys Attribute Template Column IDs
MUNSEQ_AT_DEF	Munsys Attribute Template IDs
MUNSEQ_AT_ID	Munsys Attribute IDs
MUNSEQ_DWGCAT	Drawing Catalogue IDs
MUNSEQ_GID	Munsys Object unique GIDs
MUNSEQ_GSC	Munsys GSC IDs
MUNSEQ_LNK	Munsys Linked Template IDs
MUNSEQ_MD_DISTID	Munsys Metadata Contacts IDs
MUNSEQ_MNT_REPID	Munsys Monitor Report IDs
MUNSEQ_PRIV_ID	Munsys Privileges IDs
MUNSEQ_QRYCAT_ID	Munsys Query Category IDs
MUNSEQ_QRY_ID	Munsys Queries IDs
MUNSEQ_SCHEDTASKS_ID	Munsys Scheduled Tasks IDs
MUNSEQ_SP_ID	Munsys Spatial Table IDs
MUNSEQ_USERID	Munsys User IDs
MUNSEQ_DWGCAT	MUNSEQ_DWGCAT
CMS_BLDGROOM	Cadastral Building Room IDs
CMS_BLDGFLOOR	Cadastral Building Floor IDs
CRS_CRTNODE	Cable Route Node IDs
CRS_CRTLINK	Cable Route Link IDs
CRS_CRTINF	Cable Route Infrastructure IDs
CRS_CRTDUCT	Cable Route Duct IDs
CFS_FIBSTRAND	Cable Fiber Strand IDs
CFS_FIBPATH	Cable Fiber Path IDs
CFS_FIBCABLE	Cable Fiber Cable IDs
CFS_FIBCHANNEL	Cable Fiber Channel IDs
CFS_FIBEQUIP	Cable Fiber Equipment IDs
CFS_FIBEQUIPTYPE	Cable Fiber Equipment Type IDs

Spatial Table	Description
DMS_SWPIPE	Stormwater Pipe IDs
DMS_SWNODE	Stormwater Node IDs
DMS_SWCLVT	Stormwater Culvert IDs
DMS_SWCHNL	Stormwater Channel IDs
MBK_ID	Map book IDs
RMS_INTMARK	Road Intersection Marker IDs
RMS_INTDWG	Road Intersection Drawings
SMS_SEWPIPE	Sewer Pipe IDs
SMS_SEWNODE	Sewer Node IDs
WMS_WATPIPE	Water Pipe IDs
WMS_WATNODE	Water Node IDs

Table 37 *Required sequences for Munsys applications*

Table Constraints

Table constraints prevent users from updating spatial tables without the primary key and/or foreign keys being populated. Oracle manages the table constraints and the integrity of the data. The constraint clause can constrain a single column or a group of columns in a table. The following constraints are enforced when creating a new Munsys schema and can be viewed in the Munsys dictionary script:
C:\Program Files\Open Spatial\MunConsole14.2\DBScripts\Mun_dict.sql

The default table constraints are as follows:

Table Name	Column Name	Constraint
MUNSYS_AP_SETTINGS	ALL COLUMNS except MUN_VALUE, MUN_DEFAULT, LU_TABLE, LONG_DESC	NOT NULL
MUNSYS_APPLICATION	APP_ID	UNIQUE, NOT NULL
MUNSYS_APPLICATION	APP_NAME	UNIQUE, NOT NULL
MUNSYS_APPLICATION	APP_DESC	NOT NULL
MUNSYS_APPLICATION	MENU_NAME	NOT NULL
MUNSYS_AT_COLUMNS	COLUMN_DESC	NOT NULL
MUNSYS_AT_COLUMNS	MUN_ATID	NOT NULL
MUNSYS_AT_CONTROL	AT_DEF_ID	NOT NULL

Table Name	Column Name	Constraint
MUNSYS_AT_CONTROL	TABLE_NAME	NOT NULL
MUNSYS_AT_CONTROL	COLUMN_NAME	NOT NULL
MUNSYS_AT_CONTROL	IS_EDITABLE	NOT NULL
MUNSYS_AT_CONTROL	TABLE_ORDINAL	NOT NULL
MUNSYS_AT_CONTROL	COLUMN_ORDINAL	NOT NULL
MUNSYS_AT_CONTROL	AT_CTRL_ID	UNIQUE, NOT NULL
MUNSYS_AT_DEF	AT_DEF_ID, NAMES	UNIQUE, NOT NULL
MUNSYS_AT_DEF	PRIMARY_TABLE, LAYOUT_TYPE	NOT NULL
MUNSYS_AT_TABLES	DESCRIPTION	UNIQUE, NOT NULL
MUNSYS_AT_TABLES	TABLE_NAME	NOT NULL
MUNSYS_DB_SETTINGS	ALL COLUMNS	NOT NULL
MUNSYS_GSC	GID	UNIQUE, NOT NULL
MUNSYS_GSC	ALL COLUMNS except GSC_NAME, BUFFER_DIST	NOT NULL
MUNSYS_INTEG_RESULTS	MIN_ID, SP_TABLE, GID	NOT NULL
MUNSYS_LINEAGE_COLUMNS	COLUMN_NAME	NOT NULL
MUNSYS_LINEAGE_COLUMNS	MUN_ID	NOT NULL
MUNSYS_LINEAGE_CONFIG	MUN_ID	NOT NULL
MUNSYS_LNK_TABLES	LINK_ID	UNIQUE, NOT NULL
MUNSYS_LNK_TABLES	ALL COLUMNS	NOT NULL
MUNSYS_LOCKED_OBJECTS	GID	UNIQUE, NOT NULL
MUNSYS_LOCKED_OBJECTS	ALL COLUMNS	NOT NULL
MUNSYS_LU_TABLES	ALL COLUMNS	NOT NULL
MUNSYS_MD_CONTACT	DIST_ID	UNIQUE, NOT NULL
MUNSYS_MD_SPTABLE	MUN_ID	UNIQUE, NOT NULL
MUNSYS_PRIV	PRIV_ID	UNIQUE, NOT NULL
MUNSYS_PRIV	ALL COLUMNS	NOT NULL
MUNSYS_PRIV_ROLE	ALL COLUMNS	NOT NULL
MUNSYS_QUERY	QRY_ID, CAT_ID, DESCRIPTION, USER_NAME	UNIQUE, NOT NULL
MUNSYS_QUERY	MUN_ID, SP_TABLE, QRY_FMT	NOT NULL

Table Name	Column Name	Constraint
MUNSYS_QUERY_CAT	CAT_ID	UNIQUE, NOT NULL
MUNSYS_QUERY_CAT	ALL COLUMNS	NOT NULL
MUNSYS_SP_COLUMNS	MUN_ID	UNIQUE, NOT NULL
MUNSYS_SP_COLUMNS	COLUMN_NAME	UNIQUE, NOT NULL
MUNSYS_SP_COLUMNS	COLUMN_DESC	NOT NULL
MUNSYS_SP_TABLES	MUN_ID	UNIQUE, NOT NULL
MUNSYS_SP_TABLES	ALL COLUMNS	NOT NULL
MUNSYS_USAGE_LOG	USER_ID	UNIQUE, NOT NULL
MUNSYS_USAGE_LOG	ALL_COLUMNS	NOT NULL
MUNSYS_USER_LOG	USER_ID	UNIQUE, NOT NULL
MUNSYS_USER_LOG	USER_NAME, MACHINE NAME	NOT NULL
GEN_DWGCAT	ALL COLUMNS	NOT NULL
GEN_DWGCAT	DWG_NO	UNIQUE, NOT NULL
GEN_DWGCAT	ALL COLUMNS	NOT NULL
LU_XXXXXXXXXXX	LCODE	UNIQUE, NOT NULL
LU_XXXXXXXXXXX	LVALUE	NOT NULL
SP_XXXXXXXXXXX	GID	UNIQUE, NOT NULL

Entity Relational (ER) Diagrams

The Munsys ER diagrams are shown in Appendix K: Munsys ER diagrams.

Appendix A: Munsys Capture Settings – General

General Capture Settings for the INT Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	GEN	*TAG_FNT*	SIMPLEX	null	General	N	This is the default font used when creating the style to display tags if the style has not been defined in the drawing session.
R	GEN	*INTEG_CIRCSIZE*	2	null	General	Y	This value determines the size that integrity circles will be displayed.
R	GEN	*SNAP*	0.01	null	General	N	This is the snap tolerance defined by the database and is used to determine if points are duplicates
A	GEN	*TAG_ANGLE*	0	null	General	Y	This is the default tag angle
R	GEN	*TAG_SIZE*	1	null	General	Y	This is the default tag height
C	GEN	*TAG_JUST*	L	null	General	Y	This is the default tag justification
I	GEN	*DB_EXTENTS_RESOLUTION*	10	null	General	Y	This is the resolution that the database extents is displayed at when using coordinate transformation
C	GEN	*DWG_DIR*		null	File	N	This setting determines where drawings are generated to. If this is set then this will be used for all clients otherwise the current working directory is used.
S	GEN	*SCALE_TRANSFORMED*	T	null	General	N	If this value is set, tags and symbols will automatically be rotated during query and posting if coordinate transformation is done.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
S	GEN	*INTEG_NETWORK_AUTCHECK*	T	null	General	N	If this value is set the network integrity validation is automatically included as part of object integrity validation. If this value is set to 'T', the Munsys Options database posting preference to automatically perform object integrity as part of post to database will be disabled.

General Capture Settings for the US Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	GEN	*TAG_FNT*	SIMPLEX	null	General	N	This is the default font used when creating the style to display tags if the style has not been defined in the drawing session.
R	GEN	*INTEG_CIRCSIZE*	6	null	General	Y	This value determines the size that integrity circles will be displayed.
R	GEN	*SNAP*	0.01	null	General	N	This is the snap tolerance defined by the database and is used to determine if points are duplicates
A	GEN	*TAG_ANGLE*	0	null	General	Y	This is the default tag angle
R	GEN	*TAG_SIZE*	10	null	General	Y	This is the default tag height
C	GEN	*TAG_JUST*	L	null	General	Y	This is the default tag justification
I	GEN	*DB_EXTENTS_RESOLUTION*	10	null	General	Y	This is the resolution that the database extents is displayed at when using coordinate transformation
C	GEN	*DWG_DIR*		null	File	N	This setting determines where drawings are generated to. If this is set then this will be used for all clients otherwise the current working directory is used.
S	GEN	*SCALE_TRANSFORMED*	T	null	General	N	If this value is set, tags and symbols will automatically be scaled during query and posting if coordinate transformation is done.
S	GEN	*SCALE_TRANSFORMED*	T	null	General	N	If this value is set, tags and symbols will automatically be rotated during query and posting if coordinate transformation is done.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
S	GEN	*INTEG_NETWORK_AUTCHECK*	F	null	General	N	If this value is set the network integrity validation is automatically included as part of object integrity validation. If this value is set the Munsys option to automatically perform object integrity as part of post to database will be disabled.

Appendix B: Munsys Cadastral Capture Settings

Capture Setting for the INT Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	CMS	*CMS_PARCEL_LSTATUS*	R	LU_CMS_LSTATUS	Parcel	Y	This is the default legal status value assigned when capturing a new parcel.
C	CMS	*CMS_PARCEL_WSTATUS*	C	LU_CMS_WSTATUS	Parcel	Y	This is the default work status value assigned when capturing a new parcel.
C	CMS	*CMS_PARCEL_TYPE*	P	LU_CMS_PRCLTYPE	Parcel	Y	This is the default type assigned when capturing a new parcel.
C	CMS	*CMS_EASEMENT_TYPE*	GENERAL	LU_CMS_EASETYPE	Easement	Y	This is the default type assigned when capturing a new easement.
C	CMS	*CMS_BUILDING_TYPE*	RESIDENTIAL	LU_CMS_BLDTYPE	Building	Y	This is the default type assigned when capturing a new building.
C	CMS	*CMS_ZONING_TYPE*	RES_1	LU_CMS_ZONING	Zoning	Y	This is the default type assigned when capturing a new zoning.
C	CMS	*CMS_DENSITY_TYPE*	1P1000	LU_CMS_DENSITY	Density	Y	This is the default type assigned when capturing a new density.
C	CMS	*CMS_LANDUSETYPE*	UNKNOWN	LU_CMS_LANDUSE	Land Use	Y	This is the default type assigned when capturing a new land use.
R	CMS	*CMS_EASEMENT_OFFSET*	2	null	Easement	Y	This is the default offset distance used when capturing a new easement by offset.
C	CMS	*CMS_STR_FNT*	ROMANS	null	Street Text	N	This is the font used when displaying street tags.
R	CMS	*CMS_SRCH*	5	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	CMS	*CMS_SHORT_OBJECTS*	1	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.
R	CMS	*CMS_PARCEL_TSIZE*	5	null	Parcel	Y	This is the default tag height used when capturing a new parcel.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	CMS	*CMS_EASEMENT_TSIZE*	5	null	Easement	Y	This is the default tag height used when capturing a new easement.
R	CMS	*CMS_STRNAME_TSIZE*	7	null	Street Text	Y	This is the default tag height used when capturing a new street name.
R	CMS	*CMS_STRADDR_TSIZE*	3	null	Street Text	Y	This is the default tag height used when capturing a new street address.
R	CMS	*CMS_NOTE_TSIZE*	5	null	Note	Y	This is the tag height used when capturing a new note.
C	CMS	*CMS_TOWN_LSTATUS*	R	LU_CMS_LSTATUS	Township	Y	This is the default legal status value assigned when capturing a new township.
C	CMS	*CMS_TOWN_WSTATUS*	C	LU_CMS_WSTATUS	Township	Y	This is the default work status value assigned when capturing a new township.
C	CMS	*CMS_TOWN_FNT*	COMPLEX	null	Township	N	This is the font used when displaying township tags.
R	CMS	*CMS_SUBURB_TSIZE*	15	null	Suburb	Y	This is the default tag height used when capturing a new suburb.
R	CMS	*CMS_TOWN_TSIZE*	15	null	Township	Y	This is the default tag height used when capturing a new township.
R	CMS	*CMS_WARD_TSIZE*	15	null	Ward	Y	This is the tag height used when capturing a new ward.

Capture Settings for the US Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	CMS	*CMS_PARCEL_LSTATUS*	R	LU_CMS_LSTATUS	Parcel	Y	This is the default legal status value assigned when capturing a new parcel.
C	CMS	*CMS_PARCEL_WSTATUS*	C	LU_CMS_WSTATUS	Parcel	Y	This is the default work status value assigned when capturing a new parcel.
C	CMS	*CMS_PARCEL_TYPE*	P	LU_CMS_PRCLTYPE	Parcel	Y	This is the default type assigned when capturing a new parcel.
C	CMS	*CMS_EASEMENT_TYPE*	GENERAL	LU_CMS_EASETYPE	Easement	Y	This is the default type assigned when capturing a new easement.
C	CMS	*CMS_BUILDING_TYPE*	RESIDENTIAL	LU_CMS_BLDTYPE	Building	Y	This is the default type assigned when capturing a new building.
C	CMS	*CMS_ZONING_TYPE*	RES_1	LU_CMS_ZONING	Zoning	Y	This is the default type assigned when capturing a new zoning.
C	CMS	*CMS_DENSITY_TYPE*	1P1000	LU_CMS_DENSITY	Density	Y	This is the default type assigned when capturing a new density.
C	CMS	*CMS_LANDUSETYPE*	UNKNOWN	LU_CMS_LANDUSE	Land Use	Y	This is the default type assigned when capturing a new land use.
R	CMS	*CMS_EASEMENT_OFFSET*	2	null	Easement	Y	This is the default offset distance used when capturing a new easement by offset.
C	CMS	*CMS_STR_FNT*	ROMANS	null	Street Text	N	This is the font used when displaying street tags.
R	CMS	*CMS_SRCH*	5	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	CMS	*CMS_SHORT_OBJECTS*	1	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.
C	CMS	*CMS_PARCEL_LSTATUS*	R	LU_CMS_LSTATUS	Parcel	Y	This is the default legal status value assigned when capturing a new parcel.
C	CMS	*CMS_PARCEL_WSTATUS*	C	LU_CMS_WSTATUS	Parcel	Y	This is the default work status value assigned when capturing a new parcel.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	CMS	*CMS_PARCEL_TYPE*	P	LU_CMS_PRCLTYPE	Parcel	Y	This is the default type assigned when capturing a new parcel.
C	CMS	*CMS_EASEMENT_TYPE*	GENERAL	LU_CMS_EASETYPE	Easement	Y	This is the default type assigned when capturing a new easement.
C	CMS	*CMS_BUILDING_TYPE*	RESIDENTIAL	LU_CMS_BLDTYPE	Building	Y	This is the default type assigned when capturing a new building.
C	CMS	*CMS_ZONING_TYPE*	RES_1	LU_CMS_ZONING	Zoning	Y	This is the default type assigned when capturing a new zoning.
C	CMS	*CMS_DENSITY_TYPE*	1P1000	LU_CMS_DENSITY	Density	Y	This is the default type assigned when capturing a new density.
C	CMS	*CMS_LANDUSETYPE*	UNKNOWN	LU_CMS_LANDUSE	Land Use	Y	This is the default type assigned when capturing a new land use.
R	CMS	*CMS_EASEMENT_OFFSET*	6	null	Easement	Y	This is the default offset distance used when capturing a new easement by offset.
C	CMS	*CMS_STR_FNT*	ROMANS	null	Street Text	N	This is the font used when displaying street tags.
R	CMS	*CMS_SRCH*	15	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	CMS	*CMS_SHORT_OBJECTS*	3	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.
R	CMS	*CMS_PARCEL_TSIZE*	15	null	Parcel	Y	This is the default tag height used when capturing a new parcel.
R	CMS	*CMS_EASEMENT_TSIZE*	15	null	Easement	Y	This is the default tag height used when capturing a new easement.
R	CMS	*CMS_STRNAME_TSIZE*	21	null	Street Text	Y	This is the default tag height used when capturing a new street name.
R	CMS	*CMS_STRADDR_TSIZE*	9	null	Street Text	Y	This is the default tag height used when capturing a new street address.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	CMS	*CMS_NOTE_TSIZE*	15	null	Note	Y	This is the tag height used when capturing a new note.
R	CMS	*CMS_MUNICIPAL_TSIZE*	45	null	Municipality	Y	This is the default tag height used when capturing a new municipality.

Appendix C: Munsys Drainage Capture Settings

Capture Settings for the INT Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	DMS	*DMS_SWPIPE_TYPE*	D25	LU_DMS_PIPETYPE	Pipe	Y	This is the default type assigned when capturing a new stormwater pipe.
R	DMS	*DMS_CHNL_BWIDTH*	0	null	Channel	Y	This is the default bottom width assigned when capturing a new channel.
R	DMS	*DMS_CHNL_TWIDTH*	0	null	Channel	Y	This is the default top width assigned when capturing a new channel.
R	DMS	*DMS_CHNL_DEPTH*	0	null	Channel	Y	This is the default depth assigned when capturing a new channel.
C	DMS	*DMS_CHNL_TYPE*	V_DRAIN	LU_DMS_CHANNELTYPE	Channel	Y	This is the default type assigned when capturing a new channel.
C	DMS	*DMS_CHNL_MATRL*	CONC	LU_DMS_CHANNELMATRL	Channel	Y	This is the default material assigned when capturing a new channel.
R	DMS	*DMS_CLVT_WIDTH*	0	LU_DMS_CULVERTWIDTH	Culvert	N	This is the default top width assigned when capturing a new culvert.
R	DMS	*DMS_CLVT_DEPTH*	0	LU_DMS_CULVERTDEPTH	Culvert	Y	This is the default depth assigned when capturing a new culvert.
C	DMS	*DMS_CLVT_TYPE*	PORTAL	LU_DMS_CULVERTTYPE	Culvert	Y	This is the default type assigned when capturing a new culvert.
C	DMS	*DMS_CLVT_MATRL*	CONC	LU_DMS_CULVERTMATRL	Culvert	Y	This is the default material assigned when capturing a new culvert.
C	DMS	*DMS_RIVER_TYPE*	PERENNIAL	LU_DMS_RIVERTYPE	River	Y	This is the default type assigned when capturing a new river.
C	DMS	*DMS_FLOODL_TYPE*	20YEAR	LU_DMS_FLOODTYPE	Floodline	Y	This is the default type assigned when capturing a new floodline.
C	DMS	*DMS_DAM_TYPE*	STORAGE	LU_DMS_DAMTYPE	Dam	Y	This is the default type assigned when capturing a new dam.
R	DMS	*DMS_SWPIPE_DIA*	0	LU_DMS_PIPEDIA	Pipe	Y	This is the default diameter assigned when capturing a new stormwater pipe.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	DMS	*DMS_SWPIPE_MATRL*	CONC	LU_DMS_PIPEMATRL	Pipe	Y	This is the default material assigned when capturing a new stormwater pipe.
R	DMS	*DMS_SWSERV_LEN*	10	null	Service Connection	Y	This is the default length used when placing a service connection.
C	DMS	*DMS_SWSERV_TYPE*	ACTUAL	LU_SMS_SERVTYPE	Service Connection	Y	This is the default type used when placing a service connection.
R	DMS	*DMS_SWSYM_SCL*	1	null	Stormwater Symbol	Y	This is the default symbol scale used when capturing new stormwater symbols.
R	DMS	*DMS_SWSYM_SCL*	1	null	Node	Y	This is the default scale used when capturing a new stormwater node.
R	DMS	*DMS_SHORT_OBJECTS*	0.5	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.
R	DMS	*DMS_SRCH*	5	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	DMS	*DMS_SWPIPE_TOL*	0.05	null	Integrity	N	This is the tolerance used during the integrity check to check if stormwater pipes are within snap tolerance.
R	DMS	*DMS_SWNODE_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to determine if nodes should snap and to determine if nodes are duplicated.

Capture Settings for the US Locale

R	DMS	*DMS_CHNL_OFF*	3	null	Channel	Y	This is the default offset distance used when capturing a new channel by offset.
R	DMS	*DMS_CLVT_OFF*	3	null	Culvert	Y	This is the default offset distance used when capturing a new culvert by offset.
R	DMS	*DMS_SWPIPE_OFF*	3	null	Pipe	Y	This is the default offset distance used when capturing a new stormwater pipe by offset.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	DMS	*DMS_RIVER_TSIZE*	10	null	River	Y	This is the tag height used when capturing a new river.
R	DMS	*DMS_FLOODL_TSIZE*	10	null	Floodline	Y	This is the tag height used when capturing a new floodline.
R	DMS	*DMS_DAM_TSIZE*	10	null	Dam	Y	This is the tag height used when capturing a new dam.
R	DMS	*DMS_CATCH_TSIZE*	10	null	Catchment	Y	This is the tag height used when capturing a new catchment.
R	DMS	*DMS_LBLSWPIPE_TSIZE*	7	null	Pipe	Y	This is the tag height used when capturing a new stormwater pipe label.
R	DMS	*DMS_LBLCHNL_TSIZE*	7	null	Channel	Y	This is the tag height used when capturing a new channel label.
R	DMS	*DMS_LBLCLVT_TSIZE*	7	null	Culvert	Y	This is the tag height used when capturing a new culvert label.
R	DMS	*DMS_DIM_TSIZE*	5	null	Dimension	Y	This is the tag height used when capturing a new dimension.
R	DMS	*DMS_NOTE_TSIZE*	5	null	Note	Y	This is the tag height used when capturing a new note.

Capture Settings for the US Locale

R	DMS	*DMS_CHNL_OFF*	9	null	Channel	Y	This is the default offset distance used when capturing a new channel by offset.
R	DMS	*DMS_CLVT_OFF*	9	null	Culvert	Y	This is the default offset distance used when capturing a new culvert by offset.
R	DMS	*DMS_SWPIPE_OFF*	9	null	Pipe	Y	This is the default offset distance used when capturing a new stormwater pipe by offset.
R	DMS	*DMS_RIVER_TSIZE*	30	null	River	Y	This is the tag height used when capturing a new river.
R	DMS	*DMS_FLOODL_TSIZE*	30	null	Floodline	Y	This is the tag height used when capturing a new floodline.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	DMS	*DMS_DAM_TSIZE*	30	null	Dam	Y	This is the tag height used when capturing a new dam.
R	DMS	*DMS_CATCH_TSIZE*	30	null	Catchment	Y	This is the tag height used when capturing a new catchment.
R	DMS	*DMS_LBLSWPIPE_TSIZE*	21	null	Pipe	Y	This is the tag height used when capturing a new stormwater pipe label.
R	DMS	*DMS_LBLCHNL_TSIZE*	21	null	Channel	Y	This is the tag height used when capturing a new channel label.
R	DMS	*DMS_LBLCLVT_TSIZE*	21	null	Culvert	Y	This is the tag height used when capturing a new culvert label.
R	DMS	*DMS_DIM_TSIZE*	15	null	Dimension	Y	This is the tag height used when capturing a new dimension.
R	DMS	*DMS_NOTE_TSIZE*	15	null	Note	Y	This is the tag height used when capturing a new note.

Appendix D: Munsys Electricity Capture Settings

Capture Setting for the INT Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	EMS	*EMS_DEF_MATRL*	CU	LU_EMS_CABLEMATRL	Cable	Y	This is the default material assigned when capturing a new cable.
R	EMS	*EMS_ISCALE*	1	null	Node	Y	This is the default scale used when inserting electricity legends.
R	EMS	*EMS_SYM_SCL*	1	null	Node	Y	This is the default scale used when capturing a new electricity node.
R	EMS	*EMS_DEF_DST*	5	null	Cable	N	This is the default distance used for the cable tie-in when capturing new cables.
R	EMS	*EMS_DEF_SLK*	0.1	null	Node	N	This is the default node slack used if the node does not have a specific slack specified.
R	EMS	*EMS_DEF_OFF*	1.8	null	Node	Y	This is the default offset distance used when capturing new nodes.
S	EMS	*EMS_NODE_ASKDESC*	T	null	Node	Y	This setting determines whether or not to prompt the user for the node description.
S	EMS	*EMS_CABLE_ASKINFO*	T	null	Cable	Y	This setting determines whether or not to prompt the user for the cable information.
S	EMS	*EMS_SC_ASKINFO*	T	null	Service Connection	Y	This setting determines whether or not to prompt the user for the service connection information.
R	EMS	*EMS_CABLE_OFF*	1.8	null	Cable	Y	This is the default offset distance used when capturing a new underground cable.
S	EMS	*EMS_NODE_SNAP*	T	null	Node	Y	This setting determines whether or not to snap to cadastral otherwise allows freehand placement.
S	EMS	*EMS_NODE_AUTPLACE*	F	null	Node	Y	This setting determines whether or not to automatically place nodes.
S	EMS	*EMS_NODE_AUTROT*	T	null	Node	Y	This setting determines whether or not the node is automatically aligned to the cadastral.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	EMS	*EMS_DCT_FIX*	-2.5	null	Duct	Y	This setting determines whether the duct is extended or trimmed during placement. A positive value extends the duct whilst a negative value will trim the duct.
R	EMS	*EMS_SC_LEN*	8	null	Service Connection	Y	This is the default length used when placing a direct service connection.
R	EMS	*EMS_ESSTA_SLK*	7.5	null	Node	N	This is the default slack used for a switch station when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_ESSUB_SLK*	7.5	null	Node	N	This is the default slack used for a standard sub when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EMSUB_SLK*	7.5	null	Node	N	This is the default slack used for a mini sub when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_ETRANS_SLK*	7.5	null	Node	N	This is the default slack used for a transformer when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EALINK_SLK*	0.1	null	Node	N	This is the default slack used for a air link when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EKIOSK_SLK*	5	null	Node	N	This is the default slack used for a kiosk when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EHVSWITCH_SLK*	0.1	null	Node	N	This is the default slack used for a hv switch when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EHVJUNC_SLK*	0.1	null	Node	N	This is the default slack used for a hv junction box when connecting a cable. This value is used in determining the overall length of the cable.

Capture Settings for the US Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	EMS	*EMS_DEF_MATRL*	CU	LU_EMS_CABLEMATRL	Cable	Y	This is the default material assigned when capturing a new cable.
R	EMS	*EMS_ISCALE*	1	null	Node	Y	This is the default scale used when inserting electricity legends.
R	EMS	*EMS_SYM_SCL*	1	null	Node	Y	This is the default scale used when capturing a new electricity node.
R	EMS	*EMS_DEF_DST*	15	null	Cable	N	This is the default distance used for the cable tie-in when capturing new cables.
R	EMS	*EMS_DEF_SLK*	0.3	null	Node	N	This is the default node slack used if the node does not have a specific slack specified.
R	EMS	*EMS_DEF_OFF*	5.5	null	Node	Y	This is the default offset distance used when capturing new nodes.
S	EMS	*EMS_NODE_ASKDESC*	T	null	Node	Y	This setting determines whether or not to prompt the user for the node description.
S	EMS	*EMS_CABLE_ASKINFO*	T	null	Cable	Y	This setting determines whether or not to prompt the user for the cable information.
S	EMS	*EMS_SC_ASKINFO*	T	null	Service Connection	Y	This setting determines whether or not to prompt the user for the service connection information.
R	EMS	*EMS_CABLE_OFF*	5.5	null	Cable	Y	This is the default offset distance used when capturing a new underground cable.
S	EMS	*EMS_NODE_SNAP*	T	null	Node	Y	This setting determines whether or not to snap to cadastral otherwise allows freehand placement.
S	EMS	*EMS_NODE_AUTPLACE*	F	null	Node	Y	This setting determines whether or not to automatically place nodes.
S	EMS	*EMS_NODE_AUTROT*	T	null	Node	Y	This setting determines whether or not the node is automatically aligned to the cadastral.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	EMS	*EMS_DCT_FIX*	-7.5	null	Duct	Y	This setting determines whether the duct is extended or trimmed during placement. A positive value extends the duct whilst a negative value will trim the duct.
R	EMS	*EMS_SC_LEN*	24	null	Service Connection	Y	This is the default length used when placing a direct service connection.
R	EMS	*EMS_ESSTA_SLK*	22	null	Node	N	This is the default slack used for a switch station when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_ESSUB_SLK*	22	null	Node	N	This is the default slack used for a standard sub when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EMSUB_SLK*	22	null	Node	N	This is the default slack used for a mini sub when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_ETRANS_SLK*	22	null	Node	N	This is the default slack used for a transformer when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EALINK_SLK*	0.3	null	Node	N	This is the default slack used for a air link when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EKIOSK_SLK*	15	null	Node	N	This is the default slack used for a kiosk when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EHVSWITCH_SLK*	0.3	null	Node	N	This is the default slack used for a hv switch when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EHVJUNC_SLK*	0.3	null	Node	N	This is the default slack used for a hv junction box when connecting a cable. This value is used in determining the overall length of the cable.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	EMS	*EMS_EDB_SLK*	9	null	Node	N	This is the default slack used for a db when connecting a cable. This value is used in determining the overall length of the cable. airline
R	EMS	*EMS_ELVJUNC_SLK*	0.3	null	Node	N	This is the default slack used for a lv junction box when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EHMSL_SLK*	27	null	Node	N	This is the default slack used for a hmsl when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_ESLPOLE_SLK*	18	null	Node	N	This is the default slack used for a streetlight pole when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_ESL_SLK*	0.3	null	Node	N	This is the default slack used for a streetlight when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_EBBRD_SLK*	24	null	Node	N	This is the default slack used for a billboard when connecting a cable. This value is used in determining the overall length of the cable.
R	EMS	*EMS_ESLJUNC_SLK*	0.3	null	Node	N	This is the default slack used for a sl junction nox when connecting a cable. This value is used in determining the overall length of the cable.

Appendix E: Munsys Roads Capture Settings

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	RMS	*RMS_RDCL_CLASS*	RESIDENTIAL	LU_RMS_CLASS	Road Center Line	Y	This is the default classification assigned when capturing a new road center line.
C	RMS	*RMS_RDCL_JURIS*	YES	null	Road Center Line	Y	This is the default jurisdiction assigned when capturing a new road center line.
C	RMS	*RMS_RDCL_SURFACE*	TARRED	LU_RMS_SURF	Road Center Line	Y	This is the default surface type assigned when capturing a new road center line.
C	RMS	*RMS_RDCL_TYPE*	SINGLE	LU_RMS_SEGTYPE	Road Center Line	Y	This is the default segment type assigned when capturing a new road center line.
C	RMS	*RMS_RDCL_OWNER*	MUNICIPAL	LU_RMS_SEGOWNER	Road Center Line	Y	This is the default segment owner assigned when capturing a new road center line.
C	RMS	*RMS_RDCL_TRAFDIR*	B	null	Road Center Line	Y	This is the default traffic direction assigned when capturing a new road center line.
R	RMS	*RMS_ISCALE*	1	null	Intersection Drawing	Y	This is the default scale used when inserting signal legends.
R	RMS	*RMS_RDTSYM_SCL*	1.0	null	Intersection Drawing	Y	This is the default scale used when inserting intersection warning signs and road markings.
R	RMS	*RMS_RDINTSYM_SCL*	1	null	Intersection Marker	Y	This is the default symbol scale used when capturing new intersection markers.
R	RMS	*RMS_SRCH*	5	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	RMS	*RMS_RDCL_TOL*	0.05	null	Integrity	N	This is the tolerance used during the integrity check to check if road center lines+K44 are within snap tolerance.
R	RMS	*RMS_RDINT_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to determine if nodes should snap and to determine if nodes are duplicated.
R	RMS	*RMS_SHORT_OBJECTS*	1	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
Capture Settings for the INT Locale							
R	RMS	*RMS_RDCL_OFF*	5	null	Road Center Line	Y	This setting determines the distance at which a road center line is offset from a boundary.
R	RMS	*RMS_RDEDGE_OFF*	3	null	Road Edge	Y	This setting determines the distance at which a road edge is offset from a boundary.
R	RMS	*RMS_RDWALK_OFF*	2	null	Road Walkway	Y	This setting determines the distance at which a road walkway is offset from a boundary.
R	RMS	*RMS_NOTE_TSIZE*	5	null	Note	Y	This is the tag height used when capturing a new note.
Capture Settings for the US Locale							
R	RMS	*RMS_RDCL_OFF*	15	null	Road Center Line	Y	This setting determines the distance at which a road center line is offset from a boundary.
R	RMS	*RMS_RDEDGE_OFF*	9	null	Road Edge	Y	This setting determines the distance at which a road edge is offset from a boundary.
R	RMS	*RMS_RDWALK_OFF*	6	null	Road Walkway	Y	This setting determines the distance at which a road walkway is offset from a boundary.
R	RMS	*RMS_NOTE_TSIZE*	15	null	Note	Y	This is the tag height used when capturing a new note.

Appendix F: Munsys Sewer Capture Settings

Capture Setting for the INT Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	SMS	*SMS_GPIPE_MATRL*	CLAY	LU_SMS_GPIPEMATRL	Gravity Pipe	Y	This is the default material assigned when capturing a new gravity pipe.
C	SMS	*SMS_GPIPE_TYPE*	STREET	LU_SMS_GPIPETYPE	Gravity Pipe	Y	This is the default type assigned when capturing a new gravity pipe.
C	SMS	*SMS_VPIPE_MATRL*	STEEL	LU_SMS_VPIPEMATRL	Vacuum Pipe	Y	This is the default material assigned when capturing a new vacuum pipe.
C	SMS	*SMS_VPIPE_TYPE*	PRIMARY	LU_SMS_VPIPETYPE	Vacuum Pipe	Y	This is the default type assigned when capturing a new vacuum pipe.
C	SMS	*SMS_RPIPE_MATRL*	STEEL	LU_SMS_RPIPEMATRL	Pressure Pipe	Y	This is the default material assigned when capturing a new pressure pipe.
C	SMS	*SMS_RPIPE_TYPE*	PRIMARY	LU_SMS_RPIPETYPE	Pressure Pipe	Y	This is the default type assigned when capturing a new pressure pipe.
R	SMS	*SMS_GPIPE_OFF*	1.5	null	Gravity Pipe	Y	This is the default offset distance used when capturing a new gravity pipe by offset.
R	SMS	*SMS_VPIPE_OFF*	3	null	Vacuum Pipe	Y	This is the default offset distance used when capturing a new vacuum pipe by offset.
R	SMS	*SMS_RPIPE_OFF*	5	null	Pressure Pipe	Y	This is the default offset distance used when capturing a new pressure pipe by offset.
R	SMS	*SMS_RESPIPE_OFF*	1.0	null	Residential Pipe	Y	This is the default offset distance used when capturing a new residential pipe by offset.
R	SMS	*SMS_GPIPE_DIA*	0	LU_SMS_GPIPEDIA	Gravity Pipe	Y	This is the default diameter used when capturing a new gravity pipe.
R	SMS	*SMS_VPIPE_DIA*	0	LU_SMS_VPIPEDIA	Vacuum Pipe	Y	This is the default diameter used when capturing a new vacuum pipe.
R	SMS	*SMS_RPIPE_DIA*	0	LU_SMS_RPIPEDIA	Pressure Pipe	Y	This is the default diameter used when capturing a new pressure pipe.
R	SMS	*SMS_SEWSERV_LEN*	10	null	Service Connection	Y	This is the default length used when placing a service connection.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	SMS	*SMS_SEWSERV_TYPE*	ACTUAL	LU_SMS_SERVTYPE	Service Connection	Y	This is the default type used when placing a service connection.
R	SMS	*SMS_SEWSYM_SCL*	1	null	Sewer Symbol	Y	This is the default symbol scale used when capturing new sewer symbols.
R	SMS	*SMS_SEWNODE_SCL*	1	null	Node	Y	This is the default symbol scale used when capturing new sewer nodes.
R	SMS	*SMS_SRCH*	5	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	SMS	*SMS_SEWPIPE_TOL*	0.05	null	Integrity	N	This is the tolerance used during the integrity check to check if sewer pipes are within snap tolerance.
R	SMS	*SMS_SEWNODE_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to determine if nodes should snap and to determine if nodes are duplicated.
R	SMS	*SMS_SEWSERV_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to check if sewer service connections are within snap tolerance.
R	SMS	*SMS_SHORT_OBJECTS*	0.5	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.
R	SMS	*SMS_LBLGPIPE_TSIZE*	7	null	Gravity Pipe	Y	This is the tag height used when capturing a new gravity pipe label.
R	SMS	*SMS_LBLVPIPE_TSIZE*	7	null	Vacuum Pipe	Y	This is the tag height used when capturing a new vacuum pipe label.
R	SMS	*SMS_LBLRPIPE_TSIZE*	7	null	Pressure Pipe	Y	This is the tag height used when capturing a new pressure pipe label.
R	SMS	*SMS_DIM_TSIZE*	5	null	Dimension	Y	This is the tag height used when capturing a new dimension.
R	SMS	*SMS_NOTE_TSIZE*	5	null	Note	Y	This is the tag height used when capturing a new note.
R	SMS	*SMS_BASIN_TSIZE*	20	null	Basin	Y	This is the tag height used when capturing a new basin.

Capture Settings for the US Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	SMS	*SMS_GPIPE_MATRL*	UNK	LU_SMS_GPIPEMATRL	Gravity Pipe	Y	This is the default material assigned when capturing a new gravity pipe.
C	SMS	*SMS_GPIPE_TYPE*	MAIN	LU_SMS_GPIPETYPE	Gravity Pipe	Y	This is the default type assigned when capturing a new gravity pipe.
C	SMS	*SMS_VPIPE_MATRL*	UNK	LU_SMS_VPIPEMATRL	Vacuum Pipe	Y	This is the default material assigned when capturing a new vacuum pipe.
C	SMS	*SMS_VPIPE_TYPE*	PRIMARY	LU_SMS_VPIPETYPE	Vacuum Pipe	Y	This is the default type assigned when capturing a new vacuum pipe.
C	SMS	*SMS_RPIPE_MATRL*	UNK	LU_SMS_RPIPEMATRL	Pressure Pipe	Y	This is the default material assigned when capturing a new pressure pipe.
C	SMS	*SMS_RPIPE_TYPE*	PRIMARY	LU_SMS_RPIPETYPE	Pressure Pipe	Y	This is the default type assigned when capturing a new pressure pipe.
R	SMS	*SMS_GPIPE_OFF*	8	null	Gravity Pipe	Y	This is the default offset distance used when capturing a new gravity pipe by offset.
R	SMS	*SMS_VPIPE_OFF*	8	null	Vacuum Pipe	Y	This is the default offset distance used when capturing a new vacuum pipe by offset.
R	SMS	*SMS_RPIPE_OFF*	8	null	Pressure Pipe	Y	This is the default offset distance used when capturing a new pressure pipe by offset.
R	SMS	*SMS_RESPIPE_OFF*	4	null	Residential Pipe	Y	This is the default offset distance used when capturing a new residential pipe by offset.
R	SMS	*SMS_GPIPE_DIA*	0	LU_SMS_GPIPEDIA	Gravity Pipe	Y	This is the default diameter used when capturing a new gravity pipe.
R	SMS	*SMS_VPIPE_DIA*	0	LU_SMS_VPIPEDIA	Vacuum Pipe	Y	This is the default diameter used when capturing a new vacuum pipe.
R	SMS	*SMS_RPIPE_DIA*	0	LU_SMS_RPIPEDIA	Pressure Pipe	Y	This is the default diameter used when capturing a new pressure pipe.
R	SMS	*SMS_SEWSERV_LEN*	30	null	Service Connection	Y	This is the default length used when placing a service connection.
C	SMS	*SMS_SEWSERV_TYPE*	ACTUAL	LU_SMS_SERVTYPE	Service Connection	Y	This is the default type used when placing a service connection.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	SMS	*SMS_SEWSYM_SCL*	1	null	Sewer Symbol	Y	This is the default symbol scale used when capturing new sewer symbols.
R	SMS	*SMS_SEWNODE_SCL*	1	null	Node	Y	This is the default symbol scale used when capturing new sewer nodes.
R	SMS	*SMS_SRCH*	5	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	SMS	*SMS_SEWPIPE_TOL*	0.05	null	Integrity	N	This is the tolerance used during the integrity check to check if sewer pipes are within snap tolerance.
R	SMS	*SMS_SEWNODE_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to determine if nodes should snap and to determine if nodes are duplicated.
R	SMS	*SMS_SEWSERV_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to check if sewer service connections are within snap tolerance.
R	SMS	*SMS_SHORT_OBJECTS*	0.5	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.
R	SMS	*SMS_LBLGPIPE_TSIZE*	12	null	Gravity Pipe	Y	This is the tag height used when capturing a new gravity pipe label.
R	SMS	*SMS_LBLVPIPE_TSIZE*	12	null	Vacuum Pipe	Y	This is the tag height used when capturing a new vacuum pipe label.
R	SMS	*SMS_LBLRPIPE_TSIZE*	12	null	Pressure Pipe	Y	This is the tag height used when capturing a new pressure pipe label.
R	SMS	*SMS_DIM_TSIZE*	8	null	Dimension	Y	This is the tag height used when capturing a new dimension.
R	SMS	*SMS_NOTE_TSIZE*	12	null	Note	Y	This is the tag height used when capturing a new note.
R	SMS	*SMS_BASIN_TSIZE*	50	null	Basin	Y	This is the tag height used when capturing a new basin.

Appendix G: Munsys Water Capture Settings

Capture setting for the INT Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	WMS	*WMS_WATPIPE_DIA*	0	LU_WMS_PIPEDIA	Water Pipe	Y	This is the default diameter assigned when capturing a new water pipe.
C	WMS	*WMS_WATPIPE_MATRL*	PVC	LU_WMS_PIPEMATRL	Water Pipe	Y	This is the default material assigned when capturing a new water pipe.
C	WMS	*WMS_WATPIPE_TYPE*	SECSUP	LU_WMS_PIPETYPE	Water Pipe	Y	This is the default type assigned when capturing a new water pipe.
R	WMS	*WMS_WATPIPE_OFF*	2	null	Water Pipe	Y	This is the default offset distance used when capturing a new water pipe by offset.
R	WMS	*WMS_WATSERV_LEN*	5	null	Service Connection	Y	This is the default length used when placing a service connection.
R	WMS	*WMS_WATSERV_OFF*	2	null	Service Connection	Y	This is the default offset distance used when capturing a new service connection.
R	WMS	*WMS_WATBRCH_OFF*	4	null	Service Connection	Y	This is the default length used when placing a double branch service connection.
R	WMS	*WMS_WATSYM_SCL*	1	null	Water Symbol	Y	This is the default symbol scale used when capturing new water symbols.
R	WMS	*WMS_WATNODE_SCL*	1	null	Node	Y	This is the default symbol scale used when capturing new water nodes.
R	WMS	*WMS_SRCH*	5	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	WMS	*WMS_WATPIPE_TOL*	0.05	null	Integrity	N	This is the tolerance used during the integrity check to check if water pipes are within snap tolerance.
R	WMS	*WMS_WATNODE_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to determine if nodes should snap and to determine if nodes are duplicated.
R	WMS	*WMS_WATSERV_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to check if water pipes are within snap tolerance.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	WMS	*WMS_SHORT_OBJECTS*	0.5	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.
R	WMS	*WMS_LBLWATPIPE_TSIZE*	7	null	Water Pipe	Y	This is the tag height used when capturing a new pipe label.
R	WMS	*WMS_DIM_TSIZE*	5	null	Dimension	Y	This is the tag height used when capturing a new dimension.
R	WMS	*WMS_NOTE_TSIZE*	5	null	Note	Y	This is the tag height used when capturing a new note.
R	WMS	*WMS_ZONE_TSIZE*	20	null	Zone	Y	This is the tag height used when capturing a new zone.
C	WMS	*WMS_WAT_CAT*	POTABLE	LU_WMS_WATCATEGORY	General	Y	This is the default water category assigned when capturing new water objects.

Capture Settings for the US Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	WMS	*WMS_WATPIPE_DIA*	0	LU_WMS_PIPEDIA	Water Pipe	Y	This is the default diameter assigned when capturing a new water pipe.
C	WMS	*WMS_WATPIPE_MATRL*	UNK	LU_WMS_PIPEMATRL	Water Pipe	Y	This is the default material assigned when capturing a new water pipe.
C	WMS	*WMS_WATPIPE_TYPE*	UNK	LU_WMS_PIPETYPE	Water Pipe	Y	This is the default type assigned when capturing a new water pipe.
R	WMS	*WMS_WATPIPE_OFF*	5	null	Water Pipe	Y	This is the default offset distance used when capturing a new water pipe by offset.
R	WMS	*WMS_WATSERV_LEN*	15	null	Service Connection	Y	This is the default length used when placing a service connection.
R	WMS	*WMS_WATSERV_OFF*	3	null	Service Connection	Y	This is the default offset distance used when capturing a new service connection.
R	WMS	*WMS_WATBRCH_OFF*	10	null	Service Connection	Y	This is the default length used when placing a double branch service connection.
R	WMS	*WMS_WATSYM_SCL*	1	null	Water Symbol	Y	This is the default symbol scale used when capturing new water symbols.
R	WMS	*WMS_WATNODE_SCL*	1	null	Node	Y	This is the default symbol scale used when capturing new water nodes.
R	WMS	*WMS_SRCH*	5	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	WMS	*WMS_WATPIPE_TOL*	0.05	null	Integrity	N	This is the tolerance used during the integrity check to check if water pipes are within snap tolerance.
R	WMS	*WMS_WATNODE_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to determine if nodes should snap and to determine if nodes are duplicated.
R	WMS	*WMS_WATSERV_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to check if water pipes are within snap tolerance.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	WMS	*WMS_SHORT_OBJECTS*	0.5	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.
R	WMS	*WMS_LBLWATPIPE_TSIZE*	8	null	Water Pipe	Y	This is the tag height used when capturing a new pipe label.
R	WMS	*WMS_DIM_TSIZE*	8	null	Dimension	Y	This is the tag height used when capturing a new dimension.
R	WMS	*WMS_NOTE_TSIZE*	12	null	Note	Y	This is the tag height used when capturing a new note.
R	WMS	*WMS_ZONE_TSIZE*	50	null	Zone	Y	This is the tag height used when capturing a new zone.
C	WMS	*WMS_WAT_CAT*	POTABLE	LU_WMS_WATCATEGORY	General	Y	This is the default water category assigned when capturing new water objects.

Appendix H: Munsys Map Books Capture Settings

Capture setting for the INT/US Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	MBK	*MBK_XORD_FACT*	-1	null	Coordinate Corners	Y	This setting determines how the x coordinate corner is displayed. Have a setting of -1 if the actual coordinates are negative and you want them displayed as positive.
R	MBK	*MBK_YORD_FACT*	-1	null	Coordinate Corners	Y	This setting determines how the y coordinate corner is displayed. Have a setting of -1 if the actual coordinates are negative and you want them displayed as positive.
C	MBK	*MBK_DIR*		null	File	N	This setting determines where the mapbooks are generated to. If this is set then this will be used for all clients otherwise the current working directory is used.
C	MBK	*MBK_FONT*	ROMANC	null	Map Book	Y	This is the default font used for all the sheet properties.
C	MBK	*MBK_TITLE_FONT*	ROMANC	null	Title	Y	This is the default font used for the title of the map book.
C	MBK	*MBK_PAGENO_FONT*	ROMANC	null	Page Number	Y	This is the default font used for the page numbers of the map book.
C	MBK	*MBK_DATESCALE_FONT*	ROMANC	null	Date/Scale	Y	This is the default font used for the date and scale of the map book.
C	MBK	*MBK_COORDS_FONT*	ROMANC	null	Coordinate Corners	Y	This is the default font used for the coordinate corners of the map book.
C	MBK	*MBK_DWG_PFIX*	MBK	null	Map Book	Y	This is the prefix used for all the drawings created by map book.
C	MBK	*MBK_ODD_PFIX*	O	null	Map Book	Y	This is the prefix used for odd page drawings created by map book.
C	MBK	*MBK_EVN_PFIX*	E	null	Map Book	Y	This is the prefix used for even page drawings created by map book.

Appendix I: Munsys Cable Fiber Capture Settings

Capture setting for the INT Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	CFS	*CFS_CBLTYPE*	SGL12	null	Cable Fiber	Y	This is the default Cable Fiber Type when capturing a new cable fiber.
R	CFS	*CFS_LBLFIBLINK_TSIZE*	7	null	Cable Fiber	Y	This is the tag height used when capturing a new cable fiber label.
R	CFS	*CFS_FIBDIM_OFF*	1	null	Cable Fiber	Y	This is the default offset distance used when capturing a new cable fiber dimension.
R	CFS	*CFS_CBLASKDUCT	T	null	Cable Fiber	Y	This setting determines if duct information should be captured when placing a fiber cable.
C	CFS	*CFS_CBLGROUP*	LOOP1	null	Cable Fiber	Y	This is the default Cable Fiber Group when capturing a new cable fiber.
S	CFS	*CFS_CBLAUTOTERM*	True	null	Cable Fiber	Y	This setting determines if the fiber cable is terminated automatically at the start/end node when defining a new cable.
R	CFS	*CFS_FIBSYM_SCL*	1	null	Cable Fiber Symbol	Y	This is the default symbol scale used when capturing new cable fiber symbols.
R	CFS	*CFS_DIM_TSIZE*	5	null	Dimension	Y	This is the tag height used when capturing a new dimension.
R	CFS	*CFS_GEOM_TOL*	0.01	null	Fiber Geom Settings	N	This is the tolerance used when for geometry functions.
R	CFS	*CFS_GEOM_ARCTOL*	0.01	null	Fiber Geom Settings	N	This is the arc tolerance used when for geometry functions.
C	CFS	*CFS_GEOM_UNIT*	METER	null	Fiber Geom Settings	N	This is the unit used when for geometry functions.
R	CFS	*CFS_NOTE_TSIZE*	5	null	Note	Y	This is the tag height used when capturing a new note.

Capture Settings for the US Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	CFS	*CFS_CBLTYPE*	SGL12	null	Cable Fiber	Y	This is the default Cable Fiber Type when capturing a new cable fiber.
C	CFS	*CFS_CBLGROUP*	LOOP1	null	Cable Fiber	Y	This is the default Cable Fiber Group when capturing a new cable fiber.
R	CFS	*CFS_CBLAUTOTERM*	True	null	Cable Fiber	Y	This setting determines if the fiber cable is terminated automatically at the start/end node when defining a new cable.
R	CFS	*CFS_FIBDIM_OFF*	3	null	Cable Fiber	Y	This is the default offset distance used when capturing a new cable fiber dimension.
S	CFS	*CFS_FIBSYM_SCL*	1	null	Cable Fiber Symbol	Y	This is the default symbol scale used when capturing new cable fiber symbols.
R	CFS	*CFS_DIM_TSIZE*	10	null	Dimension	Y	This is the tag height used when capturing a new dimension.
C	CFS	*CFS_GEOM_UNIT*	SURVEY_ FOOT	null	Fiber Geom Settings	N	This is the unit used when for geometry functions.
R	CFS	*CFS_GEOM_ARCTOL*	0.01	null	Fiber Geom Settings	N	This is the arc tolerance used when for geometry functions.
R	CFS	*CFS_GEOM_TOL*	0.01	null	Fiber Geom Settings	N	This is the tolerance used when for geometry functions.
R	CFS	*CFS_NOTE_TSIZE*	10	null	Note	Y	This is the tag height used when capturing a new note.
R	CFS	*CFS_CBLASKDUCT	T	null	Cable Fiber	Y	This setting determines if duct information should be captured when placing a fiber cable.

Appendix J: Munsys Cable Route Capture Settings

Capture setting for the INT Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	CRS	*CRS_CRTTYPE*	COND	LU_CRS_CRTTYPE	Cable Route	Y	This is the default Cable Route Type when capturing a new cable route.
C	CRS	*CRS_CRT_OWNER*	PRIV	LU_CRS_CRTOWNER	Cable Route	Y	This is the default Cable Route Owner when capturing a new cable route.
C	CRS	*CRS_CRT_STATUS*	INDES	LU_CRS_CRTSTATUS	Cable Route	Y	This is the default Cable Route Status when capturing a new cable route.
C	CRS	*CRS_CRT_STATE*	INDES	LU_CRS_CRTSTATE	Cable Route	Y	This is the default Cable Route State when capturing a new cable route
R	CRS	*CRS_CRTLINK_OFF*	5	null	Cable Route	Y	This is the default offset distance used when capturing a new cable route by offset.
R	CRS	*CRS_LBLCRTLINK_TSIZE*	8	null	Cable Route	Y	This is the tag height used when capturing a new cable route label.
C	CRS	*CRS_CRTNODE_NFUNC*	UNK	LU_CRS_NODEFUNC	Cable Route Node	Y	This is the default node function assigned when capturing a new cable route node.
R	CRS	*CRS_CRTSCJOINT_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the service connection joint is offset from a boundary.
R	CRS	*CRS_DEF_OFF*	1.8	null	Cable Route Node	Y	This is the default offset distance used when capturing new nodes.
C	CRS	*CRS_CRTNODE_ASKNODEREF*	T	null	Cable Route Node	Y	This setting determines whether or not to prompt the user for the node reference.
C	CRS	*CRS_NODE_AUTPLACE*	F	null	Cable Route Node	Y	This setting determines whether or not to automatically place nodes.
C	CRS	*CRS_NODE_SNAP*	T	null	Cable Route Node	Y	This setting determines whether or not to snap to cadastral otherwise allows freehand placement.
R	CRS	*CRS_CRTSECJOINT_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the secondary joint is offset from a boundary.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	CRS	*CRS_CRTDIGI_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the DIGICON terminal is offset from a boundary.
R	CRS	*CRS_CRTDPBUILD_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the distribution point building is offset from a boundary.
C	CRS	*CRS_NODE_AUTROT*	T	null	Cable Route Node	Y	This setting determines whether or not the node is automatically aligned to the cadastral.
R	CRS	*CRS_CRTSWCH_OFF*	1.5	null	Cable Route Node	N	This setting determines the distance at which the switch is offset from a boundary.
R	CRS	*CRS_CRTMICWV_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the microwave tower is offset from a boundary.
R	CRS	*CRS_CRTDLU_OFF*	1.75	null	Cable Route Node	N	This setting determines the distance at which the distributed line unit is offset from a boundary.
R	CRS	*CRS_CRTMDF_OFF*	2	null	Cable Route Node	N	This setting determines the distance at which the main distribution frame is offset from a boundary.
R	CRS	*CRS_CRTPRIMJOINT*	3	null	Cable Route Node	N	This setting determines the distance at which the primary joint is offset from a boundary.
R	CRS	*CRS_CRTSDC_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the street distribution cabinet is offset from a boundary.
R	CRS	*CRS_CRTDPAERIAL_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the distribution point aerial is offset from a boundary.
R	CRS	*CRS_CRTDPSTUBBY_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the distribution point stubby is offset from a boundary.
R	CRS	*CRS_CRTDP_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the distribution point is offset from a boundary.
R	CRS	*CRS_CRTMSAN_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the multi service access node terminal is offset from a boundary.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	CRS	*CRS_CRTSYM_SCL*	1	null	Cable Route Symbol	Y	This is the default symbol scale used when capturing new cable route symbols
R	CRS	*CRS_DIM_TSIZE*	5	null	Dimension	Y	This is the tag height used when capturing a new dimension.
R	CRS	*CRS_CRTINF_PITSIZE_H*	3	null	Infrastructure	Y	This is the height size used when placing a new pit infrastructure.
R	CRS	*CRS_CRTINF_PITSIZE_W*	5	null	Infrastructure	Y	This is the width size used when placing a new pit infrastructure.
C	CRS	*CRS_INFRASTRUCTURE_TYPE*	MH	LU_CRS_INFTYPE	Infrastructure	Y	This is the default type assigned when capturing a new infrastructure.
R	CRS	*CRS_CRTINF_VAULTSIZE_W*	5	null	Infrastructure	Y	This is the width size used when placing a new vault infrastructure.
R	CRS	*CRS_CRTINF_VAULTSIZE_H*	2	null	Infrastructure	Y	This is the height size used when placing a new vault infrastructure.
R	CRS	*CRS_CRTINF_MHSIZE_H*	5	null	Infrastructure	Y	This is the height size used when placing a new manhole infrastructure.
R	CRS	*CRS_CRTINF_POLESIZE_DIA*	5	null	Infrastructure	Y	This is the diameter size used when placing a new pole infrastructure.
R	CRS	*CRS_CRTINF_MHSIZE_W*	7	null	Infrastructure	Y	This is the width size used when placing a new manhole infrastructure.
R	CRS	*CRS_CRTINF_SITESIZE_H*	10	null	Infrastructure	Y	This is the height size used when placing a new site infrastructure.
R	CRS	*CRS_CRTINF_SITESIZE_W*	10	null	Infrastructure	Y	This is the width size used when placing a new site infrastructure.
R	CRS	*CRS_CRTINF_DBOXSIZE_H*	2	null	Infrastructure	Y	This is the height size used when placing a new drawbox infrastructure.
R	CRS	*CRS_CRTINF_DBOXSIZE_W*	4	null	Infrastructure	Y	This is the width size used when placing a new drawbox infrastructure.
C	CRS	*CRS_CRTINF_NAMENUM*	T	null	Infrastructure	Y	This setting determines if name and number should be set to same value when placing a new infrastructure.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	CRS	*CRS_CRTLINK_TOL*	0.05	null	Integrity	N	This is the tolerance used during the integrity check to check if cable route are within snap tolerance.
R	CRS	*CRS_SRCH*	5	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	CRS	*CRS_CRTNODE_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to determine if nodes should snap and to determine if nodes are duplicated.
R	CRS	*CRS_SHORT_OBJECTS*	0.5	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.
R	CRS	*CRS_CRTNODE_SCL*	1	null	Node	Y	This is the default symbol scale used when capturing new cable route nodes.
R	CRS	*CRS_NOTE_TSIZE*	10	null	Note	Y	This is the tag height used when capturing a new note.

Capture setting for the US Locale

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
C	CRS	*CRS_CRTTYPE*	COND	LU_CRS_CRTTYPE	Cable Route	Y	This is the default Cable Route Type when capturing a new cable route.
C	CRS	*CRS_CRT_OWNER*	PRIV	LU_CRS_CRTOWNER	Cable Route	Y	This is the default Cable Route Owner when capturing a new cable route.
C	CRS	*CRS_CRT_STATUS*	INDES	LU_CRS_CRTSTATUS	Cable Route	Y	This is the default Cable Route Status when capturing a new cable route.
C	CRS	*CRS_CRT_STATE*	INDES	LU_CRS_CRTSTATE	Cable Route	Y	This is the default Cable Route State when capturing a new cable route
R	CRS	*CRS_CRTLINK_OFF*	5	null	Cable Route	Y	This is the default offset distance used when capturing a new cable route by offset.
R	CRS	*CRS_LBLCRTLINK_TSIZE*	8	null	Cable Route	Y	This is the tag height used when capturing a new cable route label.
C	CRS	*CRS_CRTNODE_NFUNC*	UNK	LU_CRS_NODEFUNC	Cable Route Node	Y	This is the default node function assigned when capturing a new cable route node.
R	CRS	*CRS_CRTSCJOINT_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the service connection joint is offset from a boundary.
R	CRS	*CRS_DEF_OFF*	1.8	null	Cable Route Node	Y	This is the default offset distance used when capturing new nodes.
C	CRS	*CRS_CRTNODE_ASKNODEREF*	T	null	Cable Route Node	Y	This setting determines whether or not to prompt the user for the node reference.
C	CRS	*CRS_NODE_AUTPLACE*	F	null	Cable Route Node	Y	This setting determines whether or not to automatically place nodes.
C	CRS	*CRS_NODE_SNAP*	T	null	Cable Route Node	Y	This setting determines whether or not to snap to cadastral otherwise allows freehand placement.
R	CRS	*CRS_CRTSECJOINT_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the secondary joint is offset from a boundary.
R	CRS	*CRS_CRTDIGI_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the DIGICON terminal is offset from a boundary.

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	CRS	*CRS_CRTDPBUILD_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the distribution point building is offset from a boundary.
C	CRS	*CRS_NODE_AUTROT*	T	null	Cable Route Node	Y	This setting determines whether or not the node is automatically aligned to the cadastral.
R	CRS	*CRS_CRTSWCH_OFF*	1.5	null	Cable Route Node	N	This setting determines the distance at which the switch is offset from a boundary.
R	CRS	*CRS_CRTMICWV_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the microwave tower is offset from a boundary.
R	CRS	*CRS_CRTDLU_OFF*	1.75	null	Cable Route Node	N	This setting determines the distance at which the distributed line unit is offset from a boundary.
R	CRS	*CRS_CRTMDF_OFF*	2	null	Cable Route Node	N	This setting determines the distance at which the main distribution frame is offset from a boundary.
R	CRS	*CRS_CRTPRIMJOINT*	3	null	Cable Route Node	N	This setting determines the distance at which the primary joint is offset from a boundary.
R	CRS	*CRS_CRTSDC_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the street distribution cabinet is offset from a boundary.
R	CRS	*CRS_CRTDPAERIAL_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the distribution point aerial is offset from a boundary.
R	CRS	*CRS_CRTDPSTUBBY_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the distribution point stubby is offset from a boundary.
R	CRS	*CRS_CRTDP_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the distribution point is offset from a boundary.
R	CRS	*CRS_CRTMSAN_OFF*	3	null	Cable Route Node	N	This setting determines the distance at which the multi service access node terminal is offset from a boundary.
R	CRS	*CRS_CRTSYM_SCL*	1	null	Cable Route Symbol	Y	This is the default symbol scale used when capturing new cable route symbols

Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	CRS	*CRS_DIM_TSIZE*	10	null	Dimension	Y	This is the tag height used when capturing a new dimension.
R	CRS	*CRS_CRTINF_PITSIZE_H*	6	null	Infrastructure	Y	This is the height size used when placing a new pit infrastructure.
R	CRS	*CRS_CRTINF_PITSIZE_W*	10	null	Infrastructure	Y	This is the width size used when placing a new pit infrastructure.
C	CRS	*CRS_INFRASTRUCTURE_TYPE*	MH	LU_CRS_INFTYPE	Infrastructure	Y	This is the default type assigned when capturing a new infrastructure.
R	CRS	*CRS_CRTINF_VAULTSIZE_W*	10	null	Infrastructure	Y	This is the width size used when placing a new vault infrastructure.
R	CRS	*CRS_CRTINF_VAULTSIZE_H*	4	null	Infrastructure	Y	This is the height size used when placing a new vault infrastructure.
R	CRS	*CRS_CRTINF_MHSIZE_H*	10	null	Infrastructure	Y	This is the height size used when placing a new manhole infrastructure.
R	CRS	*CRS_CRTINF_POLESIZE_DIA*	10	null	Infrastructure	Y	This is the diameter size used when placing a new pole infrastructure.
R	CRS	*CRS_CRTINF_MHSIZE_W*	15	null	Infrastructure	Y	This is the width size used when placing a new manhole infrastructure.
R	CRS	*CRS_CRTINF_SITESIZE_H*	20	null	Infrastructure	Y	This is the height size used when placing a new site infrastructure.
R	CRS	*CRS_CRTINF_SITESIZE_W*	20	null	Infrastructure	Y	This is the width size used when placing a new site infrastructure.
R	CRS	*CRS_CRTINF_DBOXSIZE_H*	5	null	Infrastructure	Y	This is the height size used when placing a new drawbox infrastructure.
R	CRS	*CRS_CRTINF_DBOXSIZE_W*	10	null	Infrastructure	Y	This is the width size used when placing a new drawbox infrastructure.
C	CRS	*CRS_CRTINF_NAMENUM*	T	null	Infrastructure	Y	This setting determines if name and number should be set to same value when placing a new infrastructure.

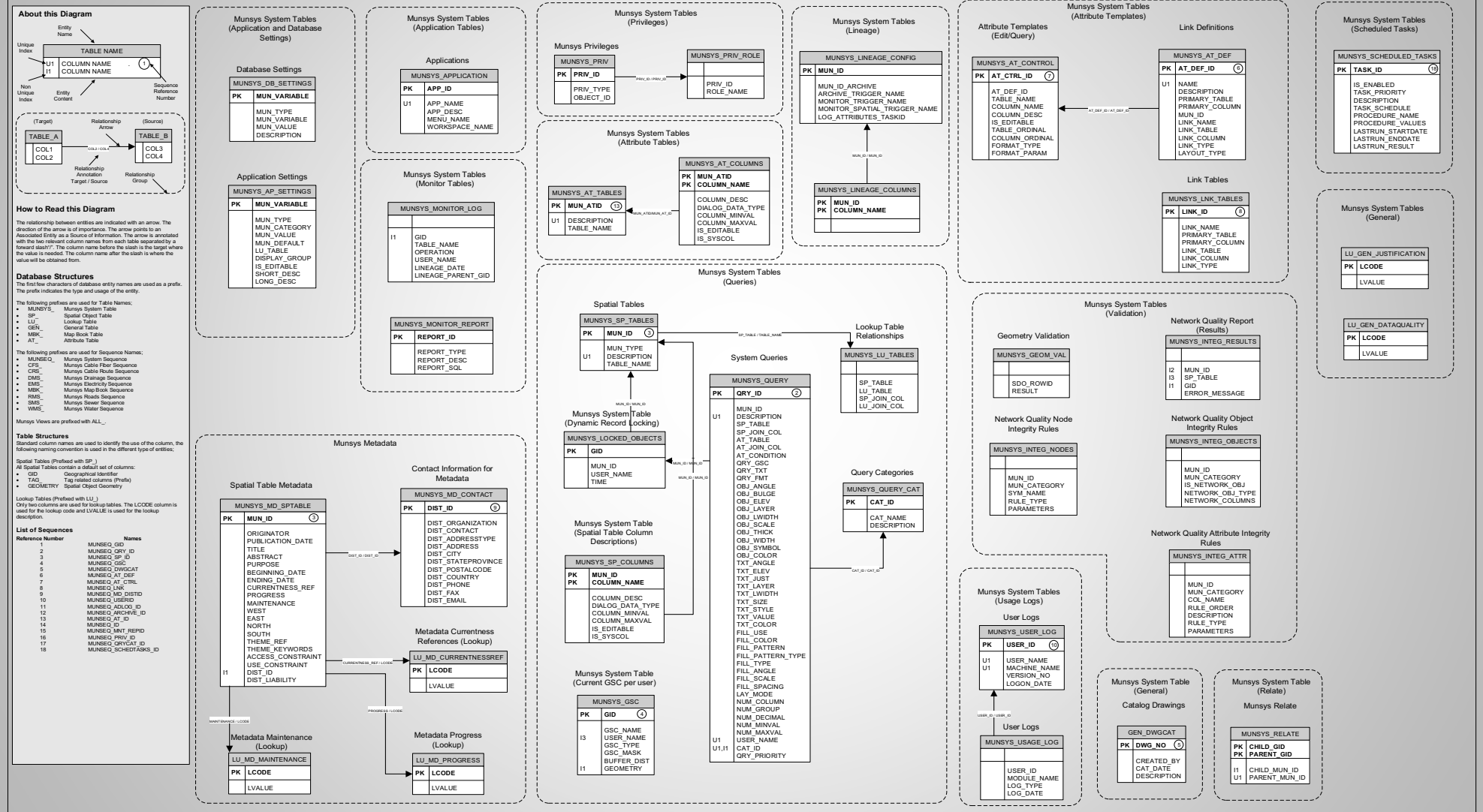
Type	Category	Variable	Default	Lookup Table	Display Group	Editable	Description
R	CRS	*CRS_CRTLINK_TOL*	0.05	null	Integrity	N	This is the tolerance used during the integrity check to check if cable route are within snap tolerance.
R	CRS	*CRS_SRCH*	5	null	Integrity	N	This is the search tolerance used during the integrity check to locate objects within this window size.
R	CRS	*CRS_CRTNODE_TOL*	0.5	null	Integrity	N	This is the tolerance used during the integrity check to determine if nodes should snap and to determine if nodes are duplicated.
R	CRS	*CRS_SHORT_OBJECTS*	0.5	null	Integrity	N	This is the value used by the integrity check to determine which short objects to delete. Any objects found that are less than this distance will be automatically deleted during the integrity check.
R	CRS	*CRS_CRTNODE_SCL*	1	null	Node	Y	This is the default symbol scale used when capturing new cable route nodes.
R	CRS	*CRS_NOTE_TSIZE*	10	null	Note	Y	This is the tag height used when capturing a new note.

Appendix K: Munsys Data Models

This appendix contains the following data models:

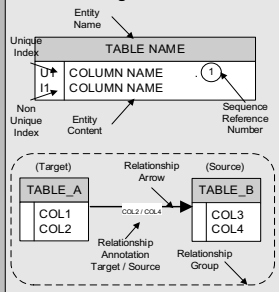
- Munsys **System** Data Model (INT and US locale)
- Munsys **Cadastral** Data Model (US locale)
- Munsys **Cadastral** Data Model (INT locale)
- Munsys **Drainage** Data Model (INT and US locale)
- Munsys **Electricity** Data Model (INT and US locale)
- Munsys **Map Books** Data Model (INT and US locale)
- Munsys **Roads** Data Model (INT and US locale)
- Munsys **Sewer** Data Model (INT and US locale)
- Munsys **Water** Data Model (INT and US locale)
- Munsys **Cable Fiber** Data Model (INT and US locale)
- Munsys **Cable Route** Data Model (INT and US locale)

Munsys System Data Model (Release 14 INT / US)



Munsys Cadastral Data Model (Release 14 US)

About this Diagram



How to Read this Diagram

The relationship between entities are indicated with an arrow. The direction of the arrow is of importance. The arrow points to an Associated Entity as a Source of Information. The arrow is annotated with the two relevant column names from each table separated by a forward slash'/'. The column name before the slash is the target where the value is needed. The column name after the slash is where the value will be obtained from.

Table Structures

Standard column names are used to identify the use of the column, the following naming convention is used in the different type of entities;

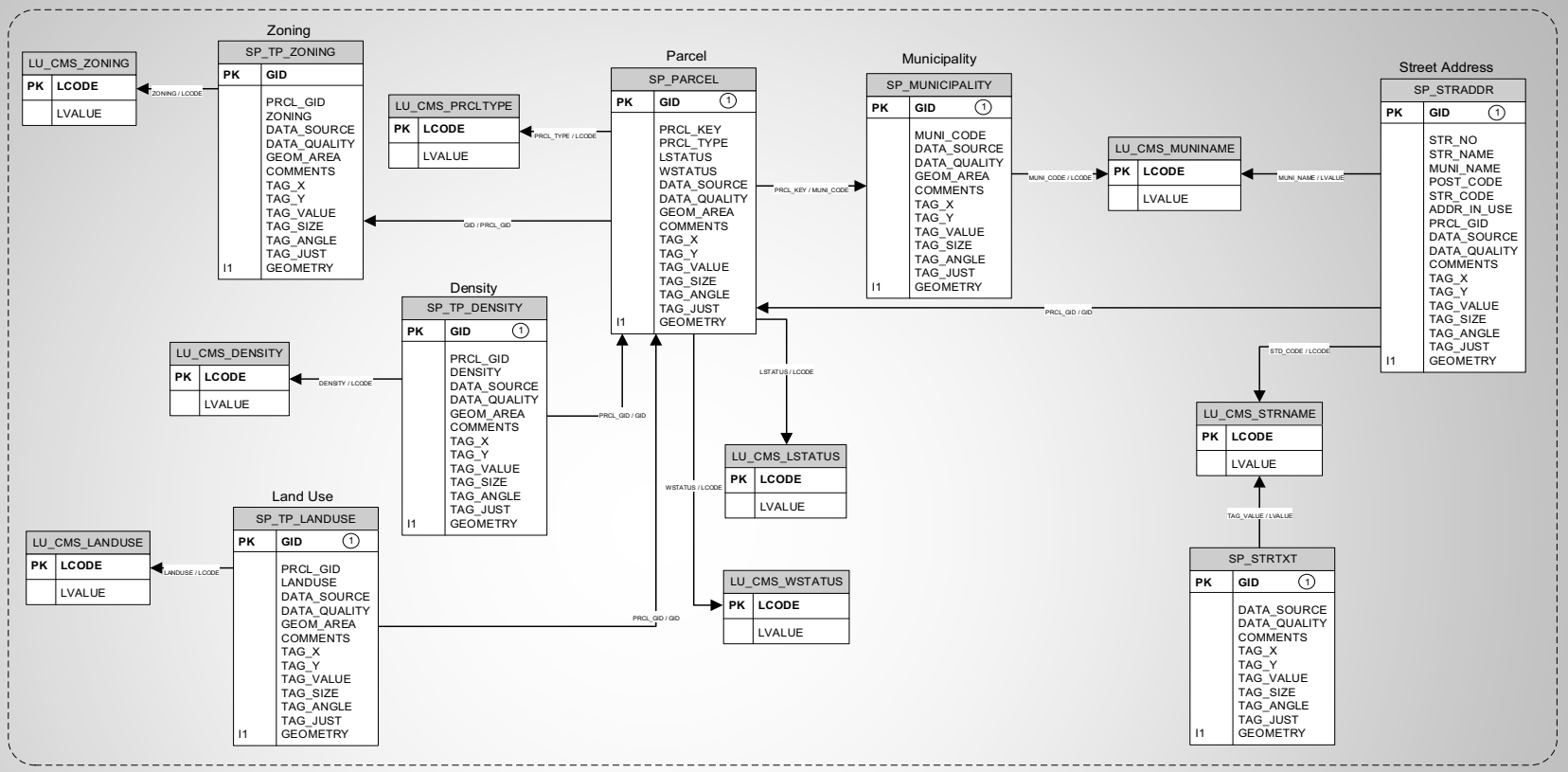
Spatial Tables (Prefixed with SP_)
All Spatial Tables contain a default set of columns:

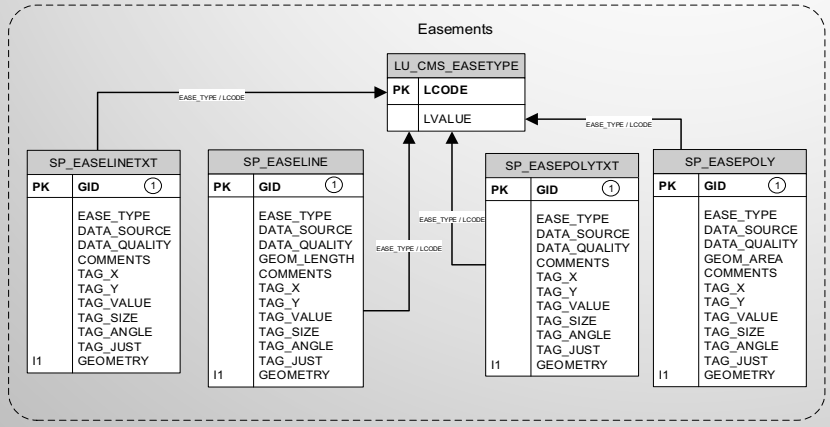
- GID — Geographical Identifier
- TAG_ — Tag related columns (Prefix)
- GEOMETRY — Spatial Object Geometry

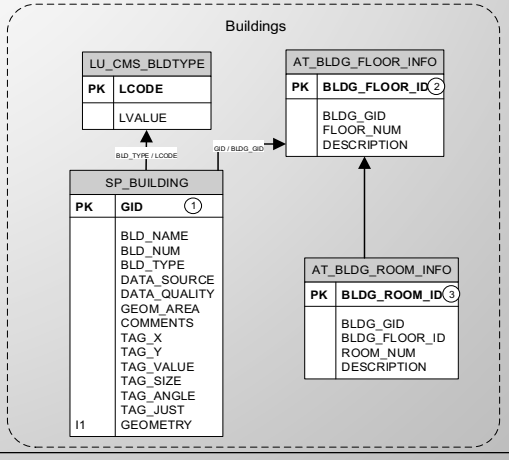
Lookup Tables (Prefixed with LU_)
Only two columns are used for lookup tables. The LCODE column is used for the lookup code and LVALUE is used for the lookup description.

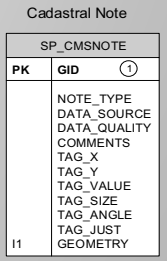
List of Sequences

Reference Number	Names
1	MUNSEQ_GID
2	CMS_BLDGFLOOR
3	CMS_BLDGROOM

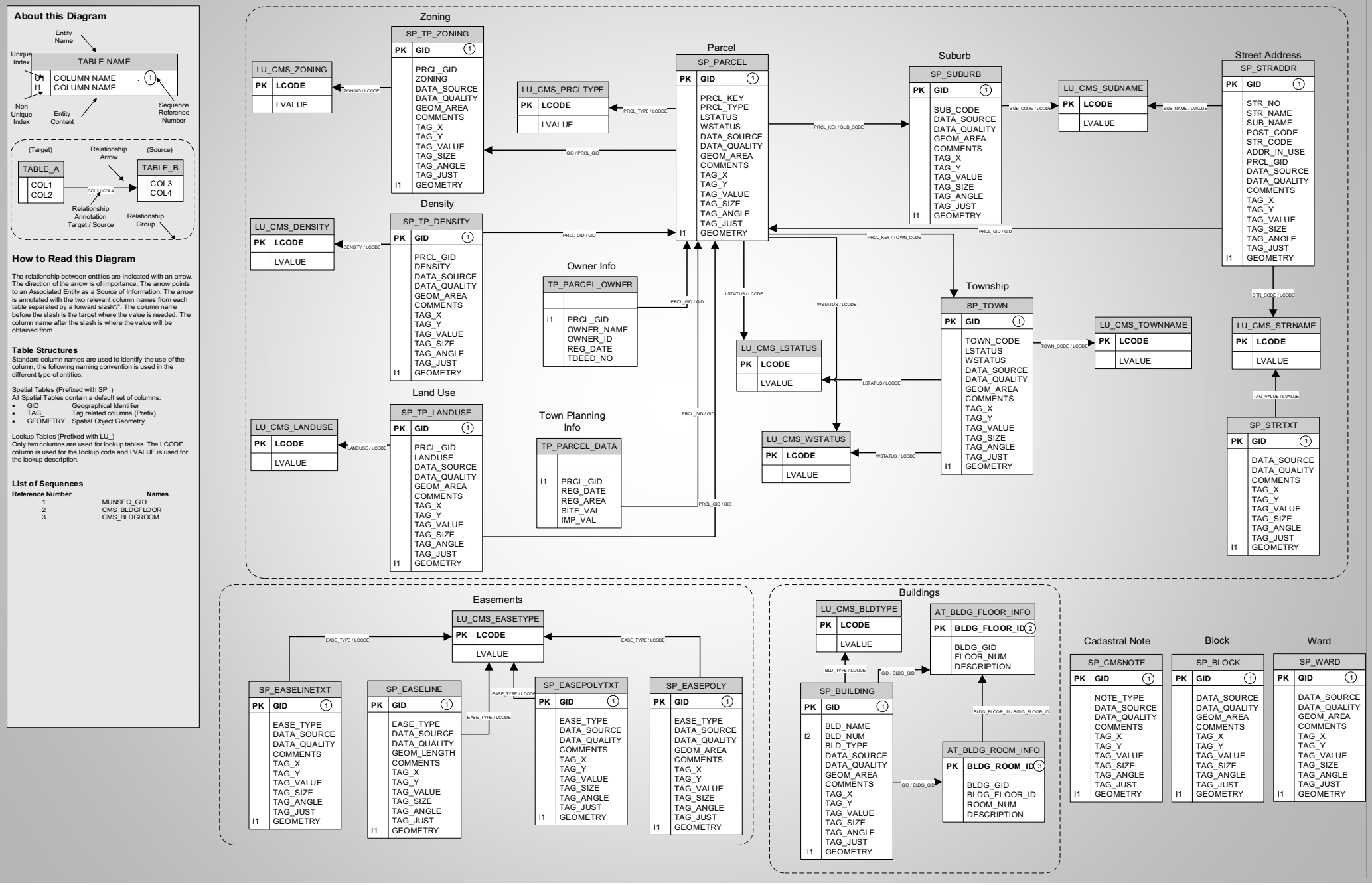




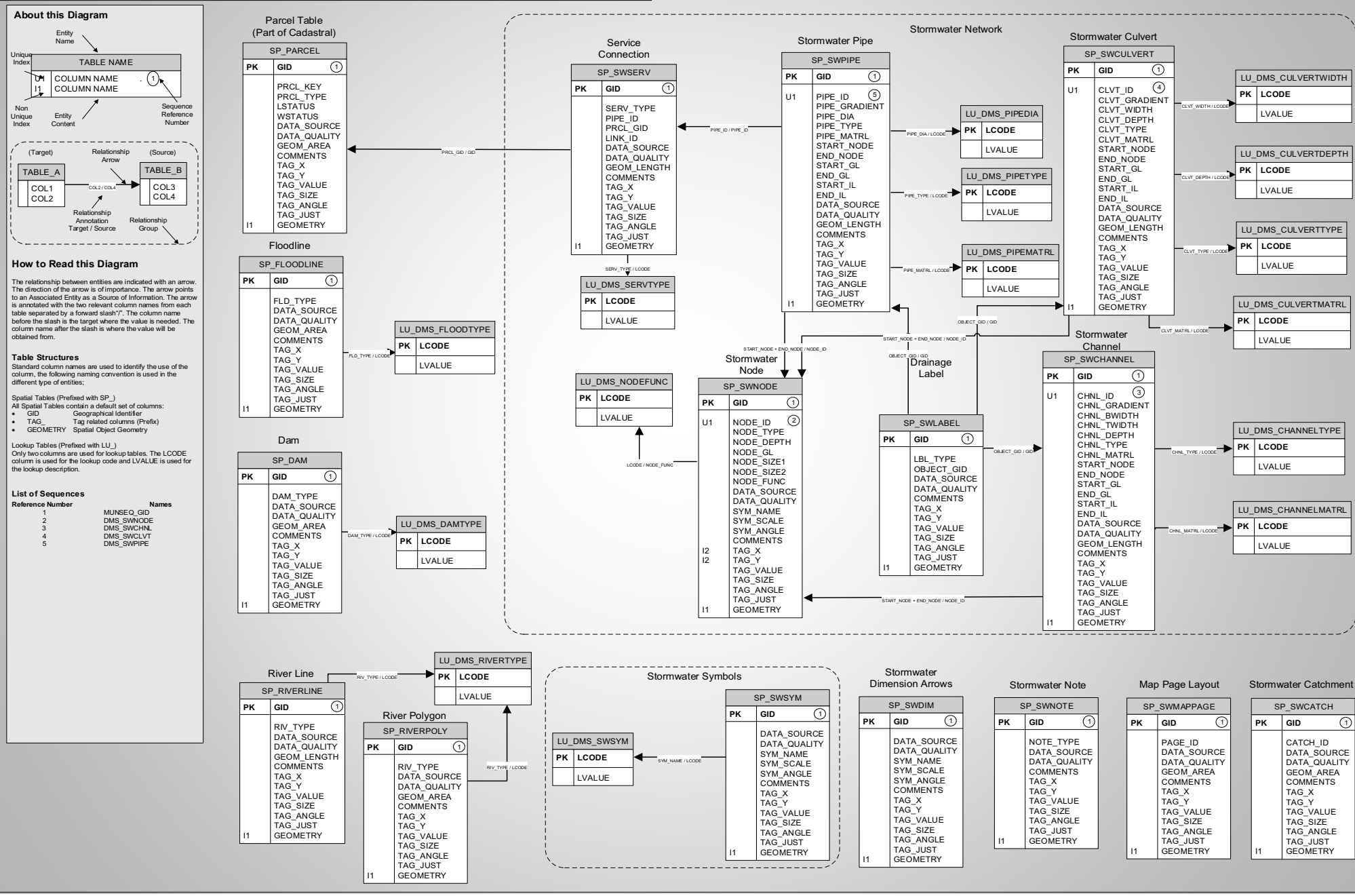




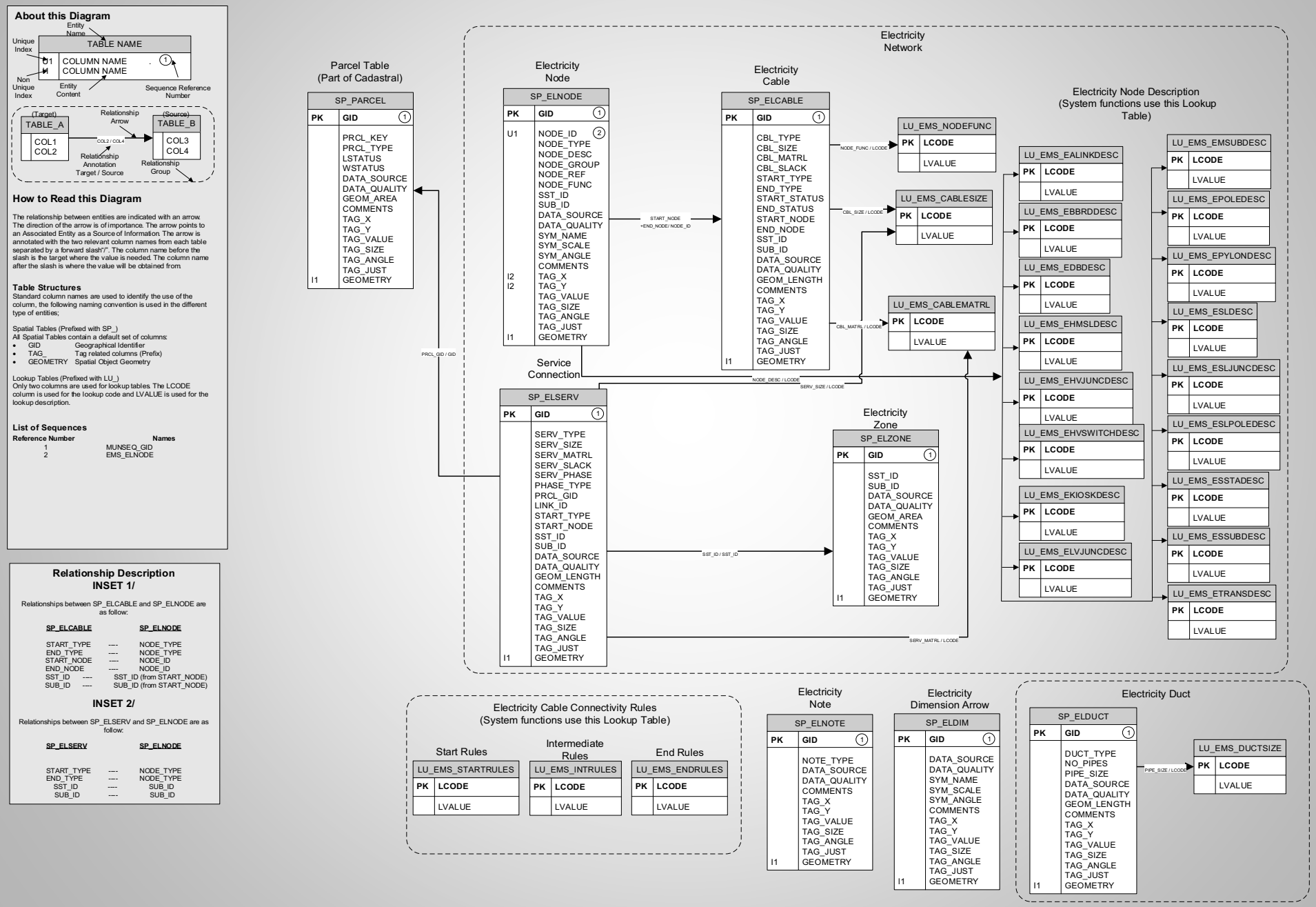
Munsys Cadastral Data Model (Release 14 INT)



Munsys Drainage Data Model (Release 14 INT / US)

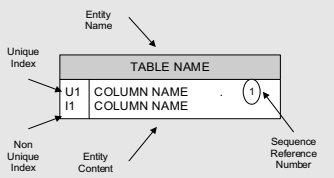


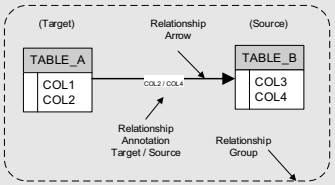
Munsys Electricity Data Model (Release 14 INT / US)



Munsys Map Book Data Model (Release 14 INT / US)

About this Diagram





How to Read this Diagram

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Table Structures

Standard column names are used to identify the use of the column, the following naming convention is used in the different type of entities;

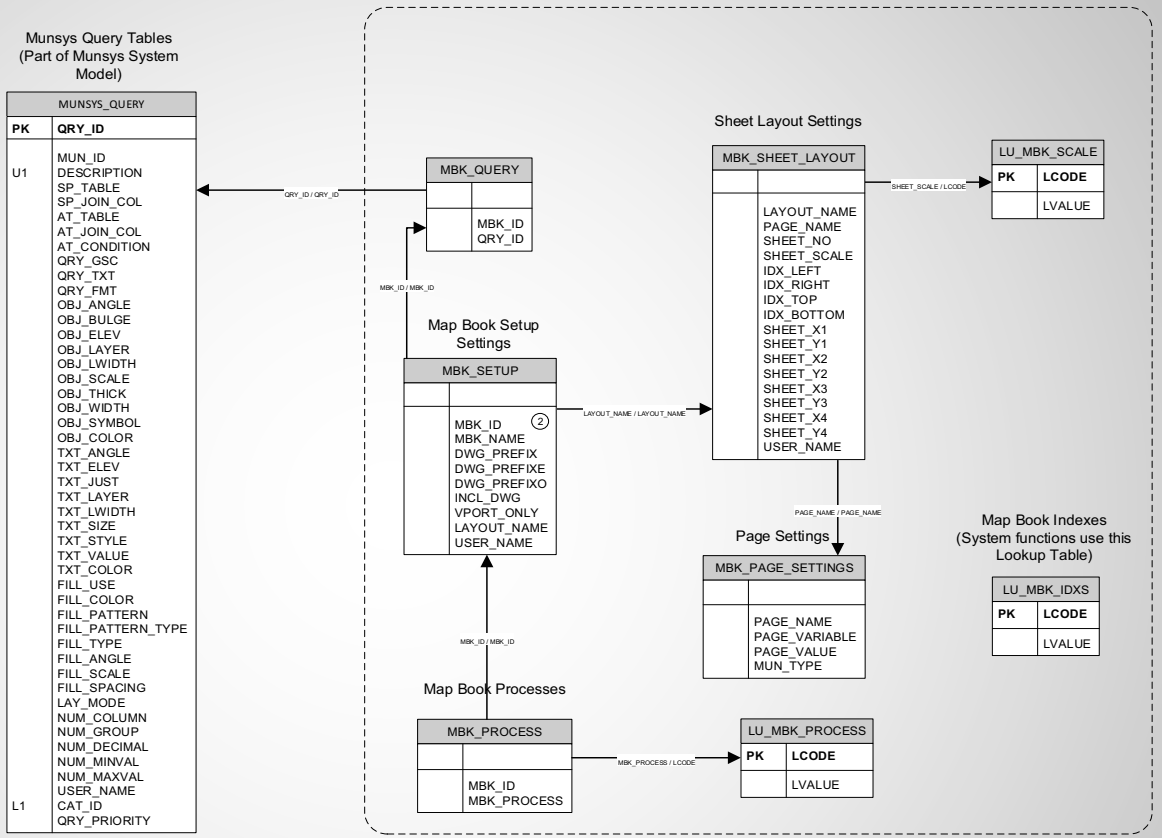
Spatial Tables (Prefixed with SP_)
All Spatial Tables contain a default set of columns:

- GID Geographical Identifier
- TAG_ Tag related columns (Prefix)
- GEOMETRY Spatial Object Geometry

Lookup Tables (Prefixed with LU_)
Only two columns are used for lookup tables. The LCODE column is used for the lookup code and LVALUE is used for the lookup description.

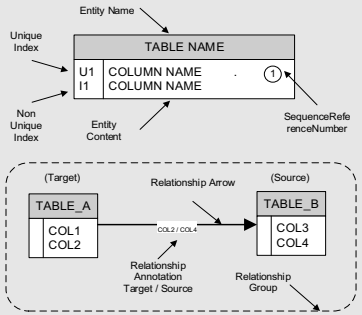
List of Sequences

Reference Number	Names
1	MUNSEQ_GID
2	MBK_ID



Munsys Roads Data Model (Release 14 INT / US)

About this Diagram



How to Read this Diagram

The relationship between entities are indicated with an arrow. The direction of the arrow is of importance. The arrow points to an Associated Entity as a Source of Information. The arrow is annotated with the two relevant column names from each table separated by a forward slash"/". The column name before the slash is the target where the value is needed. The column name after the slash is where the value will be obtained from.

Table Structures

Standard column names are used to identify the use of the column, the following naming convention is used in the different type of entities;

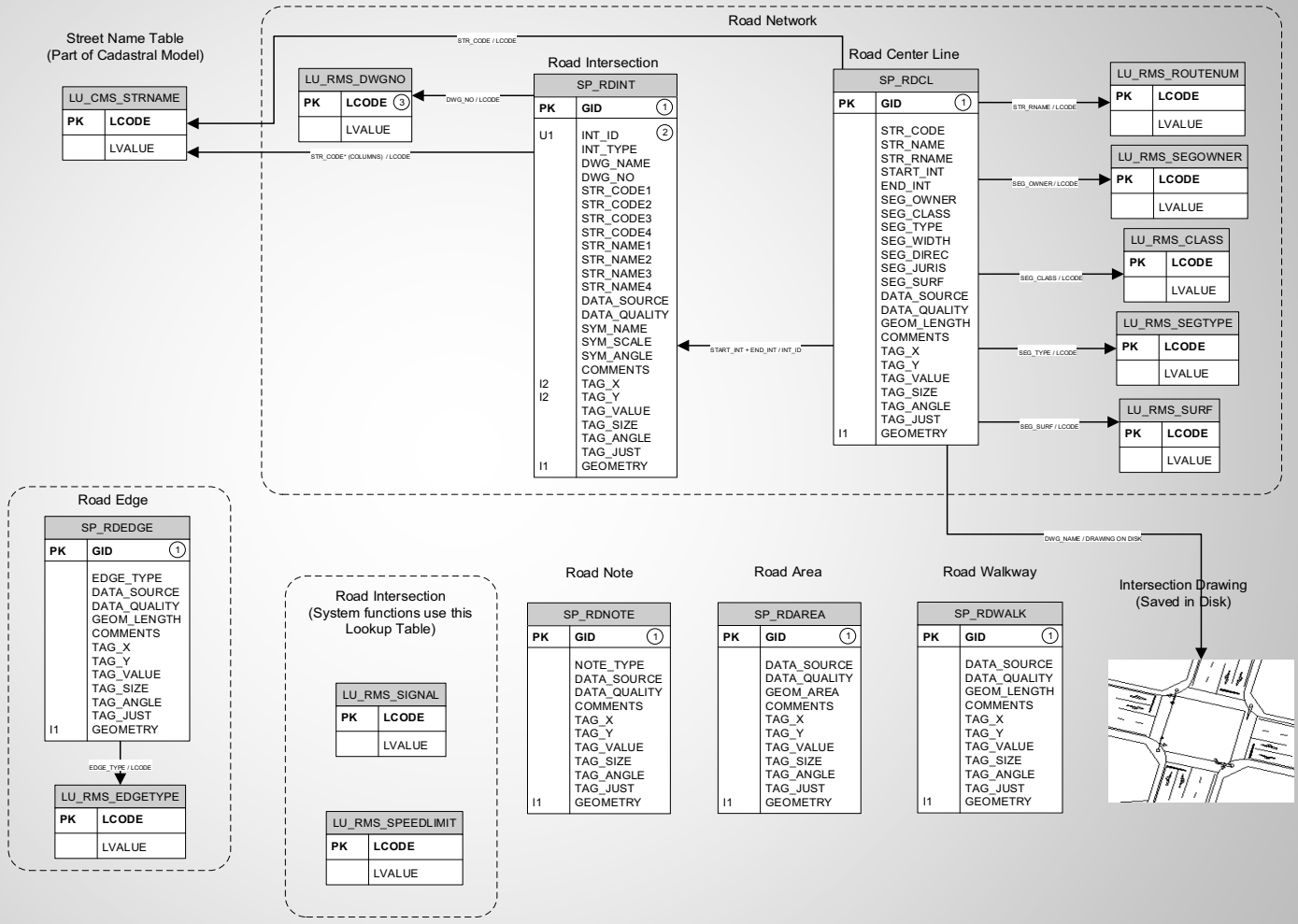
Spatial Tables (Prefixed with SP_)
All Spatial Tables contain a default set of columns:

- GID Geographical Identifier
- TAG_ Tag related columns (Prefix)
- GEOMETRY Spatial Object Geometry

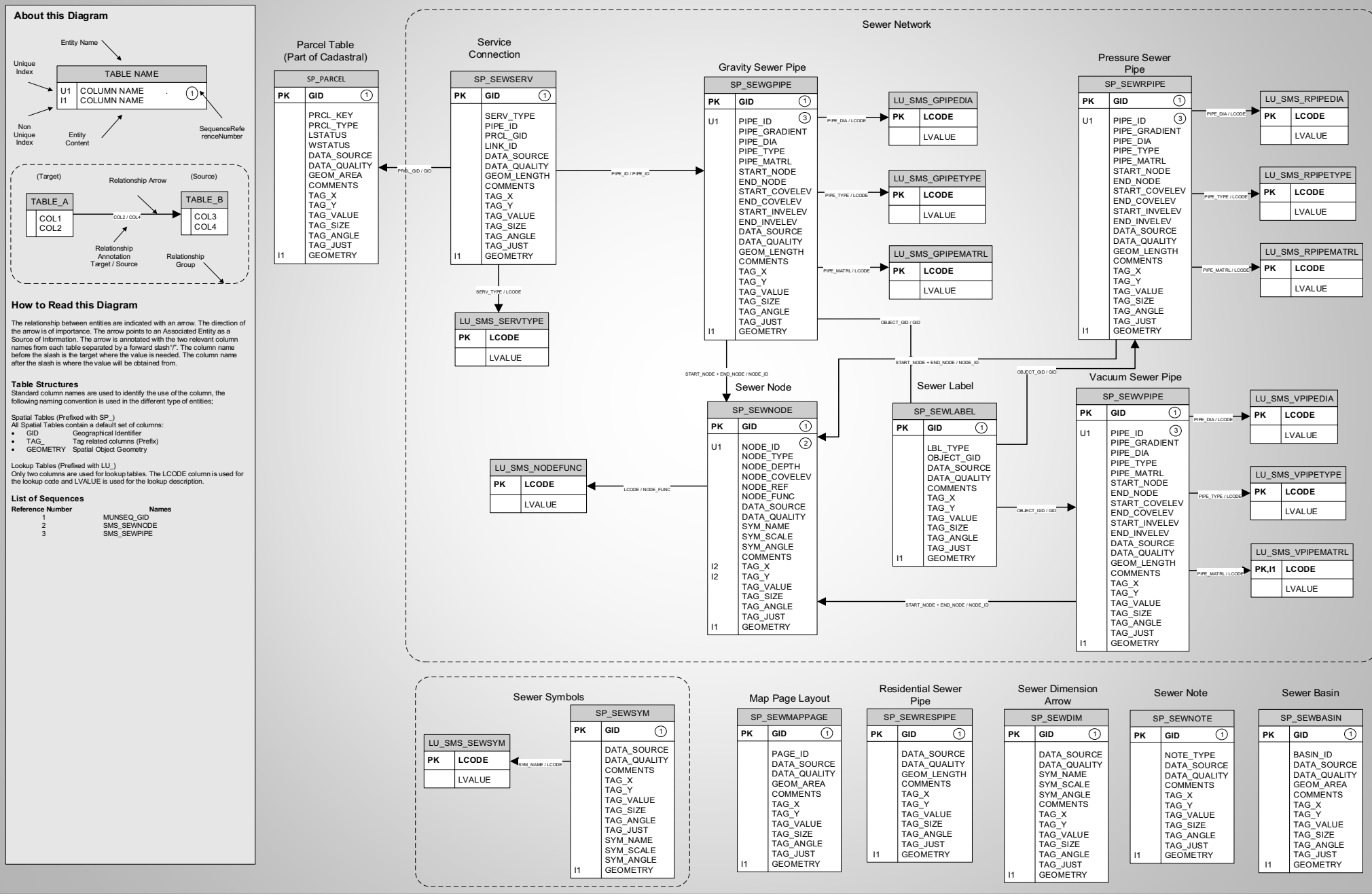
Lookup Tables (Prefixed with LU_)
Only two columns are used for lookup tables. The LCODE column is used for the lookup code and LVALUE is used for the lookup description.

List of Sequences

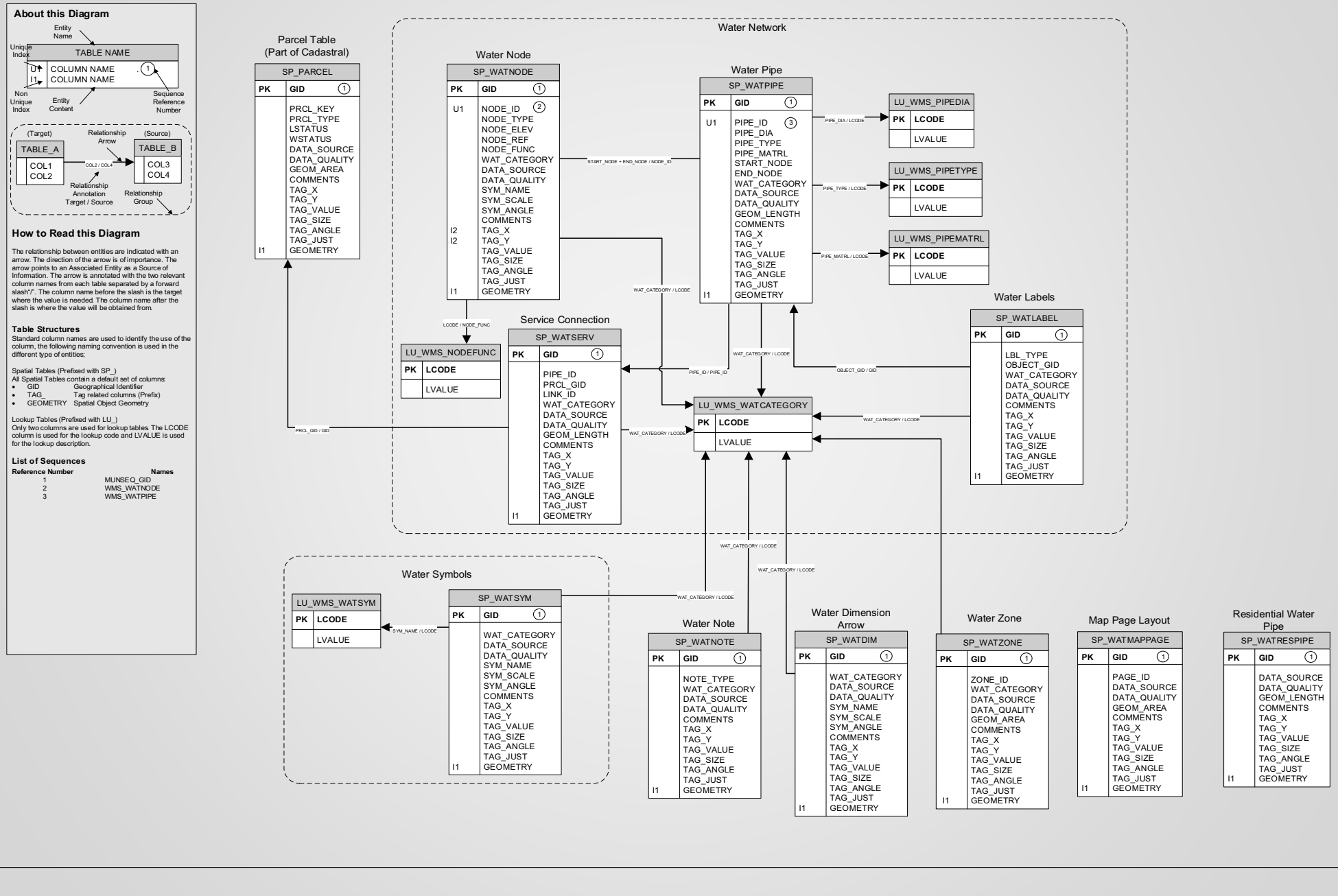
Reference Number	Names
1	MUNSEQ_GID
2	RMS_INTMARK
3	RMS_INTDWG



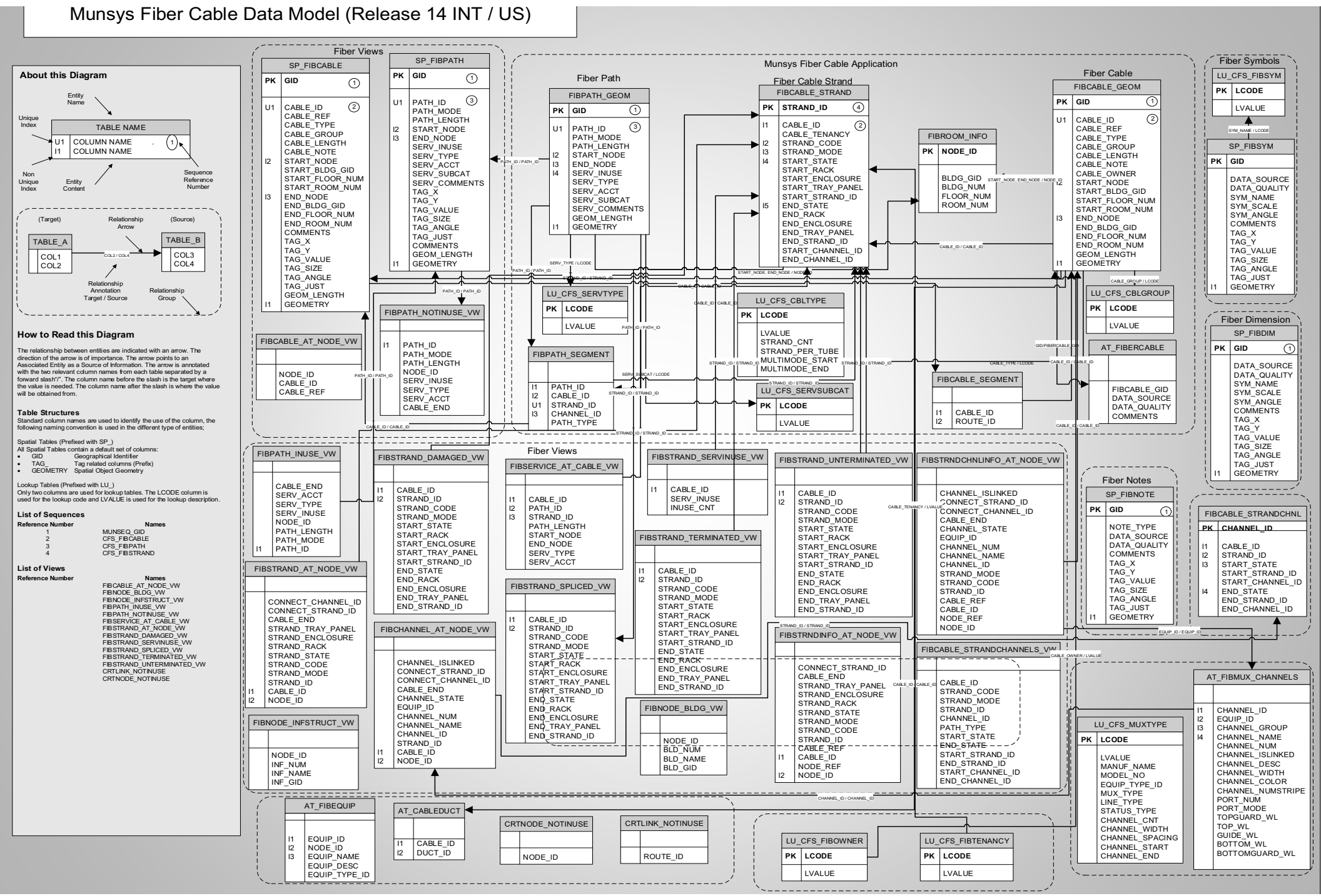
Munsys Sewer Data Model (Release 14 INT / US)



Munsys Water Data Model (Release 14 INT / US)

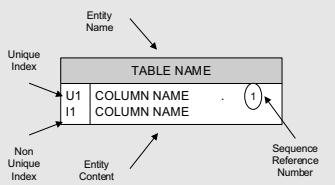


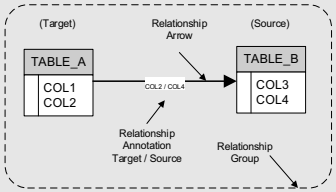
Munsys Fiber Cable Data Model (Release 14 INT / US)



Munsys Cable Route Data Model (Release 14 INT / US)

About this Diagram





How to Read this Diagram

The relationship between entities are indicated with an arrow. The direction of the arrow is of importance. The arrow points to an Associated Entity as a Source of Information. The arrow is annotated with the two relevant column names from each table separated by a forward slash'/'. The column name before the slash is the target where the value is needed. The column name after the slash is where the value will be obtained from.

Table Structures
Standard column names are used to identify the use of the column, the following naming convention is used in the different type of entities;

Spatial Tables (Prefixed with SP_)
All Spatial Tables contain a default set of columns:
- GID — Geographical Identifier
- TAG_ — Tag related columns (Prefix)
- GEOMETRY — Spatial Object Geometry

Lookup Tables (Prefixed with LU_)
Only two columns are used for lookup tables. The LCODE column is used for the lookup code and LVALUE is used for the lookup description.

List of Sequences

Reference Number	Names
1	MUNSEQ_GID
2	CRS_CRTDUCT
3	CRS_CRTLINK
4	CRS_CRTNODE
5	CRS_CRTINF

List of Views

Reference Number	Names
	CBLROUTE_AT_NODE

Cable Route Notes

SP_CRTNOTE

PK	GID (1)
	NOTE_TYPE
	DATA_SOURCE
	DATA_QUALITY
	COMMENTS
	TAG_X
	TAG_Y
	TAG_VALUE
	TAG_SIZE
	TAG_ANGLE
	TAG_JUST
I1	GEOMETRY

Cable Route Dimension

SP_CRTDIM

PK	GID (1)
	DATA_SOURCE
	DATA_QUALITY
	SYM_NAME
	SYM_SCALE
	SYM_ANGLE
	COMMENTS
	TAG_X
	TAG_Y
	TAG_VALUE
	TAG_SIZE
	TAG_ANGLE
	TAG_JUST
I1	GEOMETRY

Cable Route View

CBLROUTE_AT_NODE

	NODE_ID
	NODE_REF
	ROUTE_ID

Munsys Cable Route Application

Cable Route Labels

SP_CRTLABEL

PK	GID (1)
	LBL_TYPE
	OBJECT_GID
	DATA_SOURCE
	DATA_QUALITY
	COMMENTS
	TAG_X
	TAG_Y
	TAG_VALUE
	TAG_SIZE
	TAG_ANGLE
	TAG_JUST
I1	GEOMETRY

OBJECT_GID / GID

Munsys Cable Route Links

SP_CRTLINK

PK	GID (1)
U1	ROUTE_ID (3)
	ROUTE_TYPE
I2	START_NODE
I3	END_NODE
	OWNER
	STATUS
	STATE
	DATA_SOURCE
	DATA_QUALITY
	GEOM_LENGTH
	COMMENTS
	TAG_X
	TAG_Y
	TAG_VALUE
	TAG_SIZE
	TAG_ANGLE
	TAG_JUST
I1	GEOMETRY

START_NODE, END_NODE / NODE_ID

Munsys Cable Route Nodes

SP_CRTNODE

PK	GID (1)
U1	NODE_ID (4)
	NODE_TYPE
	NODE_REF
	OWNER
	STATUS
	STATE
	NODE_FUNC
	DATA_SOURCE
	DATA_QUALITY
	LINK_TYPE
	LINK_ID
	SYM_NAME
	SYM_SCALE
	SYM_ANGLE
	COMMENTS
	TAG_X
	TAG_Y
	TAG_VALUE
	TAG_SIZE
	TAG_ANGLE
	TAG_JUST
I1	GEOMETRY

NODE_FUNC / LCODE

LU_CRS_NODEFUNC

PK	LCODE
	LVALUE

LU_CRS_CRTTYPE

PK	LCODE
	LVALUE

LU_CRS_CRTSTATE

PK	LCODE
	LVALUE

LU_CRS_CRTOWNER

PK	LCODE
	LVALUE

LU_CRS_CRTSTATUS

PK	LCODE
	LVALUE

ROUTE_ID / ROUTE_ID
STATE / LCODE
STATE / STATE
OWNER / LCODE
STATUS /LCODE
ROUTE_ID / ROUTE_ID
NODE_ID / NODE_ID

Munsys Cable Route Infrastructure

LU_CRS_INFTYPE

PK	LCODE
	LVALUE

INF_TYPE /LCODE

SP_CRTINFSTRUCT

PK	GID (1)
U1	INF_ID (5)
I2	INF_NAME
	INF_NUM
	INF_TYPE
	DATA_SOURCE
	DATA_QUALITY
	GEOM_AREA
	COMMENTS
	TAG_X
	TAG_Y
	TAG_VALUE
	TAG_SIZE
	TAG_ANGLE
	TAG_JUST
I1	GEOMETRY

Munsys Cable Route Symbols

LU_CRS_CRTSYM

PK	LCODE
	LVALUE

Cable Route Symbols

SYM_NAME / LCODE

SP_CRTSYM

PK	GID (1)
	DATA_SOURCE
	DATA_QUALITY
	SYM_NAME
	SYM_SCALE
	SYM_ANGLE
	COMMENTS
	TAG_X
	TAG_Y
	TAG_VALUE
	TAG_SIZE
	TAG_ANGLE
	TAG_JUST
I1	GEOMETRY

Munsys Cable Route Ducts

LU_CRS_CRTDUCTCOLOR

PK	LCODE
	LVALUE

DUCT_COLOR / LCODE

Cable Route Ducts

AT_CRTDUCT

PK	DUCT_ID (2)
I1	ROUTE_ID (3)
I2	PARENT_DUCT_ID
	DUCT_NAME
	DESCRIPTION
	DUCT_TYPE
	DUCT_SIZE
	DUCT_COLOR

LU_CRS_CRTDUCTSIZE

PK	LCODE
	LVALUE

DUCT_SIZE / LCODE

DUCT_TYPE / LCODE

LU_CRS_CRTDUCTTYPE

PK	LCODE
	LVALUE