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TU Delft

3DCityDB Tools for QGIS

Quick installation and user guide

Version 0.8.3

Last update: 11 August 2023

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IDEA:

- **CityGML 3D City Database:** Why not letting users benefit from *directly* working with the 3DCityDB?
  - No need to work with files
  - Editing of features attributes could become way easier
  - SQL/relational model are rather well-known in and outside the GIS user community
  - Last but not least.... "3D city models belong best in a database" ☺

The CityGML Database
3D City DB

Motivation

BUT:

- 3DCityDB structure is rather complex
  - Lots of nested tables, intricate structure
  - Data management is difficult, although some functions are provided (e.g. delete functions)
  - There can be multiple citydb schemas in the same database instance (aka "scenarios")

- CityGML does not follow the Simple Feature for SQL model (SFS)
  - Nested features
  - One feature can have multiple representations (multiple LoDs, multiple geometry types)

- The existing **Importer/Exporter** offers some functionalities, but its *raison d'être* is basically different (...as the name says!)

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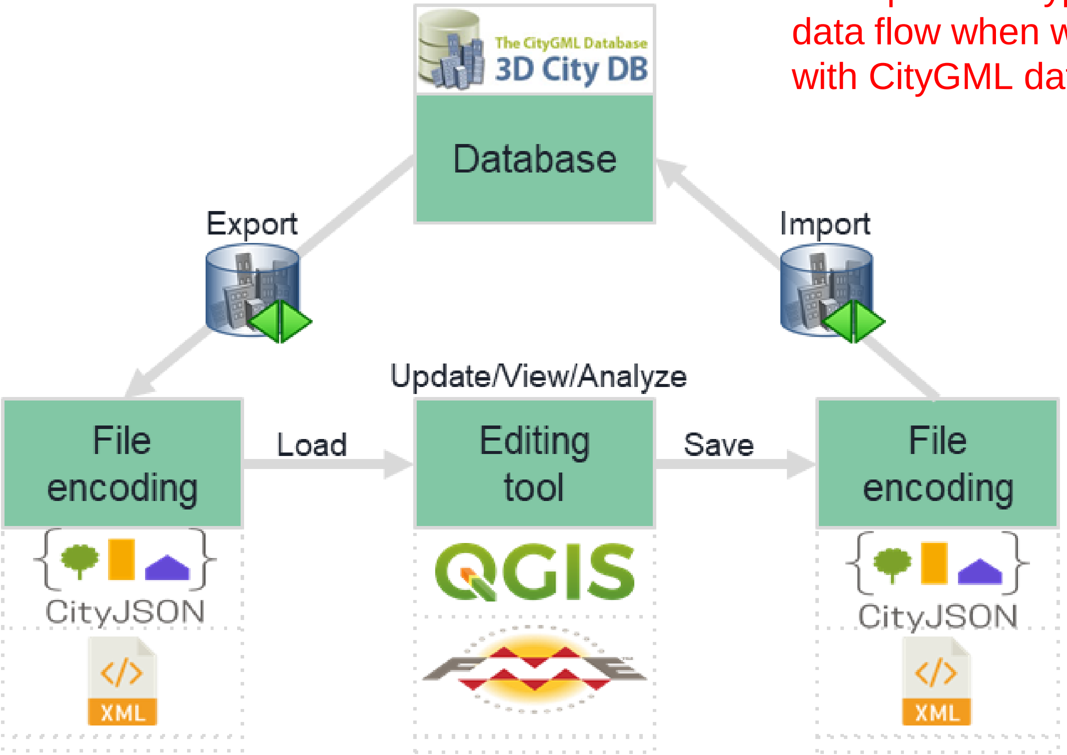
Motivation

SO:

- Why not using **QGIS**?
  - Well-known and established open-source software
  - Rather mature, version 3.28 LTR released in autumn 2022, well documented
  - Native support for PostgreSQL/PostGIS, and for Oracle Spatial
  - Has strong 2D and some (less mature) 3D visualisation functionalities
  - Can be extended with Python-based plugins

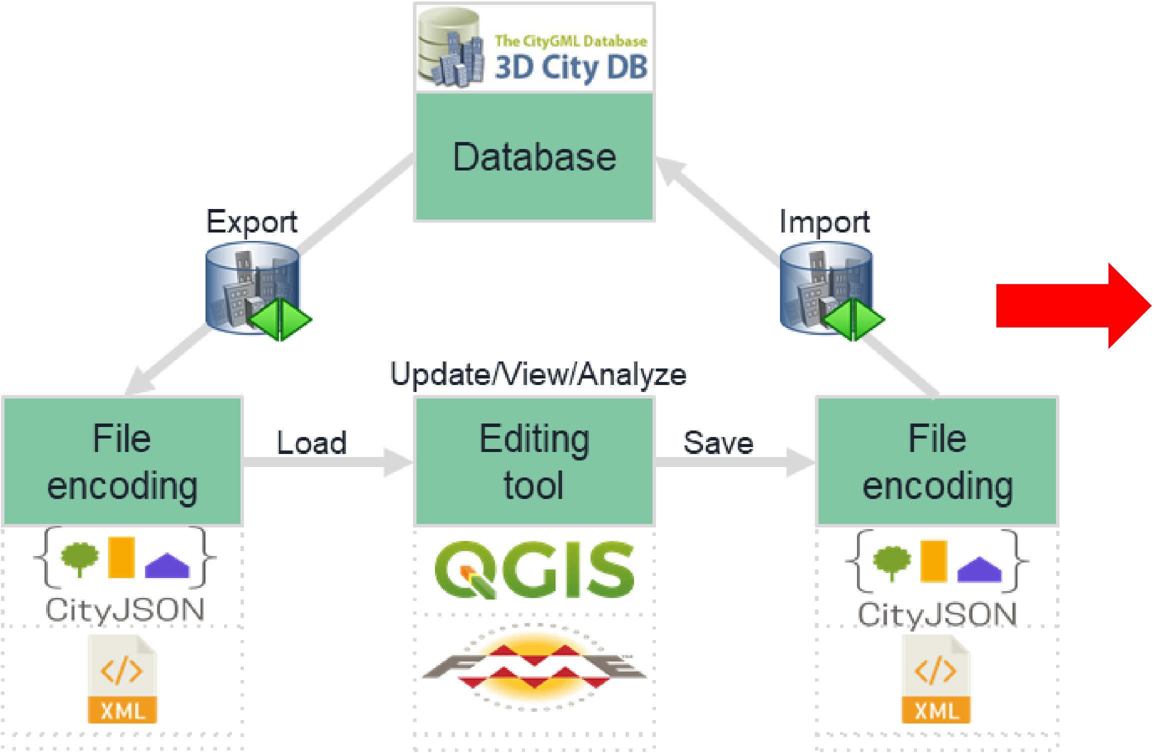
Motivation

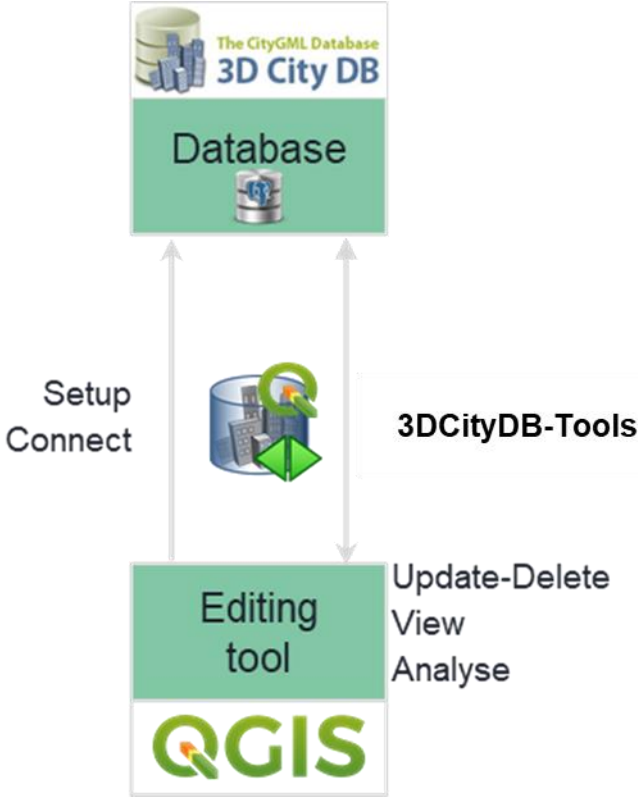


Example of a "typical" data flow when working with CityGML data

Motivation

Vision / goal of the plugin





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Plugin overview

Main functionalities

- Create **"SFS-like layers"** to hide 3DCityDB complexity when interacting with data
  - Deal efficiently with multi-LoD / different geometries / implicit representations
    - Up to ≈600 possible combinations in CityGML!
  - Merge all standard attributes of a CityObject into a single "table"
- **Deal with** the possibly *huge* **size of city models** stored in a database
- Support for **multiple citydb schemas** in the same 3DCityDB instance
- Support for **multiple users** with **different privileges** (read-only, read-write)
- **Editing of attributes**: possible (depending on user privileges)
- **Deletion of features**: possible (depending on user privileges)
- Editing of geometries: NOT possible

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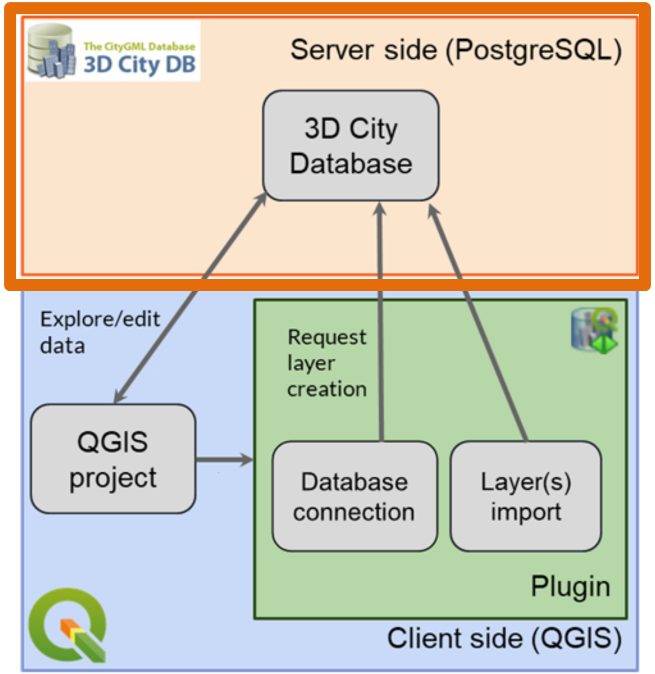
Server-side

PostgreSQL "QGIS Package"

- Creates and manages layers as views (for attributes) linked to materialized views (for geometry) following the SFS model
- Manages
  - users and privileges
  - multiple citydb schemas
- Adds default users with ro & rw privileges



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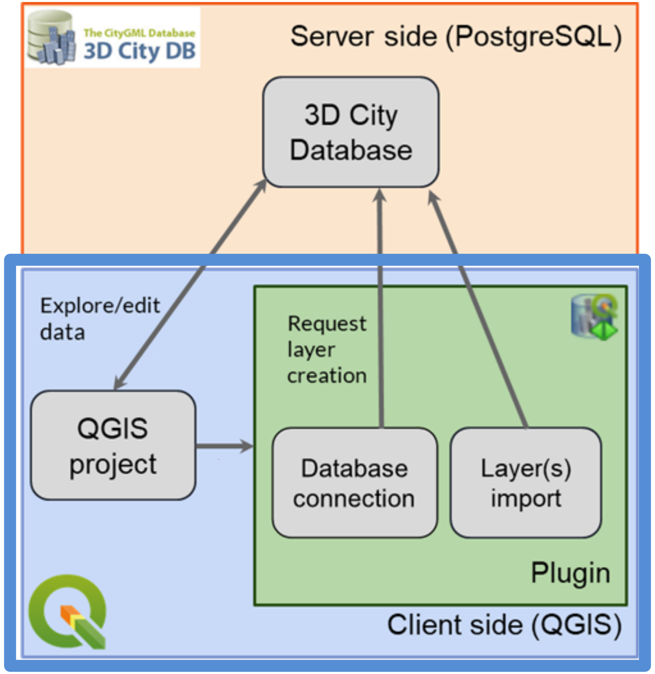
Client-side
QGIS plugin "3DCityDB-Tools"

- Manages database connections + installation of the **QGIS Package**
- Allows for GUI-based
  - layer creation and management
  - management of multiple citydb schemas
  - editing of feature attributes
- GUI includes
  - support for children tables (e.g. generic attributes)
  - CityGML enumerations
  - Codelists
- Creates a hierarchical Table of Contents



IMPORTANT NOTICE

The following slides assume that you are already familiar with the **3DCityDB Suite**
In particular you should:

- Have an already installed 3DCityDB database instance
- Be able to use the 3DCityDB Importer/Exporter
- Be able to import CityGML data into the 3DCityDB
- (Optionally) be able to create additional citydb schemas

Otherwise:

- Refer to the slides in "**3DCityDB_Suite_QuickInstall.pdf**" (also in the same folder of this file) and/or
- Follow the tutorial: https://github.com/3dcitydb/tutorials

Last but not least...

- You may profit from a basic knowledge of the main CityGML concepts ☺
- Otherwise, here a crash course for free: http://www.urbangeobigdata.it/?p=195

Installation

Software requirements

- CityGML 3D City Database **v. 4.x** for PostgreSQL
  - https://github.com/3dcitydb/3dcitydb-suite/releases
  - https://3dcitydb-docs.readthedocs.io/en/latest/
  - **BEWARE:** 3DCityDB v. 3.x and older are NOT supported!
- PostgreSQL **v. 10 or higher,** PostGIS **v. 2.0 or higher**
  - https://www.postgresql.org/download/
  - **BEWARE:** NOT compatible with older versions
- QGIS **v. 3.22 LTR or v. 3.28 LTR**
  - https://qgis.org/en/site/forusers/download.html
  - **BEWARE:** Not tested/not supported with other versions
- PgAdmin (suggested, not required)
  - https://www.pgadmin.org/download/

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Compatibility matrix

QGIS version	3DCityDB-Tools works?	Comments
QGIS 3.30, 3.32	✓	Should work, but not supported
QGIS 3.28 LTR	✓	**Works**
QGIS 3.26, 3.24	✓	Should work, but not supported
QGIS 3.22 LTR	✓	**Works. Reference version used for development**
QGIS 3.20	✗	May work, but not supported
QGIS 3.18	✗	"Import selected layers" button always disabled
QGIS 3.16 LTR	✗	User's GUI won't load. Issues with (outdated?) method QgsExtentGroupBox.setMapCanvas()

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Testing machines

Machines used for development and testing:

OS	Processor(s)	HD	RAM	PostgreSQL	PostGIS
Windows 10 21H2 64bit	Core I7-8650U 1.7 GHz	SSD 2 TB	32 GB	14, 64bit	3.2
Ubuntu 20.04.3 LTS 64bit	Intel i7-7500U (4) 3.500GHz	SSD 250 GB	8 GB	12, 64bit	3.1
Mac OS (11.6.2 64bit)	Core i9-9980HK	HDD 1TB	32 GB	14, 64bit	3.1
Ubuntu 18.4 LTS 64bit	Virtual Machine	HDD 2 TB	16 GB	10, 64bit	3.0
Windows 10 22H2 64bit	Core I7-8565U 1.8 GHz	SSD 250GB + HDD 1 TB	16 GB	15, 64 bit	3.1
Ubuntu 22.04 LTS 64bit	Virtual Machine	100 GB	8 GB	14, 64 bit	3.2

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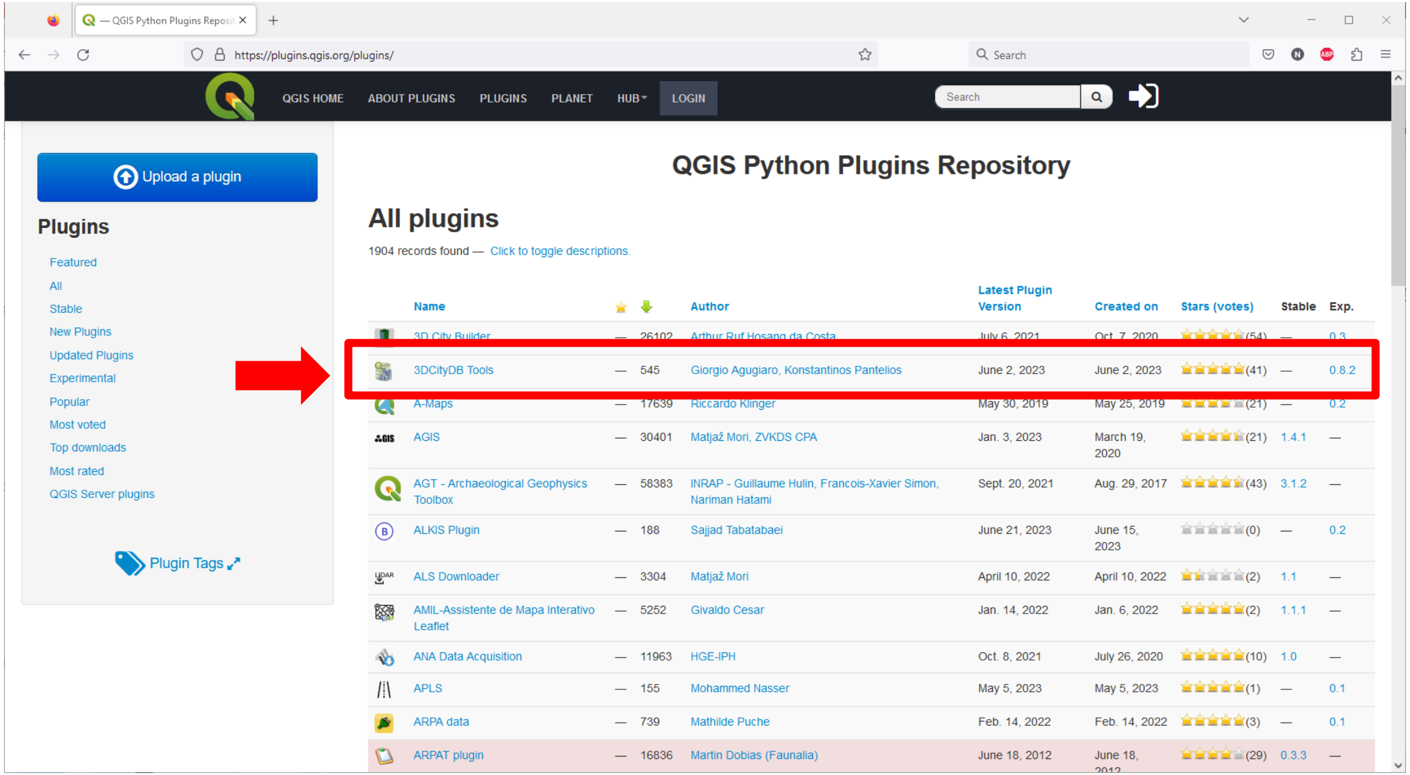
Installation via QGIS Plugins repository

Since version 0.8.2, the plugin is available also via the **QGIS Plugins repository**. This is the preferred (and easiest!) way to install it! Link: https://plugins.qgis.org/plugins/



QGIS Python Plugins Repository

Plugins

- Featured
- All
- Stable
- New Plugins
- Updated Plugins
- Experimental
- Popular
- Most voted
- Top downloads
- Most rated
- QGIS Server plugins

All plugins

1904 records found — Click to toggle descriptions.

Name	★	⬇	Author	Latest Plugin Version	Created on	Stars (votes)	Stable	Exp.
3D City Builder	—	26102	Arthur Ruf Hosang da Costa	July 6, 2021	Oct. 7, 2020	★★★★☆(54)	—	0.3
3DCityDB Tools	—	545	Giorgio Agugiaro, Konstantinos Pantelios	June 2, 2023	June 2, 2023	★★★★★(41)	—	0.8.2
A-Maps	—	17639	Riccardo Klinger	May 30, 2019	May 25, 2019	★★★★☆(21)	—	0.2
AGIS	—	30401	Matjaž Mori, ZVKDS CPA	Jan. 3, 2023	March 19, 2020	★★★★☆(21)	1.4.1	—
AGT - Archaeological Geophysics Toolbox	—	58383	INRAP - Guillaume Hulin, Francois-Xavier Simon, Nariman Hatami	Sept. 20, 2021	Aug. 29, 2017	★★★★☆(43)	3.1.2	—
ALKIS Plugin	—	188	Sajjad Tabatabaei	June 21, 2023	June 15, 2023	☆☆☆☆☆(0)	—	0.2
ALS Downloader	—	3304	Matjaž Mori	April 10, 2022	April 10, 2022	★★☆☆☆(2)	1.1	—
AMIL-Assistente de Mapa Interativo Leaflet	—	5252	Givaldo Cesar	Jan. 14, 2022	Jan. 6, 2022	★★★★★(2)	1.1.1	—
ANA Data Acquisition	—	11963	HGE-IPH	Oct. 8, 2021	July 26, 2020	★★★★★(10)	1.0	—
APLS	—	155	Mohammed Nasser	May 5, 2023	May 5, 2023	★★★★★(1)	—	0.1
ARPA data	—	739	Mathilde Puche	Feb. 14, 2022	Feb. 14, 2022	★★★★★(3)	—	0.1
ARPAT plugin	—	16836	Martin Dobias (Faunalia)	June 18, 2012	June 18, 2012	★★★★☆(29)	0.3.3	—

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Installation via QGIS Plugins repository

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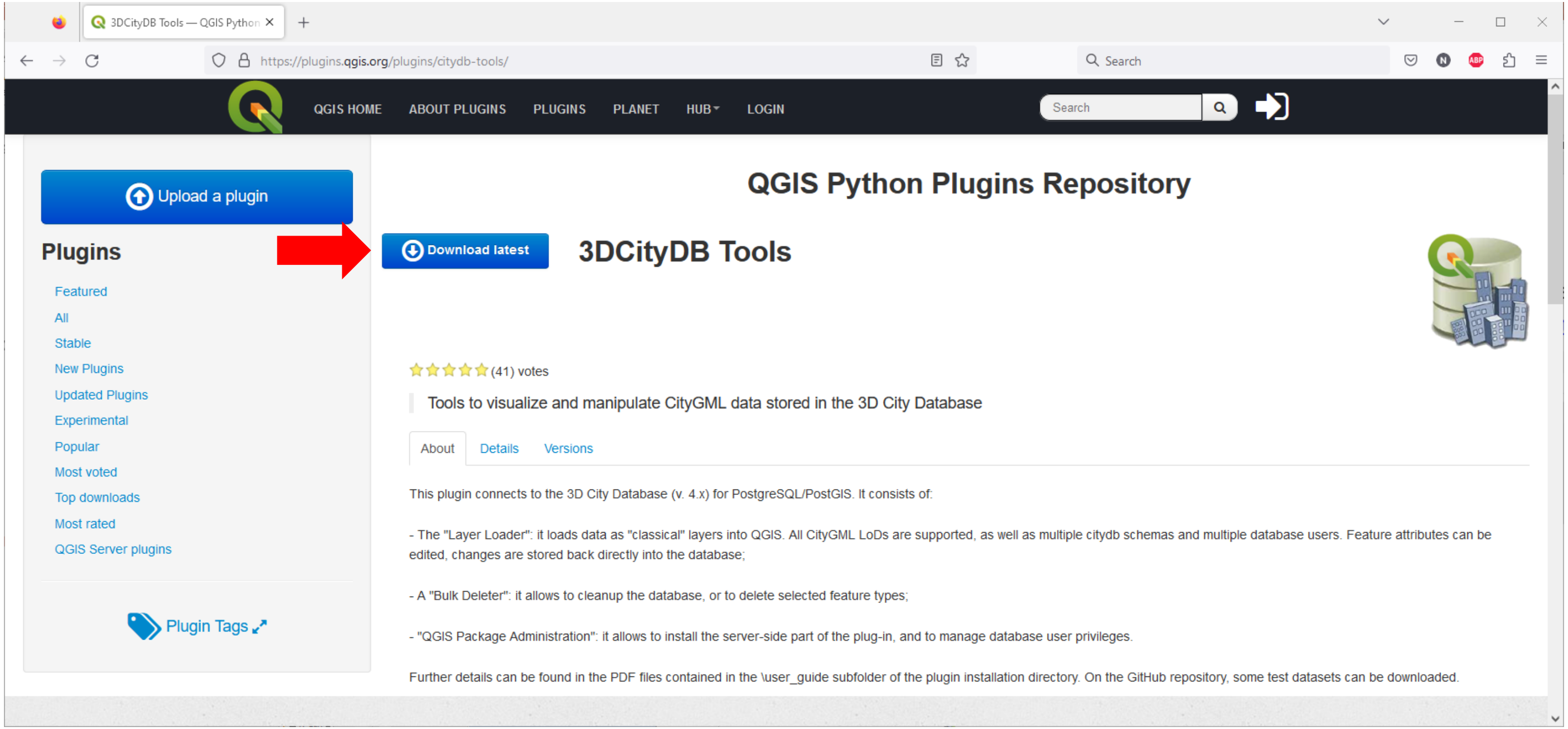
Simply select it, and download it. If QGIS is already installed, it will be loaded automatically to the right folder. Done! ☺



QGIS Python Plugins Repository

3DCityDB Tools

★★★★★ (41) votes

Tools to visualize and manipulate CityGML data stored in the 3D City Database

This plugin connects to the 3D City Database (v. 4.x) for PostgreSQL/PostGIS. It consists of:

- The "Layer Loader": it loads data as "classical" layers into QGIS. All CityGML LoDs are supported, as well as multiple citydb schemas and multiple database users. Feature attributes can be edited, changes are stored back directly into the database;

- A "Bulk Deleter": it allows to cleanup the database, or to delete selected feature types;

- "QGIS Package Administration": it allows to install the server-side part of the plug-in, and to manage database user privileges.

Further details can be found in the PDF files contained in the \user_guide subfolder of the plugin installation directory. On the GitHub repository, some test datasets can be downloaded.

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Manual installation

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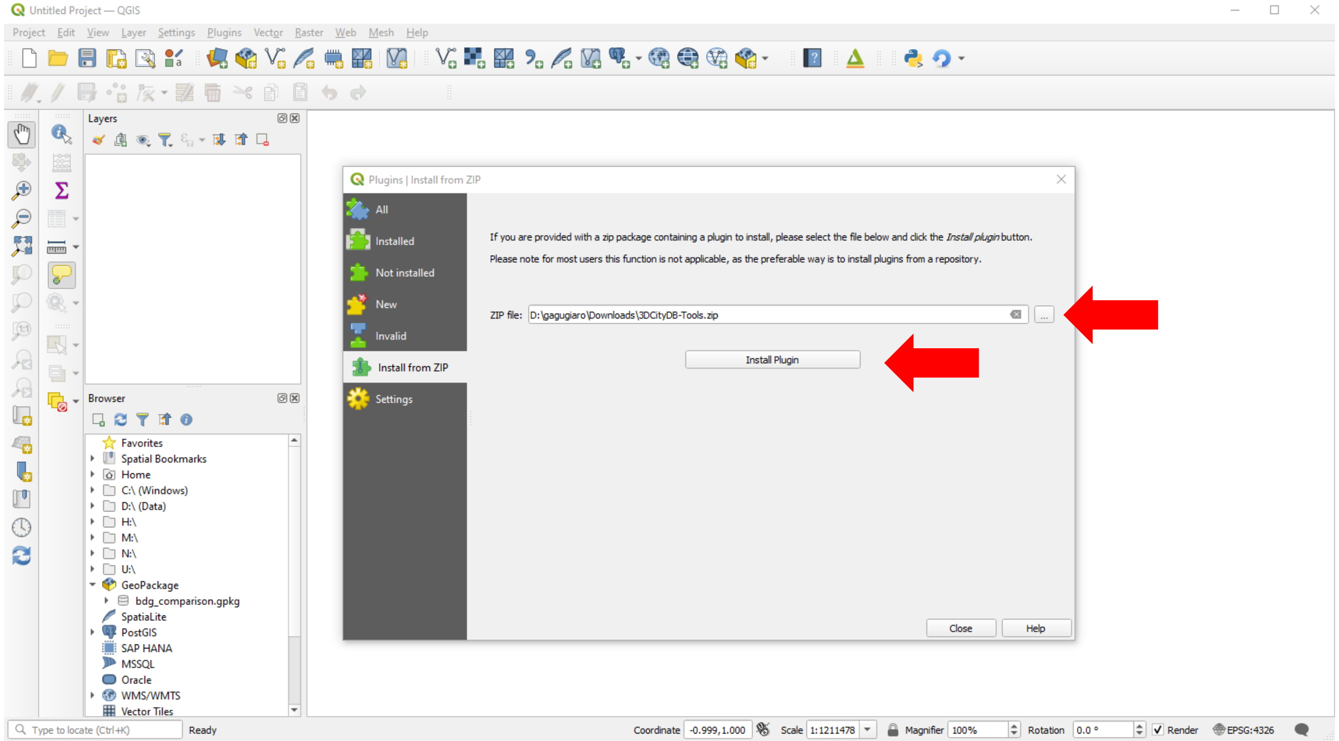
- The plugin is available also as **zip file** from the **GitHub repository**
- In QGIS, open the Plugins\Manage and install plugins window, and choose "Install from ZIP". Select the zip file and click the "Install Plugin" button



If you are provided with a zip package containing a plugin to install, please select the file below and click the *Install plugin* button.

Please note for most users this function is not applicable, as the preferable way is to install plugins from a repository.

ZIP file: D:\gagugiaro\Downloads\3DCityDB-Tools.zip

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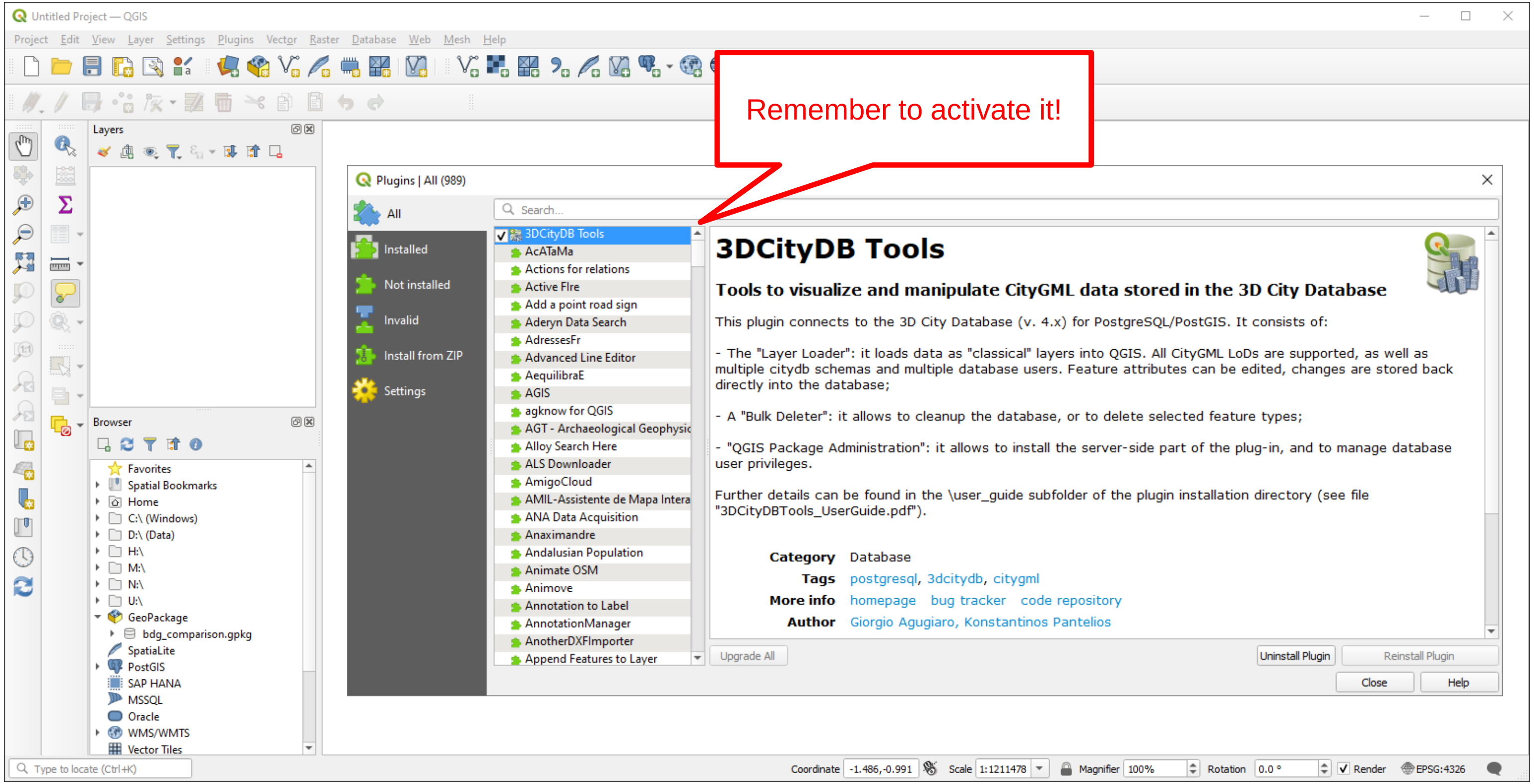
Manual installation

- Upon installation, you must activate the plugin


Remember to activate it!

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Tools to visualize and manipulate CityGML data stored in the 3D City Database

This plugin connects to the 3D City Database (v. 4.x) for PostgreSQL/PostGIS. It consists of:

- The "Layer Loader": it loads data as "classical" layers into QGIS. All CityGML LoDs are supported, as well as multiple citydb schemas and multiple database users. Feature attributes can be edited, changes are stored back directly into the database;

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- "QGIS Package Administration": it allows to install the server-side part of the plug-in, and to manage database user privileges.

Further details can be found in the \user_guide subfolder of the plugin installation directory (see file "3DCityDBTools_UserGuide.pdf").

Category	Database
Tags	postgresql, 3dcitydb, citygml
More info	homepage bug tracker code repository
Author	Giorgio Agugiaro, Konstantinos Pantelios

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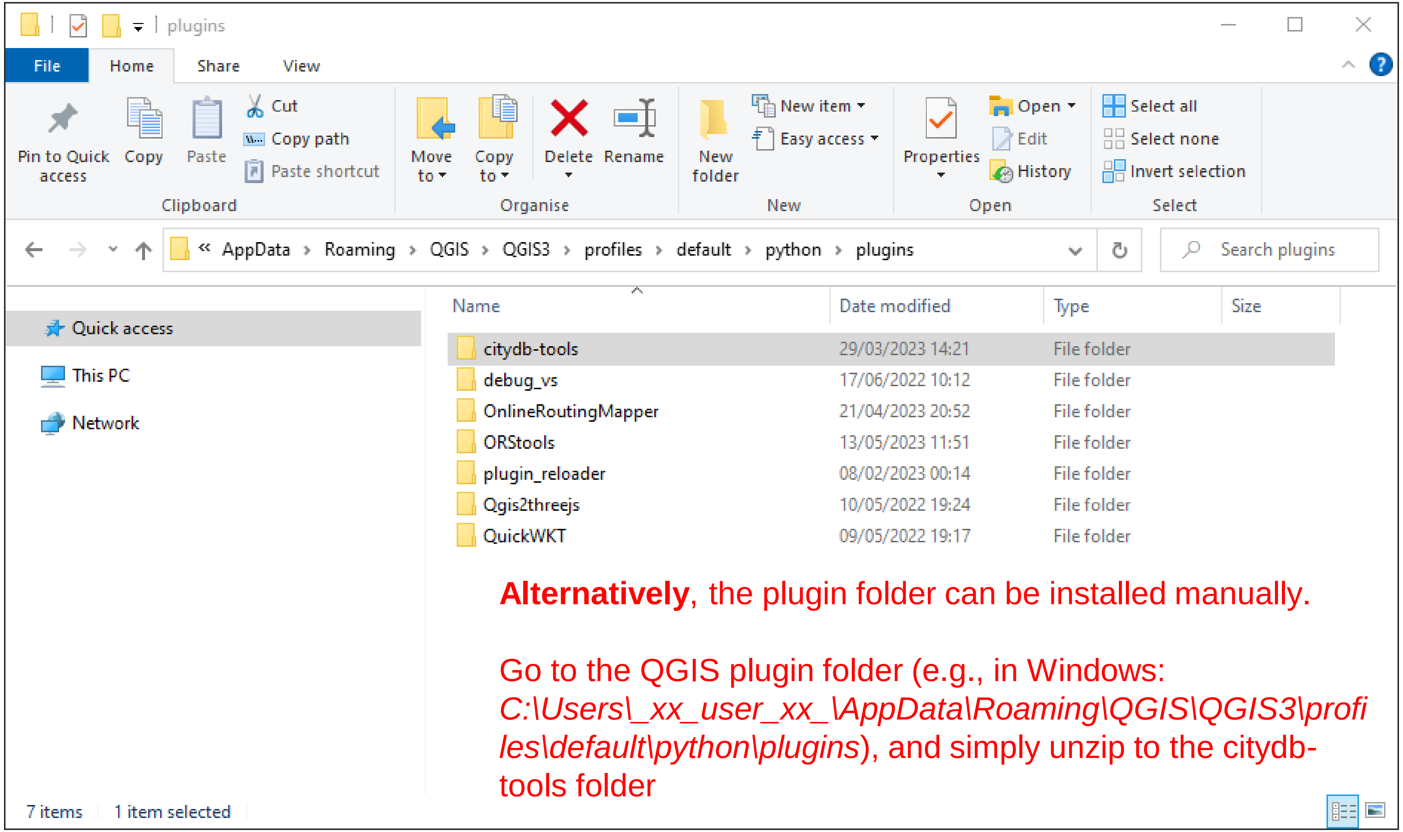


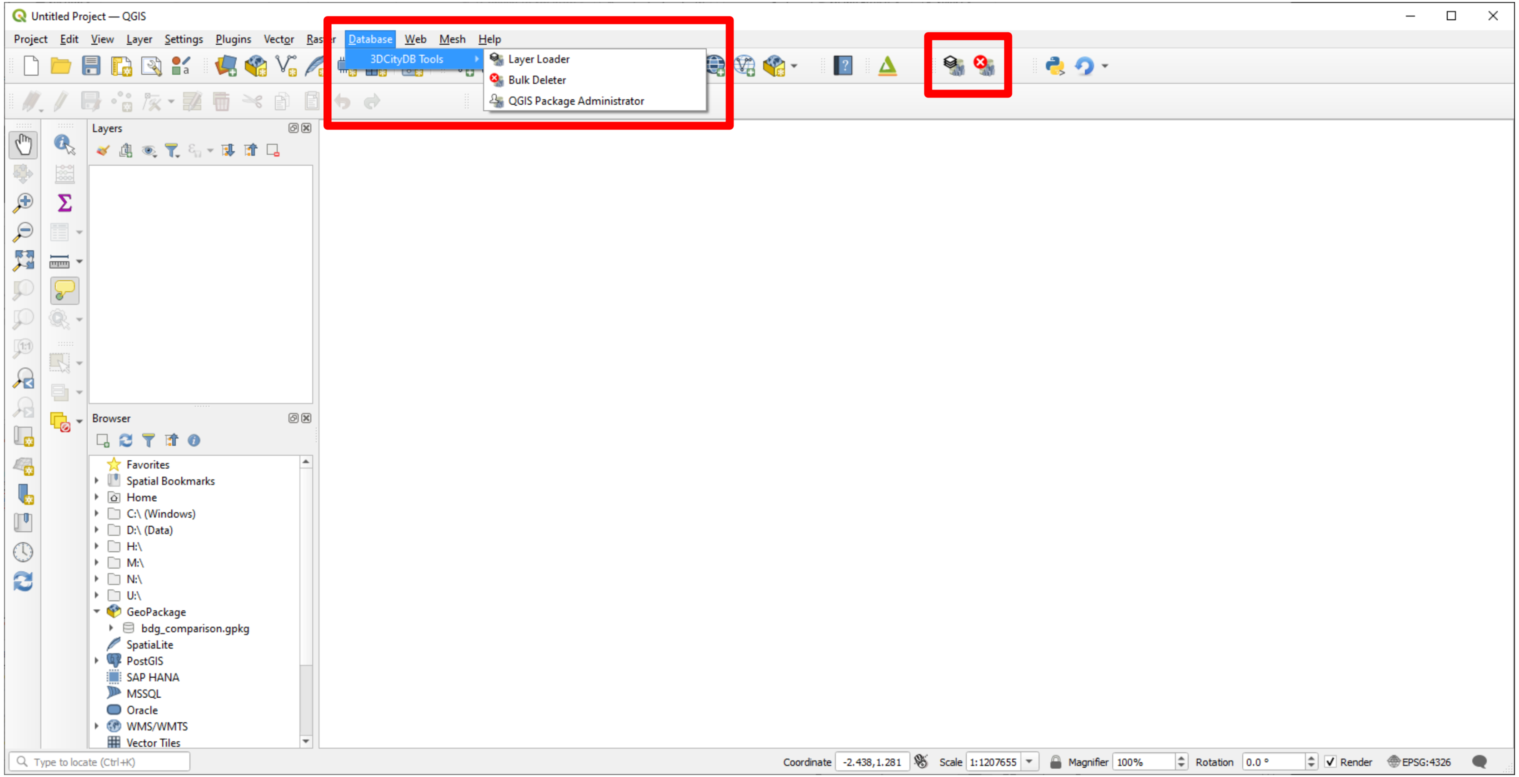
Name	Date modified	Type	Size
citydb-tools	29/03/2023 14:21	File folder	
debug_vs	17/06/2022 10:12	File folder	
OnlineRoutingMapper	21/04/2023 20:52	File folder	
ORStools	13/05/2023 11:51	File folder	
plugin_reloader	08/02/2023 00:14	File folder	
Qgis2threejs	10/05/2022 19:24	File folder	
QuickWKT	09/05/2022 19:17	File folder	

Alternatively, the plugin folder can be installed manually.

Go to the QGIS plugin folder (e.g., in Windows: *C:\Users_xx_user_xx_\AppData\Roaming\QGIS\QGIS3\profiles\default\python\plugins*), and simply unzip to the citydb-tools folder

Front-end installation

The **Database menu** will now contain a new entry, and the icons will be visible in the database icon bar (if the icon bar is activated)



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Back-end installation

The back-end installation consists in installing the **QGIS Package** into a 3DCityDB instance. It can be carried out using the "QGIS Package Administrator" GUI of the front-end. The **database administrator** is responsible for setting up in advance the server-side for *any* database user.

In general, **4 steps** are necessary:

a) Installation of the QGIS Package (i.e. the "qgis_pkg" schema)
b) Selection of the database users (e.g. "giorgio")
c) Creation of a user schema for each selected user (e.g. "qgis_giorgio")
d) Definition of the database privileges for each user and for each citydb schema (i.e. "read-only", "read & write", "none")

It is possible to perform:

- A "**simplified installation**", which carries out all 4 operation at once and automatically installs 2 default users
- A "**normal installation**", where the administrator has complete control over each step

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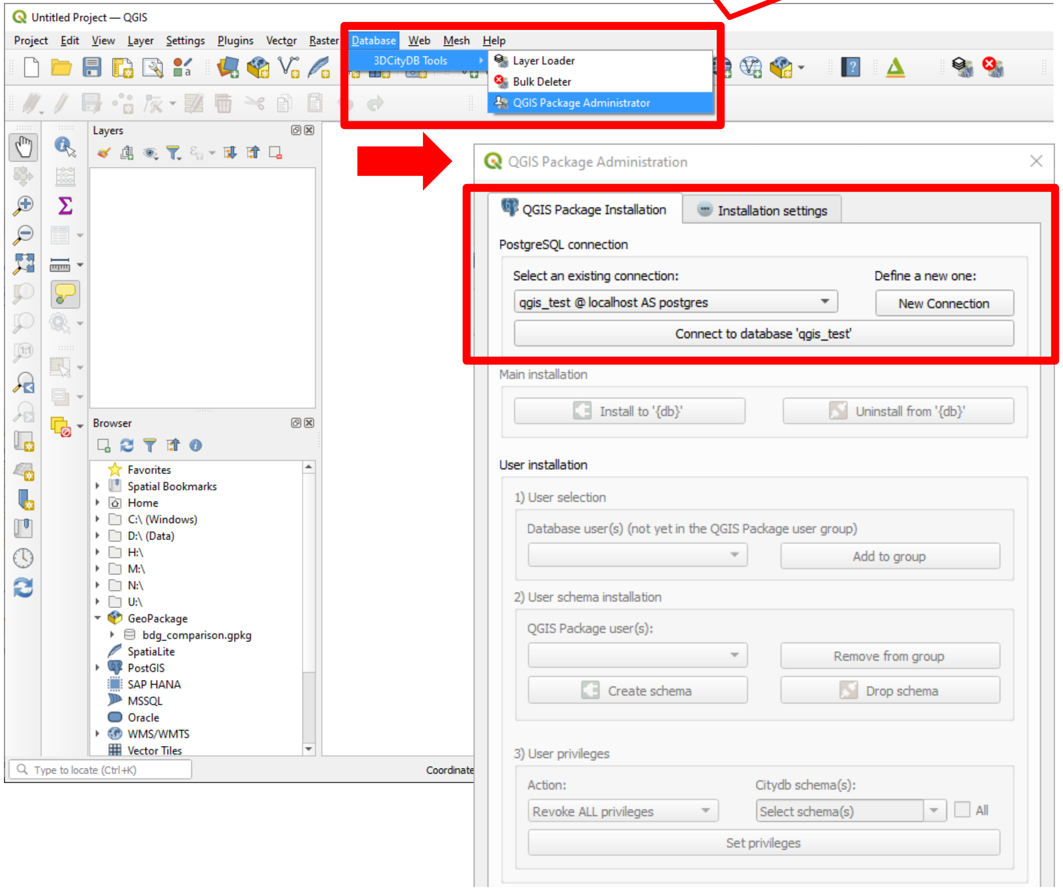
As **database administrator** (e.g. "postgres"):

1) Create a new connection or use an existing one to the desired 3DCityDB instance (here: "qgis_test")

Watch out! Pick the **QGIS Package Administrator** one!



PostgreSQL connection
Select an existing connection: qgis_test @ localhost AS postgres

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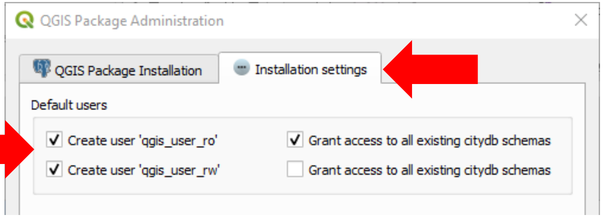
Back-end installation

2.1) **"Simplified"** installation

The QGIS Package and up to two default users are installed at once:

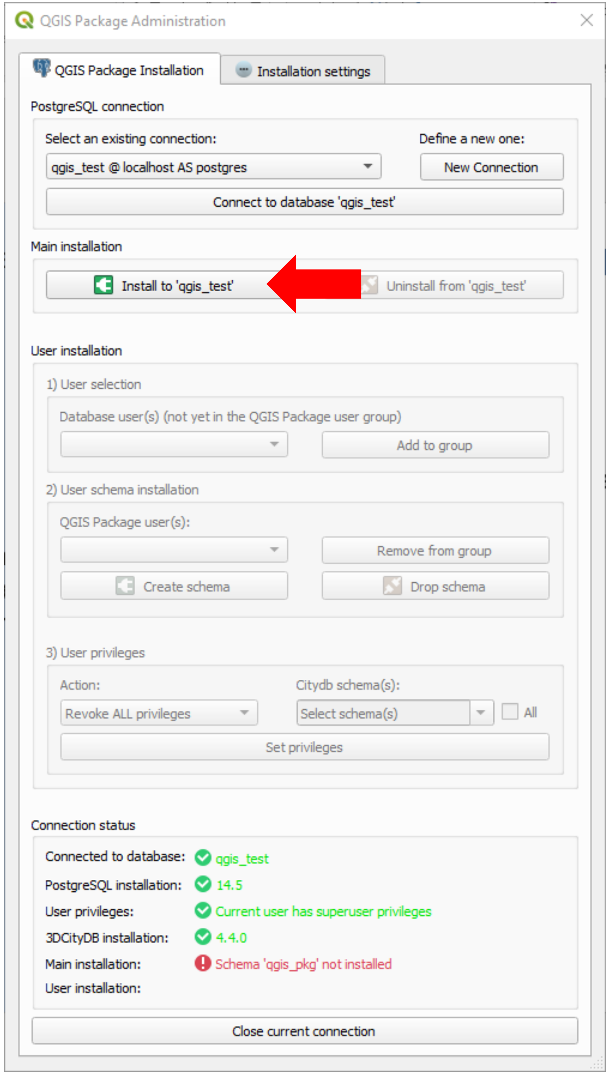
- User "**qgis_user_ro**" with read-only privileges
- User "**qgis_user_rw**" with read & write privileges
- Both users have access to all citydb schemas in the database at the moment of the installation
- **Note bene**: Their privileges and access rules can be changed at *any* time after installation. See later the "normal"-installation slides

Before clicking the Install button, go to the "Installation settings" tab and check the desired options



Default users

☑ Create user 'qgis_user_ro' ☑ Grant access to all existing citydb schemas
☑ Create user 'qgis_user_rw' □ Grant access to all existing citydb schemas



Select an existing connection: qgis_test @ localhost AS postgres

Connect to database 'qgis_test'

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s)

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ! Schema 'qgis_pkg' not installed
User installation:

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2.1) **"Simplified"** installation

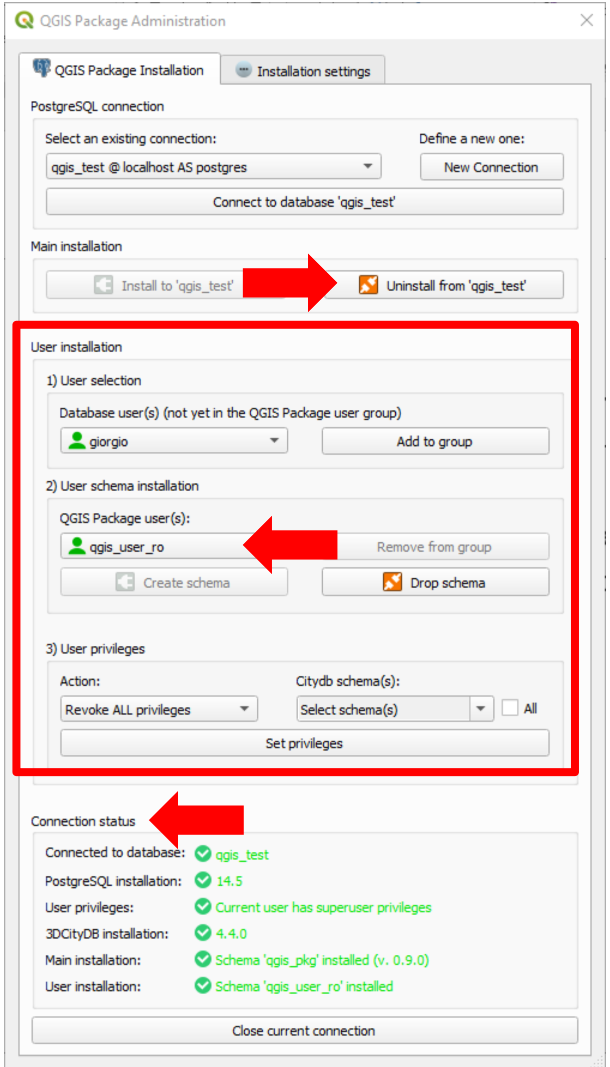
Upon successful installation:

- The **Uninstall button** is activated (in case you want to uninstall the QGIS Package)
- The **User Installation box** is activated
- You are notified in the **Connection status**

Done! ☺ Close the "QGIS Package Administration" GUI. You can now start using the plugin (e.g. the "Layer Loader" or the "Bulk Deleter") using the credentials of one of the default users

Please observe that:

- The default user(s) are automatically added the the **QGIS Package user(s)**
- You can edit the privileges in the **User privileges box**, or leave them as they are



PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS postgres

Define a new one:

Main installation

User installation

1) User selection

Database user(s) (not yet in the QGIS Package user group): giorgio

2) User schema installation

QGIS Package user(s): qgis_user_ro

3) User privileges

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s) □ All

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation: ✓ Schema 'qgis_user_ro' installed

Back-end installation

2.1) **"Simplified"** installation

In the 3DCityDB, the **qgis_pkg** schema is added and, depending on the chosen options, the **qgis_user_ro** and/or the **qgis_usr_rw** schemas are created, too

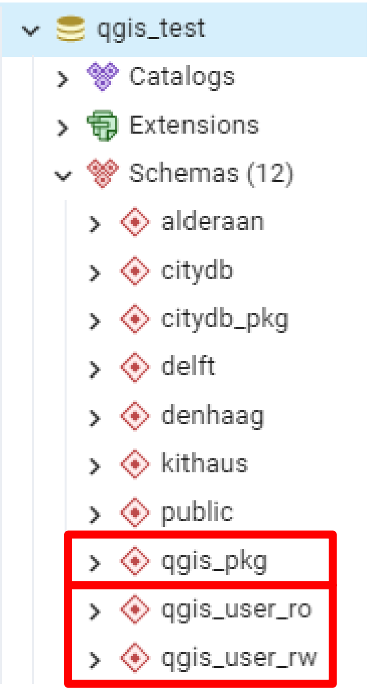
The credentials for the default users are:

User "qgis_user_ro":

- user name: qgis_user_ro
- password: qgis_user_ro

User "qgis_user_rw":

- user name: qgis_user_rw
- password: qgis_user_rw



```
qgis_test
  Catalogs
  Extensions
  Schemas (12)
    alderaan
    citydb
    citydb_pkg
    delft
    denhaag
    kithaus
    public
    qgis_pkg
    qgis_user_ro
    qgis_user_rw
```

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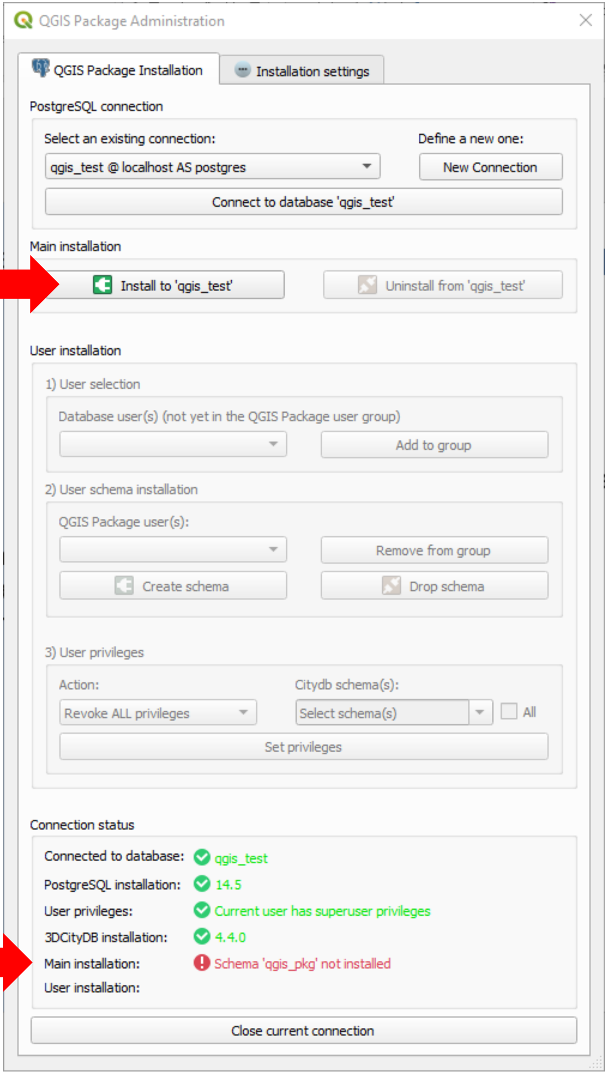
2.2) "**Normal**" installation

Using the "normal" installation, the administrator has complete control over each one of the 4 required installation steps

Step a) To install the GIS Package, click the **Install button** (here: install to database "qgis_test")

The **Connection status box** in the lower part of the dialog will keep you informed.



Select an existing connection: qgis_test @ localhost AS postgres

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s)

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ! Schema 'qgis_pkg' not installed
User installation:

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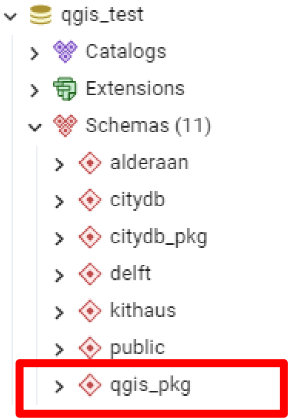
Back-end installation

2.2) "**Normal**" installation

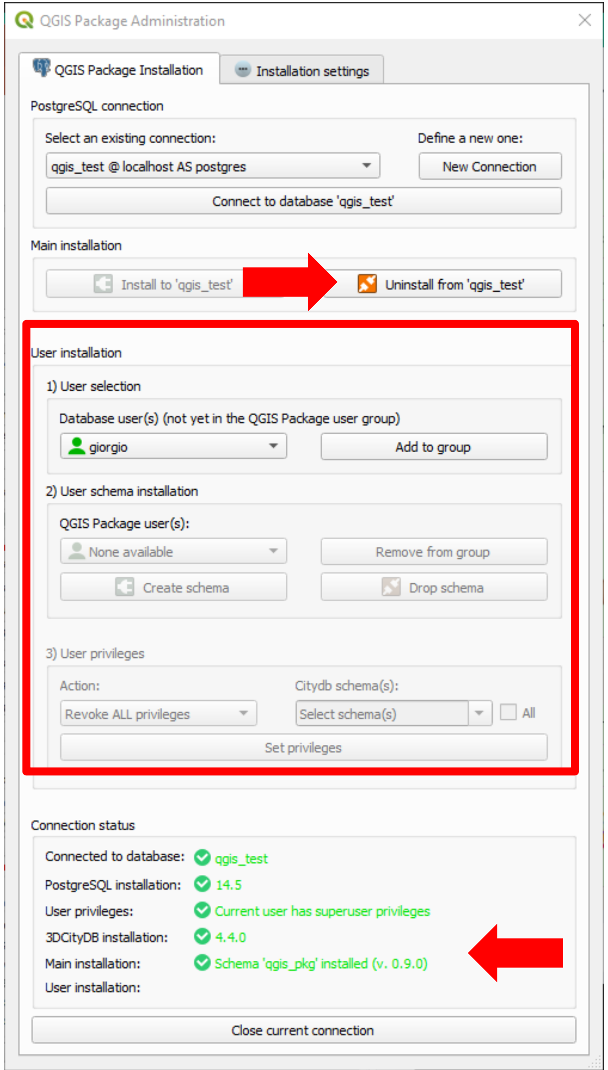
Upon successful installation:

- The **Uninstall button** is activated (in case you want to immediately uninstall)
- The **User Installation box** is activated
- You are notified in the **Connection status box**

The **"qgis_pkg"** schema is created in the the selected current database



```
qgis_test
  Catalogs
  Extensions
  Schemas (11)
    alderaan
    citydb
    citydb_pkg
    delft
    kithaus
    public
    qgis_pkg
```



QGIS Package Administration

QGIS Package Installation | Installation settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS postgres

Define a new one: New Connection

Connect to database 'qgis_test'

Main installation

Install to 'qgis_test' | Uninstall from 'qgis_test'

User installation

1) User selection

Database user(s) (not yet in the QGIS Package user group): giorgio | Add to group

2) User schema installation

QGIS Package user(s): None available | Remove from group

Create schema | Drop schema

3) User privileges

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s) □ All

Set privileges

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation:

Close current connection

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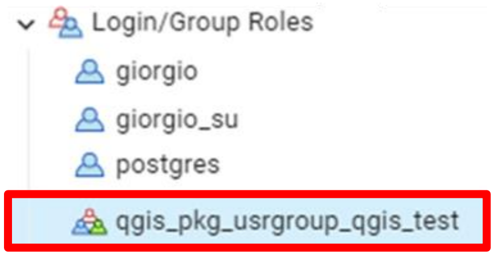
2.2) "**Normal**" installation

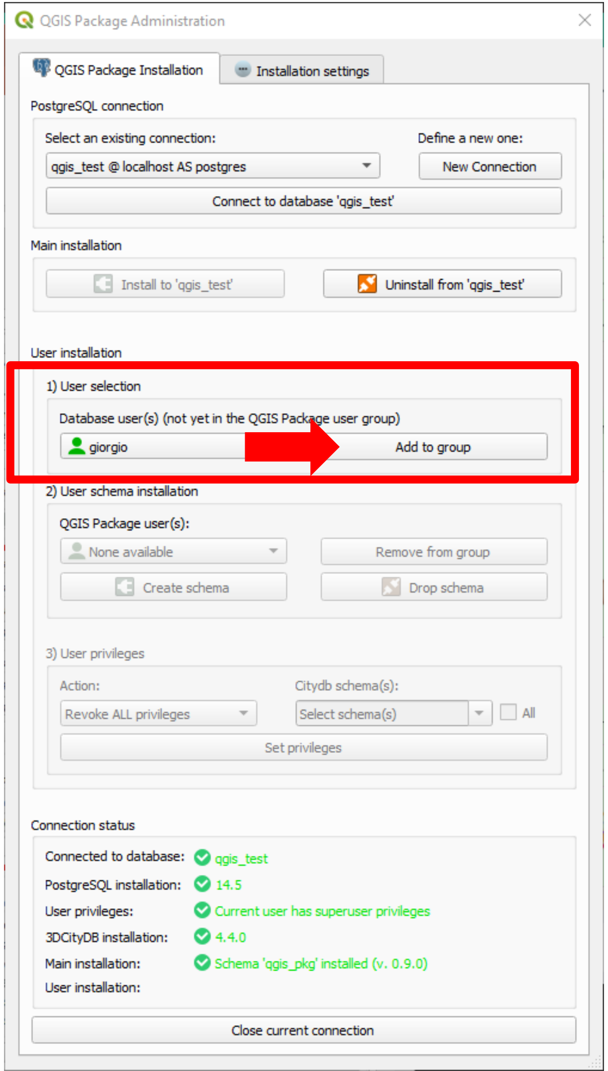
Step b) Choose from all database users the one(s) to add to the QGIS Package user group. Click the **Add to group** button



Login/Group Roles
giorgio
giorgio_su
postgres
qgis_pkg_usrgroup_qgis_test

For each 3DCityDB there group named **"qgis_pkg_usrgroup_" + database name** is created. It contains those users that will be allowed to interact with the database from the front-end.

Example: for database "qgis_test" there is a group called "qgis_pkg_usrgroup_qgis_test".



QGIS Package Administration

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS postgres

Define a new one: New Connection

Connect to database 'qgis_test'

Main installation

Install to 'qgis_test'   Uninstall from 'qgis_test'

User installation

1) User selection

Database user(s) (not yet in the QGIS Package user group): giorgio   Add to group

2) User schema installation

QGIS Package user(s): None available   Remove from group

Create schema   Drop schema

3) User privileges

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s)   □ All

Set privileges

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation:

Close current connection

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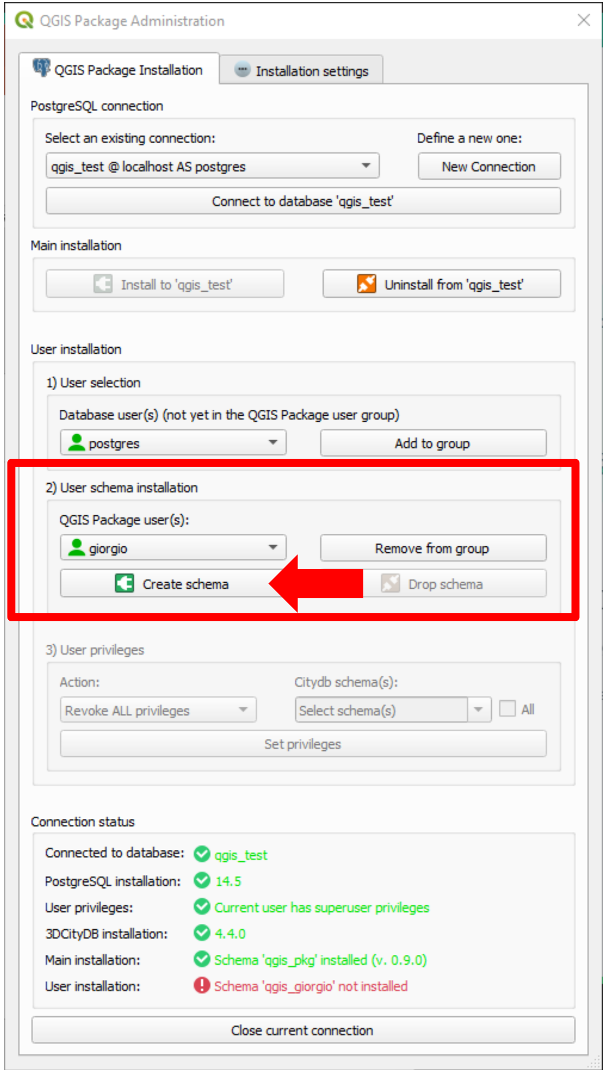
2.2) "**Normal**" installation

Step c) Create the user schema for the selected user(s) belonging to the group



QGIS Package Administration

QGIS Package Installation | Installation settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS postgres

Define a new one: New Connection

Connect to database 'qgis_test'

Main installation

Install to 'qgis_test'
Uninstall from 'qgis_test'

User installation

1) User selection

Database user(s) (not yet in the QGIS Package user group): postgres

Add to group

2) User schema installation

QGIS Package user(s): giorgio

Remove from group

Create schema
Drop schema

3) User privileges

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s) □ All

Set privileges

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation: ! Schema 'qgis_giorgio' not installed

Close current connection

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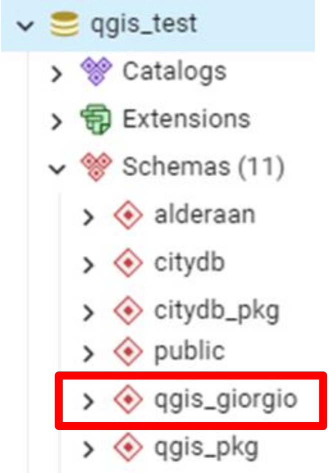
2.2) "**Normal**" installation

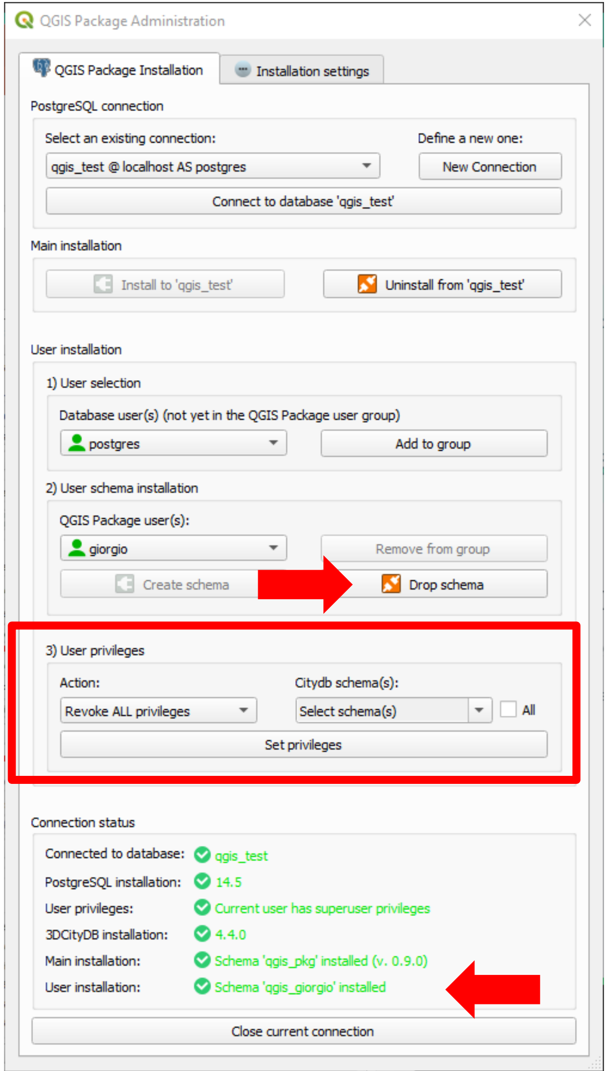
Upon successful creation of the user schema:

- The **Drop schema** button is activated (in case you want to drop the schema you just created)
- the **User privileges box** is activated
- You are notified in the **Connection status box**

A schema named **"qgis_" + user name** is created.

Example: for user "giorgio", schema "qgis_giorgio" will be created.





QGIS Package Administration

QGIS Package Installation | Installation settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS postgres

Define a new one: New Connection

Connect to database 'qgis_test'

Main installation

Install to 'qgis_test' | Uninstall from 'qgis_test'

User installation

1) User selection

Database user(s) (not yet in the QGIS Package user group): postgres | Add to group

2) User schema installation

QGIS Package user(s): giorgio | Remove from group

Create schema | Drop schema

3) User privileges

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s) □ All

Set privileges

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation: ✓ Schema 'qgis_giorgio' installed

Close current connection

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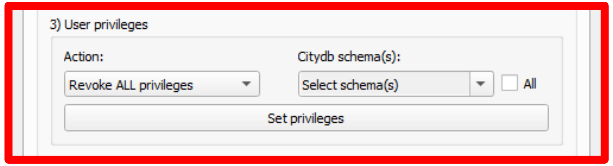
2.2) "**Normal**" installation

Step d) For the selected user, set the database privileges ("read-only", "read & write", "none") for each of the existing citydb schemas

You can assign different privileges to different citydb schemas – or revoke them.

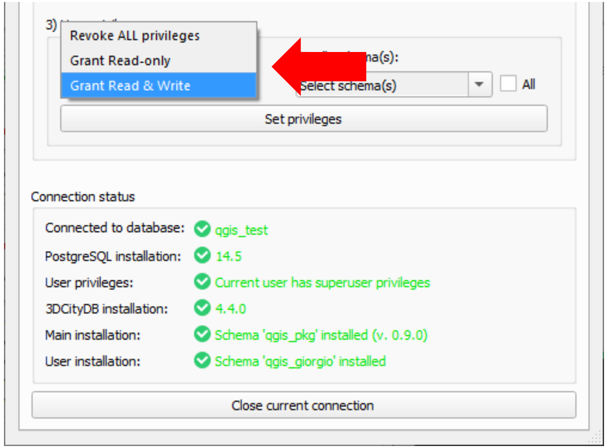
Click the **Set privileges** button to apply the settings. The privileges status in the drop down menu will be updated accordingly.



3) User privileges

Action: Revoke ALL privileges

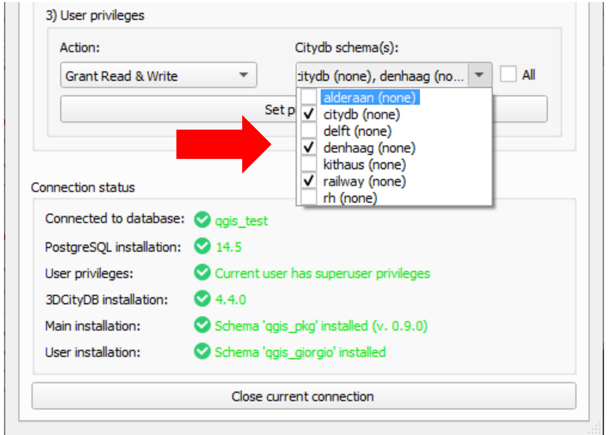
Citydb schema(s): Select schema(s) □ All



Citydb schema(s): Select schema(s) □ All

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation: ✓ Schema 'qgis_giorgio' installed



3) User privileges

Action: Grant Read & Write

Citydb schema(s): citydb (none), denhaag (no... □ All

- □ alderaan (none)
- ☑ citydb (none)
- □ delft (none)
- ☑ denhaag (none)
- □ kithaus (none)
- ☑ railway (none)
- □ rh (none)

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation: ✓ Schema 'qgis_giorgio' installed

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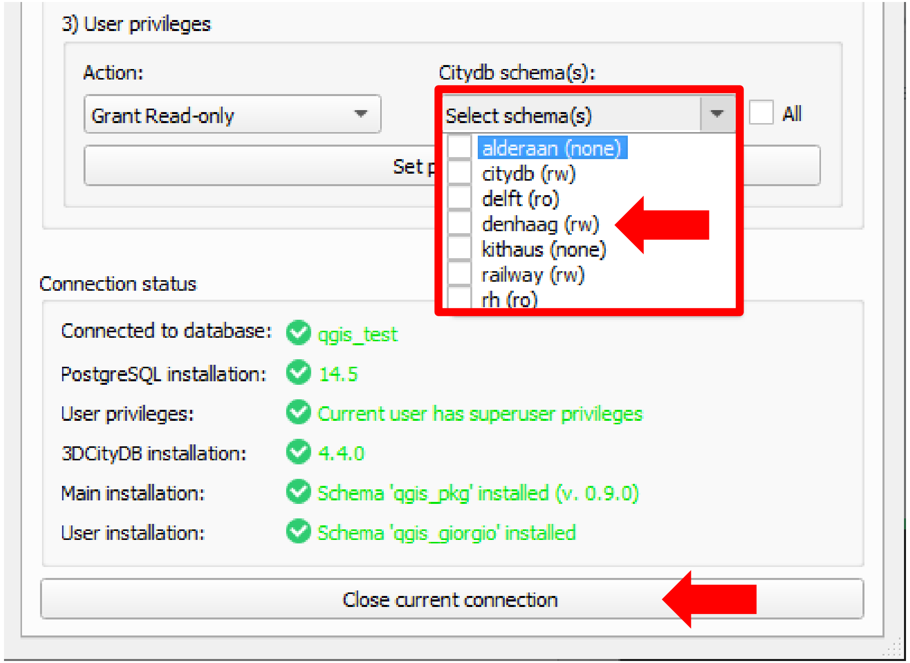
2.2) "**Normal**" installation

Every time new privileges are set, the status in the drop down menu is updated with "ro" (read-only), "rw" (read & write) or "none".

Once you are done, you can click the **Close the current connection** button

You can now use the "Layer Loader" or the "Bulk Deleter"



3) User privileges

Action: Grant Read-only

Citydb schema(s): Select schema(s) □ All

□ alderaan (none)
□ citydb (rw)
□ delft (ro)
□ denhaag (rw)
□ kithaus (none)
□ railway (rw)
□ rh (ro)

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation: ✓ Schema 'qgis_giorgio' installed

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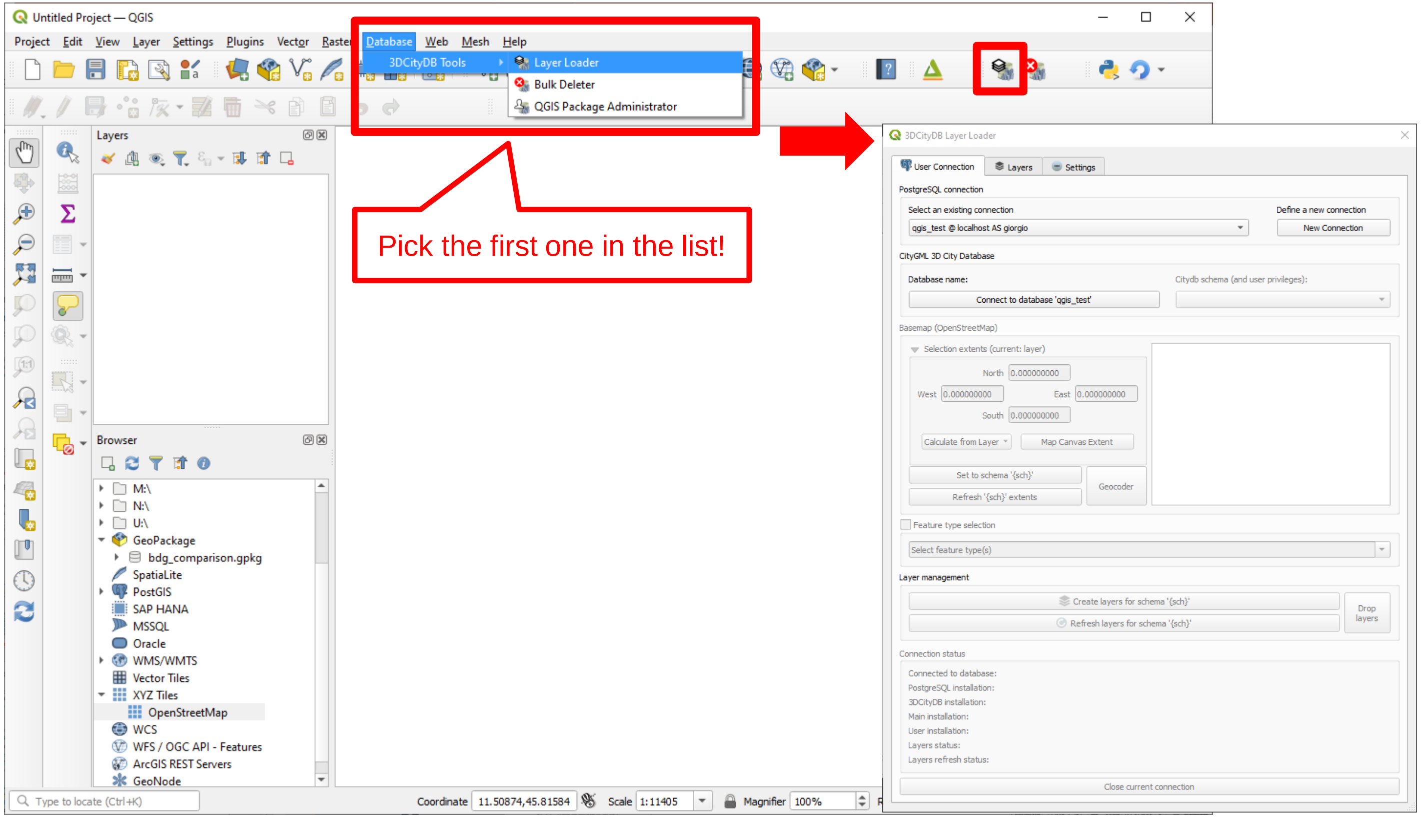
Layer Loader

Open the **Layer Loader** from the menu or by clicking on the corresponding icon



Pick the first one in the list!

Coordinate 11.50874,45.81584 Scale 1:11405 Magnifier 100%

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema (and user privileges):

Basemap (OpenStreetMap)

Selection extents (current: layer)

North 0.000000000
West 0.000000000 East 0.000000000
South 0.000000000

□ Feature type selection

Select feature type(s)

Layer management

Connection status

Connected to database:
PostgreSQL installation:
3DCityDB installation:
Main installation:
User installation:
Layers status:
Layers refresh status:

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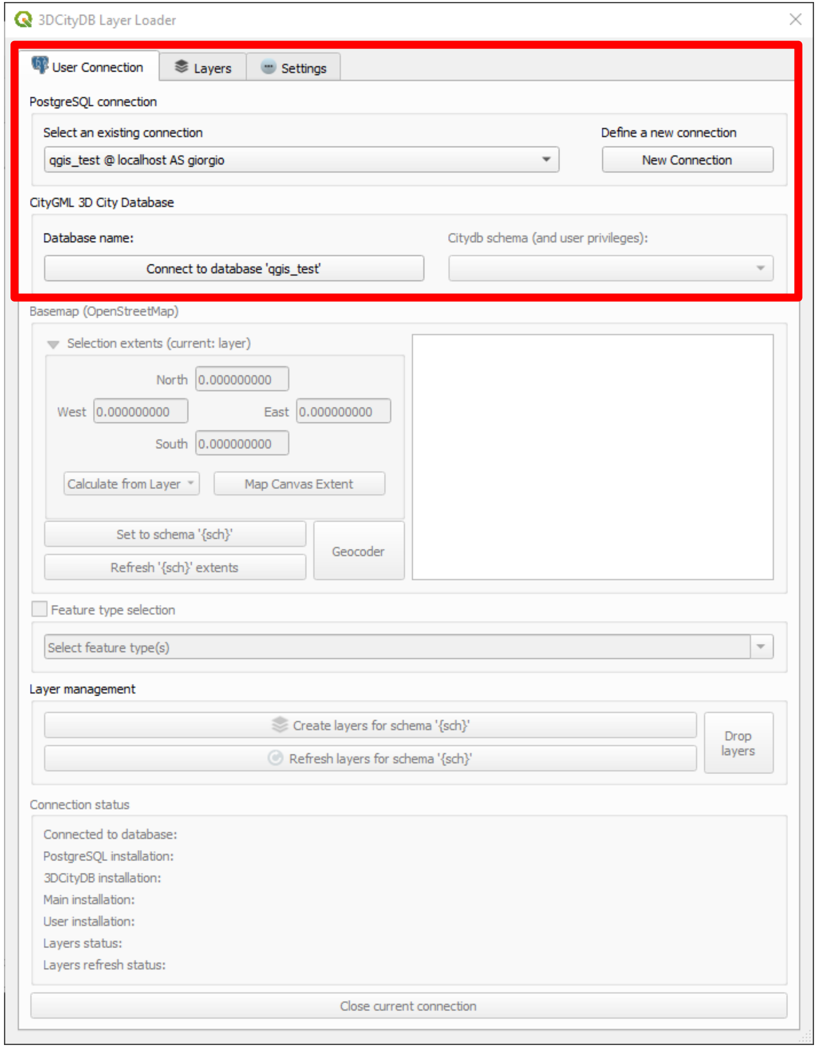
In the "User Connection" tab

1) Create a new connection or use an existing one to the desired 3DCityDB instance (here: "qgis_test")

2) Use the credentials of:

- The default users **qgis_user_ro** or **qgis_user_rw** (if previously installed)
- Your own credentials (if the administrator has set up your *usr_schema* before)



Select an existing connection: qgis_test @ localhost AS giorgio

Database name:

Citydb schema (and user privileges):

North 0.000000000
West 0.000000000
East 0.000000000
South 0.000000000

Connection status
Connected to database:
PostgreSQL installation:
3DCityDB installation:
Main installation:
User installation:
Layers status:
Layers refresh status:

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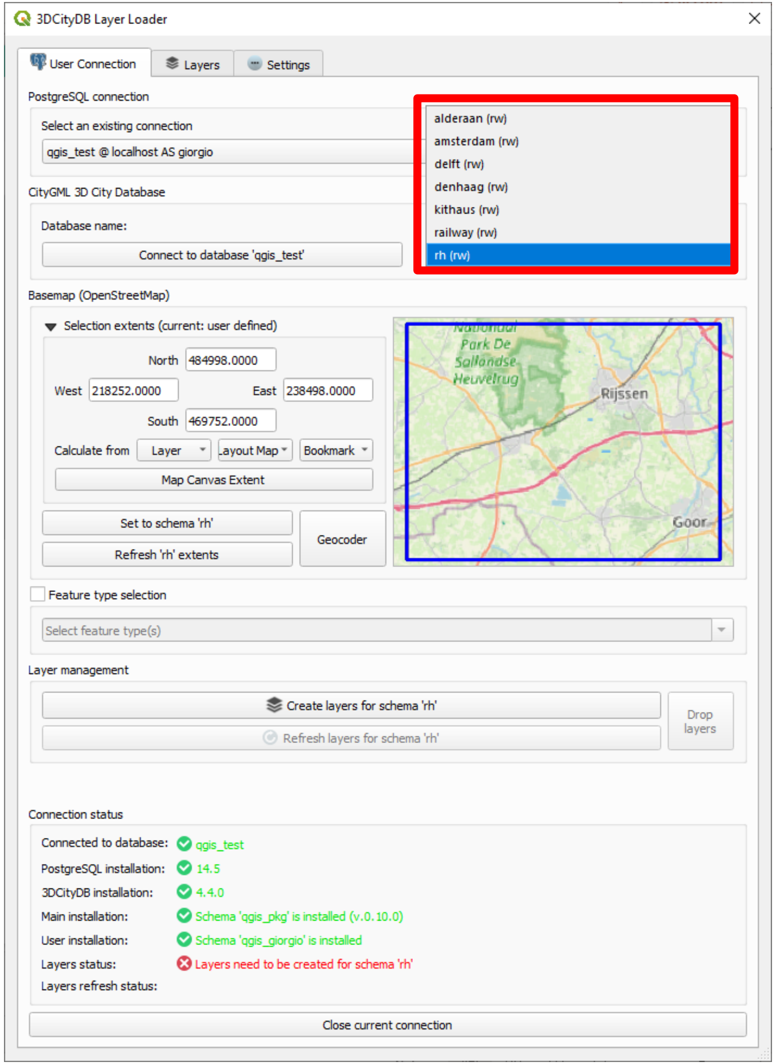
3) Once connected, choose one of the existing citydb schemas. If they contain CityGML data, they will be listed.

You will also see your privileges for that citydb schema ("ro" or "rw").

Nota bene: Generally, "**citydb**" is the default, and, very often, the only one citydb schema! Nevertheless, the next slides refer to the "**rh**" schema

How to create additional citydb schemas
https://3dcitydb-docs.readthedocs.io/en/latest/3dcitydb/multi-schema.html



3DCityDB Layer Loader

User Connection | Layers | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

CityGML 3D City Database

Database name:

Connect to database 'qgis_test'

alderaan (rw)
amsterdam (rw)
delft (rw)
denhaag (rw)
kithaus (rw)
railway (rw)
rh (rw)

Basemap (OpenStreetMap)

Selection extents (current: user defined)

North 484998.0000
West 218252.0000
East 238498.0000
South 469752.0000

Calculate from: Layer | Layout Map | Bookmark

Map Canvas Extent

Set to schema 'rh'

Refresh 'rh' extents

Geocoder

□ Feature type selection

Select feature type(s)

Layer management

Create layers for schema 'rh'

Refresh layers for schema 'rh'

Drop layers

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.10.0)
User installation: ✓ Schema 'qgis_giorgio' is installed
Layers status: ✗ Layers need to be created for schema 'rh'
Layers refresh status:

Close current connection

Layer Loader

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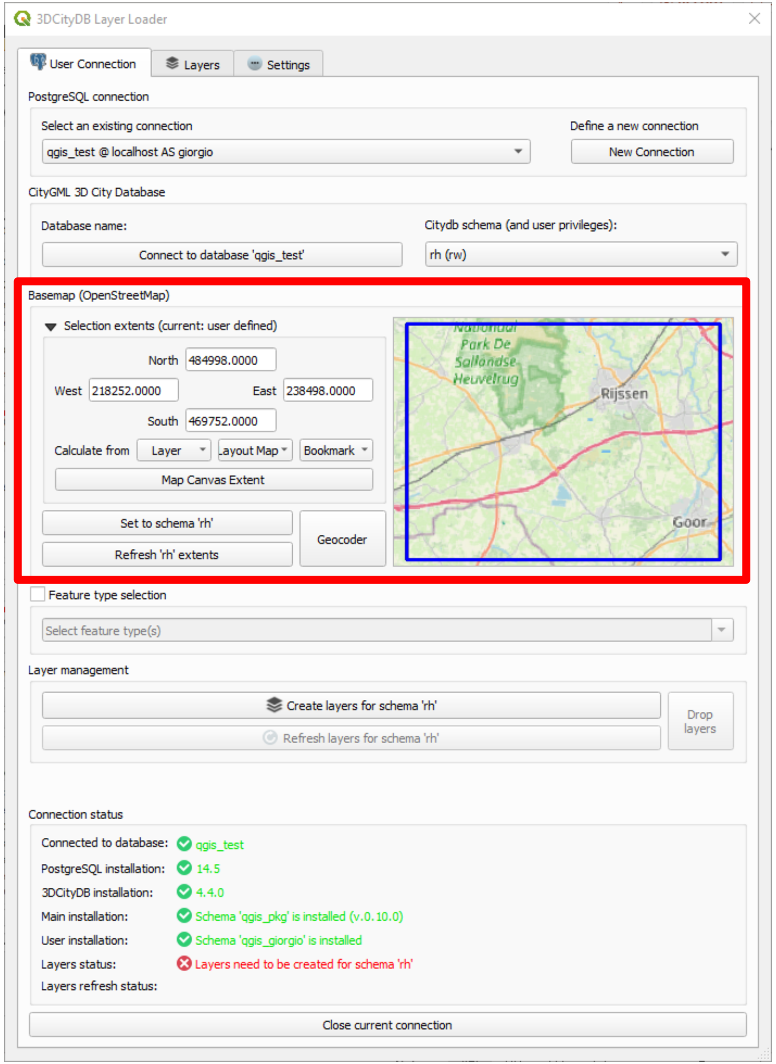
4a) Upon selection of the citydb schema, you will see the extents of the dataset. They correspond to the extents of all currently loaded data in the selected citydb schema (here, for example, schema "rh")

Please note: the very first time you load a citydb schema, and depending on the size of the city model, it might take a while to load as the bounding boxes are being computed. From the second time onwards, it will load nearly instantly.



PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema (and user privileges): rh (rw)

Basemap (OpenStreetMap)

Selection extents (current: user defined)

North 484998.0000
West 218252.0000
East 238498.0000
South 469752.0000

Calculate from: Layer | Layout Map | Bookmark

Map Canvas Extent

Set to schema 'rh'

Refresh 'rh' extents

Geocoder

□ Feature type selection

Select feature type(s)

Layer management

Create layers for schema 'rh'

Refresh layers for schema 'rh'

Drop layers

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.10.0)
User installation: ✓ Schema 'qgis_giorgio' is installed
Layers status: ✗ Layers need to be created for schema 'rh'
Layers refresh status:

Close current connection

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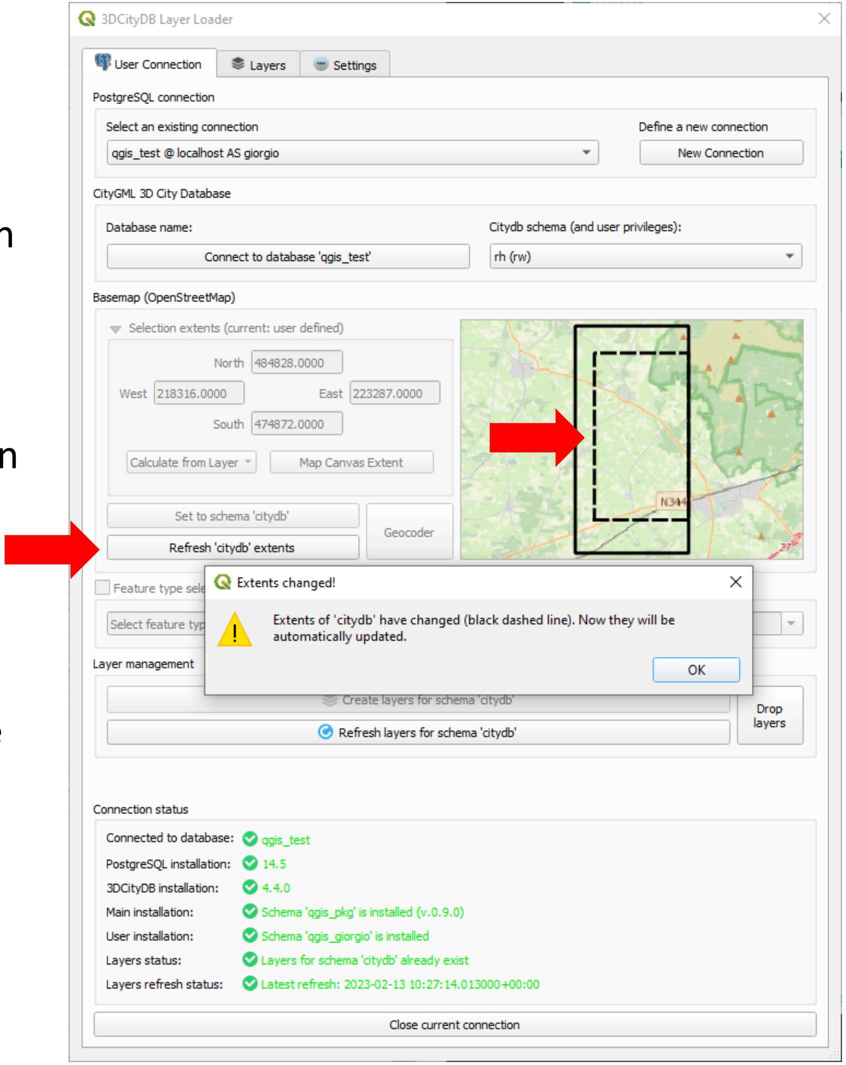
4b) If data has been added or removed in the current citydb schema, you can refresh the extents by pressing the **Refresh {cdb_schema} extents button**.

The new extents will be temporarily shown with a **black dashed line**, before being updated.

Note bene: Depending on how the extents have changed, you may have to recreate, refresh and reload the layers in QGIS (see next slides)



3DCityDB Layer Loader

User Connection | Layers | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio
Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'
Citydb schema (and user privileges): rh (rw)

Basemap (OpenStreetMap)

Selection extents (current: user defined)

North 484828.0000
West 218316.0000
East 223287.0000
South 474872.0000

Calculate from Layer | Map Canvas Extent

Set to schema 'citydb'
Refresh 'citydb' extents
Geocoder

□ Feature type sele
Select feature typ

Extents changed!

Extents of 'citydb' have changed (black dashed line). Now they will be automatically updated.

OK

Layer management

Create layers for schema 'citydb'
Refresh layers for schema 'citydb'
Drop layers

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.9.0)
User installation: ✓ Schema 'qgis_giorgio' is installed
Layers status: ✓ Layers for schema 'citydb' already exist
Layers refresh status: ✓ Latest refresh: 2023-02-13 10:27:14.013000+00:00

Close current connection

TUDelft 3Dgeoinfo

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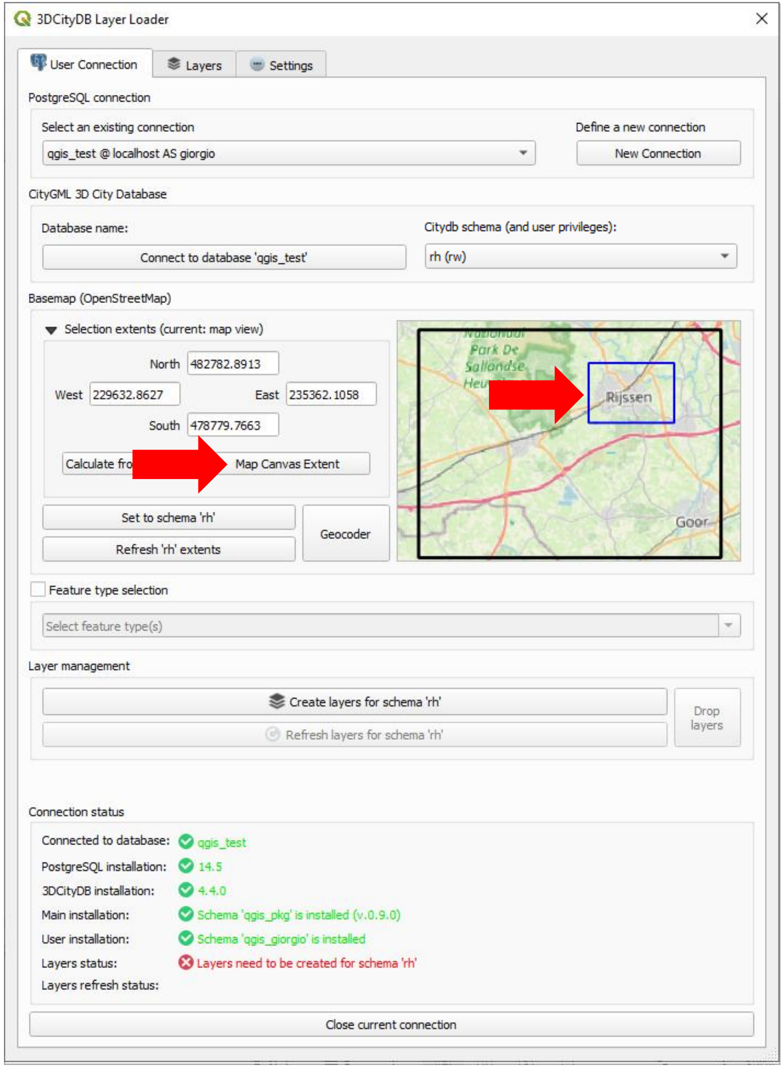
5) Depending on your needs, you can set the spatial extents of the study area for which the layers will be created

- Default: same size of the whole dataset
- Otherwise: zoom in the map and choose your own area by clicking the **Map Canvas Extent button**. The **blue bounding box** shows the layers extents.

Beware: The bigger the size, the more time it will take to populate the layers!

Behind the scenes: In the database, materialised views of the geometries will be generated according to the selected extents. In case of very large cities, it might take a long time (and a lot of space on the server)!



3DCityDB Layer Loader

User Connection | Layers | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema (and user privileges): rh (rw)

Basemap (OpenStreetMap)

Selection extents (current: map view)

North 482782.8913

West 229632.8627

East 235362.1058

South 478779.7663

Calculate fro | Map Canvas Extent

Set to schema 'rh'

Refresh 'rh' extents

Geocoder

□ Feature type selection

Select feature type(s)

Layer management

Create layers for schema 'rh'

Refresh layers for schema 'rh'

Drop layers

Connection status

Connected to database: ✓ qgis_test

PostgreSQL installation: ✓ 14.5

3DCityDB installation: ✓ 4.4.0

Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.9.0)

User installation: ✓ Schema 'qgis_giorgio' is installed

Layers status: ☒ Layers need to be created for schema 'rh'

Layers refresh status:

Close current connection

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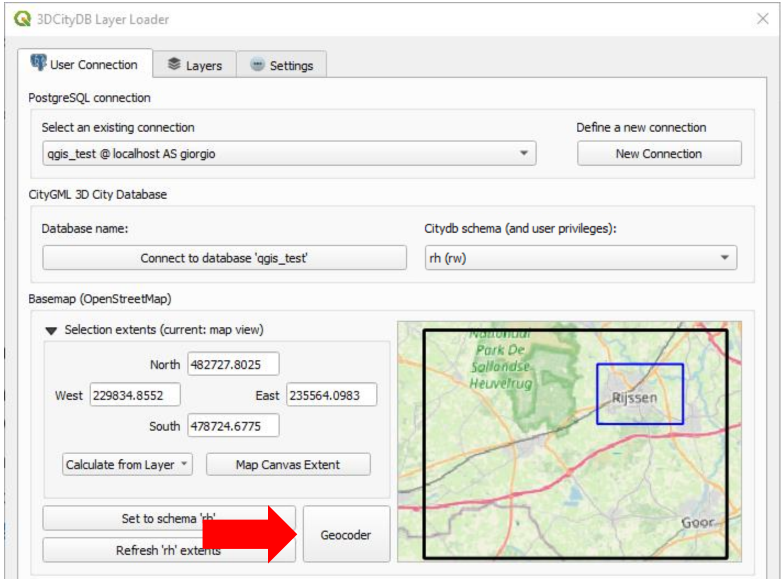
Layer Loader

5) Depending on your needs, you can set the spatial extents of the study area for which the layers will be created

- Default: same size of the whole dataset
- Otherwise: zoom in the map and choose your own area by clicking the **Map Canvas Extent button**. The **blue bounding box** shows the layers extents.


3DCityDB Layer Loader

User Connection | Layers | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema (and user privileges): rh (rw)

Basemap (OpenStreetMap)

Selection extents (current: map view)

North 482727.8025

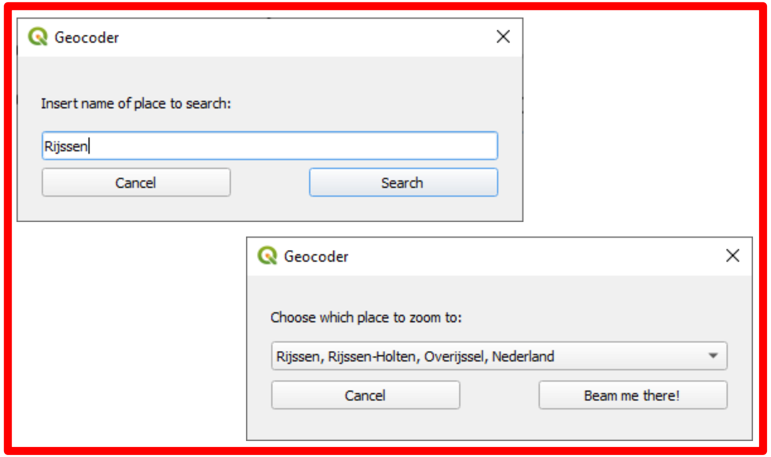
West 229834.8552

East 235564.0983

South 478724.6775

If you are looking for a specific place inside the citydb extents, you can also use the Geocoder that will zoom you directly there.

Simply click the **Geocoder button**.


Geocoder

Insert name of place to search: Rijssen

Geocoder

Choose which place to zoom to: Rijssen, Rijssen-Holten, Overijssel, Nederland

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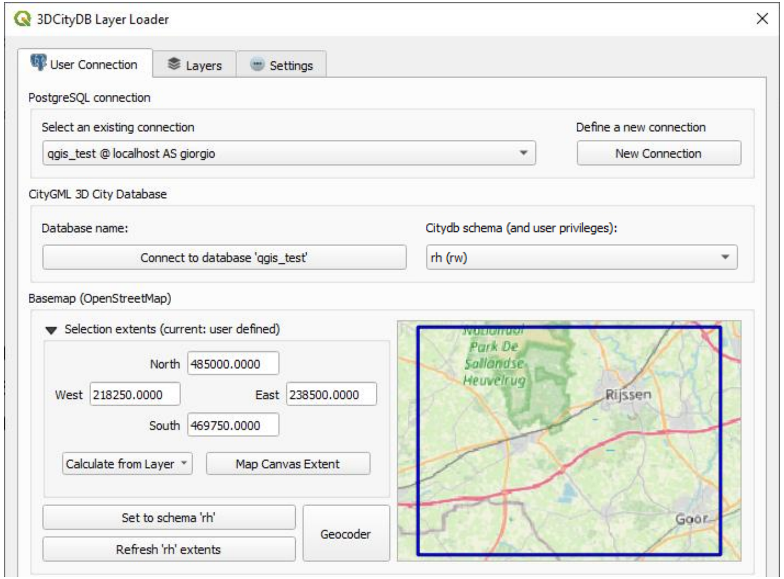
Black: database schema extents (i.e. extents of the whole city model/dataset)

Blue: database-side layers extents (i.e. extents of the materialised views)

Remember: **Layers extents ⊆ City model extents**



3DCityDB Layer Loader

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema (and user privileges): rh (rw)

Basemap (OpenStreetMap)

Selection extents (current: user defined)

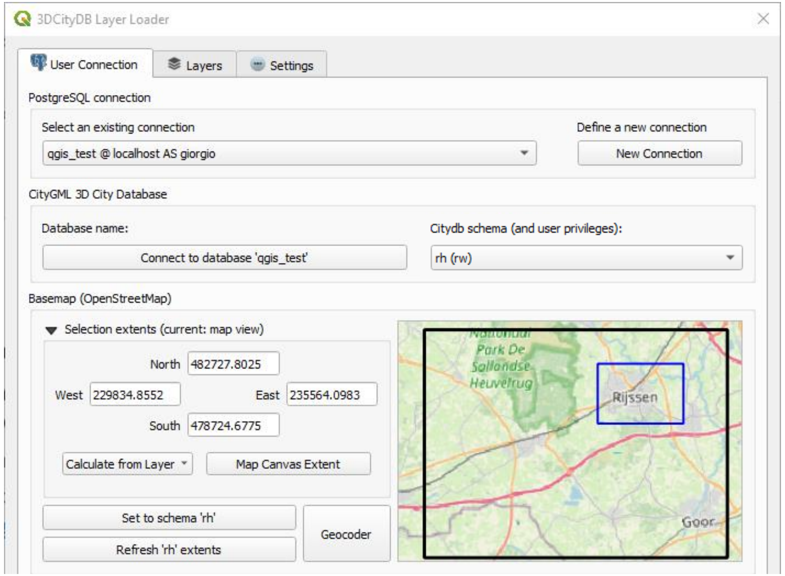
North 485000.0000

West 218250.0000

East 238500.0000

South 469750.0000

Both areas coincide (default)



3DCityDB Layer Loader

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema (and user privileges): rh (rw)

Basemap (OpenStreetMap)

Selection extents (current: map view)

North 482727.8025

West 229834.8552

East 235564.0983

South 478724.6775

User-selected layers extents

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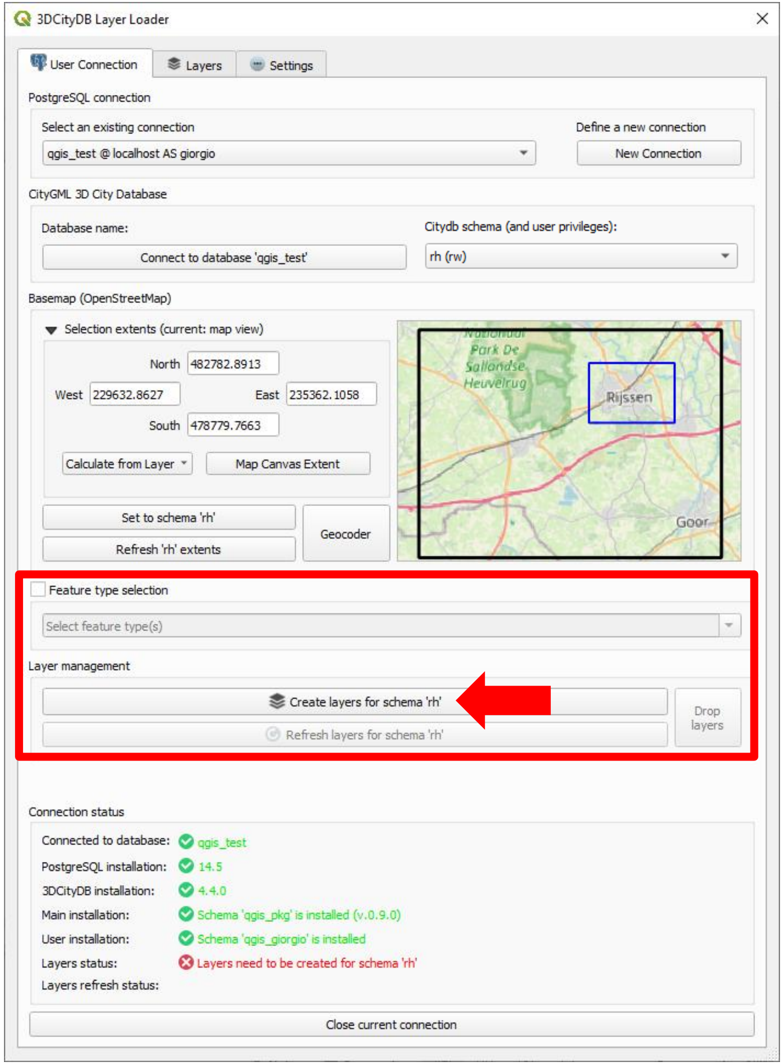
Layer Loader

6a) Create the layers

Layers for all CityObjects available withing the Layer extents will be created



3DCityDB Layer Loader

User Connection | Layers | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema (and user privileges): rh (rw)

Basemap (OpenStreetMap)

Selection extents (current: map view)

North 482782.8913

West 229632.8627

East 235362.1058

South 478779.7663

Calculate from Layer | Map Canvas Extent

Set to schema 'rh' | Refresh 'rh' extents | Geocoder

□ Feature type selection

Select feature type(s)

Layer management

Create layers for schema 'rh'

Refresh layers for schema 'rh'

Drop layers

Connection status

Connected to database: ✓ qgis_test

PostgreSQL installation: ✓ 14.5

3DCityDB installation: ✓ 4.4.0

Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.9.0)

User installation: ✓ Schema 'qgis_giorgio' is installed

Layers status: ☒ Layers need to be created for schema 'rh'

Layers refresh status:

Close current connection

Behind the scenes: In the database, (empty) materialised views of the geometries and views will be created as layers.

Only layers for *existing* data will be created.

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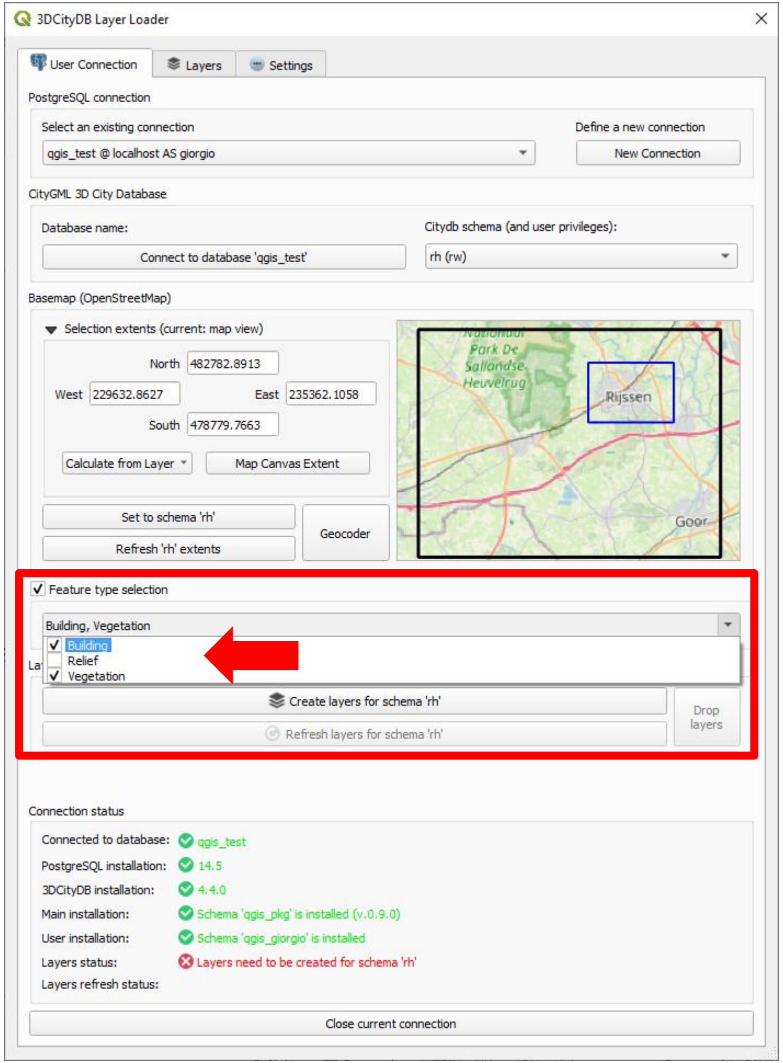
6a) Create the layers

Layers for all CityObjects available withing the Layer extents will be created.

Optionally, you can further refine your selection and choose for which Feature Types the layers will be generated. Open the **Feature type selection box** and check the desired Feature types.

Note bene: Feature Types correspond the the CityGML modules (Building, Vegetation, Transportaton, LandUse, Relief, etc.)



3DCityDB Layer Loader

User Connection | Layers | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema (and user privileges): rh (rw)

Basemap (OpenStreetMap)

Selection extents (current: map view)

North 482782.8913
West 229632.8627
East 235362.1058
South 478779.7663

Calculate from Layer | Map Canvas Extent

Set to schema 'rh' | Refresh 'rh' extents | Geocoder

☑ Feature type selection

Building, Vegetation

☑ Building
☐ Relief
☑ Vegetation

Create layers for schema 'rh'
Refresh layers for schema 'rh'
Drop layers

Connection status

Connected to database: qgis_test
PostgreSQL installation: 14.5
3DCityDB installation: 4.4.0
Main installation: Schema 'qgis_pkg' is installed (v.0.9.0)
User installation: Schema 'qgis_giorgio' is installed
Layers status: Layers need to be created for schema 'rh'
Layers refresh status:

Close current connection

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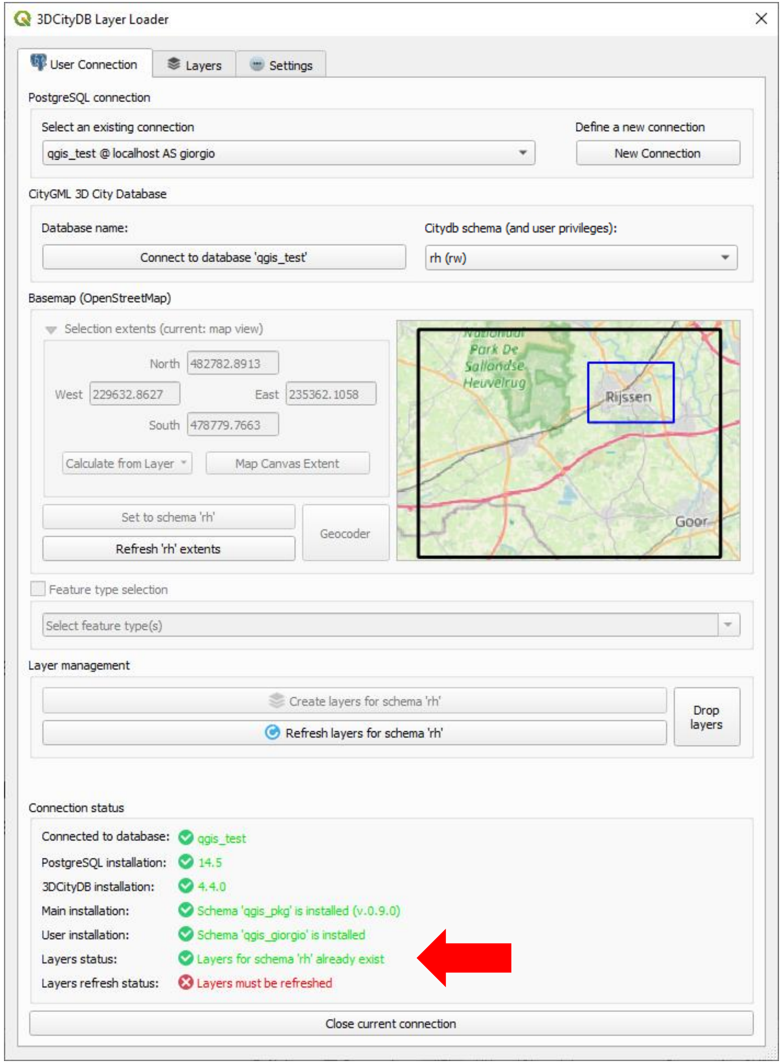
6b) Create the layers

Upon successful creation of the layers, you will be notified in the **Connection Status box**



3DCityDB Layer Loader

PostgreSQL connection
Select an existing connection: qgis_test @ localhost AS giorgio

CityGML 3D City Database
Database name: Connect to database 'qgis_test'
Citydb schema (and user privileges): rh (rw)

Basemap (OpenStreetMap)
Selection extents (current: map view)
North 482782.8913
West 229632.8627
East 235362.1058
South 478779.7663

□ Feature type selection
Select feature type(s)

Layer management

Connection status
Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.9.0)
User installation: ✓ Schema 'qgis_giorgio' is installed
Layers status: ✓ Layers for schema 'rh' already exist
Layers refresh status: ✗ Layers must be refreshed

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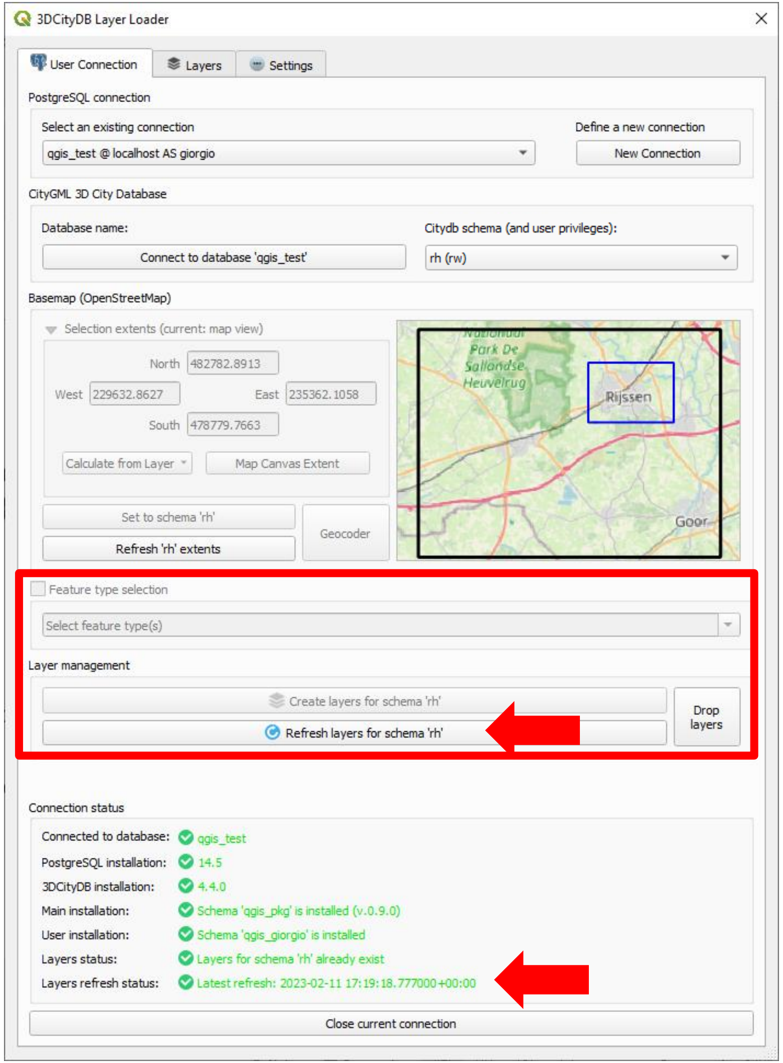
7) Populate/refresh the layers

Click on the **Refresh layers button**. Once the operation is complete, you will be notified in the **Connection status box**.

The following "Layers" tab is now activated and you can open it.

Alternatively, layers created in a previous session may be used (and/or refreshed again), or dropped.

Beware: Depending on the size of the selected area and the amount of data in the city model, this operation might take long.



3DCityDB Layer Loader

User Connection | Layers | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema (and user privileges): rh (rw)

Basemap (OpenStreetMap)

Selection extents (current: map view)

North 482782.8913
West 229632.8627
East 235362.1058
South 478779.7663

Calculate from Layer | Map Canvas Extent

Set to schema 'rh'

Refresh 'rh' extents

Geocoder

□ Feature type selection

Select feature type(s)

Layer management

Create layers for schema 'rh'

Refresh layers for schema 'rh'

Drop layers

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.9.0)
User installation: ✓ Schema 'qgis_giorgio' is installed
Layers status: ✓ Layers for schema 'rh' already exist
Layers refresh status: ✓ Latest refresh: 2023-02-11 17:19:18.777000+00:00

Close current connection

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Behind the scenes:

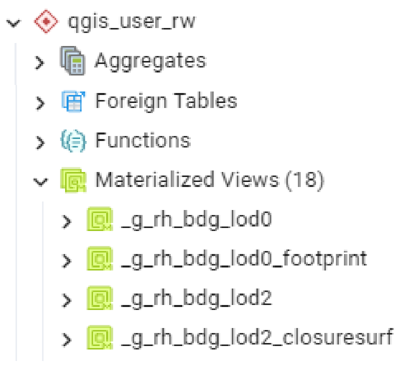
In the database user schema, both materialised views (containing the feature geometries) and the layers (as updatable views, containing the feature attributes linked to the corresponding geometries in the materialised views) can be accessed.

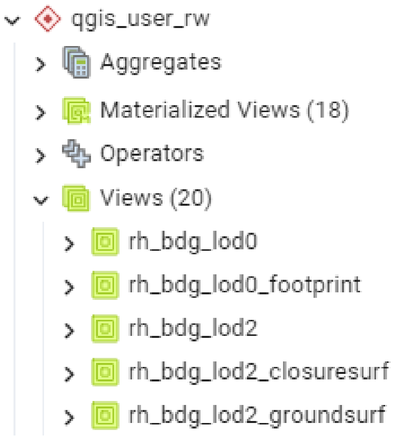
Materialised views name coding:

- "_g_" prefix + citydb schema name + feature name + lodx + (optional) semantic details

Views name coding:

- citydb schema name + feature name + lodx + (optional) semantic details
- Linked via column co_id (PK and FK to the materialised views)


qgis_user_rw
Aggregates
Foreign Tables
Functions
Materialized Views (18)
_g_rh_bdg_lod0
_g_rh_bdg_lod0_footprint
_g_rh_bdg_lod2
_g_rh_bdg_lod2_closuresurf


qgis_user_rw
Aggregates
Materialized Views (18)
Operators
Views (20)
rh_bdg_lod0
rh_bdg_lod0_footprint
rh_bdg_lod2
rh_bdg_lod2_closuresurf
rh_bdg_lod2_groundsurf

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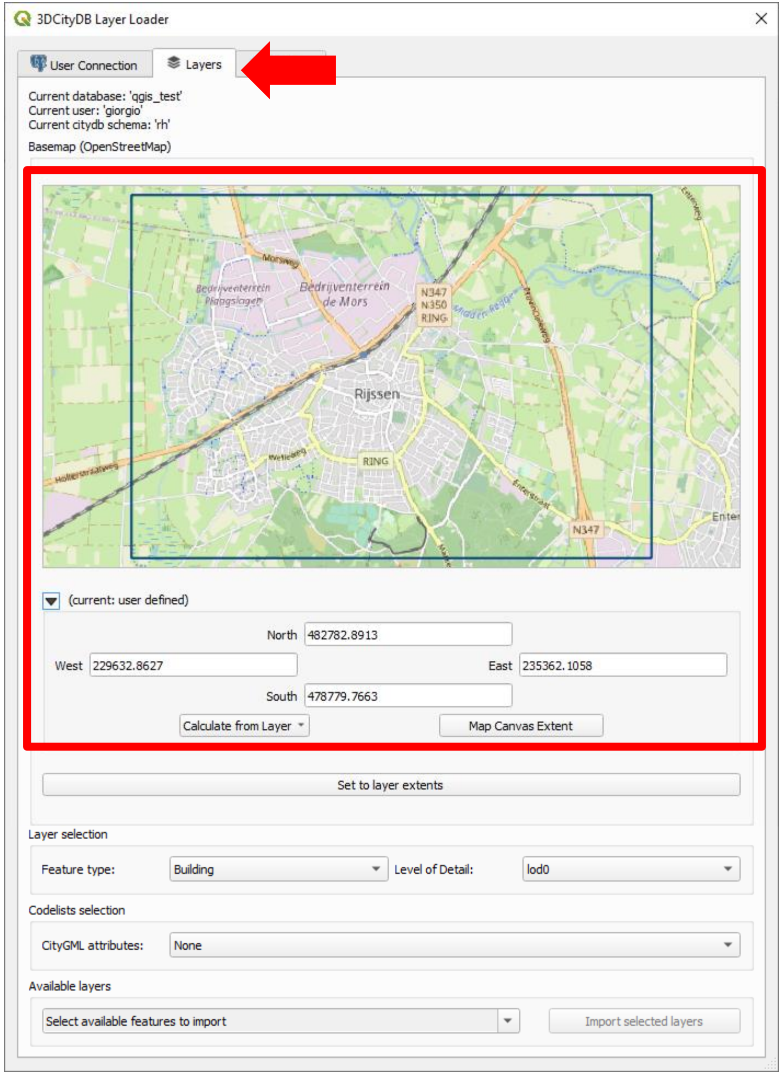
In the "Layers" tab

8) You are now directly zoomed to the layers extents (**blue bounding box**)



3DCityDB Layer Loader

User Connection | Layers

Current database: 'qgis_test'
Current user: 'giorgio'
Current citydb schema: 'rh'

Basemap (OpenStreetMap)

(current: user defined)

North 482782.8913
West 229632.8627
East 235362.1058
South 478779.7663

Calculate from Layer | Map Canvas Extent

Set to layer extents

Layer selection

Feature type: Building
Level of Detail: lod0

Codelists selection

CityGML attributes: None

Available layers

Select available features to import | Import selected layers

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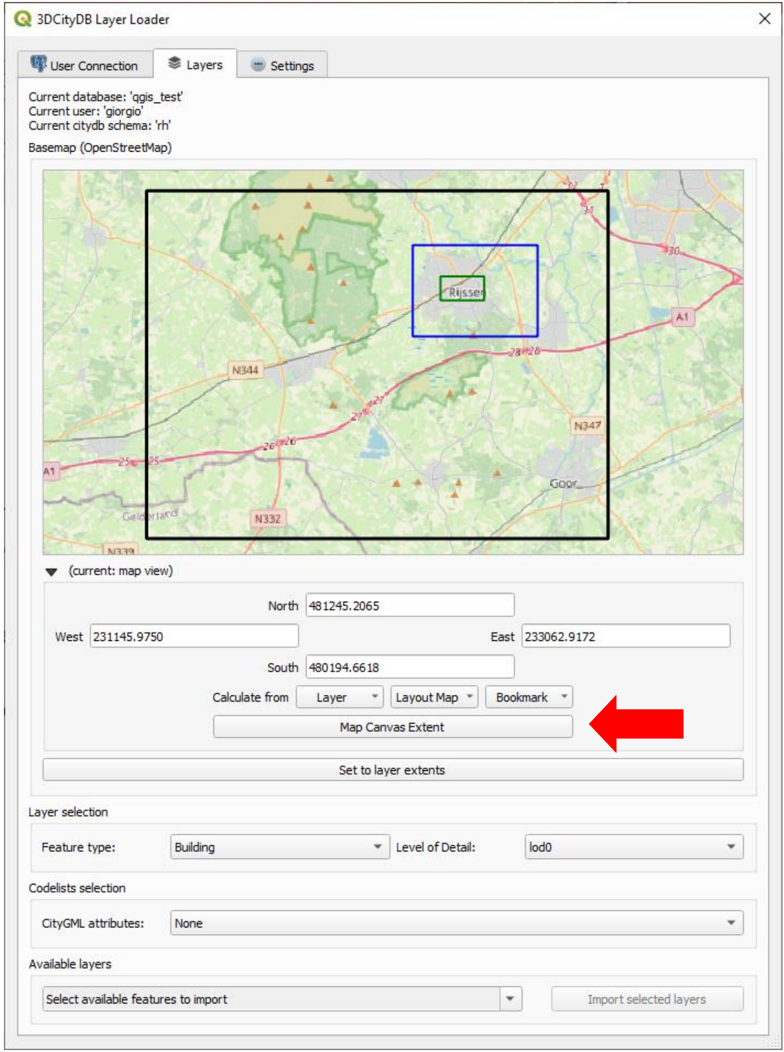
9) Depending on your needs, you can further reduce the extents of the layers to be loaded into QGIS by pressing the **Map Canvas Extent button**. The new extents are represented by the **green bounding box**.

- Default: same size of the layer extents (**blue bounding box**)
- Otherwise: zoom in and choose your own area



3DCityDB Layer Loader

User Connection | Layers | Settings

Current database: 'qgis_test'
Current user: 'giorgio'
Current citydb schema: 'rh'

Basemap (OpenStreetMap)

(current: map view)

North 481245.2065
West 231145.9750
East 233062.9172
South 480194.6618

Calculate from: Layer, Layout Map, Bookmark

Map Canvas Extent

Set to layer extents

Layer selection

Feature type: Building
Level of Detail: lod0

Codelists selection

CityGML attributes: None

Available layers

Select available features to import

Import selected layers

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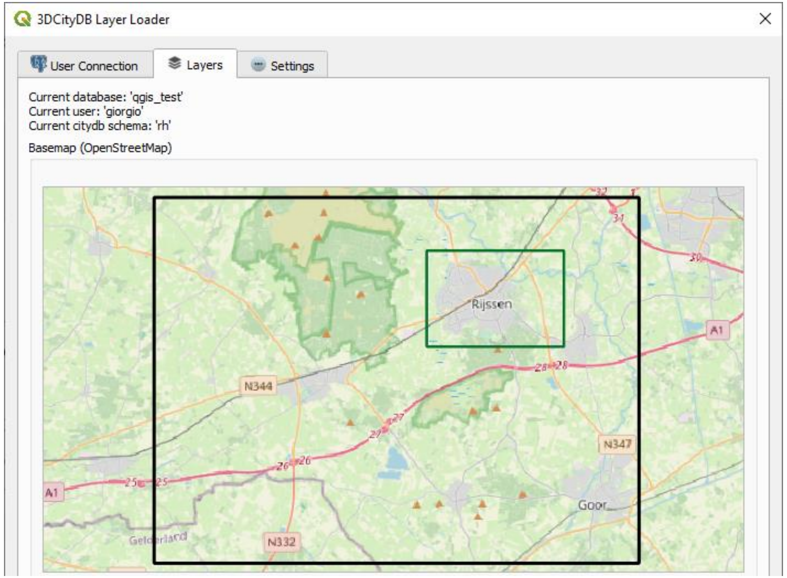
Black: database schema extents (i.e. extents of the whole city model/dataset)

Blue: database-side layers extents (i.e. extents of the materialised views)

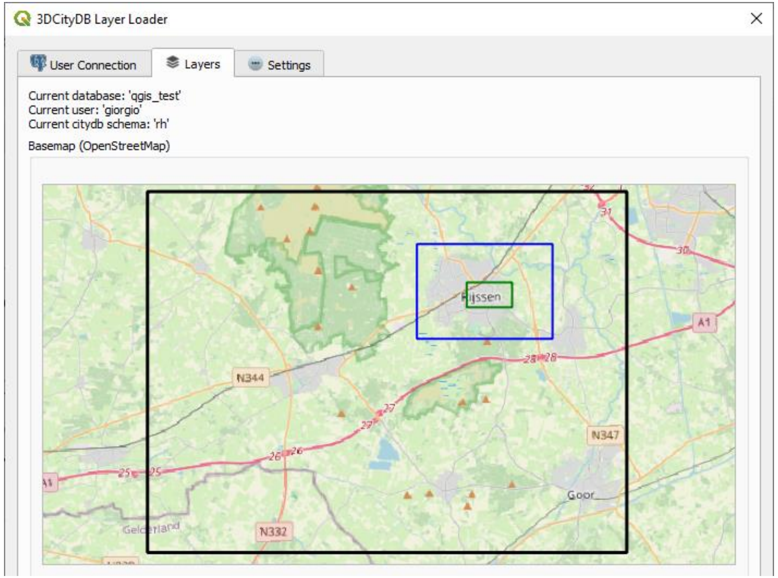
Green: QGIS-side layers extents (i.e. extents of the data loaded into QGIS)

Remember: **QGIS extents ⊆ Layers extents ⊆ City model extents**



Current database: 'qgis_test'
Current user: 'giorgio'
Current citydb schema: 'rh'

Basemap (OpenStreetMap)



Current database: 'qgis_test'
Current user: 'giorgio'
Current citydb schema: 'rh'

Basemap (OpenStreetMap)

Database- and QGIS-side extents coincide (default)

User-selected QGIS-layers extents

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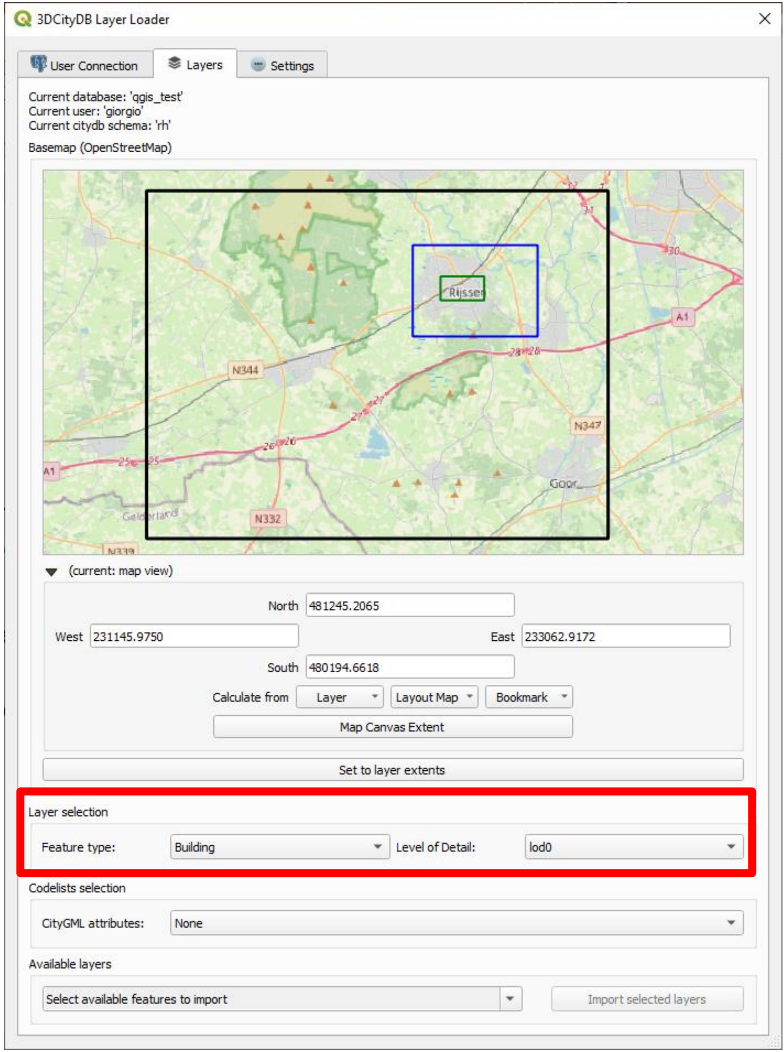
10) Select available Feature type and LoD

- Layers are grouped according to the CityGML Feature Types (e.g. "Bridge", "Building", "Tunnel", "Relief", etc.)

Behind the scenes: The plugin shows only the available Feature types and LoDs of data *within* the QGIS extents (green bounding box).



3DCityDB Layer Loader

Current database: 'qgis_test'
Current user: 'giorgio'
Current citydb schema: 'rh'

Basemap (OpenStreetMap)

(current: map view)

North 481245.2065
West 231145.9750
East 233062.9172
South 480194.6618

Layer selection

Feature type: Building
Level of Detail: lod0

Codelists selection

CityGML attributes: None

Available layers

Select available features to import

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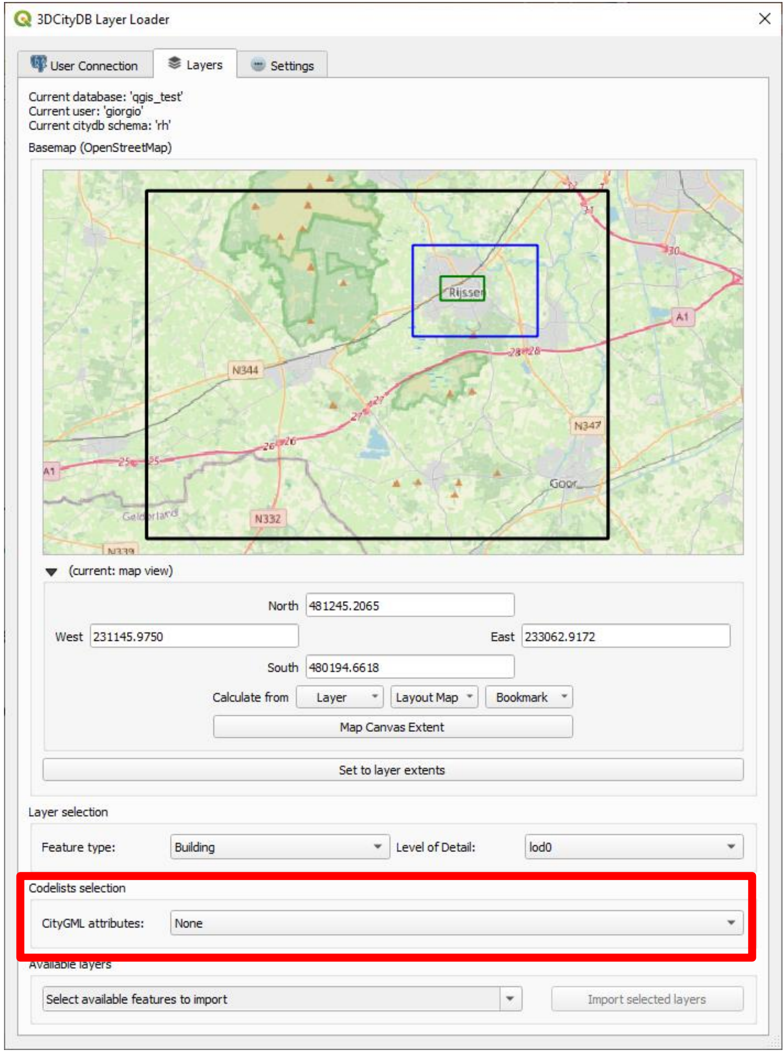
11) The **Codelist selecton** allows to <u>optionally</u> load codelists and set up the attribute forms accordingly (see next slides about "Use in QGIS" for more details)



3DCityDB Layer Loader

User Connection | Layers | Settings

Current database: 'qgis_test'
Current user: 'giorgio'
Current citydb schema: 'rh'

Basemap (OpenStreetMap)

(current: map view)

North 481245.2065
West 231145.9750
East 233062.9172
South 480194.6618

Calculate from: Layer | Layout Map | Bookmark

Map Canvas Extent

Set to layer extents

Layer selection

Feature type: Building
Level of Detail: lod0

Codelists selection

CityGML attributes: None

Available layers

Select available features to import

Import selected layers

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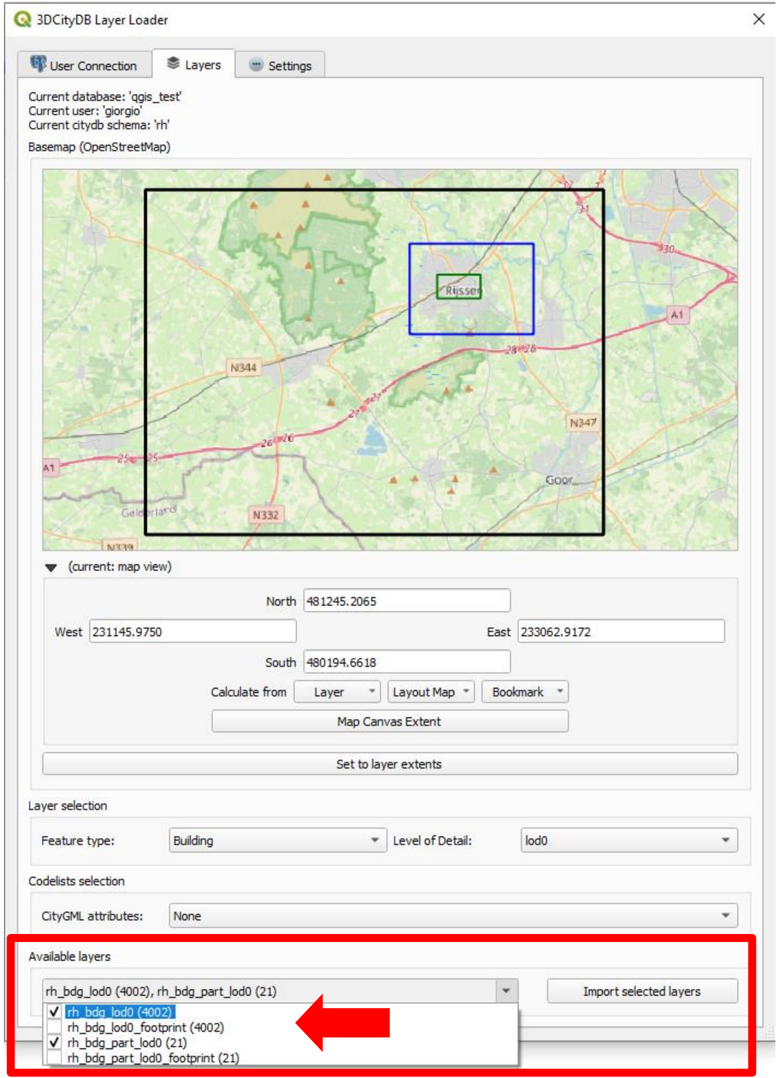
12) Select the layer(s) to import into QGIS

- The number of available features is shown next to the layer name

Behind the scenes: The plugin shows only the available Layers *within* the QGIS extents (**green bounding box**).



Current database: 'qgis_test'
Current user: 'giorgio'
Current citydb schema: 'rh'

Basemap (OpenStreetMap)

(current: map view)

North 481245.2065
West 231145.9750
East 233062.9172
South 480194.6618

Layer selection

Feature type: Building
Level of Detail: lod0

Codelists selection

CityGML attributes: None

Available layers

rh_bdg_lod0 (4002), rh_bdg_part_lod0 (21)

☑ rh_bdg_lod0 (4002)
□ rh_bdg_lod0_footprint (4002)
☑ rh_bdg_part_lod0 (21)
□ rh_bdg_part_lod0_footprint (21)

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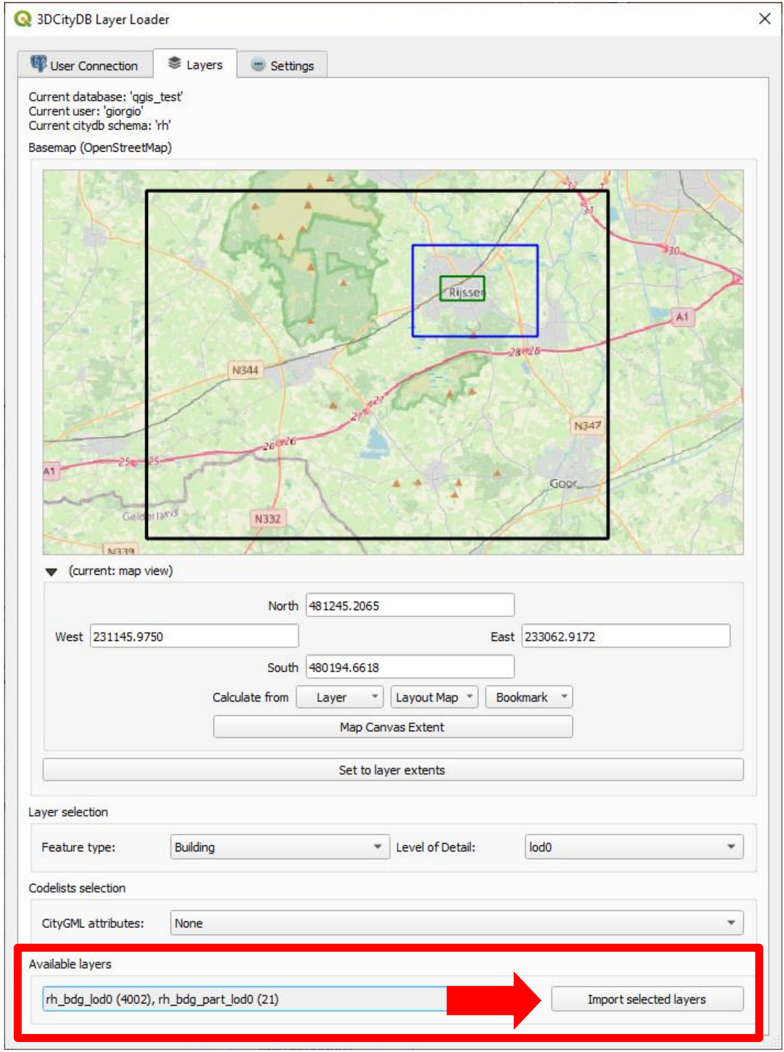
13) Import the selected layers to QGIS by clicking on the **Import selected layers button**

- The import operation can be repeated with different layers
- The layers will be automatically added to the QGIS Layers Tree / Table of Contents
- The Plugin window can be closed, the connection parameters and settings will be kept until the connection is intentionally closed by the user (in the "User Connection" tab)

Nota bene: Layers that have already been loaded can be selected, but won't be loaded again



Current database: 'qgis_test'
Current user: 'giorgio'
Current citydb schema: 'rh'

Basemap (OpenStreetMap)

(current: map view)

North 481245.2065
West 231145.9750
East 233062.9172
South 480194.6618

Calculate from: Layer, Layout Map, Bookmark
Map Canvas Extent
Set to layer extents

Layer selection
Feature type: Building
Level of Detail: lod0

Codelists selection
CityGML attributes: None

Available layers
rh_bdg_lod0 (4002), rh_bdg_part_lod0 (21)
Import selected layers

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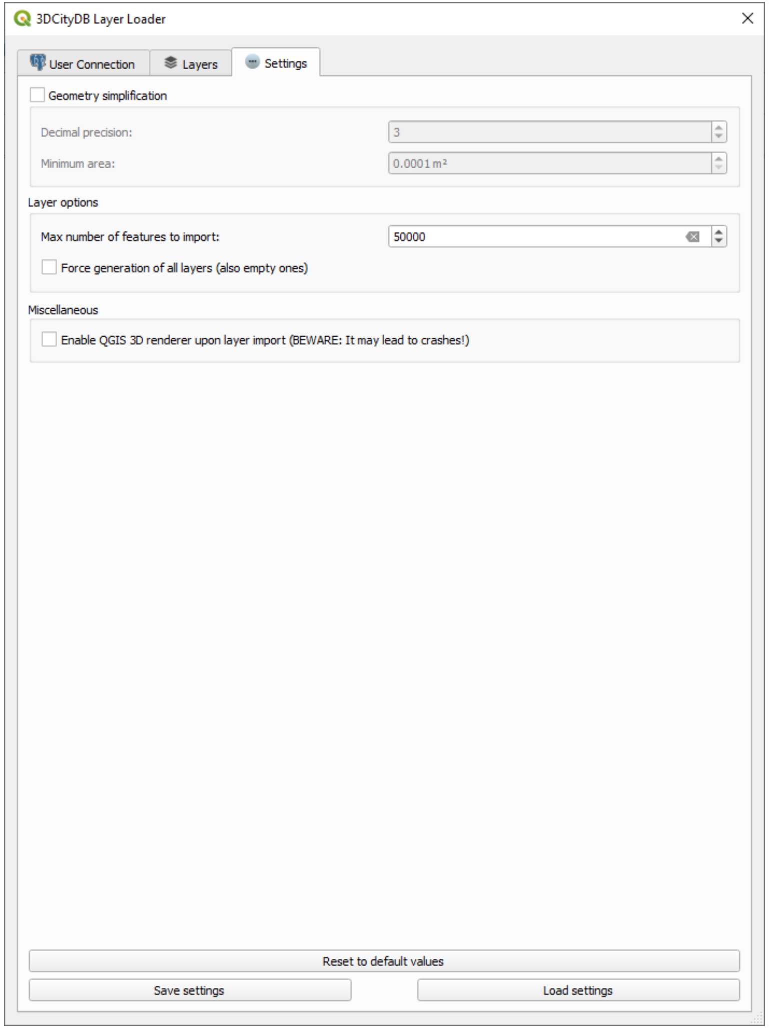
The "Settings" tab allows to enable specific options.

- The **Geometry simplification box** contains details about the coordinates precisions and the minimum area of the geometries to be generated in the materialized views
- The **Layer options box** allows to set the maximum number of features to be imported in each import action and to force the generation of the empty layers
- In the **Miscellaneous box**, the user can force the 3D rendered to be enabled upon import of the selected layers, although this might lead to instabilities (see next slides)
- Settings can be saved, (re)loaded and reset to the default values.



3DCityDB Layer Loader

□ Geometry simplification
Decimal precision: 3
Minimum area: 0.0001 m²

Layer options
Max number of features to import: 50000
□ Force generation of all layers (also empty ones)

Miscellaneous
□ Enable QGIS 3D renderer upon layer import (BEWARE: It may lead to crashes!)

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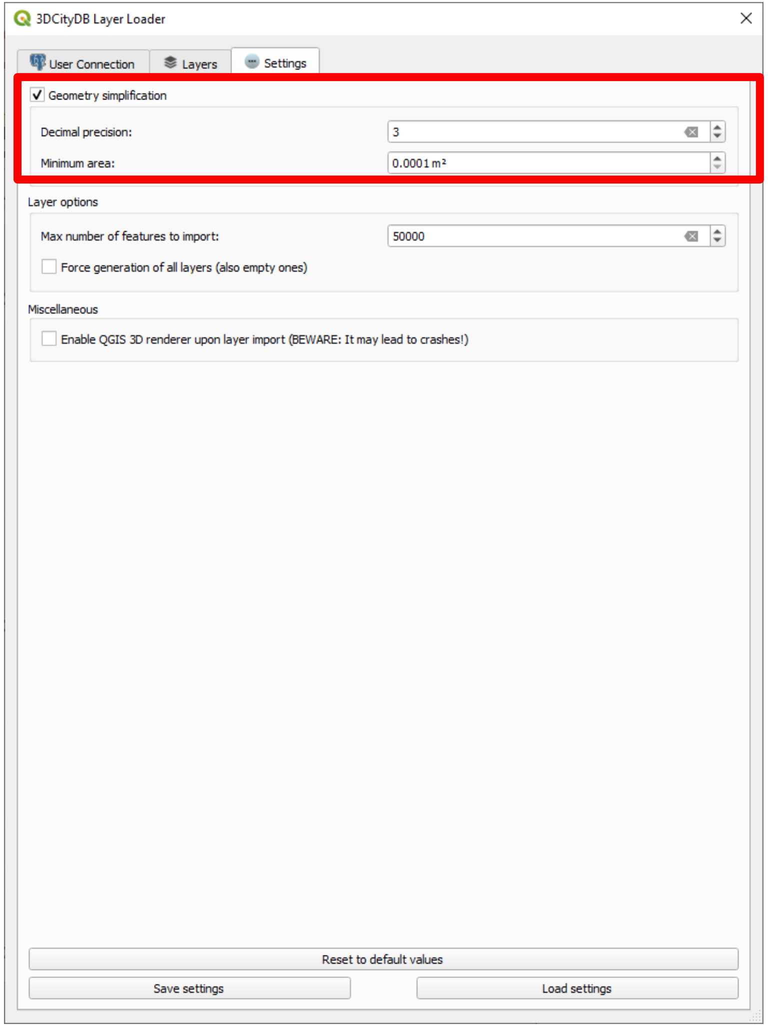
Geometry simplification

In order to simplify geometries and (partially) cope with the 3D visualisation issues of the 3D View Map in QGIS, the user can set some simplification parameters *before* generating the layers.

All polygons composing the geometries will be checked. The user can set the number of decimal positions in the coordinates. Resulting degenerate geometries are filtered out. The second parameter filters out all polygons smaller than the chosen threshold.

Beware! This operation:

- can significantly increase the time needed to refresh the layers
- does NOT change the original data in the database!



☑ Geometry simplification

Decimal precision: 3

Minimum area: 0.0001 m²

Layer options

Max number of features to import: 50000

□ Force generation of all layers (also empty ones)

Miscellaneous

□ Enable QGIS 3D renderer upon layer import (BEWARE: It may lead to crashes!)

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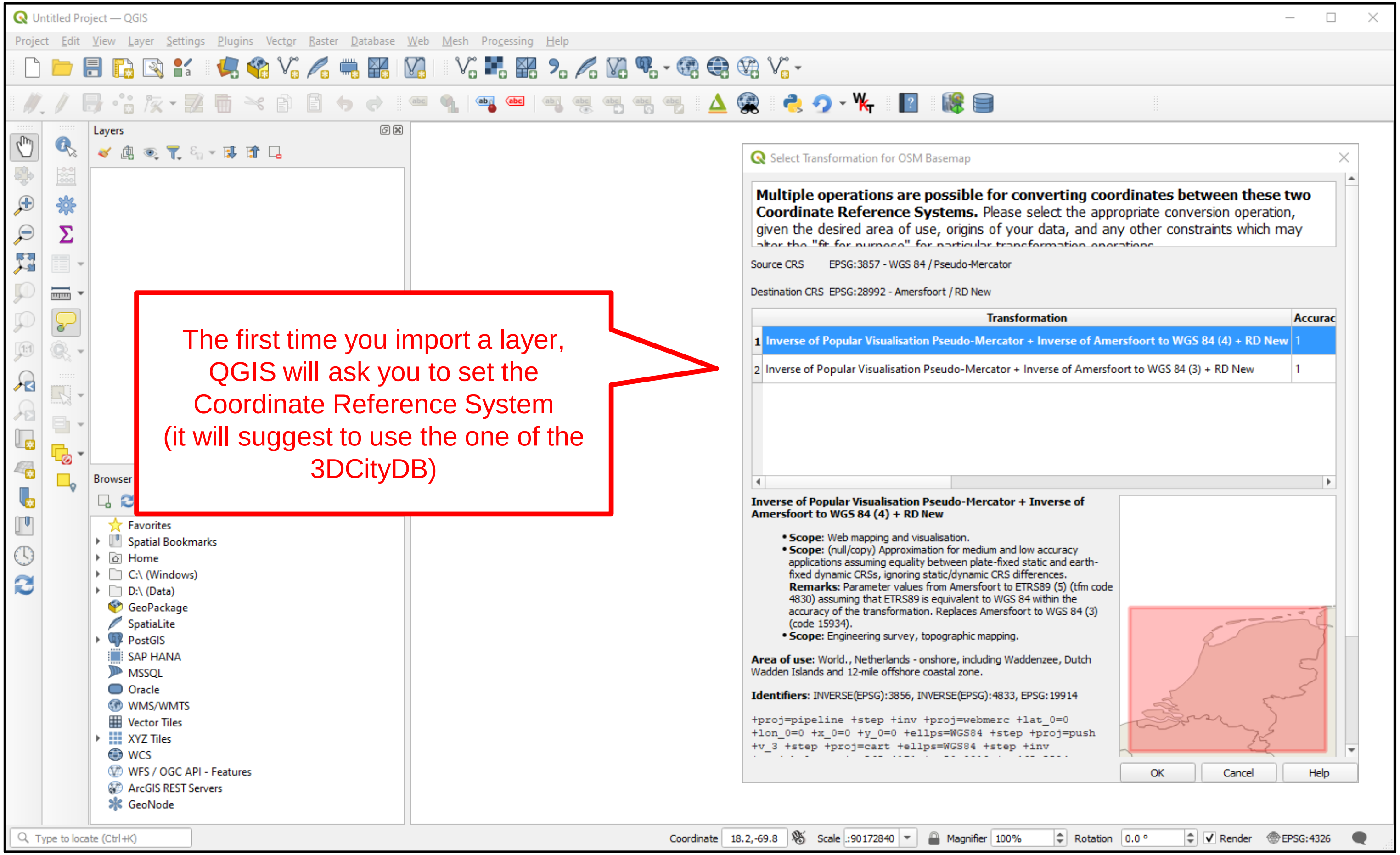
Use in QGIS: Layers



Select Transformation for OSM Basemap

Multiple operations are possible for converting coordinates between these two Coordinate Reference Systems. Please select the appropriate conversion operation, given the desired area of use, origins of your data, and any other constraints which may alter the "fit for purpose" for particular transformation operations.

Source CRS EPSG:3857 - WGS 84 / Pseudo-Mercator

Destination CRS EPSG:28992 - Amersfoort / RD New

	Transformation	Accurac
1	Inverse of Popular Visualisation Pseudo-Mercator + Inverse of Amersfoort to WGS 84 (4) + RD New	1
2	Inverse of Popular Visualisation Pseudo-Mercator + Inverse of Amersfoort to WGS 84 (3) + RD New	1

Inverse of Popular Visualisation Pseudo-Mercator + Inverse of Amersfoort to WGS 84 (4) + RD New

- **Scope:** Web mapping and visualisation.
- **Scope:** (null/copy) Approximation for medium and low accuracy applications assuming equality between plate-fixed static and earth-fixed dynamic CRSs, ignoring static/dynamic CRS differences. **Remarks:** Parameter values from Amersfoort to ETRS89 (5) (tfm code 4830) assuming that ETRS89 is equivalent to WGS 84 within the accuracy of the transformation. Replaces Amersfoort to WGS 84 (3) (code 15934).
- **Scope:** Engineering survey, topographic mapping.

Area of use: World., Netherlands - onshore, including Waddenzee, Dutch Wadden Islands and 12-mile offshore coastal zone.

Identifiers: INVERSE(EPSG):3856, INVERSE(EPSG):4833, EPSG:19914

```
+proj=pipeline +step +inv +proj=webmerc +lat_0=0
+lon_0=0 +x_0=0 +y_0=0 +ellps=WGS84 +step +proj=push
+v_3 +step +proj=cart +ellps=WGS84 +step +inv
```

The first time you import a layer, QGIS will ask you to set the Coordinate Reference System (it will suggest to use the one of the 3DCityDB)

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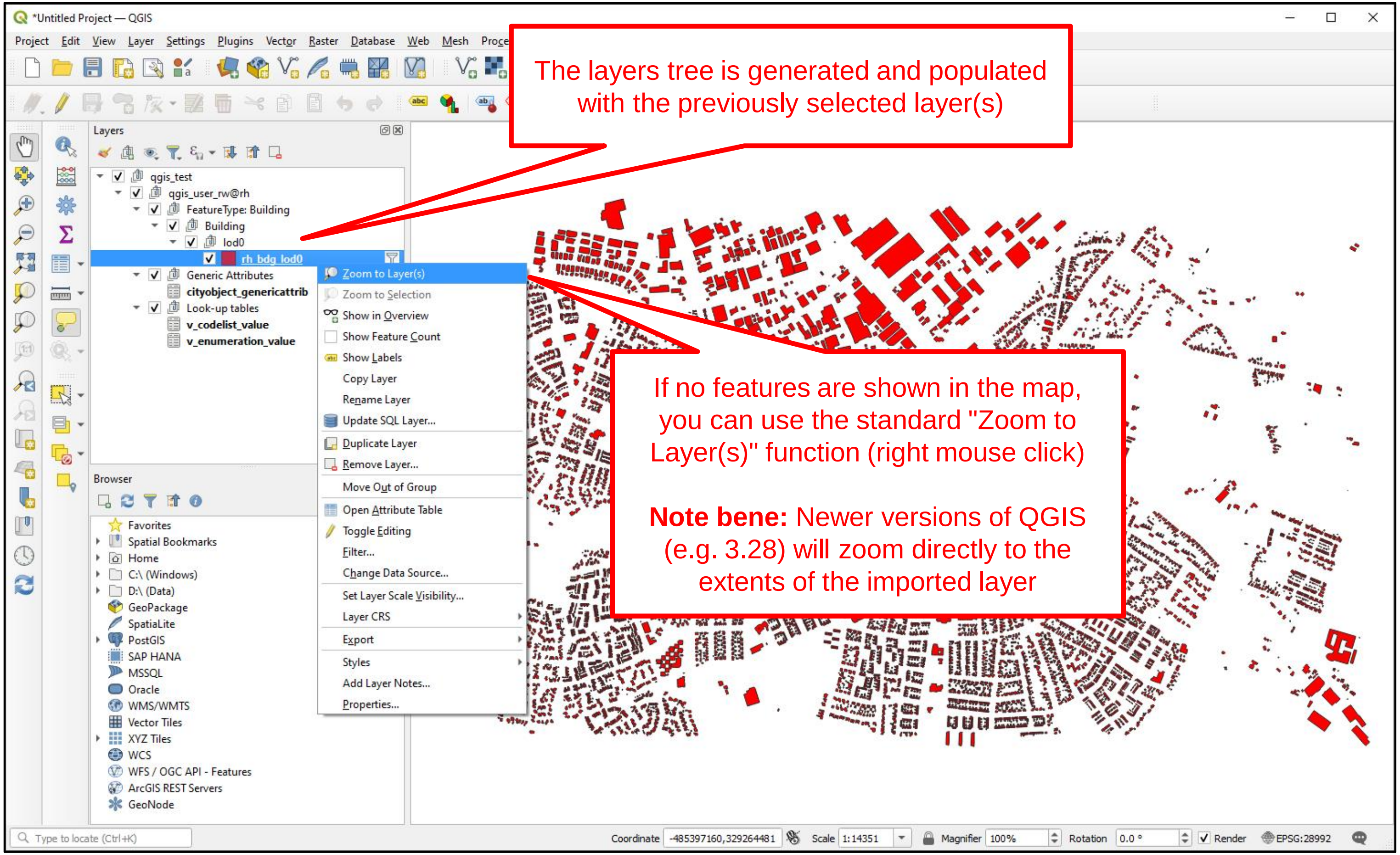

The layers tree is generated and populated with the previously selected layer(s)

If no features are shown in the map, you can use the standard "Zoom to Layer(s)" function (right mouse click)

Note bene: Newer versions of QGIS (e.g. 3.28) will zoom directly to the extents of the imported layer

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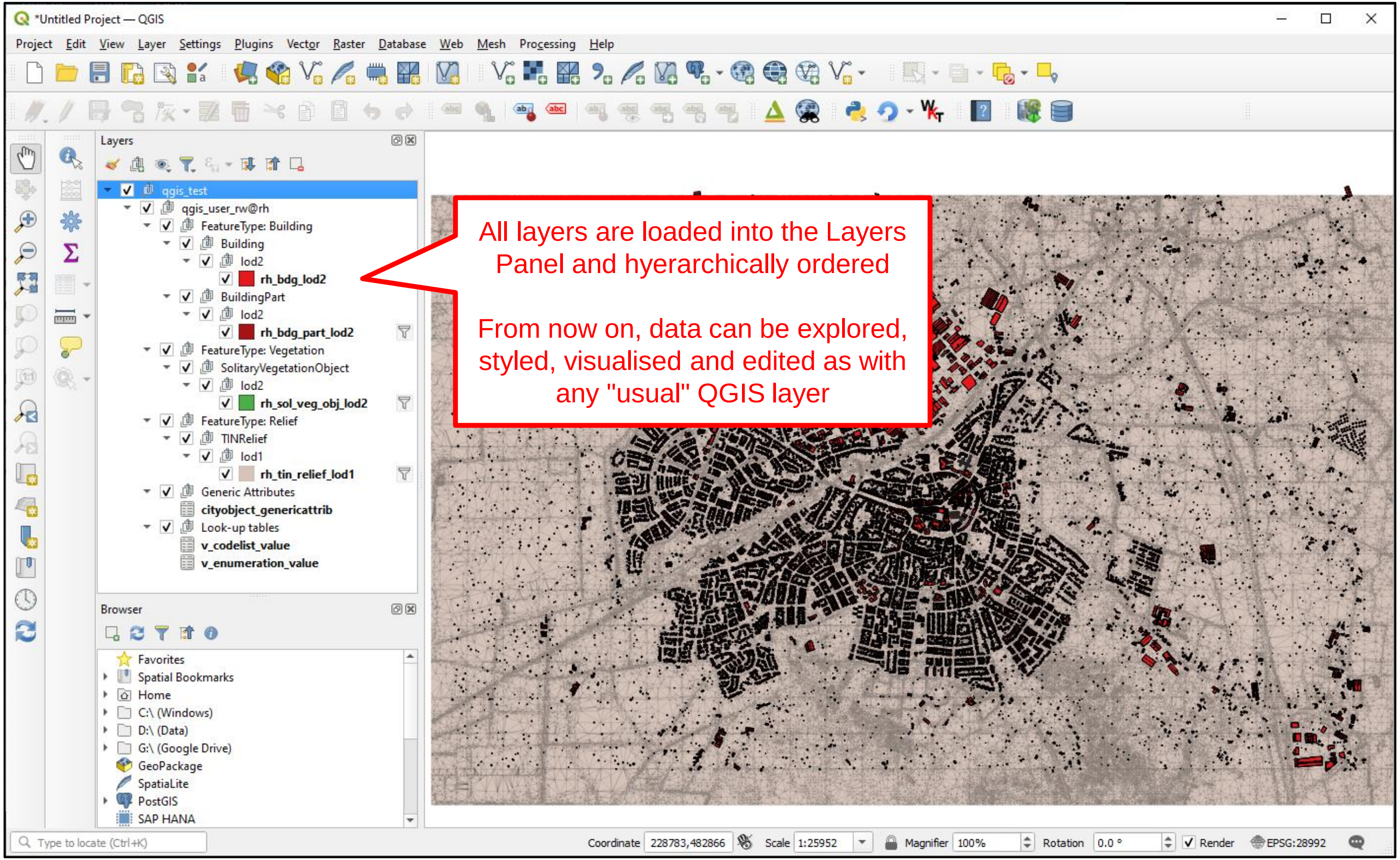

- ☑ qgis_test
  - ☑ qgis_user_rw@rh
    - ☑ FeatureType: Building
      - ☑ Building
        - ☑ lod2
          - ☑ 🟥 rh_bdg_lod2
      - ☑ BuildingPart
        - ☑ lod2
          - ☑ 🟥 rh_bdg_part_lod2
    - ☑ FeatureType: Vegetation
      - ☑ SolitaryVegetationObject
        - ☑ lod2
          - ☑ 🟩 rh_sol_veg_obj_lod2
    - ☑ FeatureType: Relief
      - ☑ TINRelief
        - ☑ lod1
          - ☑ rh_tin_relief_lod1
    - ☑ Generic Attributes
      - cityobject_genericattrib
    - ☑ Look-up tables
      - v_codelist_value
      - v_enumeration_value

Coordinate 228783,482866 Scale 1:25952 Magnifier 100% Rotation 0.0 ° ☑ Render EPSG:28992

All layers are loaded into the Layers Panel and hyerarchically ordered

From now on, data can be explored, styled, visualised and edited as with any "usual" QGIS layer

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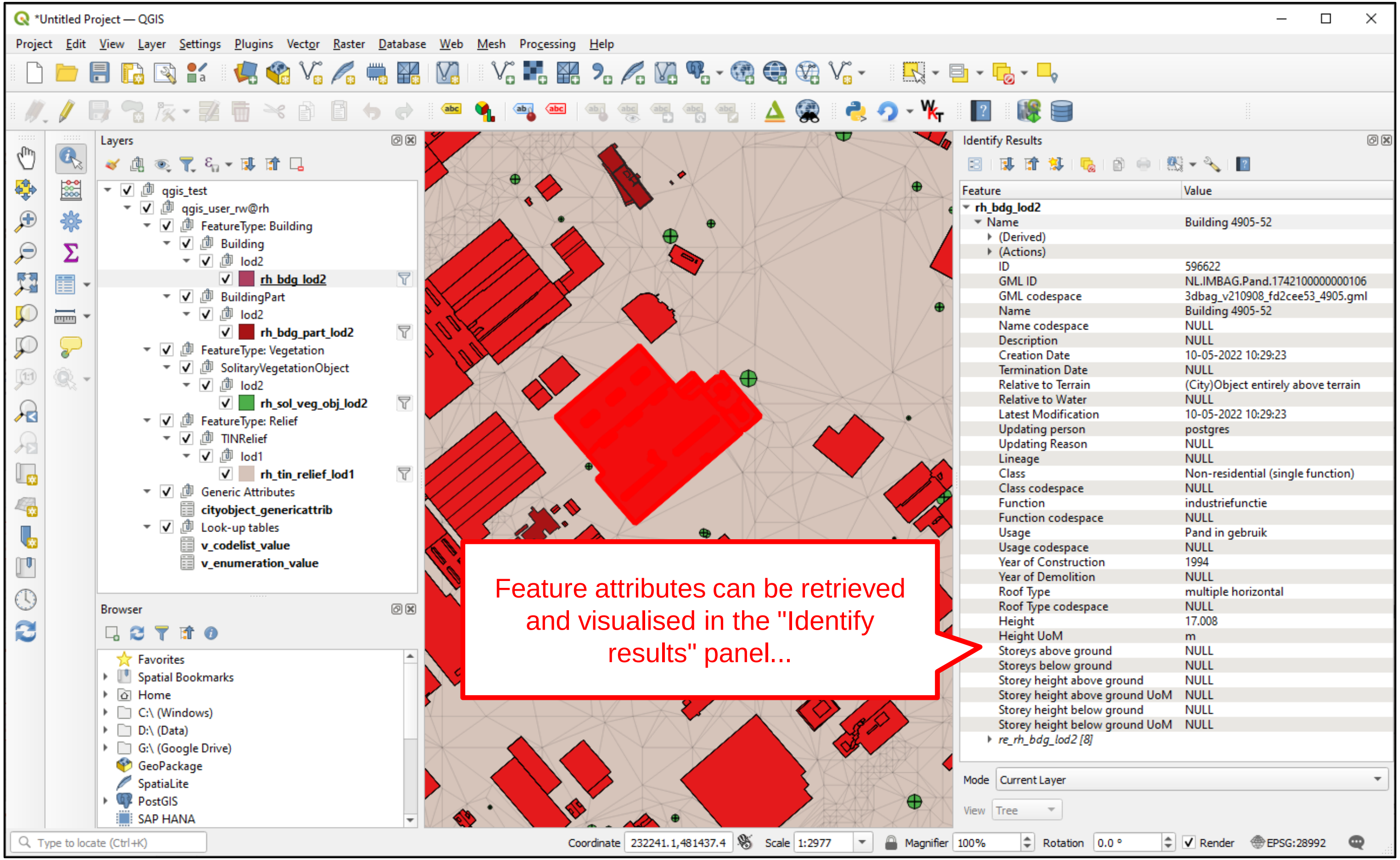

Feature	Value
rh_bdg_lod2	
Name	Building 4905-52
(Derived)	
(Actions)	
ID	596622
GML ID	NL.IMBAG.Pand.1742100000000106
GML codespace	3dbag_v210908_fd2cee53_4905.gml
Name	Building 4905-52
Name codespace	NULL
Description	NULL
Creation Date	10-05-2022 10:29:23
Termination Date	NULL
Relative to Terrain	(City)Object entirely above terrain
Relative to Water	NULL
Latest Modification	10-05-2022 10:29:23
Updating person	postgres
Updating Reason	NULL
Lineage	NULL
Class	Non-residential (single function)
Class codespace	NULL
Function	industriefunctie
Function codespace	NULL
Usage	Pand in gebruik
Usage codespace	NULL
Year of Construction	1994
Year of Demolition	NULL
Roof Type	multiple horizontal
Roof Type codespace	NULL
Height	17.008
Height UoM	m
Storeys above ground	NULL
Storeys below ground	NULL
Storey height above ground	NULL
Storey height above ground UoM	NULL
Storey height below ground	NULL
Storey height below ground UoM	NULL
re_rh_bdg_lod2 [8]	

Feature attributes can be retrieved and visualised in the "Identify results" panel...

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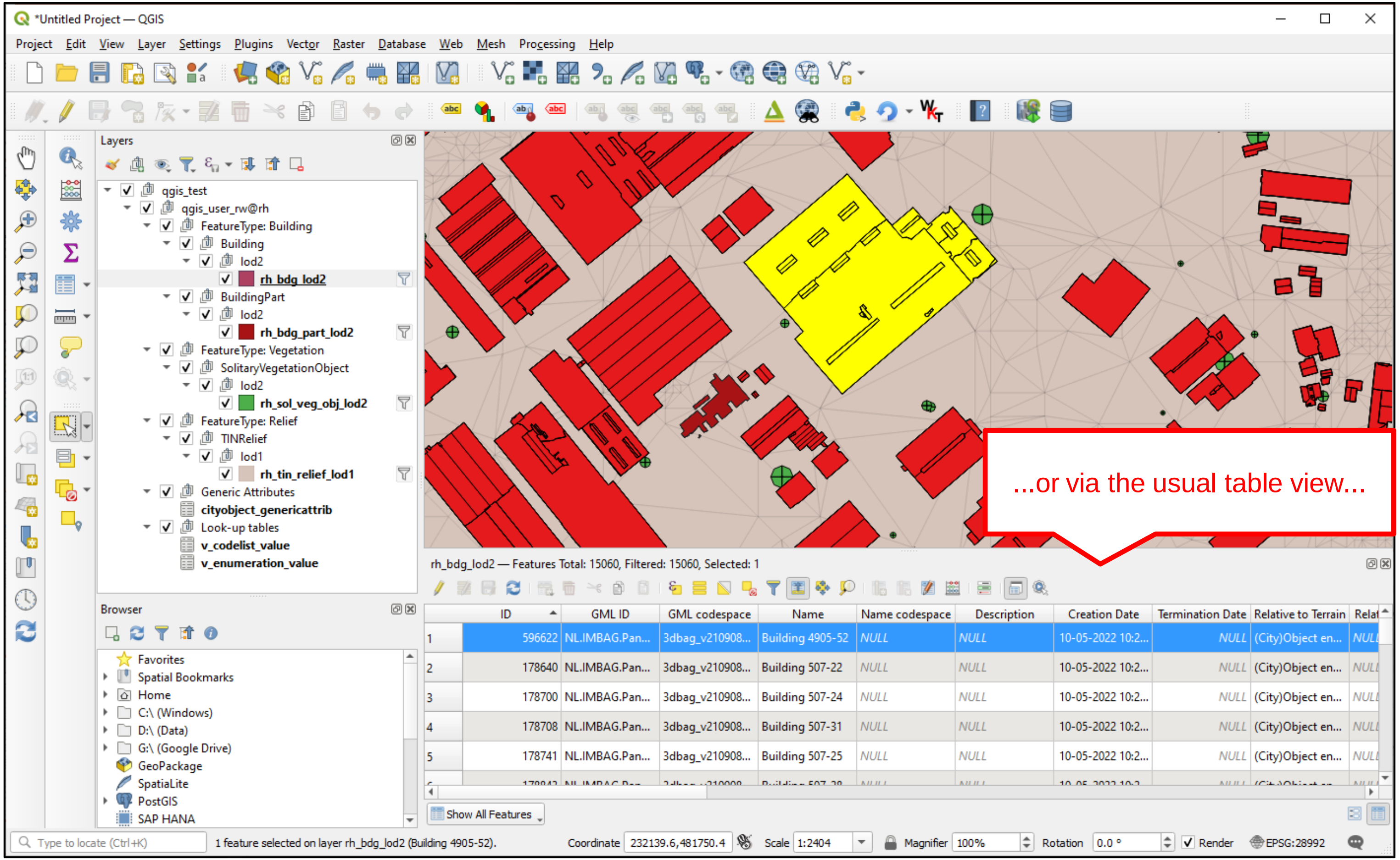

...or via the usual table view...

rh_bdg_lod2 — Features Total: 15060, Filtered: 15060, Selected: 1

	ID	GML ID	GML codespace	Name	Name codespace	Description	Creation Date	Termination Date	Relative to Terrain	Relat
1	596622	NL.IMBAG.Pan...	3dbag_v210908...	Building 4905-52	NULL	NULL	10-05-2022 10:2...	NULL	(City)Object en...	NULL
2	178640	NL.IMBAG.Pan...	3dbag_v210908...	Building 507-22	NULL	NULL	10-05-2022 10:2...	NULL	(City)Object en...	NULL
3	178700	NL.IMBAG.Pan...	3dbag_v210908...	Building 507-24	NULL	NULL	10-05-2022 10:2...	NULL	(City)Object en...	NULL
4	178708	NL.IMBAG.Pan...	3dbag_v210908...	Building 507-31	NULL	NULL	10-05-2022 10:2...	NULL	(City)Object en...	NULL
5	178741	NL.IMBAG.Pan...	3dbag_v210908...	Building 507-25	NULL	NULL	10-05-2022 10:2...	NULL	(City)Object en...	NULL

1 feature selected on layer rh_bdg_lod2 (Building 4905-52).

Coordinate 232139.6,481750.4 Scale 1:2404 Magnifier 100% Rotation 0.0 ° ☑ Render EPSG:28992

Use in QGIS: Attributes

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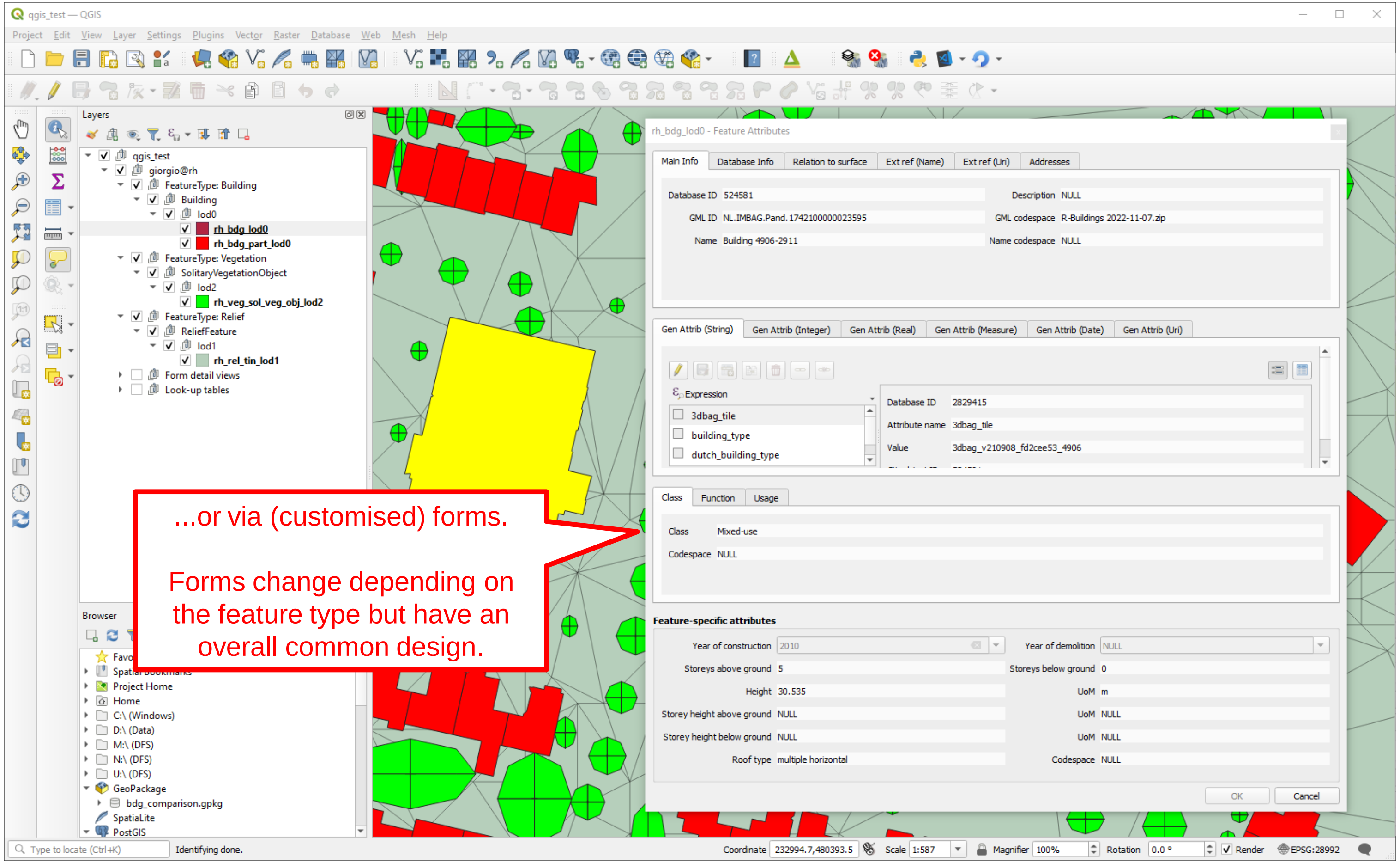

rh_bdg_lod0 - Feature Attributes

Main Info | Database Info | Relation to surface | Ext ref (Name) | Ext ref (Uri) | Addresses

Database ID	524581	Description	NULL
GML ID	NL.IMBAG.Pand.1742100000023595	GML codespace	R-Buildings 2022-11-07.zip
Name	Building 4906-2911	Name codespace	NULL

Gen Attrib (String) | Gen Attrib (Integer) | Gen Attrib (Real) | Gen Attrib (Measure) | Gen Attrib (Date) | Gen Attrib (Uri)

Expression

- □ 3dbag_tile
- □ building_type
- □ dutch_building_type

Database ID	2829415
Attribute name	3dbag_tile
Value	3dbag_v210908_fd2cee53_4906

Class | Function | Usage

Class	Mixed-use
Codespace	NULL

Feature-specific attributes

Year of construction	2010	Year of demolition	NULL
Storeys above ground	5	Storeys below ground	0
Height	30.535	UoM	m
Storey height above ground	NULL	UoM	NULL
Storey height below ground	NULL	UoM	NULL
Roof type	multiple horizontal	Codespace	NULL

OK | Cancel

Coordinate 232994.7,480393.5 Scale 1:587 Magnifier 100% Rotation 0.0 ° ☑ Render EPSG:28992

...or via (customised) forms.

Forms change depending on the feature type but have an overall common design.

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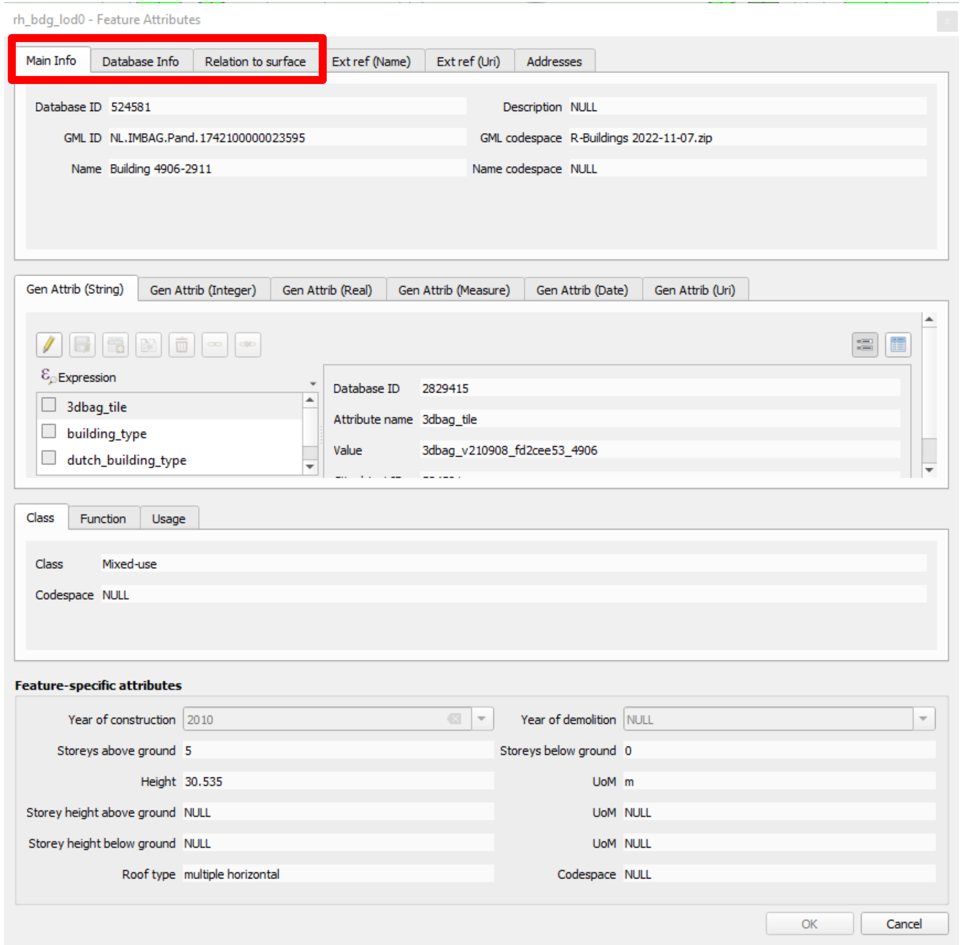
Use in QGIS: Attributes

Attributes are grouped into tabs.



Database ID 524581
Description NULL
GML ID NL.IMBAG.Pand.1742100000023595
GML codespace R-Buildings 2022-11-07.zip
Name Building 4906-2911
Name codespace NULL

□ 3dbag_tile
□ building_type
□ dutch_building_type

Database ID 2829415
Attribute name 3dbag_tile
Value 3dbag_v210908_fd2cee53_4906

Class Mixed-use
Codespace NULL

Feature-specific attributes

Year of construction	2010	Year of demolition	NULL
Storeys above ground	5	Storeys below ground	0
Height	30.535	UoM	m
Storey height above ground	NULL	UoM	NULL
Storey height below ground	NULL	UoM	NULL
Roof type	multiple horizontal	Codespace	NULL

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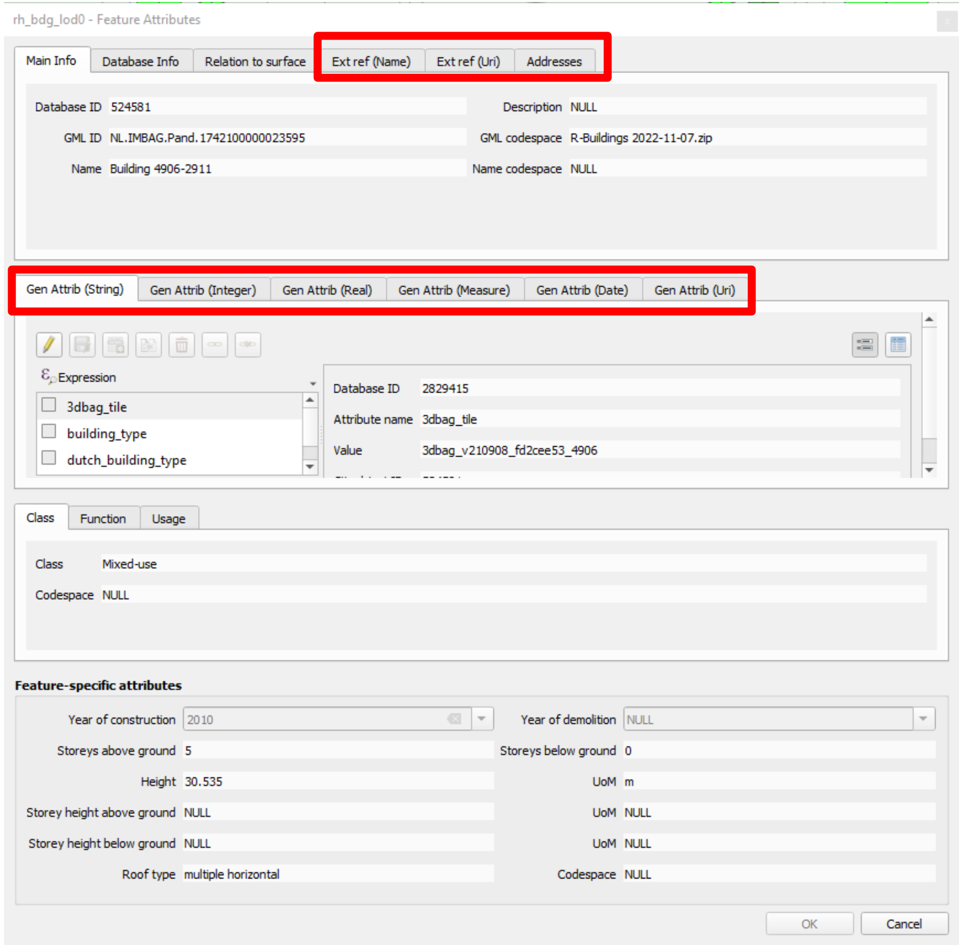
Use in QGIS: Attributes

Additional related tables are connected (e.g. External References, Addresses, Generic Attributes)



rh_bdg_lod0 - Feature Attributes

Database ID 524581
Description NULL
GML ID NL.IMBAG.Pand.1742100000023595
GML codespace R-Buildings 2022-11-07.zip
Name Building 4906-2911
Name codespace NULL

□ 3dbag_tile
□ building_type
□ dutch_building_type

Database ID 2829415
Attribute name 3dbag_tile
Value 3dbag_v210908_fd2cee53_4906

Class Mixed-use
Codespace NULL

Feature-specific attributes

Year of construction 2010
Year of demolition NULL
Storeys above ground 5
Storeys below ground 0
Height 30.535
UoM m
Storey height above ground NULL
UoM NULL
Storey height below ground NULL
UoM NULL
Roof type multiple horizontal
Codespace NULL

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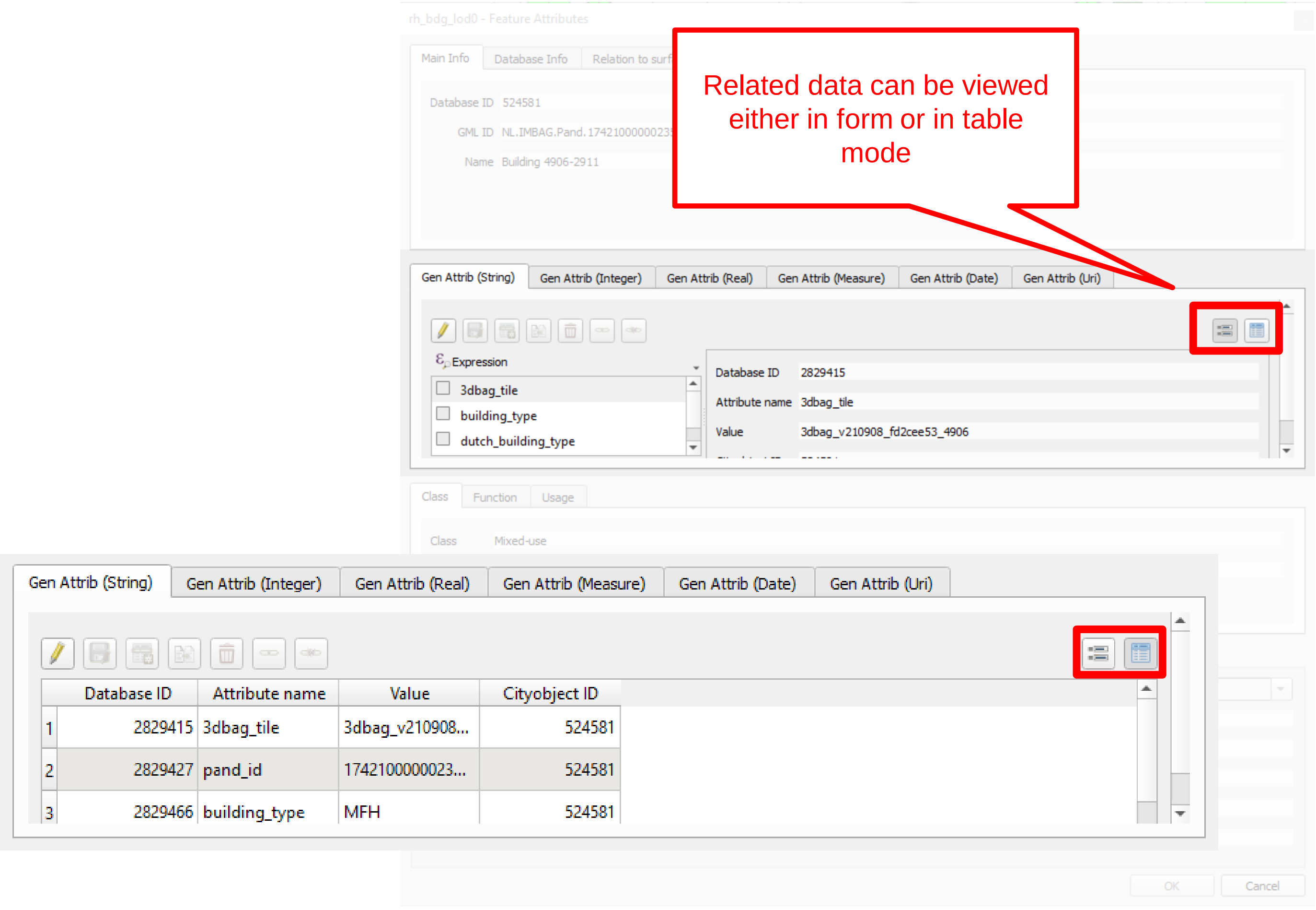

rh_bdg_lod0 - Feature Attributes

Main Info | Database Info | Relation to surf

Database ID 524581
GML ID NL.IMBAG.Pand.17421000000023
Name Building 4906-2911

Related data can be viewed either in form or in table mode

Gen Attrib (String) | Gen Attrib (Integer) | Gen Attrib (Real) | Gen Attrib (Measure) | Gen Attrib (Date) | Gen Attrib (Uri)

Expression
□ 3dbag_tile
□ building_type
□ dutch_building_type

Database ID 2829415
Attribute name 3dbag_tile
Value 3dbag_v210908_fd2cee53_4906

Class | Function | Usage

Class Mixed-use

OK Cancel

Gen Attrib (String) | Gen Attrib (Integer) | Gen Attrib (Real) | Gen Attrib (Measure) | Gen Attrib (Date) | Gen Attrib (Uri)

	Database ID	Attribute name	Value	Cityobject ID
1	2829415	3dbag_tile	3dbag_v210908...	524581
2	2829427	pand_id	1742100000023...	524581
3	2829466	building_type	MFH	524581

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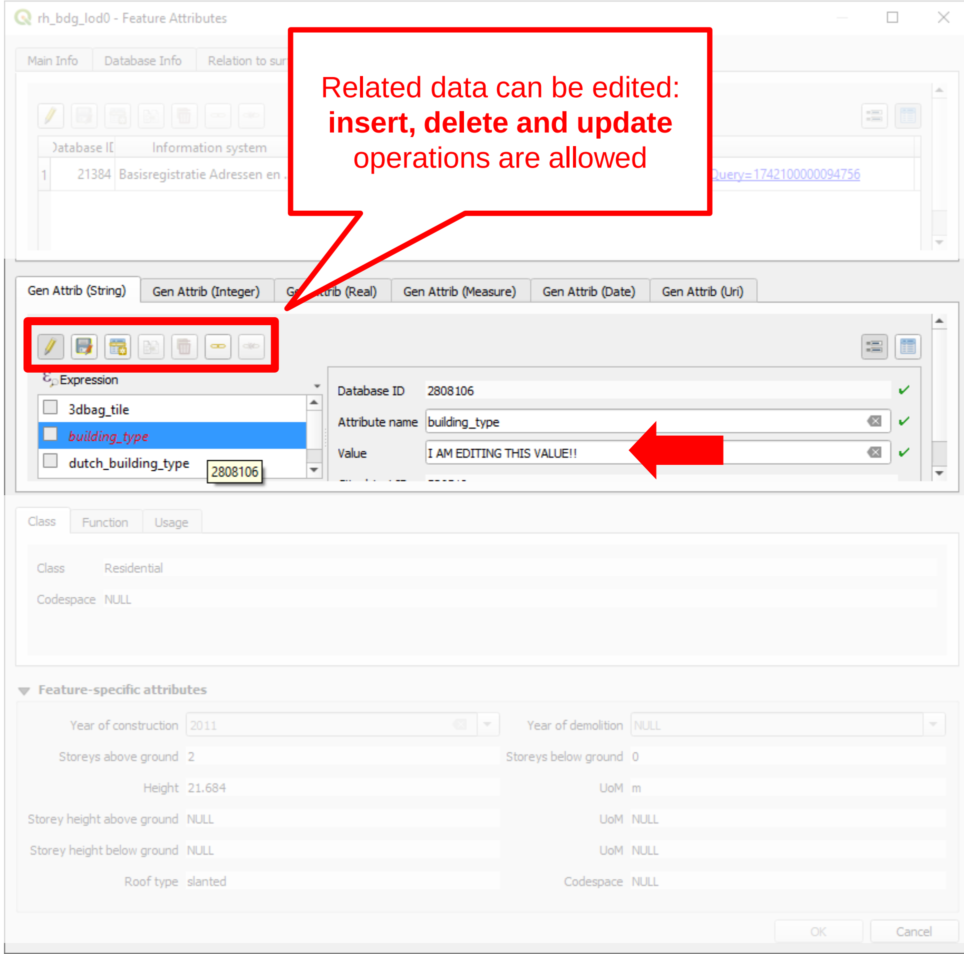

rh_bdg_lod0 - Feature Attributes

Database ID	Information system	
1 21384	Basisregistratie Adressen en ...	Query=1742100000094756

Related data can be edited: **insert, delete and update** operations are allowed

□ 3dbag_tile
□ *building_type*
□ dutch_building_type
2808106

Database ID 2808106 ✓
Attribute name building_type ✓
Value I AM EDITING THIS VALUE!! ✓

Class Residential
Codespace NULL

Feature-specific attributes

Year of construction 2011
Year of demolition NULL
Storeys above ground 2
Storeys below ground 0
Height 21.684
UoM m
Storey height above ground NULL
UoM NULL
Storey height below ground NULL
UoM NULL
Roof type slanted
Codespace NULL

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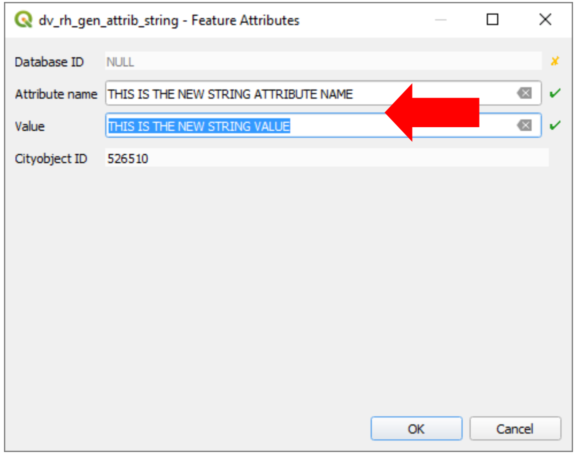
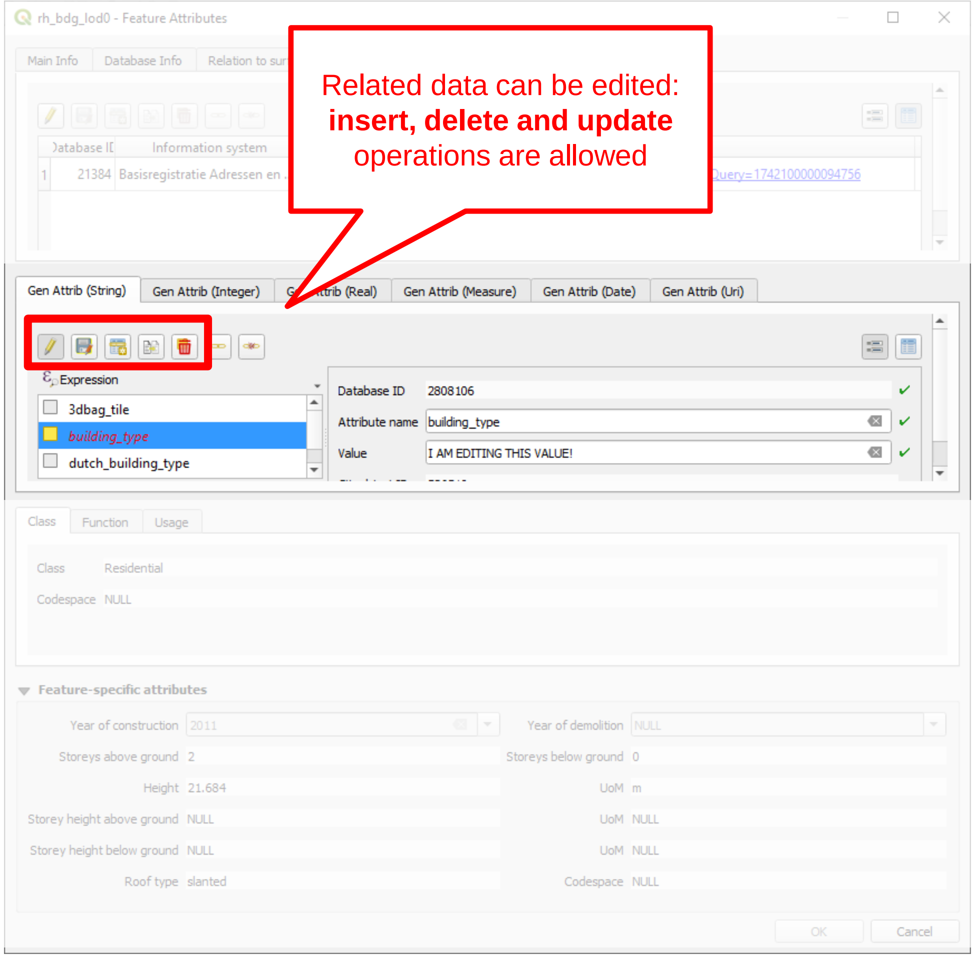


dv_rh_gen_attrib_string - Feature Attributes

Database ID NULL
Attribute name THIS IS THE NEW STRING ATTRIBUTE NAME
Value THIS IS THE NEW STRING VALUE
Cityobject ID 526510



rh_bdg_lod0 - Feature Attributes

Database ID	Information system
1 21384	Basisregistratie Adressen en .

Query=1742100000094756

□ 3dbag_tile
□ *building_type*
□ dutch_building_type

Database ID 2808106
Attribute name building_type
Value I AM EDITING THIS VALUE!

Class Residential
Codespace NULL

Feature-specific attributes

Year of construction 2011
Year of demolition NULL
Storeys above ground 2
Storeys below ground 0
Height 21.684
UoM m
Storey height above ground NULL
UoM NULL
Storey height below ground NULL
UoM NULL
Roof type slanted
Codespace NULL

Related data can be edited: **insert, delete and update** operations are allowed

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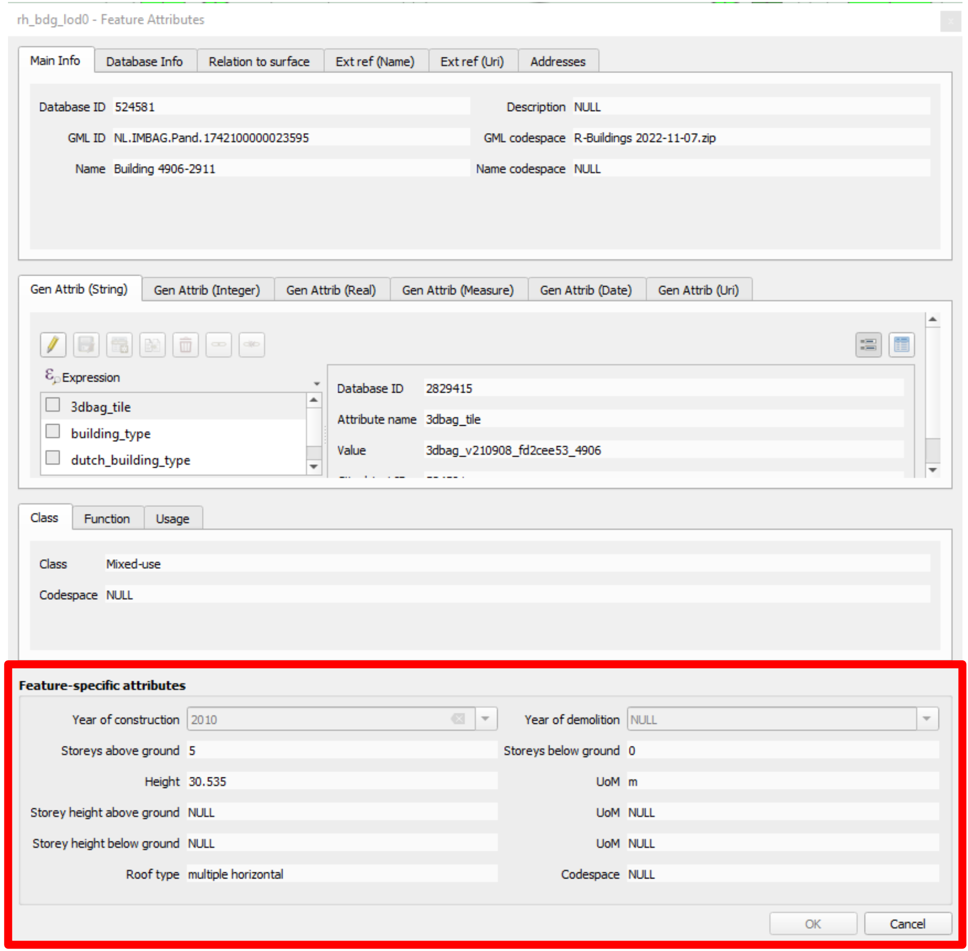

Database ID 524581
Description NULL
GML ID NL.IMBAG.Pand.1742100000023595
GML codespace R-Buildings 2022-11-07.zip
Name Building 4906-2911
Name codespace NULL

□ 3dbag_tile
□ building_type
□ dutch_building_type

Database ID 2829415
Attribute name 3dbag_tile
Value 3dbag_v210908_fd2cee53_4906

Class Mixed-use
Codespace NULL

Feature-specific attributes

Year of construction 2010
Year of demolition NULL
Storeys above ground 5
Storeys below ground 0
Height 30.535
UoM m
Storey height above ground NULL
UoM NULL
Storey height below ground NULL
UoM NULL
Roof type multiple horizontal
Codespace NULL

Feature-specific attributes are grouped in the lower part of the form.

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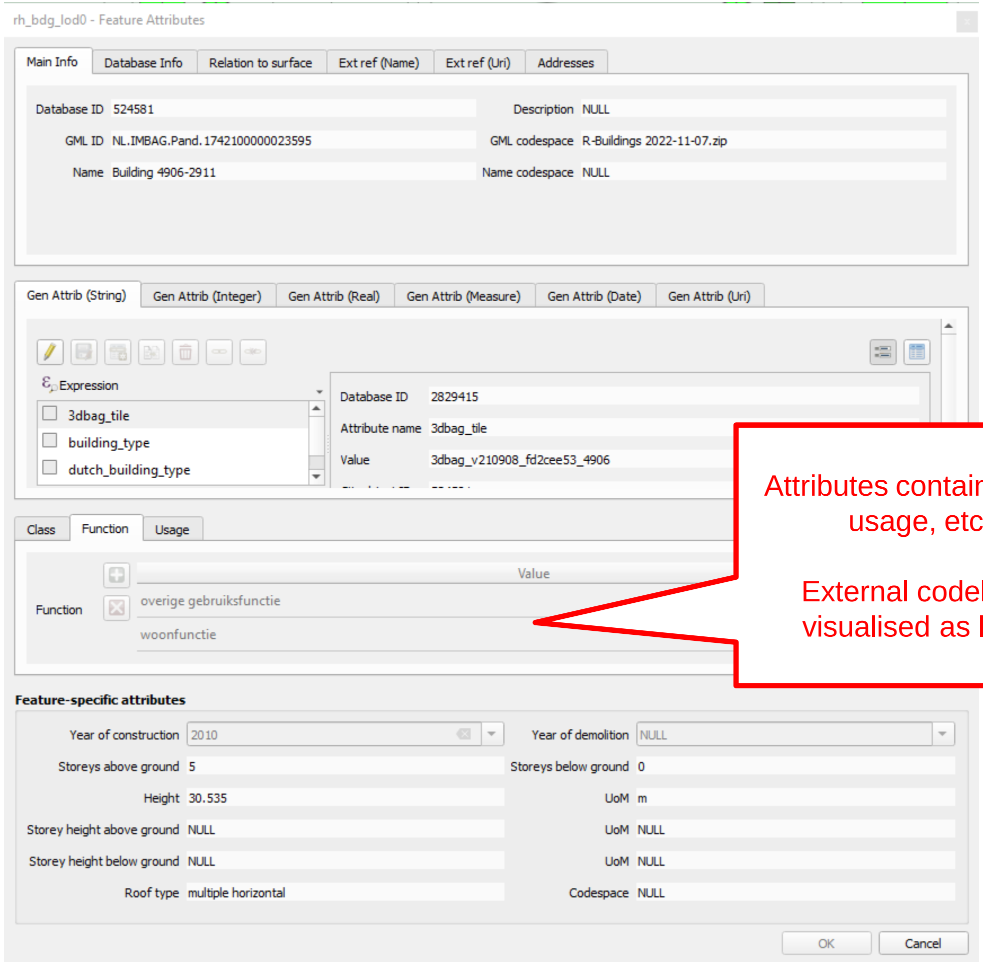

rh_bdg_lod0 - Feature Attributes

Database ID 524581
Description NULL
GML ID NL.IMBAG.Pand.1742100000023595
GML codespace R-Buildings 2022-11-07.zip
Name Building 4906-2911
Name codespace NULL

□ 3dbag_tile
□ building_type
□ dutch_building_type

Database ID 2829415
Attribute name 3dbag_tile
Value 3dbag_v210908_fd2cee53_4906

Function
overige gebruiksfunctie
woonfunctie

Feature-specific attributes

Year of construction 2010
Year of demolition NULL
Storeys above ground 5
Storeys below ground 0
Height 30.535
UoM m
Storey height above ground NULL
UoM NULL
Storey height below ground NULL
UoM NULL
Roof type multiple horizontal
Codespace NULL

Attributes containing [0..*] entries (e.g. function, usage, etc.) are presented as lists.

External codelists can also be loaded and visualised as look-up tables (see later on)

Use in QGIS: Attribute editing

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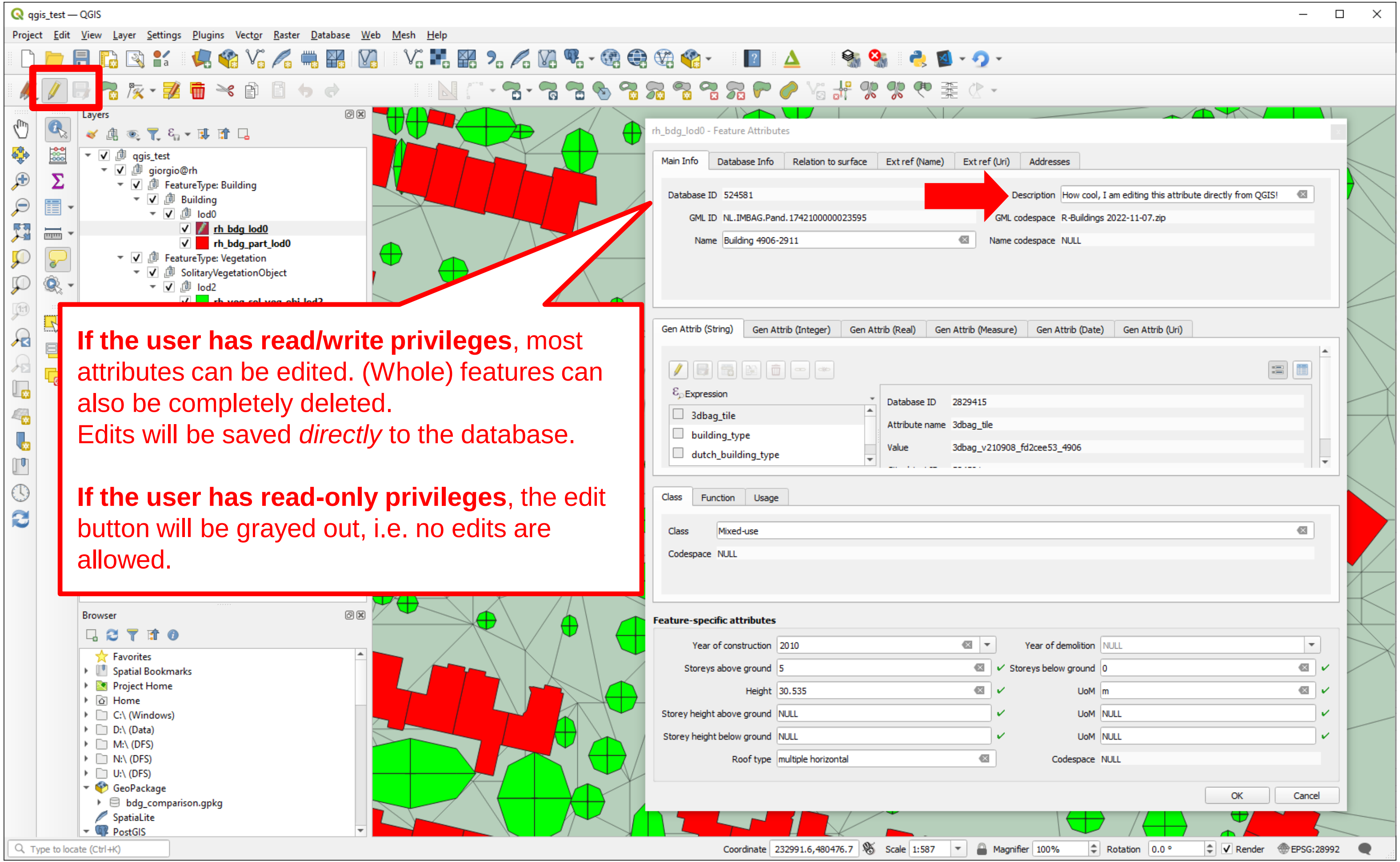

If the user has read/write privileges, most attributes can be edited. (Whole) features can also be completely deleted.
Edits will be saved *directly* to the database.

If the user has read-only privileges, the edit button will be grayed out, i.e. no edits are allowed.

rh_bdg_lod0 - Feature Attributes

Main Info | Database Info | Relation to surface | Ext ref (Name) | Ext ref (Uri) | Addresses

Database ID: 524581
Description: How cool, I am editing this attribute directly from QGIS!
GML ID: NL.IMBAG.Pand.1742100000023595
GML codespace: R-Buildings 2022-11-07.zip
Name: Building 4906-2911
Name codespace: NULL

Gen Attrib (String) | Gen Attrib (Integer) | Gen Attrib (Real) | Gen Attrib (Measure) | Gen Attrib (Date) | Gen Attrib (Uri)

Expression
□ 3dbag_tile
□ building_type
□ dutch_building_type

Database ID: 2829415
Attribute name: 3dbag_tile
Value: 3dbag_v210908_fd2cee53_4906

Class | Function | Usage

Class: Mixed-use
Codespace: NULL

Feature-specific attributes

Year of construction: 2010
Year of demolition: NULL
Storeys above ground: 5
Storeys below ground: 0
Height: 30.535
UoM: m
Storey height above ground: NULL
UoM: NULL
Storey height below ground: NULL
UoM: NULL
Roof type: multiple horizontal
Codespace: NULL

OK | Cancel

Coordinate 232991.6,480476.7 | Scale 1:587 | Magnifier 100% | Rotation 0.0 ° | ☑ Render | EPSG:28992

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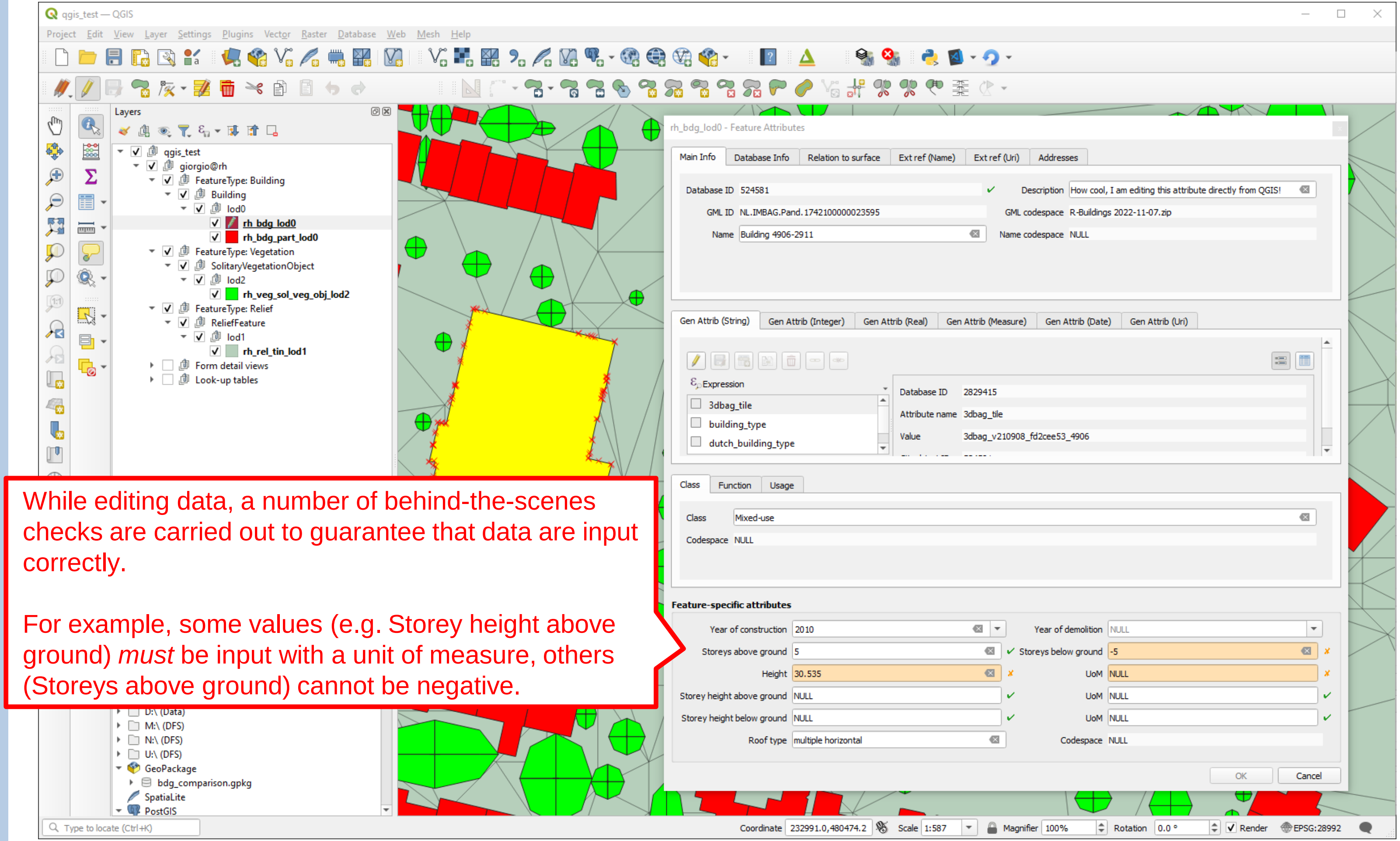
Use in QGIS: Attribute editing



Database ID 524581
Description How cool, I am editing this attribute directly from QGIS!
GML ID NL.IMBAG.Pand.1742100000023595
GML codespace R-Buildings 2022-11-07.zip
Name Building 4906-2911
Name codespace NULL

Database ID 2829415
Attribute name 3dbag_tile
Value 3dbag_v210908_fd2cee53_4906

Class Mixed-use
Codespace NULL

Feature-specific attributes

Year of construction 2010
Year of demolition NULL
Storeys above ground 5
Storeys below ground -5
Height 30.535
UoM NULL
Storey height above ground NULL
UoM NULL
Storey height below ground NULL
UoM NULL
Roof type multiple horizontal
Codespace NULL

While editing data, a number of behind-the-scenes checks are carried out to guarantee that data are input correctly.

For example, some values (e.g. Storey height above ground) *must* be input with a unit of measure, others (Storeys above ground) cannot be negative.

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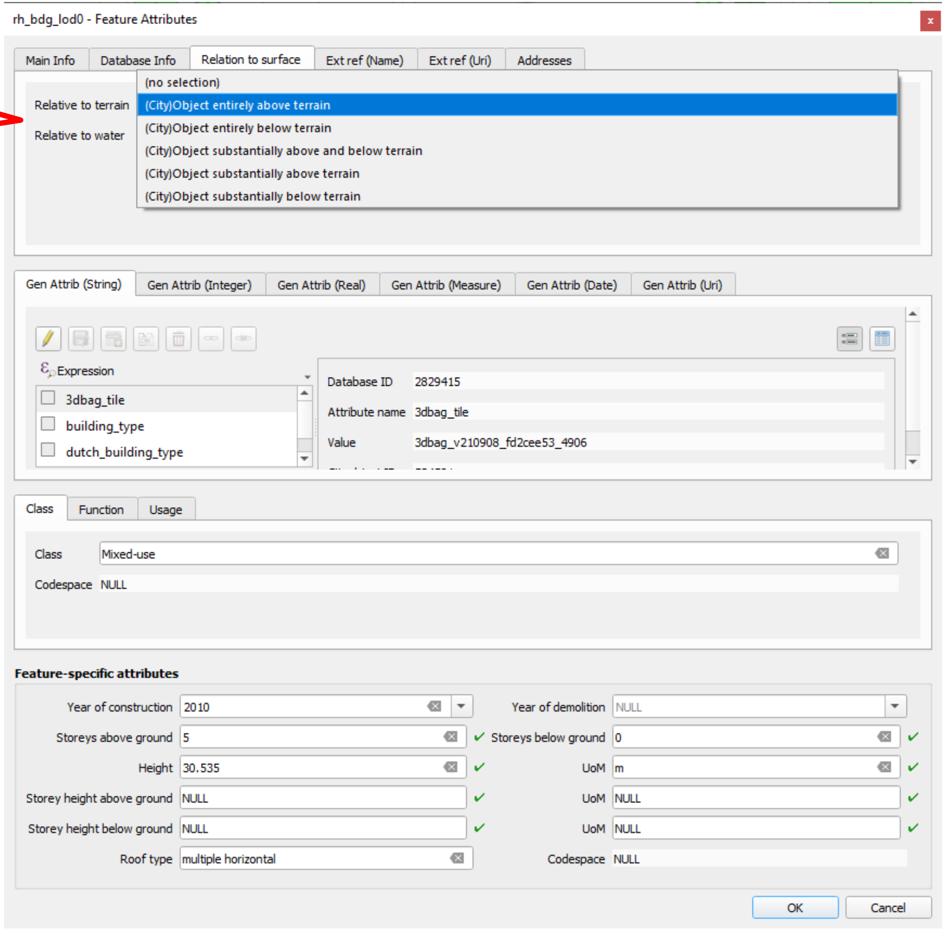
While editing data, input of enumeration values is made via drop-down lists



rh_bdg_lod0 - Feature Attributes

Relative to terrain: (City)Object entirely above terrain

Relative to water

(no selection)
(City)Object entirely above terrain
(City)Object entirely below terrain
(City)Object substantially above and below terrain
(City)Object substantially above terrain
(City)Object substantially below terrain

□ 3dbag_tile
□ building_type
□ dutch_building_type

Database ID: 2829415
Attribute name: 3dbag_tile
Value: 3dbag_v210908_fd2cee53_4906

Class: Mixed-use
Codespace: NULL

Feature-specific attributes

Year of construction	2010	Year of demolition	NULL
Storeys above ground	5 ✓	Storeys below ground	0 ✓
Height	30.535 ✓	UoM	m ✓
Storey height above ground	NULL ✓	UoM	NULL ✓
Storey height below ground	NULL ✓	UoM	NULL ✓
Roof type	multiple horizontal	Codespace	NULL

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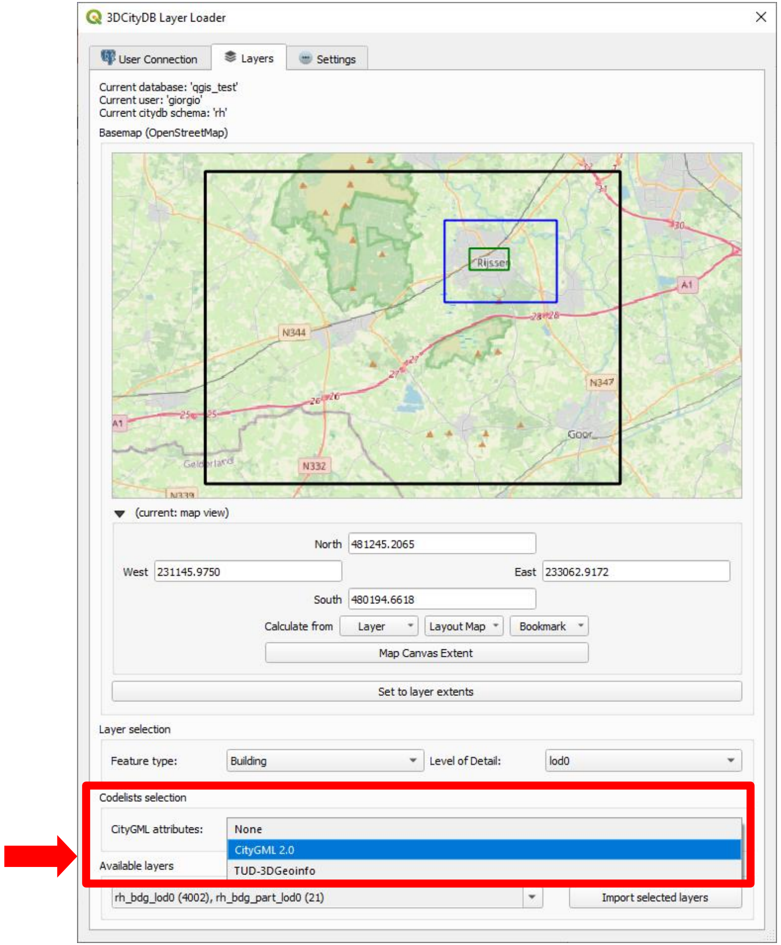
Use in QGIS: Codelist support

Codelists can be selected upon layer import

The attribute forms will be formatted automatically into drop-down lists or multiple-selection lists

Codelists can be added and customised either by the database administrator or by the user (see **Advanced options**)


3DCityDB Layer Loader

Current database: 'qgis_test'
Current user: 'giorgio'
Current citydb schema: 'rh'

Basemap (OpenStreetMap)

(current: map view)

North 481245.2065
West 231145.9750
East 233062.9172
South 480194.6618

Layer selection

Feature type: Building
Level of Detail: lod0

Codelists selection

CityGML attributes: None / CityGML 2.0 / TUD-3DGeoinfo

Available layers

rh_bdg_lod0 (4002), rh_bdg_part_lod0 (21)

TUDelft 3Dgeoinfo

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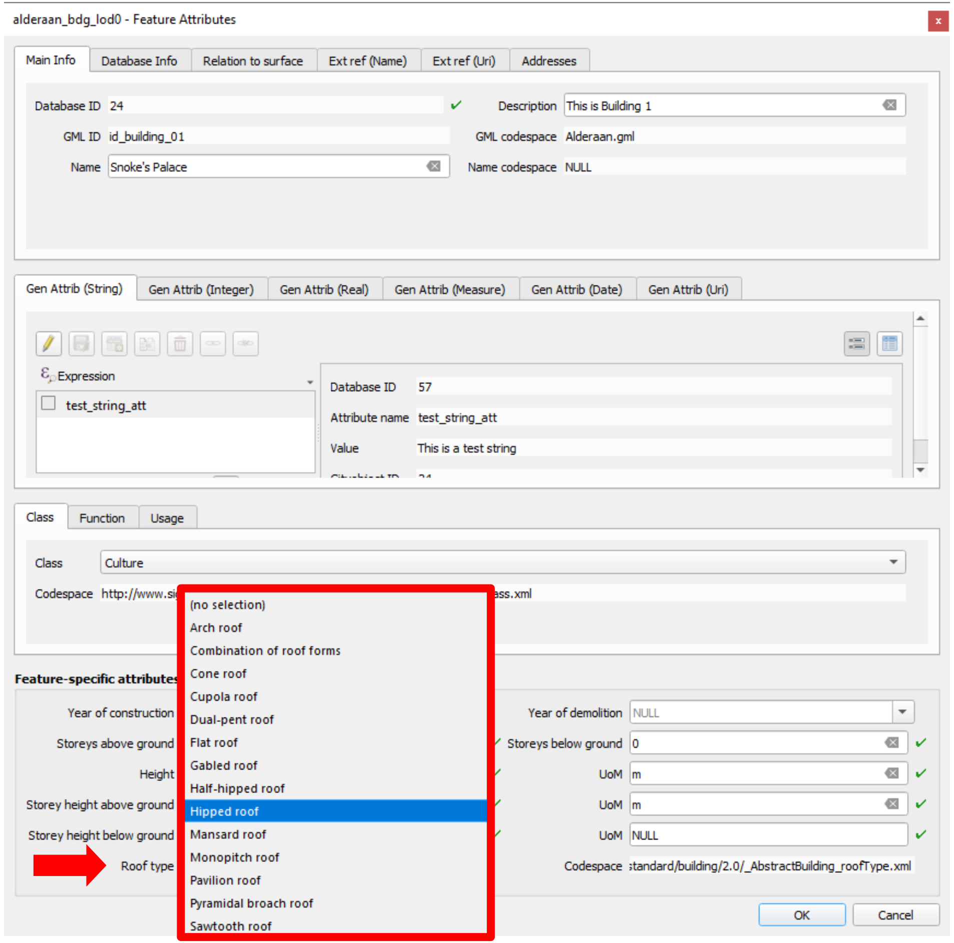
Use in QGIS: Codelist support

In the case of a CityGML property with cardinality **[0..1]**, the associated codelist values are presented as a **drop-down list**

Example: **Roof type**



alderaan_bdg_lod0 - Feature Attributes

Database ID 24 ✓
Description This is Building 1
GML ID id_building_01
GML codespace Alderaan.gml
Name Snoke's Palace
Name codespace NULL

ℰ Expression
□ test_string_att

Database ID 57
Attribute name test_string_att
Value This is a test string

Class Culture
Codespace http://www.si... ass.xml

Feature-specific attributes

Year of construction
Storeys above ground
Height
Storey height above ground
Storey height below ground
Roof type

(no selection)
Arch roof
Combination of roof forms
Cone roof
Cupola roof
Dual-pent roof
Flat roof
Gabled roof
Half-hipped roof
Hipped roof
Mansard roof
Monopitch roof
Pavilion roof
Pyramidal broach roof
Sawtooth roof

Year of demolition NULL
Storeys below ground 0 ✓
UoM m ✓
UoM m ✓
UoM NULL ✓
Codespace :tandard/building/2.0/_AbstractBuilding_roofType.xml

TUDelft 3Dgeoinfo

Use in QGIS: Codelist support

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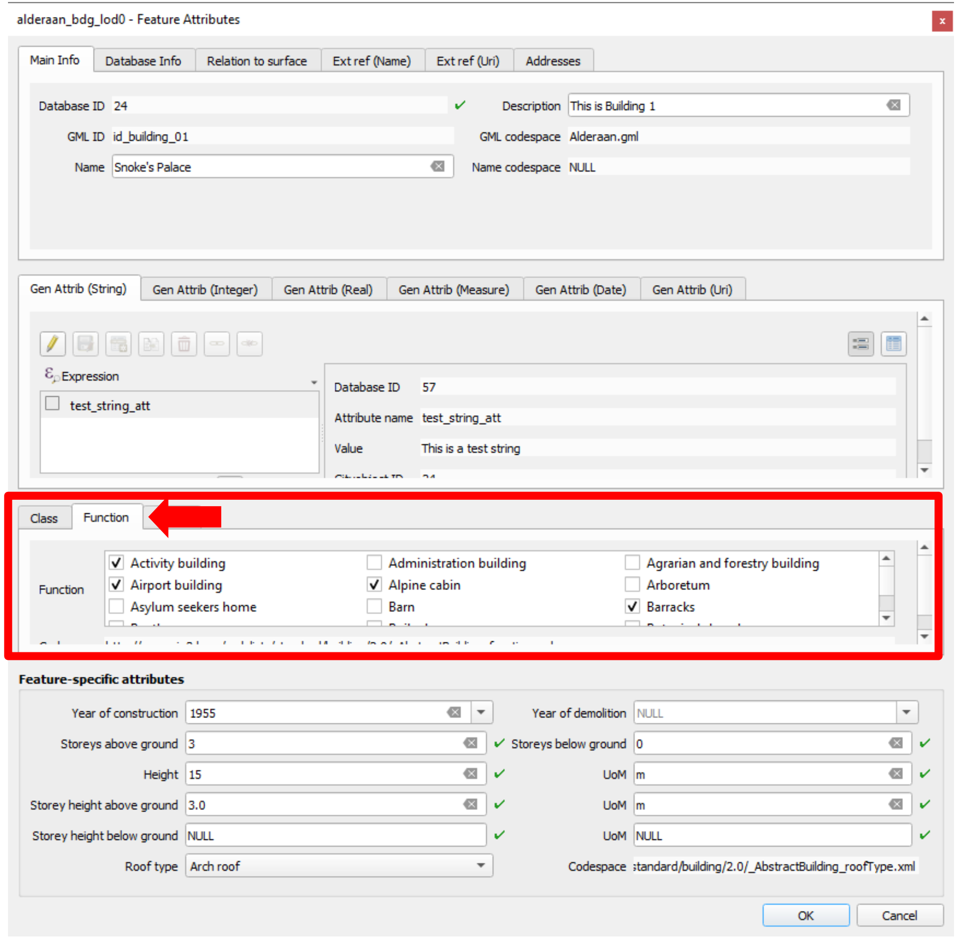
In the case of a CityGML property with cardinality **[0..*]**, the associated codelist values are presented as a **multiple-selection list**

Example: property (Building) **function**



alderaan_bdg_lod0 - Feature Attributes

Database ID 24
Description This is Building 1
GML ID id_building_01
GML codespace Alderaan.gml
Name Snoke's Palace
Name codespace NULL

□ test_string_att

Database ID 57
Attribute name test_string_att
Value This is a test string

Function

☑ Activity building	□ Administration building	□ Agrarian and forestry building
☑ Airport building	☑ Alpine cabin	□ Arboretum
□ Asylum seekers home	□ Barn	☑ Barracks

Feature-specific attributes

Year of construction 1955
Year of demolition NULL
Storeys above ground 3
Storeys below ground 0
Height 15
UoM m
Storey height above ground 3.0
UoM m
Storey height below ground NULL
UoM NULL
Roof type Arch roof
Codespace :tandard/building/2.0/_AbstractBuilding_roofType.xml

Use in QGIS: 3D visualisation

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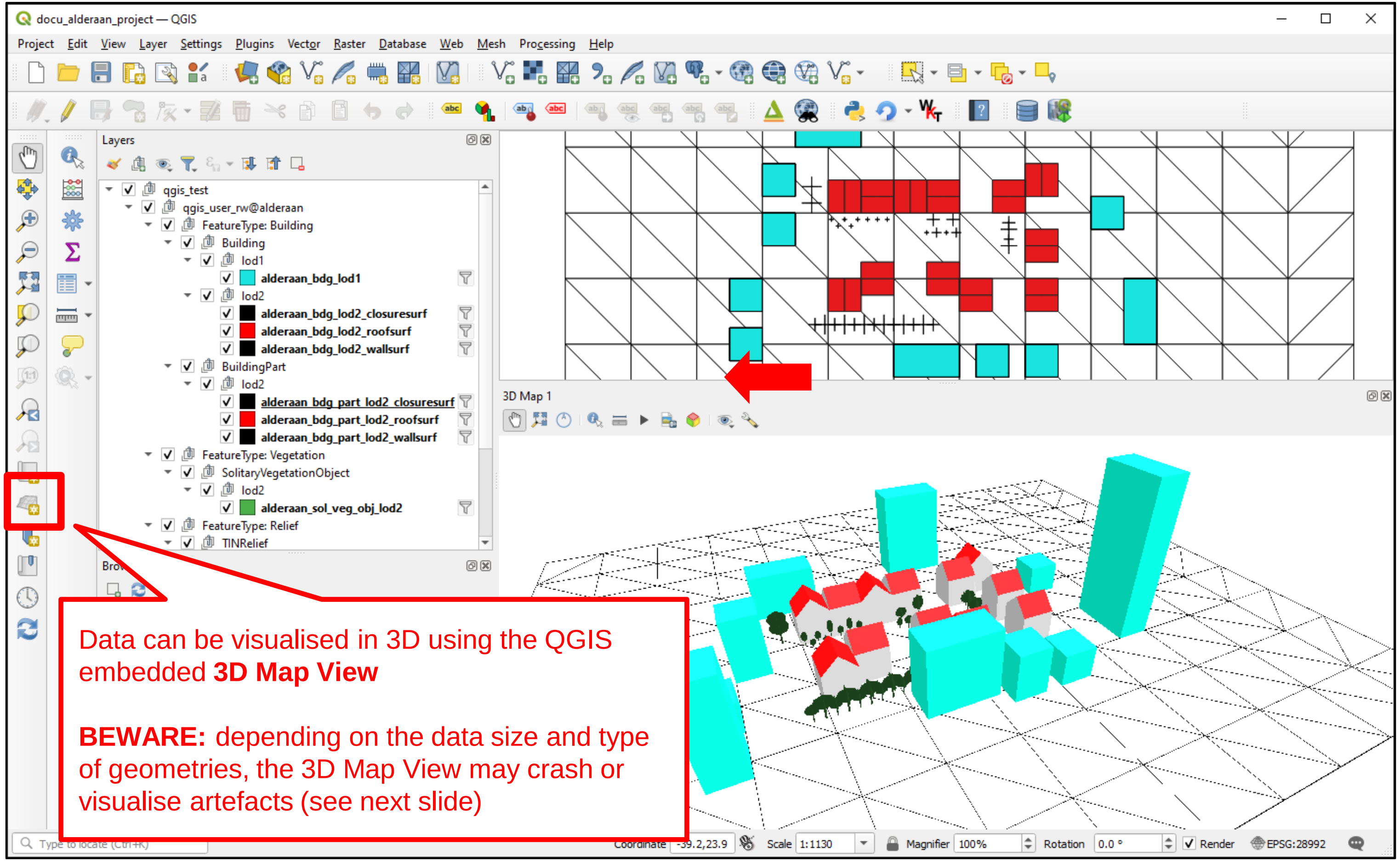

Coordinate -39.2,23.9 Scale 1:1130 Magnifier 100% Rotation 0.0 ° ☑ Render EPSG:28992

Data can be visualised in 3D using the QGIS embedded **3D Map View**

BEWARE: depending on the data size and type of geometries, the 3D Map View may crash or visualise artefacts (see next slide)

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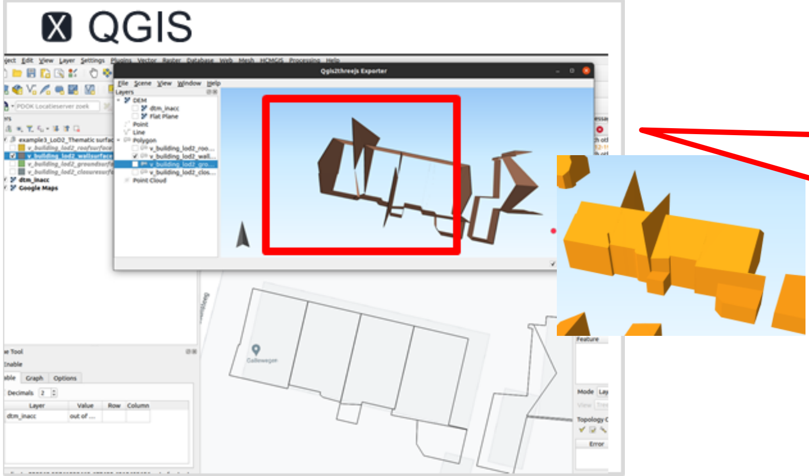
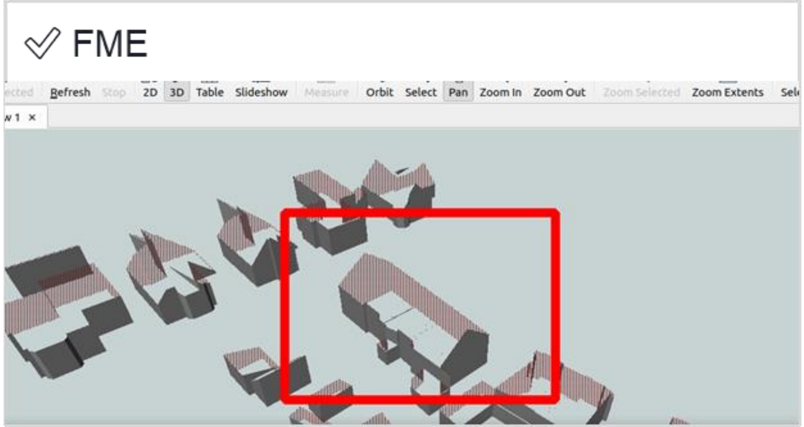
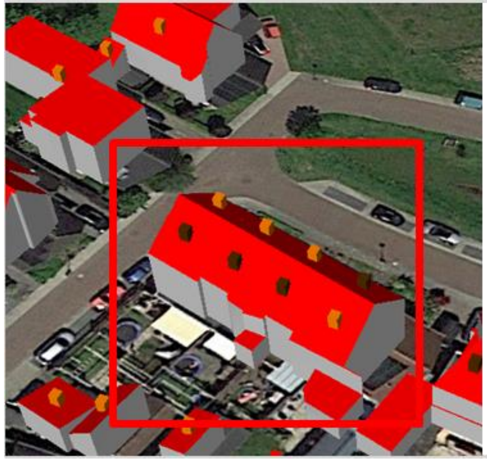
Use in QGIS: 3D visualisation



In our tests, such artefacts are however a 3D visualisation issue (QGIS 3D renderer?) and *not* related to the actual data. 3D visualisation in FME and in Google Earth show indeed correct results.





✓ Google earth (as KML)

Use in QGIS: 3D visualisation

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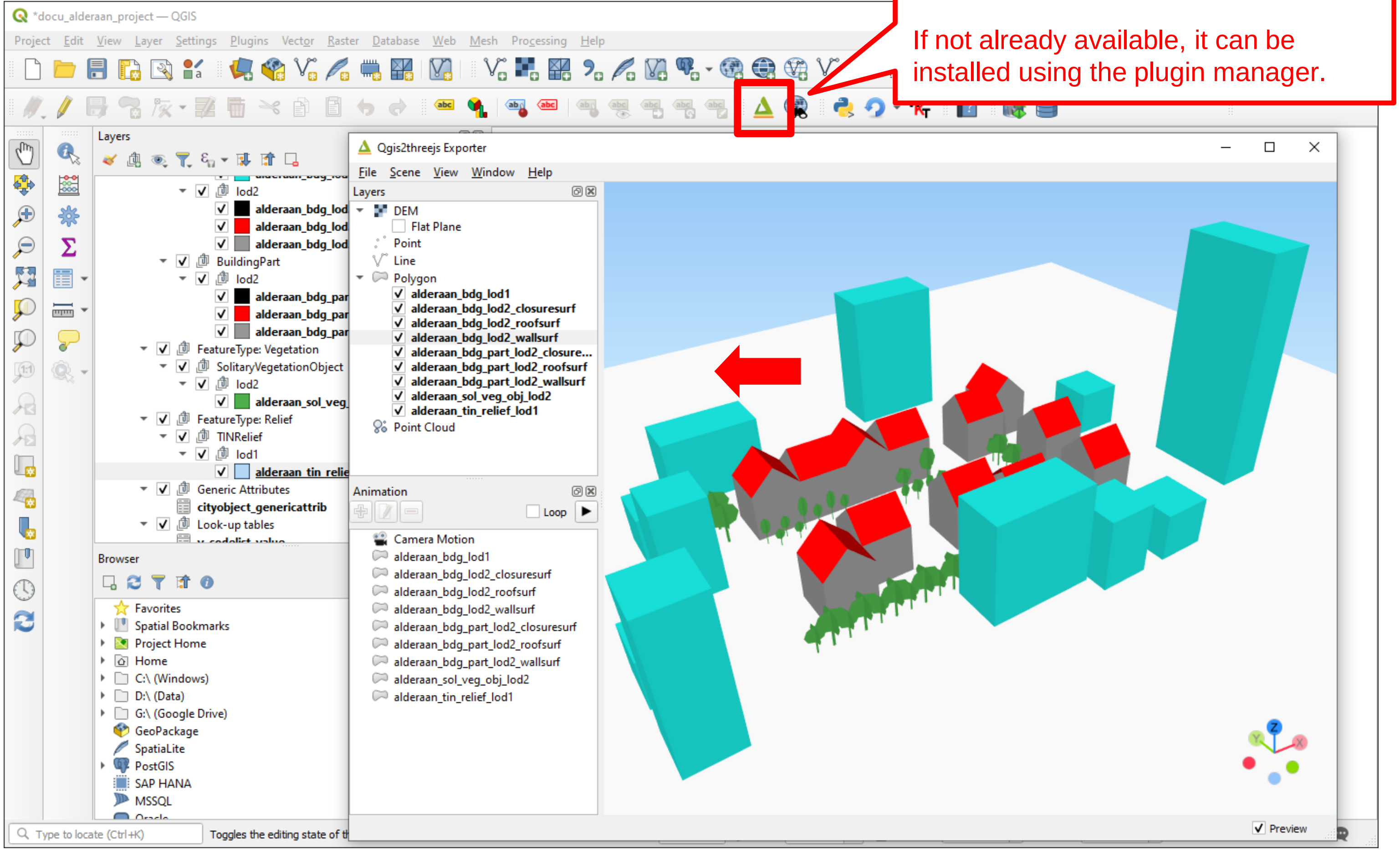
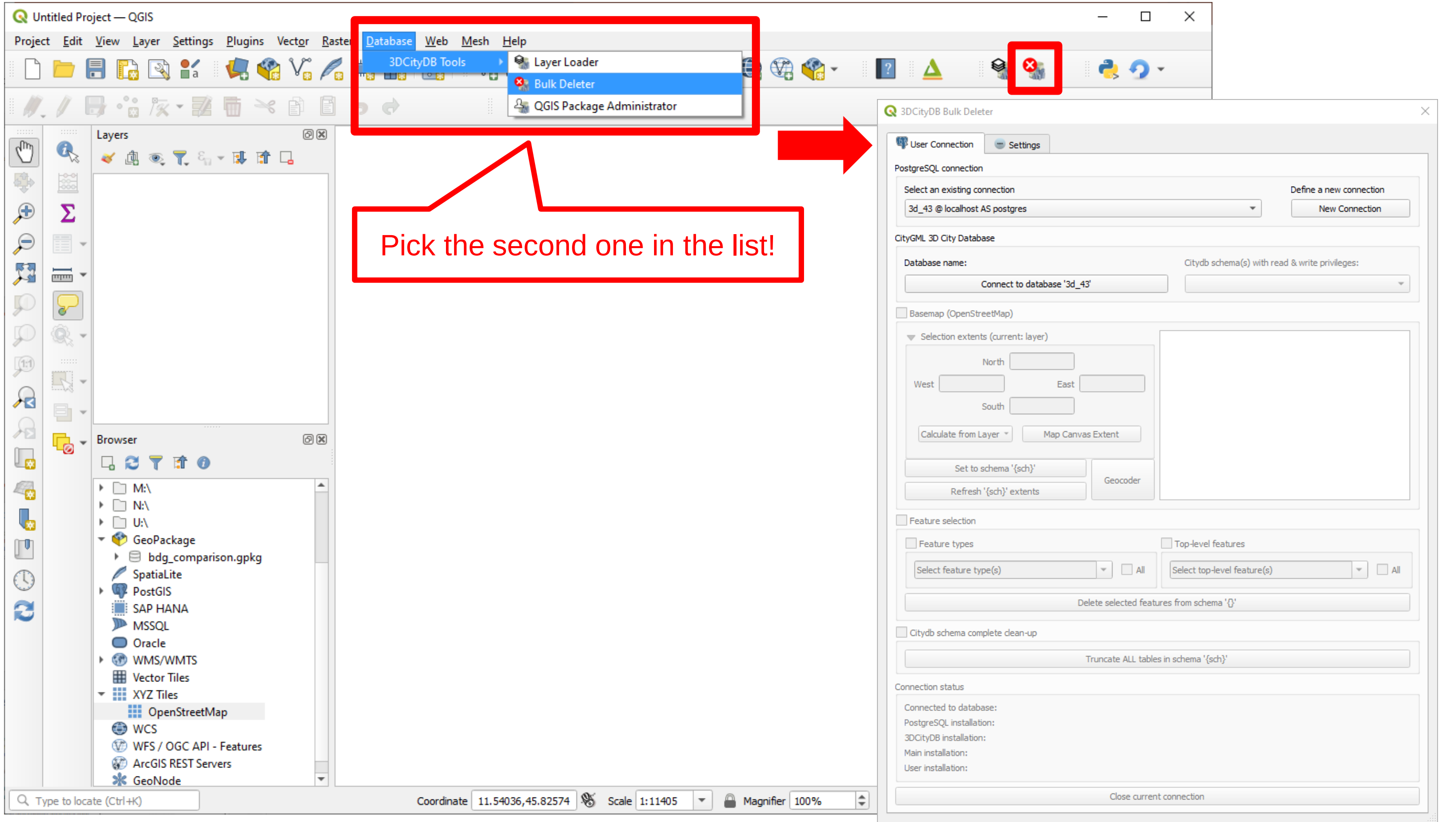
Alternatively, the **Qgis2threejs plugin** can be used for 3D visualisation.

If not already available, it can be installed using the plugin manager.



Bulk Deleter

Open the **Bulk Deleter** from the menu or by clicking on the corresponding icon



Select an existing connection: 3d_43 @ localhost AS postgres

Connect to database '3d_43'

Coordinate 11.54036,45.82574 Scale 1:11405 Magnifier 100%

Pick the second one in the list!

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In the "User Connection" tab

1) Create a new connection or use an existing one to the desired 3DCityDB instance (here: "qgis_test")

2) Connect to the chosen database

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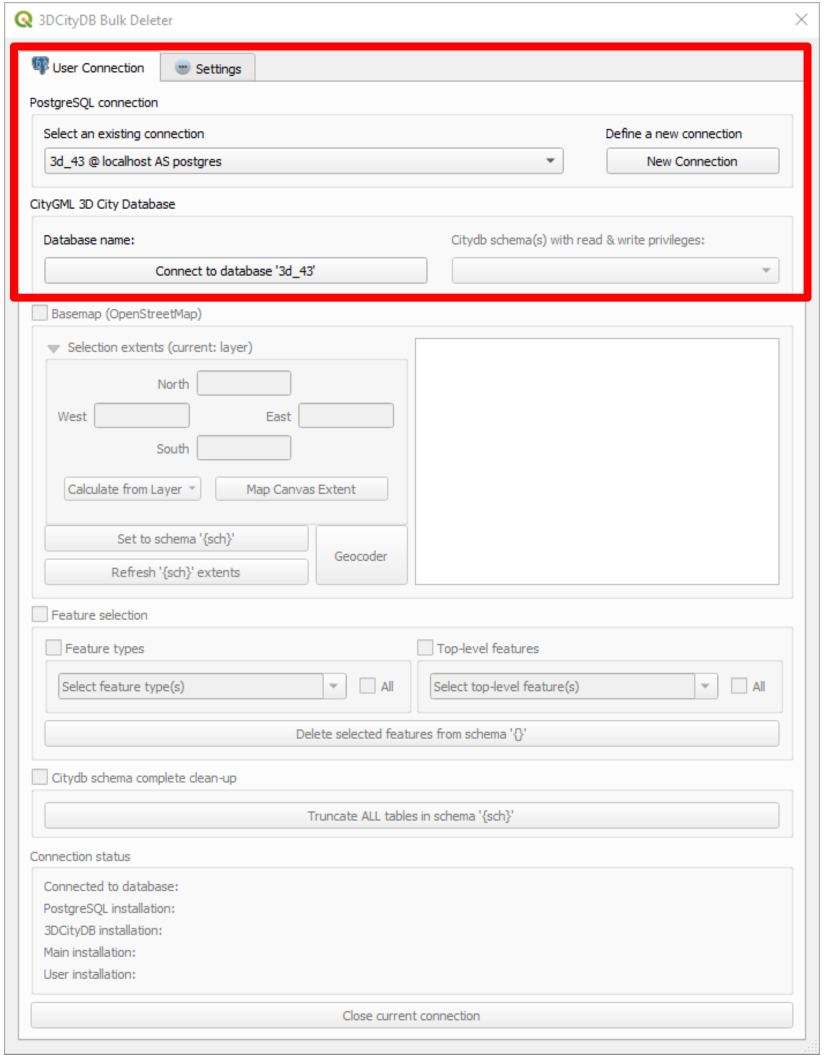

3DCityDB Bulk Deleter

User Connection | Settings

PostgreSQL connection

Select an existing connection: 3d_43 @ localhost AS postgres

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database '3d_43'

Citydb schema(s) with read & write privileges:

□ Basemap (OpenStreetMap)

Selection extents (current: layer)

North
West
East
South

Calculate from Layer | Map Canvas Extent

Set to schema '{sch}'

Refresh '{sch}' extents

Geocoder

□ Feature selection

□ Feature types: Select feature type(s) □ All

□ Top-level features: Select top-level feature(s) □ All

Delete selected features from schema '{}'

□ Citydb schema complete clean-up

Truncate ALL tables in schema '{sch}'

Connection status

Connected to database:
PostgreSQL installation:
3DCityDB installation:
Main installation:
User installation:

Close current connection

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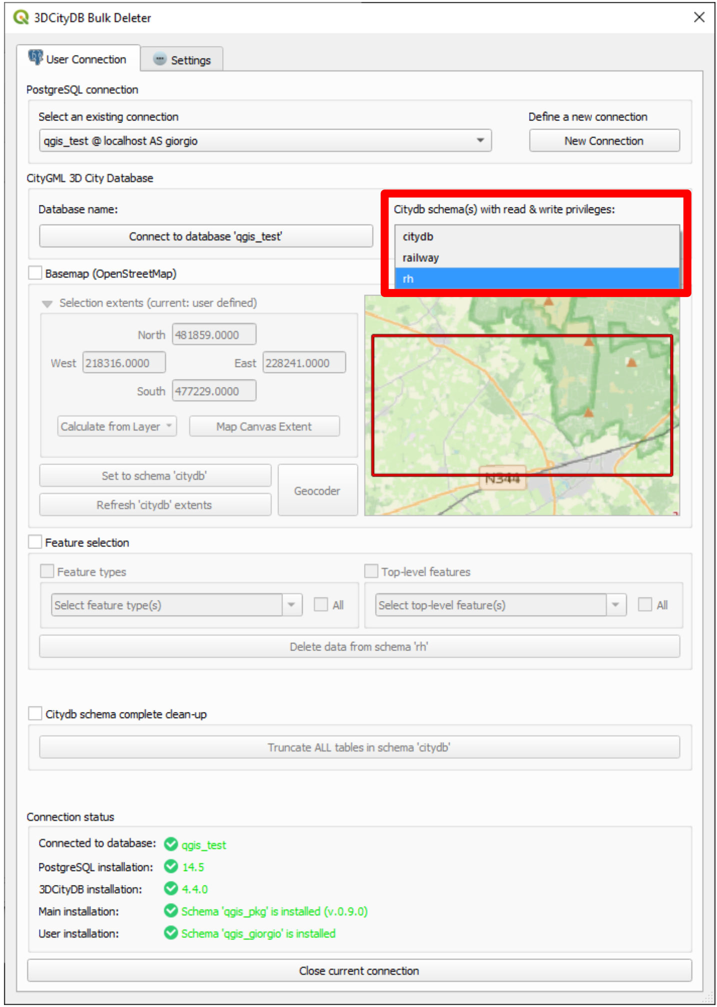
3) Once connected, choose one of the available citydb schemas

Nota bene: Only the citydb schemas for **which you have read & write ("rw") privileges** are listed



3DCityDB Bulk Deleter

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema(s) with read & write privileges:
citydb
railway
rh

□ Basemap (OpenStreetMap)

Selection extents (current: user defined)

North 481859.0000
West 218316.0000
East 228241.0000
South 477229.0000

□ Feature selection

□ Feature types: Select feature type(s) □ All

□ Top-level features: Select top-level feature(s) □ All

□ Citydb schema complete clean-up

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.9.0)
User installation: ✓ Schema 'qgis_giorgio' is installed

TUDelft 3Dgeoinfo

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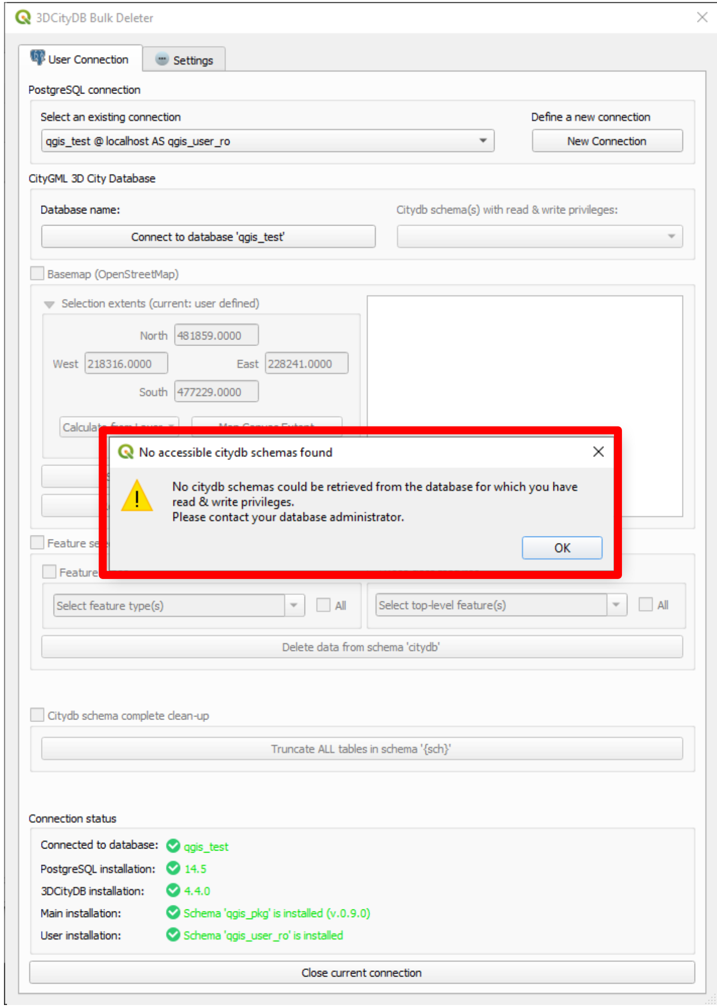
3) Once connected, choose one of the available citydb schemas

Nota bene: Only the citydb schemas for **which you have read & write ("rw") privileges** are listed

If there are no citydb schemas for which you have "rw" privileges, you will be notified before the connection is closed and the GUI completely disabled.



3DCityDB Bulk Deleter

User Connection | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS qgis_user_ro

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema(s) with read & write privileges:

□ Basemap (OpenStreetMap)

Selection extents (current: user defined)

North 481859.0000
West 218316.0000
East 228241.0000
South 477229.0000

No accessible citydb schemas found

No citydb schemas could be retrieved from the database for which you have read & write privileges.
Please contact your database administrator.

OK

□ Feature se

□ Feature

Select feature type(s) □ All

Select top-level feature(s) □ All

Delete data from schema 'citydb'

□ Citydb schema complete clean-up

Truncate ALL tables in schema '{sch}'

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.9.0)
User installation: ✓ Schema 'qgis_user_ro' is installed

Close current connection

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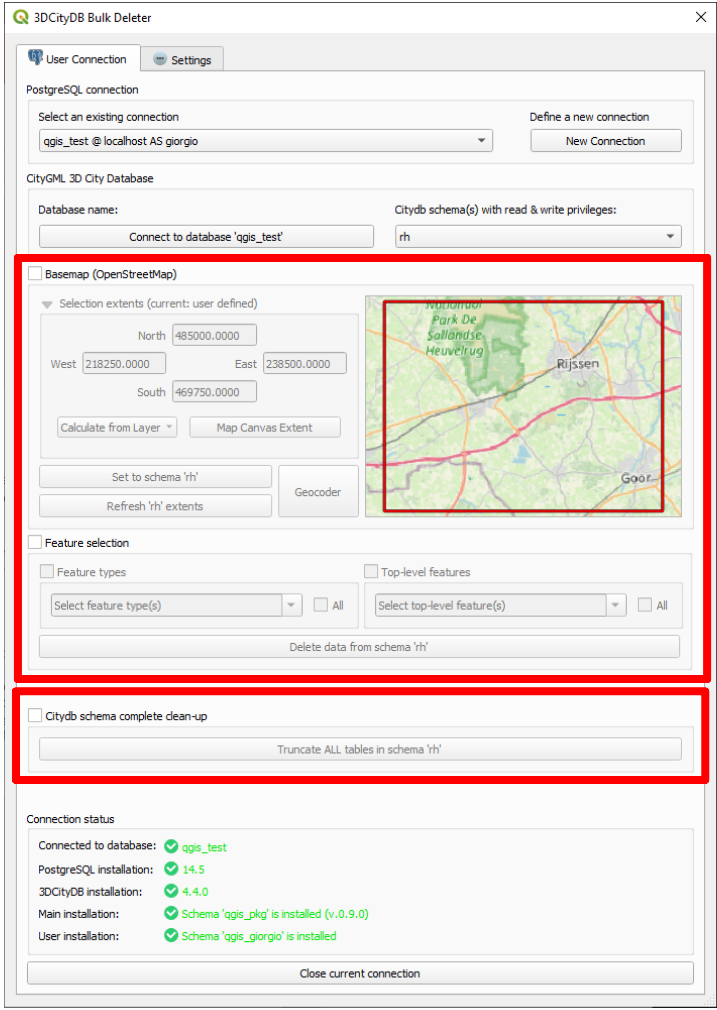
4) Once you have selected the citydb schema, you can perform 2 types of actions:

- Select specific features to delete (and optionally define a spatial filter, too)
- Clean up the whole schema, i.e. truncate all tables of the selected citydb schema

The GUI will prevent you from choosing both at the same time


3DCityDB Bulk Deleter

User Connection | Settings

PostgreSQL connection
Select an existing connection: qgis_test @ localhost AS giorgio
Define a new connection: New Connection

CityGML 3D City Database
Database name: Connect to database 'qgis_test'
Citydb schema(s) with read & write privileges: rh

□ Basemap (OpenStreetMap)
Selection extents (current: user defined)
North 485000.0000
West 218250.0000
East 238500.0000
South 469750.0000
Calculate from Layer | Map Canvas Extent
Set to schema 'rh' | Refresh 'rh' extents | Geocoder

□ Feature selection
□ Feature types: Select feature type(s) □ All
□ Top-level features: Select top-level feature(s) □ All
Delete data from schema 'rh'

□ Citydb schema complete clean-up
Truncate ALL tables in schema 'rh'

Connection status
Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.9.0)
User installation: ✓ Schema 'qgis_giorgio' is installed

Close current connection

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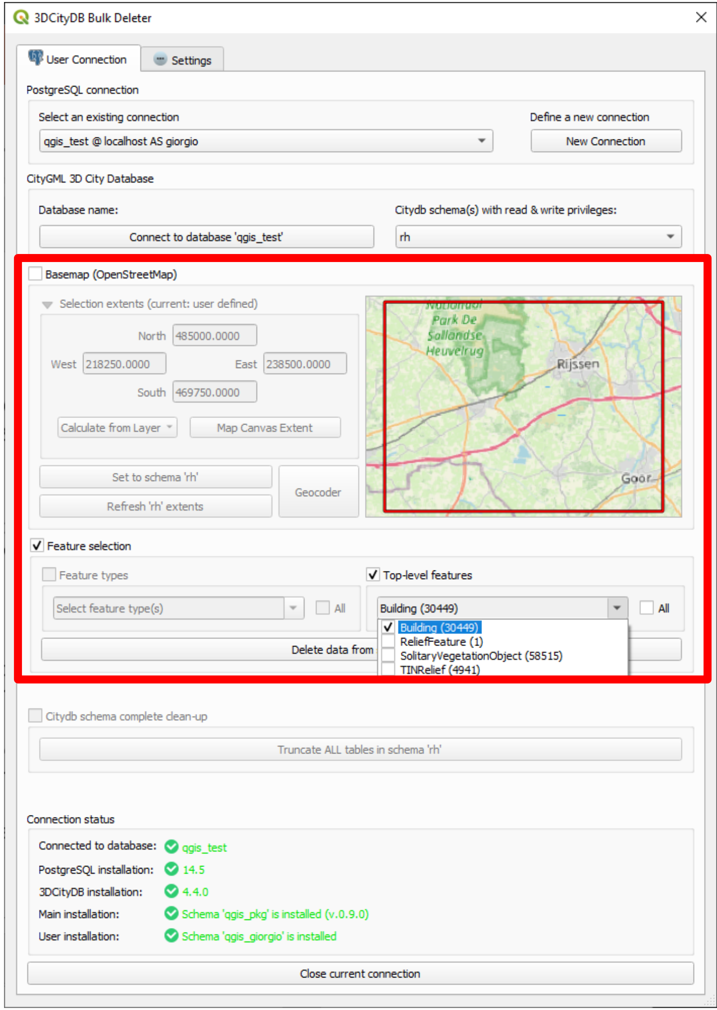
5a) Select the features to delete. Activate the **Feature selection box**. You can now select:

- either CityGML Features types
- or top-level features

Remember: Feature Types correspond to CityGML modules, i.e. they may contain multiple top-level features. For example:

- Feature Type "Vegetation" includes "Solitary Vegetation Object" and "PlantCover" top-level features
- Feature Type "Relief" includes "TINRelief", "BreakLineRelief" and "MassPointRelief" top-level features



3DCityDB Bulk Deleter

User Connection | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema(s) with read & write privileges: rh

☐ Basemap (OpenStreetMap)

Selection extents (current: user defined)

North 485000.0000
West 218250.0000
East 238500.0000
South 469750.0000

Calculate from Layer | Map Canvas Extent

Set to schema 'rh' | Refresh 'rh' extents | Geocoder

☑ Feature selection

☐ Feature types: Select feature type(s) ☐ All

☑ Top-level features: Building (30449) ☐ All

☑ Building (30449)
☐ ReliefFeature (1)
☐ SolitaryVegetationObject (58515)
☐ TINRelief (4941)

Delete data from

☐ Citydb schema complete clean-up

Truncate ALL tables in schema 'rh'

Connection status

Connected to database: qgis_test
PostgreSQL installation: 14.5
3DCityDB installation: 4.4.0
Main installation: Schema 'qgis_pkg' is installed (v.0.9.0)
User installation: Schema 'qgis_giorgio' is installed

Close current connection

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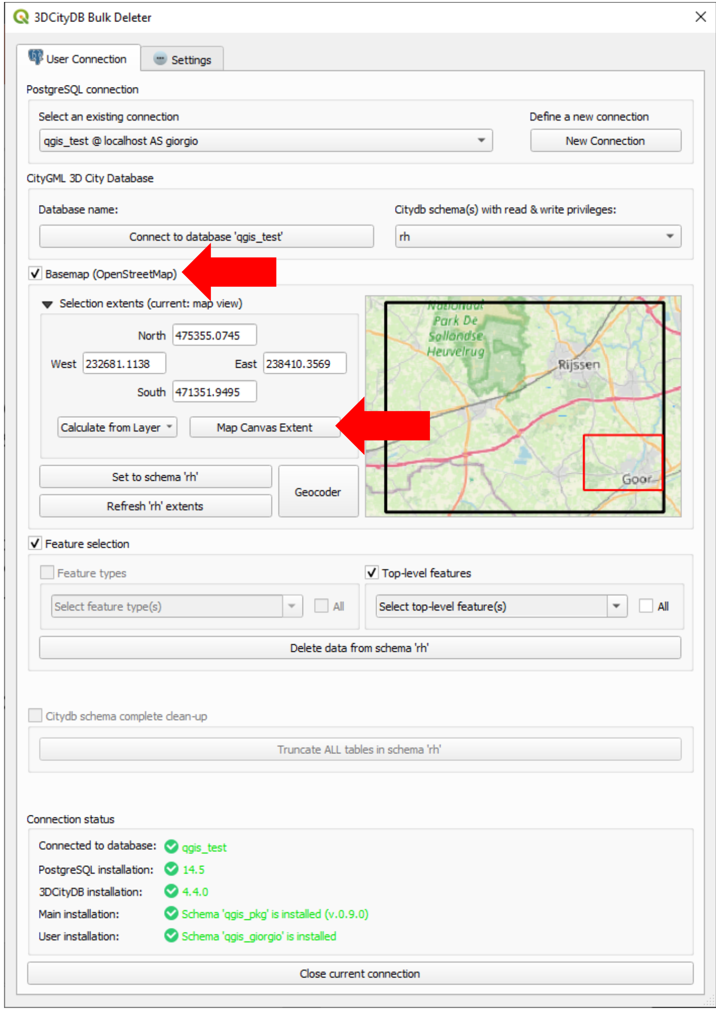
5a) Select the features to delete. Activate the **Feature selection box**. You can now select:

- either CityGML Features types
- or top-level features
- and, optionally, define the extents of the area where to delete the selected feature. You must then also activate the **Basemap box** and press the **Map Canvas Extent button**

The delete extents are represented by the **red bounding box**.

Please note: The Set to schema {cdb_schema}, Refresh {cdb_schema} and GeoCoder buttons follow the same logic as in the Layer Loader



3DCityDB Bulk Deleter

User Connection | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema(s) with read & write privileges: rh

☑ Basemap (OpenStreetMap)

Selection extents (current: map view)

North 475355.0745
West 232681.1138
East 238410.3569
South 471351.9495

Calculate from Layer | Map Canvas Extent

Set to schema 'rh' | Refresh 'rh' extents | Geocoder

☑ Feature selection

□ Feature types: Select feature type(s) □ All

☑ Top-level features: Select top-level feature(s) □ All

Delete data from schema 'rh'

□ Citydb schema complete clean-up

Truncate ALL tables in schema 'rh'

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.9.0)
User installation: ✓ Schema 'qgis_giorgio' is installed

Close current connection

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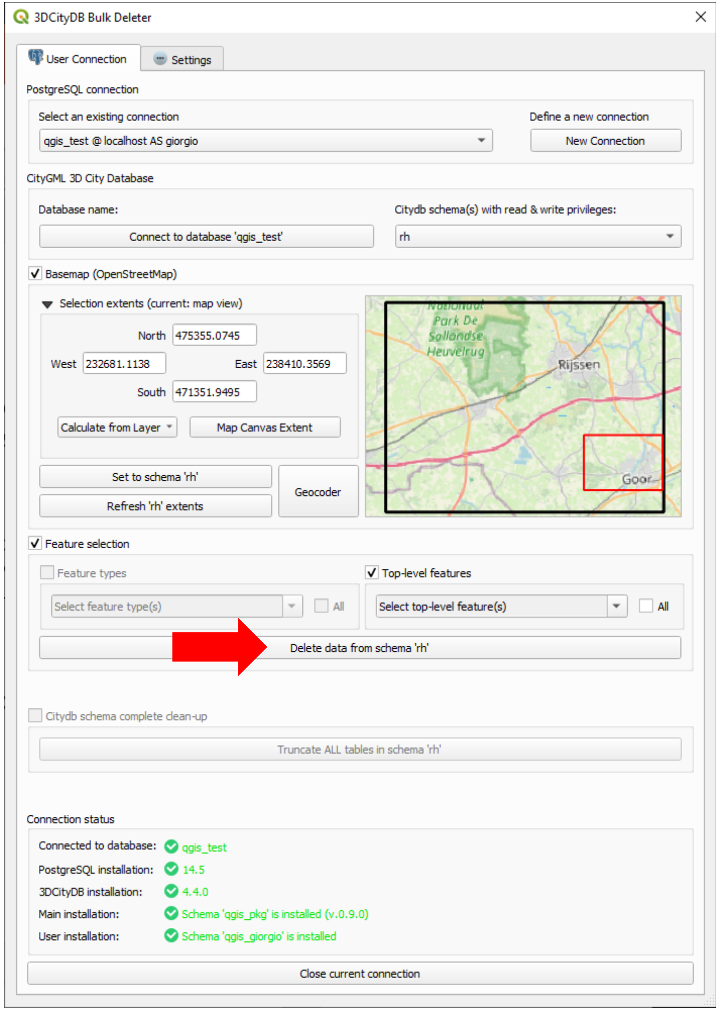
6a) Press the **Delete data from schema {cdb_schema} button**

<span style="color:red">**Beware**</span>: Depending on the quantity of selected features, the operation might take some time.

If you want to completely delete the database, you are recommended to use the other option (see next slides) which is **much** faster!



3DCityDB Bulk Deleter

User Connection | Settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema(s) with read & write privileges: rh

☑ Basemap (OpenStreetMap)

Selection extents (current: map view)

North 475355.0745

West 232681.1138

East 238410.3569

South 471351.9495

Calculate from Layer | Map Canvas Extent

Set to schema 'rh' | Refresh 'rh' extents | Geocoder

☑ Feature selection

□ Feature types: Select feature type(s) □ All

☑ Top-level features: Select top-level feature(s) □ All

Delete data from schema 'rh'

□ Citydb schema complete clean-up

Truncate ALL tables in schema 'rh'

Connection status

Connected to database: ✓ qgis_test

PostgreSQL installation: ✓ 14.5

3DCityDB installation: ✓ 4.4.0

Main installation: ✓ Schema 'qgis_pkg' is installed (v.0.9.0)

User installation: ✓ Schema 'qgis_giorgio' is installed

Close current connection

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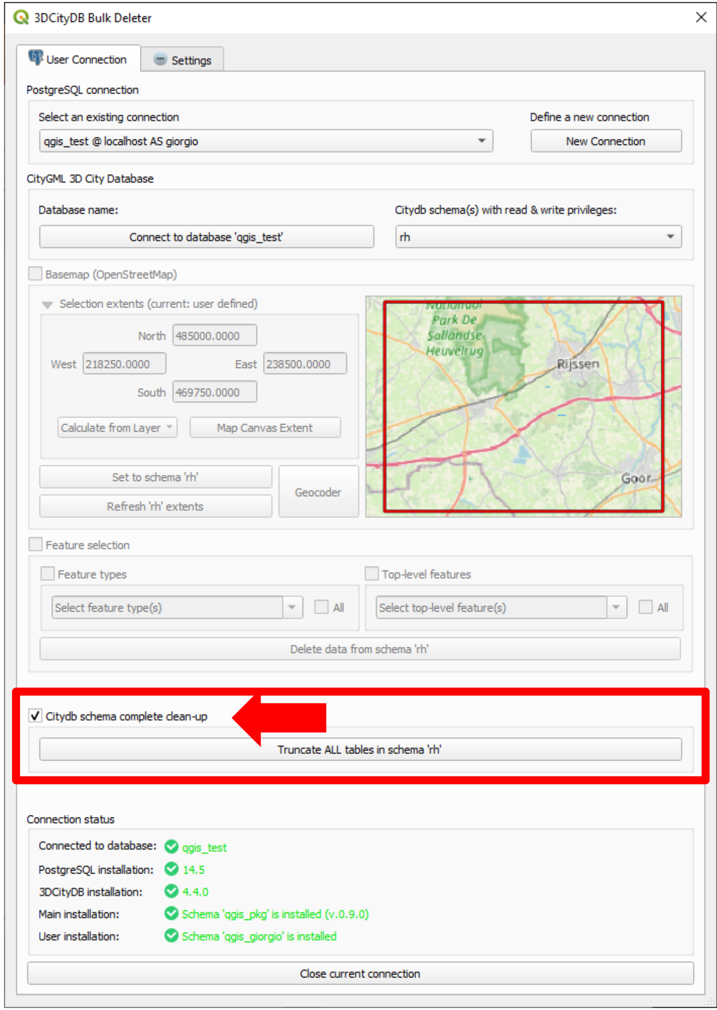
5b) Enable the **Citydb schema complete clean-up box** and press the **Truncate ALL tables in schema {cdb_schema} button**.

Beware: The selected citydb schema will be completely emptied and reset to its initial state. In addition, all preexisting privileges (also of other users) will be reset to "None"



3DCityDB Bulk Deleter

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS giorgio

Define a new connection: New Connection

CityGML 3D City Database

Database name: Connect to database 'qgis_test'

Citydb schema(s) with read & write privileges: rh

□ Basemap (OpenStreetMap)

Selection extents (current: user defined)

North 485000.0000
West 218250.0000
East 238500.0000
South 469750.0000

□ Feature selection

□ Feature types: Select feature type(s) □ All

□ Top-level features: Select top-level feature(s) □ All

☑ Citydb schema complete clean-up

Connection status

Connected to database: qgis_test
PostgreSQL installation: 14.5
3DCityDB installation: 4.4.0
Main installation: Schema 'qgis_pkg' is installed (v.0.9.0)
User installation: Schema 'qgis_giorgio' is installed

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Customised codelists

For certain CityGML properties (e.g. class, function, usage, roof type, etc.) the QGIS attribute forms in the Layer Loader can be linked to look-up tables containing

- Codelist values from the non-normative CityGML specifications
- Codelist values optionally defined by the user

This applies to properties containing single (e.g. class, roof type) or, possibly, multiple values (e.g. function, usage)

In this way the user does not have to "remember" specific codes when typing, thus reducing the chances of wrong data input

The 3DCityDB-Tools plugin already contains the codelists from the CityGML 2.0 specifications.

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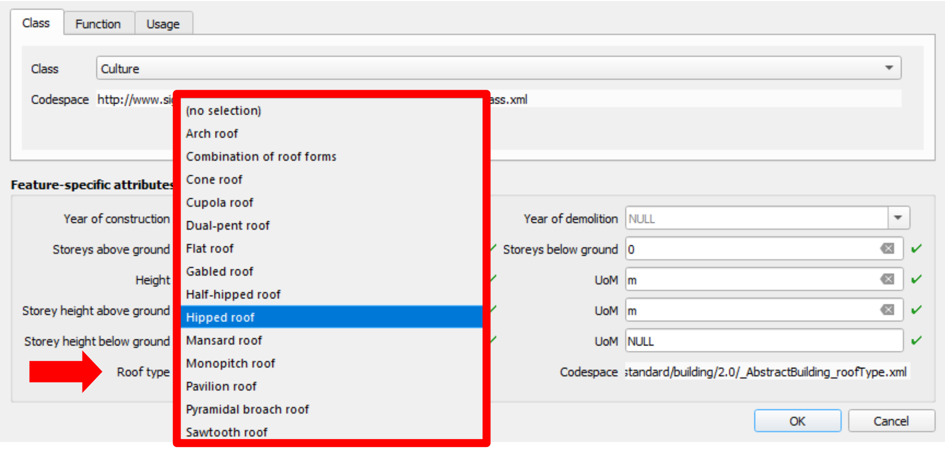
Property with cardinality [0..1]: drop-down list



Class: Culture

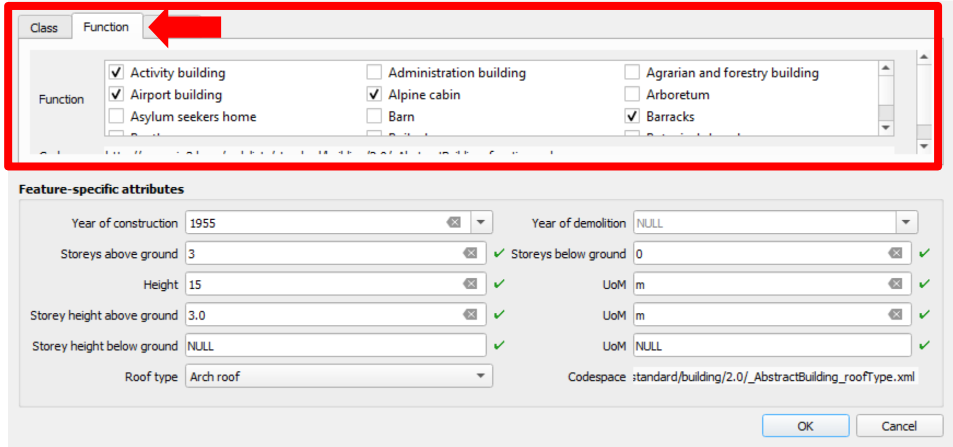
Codespace: http://www.si... ...ass.xml

Feature-specific attributes

- Year of construction
- Storeys above ground
- Height
- Storey height above ground
- Storey height below ground
- Roof type:
  - (no selection)
  - Arch roof
  - Combination of roof forms
  - Cone roof
  - Cupola roof
  - Dual-pent roof
  - Flat roof
  - Gabled roof
  - Half-hipped roof
  - Hipped roof
  - Mansard roof
  - Monopitch roof
  - Pavilion roof
  - Pyramidal broach roof
  - Sawtooth roof

- Year of demolition: NULL
- Storeys below ground: 0
- UoM: m
- UoM: m
- UoM: NULL
- Codespace: :tandard/building/2.0/_AbstractBuilding_roofType.xml

Property with cardinality [0..*]: multiple-selection list



Function:

☑ Activity building	□ Administration building	□ Agrarian and forestry building
☑ Airport building	☑ Alpine cabin	□ Arboretum
□ Asylum seekers home	□ Barn	☑ Barracks

Feature-specific attributes

- Year of construction: 1955
- Storeys above ground: 3
- Height: 15
- Storey height above ground: 3.0
- Storey height below ground: NULL
- Roof type: Arch roof

- Year of demolition: NULL
- Storeys below ground: 0
- UoM: m
- UoM: m
- UoM: NULL
- Codespace: :tandard/building/2.0/_AbstractBuilding_roofType.xml

Customised codelists

Adding customised codelists requires **two steps**:

1) **Load the actual codelist data** (codelist entries and codelist metadata). Such data must be stored in two predefined tables of the QGIS Package in the 3DCityDB
2) **Add mapping rules** for automatic setup of the lists in the attribute forms. Such data must be stored in a predefined table of the QGIS Package in the 3DCityDB

Both operations can be carried out either by the database administrator or by the user

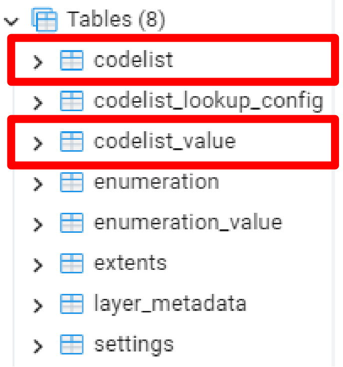
1) Administrator:
    - The predefined tables are in schema **qgis_pkg**
    - All codelists and rules are made available to each newly created qgis_{usr} schema
2) User:
    - The predefined tables are in schema **qgis_{usr_name}**
    - All codelists and rules are available only to user

Customised codelists

Adding customised codelists requires **two steps**:

1) **Load the actual codelist data** (codelist entries and codelist metadata). Such data must be stored in two predefined tables of the QGIS Package in the 3DCityDB
   - The tables are named **CODELIST** and **CODELIST_VALUE** in the qgis_{usr_name} and **CODELIST_TEMPLATE** and **CODELIST_VALUE_TEMPLATE** in the qgis_pkg schema, respectively. Their structure is exactly the same
   - The following examples are based on tables CODELIST and CODELIST_VALUE but the procedure is the same for the *_TEMPLATE ones

Customised codelists



Tables (8)
- codelist
- codelist_lookup_config
- codelist_value
- enumeration
- enumeration_value
- extents
- layer_metadata
- settings

Table **CODELIST** contains some metadata values such as the codelist name, its name_space and data_model.

It is referenced by table **CODELIST_VALUE** which contains the actual values

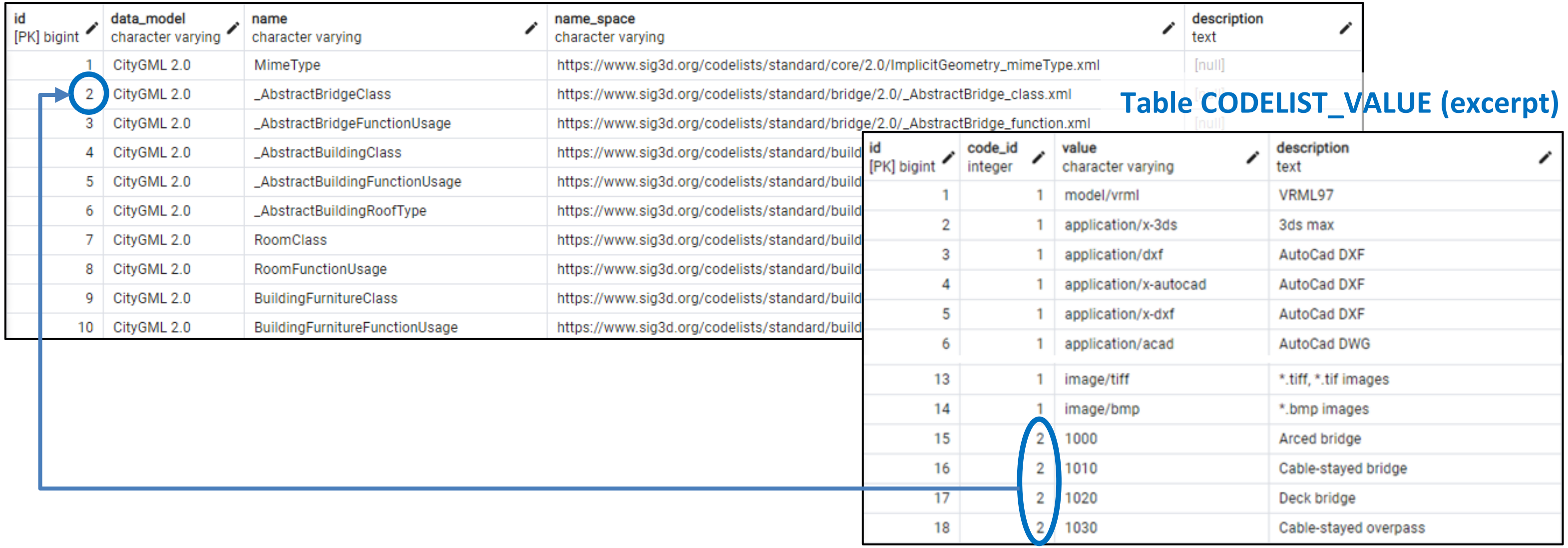


Table CODELIST (excerpt)

id [PK] bigint	data_model character varying	name character varying	name_space character varying	description text
1	CityGML 2.0	MimeType	https://www.sig3d.org/codelists/standard/core/2.0/ImplicitGeometry_mimeType.xml	[null]
2	CityGML 2.0	_AbstractBridgeClass	https://www.sig3d.org/codelists/standard/bridge/2.0/_AbstractBridge_class.xml	
3	CityGML 2.0	_AbstractBridgeFunctionUsage	https://www.sig3d.org/codelists/standard/bridge/2.0/_AbstractBridge_function.xml	
4	CityGML 2.0	_AbstractBuildingClass	https://www.sig3d.org/codelists/standard/build	
5	CityGML 2.0	_AbstractBuildingFunctionUsage	https://www.sig3d.org/codelists/standard/build	
6	CityGML 2.0	_AbstractBuildingRoofType	https://www.sig3d.org/codelists/standard/build	
7	CityGML 2.0	RoomClass	https://www.sig3d.org/codelists/standard/build	
8	CityGML 2.0	RoomFunctionUsage	https://www.sig3d.org/codelists/standard/build	
9	CityGML 2.0	BuildingFurnitureClass	https://www.sig3d.org/codelists/standard/build	
10	CityGML 2.0	BuildingFurnitureFunctionUsage	https://www.sig3d.org/codelists/standard/build	

Table CODELIST_VALUE (excerpt)

id [PK] bigint	code_id integer	value character varying	description text
1	1	model/vrml	VRML97
2	1	application/x-3ds	3ds max
3	1	application/dxf	AutoCad DXF
4	1	application/x-autocad	AutoCad DXF
5	1	application/x-dxf	AutoCad DXF
6	1	application/acad	AutoCad DWG
13	1	image/tiff	*.tiff, *.tif images
14	1	image/bmp	*.bmp images
15	2	1000	Arced bridge
16	2	1010	Cable-stayed bridge
17	2	1020	Deck bridge
18	2	1030	Cable-stayed overpass

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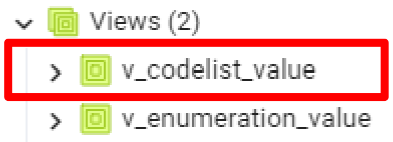
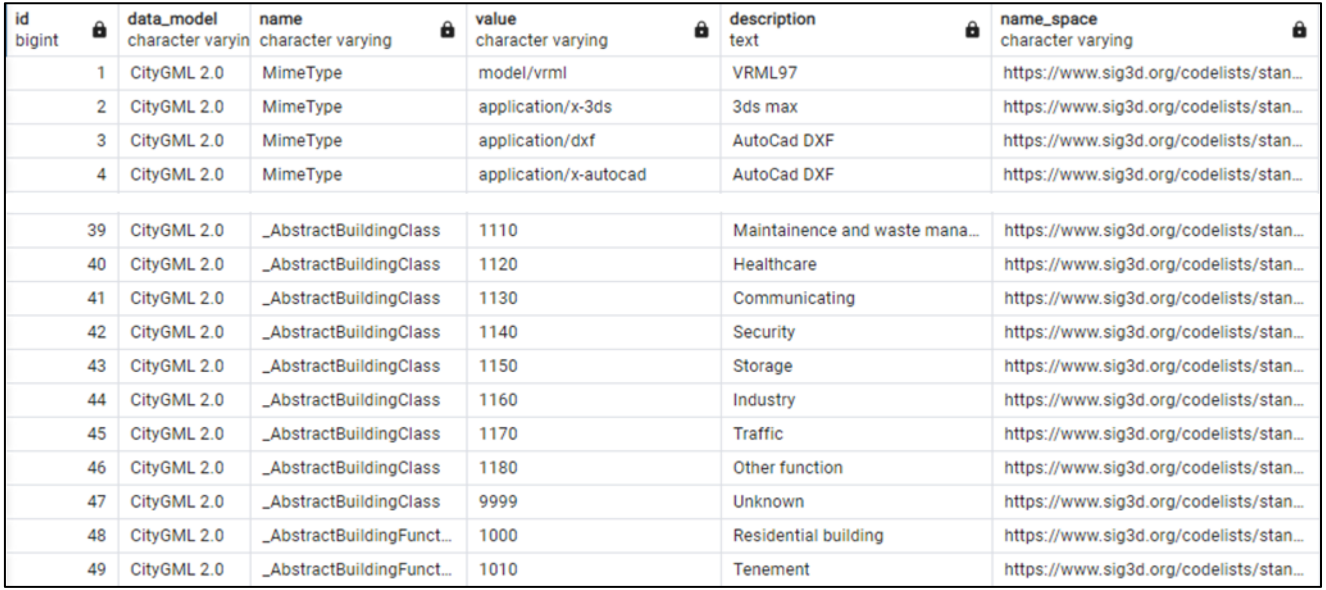
Customised codelists



In QGIS, all codelists values are retrieved from view **v_codelist_value** in the user schema of every user (e.g. "qgis_giorgio")

View V_CODELISTS_VALUE (excerpt)



id bigint	data_model character varyin	name character varying	value character varying	description text	name_space character varying
1	CityGML 2.0	MimeType	model/vrml	VRML97	https://www.sig3d.org/codelists/stan...
2	CityGML 2.0	MimeType	application/x-3ds	3ds max	https://www.sig3d.org/codelists/stan...
3	CityGML 2.0	MimeType	application/dxf	AutoCad DXF	https://www.sig3d.org/codelists/stan...
4	CityGML 2.0	MimeType	application/x-autocad	AutoCad DXF	https://www.sig3d.org/codelists/stan...
39	CityGML 2.0	_AbstractBuildingClass	1110	Maintainence and waste mana...	https://www.sig3d.org/codelists/stan...
40	CityGML 2.0	_AbstractBuildingClass	1120	Healthcare	https://www.sig3d.org/codelists/stan...
41	CityGML 2.0	_AbstractBuildingClass	1130	Communicating	https://www.sig3d.org/codelists/stan...
42	CityGML 2.0	_AbstractBuildingClass	1140	Security	https://www.sig3d.org/codelists/stan...
43	CityGML 2.0	_AbstractBuildingClass	1150	Storage	https://www.sig3d.org/codelists/stan...
44	CityGML 2.0	_AbstractBuildingClass	1160	Industry	https://www.sig3d.org/codelists/stan...
45	CityGML 2.0	_AbstractBuildingClass	1170	Traffic	https://www.sig3d.org/codelists/stan...
46	CityGML 2.0	_AbstractBuildingClass	1180	Other function	https://www.sig3d.org/codelists/stan...
47	CityGML 2.0	_AbstractBuildingClass	9999	Unknown	https://www.sig3d.org/codelists/stan...
48	CityGML 2.0	_AbstractBuildingFunct...	1000	Residential building	https://www.sig3d.org/codelists/stan...
49	CityGML 2.0	_AbstractBuildingFunct...	1010	Tenement	https://www.sig3d.org/codelists/stan...

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Customised codelists

To add values to the **CODELIST** and **CODELIST_VALUE** tables, the user can for example issue a SQL statement such as:

```
-- Optionally, delete previously loaded values belonging to the same codelist in user schema "qgis_giorgio"
DELETE FROM qgis_giorgio.codelist WHERE data_model = 'NL-BAG';
-- Insert first the codelist metadata and then the values in one single SQL statement
WITH cl AS (
   INSERT INTO qgis_giorgio.codelist (data_model, name, name_space, description)
   VALUES
   ('NL-BAG', 'BAG', 'https://..some_url_here.....', 'Codelist containing the values of the Dutch Basisregistratie
Adressen en Gebouwen)')
   RETURNING id)
INSERT INTO qgis_giorgio.codelist_value (code_id, value, description)
SELECT cl.id, v.value, v.description FROM cl, (VALUES
('apple'    , 'Codelist value for "apple"'    ),
('orange'  , 'Codelist value for "orange"'  ),
('pear'     , 'Codelist value for "pear"'     ),
('banana'  , 'Codelist value for "banana"' )
) AS v(value, description);
```

This SQL statement can be adapted by changing only the parts in red

Customised codelists

Adding customised codelists requires **two steps**:

1) **Load the actual codelist data** (codelist entries and codelist metadata). Such data must be stored in two predefined tables of the QGIS Package in the 3DCityDB

2) **Add mapping rules** for automatic setup of the lists in the attribute forms. Such data must be stored in a predefined table of the QGIS Package in the 3DCityDB

- The table is named **CODELIST_LOOKUP_CONFIG** in the qgis_{usr_name} and **CODELIST_LOOKUP_CONFIG_TEMPLATE** in the qgis_pkg schema, respectively. Their structure is exactly the same
- The following examples are based on tables CODELIST_LOOKUP_CONFIG but the procedure is the same for the *_TEMPLATE one

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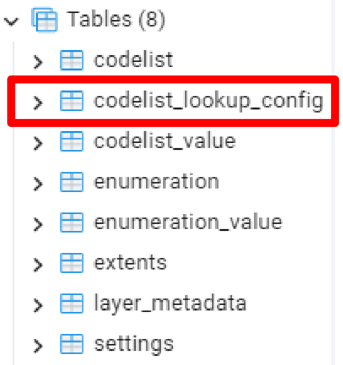
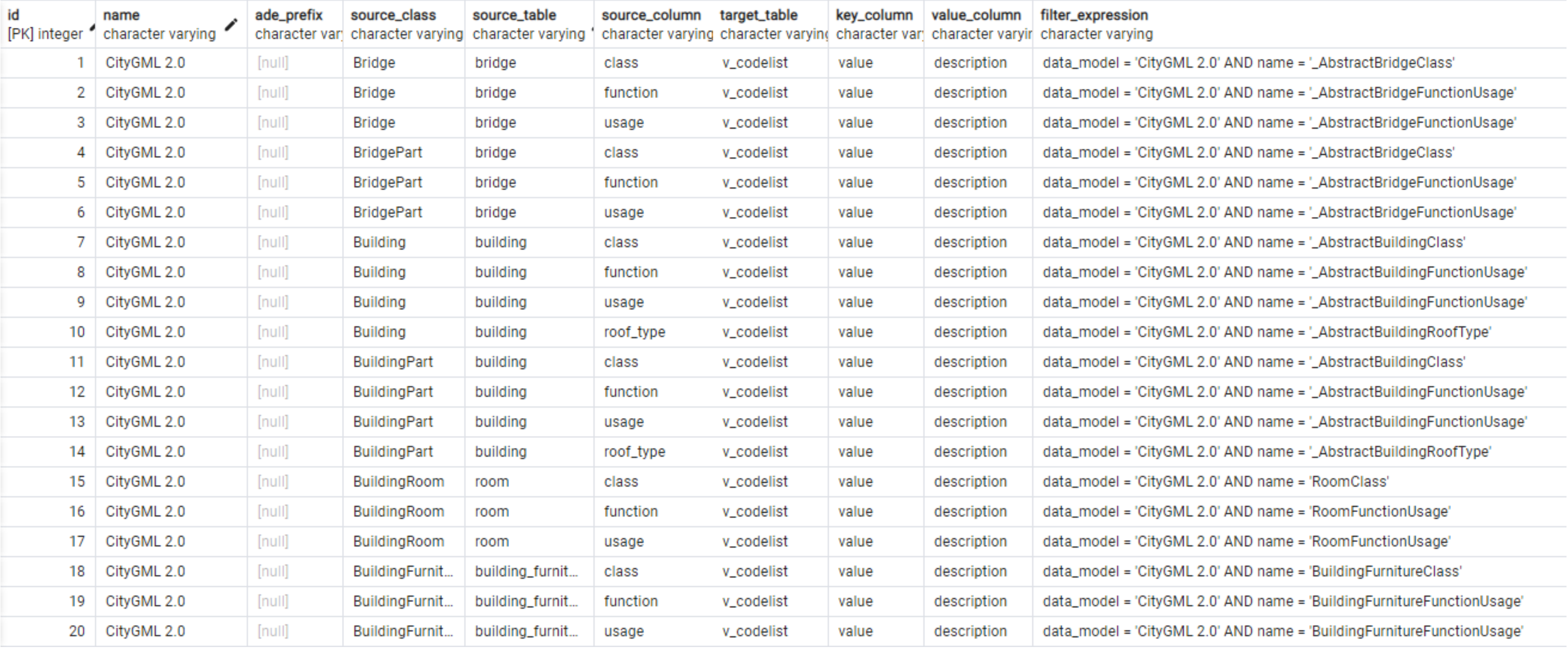
Customised codelists



- Tables (8)
  - codelist
  - codelist_lookup_config
  - codelist_value
  - enumeration
  - enumeration_value
  - extents
  - layer_metadata
  - settings

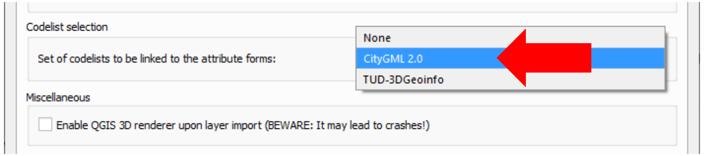
Table **CODELIST_LOOKUP_CONFIG** contains fields used to map Codelist values to the corresponding form attributes in QGIS. Explanation of the necessary fields is given in the next slide.



id [PK] integer	name character varying	ade_prefix character var	source_class character varying	source_table character varying	source_column character varying	target_table character varying	key_column character var	value_column character varyir	filter_expression character varying
1	CityGML 2.0	[null]	Bridge	bridge	class	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeClass'
2	CityGML 2.0	[null]	Bridge	bridge	function	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeFunctionUsage'
3	CityGML 2.0	[null]	Bridge	bridge	usage	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeFunctionUsage'
4	CityGML 2.0	[null]	BridgePart	bridge	class	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeClass'
5	CityGML 2.0	[null]	BridgePart	bridge	function	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeFunctionUsage'
6	CityGML 2.0	[null]	BridgePart	bridge	usage	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeFunctionUsage'
7	CityGML 2.0	[null]	Building	building	class	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBuildingClass'
8	CityGML 2.0	[null]	Building	building	function	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBuildingFunctionUsage'
9	CityGML 2.0	[null]	Building	building	usage	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBuildingFunctionUsage'
10	CityGML 2.0	[null]	Building	building	roof_type	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBuildingRoofType'
11	CityGML 2.0	[null]	BuildingPart	building	class	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBuildingClass'
12	CityGML 2.0	[null]	BuildingPart	building	function	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBuildingFunctionUsage'
13	CityGML 2.0	[null]	BuildingPart	building	usage	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBuildingFunctionUsage'
14	CityGML 2.0	[null]	BuildingPart	building	roof_type	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBuildingRoofType'
15	CityGML 2.0	[null]	BuildingRoom	room	class	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = 'RoomClass'
16	CityGML 2.0	[null]	BuildingRoom	room	function	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = 'RoomFunctionUsage'
17	CityGML 2.0	[null]	BuildingRoom	room	usage	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = 'RoomFunctionUsage'
18	CityGML 2.0	[null]	BuildingFurnit...	building_furnit...	class	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = 'BuildingFurnitureClass'
19	CityGML 2.0	[null]	BuildingFurnit...	building_furnit...	function	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = 'BuildingFurnitureFunctionUsage'
20	CityGML 2.0	[null]	BuildingFurnit...	building_furnit...	usage	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = 'BuildingFurnitureFunctionUsage'

Customised codelists

Those in yellow are the fields the must be added by the user. The other ones will be added automatically


Codelist selection

Set of codelists to be linked to the attribute forms:

Miscellaneous

☐ Enable QGIS 3D renderer upon layer import (BEWARE: It may lead to crashes!)

NAME: The name indicating the set of mapping rules. It must be the same for all rules belonging to the same group. This label will be the selectable one in the QGIS GUI.

SOURCE_CLASS: The CityGML/ADE* class the CodeList will be associated to (*ADEs are currently not supported)

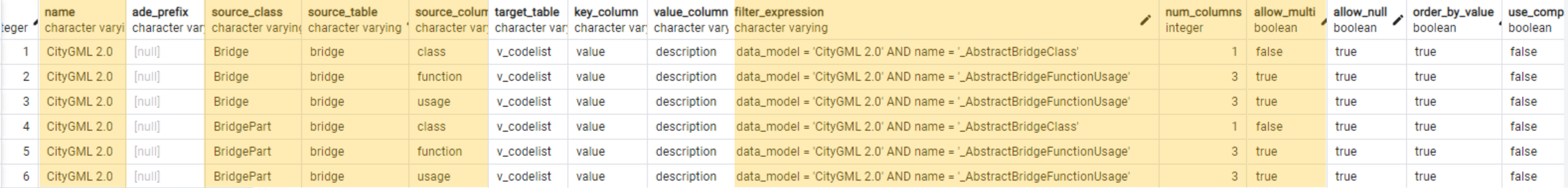
SOURCE_TABLE: The corresponding citydb table which contains the column to be associated to a codelist

SOURCE_COLUMN: The column to be associated to a codelist

ALLOW_MULTI: FALSE if the cardinality is 0..1, TRUE if it is 0..*

NUM_COLUMNS: Number of column presented in the widget and containing look-up values. Default: 1 when ALLOW_MULTI is FALSE, 3 when ALLOW_MULTI is TRUE.

FILTER_EXPRESSION: String containing the expression to filter the values of the desired codelist in the GUI form. It refers to the values of the columns DATA_MODEL and NAME of view V_CODELIST (see previous slides).



	name	ade_prefix	source_class	source_table	source_colum	target_table	key_column	value_column	filter_expression	num_columns	allow_multi	allow_null	order_by_value	use_comp
teger	character varyi	character var	character varyin	character varying	character var	character var	character var	character vary	character varying	integer	boolean	boolean	boolean	boolean
1	CityGML 2.0	[null]	Bridge	bridge	class	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeClass'	1	false	true	true	false
2	CityGML 2.0	[null]	Bridge	bridge	function	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeFunctionUsage'	3	true	true	true	false
3	CityGML 2.0	[null]	Bridge	bridge	usage	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeFunctionUsage'	3	true	true	true	false
4	CityGML 2.0	[null]	BridgePart	bridge	class	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeClass'	1	false	true	true	false
5	CityGML 2.0	[null]	BridgePart	bridge	function	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeFunctionUsage'	3	true	true	true	false
6	CityGML 2.0	[null]	BridgePart	bridge	usage	v_codelist	value	description	data_model = 'CityGML 2.0' AND name = '_AbstractBridgeFunctionUsage'	3	true	true	true	false

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Codelists and look-up tables

To add values to the **CODELIST_LOOKUP_CONFIG** table, the user can for example issue a SQL statement such as:

```
-- Optionally, delete previously loaded values belonging to the same codelist group in user schema "qgis_giorgio"
DELETE FROM qgis_giorgio.codelist_lookup_config WHERE name = 'StarWarsCodelist';
-- Insert the mapping rules in one single SQL statement
INSERT INTO qgis_giorgio.codelist_lookup_config
(name, source_class, source_table, source_column, allow_multi, num_columns, filter_expression)
VALUES
('StarWarsCodelist', 'Building'    , 'building', 'class'     , FALSE, 1, 'data_model = "StarWarsCoruscant"  AND name =
"CoruscantBdgClass"'),
('StarWarsCodelist', 'Building'    , 'building', 'function'  , TRUE , 3, 'data_model = "StarWarsCoruscant"  AND name =
"CoruscantBdgFunction"'),
('StarWarsCodelist', 'Building'    , 'building', 'usage'     , TRUE , 3, 'data_model = "StarWarsCoruscant"  AND name =
"CoruscantBdgUsage"'),
('StarWarsCodelist', 'Building'    , 'building', 'roof_type' , FALSE, 1, 'data_model = "StarWarsCoruscant"  AND name =
"CoruscantBdgRoofType"');
```

This SQL statement can be adapted by changing only the parts in red. For the qgis_pkg, use table CODELIST_LOOKUP_CONFIG_TEMPLATE instead.

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Software uninstall

Uninstallation consists of two parts:

1) Partial/complete **removal of the QGIS Package** from PostgreSQL

- This operation can be carried out only by the database administrator
- The administrator can choose to drop only the schema of a selected user (e.g. "qgis_giorgio")
- The administrator can remove all user schemas AND the qgis_pkg schema

2) **Removal of the 3DCityDB-Tools plugin** from QGIS

- This operation can be carried out by any user
- The plugin can be uninstalled from the \Plugins\Manage and Install Plugins... Menu in QGIS
- Alternatively, it can be uninstalled manually by simply removing the plugin folder

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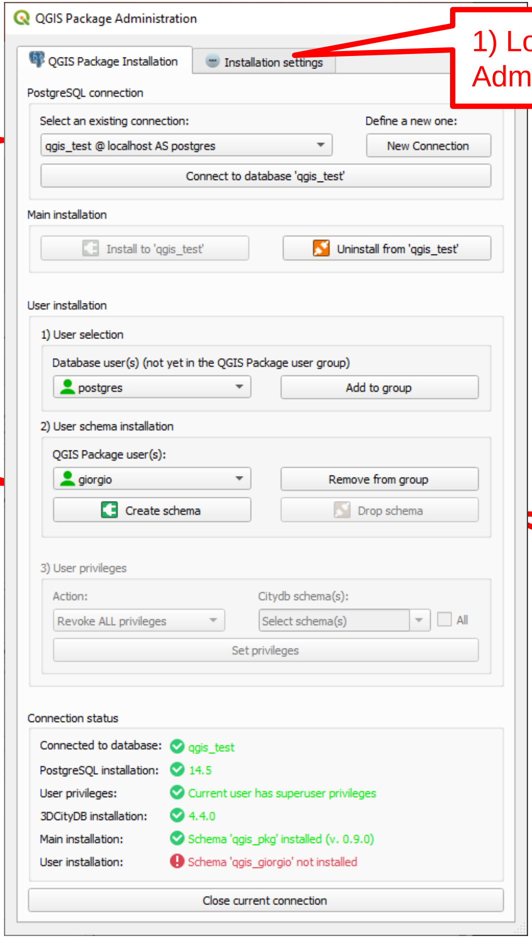
Drop user schema



Select an existing connection: qgis_test @ localhost AS postgres

Database user(s) (not yet in the QGIS Package user group): postgres

QGIS Package user(s): giorgio

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s)

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation: ! Schema 'qgis_giorgio' not installed

1) Load the "QGIS Package Administration" GUI

2) Connect as administrator

3) Select the user

4) Drop the schema of the selected user.
All privileges will be automatically reset to "None"

Drop user schema

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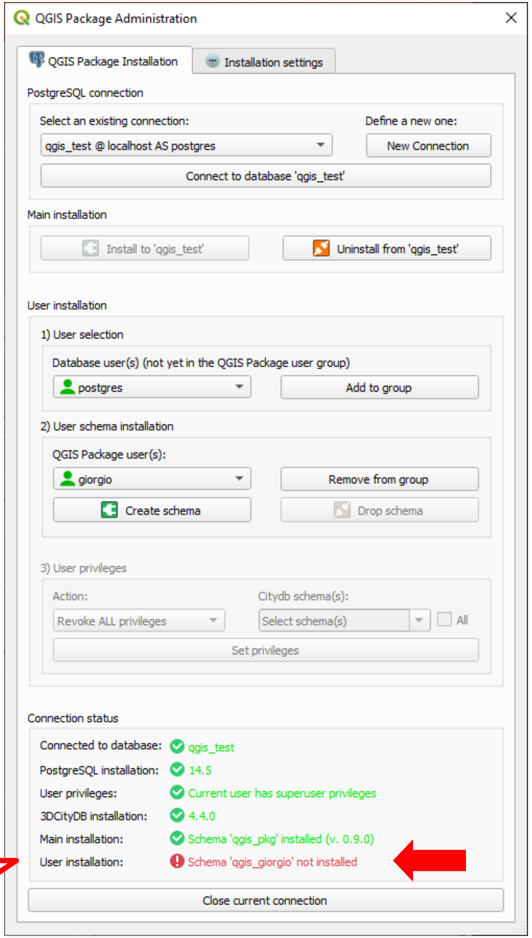

Select an existing connection: qgis_test @ localhost AS postgres

Define a new one:

1) User selection

Database user(s) (not yet in the QGIS Package user group): postgres

2) User schema installation

QGIS Package user(s): giorgio

3) User privileges

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s) □ All

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation: ! Schema 'qgis_giorgio' not installed

5) The user installation field is now red again

Software uninstall: Uninstall QGIS Package

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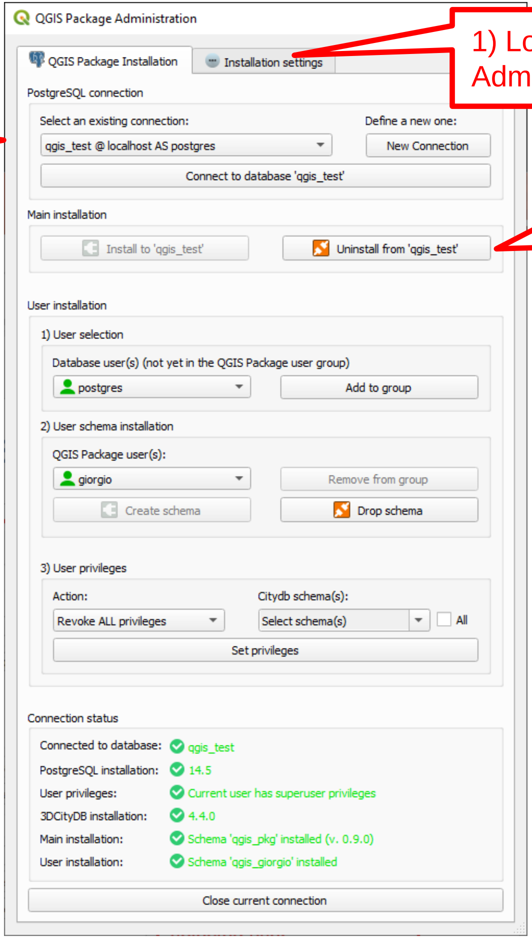

QGIS Package Administration

QGIS Package Installation | Installation settings

PostgreSQL connection

Select an existing connection: qgis_test @ localhost AS postgres

Define a new one: New Connection

Connect to database 'qgis_test'

Main installation

Install to 'qgis_test' | Uninstall from 'qgis_test'

User installation

1) User selection

Database user(s) (not yet in the QGIS Package user group)

postgres | Add to group

2) User schema installation

QGIS Package user(s):

giorgio | Remove from group

Create schema | Drop schema

3) User privileges

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s) □ All

Set privileges

Connection status

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ✓ Schema 'qgis_pkg' installed (v. 0.9.0)
User installation: ✓ Schema 'qgis_giorgio' installed

Close current connection

1) Load the "QGIS Package Administration" GUI

2) Connect as administrator

3) Uninstall the QGIS Package from the current database

Uninstall QGIS Package

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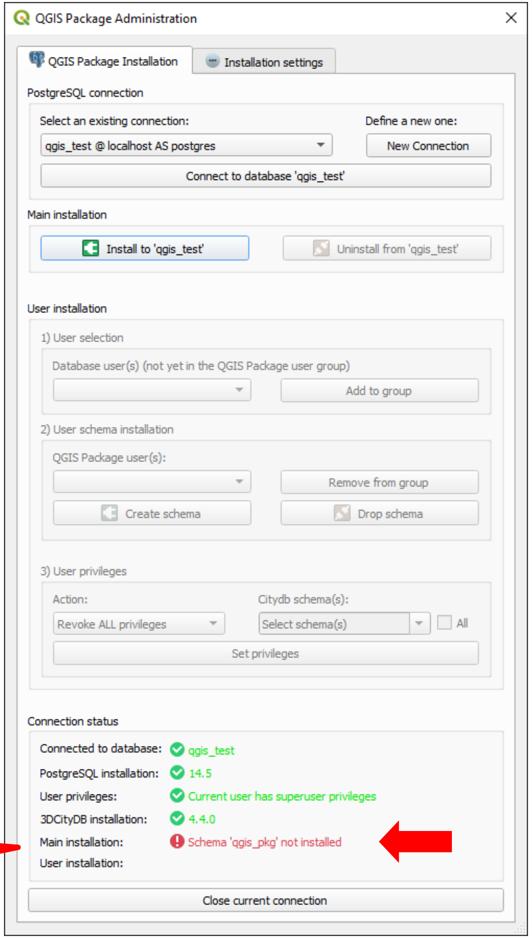

Select an existing connection: qgis_test @ localhost AS postgres

Connect to database 'qgis_test'

Action: Revoke ALL privileges

Citydb schema(s): Select schema(s)

Connected to database: ✓ qgis_test
PostgreSQL installation: ✓ 14.5
User privileges: ✓ Current user has superuser privileges
3DCityDB installation: ✓ 4.4.0
Main installation: ! Schema 'qgis_pkg' not installed
User installation:

4) The main installation field is now red again

Uninstall 3DCityDB-Tools

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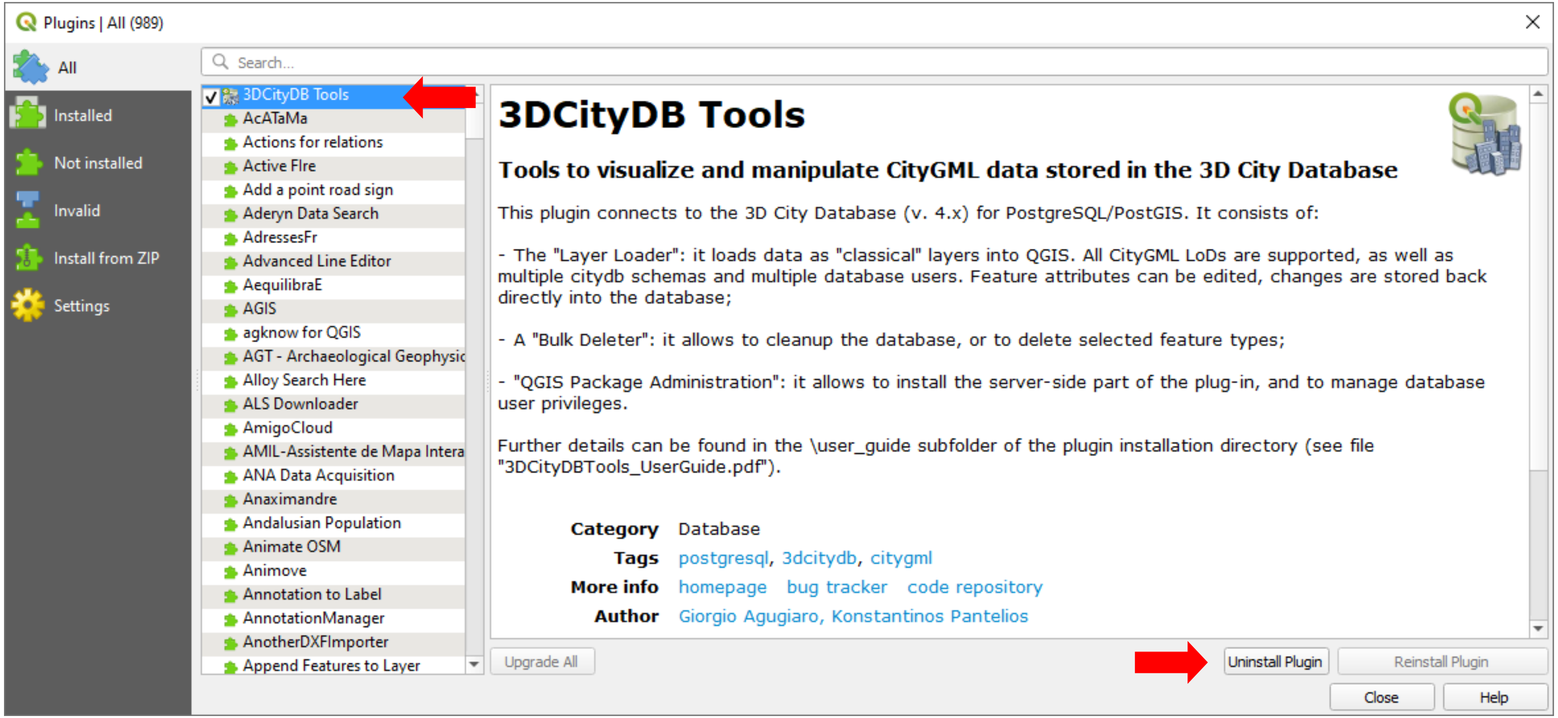
The plugin can be uninstalled from the \Plugins\Manage and Install Plugins... Menu in QGIS



3DCityDB Tools

Tools to visualize and manipulate CityGML data stored in the 3D City Database

This plugin connects to the 3D City Database (v. 4.x) for PostgreSQL/PostGIS. It consists of:

- The "Layer Loader": it loads data as "classical" layers into QGIS. All CityGML LoDs are supported, as well as multiple citydb schemas and multiple database users. Feature attributes can be edited, changes are stored back directly into the database;

- A "Bulk Deleter": it allows to cleanup the database, or to delete selected feature types;

- "QGIS Package Administration": it allows to install the server-side part of the plug-in, and to manage database user privileges.

Further details can be found in the \user_guide subfolder of the plugin installation directory (see file "3DCityDBTools_UserGuide.pdf").

Category	Database
Tags	postgresql, 3dcitydb, citygml
More info	homepage bug tracker code repository
Author	Giorgio Agugiaro, Konstantinos Pantelios

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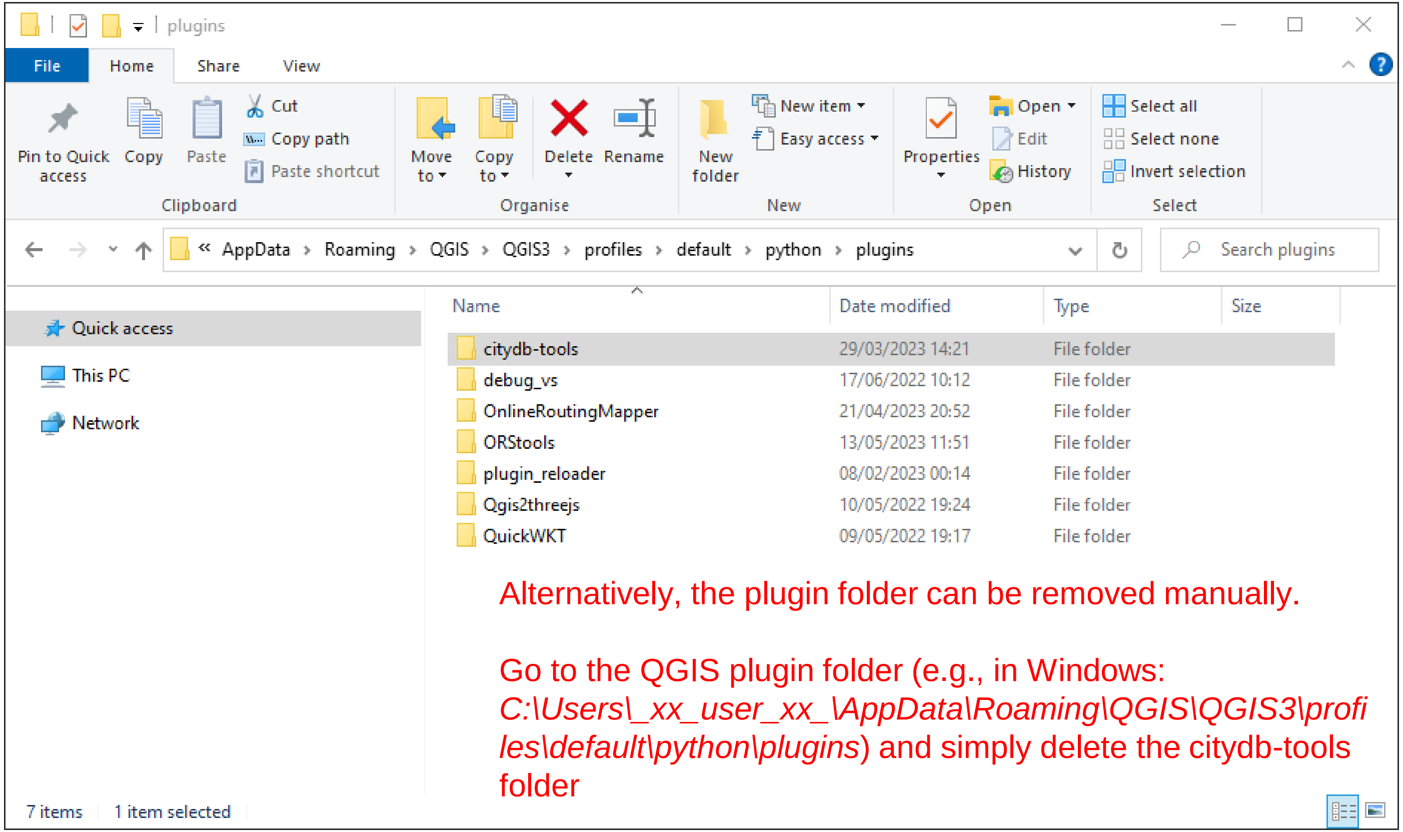
Uninstall 3DCityDB-Tools



Name	Date modified	Type	Size
citydb-tools	29/03/2023 14:21	File folder	
debug_vs	17/06/2022 10:12	File folder	
OnlineRoutingMapper	21/04/2023 20:52	File folder	
ORStools	13/05/2023 11:51	File folder	
plugin_reloader	08/02/2023 00:14	File folder	
Qgis2threejs	10/05/2022 19:24	File folder	
QuickWKT	09/05/2022 19:17	File folder	

7 items 1 item selected

Alternatively, the plugin folder can be removed manually.

Go to the QGIS plugin folder (e.g., in Windows: *C:\Users_xx_user_xx_\AppData\Roaming\QGIS\QGIS3\profiles\default\python\plugins*) and simply delete the citydb-tools folder

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Current limitations

In general:

- CityGML appearances are not supported
- The Layer Loader does not support CityObjectGroups
- CityGML ADEs (Application Domain Extensions) are not supported

The QGIS Package does not support:

- Raster-based Relief features
- Generation of layers for CityObjectGroups

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QGIS Package in a nutshell

- It represents the **server-side part** of the QGIS plugin
  - Most of the actions carried out from the QGIS GUI can be actually performed also by interacting directly with the database (e.g. using **PgAdmin**)

- It can be installed and used independently from the QGIS client-side part
  - E.g. with FME, or programmatically via Python, SQLAlchemy, etc.

- It requires
  - PostgreSQL **v. 10 or higher**
  - An existing installation of the 3DCityDB **v. 4.x**

- All relevant entities are installed in the "**qgis_pkg**" database schema
  - Database types
  - Triggers and trigger functions
  - Functions
  - Tables, mostly used as templates for the user schemas

QGIS Package in a nutshell

The database administrator can:

- Create user schemas
- Grant/revoke privileges per user and per citydb schema
- Create, refresh, drop layers
- Drop user schemas

The required SQL functions are all available in schema **qgis_pkg**.

QGIS Package: Create user schemas

The database administrator can create user schemas for specific database users.
For example:

- User "giorgio" -> schema "qgis_giorgio"
- User "konstantinos" -> schema "qgis_konstantinos"
- User "postgres" -> schema "qgis_postgres"

Each user schema will be used only by the corresponding user

Each user schema is accessible only by the corresponding user (and the database superusers)

In a user schema all necessary tables, updatable views, materialized views etc. will be created

SQL example

```
-- Create the schema for user "giorgio". It will create schema "qgis_giorgio" in the current database
SELECT qgis_pkg.create_qgis_usr_schema('giorgio');
```

QGIS Package: Create user schemas

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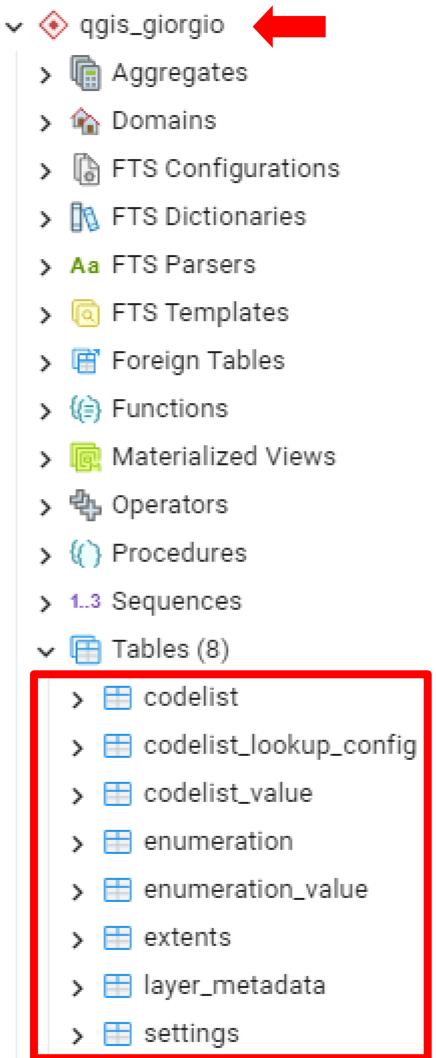
User schema overview

In each user schema (e.g. "qgis_giorgio") some tables are generated upon schema creation:

- Tables **CODELIST, CODELIST_LOOKUP_CONFIG** and **CODELIST_VALUE** are used to store codelists and related settings. See slides on **advanced options** for more details
- Tables **ENUMERATION** and **ENUMERATION_VALUE** are used to store enumerations
- Table **EXTENTS** contains the bounding boxes of the citydb schemas and those of the materialized views
- Table **LAYER_METADATA** contains information about generated and refreshed layers
- Table **SETTINGS** is used to store the user's settings (from the QGIS GUI)



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QGIS Package: User management

The database administrator can grant user privileges

SQL examples

```
-- Database user "giorgio" is added to group "qgis_pkg_usrgroup_qgis_test", can access data in citydb schema "citydb" of database "qgis_test" with read-only privileges
SELECT qgis_pkg.grant_qgis_usr_privileges('giorgio', 'ro','citydb');

-- Database user "konstantinos" is added to group "qgis_pkg_usrgroup_qgis_db", can access data in citydb schema "citydb_2" of database "qgis_db" with read-write privileges
SELECT qgis_pkg.grant_qgis_usr_privileges('konstantinos', 'rw','citydb_2');

-- Database user "camilo" is added to group "qgis_pkg_usrgroup_starwars", can access data in ALL citydb schemas of the current database "starwars" with read-write privileges
SELECT qgis_pkg.grant_qgis_usr_privileges('camilo ', 'rw');
```

QGIS Package: User management

The database administrator can revoke user privileges

SQL examples

```
-- Database user "giorgio" cannot access anymore data in citydb schema "citydb" of the current database
SELECT qgis_pkg.revoke_qgis_usr_privileges('giorgio', 'citydb');

-- Database user "camilo" cannot access anymore ANY citydb schemas of the current database
SELECT qgis_pkg.revoke_qgis_usr_privileges('camilo');
```

IMPORTANT: The database users are NOT automatically removed from the group "qgis_pkg_usrgroup_{cdb_schema}". If required, the administrator has to remove them manually (or use the QGIS plugin GUI).

```
-- Database user "giorgio" is removed from group "qgis_pkg_usrgroup_starwars" and won't be able to use the QGIS plugin anymore for the database "starwars"
REVOKE qgis_pkg_usrgroup_starwars FROM giorgio;
```

QGIS Package: Layer management

The database administrator can create layers with function **qgis_pkg.create_layers(...)**.

- All materialized views and updatable views are created, but only if corresponding data exist in the database
- The user can create layers only for selected CityGML modules using the similar functions:
  - **qgis_pkg.create_layers_bridge(...)**
  - **qgis_pkg.create_layers_building(...)**
  - **...**
  - **qgis_pkg.create_layers_waterbody(...)**
- All functions are in schema qgis_pkg and have the same signature (see next slide)

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Function

qgis_pkg.create_layers(usr_schema, cdb_schema [, perform_snapping] [, digits] [, area_poly_min] [, bbox_corners_array] [, is_geographic] [, force_layer_creation])

Parameter	Type	Description
usr_schema	varchar	The database user schema, e.g. "qgis_giorgio".
cdb_schema	varchar	the citydb schema where data are stored, e.g. "citycb", or "citydb2".
perform_snapping	integer	DEFAULT 0 (i.e. disabled). If 1, geometry simplification is performed. Unused if perform_snapping is set to 0.
digits	integer	DEFAULT 3. Number of decimal positions to keep during geometry simplification. Unused if perform_snapping is set to 0.
area_poly_min	numeric	DEFAULT 0.001 [m^2]. Minimum polygon area during geometry simplification. Unused if perform_snapping is set to 0.
bbox_corners_array	numeric[]	DEFAULT Null, i.e. the extents of the whole *cdb_schema*. Otherwise, extents of the materialized views to be created, e.g. {x_min, y_min, x_max, y_max}. Coordinates must be in the same SRS as the cdb_schema!
is_geographic	boolean	DEFAULT False. True is the coordinate system of the citydb schema has geographic coordinates, False if it has projected coordinates.
force_layer_creation	boolean	DEFAULT False. Otherswise: force creation of all layers, also the empty ones.

QGIS Package: Layer management

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SQL examples

-- For user "giorgio", create all layers for existing data in citydb schema "citydb"

```sql
SELECT qgis_pkg.create_layers('giorgio', 'citydb');
```

-- For user "giorgio", create all layers for existing data in citydb schema "citydb2" and perform geometry simplification with 2 decimal places and 0.01 m^2 minimum area for polygons

```sql
SELECT qgis_pkg.create_layers('giorgio', 'citydb', 1, 2, 0.01);
```

-- For user "camilo", create all building module layers for existing data in citydb schema "vienna"

```sql
SELECT qgis_pkg.create_layers_building('camilo', 'vienna');
```

-- For user "konstantinos", create all waterbody module layers for existing data in citydb schema "alderaan" within a certain bounding box. The bounding box is defined by the lower-left and upper-right coordinates (i.e. x_min, y_min, x_max, y_max)

```sql
SELECT qgis_pkg.create_layers_waterbody('konstantinos', 'alderaan', bbox_corners_array := '{10, 20, 110, 220}');
```

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QGIS Package: Layer management

SQL examples

```
-- The following query works, but actually it is not written in a user-friendly way.
SELECT qgis_pkg.create_layers('giorgio', 'citydb', 1, 2, 0.01);

-- In general, therefore, it is always a good habit to use named parameters when calling functions!
SELECT qgis_pkg.create_layers(
                                        usr_name := 'giorgio',
                                        cdb_schema := 'citydb',
                                        perform_snapping := 1,
                                        digits := 2,
                                        area_poly_min := 0.01)
```

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QGIS Package: Layer management

After creating the layers, you may (optionally) want to register also their bounding box in the EXTENTS table of the respective qgis_schema. This will enable the plugin in QGIS to "see" and represent the extents also from the plugin GUI.

SQL examples

```
-- In user schema "qgis_giorgio", update the extents for the whole dataset in citydb schema "citydb"
SELECT qgis_pkg.upsert_extents('qgis_giorgio', 'citydb', 'db_schema');

-- In user schema "qgis_giorgio", update the extents for the user-defined bounding box in citydb schema "citydb"
SELECT qgis_pkg. upsert_extents(
                        usr_schema := 'qgis_giorgio',
                        cdb_schema := 'citydb',
                        cdb_bbox_type := 'm_view', -- must be one of ('db_schema', 'm_view', 'qgis')
                        cdb_envelope := ST_Envelope('LINESTRING(232038 480366, 232600 480856)'::geometry),
                        is_geographic := FALSE);
```

Please note: the *cdb_envelope* parameter requires a PostGIS geometry that is a polygon. As long as this requirement is respected, other PostGIS functions can be used, for example:

- ST_GeomfromText('POLYGON((...))')
- ST_MakePolygon(...)

The SRID can be omitted as it is automatically set based on the one from the selected citydb schema. The coordinates must be however in the same CRS of the selected citydb!

QGIS Package: Layer management

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The database administrator can refresh the materialized views with function **qgis_pkg.refresh_layers(...).**

- All materialized views created before will be refreshed. This is necessary every time the layers are generated (or re-generated using a different bounding box).
- The user can refresh the materialized views only for selected CityGML modules using the similar functions:
  - **qgis_pkg.refresh_layers_bridge(...)**
  - **qgis_pkg.refresh_layers_building(...)**
  - **...**
  - **qgis_pkg.refresh_layers_waterbody(...)**
- All functions are in schema qgis_pkg and have the same signature (see next slide)

QGIS Package: Layer management

Function

qgis_pkg.refresh_layers(usr_schema, cdb_schema)

Parameter	Type	Description
usr_schema	varchar	The database user schema, e.g. "qgis_giorgio".
cdb_schema	varchar	the citydb schema where data are stored, e.g. "citycb", or "citydb2".

SQL examples

```
-- In user schema "qgis_giorgio", refresh all materialized views in citydb schema "citydb"
SELECT qgis_pkg.refresh_layers('qgis_giorgio', 'citydb');

-- In user schema "qgis_konstantinos", refresh all waterbody module materialized views in citydb schema "alderaan"
SELECT qgis_pkg.refresh_layers_waterbody('qgis_konstantinos', 'alderaan');
```

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QGIS Package: Layer management

The database administrator can drop layers with function **qgis_pkg.drop_layers(...).**

- All existing layers in the selected user schema and related to the selected citydb schema will be dropped
- The user can drop layers only for selected CityGML modules using the similar functions:
  - **qgis_pkg.drop_layers_bridge(...)**
  - **qgis_pkg.drop_layers_building(...)**
  - **...**
  - **qgis_pkg.drop_layers_waterbody(...)**
- All functions are in schema qgis_pkg and have the same signature (see next slide)

QGIS Package: Layer management

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Function

qgis_pkg.drop_layers(usr_schema, cdb_schema)

Parameter	Type	Description
usr_schema	varchar	The database user schema, e.g. "qgis_giorgio".
cdb_schema	varchar	the citydb schema where data are stored, e.g. "citycb", or "citydb2".

SQL examples

```sql
-- In user schema "qgis_giorgio", drop all layers related to citydb schema "citydb"
SELECT qgis_pkg.drop_layers('qgis_giorgio', 'citydb');

-- In user schema "qgis_konstantinos", drop all waterbody module layers related to citydb schema "alderaan"
SELECT qgis_pkg.drop_layers_waterbody('qgis_konstantinos', 'alderaan');
```

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QGIS Package: Detail views

Detail views are children tables containing additional layer data (e.g. generic attributes, external references, etc.)

Optionally, they can be created programmatically and dropped in a similar way as normal layers. If created, they will be used (also) by the plugin GUI in QGIS to link these views to the attribute forms as nested tables.

SQL examples

```
-- For user "giorgio", create the detail views for citydb schema "citydb"
SELECT qgis_pkg.create_details_view('giorgio', 'citydb');

-- For user "giorgio", create the detail views for citydb schema "citydb" inside the user-defined bounding box
SELECT qgis_pkg.create_detail_view(
                usr_name := 'giorgio',
                cdb_schema := 'citydb',
                bbox_corners_array := ARRAY[ 232038, 480366, 232600, 480856],
                is_geographic := FALSE);

-- In user schema "qgis_giorgio", drop the detail views for citydb schema "citydb"
SELECT qgis_pkg.drop_detail_view('qgis_giorgio', 'citydb');
```

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QGIS Package: Drop user schema

The database administrator can drop a user schema

FIRST, revoke privileges of the user for all citydb schemas, THEN drop the user schema. Please refer to the previous slides for more details about user privileges.

SQL example

```
-- First revoke all ro/rw privileges of user "giorgio" for all citydb schemas
SELECT qgis_pkg.revoke_qgis_usr_privileges('giorgio');
-- Then drop the layers using the drop_layer_x functios
SELECT qgis_pkg.drop_layers_building('qgis_giorgio');
SELECT qgis_pkg.drop_layers_bridge('qgis_giorgio');
…
-- Then drop the user schema
DROP SCHEMA qgis_giorgio CASCADE;
-- Optionally (if necessary) remove user "giorgio" from the "qgis_pkg_usrgroup_qgis_test" associated to database "qgis_test"
REVOKE qgis_pkg_usrgroup_qgis_test FROM giorgio;
```

QGIS Package via FME

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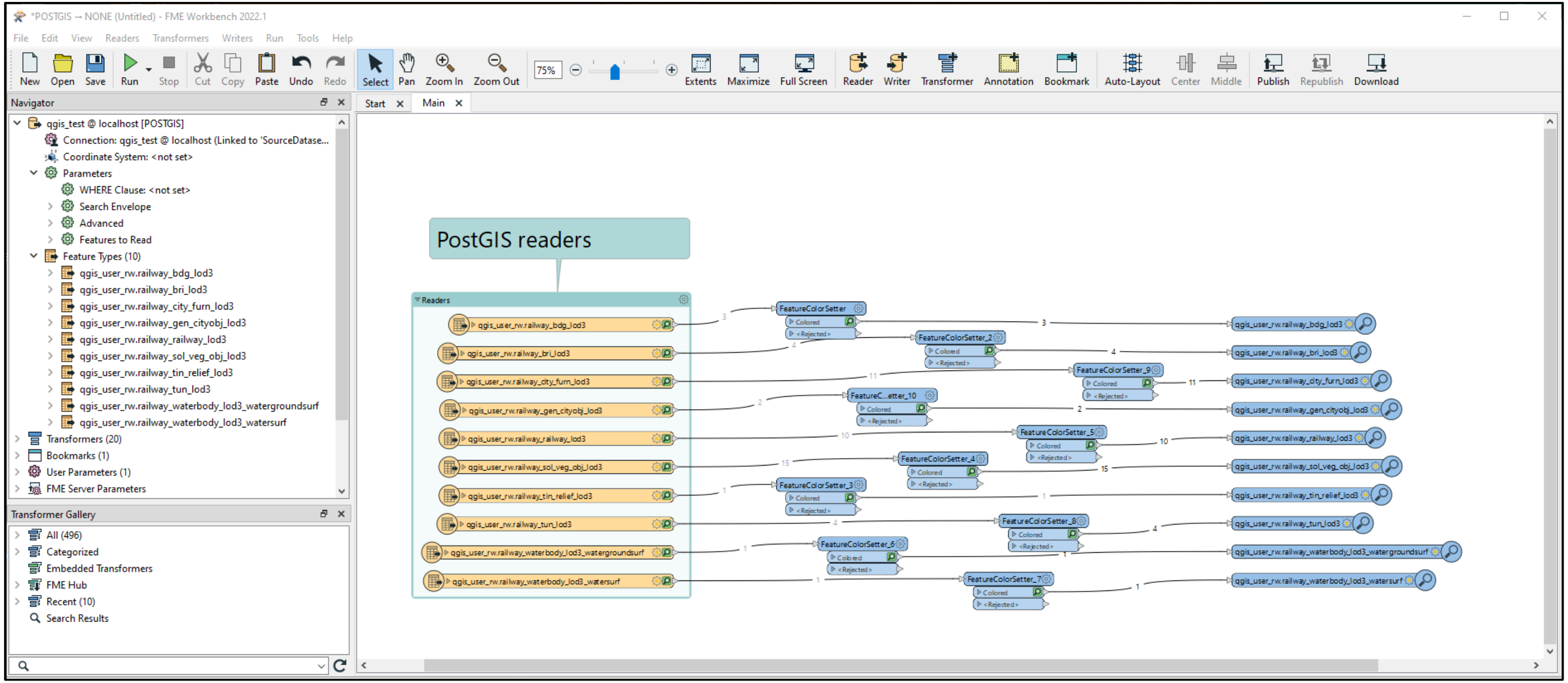
This is a simple example of how the QGIS package can be used via FME

- Simply connect to the 3D City Database and import the views with **PostGIS readers**



*POSTGIS → NONE (Untitled) - FME Workbench 2022.1

Navigator

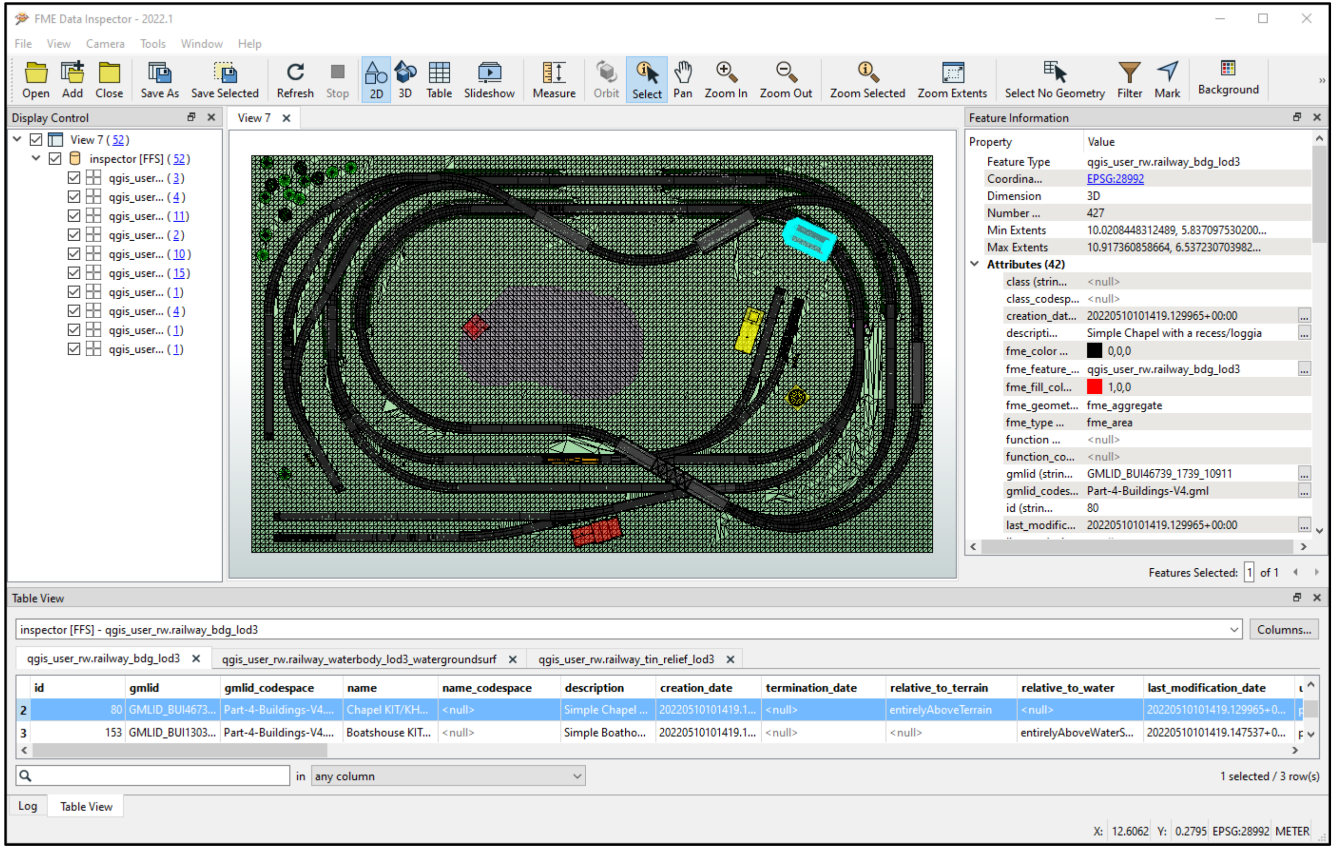
- qgis_test @ localhost [POSTGIS]
  - Connection: qgis_test @ localhost (Linked to 'SourceDatase...
  - Coordinate System: <not set>
  - Parameters
    - WHERE Clause: <not set>
    - Search Envelope
    - Advanced
    - Features to Read
  - Feature Types (10)
    - qgis_user_rw.railway_bdg_lod3
    - qgis_user_rw.railway_bri_lod3
    - qgis_user_rw.railway_city_furn_lod3
    - qgis_user_rw.railway_gen_cityobj_lod3
    - qgis_user_rw.railway_railway_lod3
    - qgis_user_rw.railway_sol_veg_obj_lod3
    - qgis_user_rw.railway_tin_relief_lod3
    - qgis_user_rw.railway_tun_lod3
    - qgis_user_rw.railway_waterbody_lod3_watergroundsurf
    - qgis_user_rw.railway_waterbody_lod3_watersurf
- Transformers (20)
- Bookmarks (1)
- User Parameters (1)
- FME Server Parameters

Transformer Gallery

- All (496)
- Categorized
- Embedded Transformers
- FME Hub
- Recent (10)
- Search Results

QGIS Package via FME

- 2D visualisation via FME Data Inspector



Property	Value
Feature Type	qgis_user_rw.railway_bdg_lod3
Coordina...	EPSG:28992
Dimension	3D
Number ...	427
Min Extents	10.0208448312489, 5.837097530200...
Max Extents	10.917360858664, 6.537230703982...
Attributes (42)	
class (strin...	<null>
class_codesp...	<null>
creation_dat...	20220510101419.129965+00:00
descripti...	Simple Chapel with a recess/loggia
fme_color ...	■ 0,0,0
fme_feature_...	qgis_user_rw.railway_bdg_lod3
fme_fill_col...	🟥 1,0,0
fme_geomet...	fme_aggregate
fme_type ...	fme_area
function ...	<null>
function_co...	<null>
gmlid (strin...	GMLID_BUI46739_1739_10911
gmlid_codes...	Part-4-Buildings-V4.gml
id (strin...	80
last_modific...	20220510101419.129965+00:00

Features Selected: 1 of 1

inspector [FFS] - qgis_user_rw.railway_bdg_lod3 Columns...

qgis_user_rw.railway_bdg_lod3 × qgis_user_rw.railway_waterbody_lod3_watergroundsurf × qgis_user_rw.railway_tin_relief_lod3 ×

	id	gmlid	gmlid_codespace	name	name_codespace	description	creation_date	termination_date	relative_to_terrain	relative_to_water	last_modification_date
2	80	GMLID_BUI4673...	Part-4-Buildings-V4....	Chapel KIT/KH...	<null>	Simple Chapel ...	20220510101419.1...	<null>	entirelyAboveTerrain	<null>	20220510101419.129965+0...
3	153	GMLID_BUI1303...	Part-4-Buildings-V4....	Boatshouse KIT...	<null>	Simple Boatho...	20220510101419.1...	<null>	<null>	entirelyAboveWaterS...	20220510101419.147537+0...

in any column

1 selected / 3 row(s)

X: 12.6062 Y: 0.2795 EPSG:28992 METER

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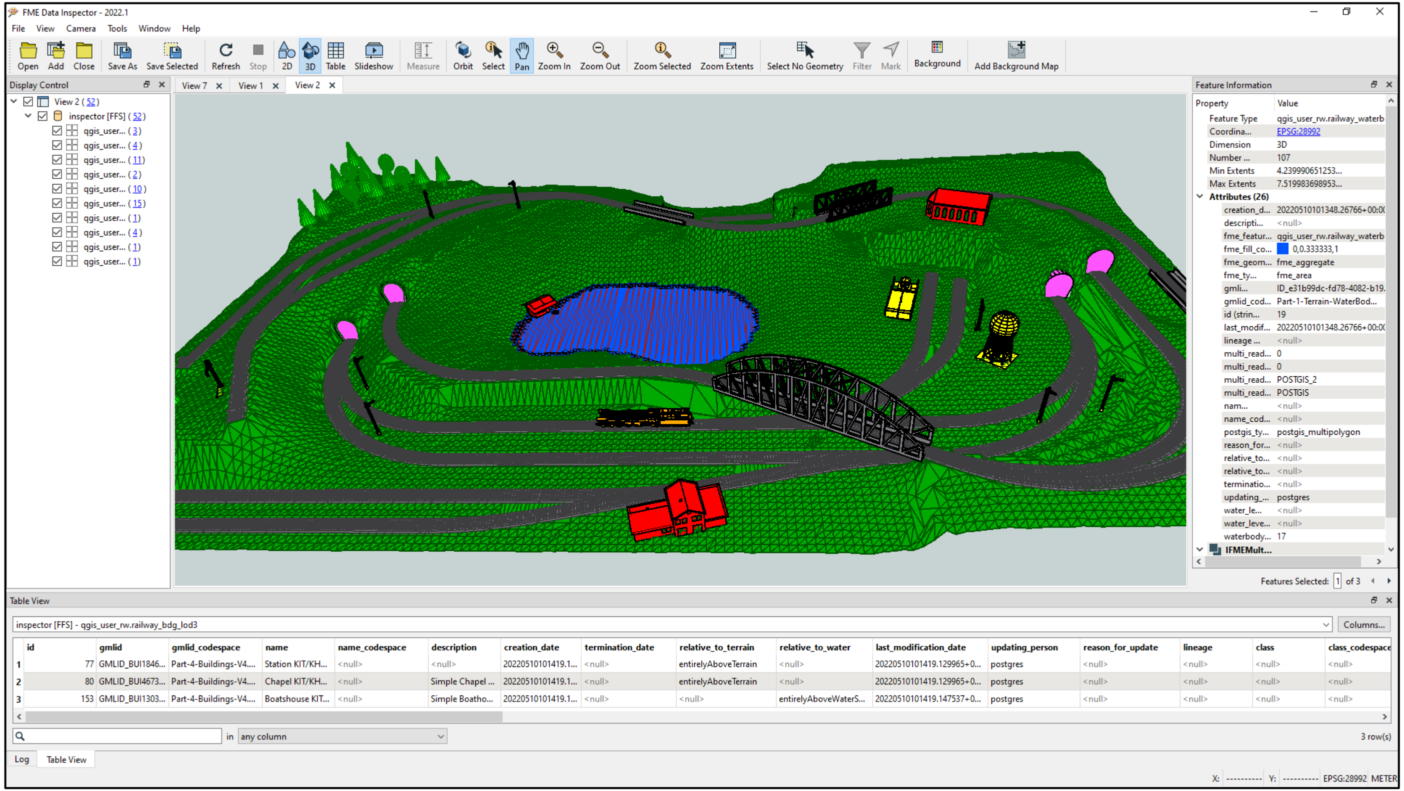
QGIS Package via FME

- 3D visualisation via FME Data Inspector



Property	Value
Feature Type	qgis_user_rw.railway_waterb
Coordina...	EPSG:28992
Dimension	3D
Number ...	107
Min Extents	4.239990651253...
Max Extents	7.519983698953...
Attributes (26)	
creation_d...	20220510101348.26766+00:00
descripti...	<null>
fme_featur...	qgis_user_rw.railway_waterb
fme_fill_co...	🟦 0,0.333333,1
fme_geom...	fme_aggregate
fme_ty...	fme_area
gmli...	ID_e31b99dc-fd78-4082-b19.
gmlid_cod...	Part-1-Terrain-WaterBod...
id (strin...	19
last_modif...	20220510101348.26766+00:00
lineage ...	<null>
multi_read...	0
multi_read...	0
multi_read...	POSTGIS_2
multi_read...	POSTGIS
nam...	<null>
name_cod...	<null>
postgis_ty...	postgis_multipolygon
reason_for...	<null>
relative_to...	<null>
relative_to...	<null>
terminatio...	<null>
updating_...	postgres
water_le...	<null>
water_leve...	<null>
waterbody...	17
IFMEMult...	

Features Selected: 1 of 3

Table View

inspector [FFS] - qgis_user_rw.railway_bdg_lod3

	id	gmlid	gmlid_codespace	name	name_codespace	description	creation_date	termination_date	relative_to_terrain	relative_to_water	last_modification_date	updating_person	reason_for_update	lineage	class	class_codespace
1	77	GMLID_BUI1846...	Part-4-Buildings-V4....	Station KIT/KH...	<null>	<null>	20220510101419.1...	<null>	entirelyAboveTerrain	<null>	20220510101419.129965+0...	postgres	<null>	<null>	<null>	<null>
2	80	GMLID_BUI4673...	Part-4-Buildings-V4....	Chapel KIT/KH...	<null>	Simple Chapel ...	20220510101419.1...	<null>	entirelyAboveTerrain	<null>	20220510101419.129965+0...	postgres	<null>	<null>	<null>	<null>
3	153	GMLID_BUI1303...	Part-4-Buildings-V4....	Boatshouse KIT...	<null>	Simple Boatho...	20220510101419.1...	<null>	<null>	entirelyAboveWaterS...	20220510101419.147537+0...	postgres	<null>	<null>	<null>	<null>

in any column

3 row(s)

X: ---------- Y: ---------- EPSG:28992 METER

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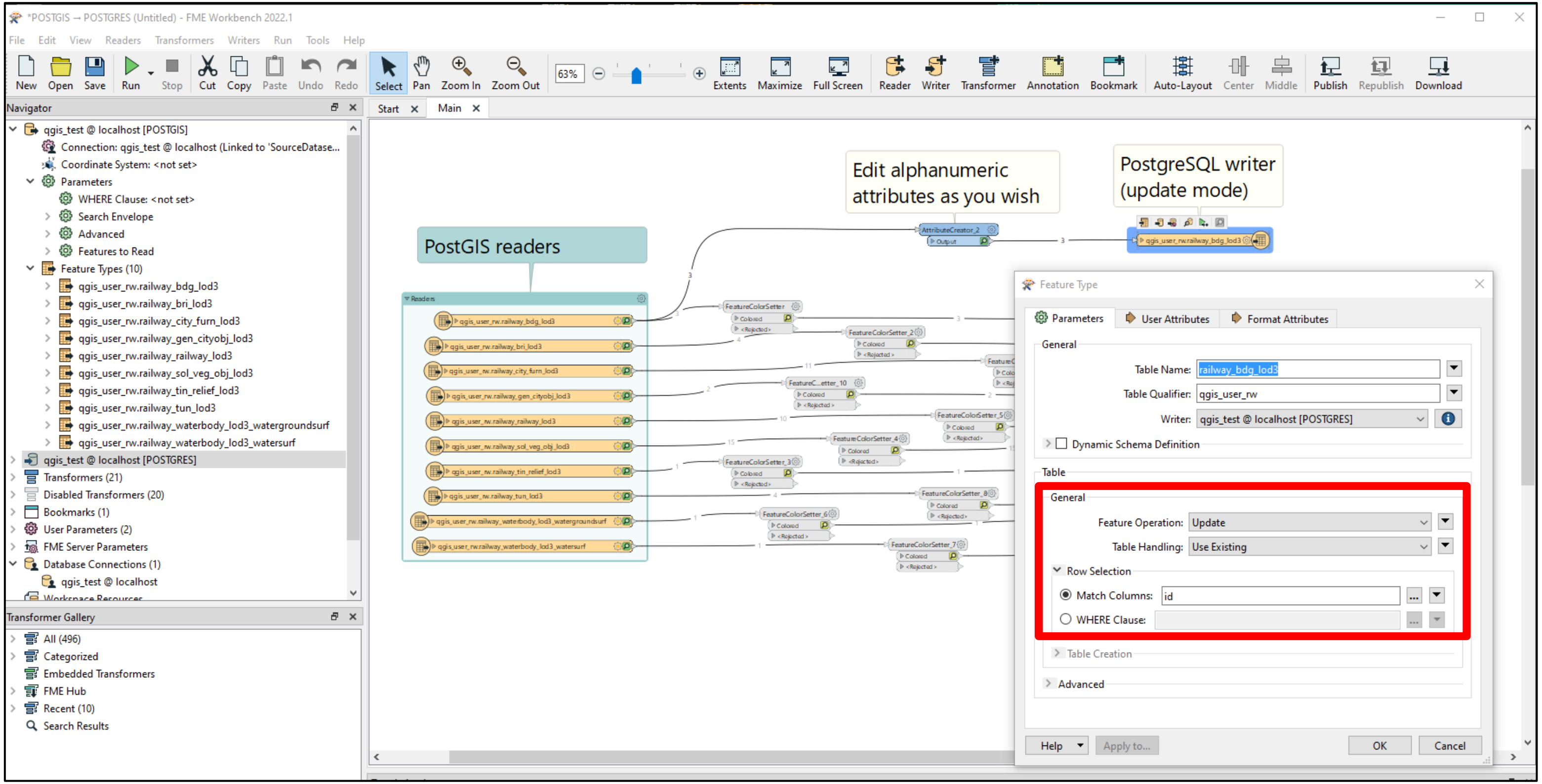
QGIS Package via FME

- Remember: alphanumeric attributes in the views are updatable! ☺
- You will need a **PostgreSQL writer in update mode**


*POSTGIS → POSTGRES (Untitled) - FME Workbench 2022.1
File Edit View Readers Transformers Writers Run Tools Help
New Open Save Run Stop Cut Copy Paste Undo Redo Select Pan Zoom In Zoom Out 63% Extents Maximize Full Screen Reader Writer Transformer Annotation Bookmark Auto-Layout Center Middle Publish Republish Download
Navigator
Start Main
Transformer Gallery
All (496)
Categorized
Embedded Transformers
FME Hub
Recent (10)
Search Results

qgis_test @ localhost [POSTGIS]
Connection: qgis_test @ localhost (Linked to 'SourceDatase...
Coordinate System: <not set>
Parameters
WHERE Clause: <not set>
Search Envelope
Advanced
Features to Read
Feature Types (10)
qgis_user_rw.railway_bdg_lod3
qgis_user_rw.railway_bri_lod3
qgis_user_rw.railway_city_furn_lod3
qgis_user_rw.railway_gen_cityobj_lod3
qgis_user_rw.railway_railway_lod3
qgis_user_rw.railway_sol_veg_obj_lod3
qgis_user_rw.railway_tin_relief_lod3
qgis_user_rw.railway_tun_lod3
qgis_user_rw.railway_waterbody_lod3_watergroundsurf
qgis_user_rw.railway_waterbody_lod3_watersurf
qgis_test @ localhost [POSTGRES]
Transformers (21)
Disabled Transformers (20)
Bookmarks (1)
User Parameters (2)
FME Server Parameters
Database Connections (1)
qgis_test @ localhost
Workspace Resources

PostGIS readers

Edit alphanumeric attributes as you wish

PostgreSQL writer (update mode)

Feature Type

Parameters | User Attributes | Format Attributes

General
Table Name: railway_bdg_lod3
Table Qualifier: qgis_user_rw
Writer: qgis_test @ localhost [POSTGRES]
□ Dynamic Schema Definition

Table
General
Feature Operation: Update
Table Handling: Use Existing
Row Selection
● Match Columns: id
○ WHERE Clause:
Table Creation
Advanced

Help | Apply to... | OK | Cancel

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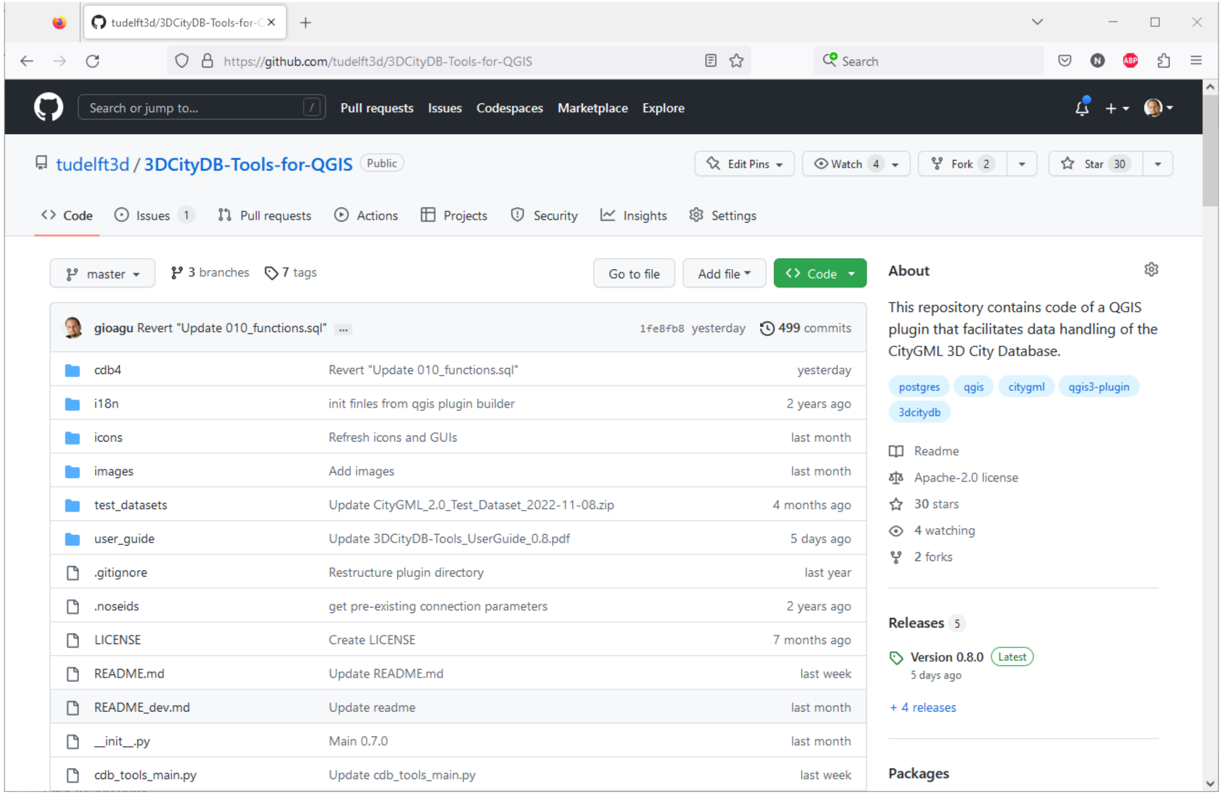
Source code and GitHub repository

- GitHub: https://github.com/tudelft3d/3DCityDB-Tools-for-QGIS



tudelft3d / 3DCityDB-Tools-for-QGIS Public

gioagu Revert "Update 010_functions.sql" ... 1fe8fb8 yesterday 499 commits

cdb4	Revert "Update 010_functions.sql"	yesterday
i18n	init finles from qgis plugin builder	2 years ago
icons	Refresh icons and GUIs	last month
images	Add images	last month
test_datasets	Update CityGML_2.0_Test_Dataset_2022-11-08.zip	4 months ago
user_guide	Update 3DCityDB-Tools_UserGuide_0.8.pdf	5 days ago
.gitignore	Restructure plugin directory	last year
.noseids	get pre-existing connection parameters	2 years ago
LICENSE	Create LICENSE	7 months ago
README.md	Update README.md	last week
README_dev.md	Update readme	last month
__init__.py	Main 0.7.0	last month
cdb_tools_main.py	Update cdb_tools_main.py	last week

About

This repository contains code of a QGIS plugin that facilitates data handling of the CityGML 3D City Database.

postgres qgis citygml qgis3-plugin 3dcitydb

Readme
Apache-2.0 license
30 stars
4 watching
2 forks

Releases 5

Version 0.8.0 Latest
5 days ago

+ 4 releases

Packages

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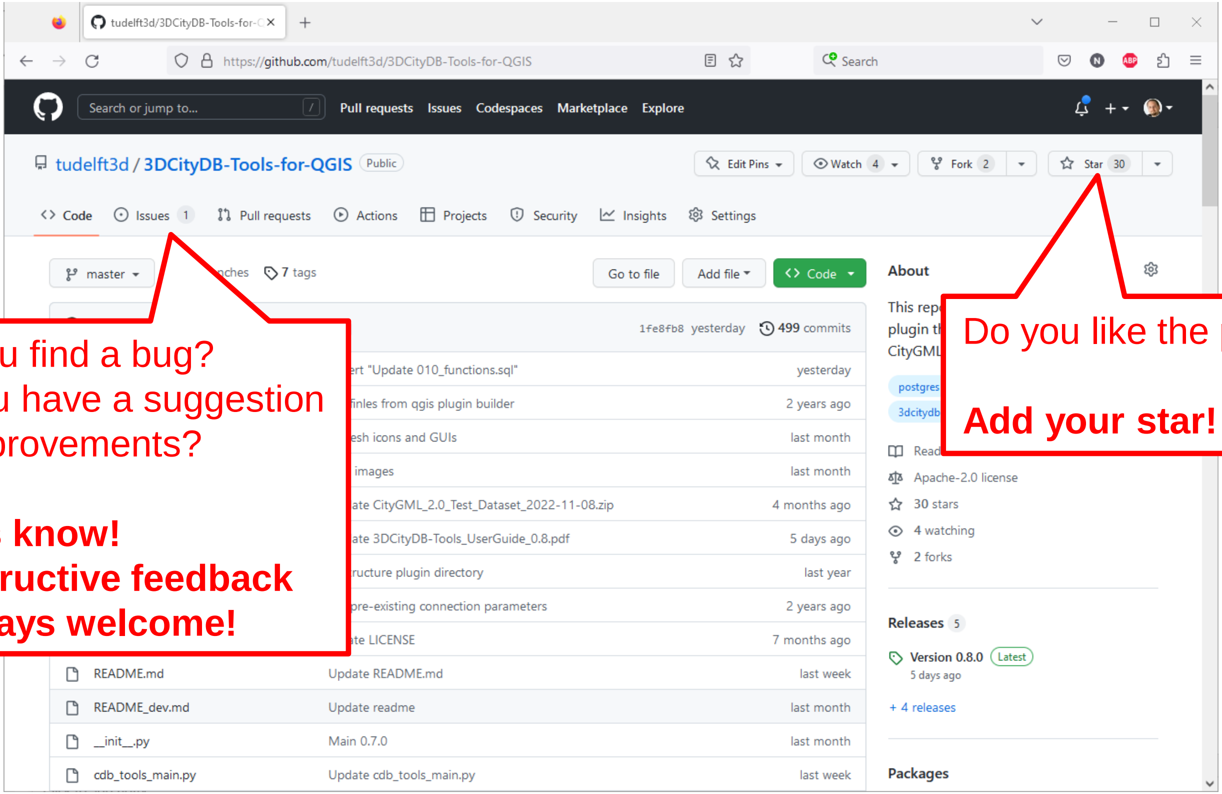

	1fe8fb8 yesterday	499 commits
	ert "Update 010_functions.sql"	yesterday
	finles from qgis plugin builder	2 years ago
	esh icons and GUIs	last month
	images	last month
	ate CityGML_2.0_Test_Dataset_2022-11-08.zip	4 months ago
	ate 3DCityDB-Tools_UserGuide_0.8.pdf	5 days ago
	ructure plugin directory	last year
	pre-existing connection parameters	2 years ago
	ate LICENSE	7 months ago
README.md	Update README.md	last week
README_dev.md	Update readme	last month
__init__.py	Main 0.7.0	last month
cdb_tools_main.py	Update cdb_tools_main.py	last week

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This rep
plugin t
CityGML

postgres
3dcitydb

Read
Apache-2.0 license
30 stars
4 watching
2 forks

Releases 5

Version 0.8.0 Latest
5 days ago

+ 4 releases

Packages

Did you find a bug?
Do you have a suggestion for improvements?

Let us know!
Constructive feedback is always welcome!

Do you like the plugin?

Add your star! ☺

Resources

Test datasets

- In the GitHub repository, you will find test datasets that you can import into the 3DCityDB (using the Importer/Exporter) to test the 3DCityDB-Tools plugin. They are located in subfolder \test_datasets

- The test datasets are:
  - CityGML_2.0_Test_Dataset_2022-03-11.zip (aka "Railway")
  - FZK-Haus-LoD-all-KIT-IAI-KHH-B36-V1.zip (aka "Kit House")
  - DenHaag_bdg_lod2.zip

- You can find links to many additional free and open CityGML/CityJSON datasets at:
  - Awesome CityGML: https://github.com/OloOcki/awesome-citygml
  - 3D Geoinformation group @ TU Delft: https://3d.bk.tudelft.nl/opendata/opencities/

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ChangeLog for version 0.8.3

Main changes

- The plugin is not anymore "experimental"; thus it can be installed by anybody from QGIS
- Minor edits to the Layer Loader dialog GUI
  - Moved Codelist selection combo box from Settings tab to Layers tab
- Updated this document
  - Added installation from QGIS Plugins repository
  - Updated figures with new Layer Loader dialog GUI
  - QGIS Package: Corrected SQL examples to refresh views
  - QGIS Package: Added SQL examples for detail views
  - QGIS Package: Added SQL examples to upsert the user-defined bounding box extents
  - Corrected some typos and other minor errors

Changelog

ChangeLog for version 0.8.2

Main changes

- Minor internal changes to comply with the QGIS Plugin online repository

ChangeLog for version 0.8.1

Main changes

- Layer loader: Detail View layers are now ro/rw depending on user privileges
- QGIS Package: Version 0.10.1

Bug fixes

- QGIS Package: Fixed bug to set user privileges

Changelog

ChangeLog for version 0.8.0

Client-side: Layer Loader

- Added support for Address features as layers
- Added support for LoD-independent layers (i.e., "LoDx")
- Redesigned and extended attribute forms to support:
  - External References (per type)
  - Generic Attributes (per type)
  - Addresses
  - All subforms allow insert, update and delete operations
- Added support for CodeLists selection via GUI
- Improved support of datasets with geographic coordinates (bbox)

Client side: Bulk Deleter

- Improved support of datasets with geographic coordinates (bbox)
- Renamed root-class to top-level features

Client-side: QGIS Package Administration

- Minor bug fixes and code clean-up

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Changelog for version 0.8.0 (ctd)

Server-side (QGIS Package):

- New version 0.10
- Updates to layer_metadata table
- Updates to layer creation functions
- Added support for (updatable) Detail Views
- Added support for look-up tables metadata
- Improved support to datasets with geographic coordinates (bbox precision)
- Improved speed to compute the bbox and list cdb_schemas
- Minor code clean-up and bug fixes

Changelog

Changelog for version 0.7.1

Main changes

- Code restructuring to allow for better modularization of current (and future) modules
- Allow for concurrent dialogs, but added logic to:
  - Prevent having user dialogs (and connections) open when using the "QGIS Package Administration"
  - Prevent having user dialogs connected to the same database *and* citydb schema at the same time
- Ships with QGIS Package v. 0.9.1

Bug fixes

- When cleaning up the database, sequences are now correctly restarted

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Changelog

Changelog for version 0.7.0

The 3DCityDB-Loader is growing and gets therefore a **new name**: **3DCityDB-Tools**

Server-side (QGIS Package):

- Version 0.9.0
- Each 3DCityDB instance gets not its own database group
- Added support for new client-side functionalities:
  - Refactored layer_metadata table
  - Added functions to manage groups
  - Added functions to check Feature Types availability
- Minor code clean-up and bug fixes

Client-side: Admin GUI

- QGIS Package Installation tab: Major rework, added user management
- Installation settings tab (NEW)
- Minor GUI improvements to the New connection dialog
- QGIS Package uninstall procedure is now much faster
- User schema uninstall procedure is now much faster
- Rewritten all SQL queries to follow psycopg2 syntax
- Minor code refactoring and clean-up

Changelog

Changelog for version 0.7.0 (ctd)

Client-side: Loader GUI

- Connection tab
  - Added Feature Type selection in layer generation
  - Added Geocoding function (based on Nominatim API)
  - Creating and dropping layers is now faster
  - Minor redesign of the GUI
- Settings tab (NEW)
- Editing of layers from read-only citydb schemas is now blocked in QGIS
- QML files are split and loaded separately for forms, 2D styles and (optionally) 3D styles, respectively
- Rewritten all SQL queries to follow psycopg2 syntax
- Major code refactoring and clean-up

Client side: Bulk Deleter GUI (NEW)

- A user with rw privileges can delete features selecting them:
  - via a spatial filter
  - and/or via a Feature Type/Root-class feature filters
- A user with rw privileges can delete ALL DATA from the selected citydb schema (i.e., truncate all tables)
- Geocoding function (based on Nominatim API)

Changelog

Changelog for version 0.6.0

Server-side (QGIS Package)

- Version 0.8.0
- Fixed bug in delete trigger functions to extract the name of the cdb_schema
- Rewritten functions to compute and upsert the extents
- Added layer support for (#8):
  - Terrain Intersection Curve geometries (bridge, building, tunnel, generics, city_furniture)
  - MultiCurve geometries (bridge, building, tunnel)
  - MasspointRelief, BreaklinesRelief Features
- Minor code clean-up and bug fixes

Client-side (Admin):

- Reworked the series of checks carried out upon connection
  - Added check and warning if PostgreSQL < 10.0
  - Added check and warning if QGIS Package < 0.8.0
- Changes to the GUI dialog
  - Reshaped connection buttons
  - Minor other visual improvements (labels, tooltips, etc.)
- Minor code refactoring and clean-up

Changelog

Changelog for version 0.6.0 (ctd)

Client-side (User):

- Added compatibility for QGIS v. 3.28 LTR
- Reworked the series of checks carried out upon connection
  - Added check and warning for outdated QGIS Package versions
  - Added check and warning in case there are no accessible citydb schemas
  - Added check and warning in case there are only empty citydb schemas
- Added functionality to update the cdb_extents in case data are added/removed to/from the citydb schemas
- Solved bug of bboxes being wrongly resized (enlarged) after canvases are set/changed
- Improved function to import layers
  - Drop QGIS spatial filter if QGIS bbox = Layers bbox
  - Added check to avoid loading multiple times the same layer
- Changes to the GUI dialog, forms, etc.
  - Reshaped connection buttons
  - Added button "Refresh {sch} extents"
  - In the "Layer" tab, the Feature types in the combo box are now ordered alphabetically
  - Minor other visual improvements (labels, tooltips, etc.)
  - Added forms for new Relief Features, etc.
- Further major code refactoring and clean-up

Changelog

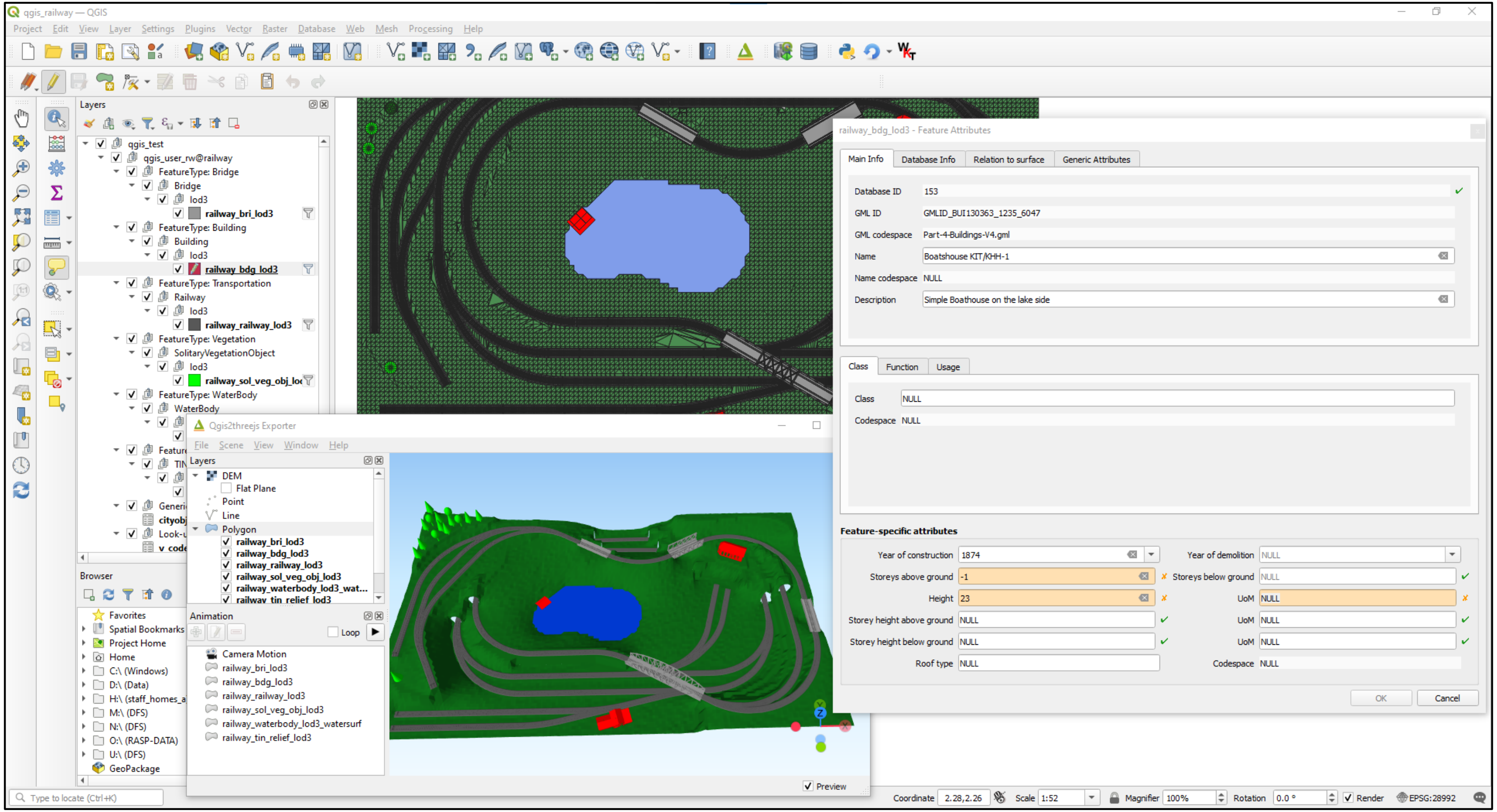
Changelog for version 0.5.0

First public release of the 3DCityDB-Loader plugin for QGIS

Main changes

- Major code refactoring and cleaning up
- Minor bug fixes
- User guide documentation updated and extended with FME examples
- Switched to TUD GitHub repository

Enjoy! ☺



Database ID 153 ✓

GML ID GMLID_BUI130363_1235_6047

GML codespace Part-4-Buildings-V4.gml

Name Boatshouse KIT/KHH-1

Name codespace NULL

Description Simple Boathouse on the lake side

Class NULL

Codespace NULL

Feature-specific attributes

Year of construction	1874		Year of demolition	NULL	
Storeys above ground	-1	✗	Storeys below ground	NULL	✓
Height	23	✗	UoM	NULL	✗
Storey height above ground	NULL	✓	UoM	NULL	✓
Storey height below ground	NULL	✓	UoM	NULL	✓
Roof type	NULL		Codespace	NULL	

Coordinate 2.28,2.26 Scale 1:52 Magnifier 100% Rotation 0.0 ° ☑ Render EPSG:28992

Main developers

Dr. Giorgio Agugiaro
g.agugiaro@tudelft.nl
3D Geoinformation Group
TU Delft
The Netherlands
https://3d.bk.tudelft.nl/gagugiaro

Konstantinos Pantelios
konstantinospantelios@yahoo.com
MSc Geomatics graduate
TU Delft
The Netherlands

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3DCityDB Tools

for

QGIS