

# Information Delivery Specifications IDS

## US Bridges and Structures Design-to-Construction Exchange

Data requirements for US workhorse bridges and related structures as defined by TPF-5(372) using ISO 16739-1:2024 IFC4.3.2.0 schema and the buildingSMART International Alignment-based View [AbV] base model view definition.

**Version 1.0 DOES NOT contain US Bridge Data Dictionary links via the bSDD**

**Version:** 1.0.202503

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**Milestone:** Design-to-Construction

**Purpose:** Handover of bridge and structure design from Bridge Engineer to Contractor for quantity take off and pricing, construction process planning, and basis for fabrication detailing.

## 01 Project

Basic project identification information

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCPROJECT**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **ContractNumber** of PSet **usBridge\_ProjectCommon (IFCTEXT)**
- MUST HAVE property **DatePrepared** of PSet **usBridge\_ProjectCommon (IFCDATETIME)**
- MUST HAVE property **DesignNumber** of PSet **usBridge\_ProjectCommon (IFCLABEL)**
- MUST HAVE property **ModelVersion** of PSet **usBridge\_ProjectCommon (IFCLABEL)**
- MUST HAVE property **ProjectIDNumber** of PSet **usBridge\_ProjectCommon (IFCLABEL)**
- MAY HAVE property **ProjectURL** of PSet **usBridge\_ProjectCommon (IFCLABEL)**

### 01.01 Owner

Bridge owner identification

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCPERSONANDORGANIZATION**

**that MEET the following requirements**

- MUST HAVE attribute **ThePerson**
- MUST HAVE attribute **TheOrganization**
- MUST HAVE attribute **Roles**

#### 01.01.01 Person

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPERSON**

**that MEET the following requirements**

- MUST HAVE attribute **FamilyName**
- MUST HAVE attribute **GivenName**
- MUST HAVE attribute **Roles**

## 01.01.02 Organization

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCORGANIZATION**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE attribute **Roles**
- MAY HAVE property **AddressLines** of PSet **Pset\_Address (IFCLABEL)**
- MAY HAVE property **PostalBox** of PSet **Pset\_Address (IFCLABEL)**
- MAY HAVE property **Town** of PSet **Pset\_Address (IFCLABEL)**
- MAY HAVE property **Region** of PSet **Pset\_Address (IFCLABEL)**
- MAY HAVE property **PostalCode** of PSet **Pset\_Address (IFCLABEL)**

## 01.02 Engineer

Bridge engineer identification. May or may not be same as Owner

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCPERSONANDORGANIZATION**

**that MEET the following requirements**

- MUST HAVE attribute **ThePerson**
- MUST HAVE attribute **TheOrganization**
- MUST HAVE attribute **Roles**

### 01.02.01 Person

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCPERSON**

**that MEET the following requirements**

- MUST HAVE attribute **FamilyName**
- MUST HAVE attribute **GivenName**
- MUST HAVE attribute **Roles**

### 01.02.02 Organization

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCORGANIZATION**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE attribute **Roles**
- MAY HAVE property **AddressLines** of PSet **Pset\_Address (IFCLABEL)**
- MAY HAVE property **PostalBox** of PSet **Pset\_Address (IFCLABEL)**
- MAY HAVE property **Town** of PSet **Pset\_Address (IFCLABEL)**
- MAY HAVE property **Region** of PSet **Pset\_Address (IFCLABEL)**
- MAY HAVE property **PostalCode** of PSet **Pset\_Address (IFCLABEL)**

## 01.03 Documentation References

References to external documentation related to the project delivery

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCDOCUMENTREFERENCE**

**that MEET the following requirements**

- ...

## 02 Site

Basic site identification

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCSITE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MAY HAVE property **ChannelBottomElevation** of PSet **usBridge\_SiteCommon (IFCREAL)**
- MAY HAVE property **OverFeatureFunctClass** of PSet **usBridge\_SiteCommon (IFCLABEL)**
- MUST HAVE property **PrimaryRoadFunctClass** of PSet **usBridge\_SiteCommon (IFCLABEL)**
- MAY HAVE property **UnderFeatureFunctClass** of PSet **usBridge\_SiteCommon (IFCLABEL)**
- MAY HAVE property **OverFeatureLocalNameNumber** of PSet **usBridge\_SiteCommon (IFCLABEL)**
- MUST HAVE property **PrimaryRoadLocalNameNumber** of PSet **usBridge\_SiteCommon (IFCLABEL)**  
(Instructions: May also include mile marker)
- MAY HAVE property **UnderFeatureLocalNameNumber** of PSet **usBridge\_SiteCommon (IFCLABEL)**
- MAY HAVE property **OverFeatureRouteNameNumber** of PSet **usBridge\_SiteCommon (IFCLABEL)**
- MUST HAVE property **PrimaryRoadRouteNameNumber** of PSet **usBridge\_SiteCommon (IFCLABEL)**  
(Instructions: May also include mile marker)
- MAY HAVE property **UnderFeatureRouteNameNumber** of PSet **usBridge\_SiteCommon (IFCLABEL)**

### 02.01 Georeferencing

Information related to how the IFC model is related to a real world context, using the preferred Coordinate Referencing System (either Project or Geographic).

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCCOORDINATEREFERENCESYSTEM**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

#### 02.01.01 ProjectedCRS

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPROJECTEDCRS**

**that MEET the following requirements**

- MUST HAVE attribute **VerticalDatum**
- MUST HAVE attribute **MapProjection**
- MUST HAVE attribute **MapZone**
- MUST HAVE attribute **MapUnit**

## 02.01.02 GeographicCRS

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCGEOGRAPHICCRS**

**that MEET the following requirements**

- MUST HAVE attribute **PrimeMeridian**
- MUST HAVE attribute **AngleUnit**
- MUST HAVE attribute **HeightUnit**

## 02.01.03 Benchmark (Landmark)

A surveyed site benchmark (landmark) for the project. This is for georeferencing/geolocation, not alignment stationing purposes.

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCREFERENT.LANDMARK**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

## 03 Bridge

Basic bridge identification and information

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCBRIDGE** with predefined type **GIRDER (or: CULVERT)**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **StructureIndicator** of PSet **Pset\_BridgeCommon (IFCLABEL)** with value = **COMPOSITE (or: = HOMOGENEOUS)**
- MUST HAVE property **AverageDailyTraffic** of PSet **usBridge\_BridgeCommon (IFCINTEGER)**
- MUST HAVE property **AverageDailyTruckTraffic** of PSet **usBridge\_BridgeCommon (IFCINTEGER)**
- MUST HAVE property **DesignHourlyVolume** of PSet **usBridge\_BridgeCommon (IFCINTEGER)**
- MUST HAVE property **DesignSpeed** of PSet **usBridge\_BridgeCommon (IFCINTEGER)** (Instructions: MPH)
- MAY HAVE property **InterimVertClearance** of PSet **usBridge\_BridgeCommon (IFCLENGTHMEASURE)** (Instructions: Staged)
- MAY HAVE property **MinHorizClearance** of PSet **usBridge\_BridgeCommon (IFCLENGTHMEASURE)**
- MAY HAVE property **MinVertClearance** of PSet **usBridge\_BridgeCommon (IFCLENGTHMEASURE)**
- MUST HAVE property **NumberOfSpans** of PSet **usBridge\_BridgeCommon (IFCINTEGER)**
- MUST HAVE property **NumberOfSupports** of PSet **usBridge\_BridgeCommon (IFCINTEGER)**
- MAY HAVE property **AltNameExisting** of PSet **usBridge\_BridgeCommon (IFCINTEGER)**
- MAY HAVE property **AltNameNew** of PSet **usBridge\_BridgeCommon (IFCINTEGER)**

## 04 Superstructure

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGE**

**that MEET the following requirements**

- ...

### 04.01 Deck

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCBRIDGEPART** with predefined type **DECK (or: DECK\_SEGMENT)**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

#### 04.01.01 Deck Slab

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCSLAB.FLOOR**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **DECK (or: DECK\_SEGMENT)**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Depth** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **GrossArea** of PSet **Qto\_SlabBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_SlabBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)



## 04.01.02 Haunch

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCSLAB.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **DECK (or: DECK\_SEGMENT)**
- attribute **ObjectType = HAUNCH**

**that MEET the following requirements**

- MUST HAVE property **Depth** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **GrossArea** of PSet **Qto\_SlabBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_SlabBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

**Instructions**

optional

## 04.01.03 Deck Wearing Surface

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCSLAB.WEARING**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **DECK (or: DECK\_SEGMENT)**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Depth** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **GrossArea** of PSet **Qto\_SlabBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_SlabBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.01.04 Closure Pour

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCSLAB.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **DECK (or: DECK\_SEGMENT)**
- attribute **ObjectType = CLOSURE\_POUR**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Depth** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **GrossArea** of PSet **Qto\_SlabBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_SlabBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.01.05 Median

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCKERB.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **DECK (or: DECK\_SEGMENT)**
- attribute **ObjectType = MEDIAN**

**that MEET the following requirements**

- MUST HAVE property **Depth** of PSet **Qto\_KerbBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **Height** of PSet **Qto\_KerbBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_KerbBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Volume** of PSet **Qto\_KerbBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Volume>)
- MUST HAVE property **Width** of PSet **Qto\_KerbBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.01.06 Expansion Joint

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCDISCRETEACCESSORY.EXPANSION\_JOINT\_DEVICE**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **DECK (or: DECK\_SEGMENT)**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

## 04.01.07 Curb / Sidewalk

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCKERB.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **DECK (or: DECK\_SEGMENT)**
- attribute **ObjectType** with value = **CURB (or: SIDEWALK)**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Depth** of PSet **Qto\_KerbBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **Height** of PSet **Qto\_KerbBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_KerbBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Volume** of PSet **Qto\_KerbBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Volume>)
- MUST HAVE property **Width** of PSet **Qto\_KerbBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.02 Barrier (Parapet)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWALL.PARAPET**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossFootPrintArea** of PSet **Qto\_WallBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossFootPrintArea>)
- MUST HAVE property **Height** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_WallBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Width** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)
- MUST HAVE property **Length** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

### 04.02.01 Guardrail (on Barrier)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCRAILING.GUARDRAIL**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Length** of PSet **Qto\_RailingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 04.02.02 Handrail (on Barrier)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCRAILING.HANDRAIL**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Length** of PSet **Qto\_RailingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 04.02.03 Fence (on Barrier)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCRAILING.FENCE**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Length** of PSet **Qto\_RailingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 04.03 Guardrail

Bridge guardrail instead of parapet barrier

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCRAILING.GUARDRAIL**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Length** of PSet **Qto\_RailingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 04.04 Fence

Fence barrier instead of parapet barrier

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCRAILING.FENCE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Length** of PSet **Qto\_RailingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 04.05 Sound Barrier/Wall

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWALL.USERDEFINED**
- attribute **ObjectType = SOUND\_BARRIER**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossFootPrintArea** of PSet **Qto\_WallBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossFootPrintArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_WallBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Height** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.06 Median Barrier

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWALL.USERDEFINED**
- attribute **ObjectType = MEDIAN\_BARRIER**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossFootPrintArea** of PSet **Qto\_WallBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossFootPrintArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_WallBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Height** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.07 Median Guardrail

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCRAILING.GUARDRAIL**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Length** of PSet **Qto\_RailingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 04.08 Girders (Rolled Steel)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCELEMENTASSEMBLY.GIRDER**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

### 04.08.01 Girder Segment

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBEAM.GIRDER\_SEGMENT**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MUST HAVE property **CrossSectionArea** of PSet **Qto\_BeamBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/CrossSectionArea>)
- MUST HAVE property **Length** of PSet **Qto\_BeamBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

### 04.08.02 Cover Plate

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPLATE.COVER\_PLATE**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MUST HAVE property **GrossVolume** of PSet **Qto\_PlateBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **GrossArea** of PSet **Qto\_PlateBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

### 04.08.03 Splice

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPLATE.SPLICE\_PLATE**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MUST HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.08.04 Stiffener

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPLATE.STIFFENER\_PLATE**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MUST HAVE property **GrossArea** of PSet **Qto\_PlateBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_PlateBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.08.05 Shear Studs

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCMECHANICALFASTENER.STUDSHEARCONNECTOR**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MAY HAVE property **AppliedMethod** of PSet **usBridge\_ShearConnectorCommon (IFCLABEL)**
- MAY HAVE property **AttachmentMethod** of PSet **usBridge\_ShearConnectorCommon (IFCLABEL)**
- MAY HAVE property **HeadShape** of PSet **usBridge\_ShearConnectorCommon (IFCLABEL)**
- MAY HAVE property **PlaceOfAssembly** of PSet **usBridge\_ShearConnectorCommon (IFCLABEL)**
- MAY HAVE property **TestingMethod** of PSet **usBridge\_ShearConnectorCommon (IFCLABEL)**

## 04.09 Girders (Built-up Steel)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCELEMENTASSEMBLY.GIRDER**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

### 04.09.01 Flange Plates (Top/Bottom)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPLATE.FLANGE\_PLATE**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MUST HAVE property **GrossArea** of PSet **Qto\_PlateBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_PlateBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)



## 04.09.02 Web Plate

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPLATE.WEB\_PLATE**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MUST HAVE property **GrossArea** of PSet **Qto\_PlateBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_PlateBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.09.03 Cover Plate

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPLATE.COVER\_PLATE**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MUST HAVE property **GrossArea** of PSet **Qto\_PlateBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_PlateBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.09.04 Splice

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPLATE.SPLICE\_PLATE**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MUST HAVE property **GrossVolume** of PSet **Qto\_PlateBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **GrossArea** of PSet **Qto\_PlateBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)



## 04.09.05 Stiffener

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPLATE.STIFFENER\_PLATE**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MUST HAVE property **GrossArea** of PSet **Qto\_PlateBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_PlateBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 04.09.06 Shear Studs

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCMECHANICALFASTENER.STUDSHEARCONNECTOR**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MAY HAVE property **AppliedMethod** of PSet **usBridge\_ShearConnectorCommon (IFCLABEL)**
- MAY HAVE property **AttachmentMethod** of PSet **usBridge\_ShearConnectorCommon (IFCLABEL)**
- MAY HAVE property **HeadShape** of PSet **usBridge\_ShearConnectorCommon (IFCLABEL)**
- MAY HAVE property **PlaceOfAssembly** of PSet **usBridge\_ShearConnectorCommon (IFCLABEL)**
- MAY HAVE property **TestingMethod** of PSet **usBridge\_ShearConnectorCommon (IFCLABEL)**

## 04.10 Girders (Concrete)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBEAM.BEAM**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **CrossSectionArea** of PSet **Qto\_BeamBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/CrossSectionArea>)
- MUST HAVE property **Length** of PSet **Qto\_BeamBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_BeamBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)

## 04.10.01 Embedded Plate

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCDISCRETEACCESSORY.ANCHORPLATE**

**that MEET the following requirements**

- MAY HAVE property **GrossVolume** of PSet **Qto\_PlateBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MAY HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)
- MAY HAVE property **GrossArea** of PSet **Qto\_PlateBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)

## 04.11 Crossframes

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCELEMENTASSEMBLY.CROSS\_BRACING**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

### 04.11.1 Crossframe Members

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCMEMBER** with predefined type **CHORD (or: MEMBER; PLATE; STRUT; BRACE; COLLAR; STRINGER)**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.CROSS\_BRACING**

**that MEET the following requirements**

- MUST HAVE property **Length** of PSet **Qto\_MemberBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

### 04.11.2 Gusset Plates

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPLATE.GUSSET\_PLATE**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.CROSS\_BRACING**

**that MEET the following requirements**

- MUST HAVE property **GrossVolume** of PSet **Qto\_PlateBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)
- MUST HAVE property **GrossArea** of PSet **Qto\_PlateBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)

## 04.12 Diaphragms (Steel)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBEAM.DIAPHRAGM**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **CrossSectionArea** of PSet **Qto\_BeamBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/CrossSectionArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_BeamBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_BeamBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 04.13 Diaphragms (Concrete)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBEAM.DIAPHRAGM**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossVolume** of PSet **Qto\_BeamBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_BeamBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **CrossSectionArea** of PSet **Qto\_BeamBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/CrossSectionArea>)

## 04.14 Bases (Signage/Lighting)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCELEMENTASSEMBLY.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUPERSTRUCTURE**
- attribute **ObjectType** with value = **BASE\_SIGNAGE** (or: = **BASE\_LIGHTING**)

**that MEET the following requirements**

- ...

## 05 Substructure

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCBRIDGEPART.SUBSTRUCTURE**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGE**

**that MEET the following requirements**

- ...

### 05.01 Bearing

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBEARING** with predefined type **CYLINDRICAL (or: DISK; ELASTOMERIC; GUIDE; POT; ROCKER; ROLLER; SPHERICAL; USERDEFINED)**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **SUBSTRUCTURE (or: ABUTMENT; PIER)**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

### 05.02 Abutment

IFC versions: **IFC4X3\_ADD2**

**The model MUST contain entities that have**

- IFC class **IFCBRIDGEPART.ABUTMENT**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUBSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

#### 05.02.01 Pedestal

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCSLAB.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.ABUTMENT**
- attribute **ObjectType = PEDESTAL**

**that MEET the following requirements**

- MUST HAVE property **Depth** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_SlabBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)
- MUST HAVE property **GrossArea** of PSet **Qto\_SlabBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)

**Instructions**

Optional

## 05.02.02 Abutment Wall

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWALL.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.ABUTMENT**
- attribute **ObjectType = ABUTMENT\_WALL**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossFootPrintArea** of PSet **Qto\_WallBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossFootPrintArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_WallBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Height** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 05.02.03 Backwall

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWALL.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.ABUTMENT**
- attribute **ObjectType = BACKWALL**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossFootPrintArea** of PSet **Qto\_WallBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossFootPrintArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_WallBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Height** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 05.02.04 Stem Wall

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWALL.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.ABUTMENT**
- attribute **ObjectType = STEM\_WALL**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossFootPrintArea** of PSet **Qto\_WallBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossFootPrintArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_WallBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Height** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 05.02.05 Wingwall

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWALL.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.ABUTMENT**
- attribute **ObjectType = WINGWALL**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossFootPrintArea** of PSet **Qto\_WallBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossFootPrintArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_WallBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Height** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 05.03 Pier

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBRIDGEPART.PIER**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.SUBSTRUCTURE**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

### 05.03.01 Pedestal

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCSLAB.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.PIER**
- attribute **ObjectType = PEDESTAL**

**that MEET the following requirements**

- MUST HAVE property **Depth** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_SlabBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)
- MUST HAVE property **GrossArea** of PSet **Qto\_SlabBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)

**Instructions**

optional

### 05.03.02 Embedded Plate

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCDISCRETEACCESSORY.ANCHORPLATE**
- relationship **IFCRELAGGREGATES** with IFC class **IFCELEMENTASSEMBLY.GIRDER**

**that MEET the following requirements**

- MAY HAVE property **GrossArea** of PSet **Qto\_PlateBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)
- MAY HAVE property **GrossVolume** of PSet **Qto\_PlateBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MAY HAVE property **Width** of PSet **Qto\_PlateBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)



### 05.03.03 Pier Cap

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBEAM.PIERCAP**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.PIER**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossVolume** of PSet **Qto\_BeamBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_BeamBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

### 05.03.04 Pier Wall

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWALL.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.PIER**
- attribute **ObjectType = PIER\_WALL**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossFootPrintArea** of PSet **Qto\_WallBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossFootPrintArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_WallBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Height** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

### 05.03.05 Crash Wall

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWALL.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.PIER**
- attribute **ObjectType = CRASH\_WALL**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossFootPrintArea** of PSet **Qto\_WallBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossFootPrintArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_WallBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Height** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)



## 05.03.06 Pier Column/Bent

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCCOLUMN.PIERSTEM**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.PIER**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossVolume** of PSet **Qto\_ColumnBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_ColumnBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 05.04 Foundation

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBRIDGEPART.FOUNDATION**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **ABUTMENT (or: PIER)**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

### 05.04.01 Footing / Pile Cap

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCFOOTING** with predefined type **STRIP\_FOOTING (or: PILE\_CAP; PAD\_FOOTING)**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.FOUNDATION**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossVolume** of PSet **Qto\_FootingBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Height** of PSet **Qto\_FootingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_FootingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_FootingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPILE** with predefined type **BORED (or: DRIVEN)**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.FOUNDATION**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **CrossSectionArea** of PSet **Qto\_PileBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/CrossSectionArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_PileBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_PileBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 06 Structures

Includes Approaches, Slope Protection, and Retaining Structures. These may be part of the bridge OR adjacent and part of the site

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBRIDGEPART** with predefined type **SURFACESTRUCTURE (or: USERDEFINED)**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGE (or: IFCSITE)**
- attribute **ObjectType** with value = **APPROACH\_STRUCTURE (or: = RETAINING\_STRUCTURE)**

**that MEET the following requirements**

- ...

### 06.01 Approach Structure

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBRIDGEPART.USERDEFINED**
- attribute **ObjectType = APPROACH\_STRUCTURE**

**that MEET the following requirements**

- ...

#### 06.01.01 Approach Slab

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCSLAB** with predefined type **APPROACH\_SLAB (or: APPROACH\_STRUCTURE)**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART.USERDEFINED**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Depth** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_SlabBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 06.01.02 Sleeper Headwall

"Sleeper" Slab or Footing

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCSLAB.USERDEFINED**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **USERDEFINED (or: APPROACH\_STRUCTURE)**
- attribute **ObjectType = HEADWALL**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Depth** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_SlabBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 06.01.03 Sleeper Slab

"Sleeper" Slab or Footing

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCFOOTING** with predefined type **PAD\_FOOTING (or: STRIP\_FOOTING; PILE\_CAP)**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **USERDEFINED (or: APPROACH\_STRUCTURE)**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **Height** of PSet **Qto\_FootingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_FootingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_FootingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_FootingBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)

## 06.01.04 Pile

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPILE** with predefined type **BORED (or: DRIVEN)**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **USERDEFINED (or: APPROACH\_STRUCTURE)**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **CrossSectionArea** of PSet **Qto\_PileBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/CrossSectionArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_PileBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_PileBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 06.02 Slope Protection

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBRIDGEPART.USERDEFINED**
- attribute **ObjectType = SLOPE\_PROTECTION**

**that MEET the following requirements**

- ...

### 06.02.01 Slope Protection Slab

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCSLAB.PAVING**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **USERDEFINED (or: SLOPE\_PROTECTION)**

**that MEET the following requirements**

- MUST HAVE property **Depth** of PSet **Qto\_SlabBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Depth>)
- MUST HAVE property **GrossArea** of PSet **Qto\_SlabBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossArea>)

## 06.03 Retaining Structure

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBRIDGEPART.USERDEFINED**
- attribute **ObjectType = RETAINING\_STRUCTURE**

**that MEET the following requirements**

- ...

## 06.03.01 Retaining Wall

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWALL.RETAININGWALL**
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **USERDEFINED (or: RETAINING\_STRUCTURE)**

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossFootPrintArea** of PSet **Qto\_WallBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossFootPrintArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_WallBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Width** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)
- MUST HAVE property **Height** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_WallBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 06.03.02 Footing / Pile Cap

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCFOOTING** with predefined type **STRIP\_FOOTING** (or: **PILE\_CAP**; **PAD\_FOOTING**)
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **USERDEFINED** (or: **RETAINING\_STRUCTURE**)

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **GrossVolume** of PSet **Qto\_FootingBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Height** of PSet **Qto\_FootingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_FootingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_FootingBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)

## 06.03.03 Pile

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPILE** with predefined type **BORED** (or: **DRIVEN**)
- relationship **IFCRELCONTAINEDINSPATIALSTRUCTURE** with IFC class **IFCBRIDGEPART** with predefined type **USERDEFINED** (or: **RETAINING\_STRUCTURE**)

**that MEET the following requirements**

- MUST HAVE attribute **Name**
- MUST HAVE property **CrossSectionArea** of PSet **Qto\_PileBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/CrossSectionArea>)
- MUST HAVE property **GrossVolume** of PSet **Qto\_PileBaseQuantities (IFCVOLUMEMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossVolume>)
- MUST HAVE property **Length** of PSet **Qto\_PileBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)

## 07 Detailed Elements

Includes Reinforcing, Electrical Conduit, and Drainage Plumbing

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCREINFORCINGBAR** (or: **IFCTENDON**; **IFCTENDONANCHOR**; **IFCTENDONCONDUIT**; **IFCCABLECARRIERSEGMENT**; **IFCCABLECARRIERFITTING**; **IFCJUNCTIONBOX**; **IFCWASTETERMINAL**; **IFCPIPESEGMENT**; **IFCPIPEFITTING**)

**that MEET the following requirements**

- ...

### 07.01 Reinforcing

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCBUILTSYSTEM.REINFORCING**

**that MEET the following requirements**

- ...

#### 07.01.01 Reinforcing Bars

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCREINFORCINGBAR**

**that MEET the following requirements**

- ...

#### 07.01.02 Prestressing Tendons

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCTENDON**

**that MEET the following requirements**

- ...

#### 07.01.03 Prestressing Tendon Duct

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCTENDONCONDUIT**

**that MEET the following requirements**

- ...



## 07.01.04 Prestressing Anchor

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCTENDONANCHOR**

**that MEET the following requirements**

- ...

## 07.02 Mechanical Fasteners

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCMECHANICALFASTENER**

**that MEET the following requirements**

- ...

### 07.02.01 Anchor Bolt

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCMECHANICALFASTENER.ANCHORBOLT**

**that MEET the following requirements**

- MUST HAVE property **AnchorBoltDiameter** of PSet **Pset\_MechanicalFastenerAnchorBolt (IFCPOSITIVELENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/AnchorBoltDiameter>)
- MUST HAVE property **AnchorBoltLength** of PSet **Pset\_MechanicalFastenerAnchorBolt (IFCPOSITIVELENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/AnchorBoltLength>)
- MUST HAVE property **AnchorBoltProtrusionLength** of PSet **Pset\_MechanicalFastenerAnchorBolt (IFCPOSITIVELENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/AnchorBoltProtrusionLength>)
- MUST HAVE property **AnchorBoltThreadLength** of PSet **Pset\_MechanicalFastenerAnchorBolt (IFCPOSITIVELENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/AnchorBoltThreadLength>)

## 07.02.02 Bolt

Includes washers and nuts

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCMECHANICALFASTENER.BOLT**

**that MEET the following requirements**

- MUST HAVE property **ThreadDiameter** of PSet **Pset\_MechanicalFastenerBolt (IFCPOSITIVELENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/ThreadDiameter>)
- MUST HAVE property **ThreadLength** of PSet **Pset\_MechanicalFastenerBolt (IFCPOSITIVELENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/ThreadLength>)
- MUST HAVE property **NutShape** of PSet **Pset\_MechanicalFastenerBolt (IFCLABEL)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/NutShape>)
- MUST HAVE property **NutsCount** of PSet **Pset\_MechanicalFastenerBolt (IFCCOUNTMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/NutsCount>)
- MUST HAVE property **WasherShape** of PSet **Pset\_MechanicalFastenerBolt (IFCLABEL)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/WasherShape>)
- MUST HAVE property **WashersCount** of PSet **Pset\_MechanicalFastenerBolt (IFCCOUNTMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/WashersCount>)
- MUST HAVE property **HeadShape** of PSet **Pset\_MechanicalFastenerBolt (IFCLABEL)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/HeadShape>)
- MUST HAVE property **KeyShape** of PSet **Pset\_MechanicalFastenerBolt (IFCLABEL)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/KeyShape>)

## 07.02.03 Dowel

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCMECHANICALFASTENER.DOWEL**

**that MEET the following requirements**

- ...

## 07.02.04 Rivet

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCMECHANICALFASTENER.RIVET**

**that MEET the following requirements**

- ...

## 07.02.05 Screw

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCMECHANICALFASTENER.SCREW**

**that MEET the following requirements**

- ...

## 07.02.06 Shear Connector

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCMECHANICALFASTENER.SHEARCONNECTOR**

**that MEET the following requirements**

- ...

## 07.03 Drainage System

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCDISTRIBUTIONSYSTEM.DRAINAGE**

**that MEET the following requirements**

- ...

### 07.03.01 Drain

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCWASTETERMINAL.GULLYSUMP**

**that MEET the following requirements**

- MUST HAVE attribute **Name**

### 07.03.02 Drain Pipes

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPIPESEGMENT.RIGIDSEGMENT**

**that MEET the following requirements**

- MUST HAVE property **Length** of PSet **Qto\_PipeSegmentBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **GrossCrossSectionArea** of PSet **Qto\_PipeSegmentBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/GrossCrossSectionArea>)

### 07.03.03 Drain Fittings

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPIPEFITTING** with predefined type **BEND (or: CONNECTOR; JUNCTION; TRANSITION)**

**that MEET the following requirements**

- ...

### 07.03.04 Drain Outlet

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCPIPEFITTING.EXIT**

**that MEET the following requirements**

- ...

## 07.04 Electrical

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCDISTRIBUTIONSYSTEM.ELECTRICAL**

**that MEET the following requirements**

- ...

### 07.04.01 Conduits

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCCABLECARRIERSEGMENT.CONDUITSEGMENT**

**that MEET the following requirements**

- MUST HAVE property **Length** of PSet **Qto\_CableCarrierSegmentBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **CrossSectionArea** of PSet **Qto\_CableCarrierSegmentBaseQuantities (IFCAREAMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/CrossSectionArea>)

### 07.04.02 Conduit Fittings

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCCABLECARRIERFITTING** with predefined type **BEND (or: CONNECTOR; CROSS; JUNCTION; REDUCER; TEE; TRANSITION; USERDEFINED)**

**that MEET the following requirements**

- ...

### 07.04.03 Junction Box

IFC versions: **IFC4X3\_ADD2**

**The model MAY contain entities that have**

- IFC class **IFCJUNCTIONBOX.POWER**

**that MEET the following requirements**

- MUST HAVE property **Height** of PSet **Qto\_JunctionBoxBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Height>)
- MUST HAVE property **Length** of PSet **Qto\_JunctionBoxBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Length>)
- MUST HAVE property **Width** of PSet **Qto\_JunctionBoxBaseQuantities (IFCLENGTHMEASURE)** (URI: <https://identifier.buildingsmart.org/uri/buildingsmart/ifc/4.3/prop/Width>)