The CityGML Alderaan dataset

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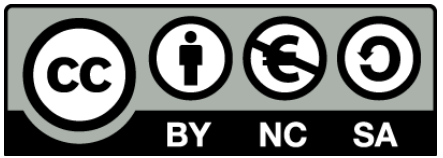

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CityGML Alderaan

The dataset consists of a fantasy city consisting of buildings, trees, and a DTM. The zipped file contains XML-based CityGML 2.0 data grouped into different files.

When it comes to its coordinate reference system, it is:

- Horizontal datum: EPSG 28992 (Amersfoort /RD NEW)
- Vertical datum: EPSG 5109

Nota bene: when visualised, the city model will appear in France, a bit west of the municipality of Joigny.

All data can be:

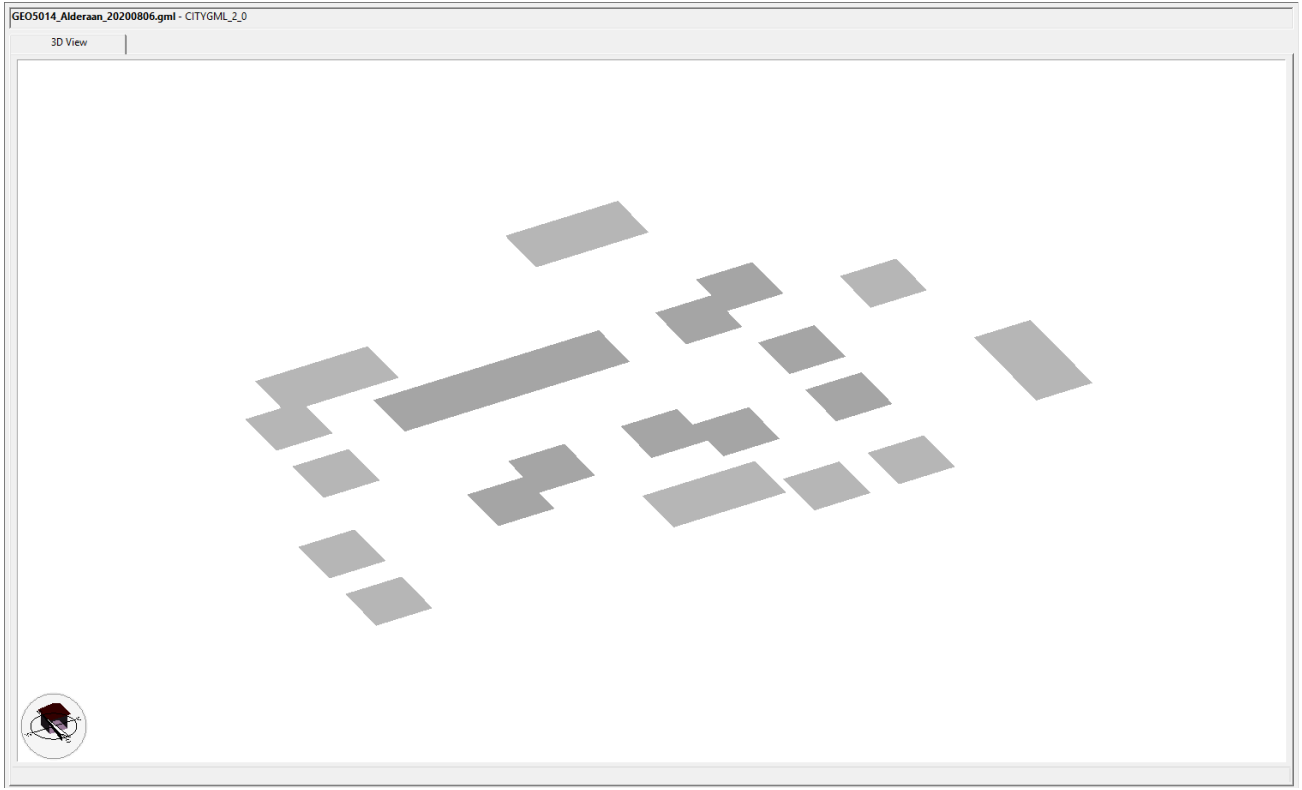
- visualised, for example, in the **KIT ModelViewer** or **FME Data Inspector**
- imported into the **3D City Database** and then visualised using in QGIS using the **3DCityDB-Tools plugin**

CityGML Alderaan

- File name: **Alderaan_buildings.gml**
  - 10 single-part and 1 multi-part buildings in LoD0, LoD1, LoD2 (via thematic surfaces)
  - 11 "ancillary" buildings in LoD0 and LoD1
    - The ancillary buildings are grouped into a CityObjectGroup
  - There are appearances to "style" the different geometries (via X3D materials)
  - There are some generic attributes as example
  - There are some comments to help you understand what is what
- File name: **Alderaan_trees.gml**:
  - 33 SolitaryVegetationObjects (trees) in LoD1, LoD2, LoD3, modelled via implicit geometries
  - 1 CityObjectGroup containing all trees
  - 1 global apperance
- File name: **Alderaan_DTM.gml**:
  - 1 ReliefFeature, consisting of
  - 60 TINRelief objects, in LoD1
  - 1 global appearance

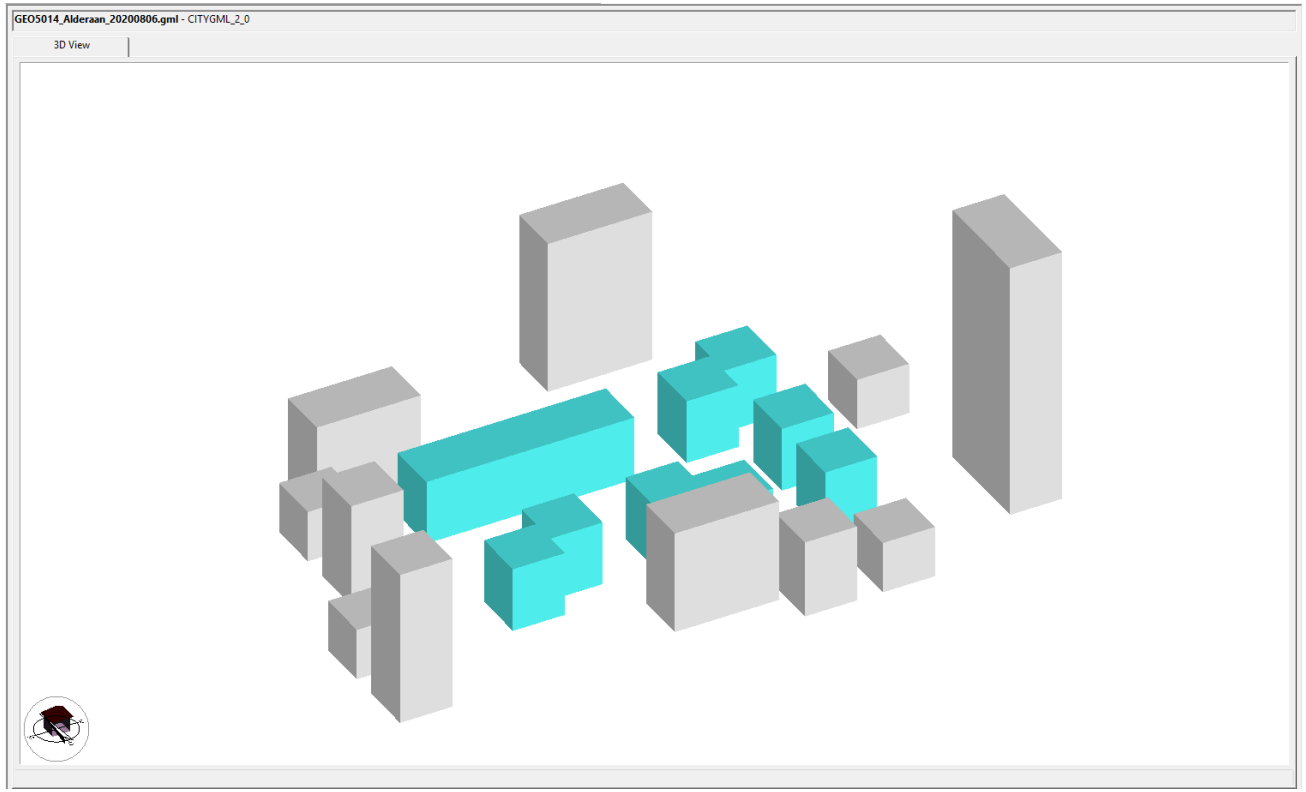
CityGML Alderaan (Buildings)

LoD0 footprints of all 22 buildings



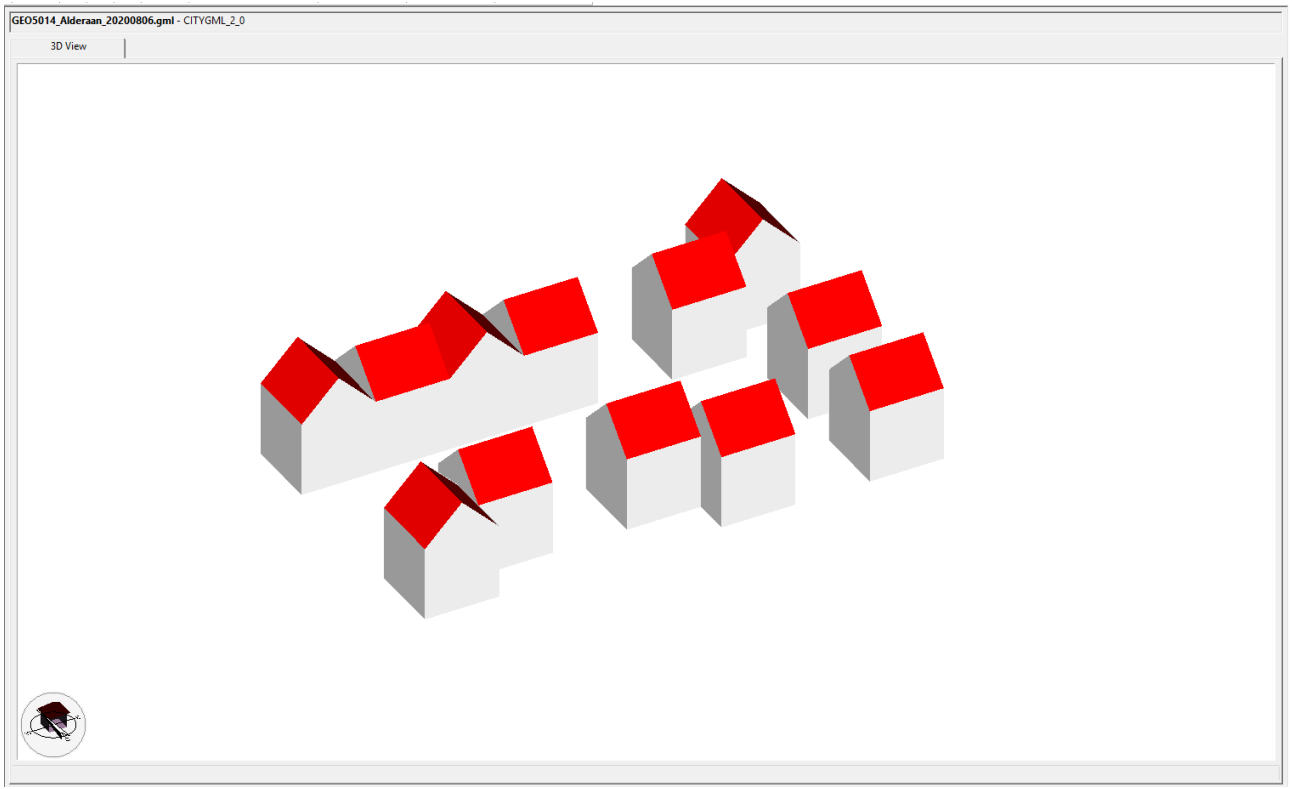
CityGML Alderaan (Buildings)

LoD1 prismatic geometries. In azure the "core" buildings, in grey the "ancillary" buildings



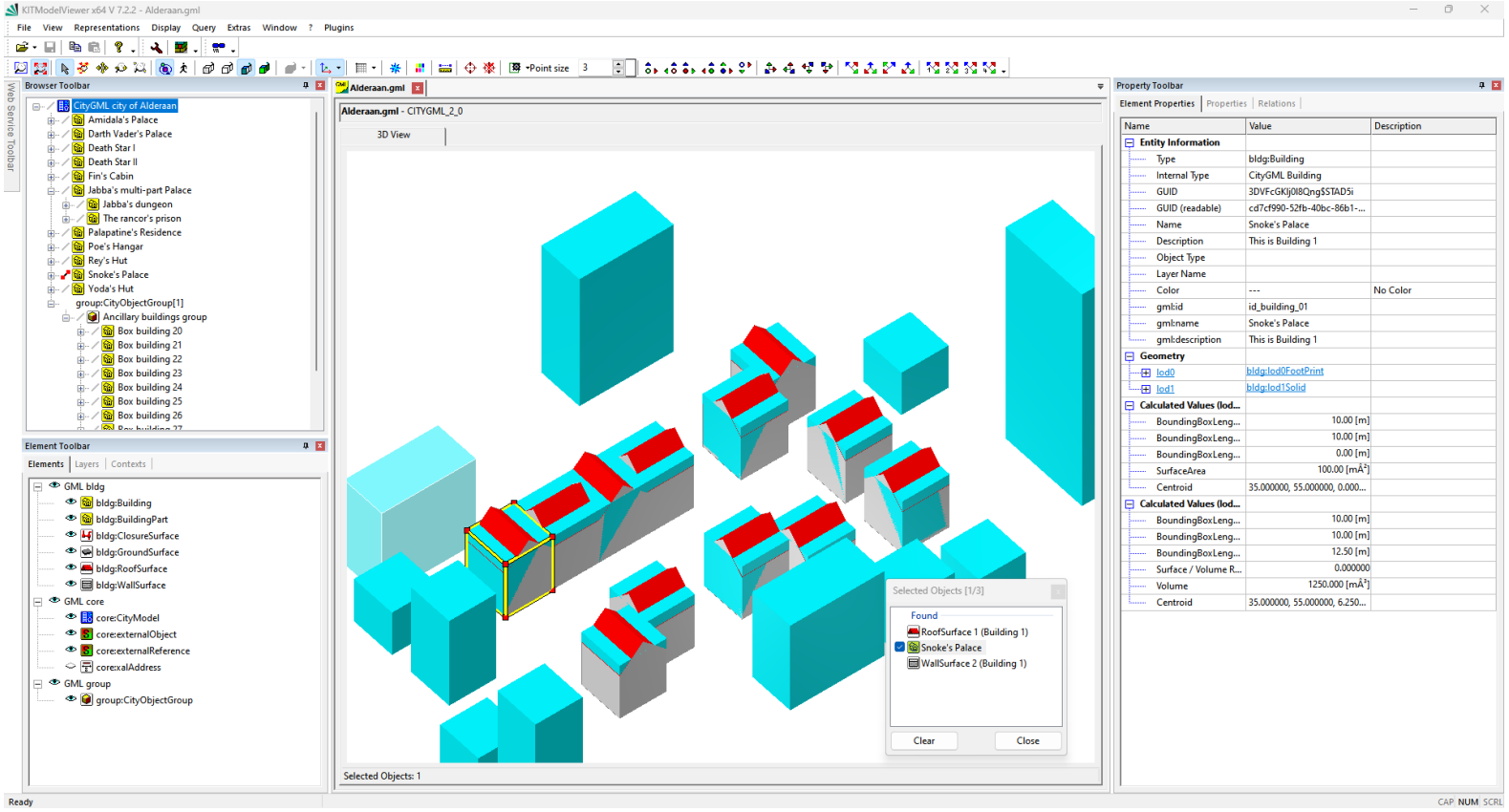
CityGML Alderaan (Buildings)

LoD2 thematic surfaces (only for the "core" buildings)



CityGML Alderaan (Buildings)

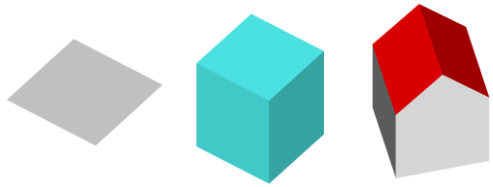
Multi-LoD view



CityGML Alderaan (Buildings)

XML file contents (simplified)

- Header and city model attributes
- Building 1
- Building 2
- ...
- Building 12
- CityObjectGroup 1
  - Ancillary Building 20
  - Ancillary Building 21
  - ...
  - Ancillary Building 30
- Appearance of buildings in LoD0
- Appearance of buildings in LoD1
- Appearance of buildings in LoD2
- Appearance of ancillary buildings



- Building 1
  - Some properties (incl. generic attributes)
  - LoD0 Footprint
  - LoD1 Solid
  - RoofSurface 1
    - Some properties (incl. generic attributes)
  - RoofSurface 2
  - GroundSurface
  - WallSurface 1
  - ...
  - WallSurface 4
  - Address

Property Toolbar

Properties | Relations | Element Properties

Name	Value
Generic Attributes	
test_measure_att	134.45
test_uri_att	https://www.brickset.com
test_integer_att	12
test_real_att	12.34
test_date_att	2020-08-06
test_string_att	This is a test string
GML Attributes	
bldg:class	habitation
bldg:function	residential building
bldg:roofType	gabled roof
bldg:storeyHeightsAbove...	3
gml:description	This is Building 1
gml:id	id_building_01
gml:name	Snoke's Palace
bldg:yearOfConstruction	1955
core:creationDate	2019-11-17
bldg:storeysAboveGround	3
bldg:storeysBelowGround	0
bldg:measuredHeight	15 [m]

TU Delft 3Dgeoinfo

GEO5014_Alderaan.gml

```
<core:cityObjectMember>
    <bldg:Building gml:id="id_building_01">
        <gml:description>This is Building 1</gml:description>
        <gml:name>Snoke's Palace</gml:name>
        <core:creationDate>2019-11-17</core:creationDate>
        <!-- This is an exemplary set of generic attributes attached to a Building BEGIN -->
        <gen:measureAttribute name="test_measure_att">
            <gen:value uom="m^2">134.45</gen:value>
        </gen:measureAttribute>
        <gen:uriAttribute name="test_uri_att">
            <gen:value>https://www.brickset.com</gen:value>
        </gen:uriAttribute>
        <gen:intAttribute name="test_integer_att">
            <gen:value>12</gen:value>
        </gen:intAttribute>
        <gen:doubleAttribute name="test_real_att">
            <gen:value>12.34</gen:value>
        </gen:doubleAttribute>
        <gen:dateAttribute name="test_date_att">
            <gen:value>2020-08-06</gen:value>
        </gen:dateAttribute>
        <gen:stringAttribute name="test_string_att">
            <gen:value>This is a test string</gen:value>
        </gen:stringAttribute>
        <!-- This is an exemplary set of generic attributes attached to a Building END -->
        <bldg:class codeSpace="http://www.sig3d.org/codelists/standard/building/2.0/_AbstractBuilding_class.xml">habitation</bldg:class>
        <bldg:function codeSpace="http://www.sig3d.org/codelists/standard/building/2.0/_AbstractBuilding_function.xml">residential building</bldg:function>
        <bldg:yearOfConstruction>1955</bldg:yearOfConstruction>
        <bldg:roofType codeSpace="http://www.sig3d.org/codelists/standard/building/2.0/_AbstractBuilding_roofType.xml">gabled roof</bldg:roofType>
        <bldg:measuredHeight uom="m">15</bldg:measuredHeight>
        <bldg:storeysAboveGround>3</bldg:storeysAboveGround>
        <bldg:storeysBelowGround>0</bldg:storeysBelowGround>
        <bldg:storeyHeightsAboveGround uom="m">3</bldg:storeyHeightsAboveGround>
        <bldg:lod0FootPrint>
            <gml:MultiSurface gml:id="id_building_1_footprint_multisurf_1" srsName="urn:ogc:def:crs,crs:EPSG::28992,crs:EPSG::5109" srsDimension="3">
        </bldg:lod0FootPrint>
        <bldg:lod1Solid>
            <gml:Solid gml:id="id_building_01_lod1_Solid_1" srsName="urn:ogc:def:crs,crs:EPSG::28992,crs:EPSG::5109" srsDimension="3">
        </bldg:lod1Solid>
        <!-- Set of LoD2 thematic surfaces BEGIN -->
        <bldg:boundedBy>
            <bldg:RoofSurface gml:id="id_building_1_roofsurface_1">
        </bldg:boundedBy>
        <bldg:boundedBy>
            <bldg:RoofSurface gml:id="id_building_1_roofsurface_2">
        </bldg:boundedBy>
        <bldg:boundedBy>
            <bldg:GroundSurface gml:id="id_building_1_groundsurface_1">
        </bldg:boundedBy>
        <bldg:boundedBy>
            <bldg:WallSurface gml:id="id_building_1_wallsurface_2">
        </bldg:boundedBy>
        <bldg:boundedBy>
            <bldg:WallSurface gml:id="id_building_1_wallsurface_1">
```

Generic attributes

Building properties

LoD0 Footprint

LoD1 Solid

LoD2 RoofSurface

LoD2 RoofSurface

LoD2 GroundSurface

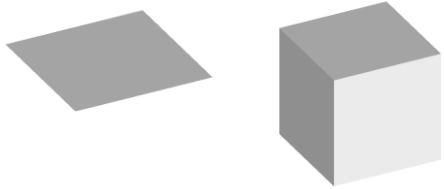
LoD2 WallSurface

LoD2 WallSurface

CityGML Alderaan (Buildings)

XML file contents (simplified)

- Header and city model attributes
- Building 1
- Building 2
- ...
- Building 12
- CityObjectGroup 1
  - Ancillary Building 20
  - Ancillary Building 21
  - ...
  - Ancillary Building 30
- Appearance of buildings in LoD0
- Appearance of buildings in LoD1
- Appearance of buildings in LoD2
- Appearance of ancillary buildings



- Ancillary Building 20
  - Some properties
  - LoD0 Footprint
  - LoD1 Solid

Property Toolbar

Properties | Relations | Element Properties

Name	Value
GML Attributes	
gml:description	This is a simple, primastic building meant to p...
gml:id	id_box_building_20
gml:name	Box building 20

TU Delft 3Dgeoinfo

GEO5014_Alderaan.gml

```
2772  <!-- ***************************** -->
2773  <!-- Group of Ancillary buildings -->
2774  <!-- ***************************** -->
2775  <!-- ***************************** -->
2776  <!-- CityObject Group 01 -->
2777  <!-- ***************************** -->
2778      <core:cityObjectMember>
2779          <grp:CityObjectGroup gml:id="id_group_1">
2780              <gml:description>This group contains all ancillary buildings of CityGML city Alderaan</gml:description>
2781              <gml:name>Ancillary buildings group</gml:name>
2782              <!-- This is an exemplary set of generic attributes attached to a CityObjecGroup BEGIN -->
2783              <gen:measureAttribute name="test_measure_att_group">
2784                  <gen:value uom="€">1234</gen:value>
2785              </gen:measureAttribute>
2786              <gen:uriAttribute name="test_uri_att_group">
2787                  <gen:value>https://en.wikipedia.org/wiki/Black_Forest_gateau</gen:value>
2788              </gen:uriAttribute>
2789              <gen:intAttribute name="test_integer_att_group">
2790                  <gen:value>12345</gen:value>
2791              </gen:intAttribute>
2792              <gen:doubleAttribute name="test_real_att_group">
2793                  <gen:value>0.002</gen:value>
2794              </gen:doubleAttribute>
2795              <gen:dateAttribute name="test_date_att_group">
2796                  <gen:value>2020-08-04</gen:value>
2797              </gen:dateAttribute>
2798              <gen:stringAttribute name="test_string_att_group">
2799                  <gen:value>This is a test string for group</gen:value>
2800              </gen:stringAttribute>
2801              <!-- This is an exemplary set of generic attributes attached to a CityObjecGroup END -->
2802  <!-- ********************* -->
2803  <!-- Ancillary building 20 -->
2804  <!-- ********************* -->
2805              <grp:groupMember>
2806                  <bldg:Building gml:id="id_box_building_20">
2807                      <gml:description>This is a simple, primastic building meant to provide shadowing and occlusions</gml:description>
2808                      <gml:name>Box building 20</gml:name>
2809                      <bldg:lod0FootPrint>
2810                          <gml:MultiSurface gml:id="id_lod0_MultiSurf_20" srsName="urn:ogc:def:crs,crs:EPSG::28992,crs:EPSG::5109" srsDimension="3">
2821                      </bldg:lod0FootPrint>
2822                      <bldg:lod1Solid>
2823                          <gml:Solid gml:id="id_lod1_Solid_20" srsName="urn:ogc:def:crs,crs:EPSG::28992,crs:EPSG::5109" srsDimension="3">
2883                      </bldg:lod1Solid>
2884                  </bldg:Building>
2885              </grp:groupMember>
```

Group properties

Generic attributes

Building properties

LoD0 Footprint

LoD1 Solid

CityGML Alderaan (Buildings)

XML file contents (simplified)

- Header and city model attributes
- Building 1
- Building 2
- ...
- Building 12
- CityObjectGroup 1
  - Ancillary Building 20
  - Ancillary Building 21
  - ...
  - Ancillary Building 30
- Appearance of buildings in LoD0
- Appearance of buildings in LoD1
- Appearance of buildings in LoD2
- Appearance of ancillary buildings

- Appearance for Buildings LoD0
  - Some properties
  - X3D Material (front)
  - X3D Material (back)

```
<!-- ************************* -->
<!-- Appearance Buildings LoD0 -->
<!-- ************************* -->
    <app:appearanceMember>
        <app:Appearance gml:id="Appearance_Buildings_LoD0">
            <gml:description>This appearance defines the colours of the LoD0 building geometries (Footprint surfaces are green)</gml:description>
            <gml:name>Alderaan LoD0 Buildings appearance</gml:name>
            <app:theme>LoD0_buildings</app:theme>
            <app:surfaceDataMember>
                <app:X3DMaterial gml:id="id_SurfaceData_Footprint_Gray_FRONT">
                    <gml:name>SurfaceData LoD0 buildings (Footprint gray) FRONT</gml:name>
                    <!-- Please note the following attribute to set the FRONT side colour -->
                    <app:isFront>true</app:isFront>
                    <!-- These are the RGB values of the solid colour -->
                    <app:diffuseColor>0.854 0.854 0.854</app:diffuseColor>
                    <!-- These are Xlinks to the gmlids of the LoD0 multisurfaces. All dependent geometries inherit the same colour!! -->
                    <app:target>#id_building_1_footprint_multisurf_1</app:target>
                    <app:target>#id_building_2_footprint_multisurf_1</app:target>
                    <app:target>#id_building_3_footprint_multisurf_1</app:target>
                    <app:target>#id_building_4_footprint_multisurf_1</app:target>
                    <app:target>#id_building_5_footprint_multisurf_1</app:target>
                    <app:target>#id_building_6_footprint_multisurf_1</app:target>
                    <app:target>#id_building_7_footprint_multisurf_1</app:target>
                    <app:target>#id_building_8_footprint_multisurf_1</app:target>
                    <app:target>#id_building_9_footprint_multisurf_1</app:target>
                    <app:target>#id_building_10_footprint_multisurf_1</app:target>
                    <app:target>#id_building_11_footprint_multisurf_1</app:target>
                    <app:target>#id_building_12_footprint_multisurf_1</app:target>
                </app:X3DMaterial>
            </app:surfaceDataMember>
            <app:surfaceDataMember>
                <app:X3DMaterial gml:id="id_SurfaceData_Footprint_Gray_BACK">
                    <gml:name>SurfaceData LoD0 buildings (Footprint gray) BACK</gml:name>
                    <!-- Please note the following attribute to set the BACK side colour -->
                    <app:isFront>false</app:isFront>
                    <app:diffuseColor>0.854 0.854 0.854</app:diffuseColor>
                    <app:target>#id_building_1_footprint_multisurf_1</app:target>
                    <app:target>#id_building_2_footprint_multisurf_1</app:target>
                    <app:target>#id_building_3_footprint_multisurf_1</app:target>
                    <app:target>#id_building_4_footprint_multisurf_1</app:target>
                    <app:target>#id_building_5_footprint_multisurf_1</app:target>
                    <app:target>#id_building_6_footprint_multisurf_1</app:target>
                    <app:target>#id_building_7_footprint_multisurf_1</app:target>
                    <app:target>#id_building_8_footprint_multisurf_1</app:target>
                    <app:target>#id_building_9_footprint_multisurf_1</app:target>
                    <app:target>#id_building_10_footprint_multisurf_1</app:target>
                    <app:target>#id_building_11_footprint_multisurf_1</app:target>
                    <app:target>#id_building_12_footprint_multisurf_1</app:target>
                </app:X3DMaterial>
            </app:surfaceDataMember>
        </app:Appearance>
    </app:appearanceMember>
```

This is a global appearance

Appearance properties

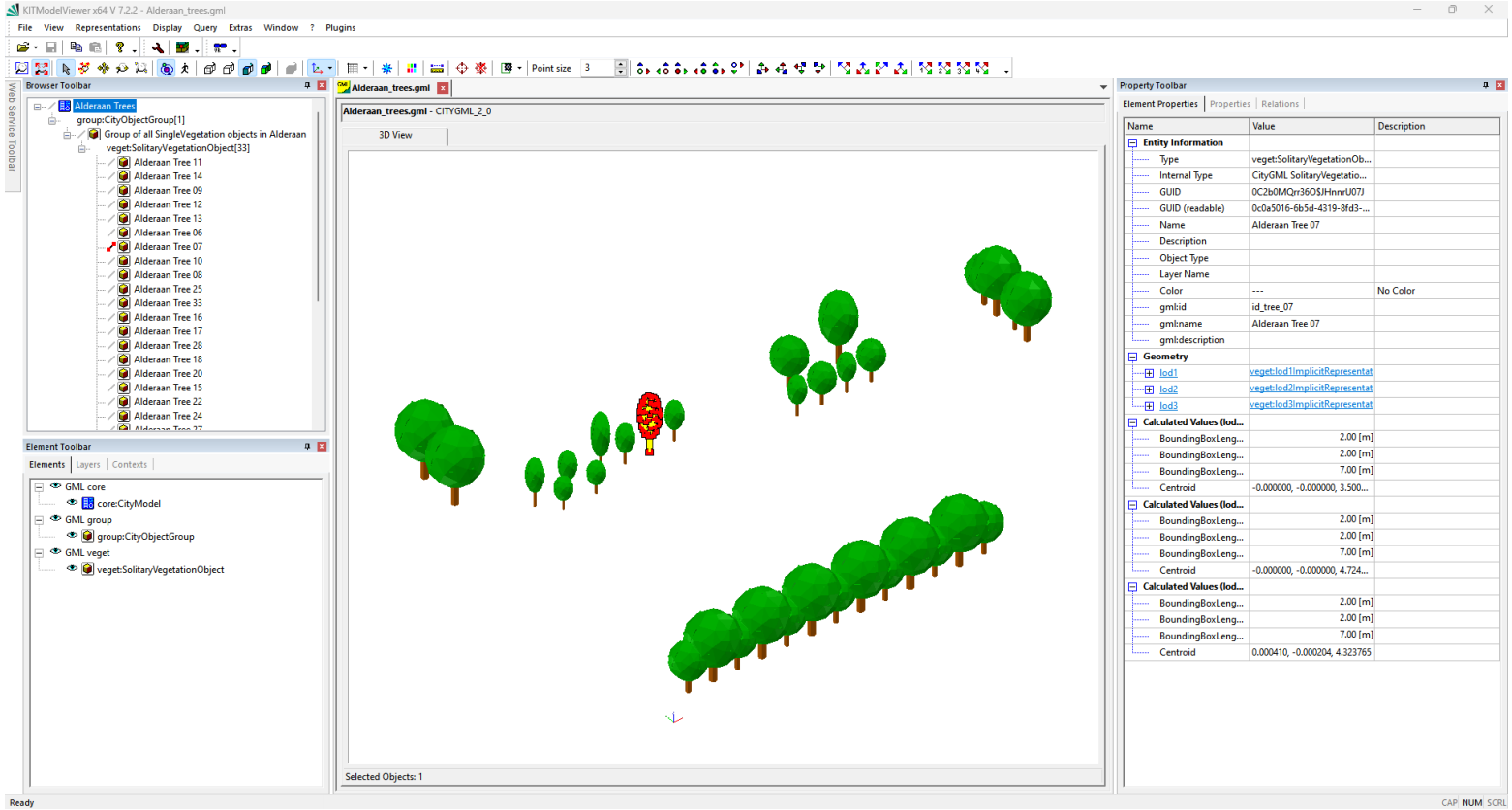
X3D Material properties

These are Xlinks to high-level **geometries** (in this case: multi-surfaces). When visualising the dataset, appearance is then propagated to the lower-level geometries (in this case: polygons)

X3D Material properties

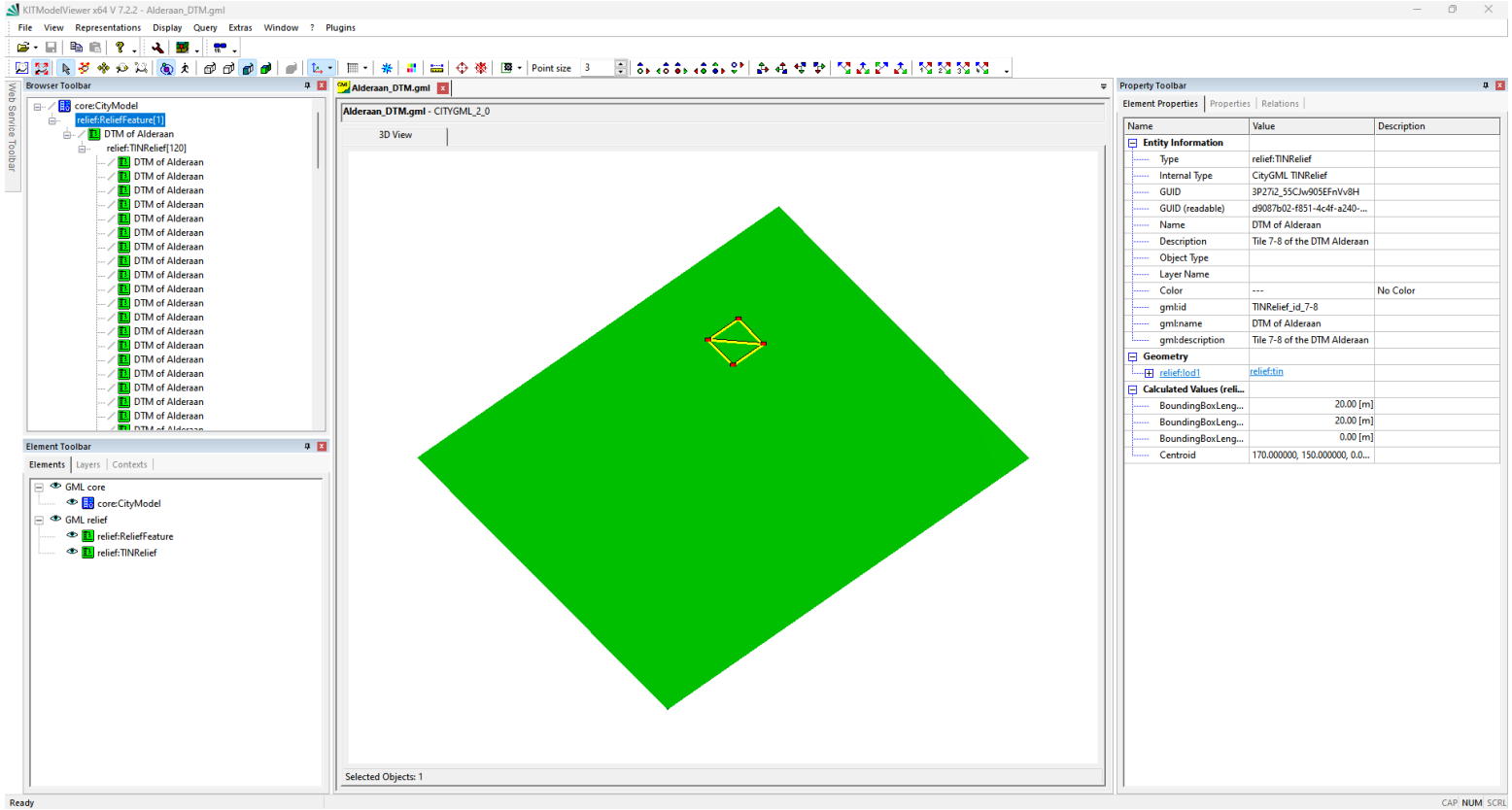
CityGML Alderaan (Trees)

- Trees visualised in LoD3



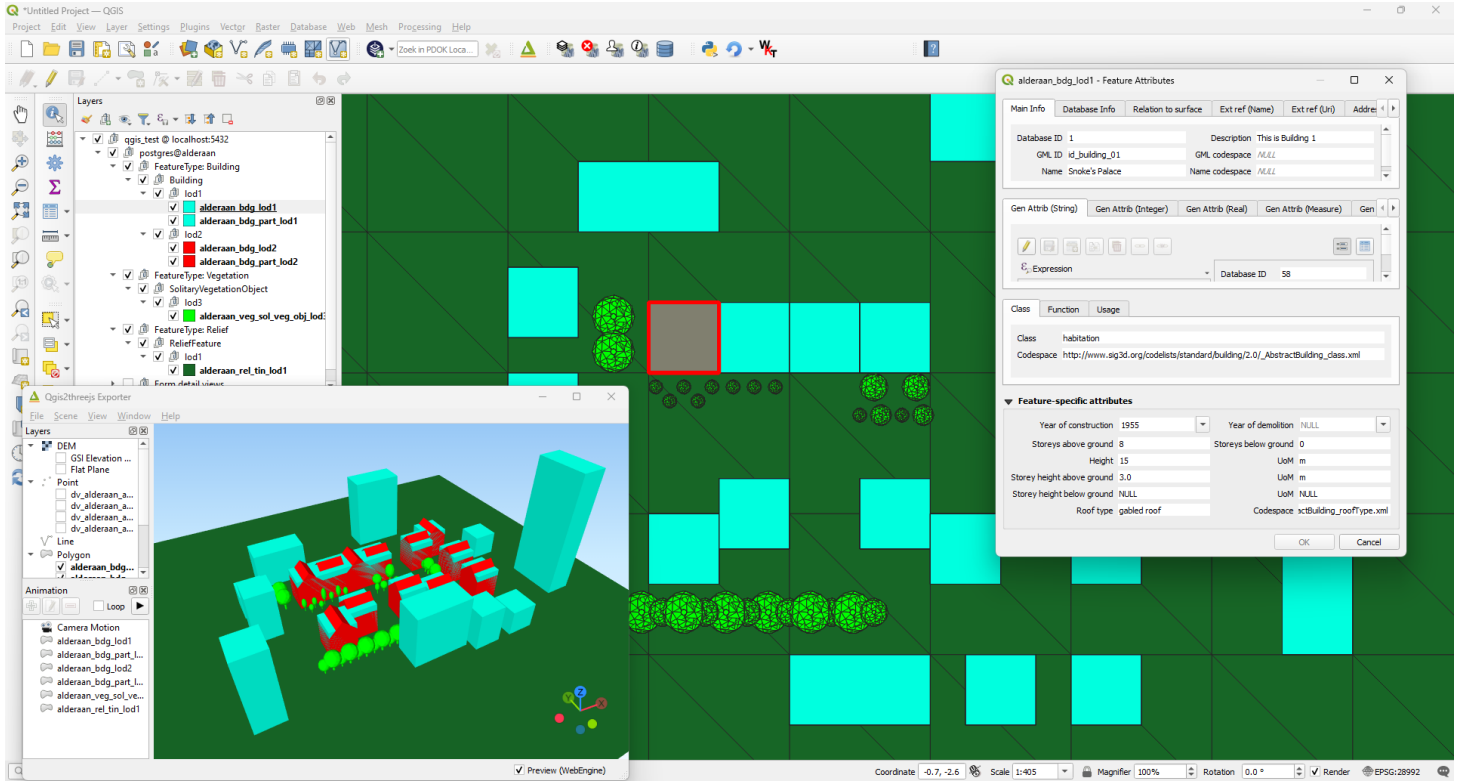
CityGML Alderaan (DTM)

- DTM visualised in LoD1



CityGML Alderaan (all)

- All CityGML files can be imported into the [3D City Database 4.x] and visualised in QGIS using the [3DCityDB-Tools plugin]



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https://3d.bk.tudelft.nl/gagugiaro