The ISO 19650 series and BIM projects

@theNBS

#DiscoverNBS

NBS

Welcome

Dr Stephen Hamil
Innovation Director, NBS

CONSTRUCTING EXCELLENCE

ISO 19650 – A global opportunity

Paul Shillcock
Principal Advisor, Operam

NBS

Uniclass

Dr Stephen Hamil
Innovation Director, NBS

CONSTRUCTING EXCELLENCE

Dr Stephen Hamil

Innovation Director, NBS

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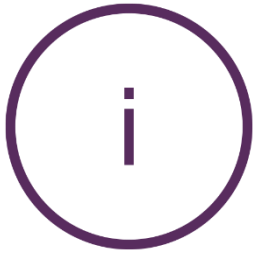


1. Uniclass intro

2. Use in industry

3. Uniclass and NBS

1. Uniclass intro

Classification - Uniclass

13,400 classifications across 11 tables for all sectors

(Larger scale items – arranged broadly by industry sector and function)

10 Preparation and repair	20 Administrative, commercial and protective services	25 Cultural, educational, scientific and information	30 Industrial	32 Water and land management	35 Medical, health, welfare and sanitary	40 Recreational	42 Sport and activity	45 Residential
50 Waste disposal	55 Piped supply	60 Heating, cooling and refrigeration	65 Ventilation and air conditioning	70 Electrical power generation and distribution	75 Communications, security, safety and protection	80 Transport	85 Operation and maintenance	90 Circulation and storage

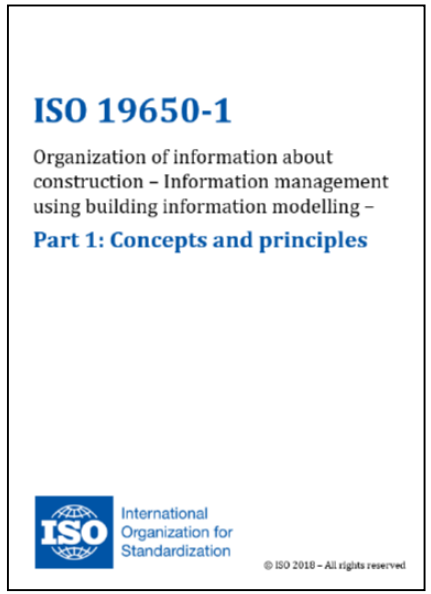
Classification - Uniclass

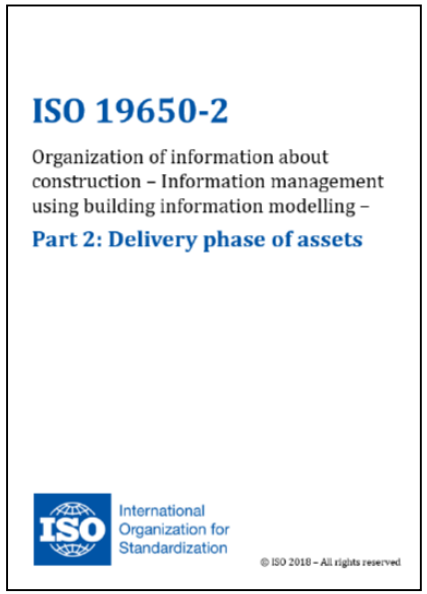
Elements, functions and systems

(Smaller scale items – arranged broadly by fabric and function)

15 Preparatory	20 Structural	25 Wall and barrier	30 Roof, floor and paving	32 Damp-proofing, waterproofing and plaster finishing	35 Stair and ramp	37 Tunnel, shaft, vessel and tower	40 Signage, fittings, furnishings and equipment	45 Flora and fauna
50 Waste disposal	55 Piped supply	60 Heating, cooling and refrigeration	65 Ventilation and air conditioning	70 Electrical power and lighting	75 Communications, security, safety and protection	80 Transport	85 Process engineering	90 Soft facility management

ISO 19650 series of international standards





5.1.7 Establish the project's common data environment

The appointing party shall establish (implement, configure and support) the project's common data environment (CDE) to serve the overall requirements of the project and to support the collaborative production of information (5.6).

The project's common data environment shall enable:

a) each information container to have a unique ID, based upon an agreed and documented convention comprised of fields separated by a delimiter;

b) each field to be assigned a value from an agreed and documented codification standard;

c) each information container to have the following attributes assigned:

— status (suitability)

— revision

— classification (in accordance with the framework defined in ISO 12006-2)

NA.4.4 Classification

Classification of information within information containers should be in accordance with Uniclass 2015 (the UK implementation of ISO 12006-2).

VIEW AND DOWNLOAD THE CLASSIFICATION TABLES

Search Uniclass2015: air

Filter by: Complexes

- All tables
- Complexes
- Entities
- Activities
- Spaces/locations
- Elements
- Systems
- Products
- CAD

Results 1 to 8 of 8

Code	Title
Co_20_60_02	Air force complexes
Co_25_50_58	Open air museums
Co_25_50_59	Open air sculpture parks
Co_35_10_02	Air ambulance complexes
Co_40_05_30	Fairground complexes
Co_65	Ventilation and air conditioning complexes
Co_80_05_02	Airports and airfields
Co_80_20_13	Chairlift way complexes

Results 1 to 8 of 8

DOWNLOAD THE TABLES:

- Co Complexes
- En Entities
- Ac Activities
- SL Spaces/ locations

Stephen

Classification - Technical S

https://toolkit.thenbs.com/articles/classification#classificationtables

VIEW AND DOWNLOAD THE CLASSIFICATION TABLES

Search Uniclass2015: air

Filter by: Spaces/locations

- All tables
- Complexes
- Entities
- Activities
- Spaces/locations
- Elements
- Systems
- Products
- CAD

Results 1 to 10 of 22

Code	Title
SL_20_45_29	Fuel filling station air and water points
SL_20_50_36	Hair and beauty salons
SL_30_60_13	Clothes drying and airing rooms
SL_40_05_42	Indoor fairground spaces
SL_40_05_60	Outdoor fairground spaces
SL_40_05_88	Temporary outdoor fairgrounds
SL_80_05_04	Aircraft fuelling spaces
SL_80_05_05	Aircraft manoeuvring bu
SL_80_05_06	Aircraft standing areas
SL_80_05_07	Aircraft storage spaces

Results 1 to 10 of 22

DOWNLOAD THE TABLES:

- Co Complexes
- En Entities

VIEW AND DOWNLOAD THE CLASSIFICATION TABLES

Search Uniclass2015: bar

Filter by: Elements

- All tables
- Complexes
- Entities
- Activities
- Spaces/locations
- Elements
- Systems
- Products
- CAD

Results 1 to 2 of 2

Code	Title
Ee_25	Wall and barrier elements
Ee_25_55	Barriers

Results 1 to 2 of 2

DOWNLOAD THE TABLES:

- Co Complexes
- En Entities
- Ac Activities
- SL Spaces/ locations
- Ee Elements
- Ss Systems
- Pr Products
- Zz CAD

VIEW AND DOWNLOAD THE CLASSIFICATION TABLES

Search Uniclass2015: blast

Filter by: Systems

- All tables
- Complexes
- Entities
- Activities
- Spaces/locations
- Elements
- Systems
- Products
- CAD

Results 1 to 2 of 2

Code	Title
Ss_25_16_08	Blast barrier systems
Ss_25_16_08_44	Jet blast deflection systems

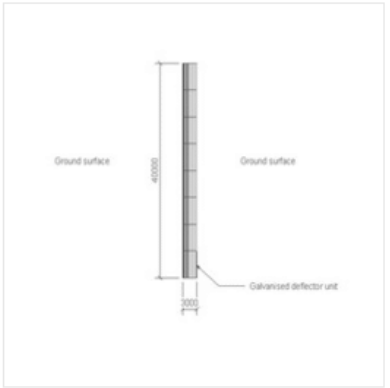
Results 1 to 2 of 2

Prev

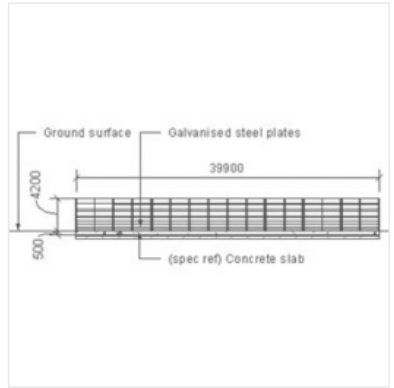
DOWNLOAD THE TABLES:

- Co Complexes
- En Entities
- Ac Activities
- SL Spaces/ locations
- Ee Elements
- Ss Systems
- Pr Products
- Zz CAD

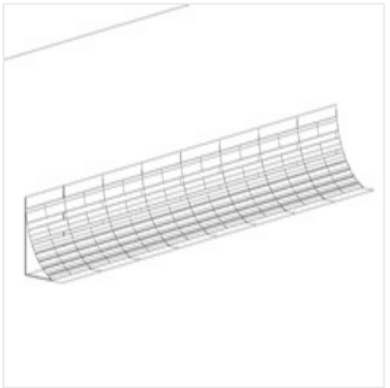
Plan



Elevation



Model



2D Section

Stephen

Classification - Technical S

https://toolkit.thenbs.com/articles/classification#classificationtables

VIEW AND DOWNLOAD THE CLASSIFICATION TABLES

Search Uniclass2015: blast

Filter by: Products

- All tables
- Complexes
- Entities
- Activities
- Spaces/locations
- Elements
- Systems
- Products
- CAD

Results 1 to 6 of 6

Code	Title
Pr_20_31_35_33	Granulated blast furnace slag
Pr_20_31_35_34	Ground granulated blast furnace slag
Pr_20_31_35_60	Partially ground granulated blast furnace slag
Pr_25_71_57_44	Jet blast deflectors
Pr_40_70_31_06	Blast chiller cabinets
Pr_40_70_31_08	Blast freezer cabinets

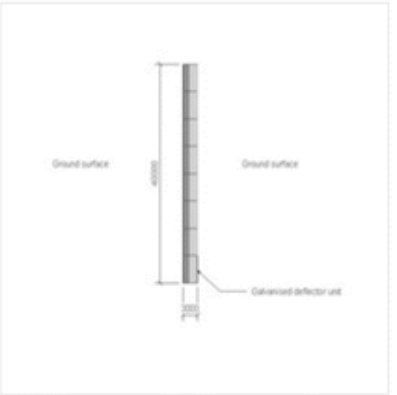
Results 1 to 6 of 6

Prev

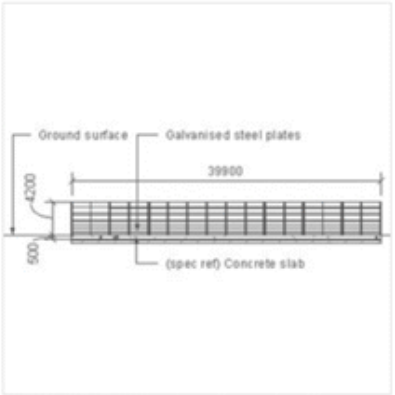
DOWNLOAD THE TABLES:

- Co Complexes
- En Entities
- Ac Activities
- SL Spaces/ locations
- Ee Elements
- Ss Systems

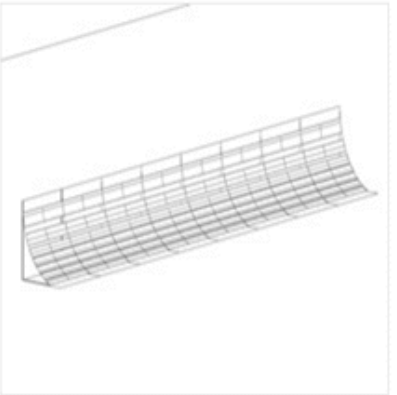
Plan



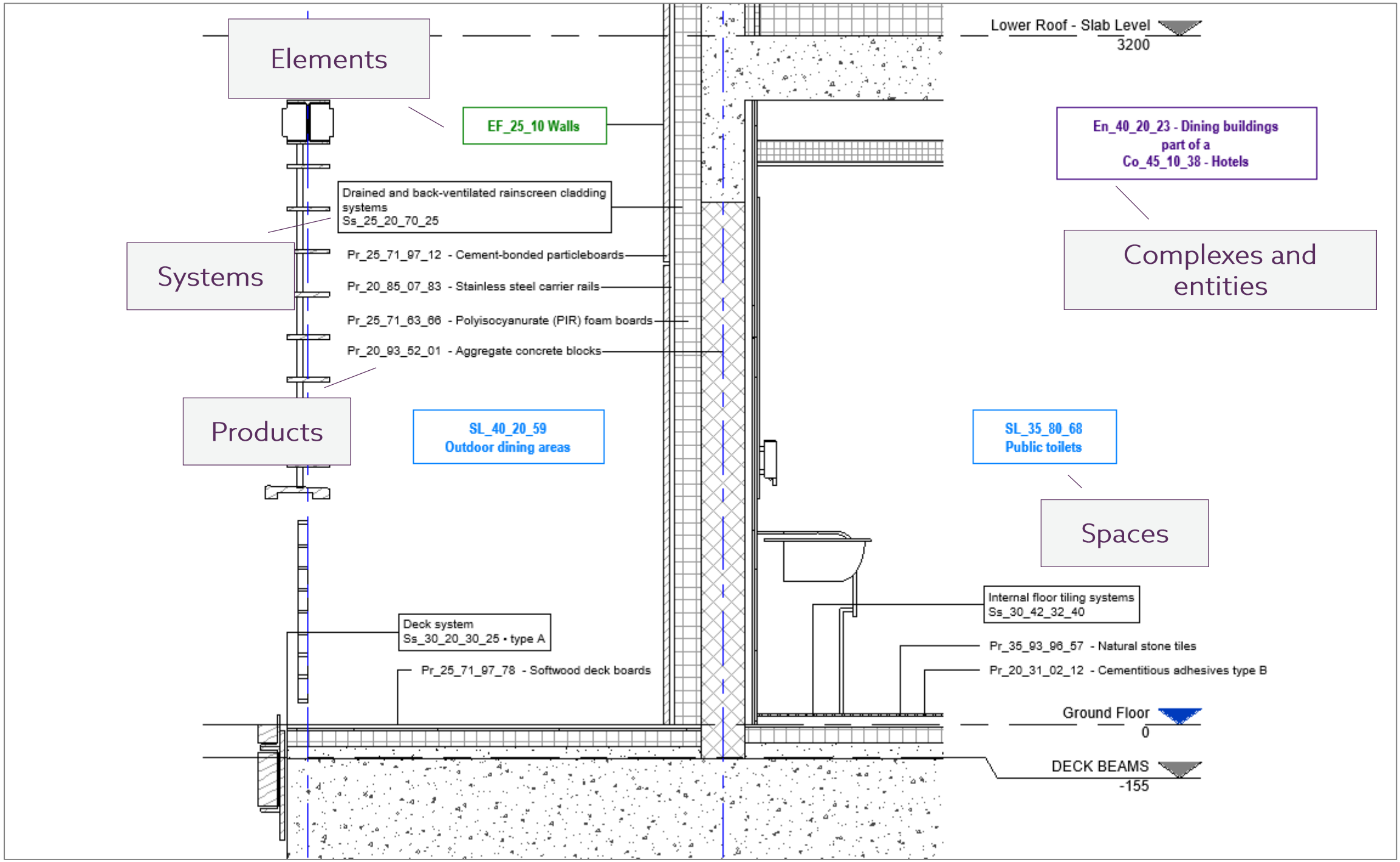
Elevation



Model



2D Section


Elements
EF_25_10 Walls
Systems
Drained and back-ventilated rainscreen cladding systems
Ss_25_20_70_25
Products
Pr_25_71_97_12 - Cement-bonded particleboards
Pr_20_85_07_83 - Stainless steel carrier rails
Pr_25_71_63_66 - Polyisocyanurate (PIR) foam boards
Pr_20_93_52_01 - Aggregate concrete blocks
Lower Roof - Slab Level
3200
En_40_20_23 - Dining buildings
part of a
Co_45_10_38 - Hotels
Complexes and entities
SL_40_20_59
Outdoor dining areas
SL_35_80_68
Public toilets
Spaces
Internal floor tiling systems
Ss_30_42_32_40
Pr_35_93_96_57 - Natural stone tiles
Pr_20_31_02_12 - Cementitious adhesives type B
Deck system
Ss_30_20_30_25 • type A
Pr_25_71_97_78 - Softwood deck boards
Ground Floor
0
DECK BEAMS
-155

2. Use in industry

UK Government publications - Buildings

Uniclass classification - at Component level

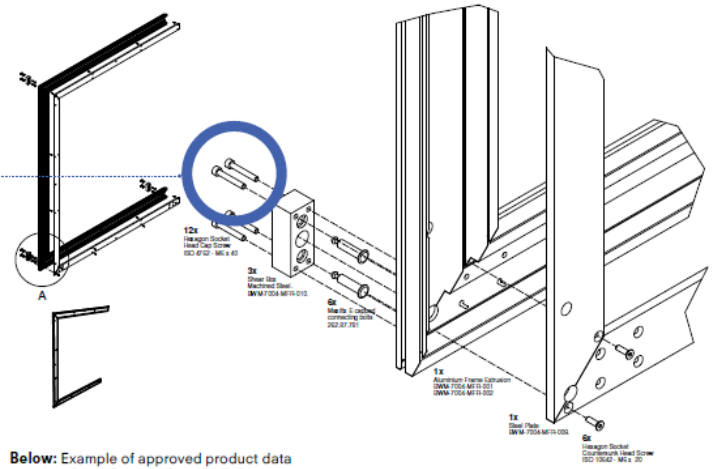
Pr -	Products
Pr_20	Structure and general products
Pr_20_29	Fastener products
Pr_20_29_76	Screws
Pr_20_29_76_81	Socket screws

At this level the components can be linked to individual manufacturers data. This is described in more detail in 'Product Data Definition - A technical specification for defining and sharing structured digital construction product information' (S. Thompson, April 2016).

LEXiCON, hosted by the Construction Products Association (CPA), will implement the methodology set out in the Product Data Definition document and facilitate the capture of the following information relating to products:

- Essential Requirements for the Harmonised European Standards (hENs);
- Requirements from other Standard (e.g relevant ISO, EN or BS standards other than those captured above);
- Industry recognised documents;
- Mandated requirements for a specific sector or application e.g. NRM for Chartered Surveyors;
- Non-mandated but recognised within a specific sector e.g. CIBSE Guide M;
- Industry agreed and recognised e.g. identified by a professional institute, trade association or cross-industry group;
- User-defined additional terms proposed for approval and wider adoption.

Healthcare example showing individual components making up the wall panel.



Below: Example of approved product data template from 'Product Data Definition' http://bim-level2.org/globalassets/pdfs/product-data-definition_v2.pdf

UK Government publications - Infrastructure

2017

Uniclass classif

Ac -	Activities
Ac_80	Transport
Ac_80_10	Loading a activities
Ac_80_10_60	Passenger
Ac_80_10_61	Passenger
Ac_80_10_62	Passenger
Ac_80_10_63	Passenger
Ac_80_10_64	Passenger
Ac_80_10_86	Ticketing
Ac_80_50	Railway ac
Ac_80_50_71	Rail signal
Ac_80_50_73	Railway tra
Ac_80_50_75	Railway tra
Ac_80_50_90	Train stopp
Ac_80_60	Rail storag activities
Ac_80_60_11	Carriage c
Ac_80_60_26	Engine fue
Ac_80_60_27	Engine ins
Ac_80_60_28	Engine ser
Ac_80_60_29	Engine wa
Ac_80_60_70	Rail repair
Ac_90	Circulatio
Ac_90_10	Circulatio
Ac_90_10_16	Covered v
Ac_90_10_24	Dropping-
Ac_90_10_27	Entering a
Ac_90_10_49	Lift stoppi
Ac_90_10_50	Lift travelli
Ac_90_10_96	Wheelchai
Ac_90_20	Common
Ac_90_20_13	Changing
Ac_90_20_69	Queuing
Ac_90_20_96	Waiting

Uniclass clas

EF -	Elem
EF_20	Struc
EF_20_10	Frame
EF_25	Wall a
EF_25_10	Walls
EF_70	Electr functi
EF_70_30	Electr transr
EF_70_80	Lighti
EF_75	Comr and p
EF_75_10	Comr
EF_75_30	Signa
EF_75_40	Secu
EF_75_50	Safet

Ss -	Syste
Ss_25	Wall a
Ss_25_10	Frame
Ss_25_10_32	Frame
Ss_25_10_32_45	Light
Ss_25_12	Panel
Ss_25_12_15	Conc
Ss_25_20_33	Glass (GRC
Ss_25_20_33_35	GRC
Ss_25_25	Wall l
Ss_25_25_05	Acou

Pr - Prod

Uniclass classifi

Ss -	Systems
Ss_25	Wall and b
Ss_25_10	Framed wa
Ss_25_10_32	Framed wa
Ss_25_10_32_45	Light steel
Ss_25_12	Panel wall
Ss_25_12_15	Concrete p
Ss_25_20_33	Glass fibre (GRC) clad
Ss_25_20_33_35	GRC cladd
Ss_25_25	Wall lining
Ss_25_25_05	Acoustic p
Ss_40_10	Signage sy
Ss_40_85_70	Rail FF&E s
Ss_40_85_70_60	Passenger systems
Ss_70	Electrical s
Ss_70_30	Electricity transmissio
Ss_70_30_45	Low-voltag
Ss_70_30_45_45	Low-voltag
Ss_70_30_80	Small powe
Ss_70_30_80_35	Hard-wired systems
Ss_70_30_80_45	Low-voltag with prefab
Ss_70_80	Lighting sy
Ss_70_80_33	General sp
Ss_70_80_33_33	General lig prefabricat

Uniclass classification - at Component level

Pr -	Products
Pr_20	Structure and general products
Pr_20_29	Fastener products
Pr_20_29_60	Packings, washers and spacers
Pr_20_29_60_96	Washers

At this level the components can be linked to individual manufacturers data. This is described in more detail in 'Product Data Definition - A technical specification for defining and sharing structured digital construction product information' (S. Thompson, April 2016).

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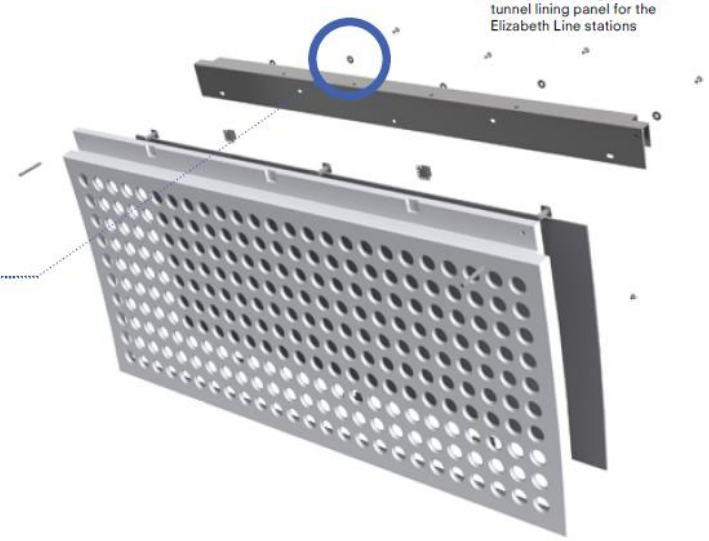


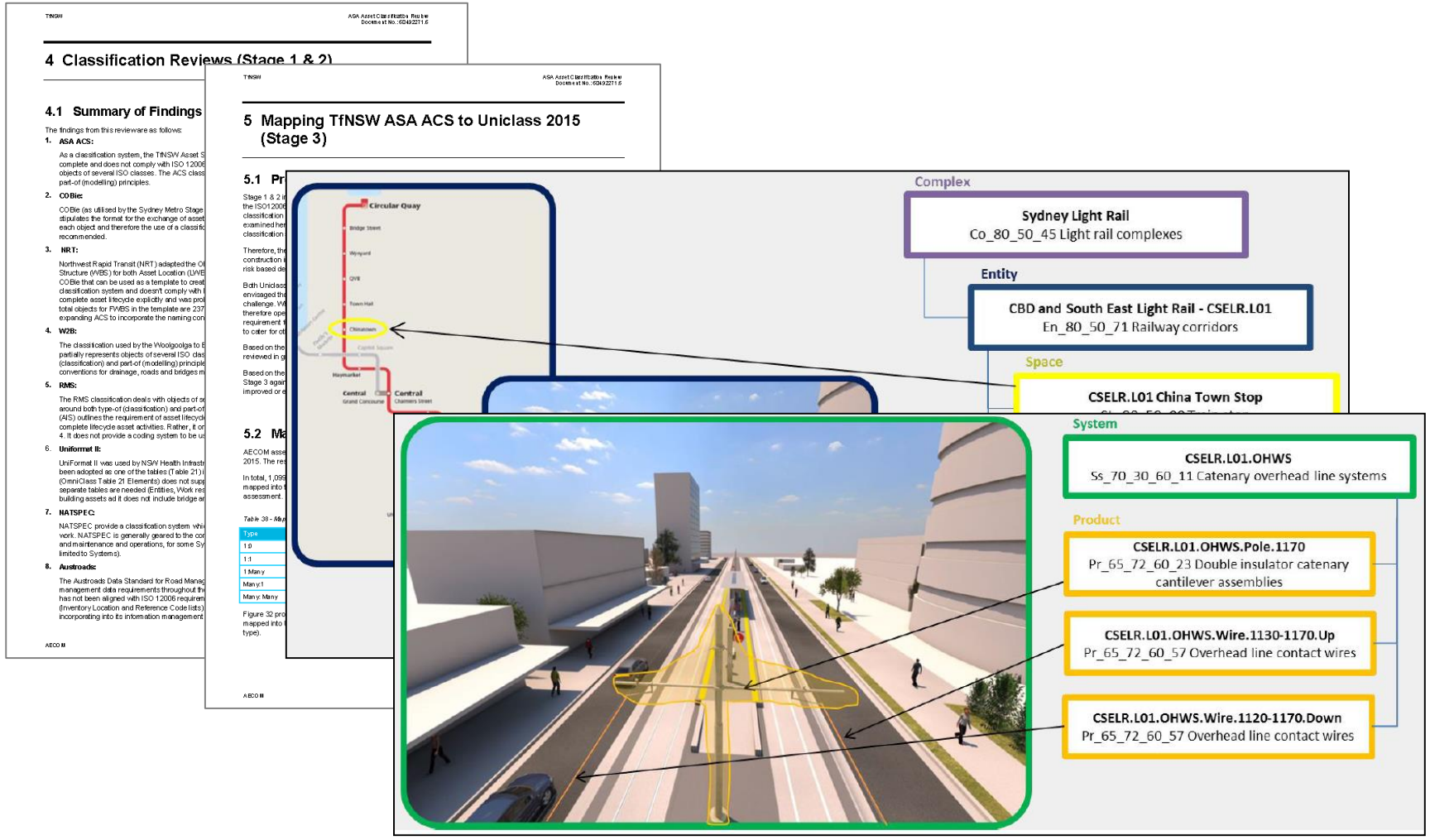
Example showing acoustic tunnel lining panel for the Elizabeth Line stations

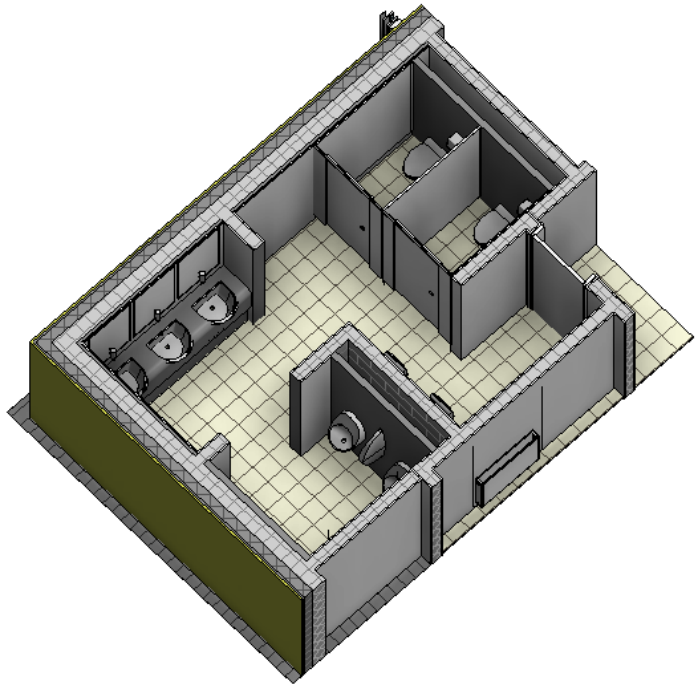
Below: Example of approved product data template from 'Product Data Definition' http://bim-level2.org/globalassets/pdfs/product-data-definition_v2.pdf

54

55

Australia – Transport for New South Wales



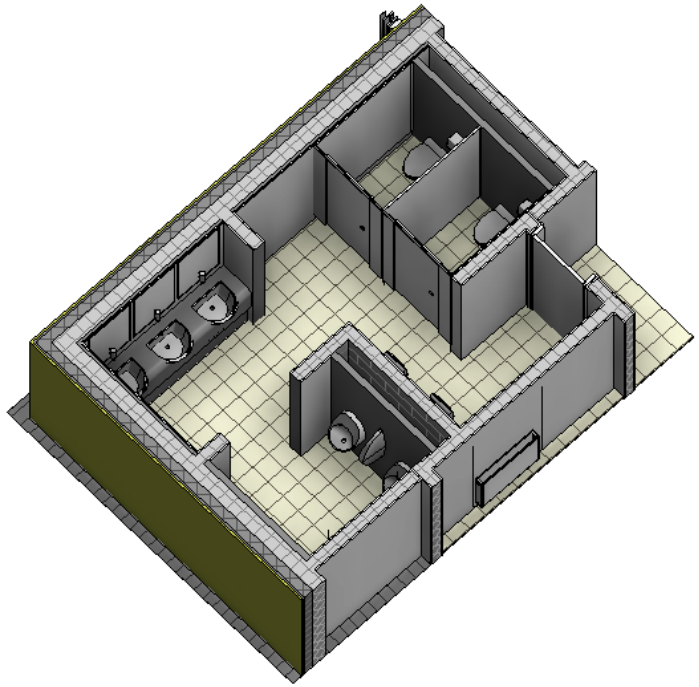


SL_35_80_68 - Public toilets

SL_35_80_68 - Public restrooms

SL_35_80_68 - Baños publicos

SL_35_80_68 - 公衆トイレ



SL_35_80_68 - Public toilets

SL_35_80_68 - Public restrooms

SL_35_80_68 - Baños publicos

SL_35_80_68 - 公衆トイレ

Mappings

UNIT/ MODULAR SUSPENDED CEILING SYSTEMS

A unit (modular) suspended ceili

Uniclass2015 - Ss_30_25_22_90 U

		Refer
NBS	NBS Code	20-10
RICS	NRM1	3.3.3 I Rules 3.3.2 I Rules

POINT SMOKE DETECTORS

Point smoke detectors are described by characteristics such as detector type.
An example use may be within a fire detection and alarm system.

Uniclass2015 - Pr_75_75_30_65 Point smoke detectors

		Reference
NBS	NBS Code	90-75-30/350 Point smoke detectors
IFC2x3	IFC2x3	IFCSENSORTYPE.SMOKESENSOR
SFG20	SFG20	50-10 Smoke Detectors

3. Uniclass and NBS

NBS

BIM Object Standard

Version 2.0 January 2018

NBS BIM Object Standard v2.0

The standard is intended for construction professionals, manufacturers and other BIM content developers to assist in the creation of BIM objects that operate in a Common Data Environment (CDE).

Introduction
Standardizing BIM Objects
Scope and Purpose
Section 1: General Requirements
Section 2: Information Requirements
Section 3: Geometry Requirements
Section 4: Functional Requirements
Section 5: Metadata Requirements

Section 2

Information requirements

Section 2: Information requirements

This section defines the requirements for the information contained within a BIM object. The scope of this section includes general requirements such as property sets, properties and values, as well as COBie and IFC properties.

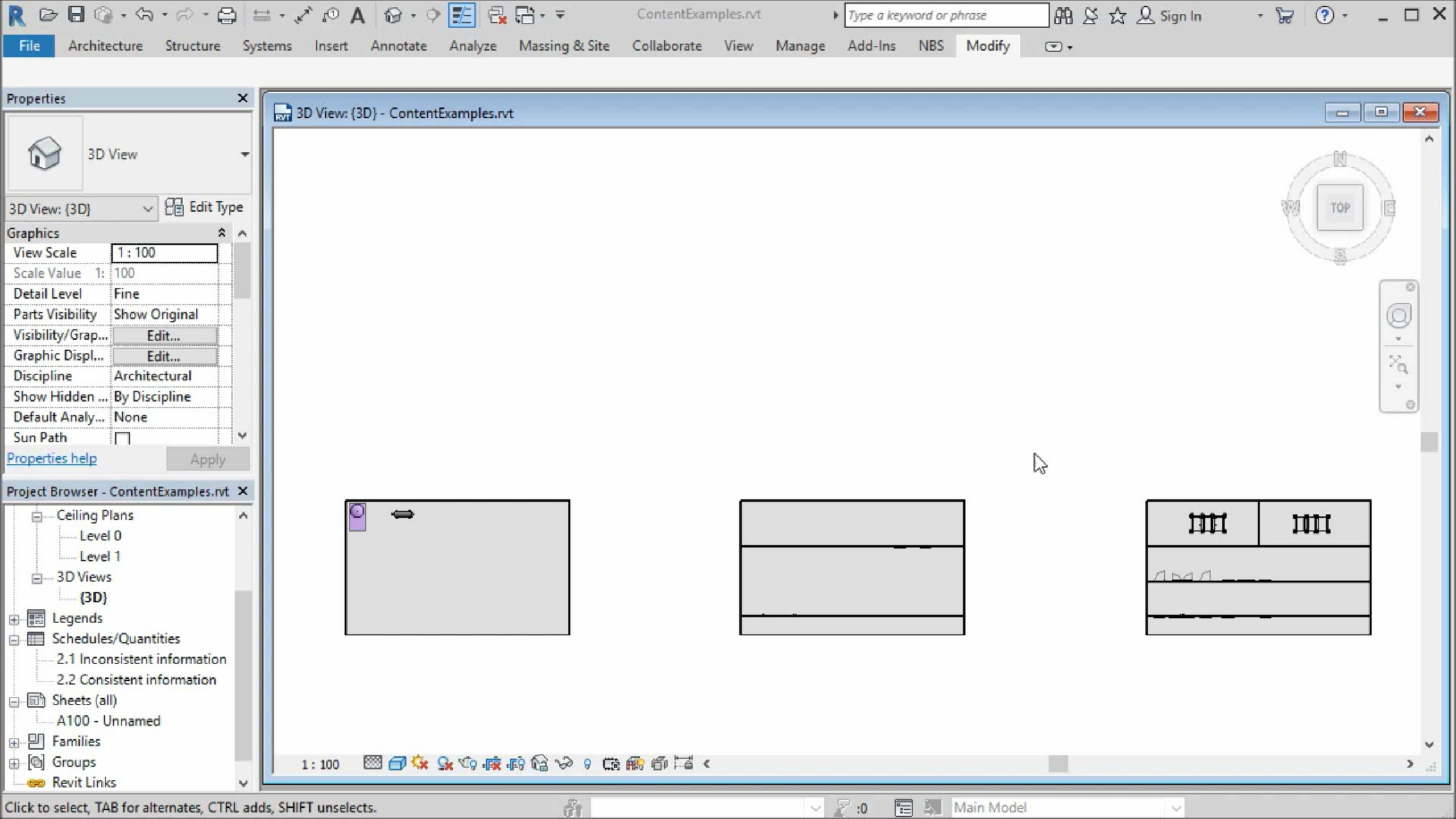
2.1 General

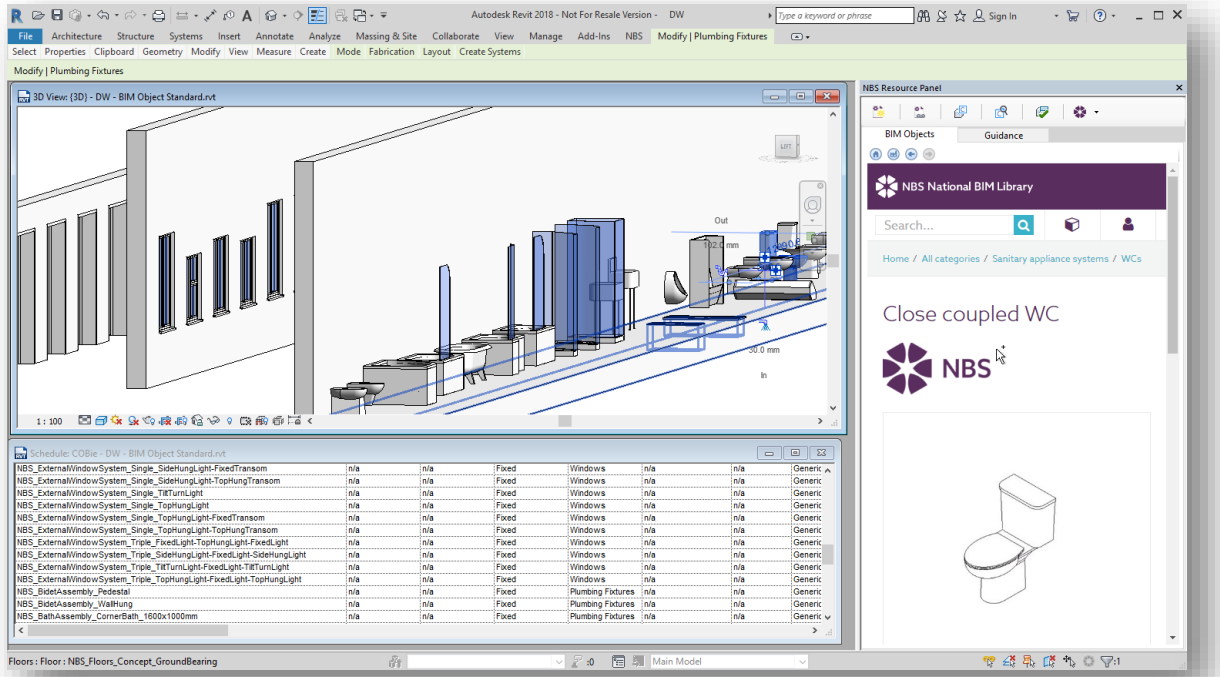
- 2.1 General
- 2.2 Values
- 2.3 Property groups and usage
- 2.4 Property naming
- 2.5 IFC
- 2.6 Facility management properties
- 2.7 BOS_General
- 2.8 BOS_Certification
- 2.9 BOS_Enviromental
- 2.10 Supplementary properties

2.1.3 The BIM object shall have completedvalueswhere known, and shall not include unset or undefined values. Where the information is unknown, not applicable or not available, a default value 'n/a' shall be used. If the data type restricts the use of an alphanumeric value, the appropriate value to that property shall be used, e.g. '0' for numeric fields and '1900-12-31T23:59:59' for date fields.

2.1.4 The BIM object shall use units of measurements that are appropriate to its type, intended use and specific domain. The BIM object:

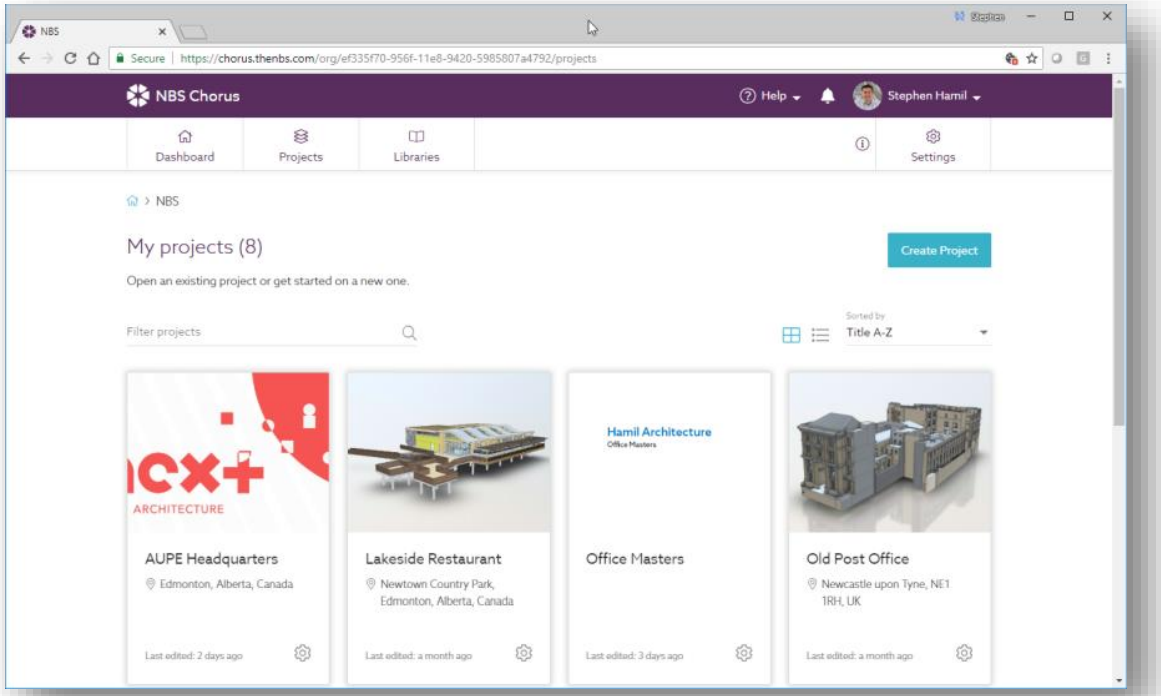
a) Shall use the Système international d'unités (SI) protocols for dimensions and units generally.
b) Should use base unit symbols to BS ISO 80000-1.


ContentExamples.rvt
Type a keyword or phrase
Sign In
File
Architecture
Structure
Systems
Insert
Annotate
Analyze
Massing & Site
Collaborate
View
Manage
Add-Ins
NBS
Modify
Properties
3D View
3D View: {3D}
Edit Type
Graphics
View Scale
1 : 100
Scale Value 1:
100
Detail Level
Fine
Parts Visibility
Show Original
Visibility/Grap...
Edit...
Graphic Displ...
Edit...
Discipline
Architectural
Show Hidden ...
By Discipline
Default Analy...
None
Sun Path
Properties help
Apply
Project Browser - ContentExamples.rvt
Ceiling Plans
Level 0
Level 1
3D Views
{3D}
Legends
Schedules/Quantities
2.1 Inconsistent information
2.2 Consistent information
Sheets (all)
A100 - Unnamed
Families
Groups
Revit Links
3D View: {3D} - ContentExamples.rvt
TOP
1 : 100
Click to select, TAB for alternates, CTRL adds, SHIFT unselects.
:0
Main Model



NBS National BIM Library

nationalBIMlibrary.com



NBS Chorus

theNBS.com/Chorus

NBS

https://chorus.thenbs.com/org/ef335f70-956f-11e8-9420-5985807a4792/projects

NBS Chorus

Help

Stephen Hamil

Dashboard | Projects | Libraries | Settings

NBS

My projects (14)

Create Project

Open an existing project or get started on a new one.

Filter projects

Sorted by Code A-Z

Sample specifications

Newcastle upon Tyne, NE1 1RH, UK

Old Post Office

Newcastle upon Tyne, NE1 1RH, UK

Primary School

Manchester, M16 8FQ, UK

Lakeside Restaurant

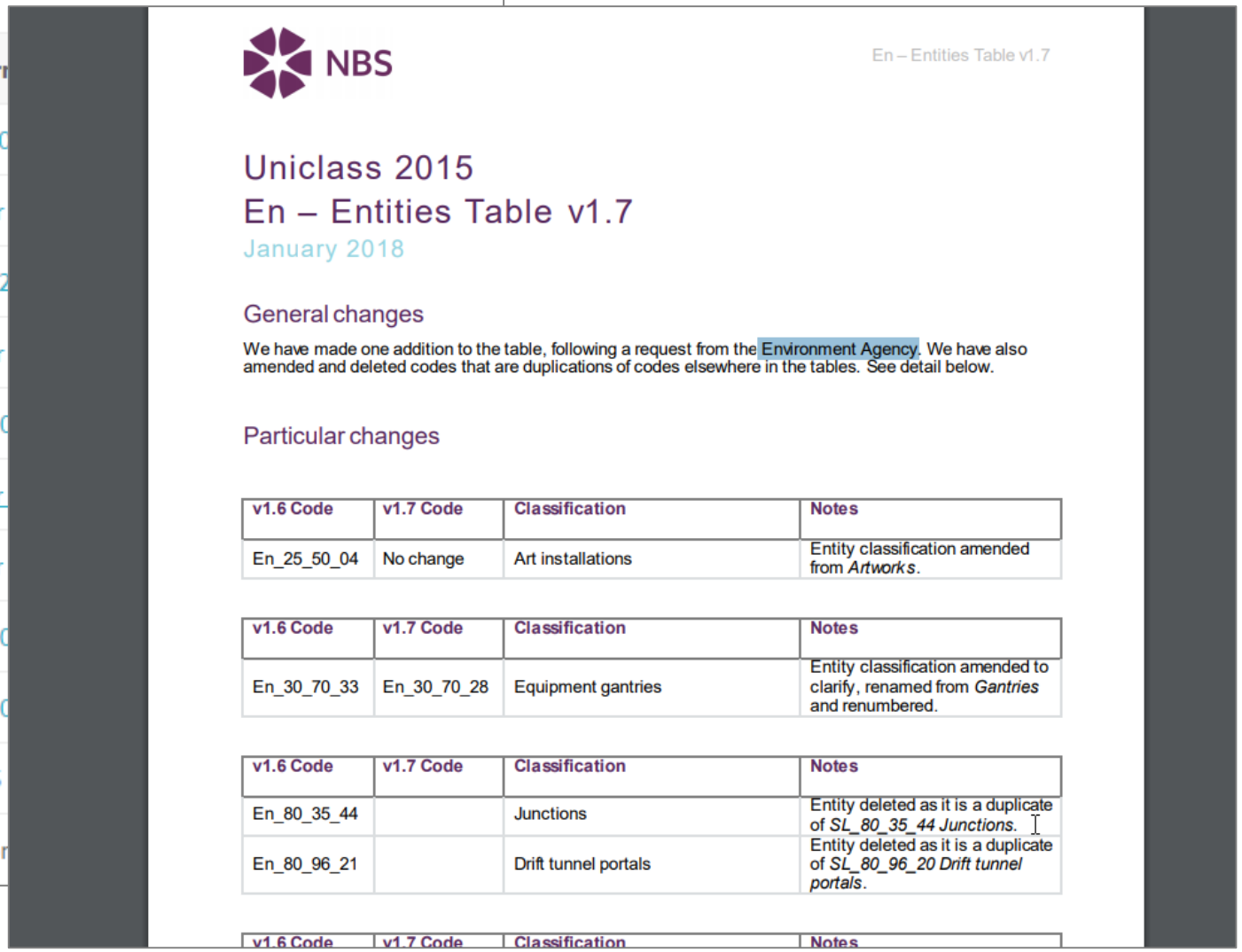
Newtown Country Park, Edmonton, Alberta, Canada

Governance and maintenance

DOWNLOAD THE TABLES:

The current status of the classification tables is listed below.

Table	Status and revision infor
Co - Complexes	v1.7, Published August 20
En - Entities	v1.10, Published October
Ac - Activities	v1.8, Published October 2
SL - Spaces/ locations	v1.10, Published October
EF - Elements/ functions	v1.3, Published August 20
Ss - Systems	v1.12, Published October
Pr - Products	v1.12, Published October
TE - Tools and Equipment	v1.5, Published August 20
PM - Project management	v1.2, Published August 20
Zz- CAD	v1.0, Published July 2015
FI - Form of information	Beta status – consultation



NBS

Uniclass 2015

En – Entities Table v1.7

January 2018

General changes

We have made one addition to the table, following a request from the Environment Agency. We have also amended and deleted codes that are duplications of codes elsewhere in the tables. See detail below.

Particular changes

v1.6 Code	v1.7 Code	Classification	Notes
En_25_50_04	No change	Art installations	Entity classification amended from *Artworks*.

v1.6 Code	v1.7 Code	Classification	Notes
En_30_70_33	En_30_70_28	Equipment gantries	Entity classification amended to clarify, renamed from *Gantries* and renumbered.

v1.6 Code	v1.7 Code	Classification	Notes
En_80_35_44		Junctions	Entity deleted as it is a duplicate of *SL_80_35_44 Junctions*.
En_80_96_21		Drift tunnel portals	Entity deleted as it is a duplicate of *SL_80_96_20 Drift tunnel portals*.

v1.6 Code	v1.7 Code	Classification	Notes

Summary

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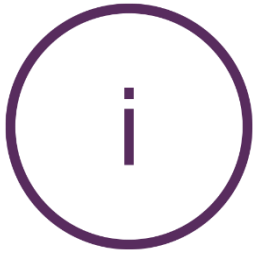
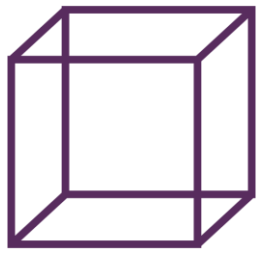


1. A classification system for BIM

2. Industry usage growing



3. Now ingrained in latest NBS tools

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NBS Construction Technology Report 2019

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Model viewing

It is not just those involved in the creation of a model who need to view it. Clients, those who will use the building, contractors, construction workers and those checking a design's compliance may also need to view it. Buying full modelling licences for these people can be prohibitively expensive; this is where model viewers are useful. Model viewers allow BIM files to be rendered and viewed at a small (or no) cost. They often support a range of file formats, and typically support open formats like Industry Foundation Classes (IFCs).

Model viewers can bring BIM to life for those who are unfamiliar with it. They can give all stakeholders a detailed visualisation of a project before construction work commences, thereby providing detailed feedback at a time when it can still be acted upon.

What tools do you use to view, or help others view, your models?

Buying full modelling licences for these people can be prohibitively expensive; this is where model viewers are useful.

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Future Tech

The findings of this report suggest that the process of design is undergoing technological transformation. What began with CAD and then moved to 3D modelling is now developing into collaborative work on information-rich models. Practices are increasingly using a blended technology stack to support information-rich design.

The graph below shows where we are now, and where we might be going in the next five years and beyond.

Most striking is the rise of cloud-based working; a cornerstone of effective collaborative working. 43% are using the cloud now, and within five years' time that figure is expected to rise to almost 90%. We are nearing the end of desktop applications and local storage.

But we can also see that technologies which recently seemed far off are gaining a real foothold. Virtual, augmented or mixed reality is already being used by a third of practices, and 75% expect to be using it within five years. This offers the opportunity for designers (as well as clients and contractors) to interact in realistic, true 3D rendering of models, and so to make better design choices in a more collaborative manner.

Just as the UK Government acted as a catalyst for BIM, they are now seeking to promote off-site construction. In the Autumn Budget 2017, the Government outlined its plans to promote off-site construction, with five central government departments looking to adopt a presumption in favour of off-site construction.

Off-site construction offers the potential for buildings to be largely created in factory conditions, and then quickly erected on site afterwards. It offers the benefits of greater automation and efficiency, higher quality and better conditions for workers. Large players like Aecom, Laing O'Rourke and the Berkeley Group are already involved. There's a risk that if the design professions are not involved, they will get left behind. Already, however, 41% are involved in some form of design for off-site construction, and a further third expect to be within five years.

Looking to the other future technologies in the graph, we can see that there is still a great deal of uncertainty. Many don't know if they will be using the technologies listed in the future. However, we do see an industry open to change with, typically, fewer than a fifth ruling out any given future technology.

Current and expected use of the following technologies.

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Description

Date And Time

Fri, 1 February 2019

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Sample specifications

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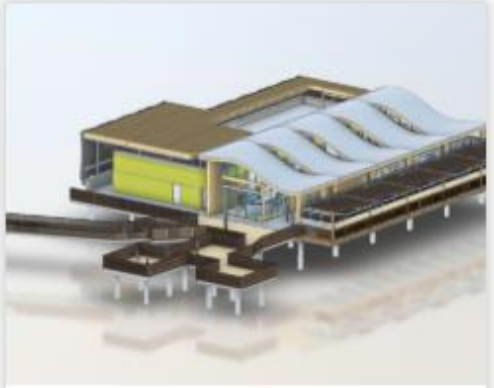
Old Post Office

Newcastle upon Tyne, NE1 1RH, UK

Primary School

Manchester, M16 8FQ, UK



Lakeside Restaurant

Newtown Country Park, Edmonton, Alberta, Canada

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