

# IMKL Update 3.0 Workshop 3

30/05/2024

# Practical arrangements

Sound of audience is  
**muted** by default



Use the **hand** icon if you want to say something. Collaboration is greatly appreciated!

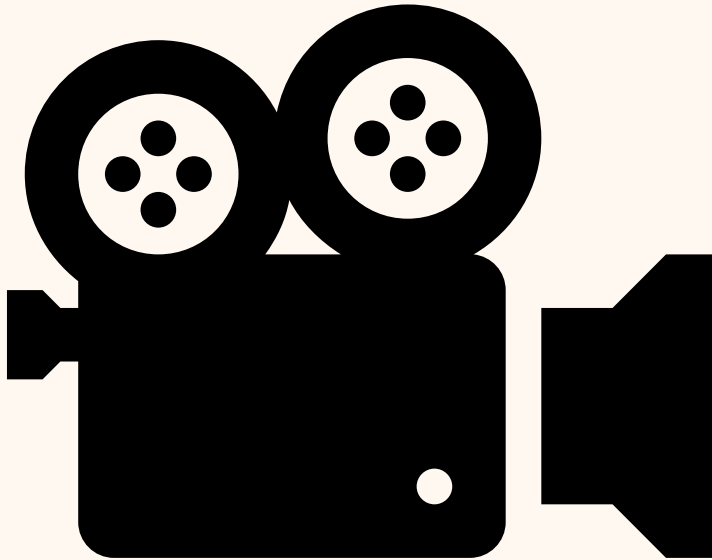


Questions, comments and suggestions can be shared via the chat function. Interaction is encouraged!



**Leading language** will be **English**, questions can be asked in mother tongue (NL/FR)

# Recording?



# Agenda

- Decisions and feedback from workshop 2
- Geometry:
  - Summary workshop 2
  - TAW/DNG Level
  - Standard VerticalPositionDetail
  - UtilityLinkSequences
  - Multi curves in UtilityLinkSequences
- Codelists:
  - New codelists:
    - VisibilityTypeValue
    - RiskTypeValue
    - MethodOfMeasurement
    - ReferenceSurfaceType
  - Impact on existing codelists:
    - ConditionOfFacilityValue
    - OilGasChemicalsProductTypeIMKLValue
    - Appearance & Colour
    - Measurement points
    - SewerAppurtenanceType





# **Workshop 2: Decisions and feedback**

# Decisions workshop 2

- IMKL 3 will use **Lambert 2008** as the coordinate reference system. Lambert 72 can still be used in IMKL 2.3 during the transition period.
- IMKL 3 will support the following **units of measure** for accuracies and depths: *mm*, *cm* and *m*.
- **2.5D** coordinates will be allowed but are optional. **VerticalPositionDetails** are required.



# Feedback workshop 2

## Points of attention:

- Depth (diepte) vs Coverage (dekking)  
=> Will be discussed in a following workshop
- Position of *survey* element in the XML document  
=> Later in this workshop

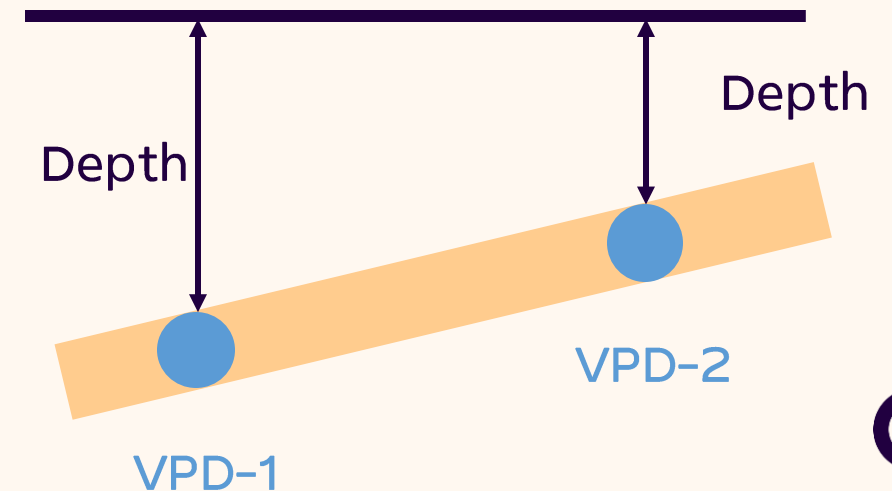
## Questions:

**Q:** How should **measurement points** (e.g. piezometric tubes, grondwatermeetputten) be encoded in IMKL 3?

**A:** Later in this workshop

**Q:** How frequently should the depth of a cable be specified?

**A:** There are no guidelines for this.

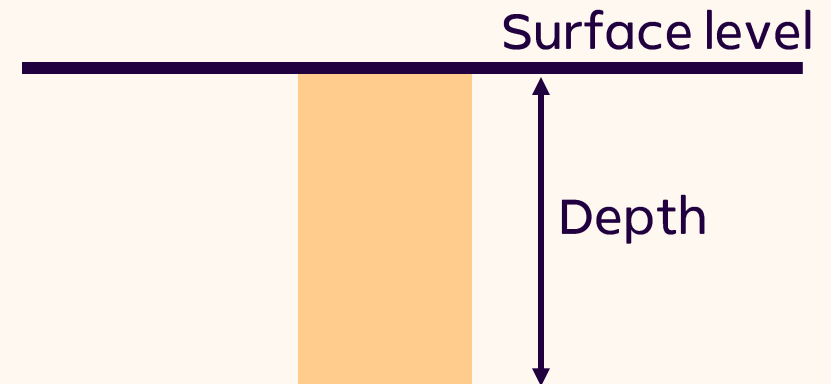
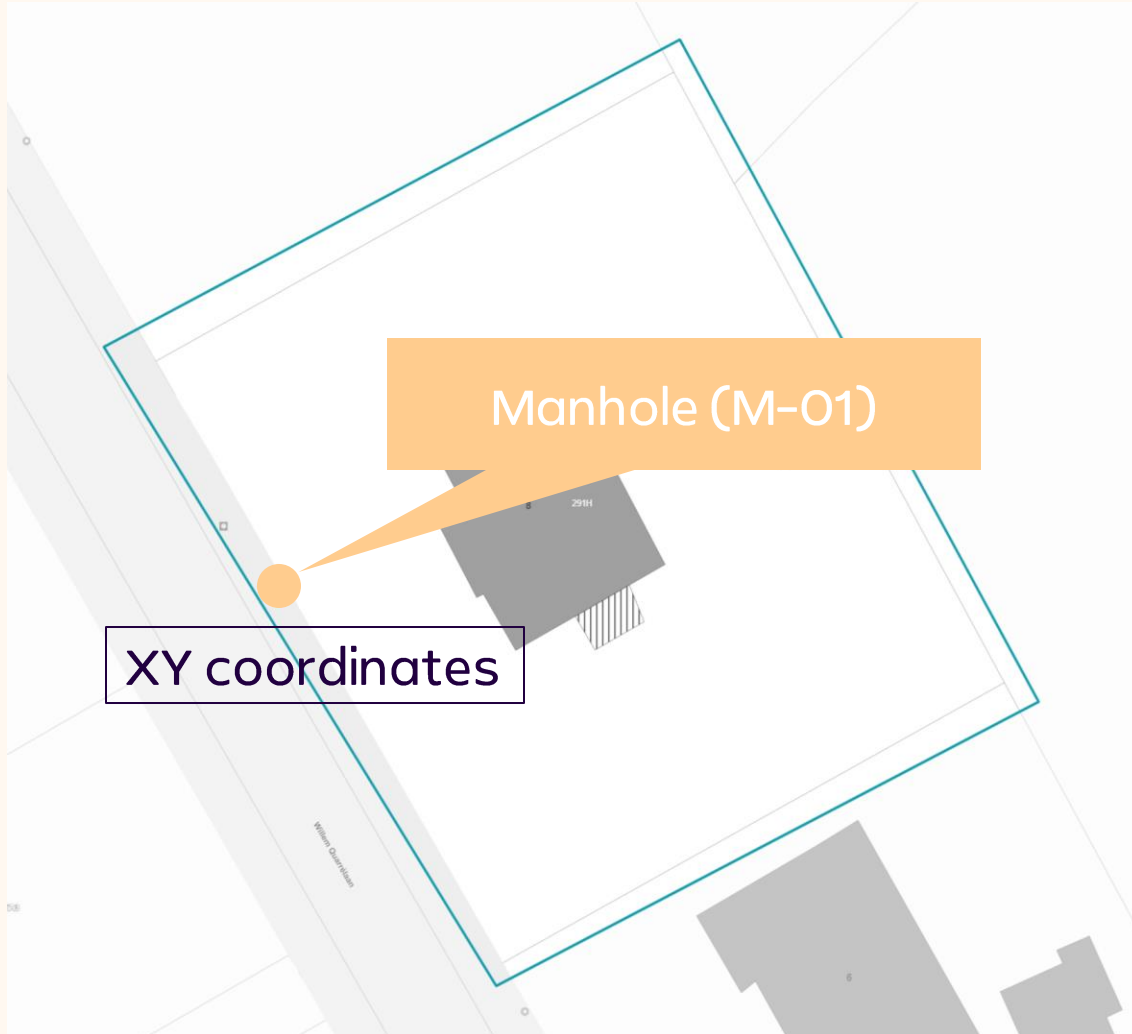




# **Recap Workshop 2**

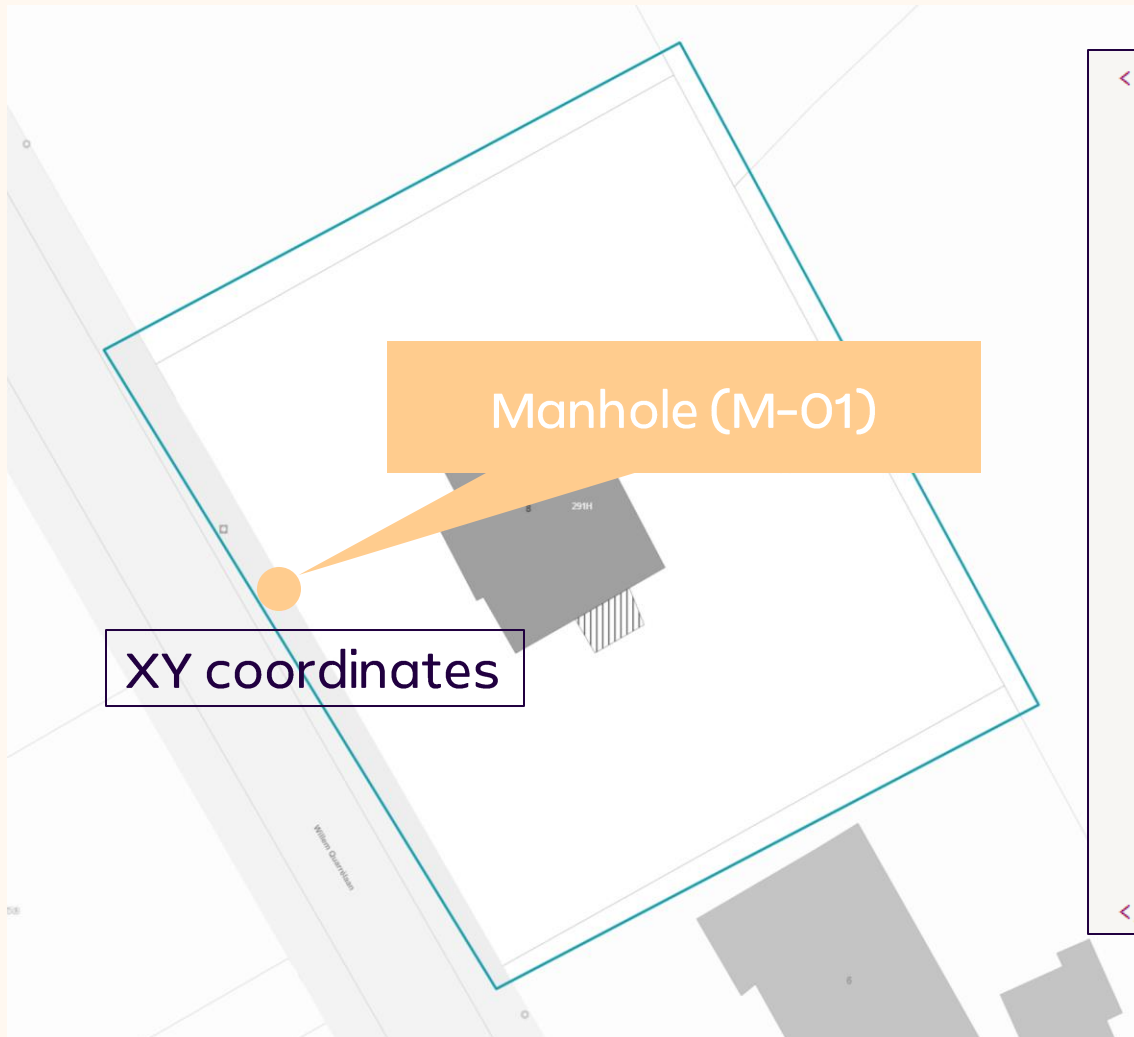


# Example - Manhole



# Example - Manhole

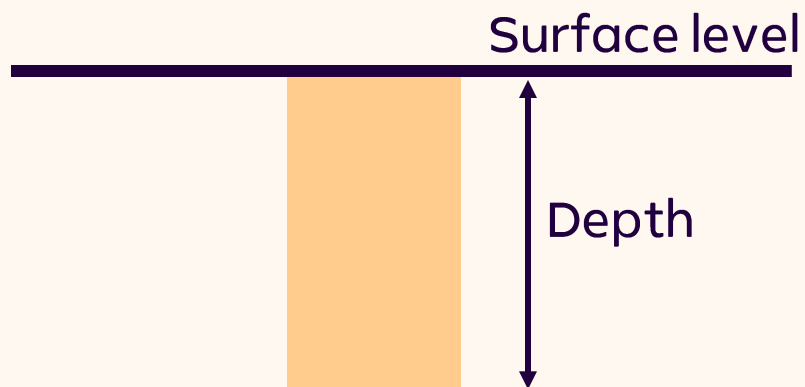
## Survey



```
<imkl:featureMember>
  <imkl:manhole>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>M-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <us-net-common:geometry>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>103674.885 192127.454</gml:pos>
      </gml:Point>
    <imkl:survey>
      <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation"/>
      <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01"/>
      <imkl:date>2024-01-01T12:00:00</imkl:date>
      <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
    </imkl:survey>
    </us-net-common:geometry>
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
  </imkl:manhole>
</imkl:featureMember>
```

# Example - Manhole

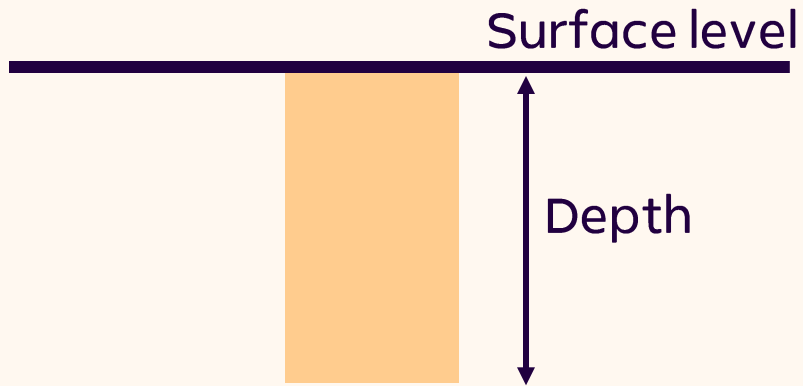
Relative depth



```
<imkl:featureMember>
  <imkl:manhole>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>M-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <us-net-common:geometry>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>103674.885 192127.454</gml:pos>
      </gml:Point>
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation"/>
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01"/>
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </us-net-common:geometry>
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
    <imkl:verticalPositionDetail>
      <xlink:href="http://TODO/verticalPositionDetail/Demo:VPD-1"
      <xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:verticalPositionDetail>
  </imkl:manhole>
</imkl:featureMember>
```

# Example - Manhole

Relative depth

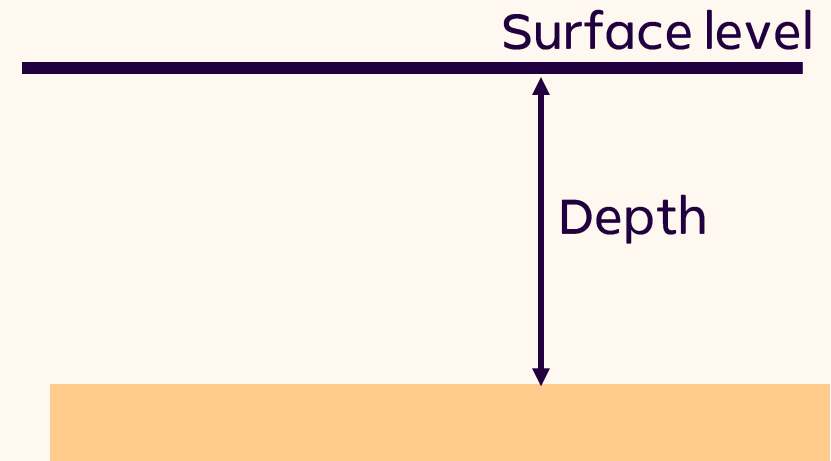
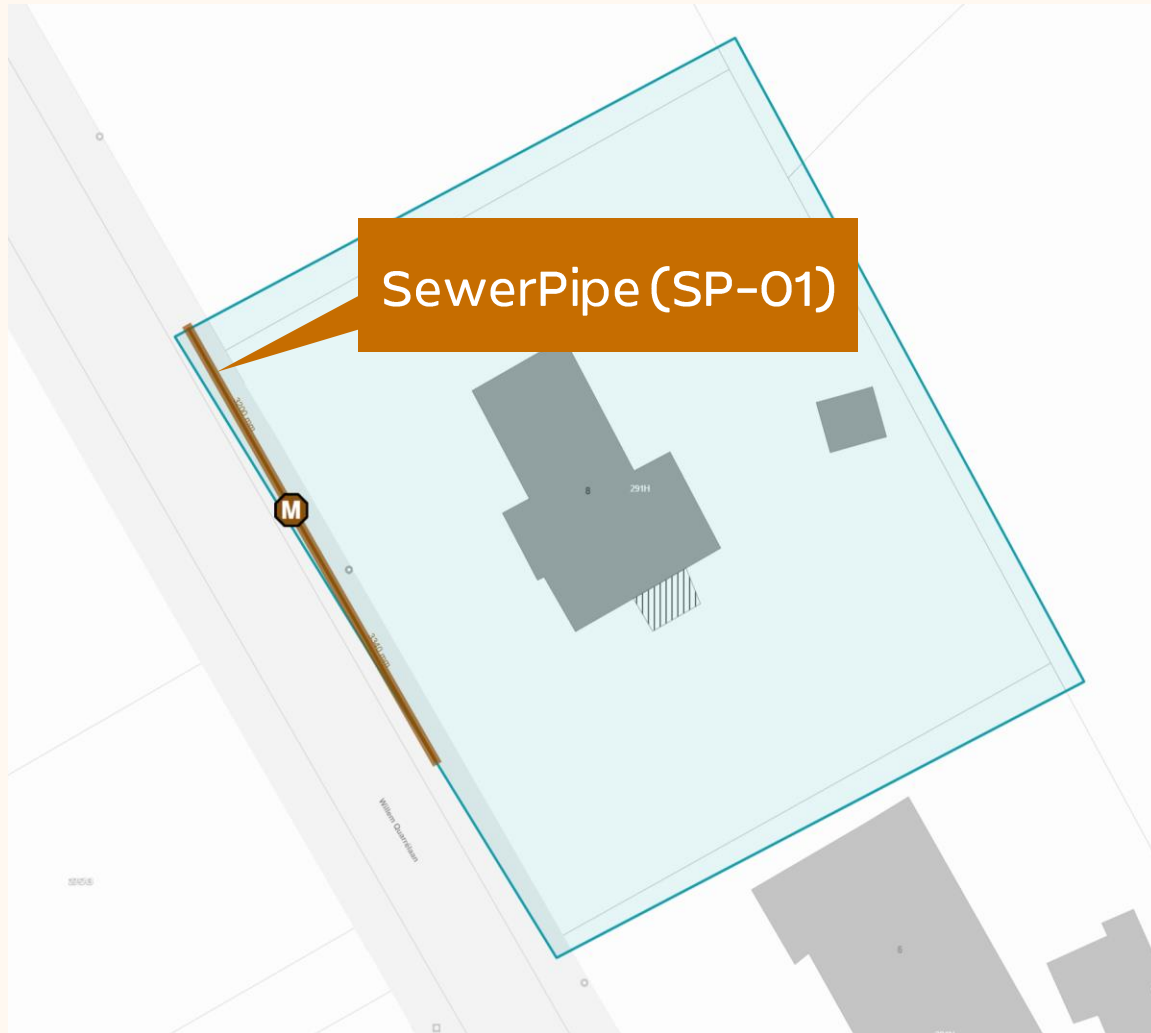


```
<imkl:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3">
        <base:localId>VPD-1</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </imkl:imklId>
    <imkl:beginLifespanVersion>2000-10-05T00:00:00</imkl:beginLifespanVersion>
    <imkl:referenceSurface>
      <imkl:type xlink:href="http://TODO/ReferenceSurfaceTypeValue/SurfaceLevel" />
    </imkl:referenceSurface>
    <imkl:depth uom="urn:ogc:def:uom:OGC::m">1</imkl:depth>
    <imkl:hasUtilityNetworkElement
      xlink:href="http://TODO/manhole/Demo:M-01"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:verticalPositionDetail>
  </imkl:featureMember>
```

Within the *verticalPositionDetail* element the *referenceSurface* is mandatory.

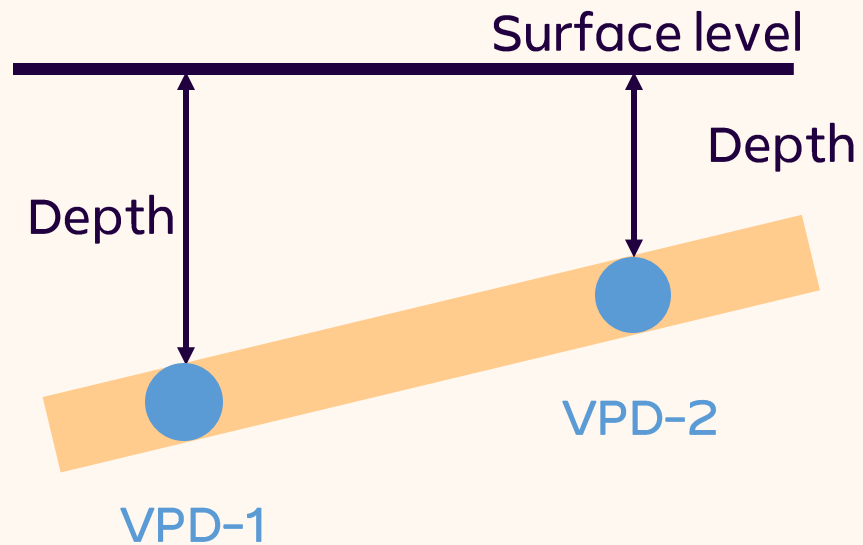
When using the *relative depth* option the *referenceSurface* should only contain a type element with value *SurfaceLevel*.

# Example - SewerPipe



# Example - SewerPipe

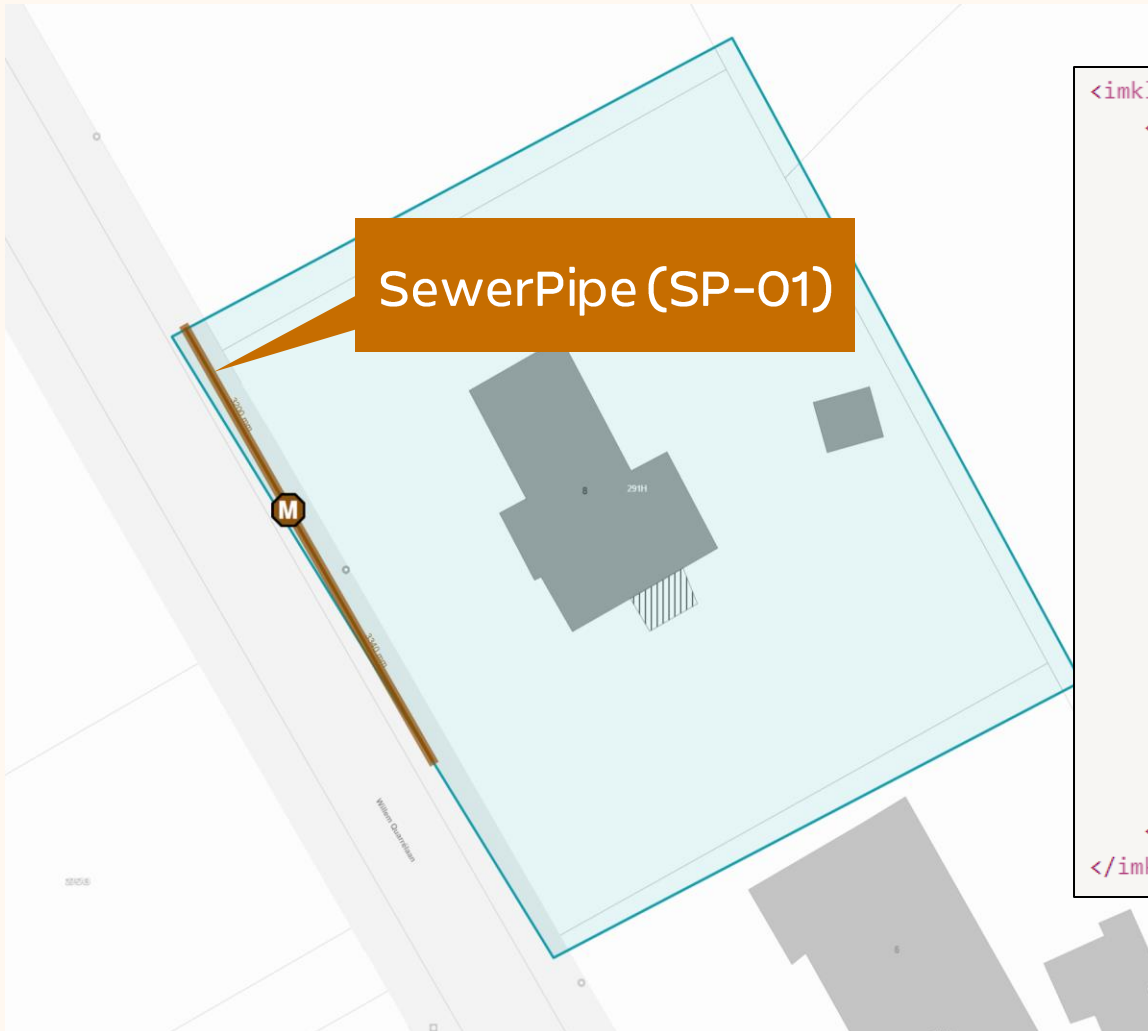
UtilityLinkSet



```
<imkl:featureMember>
  <imkl:sewerPipe>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>SP-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <net:link xlink:href="http://TODO/UtilityLink/Demo:L-01" />
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
    <imkl:verticalPositionDetail
      xlink:href="http://TODO/verticalPositionDetail/Demo:VPD-1"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    <imkl:verticalPositionDetail
      xlink:href="http://TODO/verticalPositionDetail/Demo:VPD-2"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    <!-- + subtheme, sewerWaterType, ... -->
  </imkl:sewerPipe>
</imkl:featureMember>
```

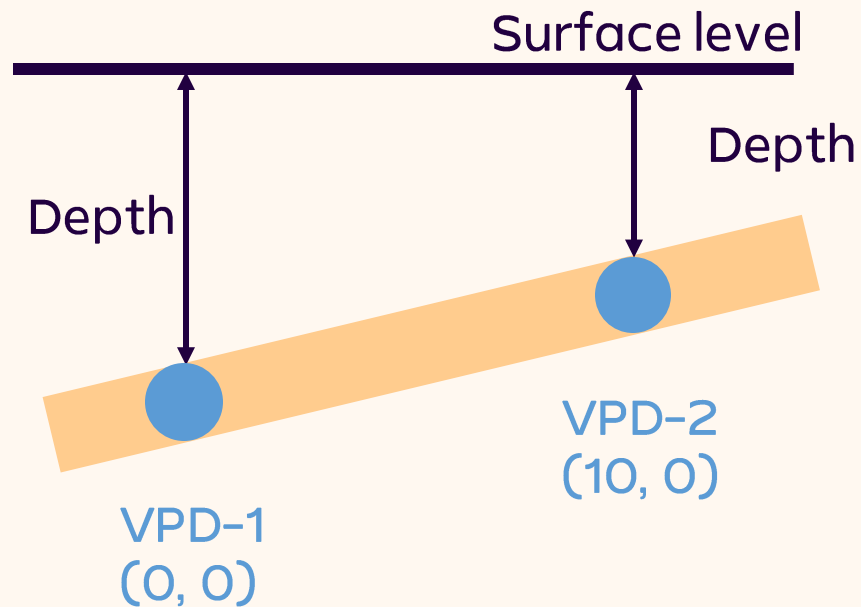
# Example - SewerPipe

UtilityLink



```
<imkl:featureMember>
  <us-net-common:UtilityLink>
    <net:beginLifespanVersion>2024-01-01T12:00:00.0Z</net:beginLifespanVersion>
    <net:inspireId>
      <base:Identifier>
        <base:localId>L-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </net:inspireId>
    <net:centrelineGeometry>
      <gml:LineString srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:posList>0 0 10 0</gml:posList>
      </gml:LineString>
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation"/>
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01"/>
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </net:centrelineGeometry>
  </us-net-common:UtilityLink>
</imkl:featureMember>
```

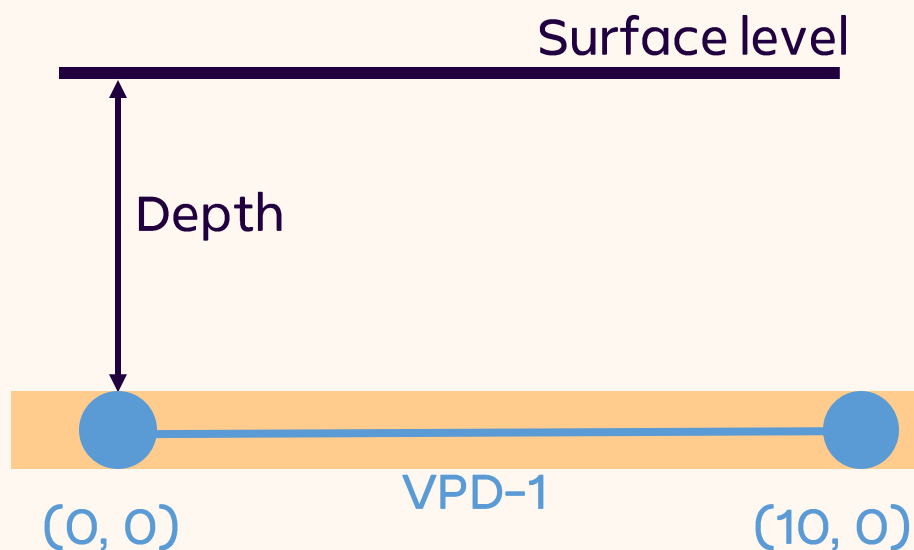
# Example - SewerPipe



```
<imkl:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3">
        <base:localId>VPD-1</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </imkl:imklId>
    <imkl:location>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>0 0</gml:pos>
      </gml:Point>
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation" />
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </imkl:location>
    <imkl:beginLifespanVersion>2000-10-05T00:00:00</imkl:beginLifespanVersion>
    <imkl:referenceSurface>
      <imkl:type xlink:href="http://TODO/ReferenceSurfaceTypeValue/SurfaceLevel" />
    </imkl:referenceSurface>
    <imkl:depth uom="urn:ogc:def:uom:OGC::m">1</imkl:depth>
    <imkl:hasUtilityNetworkElement
      xlink:href="http://TODO/manhole/Demo:L-01"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:verticalPositionDetail>
  </imkl:featureMember>
```



# Example - SewerPipe



```
<imkl:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3">
        <base:localId>VPD-1</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </imkl:imklId>
    <imkl:location>
      <gml:LineString srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:posList>0 0 10 0</gml:posList>
      </gml:LineString>
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation" />
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </imkl:location>
    <imkl:beginLifespanVersion>2000-10-05T00:00:00</imkl:beginLifespanVersion>
    <imkl:referenceSurface>
      <imkl:type xlink:href="http://TODO/ReferenceSurfaceTypeValue/SurfaceLevel" />
    </imkl:referenceSurface>
    <imkl:depth uom="urn:ogc:def:uom:OGC::m">1</imkl:depth>
    <imkl:hasUtilityNetworkElement
      xlink:href="http://TODO/manhole/Demo:L-01"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:hasUtilityNetworkElement>
  </imkl:verticalPositionDetail>
</imkl:featureMember>
```

# Survey

After workshop 2 there was some feedback on the position of the survey element in the XML documents.

```
<gml:featureMember>
  <imkl:manhole>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>M-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <us-net-common:geometry>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>103674.885 192127.454</gml:pos>
      </gml:Point>
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation"/>
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01"/>
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </us-net-common:geometry>
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
    <imkl:verticalPositionDetail
      xlink:href="http://TODO/verticalPositionDetail/Demo:VPD-1"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
  </imkl:manhole>
</gml:featureMember>
```

```
<gml:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3">
        <base:localId>VPD-1</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </imkl:imklId>
    <imkl:location>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>0 0</gml:pos>
      </gml:Point>
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation" />
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </imkl:location>
    <imkl:beginLifespanVersion>2000-10-05T00:00:00</imkl:beginLifespanVersion>
    <imkl:verticalPosition>
      <imkl:pos srsName="http://spatialreference.org/ref/epsg/5710/" srsDimension="1">21</imkl:pos>
      <imkl:survey>
        <imkl:method nilReason="missing" xsi:nil="true" />
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </imkl:verticalPosition>
    <imkl:hasUtilityNetworkElement
      xlink:href="http://TODO/manhole/Demo:M-01"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
  </imkl:verticalPositionDetail>
</gml:featureMember>
```

# Survey

## Option 1: Nested in geometry

```
<gml:featureMember>
  <imkl:manhole>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>M-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <us-net-common:geometry>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>103674.885 192127.454</gml:pos>
      </gml:Point>
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation"/>
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01"/>
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </us-net-common:geometry>
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
    <imkl:verticalPositionDetail
      xlink:href="http://TODO/verticalPositionDetail/Demo:VPD-1"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
  </imkl:manhole>
</gml:featureMember>
```

## Option 2: Sibling of geometry

```
<gml:featureMember>
  <imkl:manhole>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>M-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <us-net-common:geometry>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>103674.885 192127.454</gml:pos>
      </gml:Point>
    </us-net-common:geometry>
    <imkl:locationSurvey>
      <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation"/>
      <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01"/>
      <imkl:date>2024-01-01T12:00:00</imkl:date>
      <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
    </imkl:locationSurvey>
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
    <imkl:verticalPositionDetail
      xlink:href="http://TODO/verticalPositionDetail/Demo:VPD-1"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
  </imkl:manhole>
</gml:featureMember>
```

# Survey

## Option 1: Nested in location

```
<gml:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3">
        <base:localId>VPD-1</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </imkl:imklId>
    <imkl:location>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>0 0</gml:pos>
      </gml:Point>
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation" />
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </imkl:location>
    <imkl:beginLifespanVersion>2000-10-05T00:00:00</imkl:beginLifespanVersion>
    <imkl:verticalPosition>
      <imkl:pos srsName="http://spatialreference.org/ref/epsg/5710/" srsDimension="1">21</imkl:pos>
      <imkl:survey>
        <imkl:method nilReason="missing" xsi:nil="true" />
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </imkl:verticalPosition>
    <imkl:hasUtilityNetworkElement
      xlink:href="http://TODO/manhole/Demo:M-01"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:verticalPositionDetail>
  </gml:featureMember>
```

## Option 2: Sibling of location

```
<gml:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3">
        <base:localId>VPD-1</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </imkl:imklId>
    <imkl:location>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>0 0</gml:pos>
      </gml:Point>
    </imkl:location>
    <imkl:locationSurvey>
      <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation" />
      <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
      <imkl:date>2024-01-01T12:00:00</imkl:date>
      <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
    </imkl:locationSurvey>
    <imkl:beginLifespanVersion>2000-10-05T00:00:00</imkl:beginLifespanVersion>
    <imkl:depth>0.80</imkl:depth>
    <imkl:verticalPosition>
      <imkl:pos srsName="http://spatialreference.org/ref/epsg/5710/" srsDimension="1">21</imkl:pos>
    </imkl:verticalPosition>
    <imkl:verticalPositionSurvey>
      <imkl:method nilReason="missing" xsi:nil="true" />
      <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
      <imkl:date>2024-01-01T12:00:00</imkl:date>
      <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
    </imkl:verticalPositionSurvey>
    <imkl:hasUtilityNetworkElement
      xlink:href="http://TODO/manhole/Demo:M-01"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:verticalPositionDetail>
  </gml:featureMember>
```

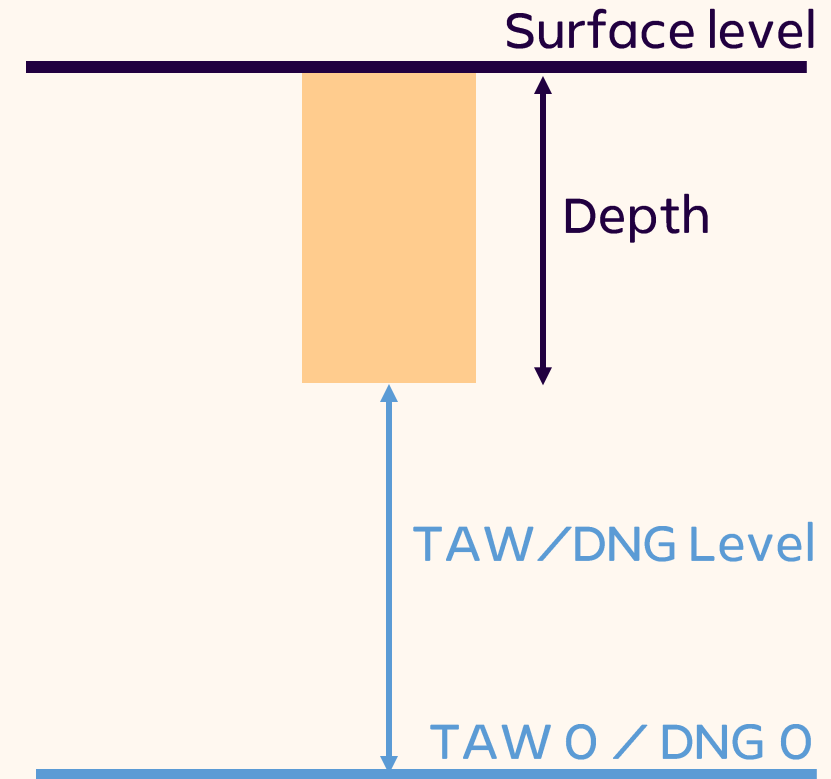
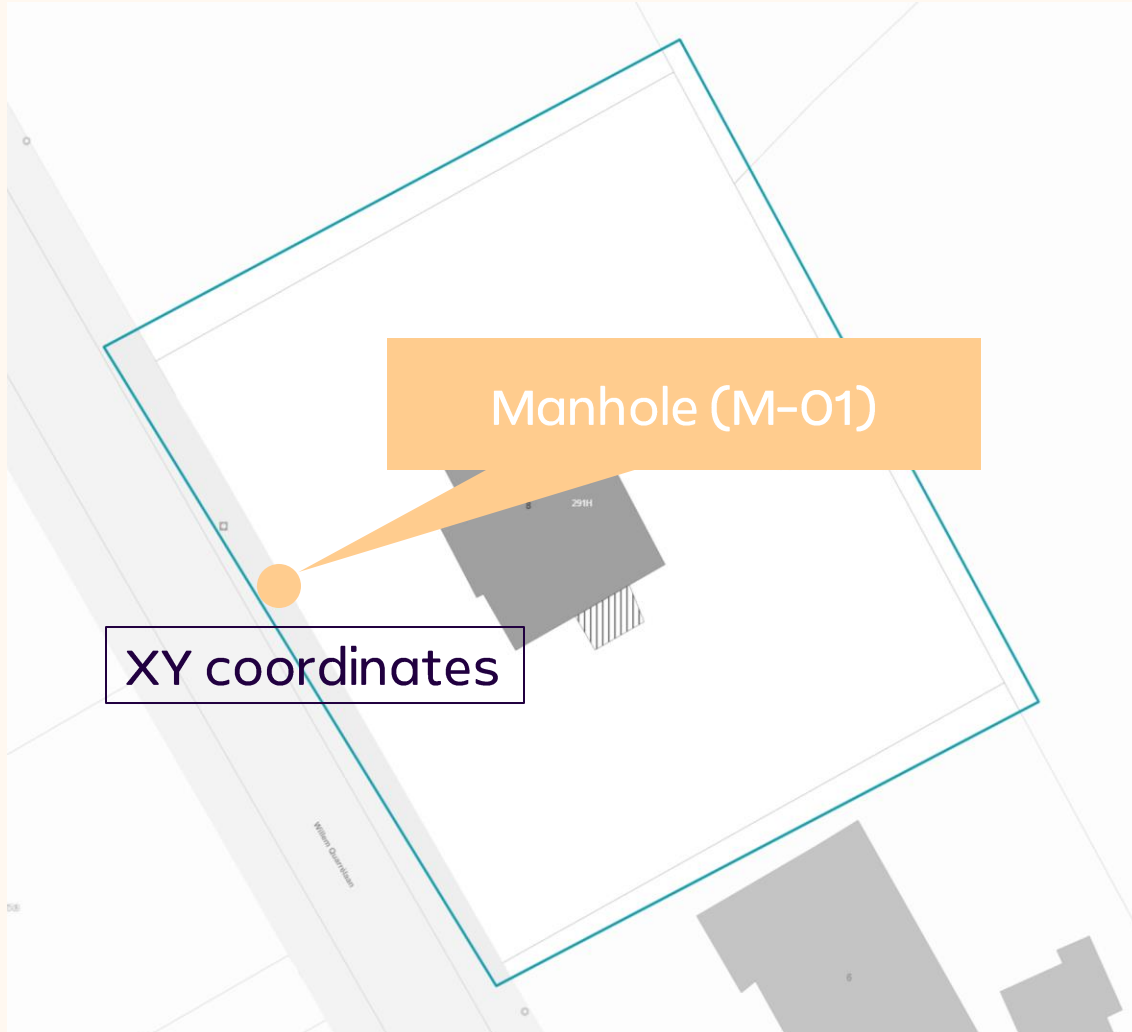




**TAW/DNG Level**

# Example - Manhole

Relative depth – TAW/DNG Level



TAW: Tweede Algemene Waterpassing  
DNG: Deuxième nivellement général



# Example - Manhole

TAW/DNG Level

Surface level

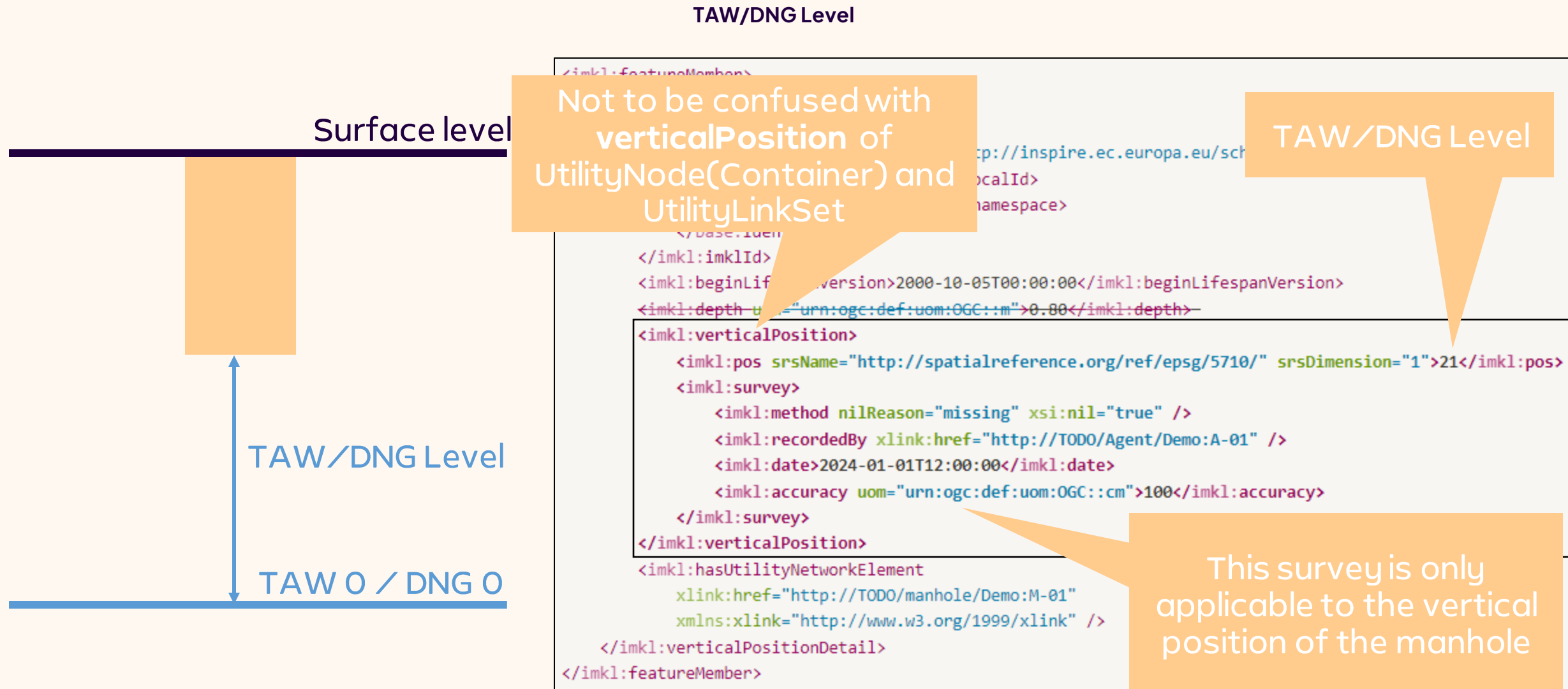
TAW/DNG Level

TAW 0 / DNG 0

```
<imkl:featureMember>
  <imkl:manhole>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>M-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <us-net-common:geometry>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>103674.885 192127.454</gml:pos>
      </gml:Point>
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation"/>
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01"/>
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </us-net-common:geometry>
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
    <imkl:verticalPositionDetail
      xlink:href="http://TODO/verticalPositionDetail/Demo:VPD-1"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:verticalPositionDetail>
  </imkl:manhole>
</imkl:featureMember>
```



# Example - Manhole



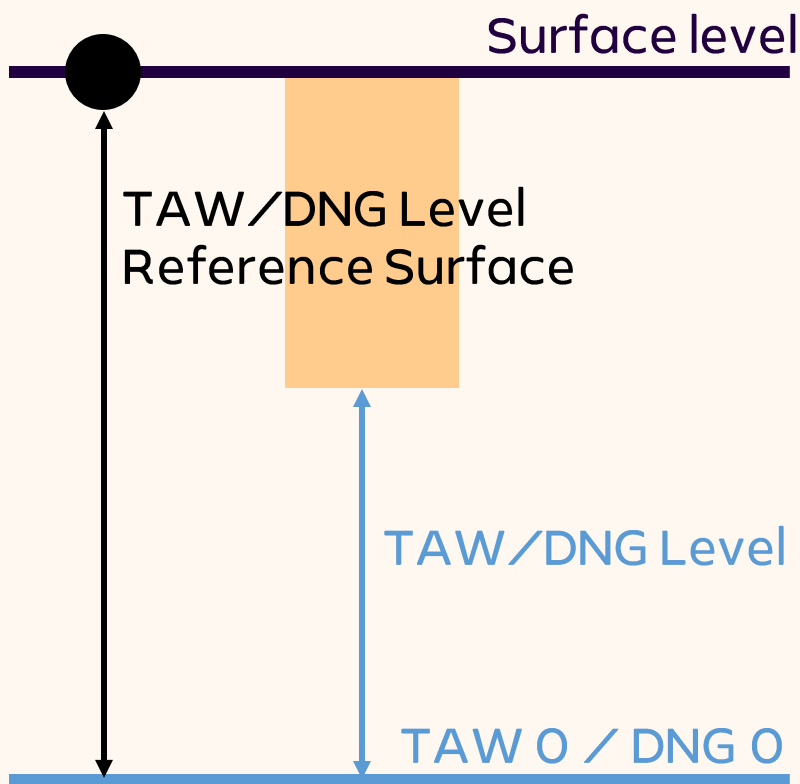


Should the referenceSurface  
verticalPosition and location  
be mandatory?

The corresponding information was optional  
in IMKL 2.3.

## Example

TAW/DNG



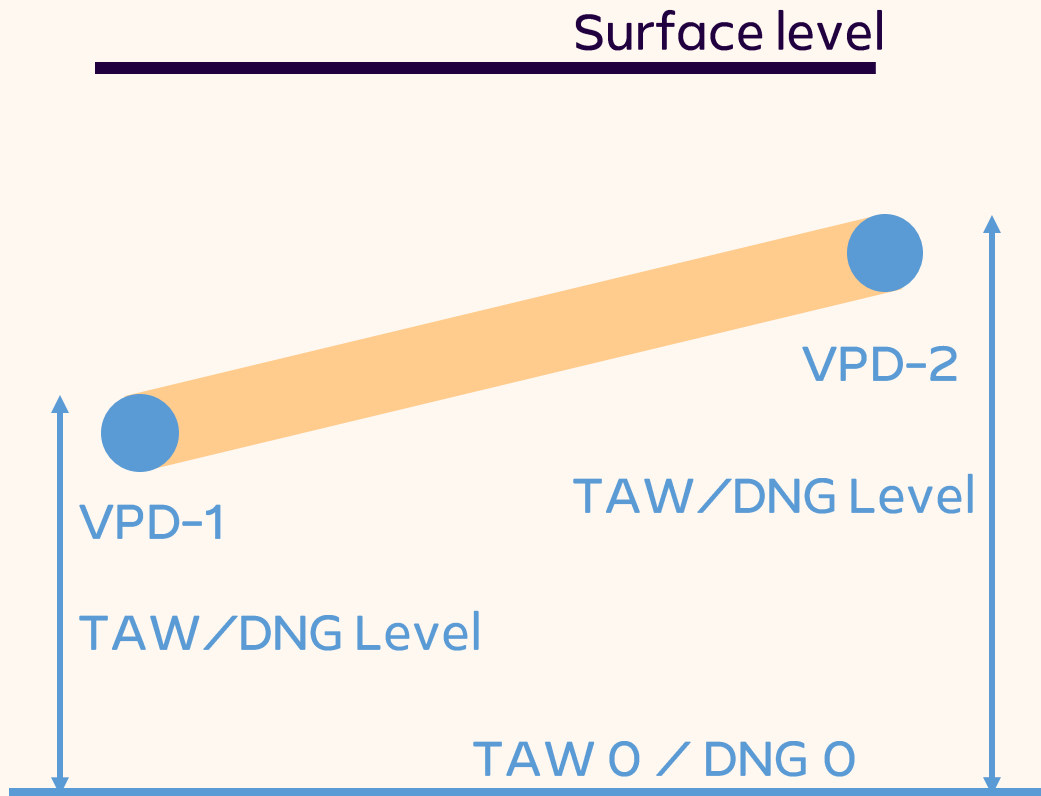
```
<imkl:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://www.w3.org/1999/xml" base="1" />
    </imkl:imklId>
    <imkl:beginLifespanVersion>2000-10-01</imkl:beginLifespanVersion>
    <imkl:referenceSurface>
      <imkl:verticalPosition>
        <imkl:pos srsName="http://spatialreference.org/ref/epsg/5710/" srsDimension="1">
          22</imkl:pos>
        <imkl:survey>
          <imkl:method nilReason="missing" xsi:nil="true" />
          <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
          <imkl:date>2024-01-01T12:00:00</imkl:date>
          <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
        </imkl:survey>
      </imkl:verticalPosition>
      <imkl:type xlink:href="http://TODO/ReferenceSurfaceTypeValue/SurfaceLevel" />
      <imkl:location>
        <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
          <gml:pos>103674.885 192127.454</gml:pos>
        </gml:Point>
        <imkl:survey>
          <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation" />
          <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
          <imkl:date>2024-01-01T12:00:00</imkl:date>
          <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
        </imkl:survey>
      </imkl:location>
    </imkl:referenceSurface>
    <imkl:verticalPosition>
      ...
    </imkl:verticalPosition>
    <imkl:hasUtilityNetworkElement
      xlink:href="http://TODO/manhole/De
      xmlns:xlink="http://www.w3.org/199
    </imkl:verticalPositionDetail>
  </imkl:featureMember>
```

This survey is only applicable to the vertical position of the reference surface

This survey is only applicable to the location of the reference surface

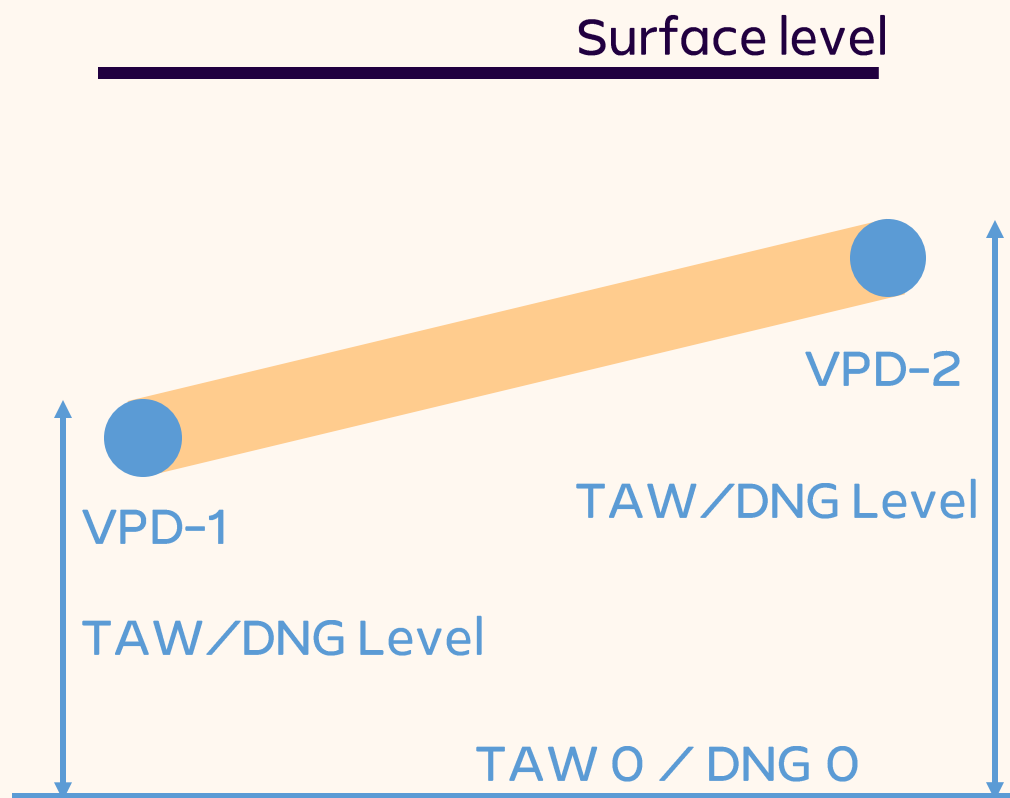
# Example - SewerPipe

2 VerticalPositionDetails with Point Geometry



```
<imkl:featureMember>
  <imkl:sewerPipe>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>SP-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <net:link xlink:href="http://TODO/UtilityLink/Demo:L-01" />
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
    <imkl:verticalPositionDetail
      xlink:href="http://TODO/verticalPositionDetail/Demo:VPD-1"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    <imkl:verticalPositionDetail
      xlink:href="http://TODO/verticalPositionDetail/Demo:VPD-2"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    <!-- + subtheme, sewerWaterType, ... -->
  </imkl:sewerPipe>
</imkl:featureMember>
```

# Examp



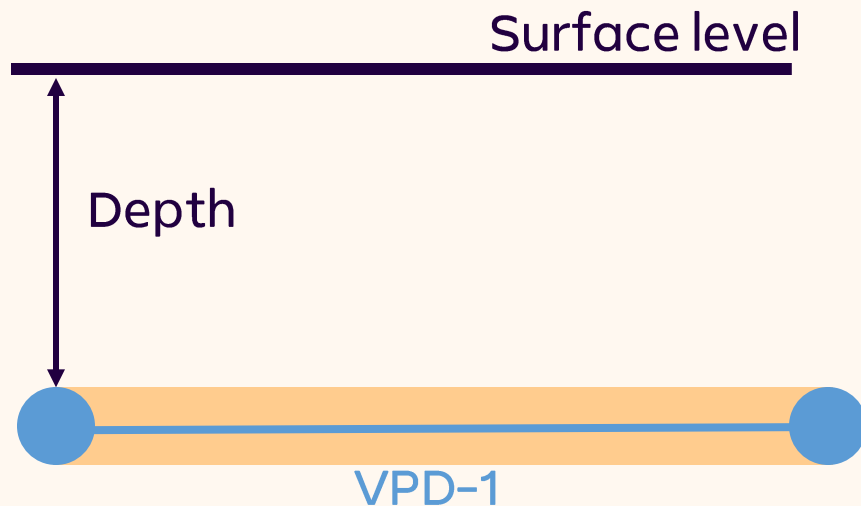
```
<imkl:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://www.w3.org/2001/XMLSchema#base/3.3">
        <base:localId>VPD-1</base:localId>
        <base:namespace>imkl</base:namespace>
      </base:Identifier>
    </imkl:imklId>
    <imkl:location>
      <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:pos>0 0</gml:pos>
      </gml:Point>
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation" />
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </imkl:location>
    <imkl:beginLifespanVersion>2000-10-05T00:00:00</imkl:beginLifespanVersion>
    <imkl:depth uom="urn:ogc:def:uom:OGC::m">0.00</imkl:depth>
    <imkl:verticalPosition>
      <imkl:pos srsName="http://spatialreference.org/ref/epsg/5710/" srsDimension="1">21</imkl:pos>
      <imkl:survey>
        <imkl:method nilReason="missing" xsi:nil="true" />
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </imkl:verticalPosition>
    <imkl:hasUtilityNetworkElement
      xlink:href="http://TODO/manhole/Demo:M-01"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:verticalPositionDetail>
  </imkl:featureMember>
```

ReferenceSurface omitted for brevity

# Example - SewerPipe

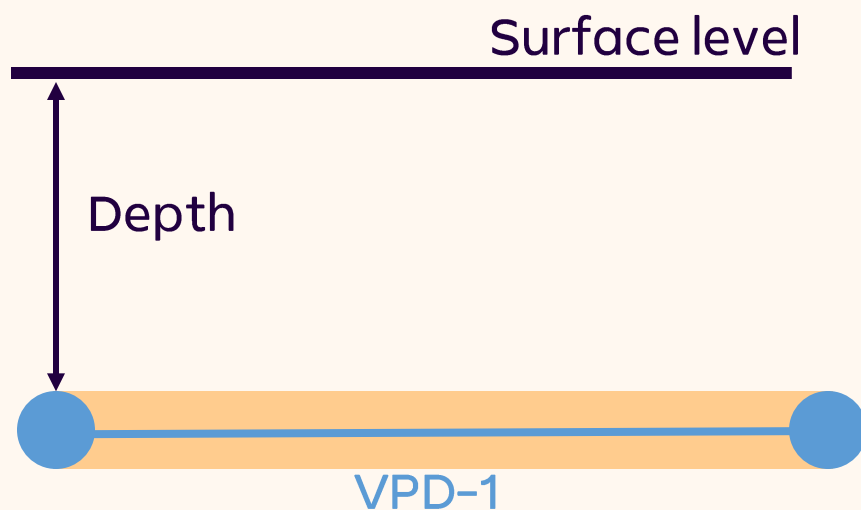
## 1 VerticalPositionDetail with Line Geometry

If the TAW/DNG Level of consecutive points is the same, they can be combined in a single VerticalPositionDetail with a Line geometry.



```
<imkl:featureMember>
  <imkl:sewerPipe>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>SP-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <net:link xlink:href="http://TODO/UtilityLink/Demo:L-01" />
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
    <imkl:verticalPositionDetail
      xlink:href="http://TODO/verticalPositionDetail/Demo:VPD-1"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    <!-- + subtheme, sewerWaterType, ... -->
  </imkl:sewerPipe>
</imkl:featureMember>
```

# Exam



```
<imkl:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://schemas/base/3.3">
        <base:localId>V
        <base:namespace
      </base:Identifier>
    </imkl:imklId>
    <imkl:location>
      <gml:LineString srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:posList>0 0 10 0</gml:posList>
      </gml:LineString >
      <imkl:survey>
        <imkl:method xlink:href="http://TODO/SurveyMethodValue/TotalStation" />
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </imkl:location>
    <imkl:beginLifespanVersion>2000-10-05T00:00:00</imkl:beginLifespanVersion>
    <imkl:depth uom="urn:ogc:def:uom:OGC::m">0.80</imkl:depth>
    <imkl:verticalPosition>
      <imkl:pos srsName="http://spatialreference.org/ref/epsg/5710/" srsDimension="1">21</imkl:pos>
      <imkl:survey>
        <imkl:method nilReason="missing" xsi:nil="true" />
        <imkl:recordedBy xlink:href="http://TODO/Agent/Demo:A-01" />
        <imkl:date>2024-01-01T12:00:00</imkl:date>
        <imkl:accuracy uom="urn:ogc:def:uom:OGC::cm">100</imkl:accuracy>
      </imkl:survey>
    </imkl:verticalPosition>
    <imkl:hasUtilityNetworkElement
      xlink:href="http://TODO/manhole/Demo:M-01"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:verticalPositionDetail>
  </imkl:featureMember>
```

ReferenceSurface omitted for brevity

# Summary

## TAW/DNG Level

- **Coordinate reference system:** Lambert 72 replaced with Lambert 2008
- **VerticalPosition:** No changes
- **Survey:** The *survey* replaces *liggingNauwkeurigheid*
- **VerticalPositionDetail:**
  - Replaces *TAWDiepte*:
    - *Pos* replaces *dieptePeil*
    - *Location* replaces *ligging*. Location can be Point or Line. Survey for accuracy of this location.
  - Survey for verticalPositionDetail: replaces *diepteNauwkeurigheid*, *datumOpmetingDieptePeil*
  - ReferenceSurface added
    - *Pos* replaces *maaiveldPeil*
    - *Survey* replaces *datumOpmetingMaaiveldPeil*

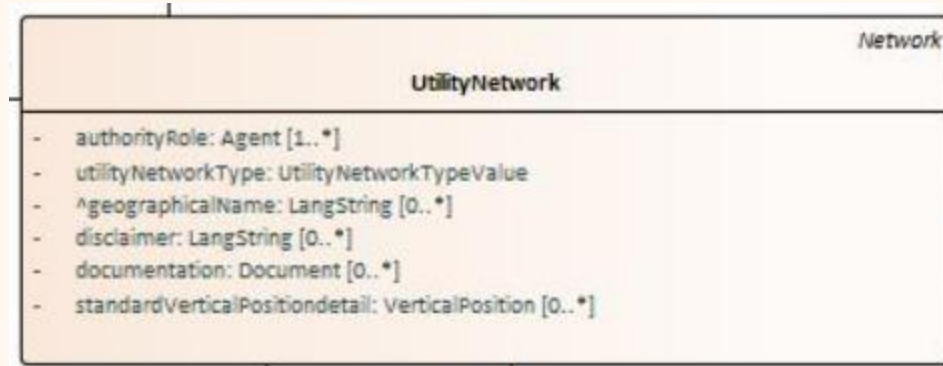




# **Other topics**

# Standard VerticalPositionDetail

- Optional VerticalPositionDetail for the whole network.
- Gets overruled by element specific verticalPositionDetail if present.



- **Max 1** standard verticalPositionDetail allowed?

Are there situations where more than 1 standard verticalPositionDetail is useful?

- Replaces **standaardDekking** from IMKL 2.3.
- Different **interpretation of depth** for UtilityNode(Container)s and UtilityLinkSets?



# Standard VerticalPositionDetail

Relative Depth

```
<imkl:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3">
        <base:localId>VPD-1</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </imkl:imklId>
    <imkl:beginLifespanVersion>2000-10-05T00:00:00</imkl:beginLifespanVersion>
    <imkl:referenceSurface>
      <imkl:type xlink:href="http://TODO/ReferenceSurfaceTypeValue/SurfaceLevel" />
    </imkl:referenceSurface>
    <imkl:depth uom="urn:ogc:def:uom:OGC::m">1</imkl:depth>
    <imkl:utilityNetwork
      xlink:href="http://TODO/UtilityNetwork/Demo:UN-01"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:verticalPositionDetail>
  </imkl:featureMember>
```



# Standard VerticalPositionDetail

TAW/DNG Level

```
<imkl:featureMember>
  <imkl:verticalPositionDetail>
    <imkl:imklId>
      <base:Identifier xmlns:base="http://inspire.ec.europa.eu/schemas/base/3.3">
        <base:localId>VPD-1</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </imkl:imklId>
    <imkl:location>...</imkl:location>
    <imkl:referenceSurface>
      <imkl:verticalPosition>
        <imkl:pos srsName="http://spatialreference.org/ref/epsg/5710/" srsDimension="1">
          22</imkl:pos>
        <imkl:survey>...</imkl:survey>
      </imkl:verticalPosition>
      <imkl:type xlink:href="http://TODO/ReferenceSurfaceTypeValue/SurfaceLevel" />
      <imkl:location>
        <gml:Point srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
          <gml:pos>103674.885 192127.454</gml:pos>
        </gml:Point>
        <imkl:survey>...</imkl:survey>
      </imkl:location>
    </imkl:referenceSurface>
    <imkl:beginLifespanVersion>2000-10-05T00:00:00</imkl:beginLifespanVersion>
    <imkl:verticalPosition>
      <imkl:pos srsName="http://spatialreference.org/ref/epsg/5710/" srsDimension="1">21</imkl:pos>
      <imkl:survey>...</imkl:survey>
    </imkl:verticalPosition>
    <imkl:hasUtilityNetworkElement
      xlink:href="http://TODO/manhole/Demo:M-01"
      xmlns:xlink="http://www.w3.org/1999/xlink" />
    </imkl:verticalPositionDetail>
  </imkl:featureMember>
```

The surface level is at 22m at the given location

Is TAW/DNG Level relevant as standard VPD? Or do we only allow relative depths (as in IMKL 2.3)?

Standard TAW/DNG level is 21m

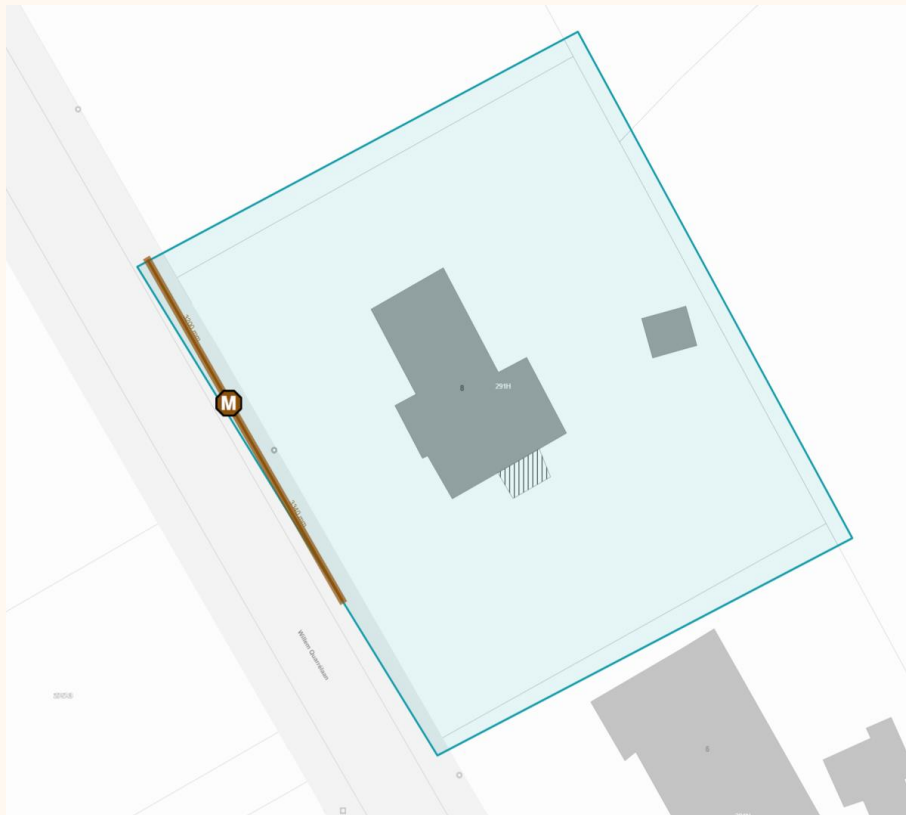


# UtilityLinkSequence

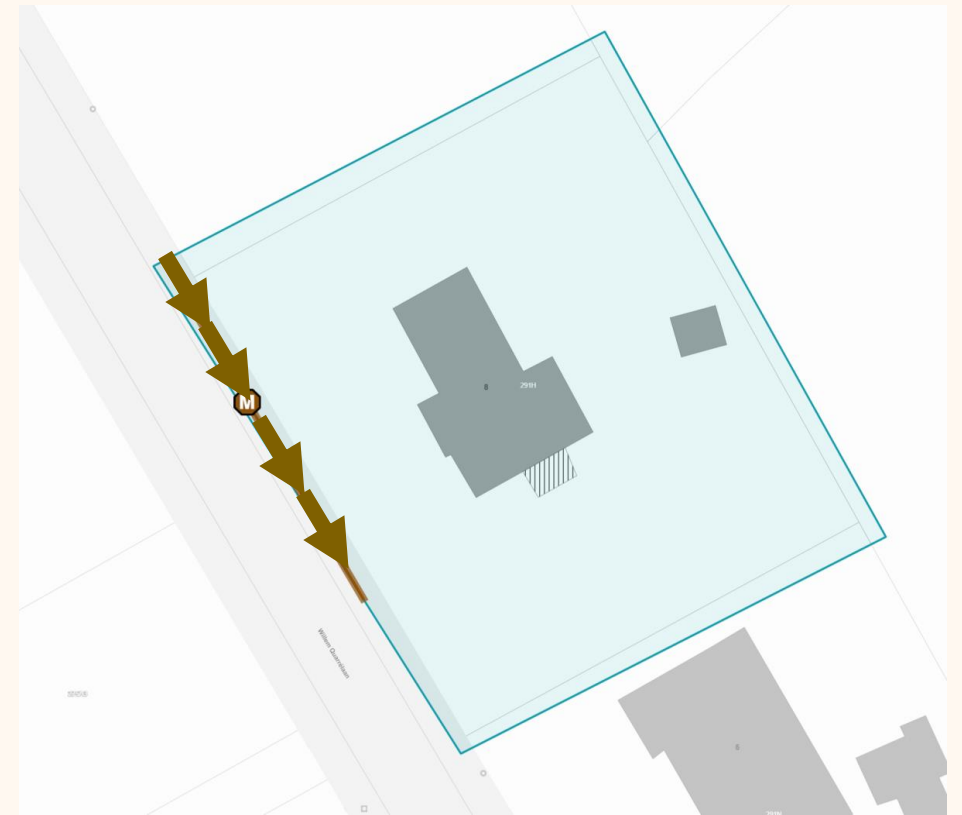
A UtilityLinkSequence is a **sorted collection** of **directed** links.

UtilityLinkSequences can be useful to describe a UtilityLinkSet with a specific flow direction.

UtilityLink



UtilityLinkSequence



# UtilityLinkSequence

A UtilityLinkSequence is a **sorted collection** of **directed** links.

UtilityLinkSequences can be useful to describe a UtilityLinkSet with a specific flow direction.

For the use cases of IMKL the direction of the link is not relevant.

Hence, we suggest to not use UtilityLinkSequences. This was already the case in IMKL 2.3.



# UtilityLink – Multi curve



```
<imkl:featureMember>
  <imkl:sewerPipe>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>SP-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <net:link xlink:href="http://TODO/UtilityLink/Demo:L-01" />
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
    <!-- + subtheme, sewerWaterType, ... -->
  </imkl:sewerPipe>
</imkl:featureMember>
```

1 UtilityLink

# UtilityLink – Multi curve



1 UtilityLink

```
<imkl:featureMember>
  <us-net-common:UtilityLink>
    <net:beginLifespanVersion>2024-01-01T12:00:00Z</net:beginLifespanVersion>
    <net:inspireId>
      <base:Identifier>
        <base:localId>L-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </net:inspireId>
    <net:centrelineGeometry>
      <gml:LineString srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:posList>0 0 10 0</gml:posList>
      </gml:LineString>
    </net:centrelineGeometry>
  </us-net-common:UtilityLink>
</imkl:featureMember>
```

# UtilityLink – Multi curve

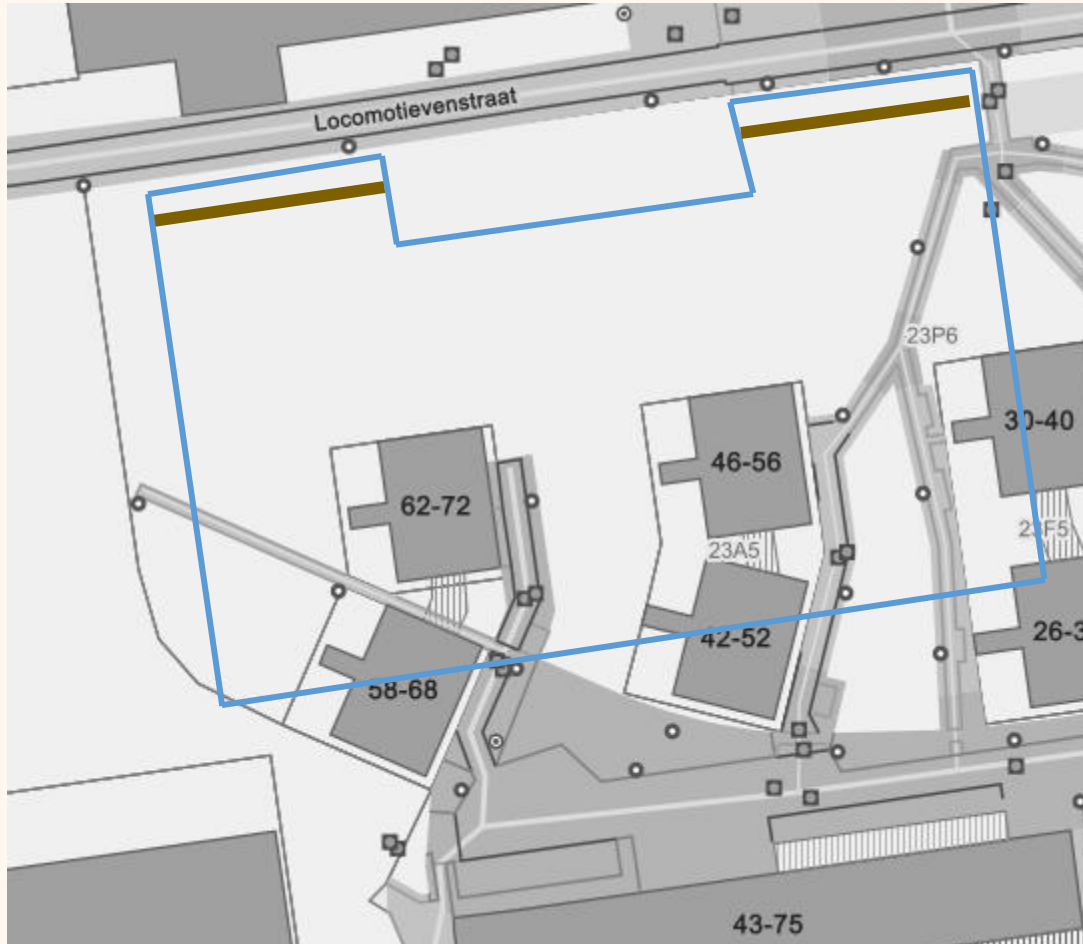


```
<imkl:featureMember>
  <imkl:sewerPipe>
    <us-net-common:inspireId>
      <base:Identifier>
        <base:localId>SP-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </us-net-common:inspireId>
    <net:link xlink:href="http://TODO/UtilityLink/Demo:L-01" />
    <net:link xlink:href="http://TODO/UtilityLink/Demo:L-02" />
    <us-net-common:verticalPosition>underground</us-net-common:verticalPosition>
    <!-- + subtheme, sewerWaterType, ... -->
  </imkl:sewerPipe>
</imkl:featureMember>
```

2 UtilityLinks



# UtilityLink – Multi curve



```
<imkl:featureMember>
  <us-net-common:UtilityLink>
    <net:beginLifespanVersion>2024-01-01T12:00:00</net:beginLifespanVersion>
    <net:inspireId>
      <base:Identifier>
        <base:localId>L-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </net:inspireId>
    <net:centrelineGeometry>
      <gml:LineString srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:posList>0 0 4 0</gml:posList>
      </gml:LineString>
    </net:centrelineGeometry>
  </us-net-common:UtilityLink>
</imkl:featureMember>
<imkl:featureMember>
  <us-net-common:UtilityLink>
    <net:beginLifespanVersion>2024-01-01T12:00:00</net:beginLifespanVersion>
    <net:inspireId>
      <base:Identifier>
        <base:localId>L-02</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </net:inspireId>
    <net:centrelineGeometry>
      <gml:LineString srsName="http://spatialreference.org/ref/epsg/3812/" srsDimension="2">
        <gml:posList>6 0 10 0</gml:posList>
      </gml:LineString>
    </net:centrelineGeometry>
  </us-net-common:UtilityLink>
</imkl:featureMember>
```

UtilityLink L-01

UtilityLink L-02



# UtilityLink – Multi curve

## Problem:

2 UtilityLinks (with unique ID's) need to be created for what was only 1 UtilityLink in the source dataset. This means **new ID's need to be generated** that do not match with ID's in the source dataset.

## Possible solution:

Allow MultiCurve as centrelineGeometry for UtilityLinks.



# UtilityLink – Multi curve

## Example of MultiCurve

```
<imkl:featureMember>
  <us-net-common:UtilityLink>
    <net:beginLifespanVersion>2024-01-01T12:00:00.0Z</net:beginLifespanVersion>
    <net:inspireId>
      <base:Identifier>
        <base:localId>L-01</base:localId>
        <base:namespace>Demo</base:namespace>
      </base:Identifier>
    </net:inspireId>
    <net:centrelineGeometry>
      <gml:MultiCurve srsDimension="2">
        <gml:curveMember>
          <gml:LineString>
            <gml:posList>0 0 4 0</gml:posList>
          </gml:LineString>
        </gml:curveMember>
        <gml:curveMember>
          <gml:LineString>
            <gml:posList>6 0 10 0</gml:posList>
          </gml:LineString>
        </gml:curveMember>
      </gml:MultiCurve>
    </net:centrelineGeometry>
  </us-net-common:UtilityLink>
</imkl:featureMember>
```



# UtilityLink – Multi curve

## Problem:

2 UtilityLinks (with unique ID's) need to be created for what was only 1 UtilityLink in the source dataset. This means **new ID's need to be generated** that do not match with ID's in the source dataset.

## Possible solution:

Allow MultiCurve as centrelineGeometry for UtilityLinks.

## Advantages:

- No need to generate new ID's

## Disadvantages:

- This solution is **not** in accordance with the INSPIRE guidelines. Hence, the same data transformation **can not** be used for both INSPIRE and KLIP (for network operators where this is applicable).





**Codelists**

# Codelists

A *codelist* is a predefined list of values associated with a property.

E.g. `UtilityNetworkType` can have the following values:

- electricity
- oilGasChemical
- sewer
- water
- thermal
- telecommunications
- crossTheme

```
<gml:featureMember>
  <imkl:UtilityNetwork>
    ...
    <us-net-common:utilityNetworkType xlink:href="http://inspire.ec.europa.eu/codelist/UtilityNetworkTypeExtendedValue/electricity" />
    ...
  </imkl:UtilityNetwork>
</gml:featureMember>
```



# Codelists

Changes in IMKL 3:

- IMKL 2.3 contained a mix of codelists from INSPIRE (English) and IMKL specific codelists (Dutch). **For IMKL 3 all values will be translated into English.**
- **New codelists** are introduced.
- Opportunity to **update** values of **existing codelists**.



# ConditionOfFacilityValue

- Existing codelist used to indicate the current status of an element in a utility network. This property is **mandatory**.
- Existing values in IMKL 2.3:
  - **functional**: The facility is functional
  - **projected**: The facility is being designed. Construction has not yet started.
  - **disused**: The facility is no longer used.
- Proposal for IMKL 3:
  - Keep existing values
  - Add **under construction**: The facility is under construction and not yet functional. This applies only to the initial construction of the facility and not to maintenance work.

Source: <https://inspire.ec.europa.eu/codelist/ConditionOfFacilityValue>



# OilGasChemicalsProductTypeMKLValue

- Existing codelist used to indicate the product type of an OilGasChemicalsPipe.
- Request to add option **Carbon Dioxide** (CO<sub>2</sub>).

oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/naturalGas">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/naturalGas</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/bioGas">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/bioGas</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/acetone">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/acetone</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/air">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/air</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/argon">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/argon</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/butadiene1.2">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/butadiene1.2</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/butadiene1.3">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/butadiene1.3</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/butane">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/butane</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/carbonMonoxide">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/carbonMonoxide</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/chlorine">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/chlorine</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/concrete">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/concrete</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/crude">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/crude</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/dichloroethane">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/dichloroethane</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/diesel">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/diesel</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/ethylene">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/ethylene</a>
oilGasChemicals	oilGasChemicalsProductType	<a href="http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/gasFabricationOfCocs">http://mir.agiv.be/cl/IMKL/v2/OilGasChemicalsProductTypeMKLValue/gasFabricationOfCocs</a>





# VisibilityTypeValue

- *VisibilityTypeValue* is a **new codelist**.
- It will be used for property *visibility* of *UtilityNode*, *UtilityNodeContainer* and *UtilityLinkSet*. This property is **optional**.
- *visibility* replaces *isBovengrondsZichtbaar* (yes/no) of IMKL 2.3. A codelists allows for more flexibility than a yes/no value.
- Proposal for IMKL 3:
  - *visibleAboveGround*
  - *notVisibleAboveGround*



# RiskTypeValue

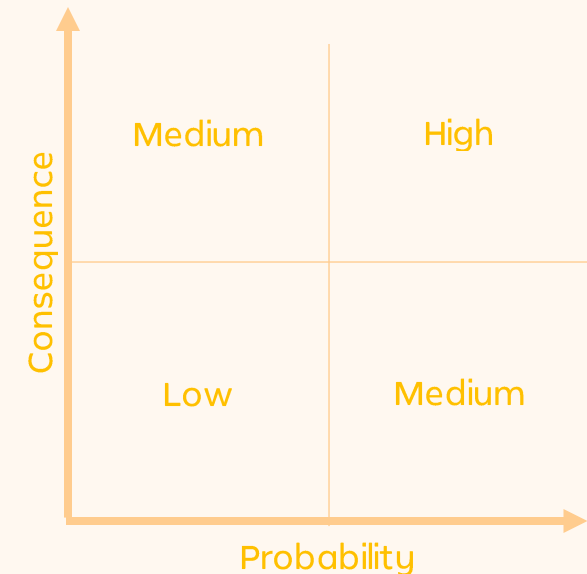
- *RiskTypeValue* is a **new codelist**.
- It will be used for property *risk* of *UtilityNode*, *UtilityNodeContainer* and *UtilityLinkSet*. This property is **optional**.
- *risk* replaces *isRisicovol* (yes/no) of IMKL 2.3. A codelists allows for more flexibility than a yes/no value.
- How do we define risk?



# RiskTypeValue - Option 1

$$\text{Risk} = \text{Probability of Failure} \times \text{Consequence}$$

- Possible values:
  - Low
  - Medium
  - High
- This approach is used in a.o. the Aquastreng model.
- Advantages:
  - Easy to implement: Each network element has 1 risk value.
  - Probability of failure is taken into account.
- Disadvantages:
  - Type of consequence is not clear.
  - How do you determine probability?



# RiskTypeValue - Option 2

- Classification using types of hazard

Codelist	ValueEN
RiskTypeValue	Biohazard
RiskTypeValue	Corrosive
RiskTypeValue	Electricity
RiskTypeValue	Explosion risk
RiskTypeValue	Flammable materials
RiskTypeValue	Hazardous to the environment
RiskTypeValue	High temperature
RiskTypeValue	High voltage
RiskTypeValue	Irritant
RiskTypeValue	Laser radiation
RiskTypeValue	Low temperature
RiskTypeValue	Non ionizing radiation
RiskTypeValue	Optical radiation
RiskTypeValue	Oxidising
RiskTypeValue	Pressurized gas
RiskTypeValue	Radiation
RiskTypeValue	Strong magnetic field
RiskTypeValue	Toxic

- Advantages:
  - Type of hazard is clear
- Disadvantages:
  - Probability of failure is not taken into account
  - More complex to implement: Each element can have multiple risks.



# MethodOfMeasurement

- *MethodOfMeasurement* is a **new codelist**.
- It will be used for the *method* property of a **survey**.
- Notes:
  - nilReason is possible for method.
  - A survey can apply to an x/y position or a depth.
- Proposal to include the following values in IMKL 3:
  - Digitized plan
  - Total station
  - GNSS (instead of GPS)
  - Terrestrial
  - Triangulation
  - Photogrammetry
  - LiDAR/Laserscan (are these the same or different methods?)
  - Measuring tape
- Feedback after previous workshop: method is overkill. Accuracy is more important.



# NilReason

```
<imkl:method nilReason="missing" xsi:nil="true" />
```

Explanation for a void value.

It is a codelist with the following options:

- **inapplicable:** There is no value
- **missing:** The correct value is not readily available, however a correct value probably exists
- **unknown:** The correct value is not known
- **withheld:** The value is not divulged
- **template:** The value will be available later



# ReferenceSurfaceType

- *ReferenceSurfaceType* is a **new codelist**.
- It will be used for the *type* property of a **reference surface**.
- *SurfaceLevel* (maaiveld, niveau de sol) is currently the only type of reference surface in use for IMKL 3.



# Appearance & Colour

- Used to indicate the colour of an element in a utility network.
- *Appearance* and *colour* replace *kleur* of IMKL 2.3.

## IMKL 2.3

```
<gml:featureMember>
  <imkl:appurtenance>
    ...
    <imkl:kleur>grijs</imkl:kleur>
  </imkl:appurtenance>
</gml:featureMember>
```

## IMKL 3

```
<gml:featureMember>
  <imkl:appurtenance>
    ...
    <imkl:appearance>
      <imkl:colour>grey</imkl:colour>
    </imkl:appearance>
    ...
  </imkl:appurtenance>
</gml:featureMember>
```

- In IMKL 2.3 this was not a codelist. Because of the number of different colour combinations, we propose to keep it as *free text* in IMKL 3.





# Appearance & Colour

- To indicate the language of the colour value, the colour property will be a *LangString* in IMKL 3.
- Appearance is optional, but if present at least 1 colour needs to be provided (EN, NL or FR). Applications can show the preferred language if present or fall back to another value.

```
<gml:featureMember>
  <imkl:appurtenance>
    ...
    <imkl:appearance>
      <imkl:colour lang="NL">bruin</imkl:colour>
      <imkl:colour lang="FR">brun</imkl:colour>
      <imkl:colour lang="EN">brown</imkl:colour>
    </imkl:appearance>
    ...
  </imkl:appurtenance>
</gml:featureMember>
```

```
<gml:featureMember>
  <imkl:appurtenance>
    ...
    <imkl:appearance>
      <imkl:colour lang="FR">brun</imkl:colour>
      <imkl:colour lang="EN">brown</imkl:colour>
    </imkl:appearance>
    ...
  </imkl:appurtenance>
</gml:featureMember>
```

```
<gml:featureMember>
  <imkl:appurtenance>
    ...
    <imkl:appearance>
      <imkl:colour lang="EN">brown</imkl:colour>
    </imkl:appearance>
    ...
  </imkl:appurtenance>
</gml:featureMember>
```

```
<gml:featureMember>
  <imkl:appurtenance>
    ...
    <!-- No appearance specified -->
    ...
  </imkl:appurtenance>
</gml:featureMember>
```



# LangString

The concept of LangStrings will be used for other *free text* properties as well.

For example:

- Address information (municipality, street name)
- Text in annotations
- Description of documents
- Technical specifications of UtilityLinkSets

Is a default value without specifying the language required? If present, no language specific values should be provided.

```
<gml:featureMember>
  <imkl:appurtenance>
    ...
    <imkl:appearance>
      <imkl:colour>grey</imkl:colour>
    </imkl:appearance>
    ...
  </imkl:appurtenance>
</gml:featureMember>
```



# Measurement points

Question from AWV and VMM:

*How should **measurement points** (e.g. piezometric tubes, grondwatermeetputten) be encoded in IMKL 3?*

- Are there other organisations that have this type of measurement point?
- In a 2D view vertical drillings can be represented as a point location. Hence, they can be represented as Appurtenance with a verticalPositionDetail for the depth.
- Is representation as Appurtenance sufficient? If so, which additional appurtenance types are required?



# SewerAppurtenanceType

Updates to codelist SewerAppurtenanceType will be discussed separately.

Let us know if you are interested to join this discussion.





**Next steps**

# Next workshops

- **Workshop 4 (13/06/2024):** Feedback workshop 3, documents and plans, connections
- **Workshop 5 (25/06/2024):** Feedback workshop 4, annotations, protected area, topographical element
- **Workshop 6 (12/09/2024):** Presentation of XSD, migration from IMKL 2.3 to IMKL 3 and start of review
- **Workshop 7 (29/09/2024):** Validation



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