

The 'I' in Infrastructure: Using Civil 3D & Navisworks for Asset Information Exchange

Tom Hughes

Mott MacDonald

@bimostb

Good Morning Las Vegas

Bristol



Bristol

Mostly Cloudy · 11°C
11:26 AM

Directions

★

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Photos

Quick facts

Bristol is a city straddling the River Avon in the southwest of England with a prosperous maritime history. Its former city-centre port is now a cultural hub, the Harbourside, where the M Shed museum explores local social and industrial heritage. The harbour's 19th-century warehouses now contain restaurants, shops and cultural institutions such as contemporary art gallery The Arnolfini.

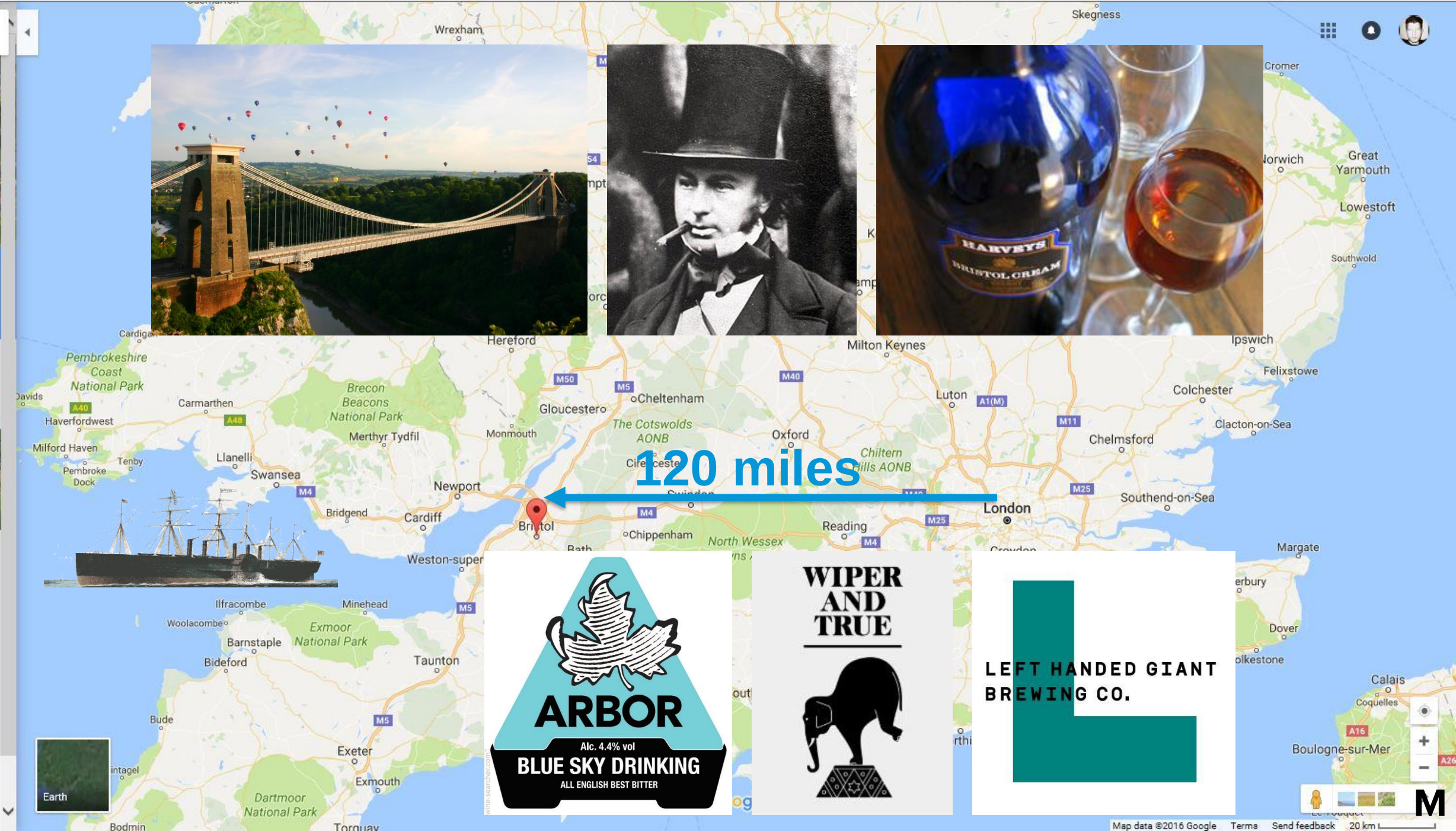
Population: 428,100 (2011)
Mayor: Marvin Rees
Area: 110 km²

Hotels









120 miles









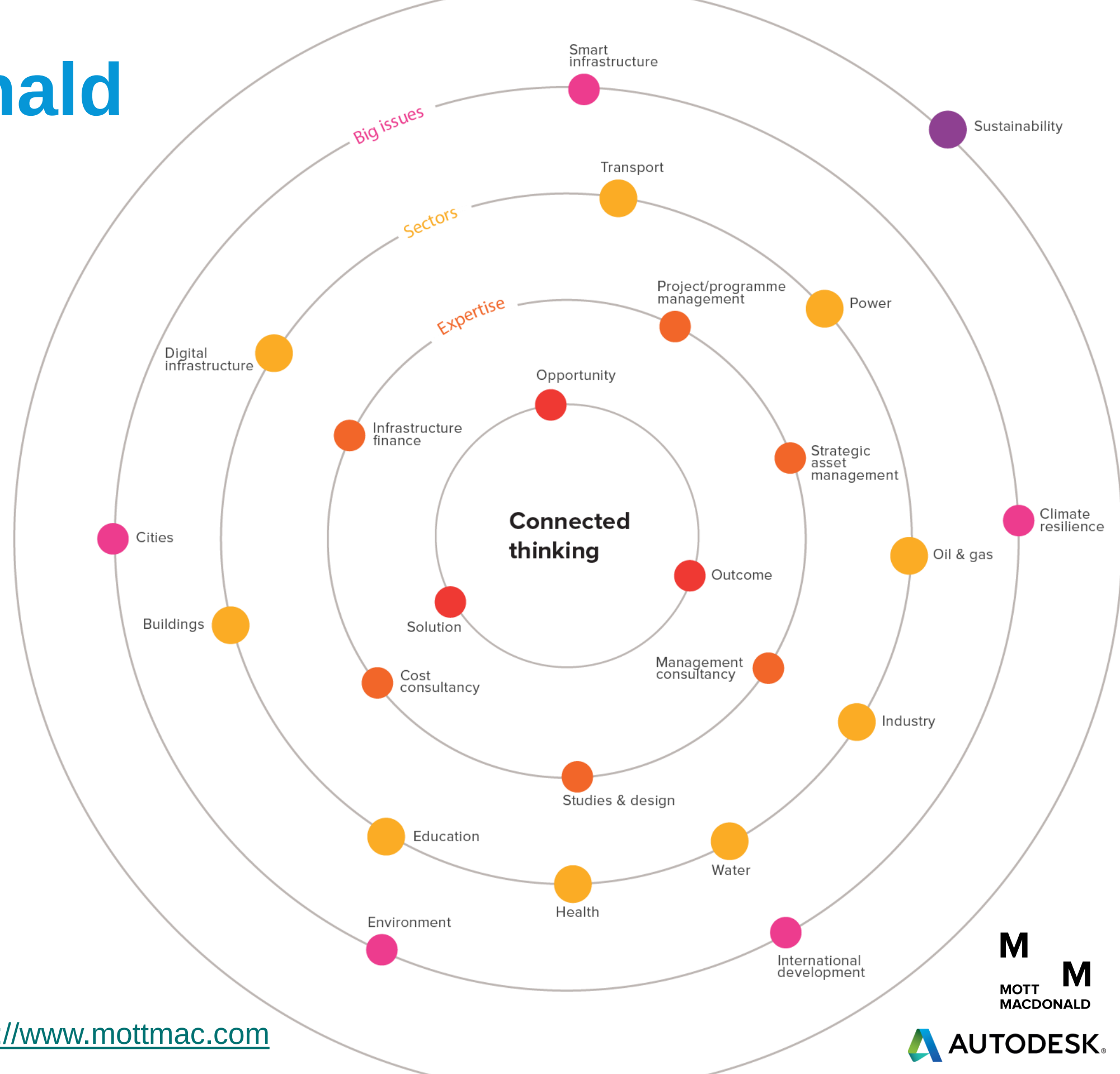


Thank-you



About Mott MacDonald

We're a global engineering, management and development consultancy focused on guiding our clients through many of **the planet's most intricate challenges.**



<https://www.mottmac.com>

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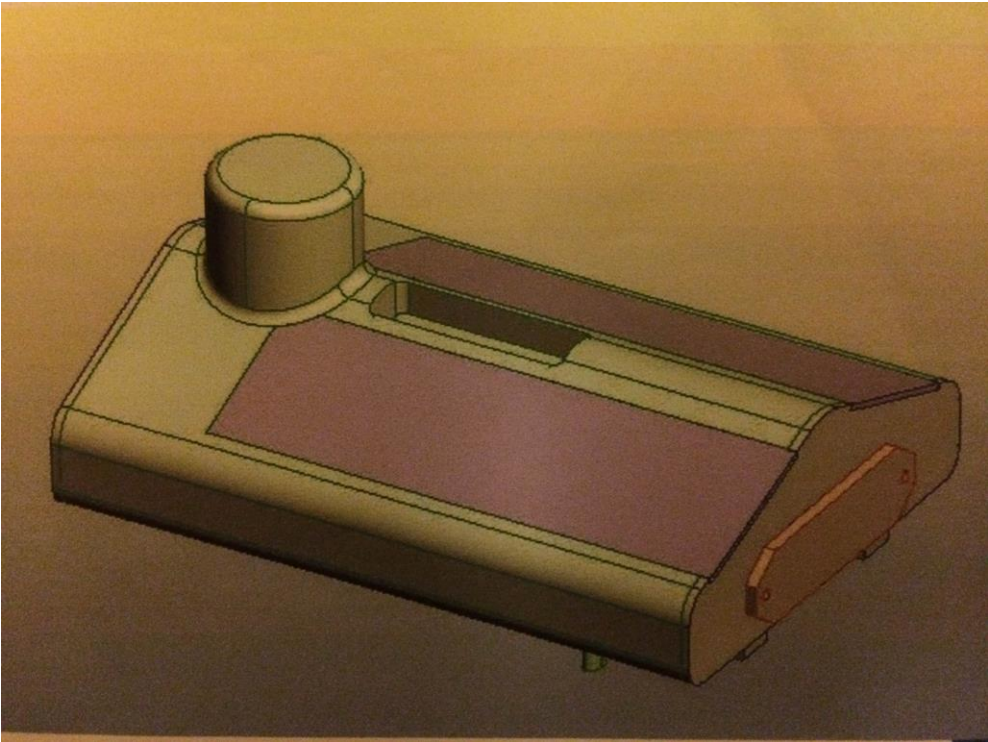
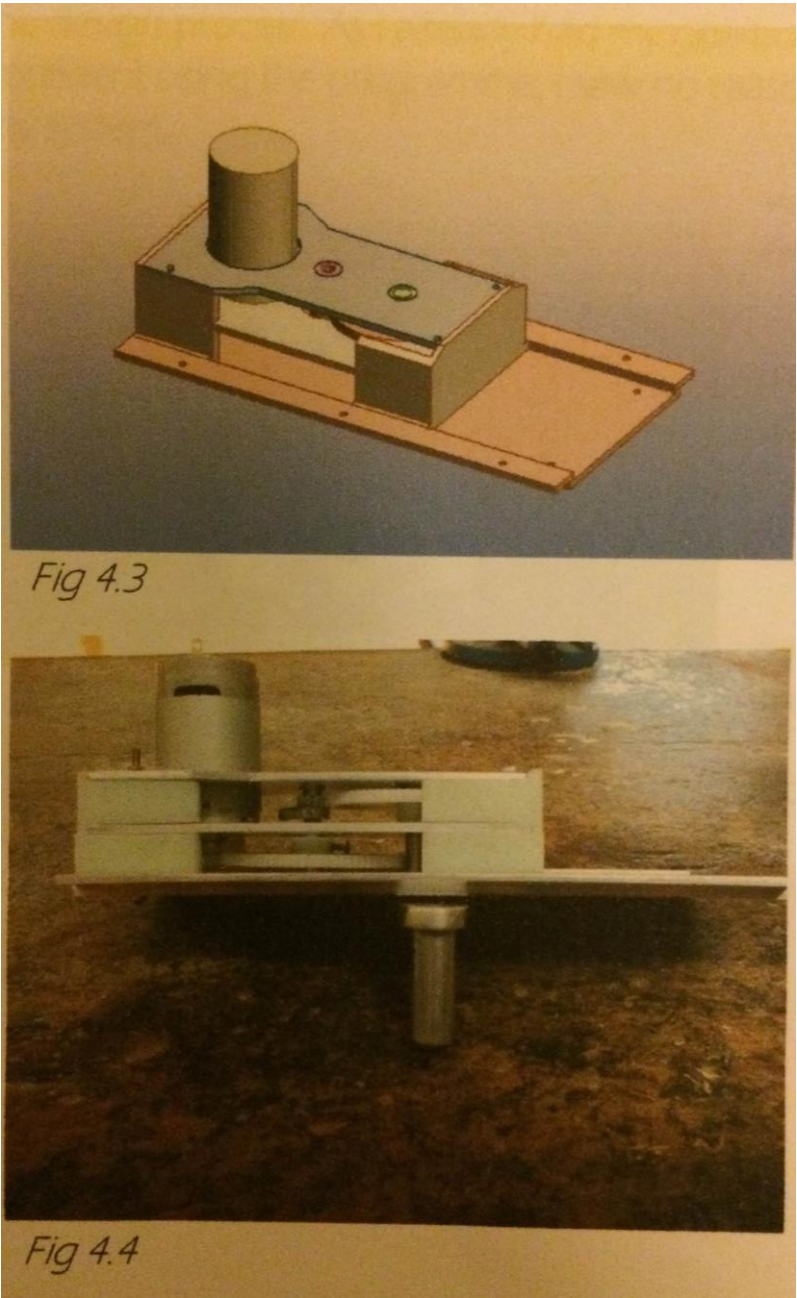
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Your AU Expert

Tom Hughes

- Is a consultant for Mott MacDonald as part of a global Digital Delivery team.
- Specializes in the UK Level 2 BIM requirements, Common Data Environment, infrastructure BIM and Autodesk best practice.
- Works on a wide variety of projects for both key clients in the UK and around the globe.
- member of the Institute of Civil Engineers
- BRE Academy BIM member
- Member of the Autodesk futures portal for Civil and Infrastructure

Your AU Expert



Class summary

Adding asset information to Infrastructure BIM projects.

While the delivery of asset information on Building projects is becoming well understood the same is not always true for Infrastructure projects.

This class will look to change that.

Using real clients requirements for common infrastructure assets the class will demonstrate how property datasets can be structured for asset information delivery.

The class will show how standards can be managed at a company level so that all projects deliver consistently structured data and how the property data of several common Civil 3D objects can be extended to allow client specific attributes to be added to designs as they progress.

The class will then show how this data can be passed downstream to Autodesk Navisworks and how the Navisworks COBie Extension can be configured to deliver asset information either in COBie format as well as showing how the tool can be used to deliver based on bespoke client requirements.

Class summary

This class is looking to change your perspective about 'Asset Information' for infrastructure projects.

Some common misconceptions

- *“Civil 3D can't produce asset information”*
- *“Clients aren't asking for asset information”*
- *“COBie isn't suitable for an infrastructure project”*

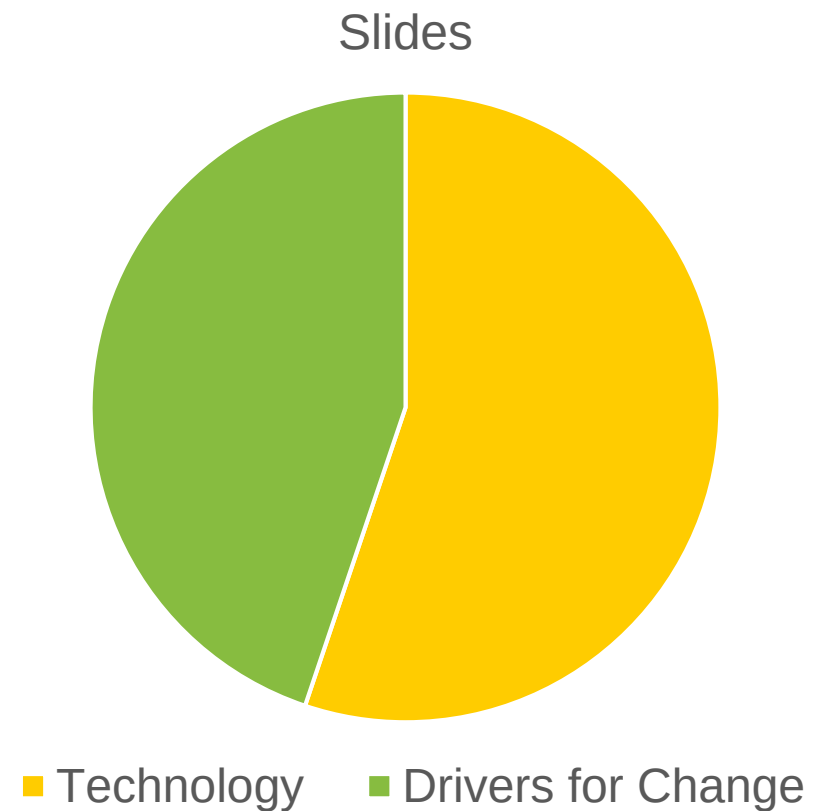
Key learning objectives

At the end of this class, you will be able to

- Add rich data to an infrastructure model
- Configure the Navisworks COBie Extension based on client asset information requirements
- Set-up and manage property dataset definitions
- Use several new product features in AutoCAD Civil 3D 2017

Class structure

I've tried to balance this class to give as much 'Why' as there is 'How'.

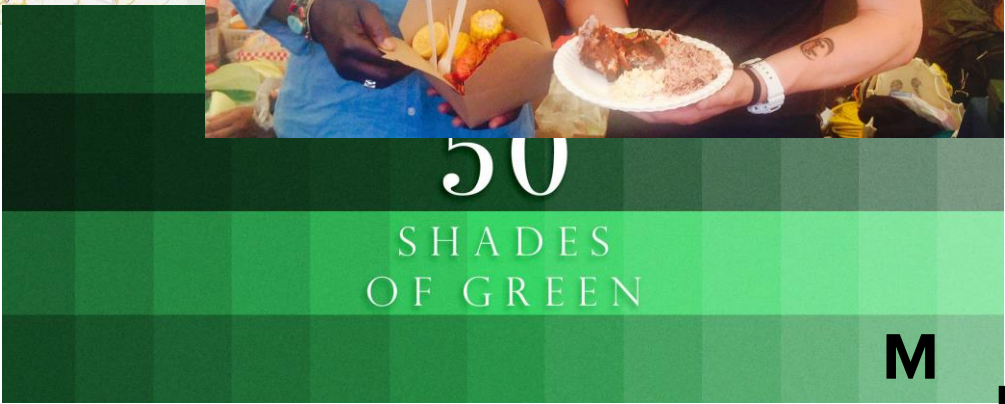
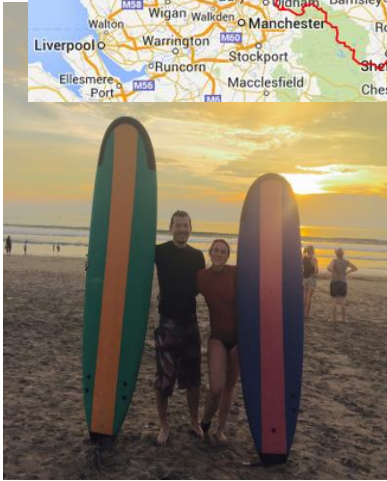
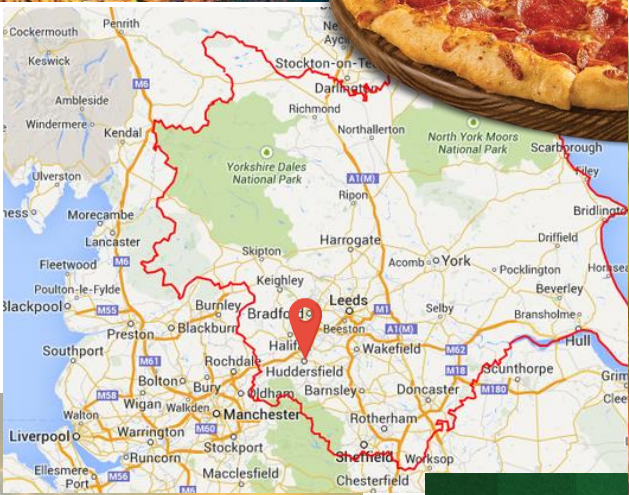


Segue



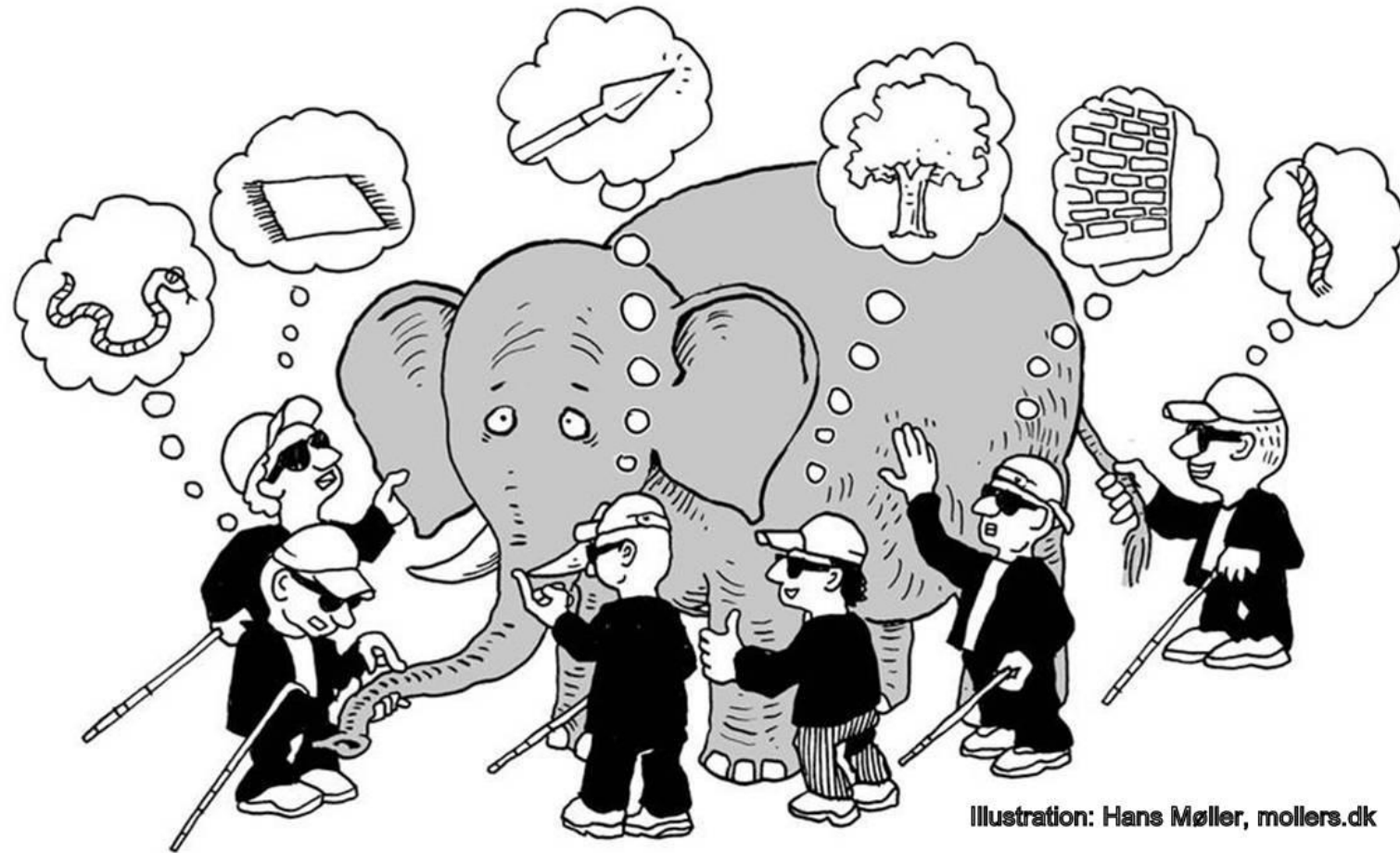
Your AU Expert

Question	Answer
What is your name?	Tom Hughes
When is your birthday?	16 th September
Where were you born?	Huddersfield
What is your favourite colour?	Green
What is your Favourite food?	Pizza
Do you have a hobby?	Cooking
Where do go on your last vacation?	Bali
Did you enjoy last night?	Yes



Asset Information 101

‘What actually is asset information?’



I like to think of ‘asset information’ as a collection of data that will add value to the operation and maintenance of a built asset by answering questions about the design and construction.

Call back



Tom Hughes

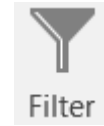
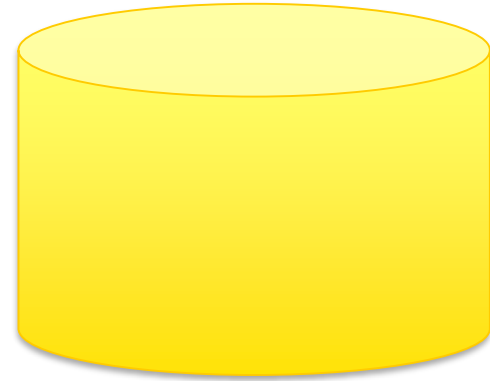


Question	Answer
Name	Tom Hughes
Birthday	16 th September
City of birth	Huddersfield
Favourite colour	Green
Favourite food	Pizza
Hobby	Cooking
Last holiday	Bali
Did you enjoy last night?	Yes

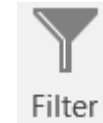
‘I wonder who likes pizza?’



Real world example



Type = Bridge



SubType = Plate Girder



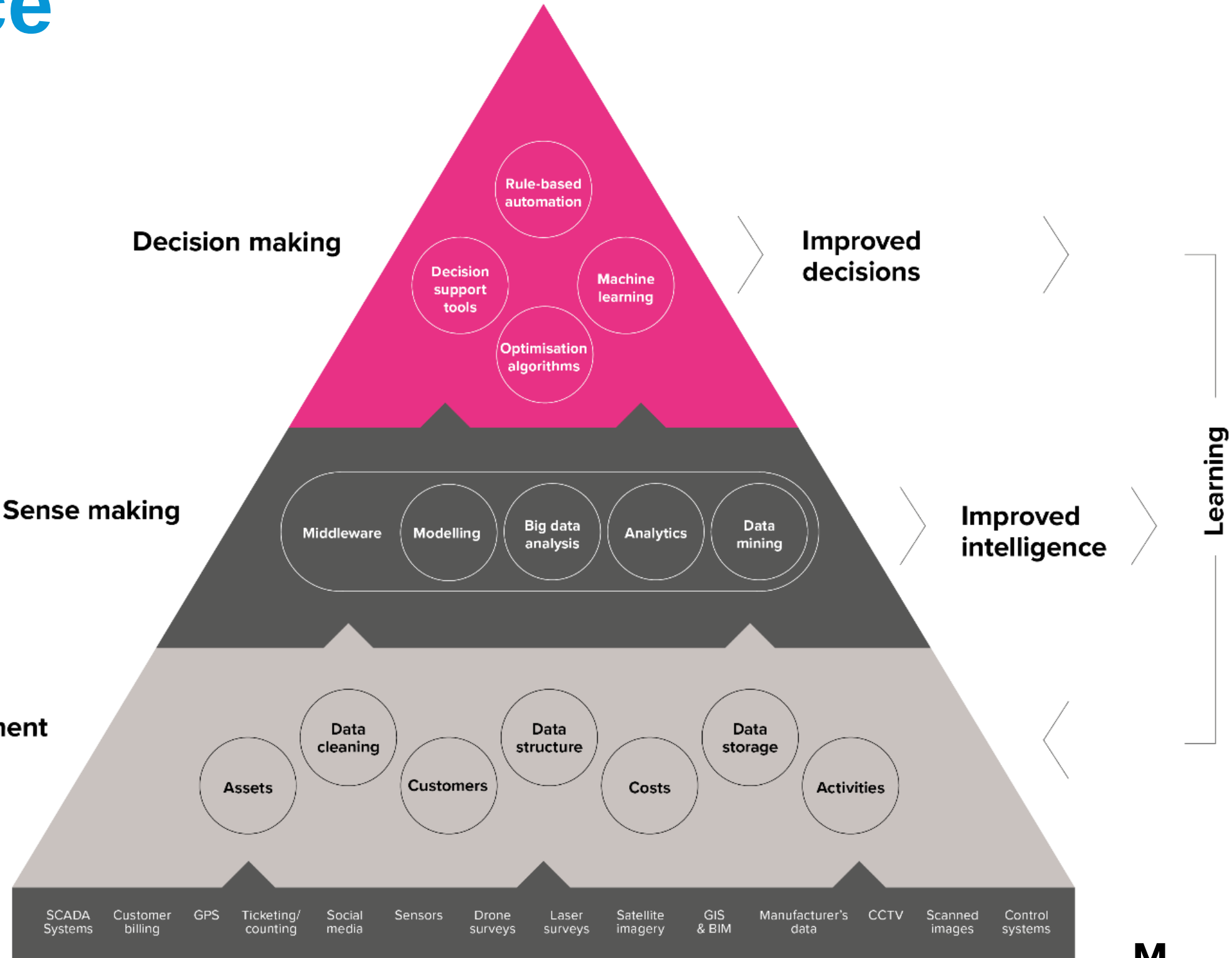
BuildDate, before 1976



InspectedDate, before Nov 2015

‘How many plate girder bridges, that are over 40 years old, have not been inspected in the last 12 months?’

Value of intelligence



Asset Information - 'It's like a time machine'



'I wonder if this culvert can take an additional 1.5m³/s of flow?'

Back to 2007



96 Recommendations to learn lessons for one of the biggest infrastructure failures in the UK

Of the 'Key Recommendations'

Definitive electronic maps of all drainage ditches and streams, making clear who is responsible for maintaining them - these should be drawn up by local authorities, which must take a stronger overall lead on flooding in their area

A joint nerve centre run by the Met Office and the Environment Agency - this would hopefully produce more accurate flood warnings based on pooled information

Greater openness in the property market to ensure that buyers have a clear understanding of the risks of buying in a flood-prone area - local authority searches and Home Information Packs should both be required by law to carry that information

Asset Information Requirements

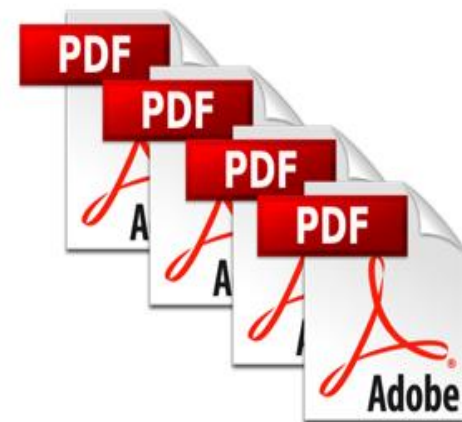
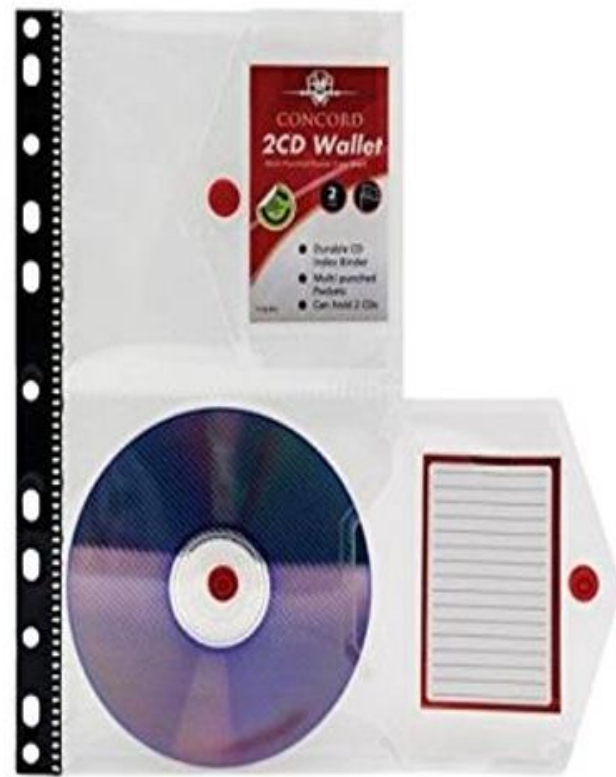


What information is required?

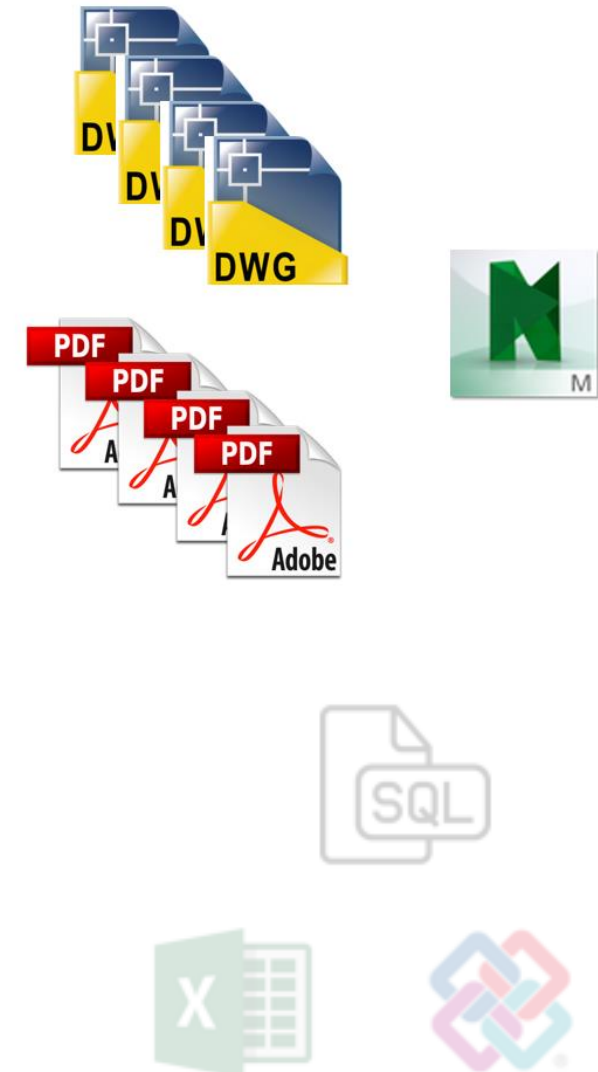
The asset information requirements are simply the information that is required for each asset.

- What information is required?
- How it should be structured?
- Who should produce it?
- How should be exchanged?

Asset Operator/Maintainer's Perspective



Designer/Contractor's Perspective



Client's Perspective

The client has the greatest vested interest in seeing information passing from the design and construction stages of the project to asset operation and maintenance.

- What information do we need?
- How can we get this information?

Opportunity

Better outcomes
for everyone

Define the I in BIM

structured asset
information

Intelligent decisions

Smart Infrastructure

Assist our colleagues in constructive
discussion with our clients

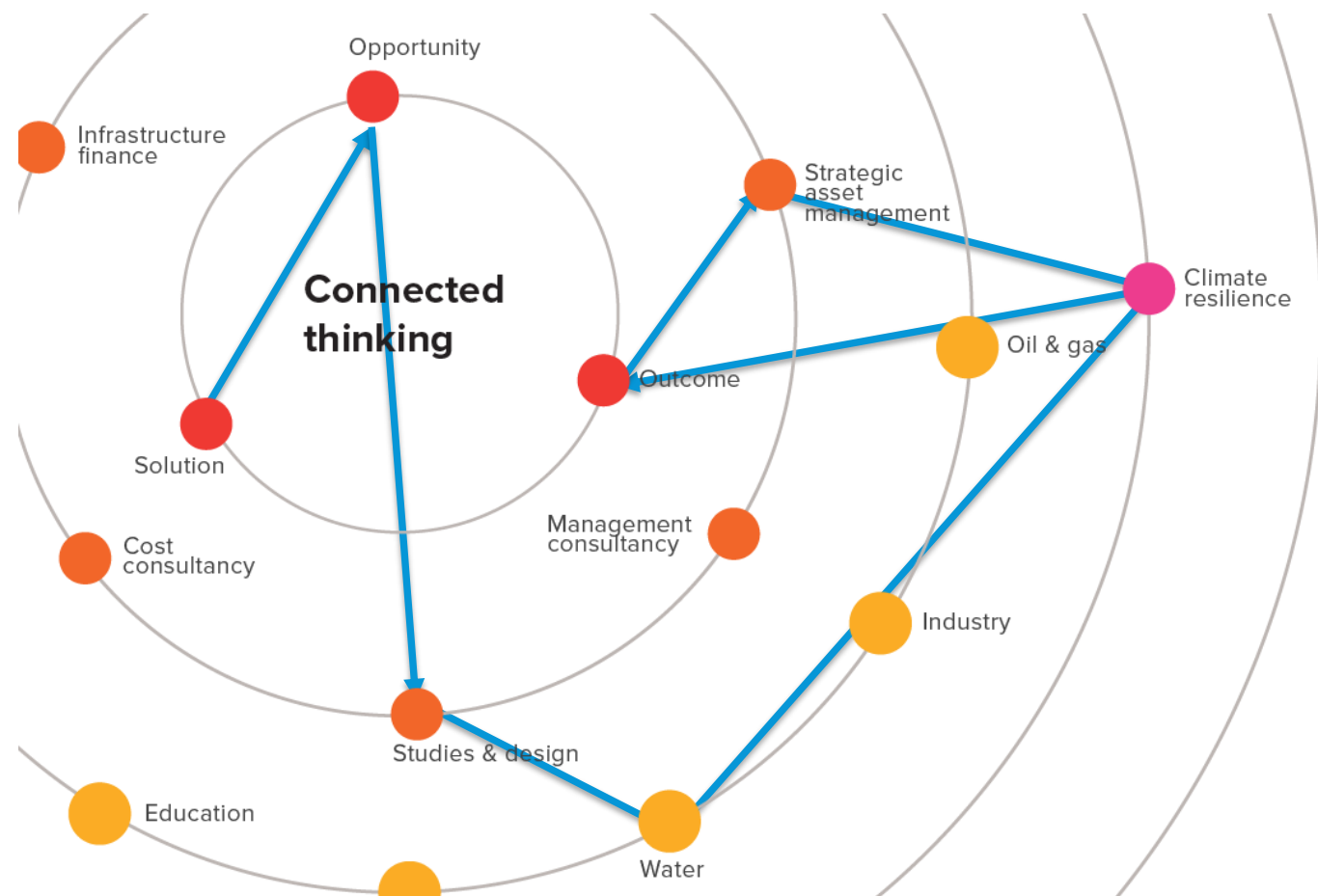
As Civil 3D users the opportunity
is to better understand the
capability of the software



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‘Planet’s most intricate challenges’

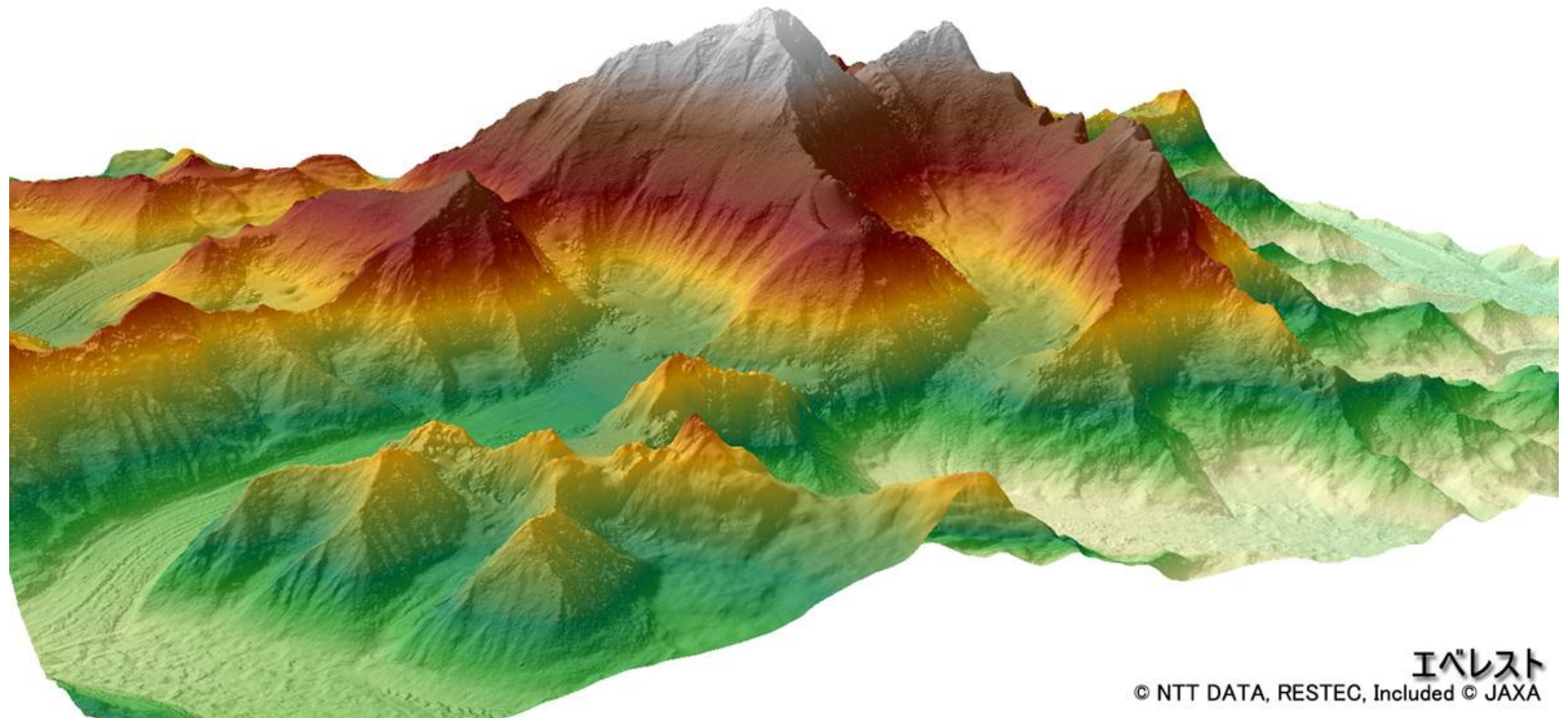


Flood visualisation



<https://www.gov.uk/government/publications/exeter-flood-defence-scheme/exeter-flood-defence-scheme>

Civil 3D gunslinger 2016



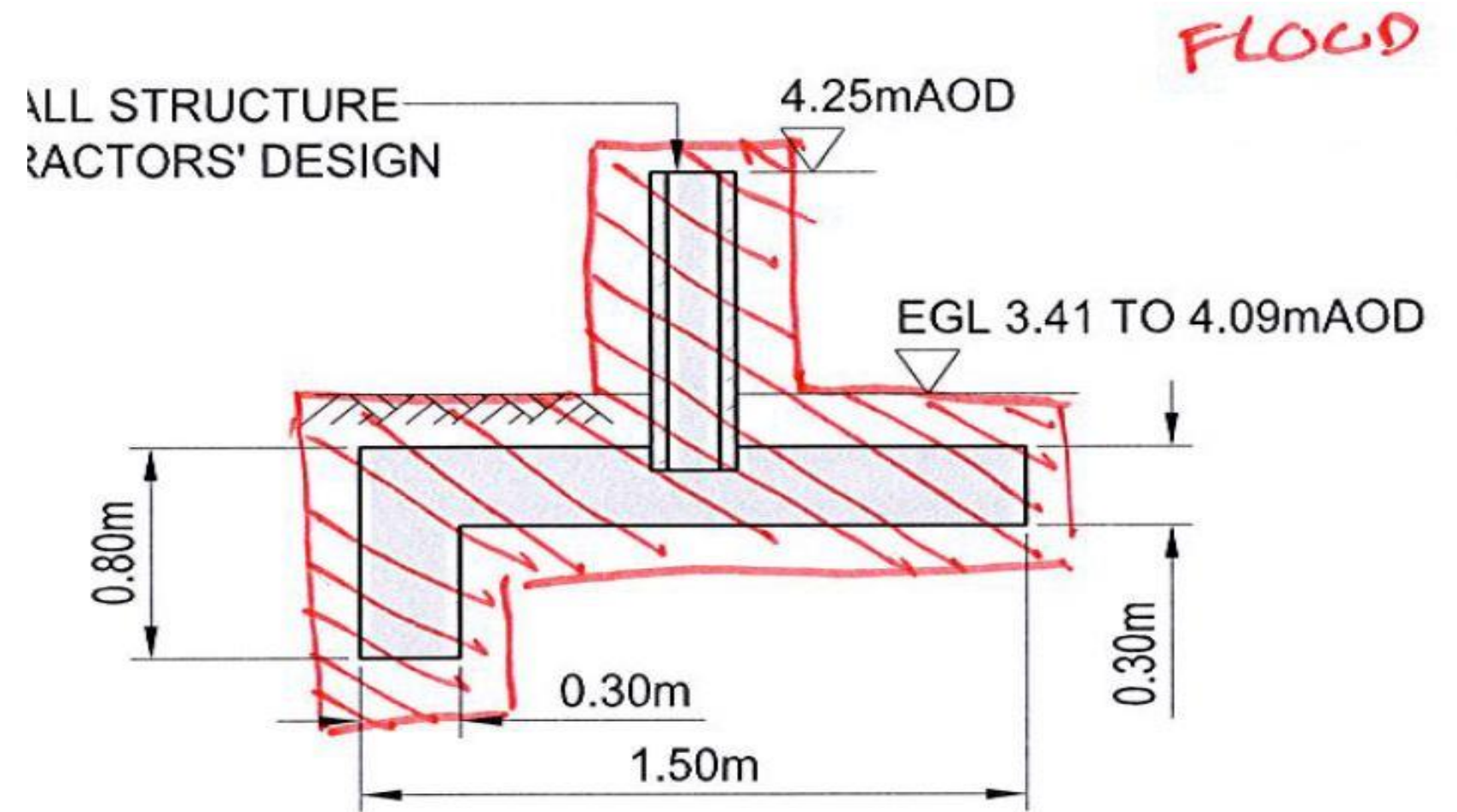
'You don't have to be a fantastic hero to do certain things -- to compete. You can be just an ordinary chap, sufficiently motivated to reach challenging goals'

Edmund Hillary

Adding Asset Information to a Civil 3D model

Step 1 – Background Information

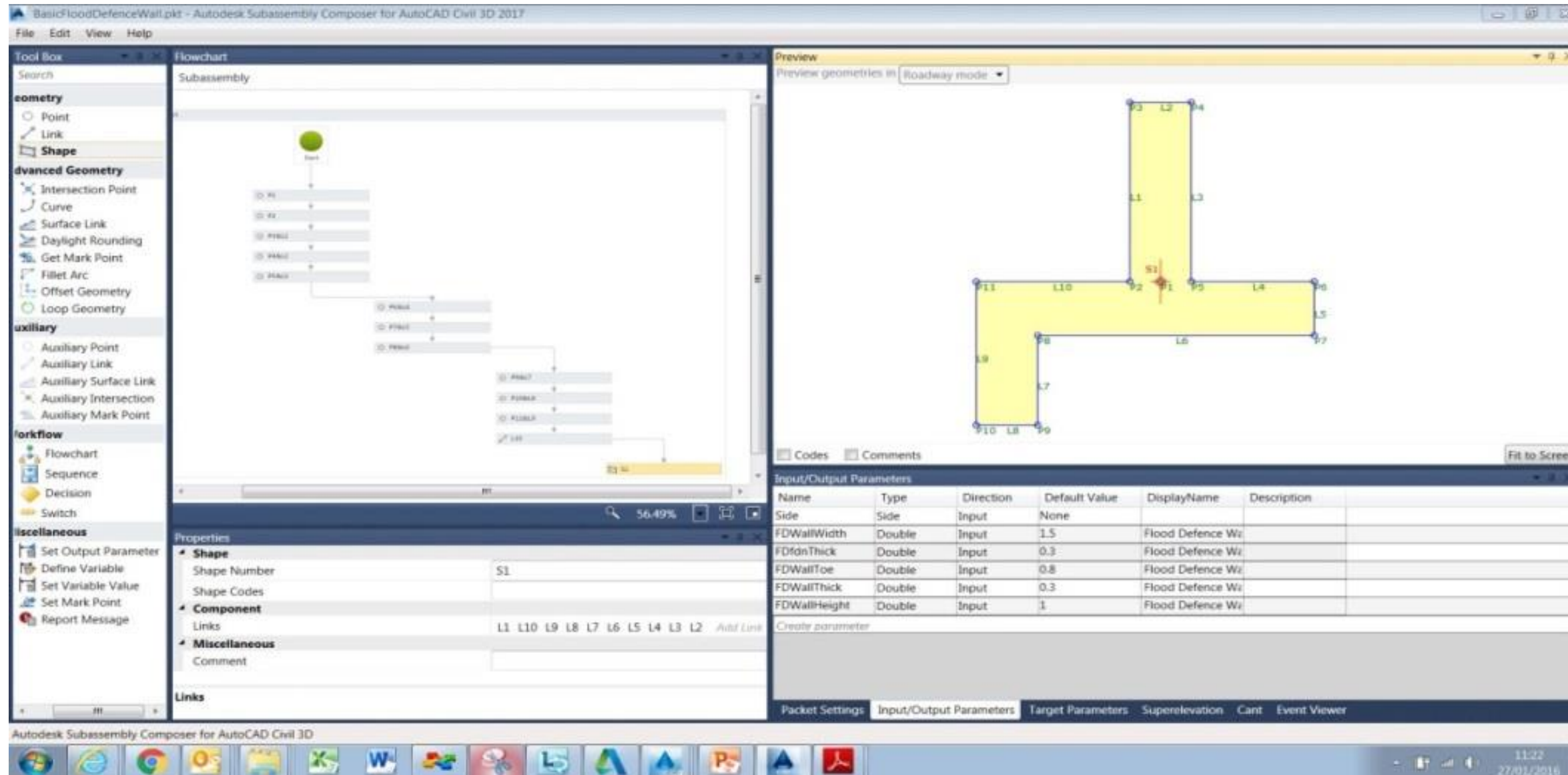
Name	Value	DataDrop	DPoW WorkStage	Unit
current SOP		LOD1	Brief	n/a
current SOP date		LOD1	Brief	date
asset type		LOD3	Definition	n/a
asset subtype		LOD3	Definition	n/a
description		LOD3	Definition	n/a
location		LOD3	Definition	n/a
primary purpose		LOD3	Definition	n/a
asset owner		LOD6	Handover	n/a
asset operator		LOD6	Handover	n/a
asset maintainer		LOD6	Handover	n/a
data owner asset ref		LOD6	Handover	n/a
alt asset ref		LOD6	Handover	n/a
asset name		LOD6	Handover	n/a
comments		LOD3	Definition	n/a
secondary purpose 1		LOD6	Handover	n/a
secondary purpose 2		LOD6	Handover	n/a
operational requirement		LOD3	Definition	n/a
replacement cost		LOD3	Definition	Pounds
replacement cost assessment date		LOD3	Definition	date
asset status		LOD6	Handover	n/a



DETAIL 'C' - TYPICAL WALL

Adding Asset Information to a Civil 3D model

Step 2 – Creating a sub-assembly



Adding Asset Information to a Civil 3D model

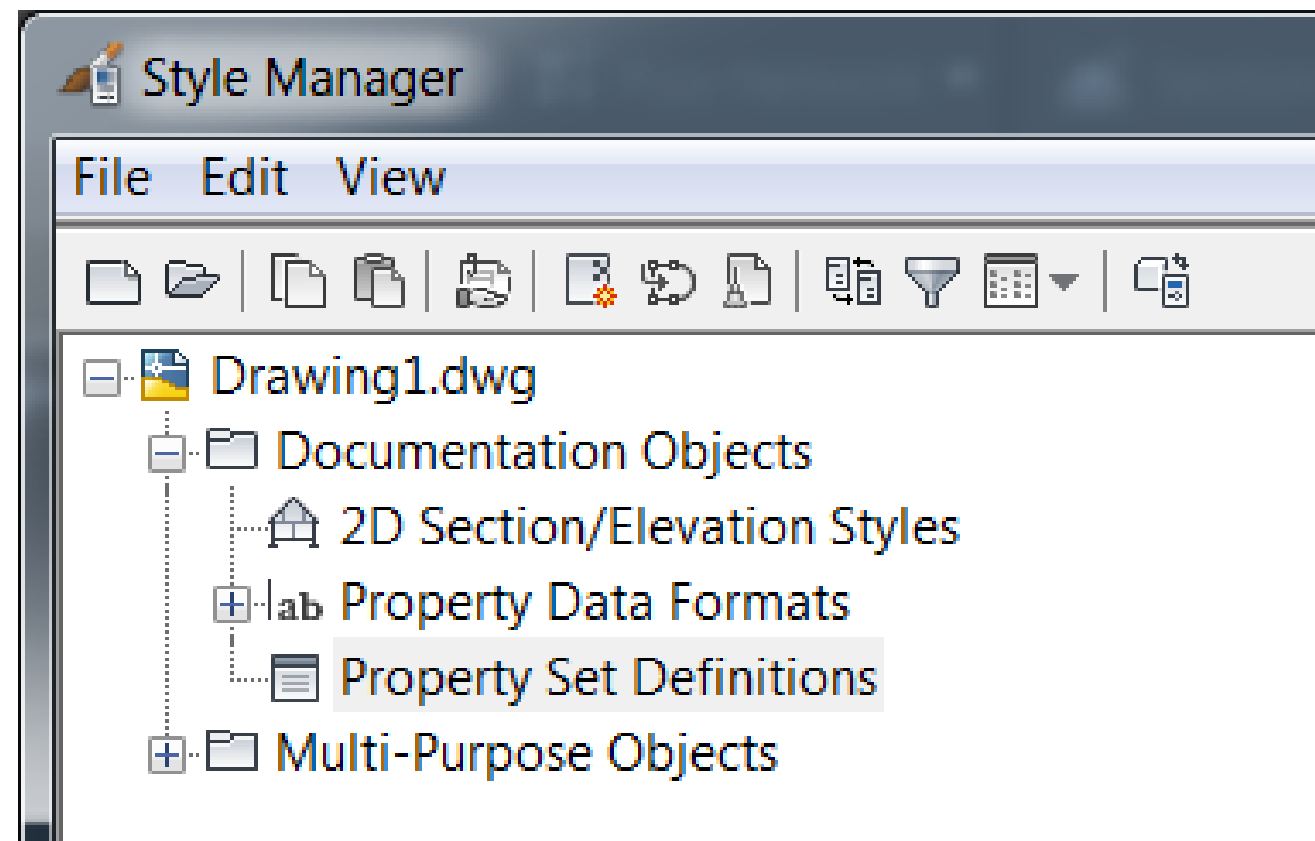
Step 3 – Creating Property Sets for Assets

Click Manage tab ➤ Property Set Data panel ➤ Define Property Sets  Find.

Or

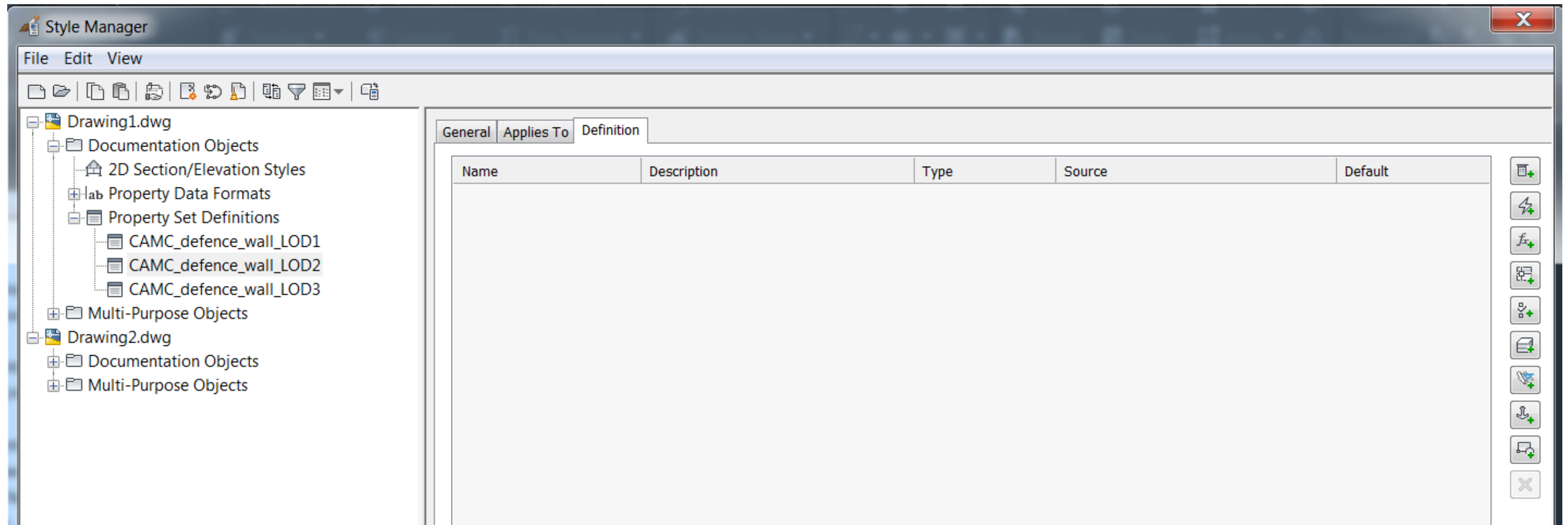
Command:

 STYLEMANAGER



Adding Asset Information to a Civil 3D model

Step 3 – Creating Property Sets for Assets



Adding Asset Information to a Civil 3D model

Step 3 – Creating Property Sets for Assets



Add Manual Property Set Definition

GeneralApplies ToDefinition

Name
+ Manual_Set_Definition_Text
+ Manual_Set_Definition_List
+ Manual_Set_Definition_TorF
+ Manual_Set_Definition_Integ

Style Manager

File Edit View

Drawing1.dwg

Documentation Objects

2D Section/Elevation Styles

lab Property Data Formats

Property Set Definitions

CAMC_defence_wall_LOD1

CAMC_defence_wall_LOD2

CAMC_defence_wall_LOD3

Multi-Purpose Objects

AEC Polygon Styles

Classification Definitions

Layer Key Styles

List Definitions

NEW LIST

GeneralApplies ToItems

☐ Allow individual property values to vary from this list

Name	Description
A	
B	
C	
D	

Default
A
True
0

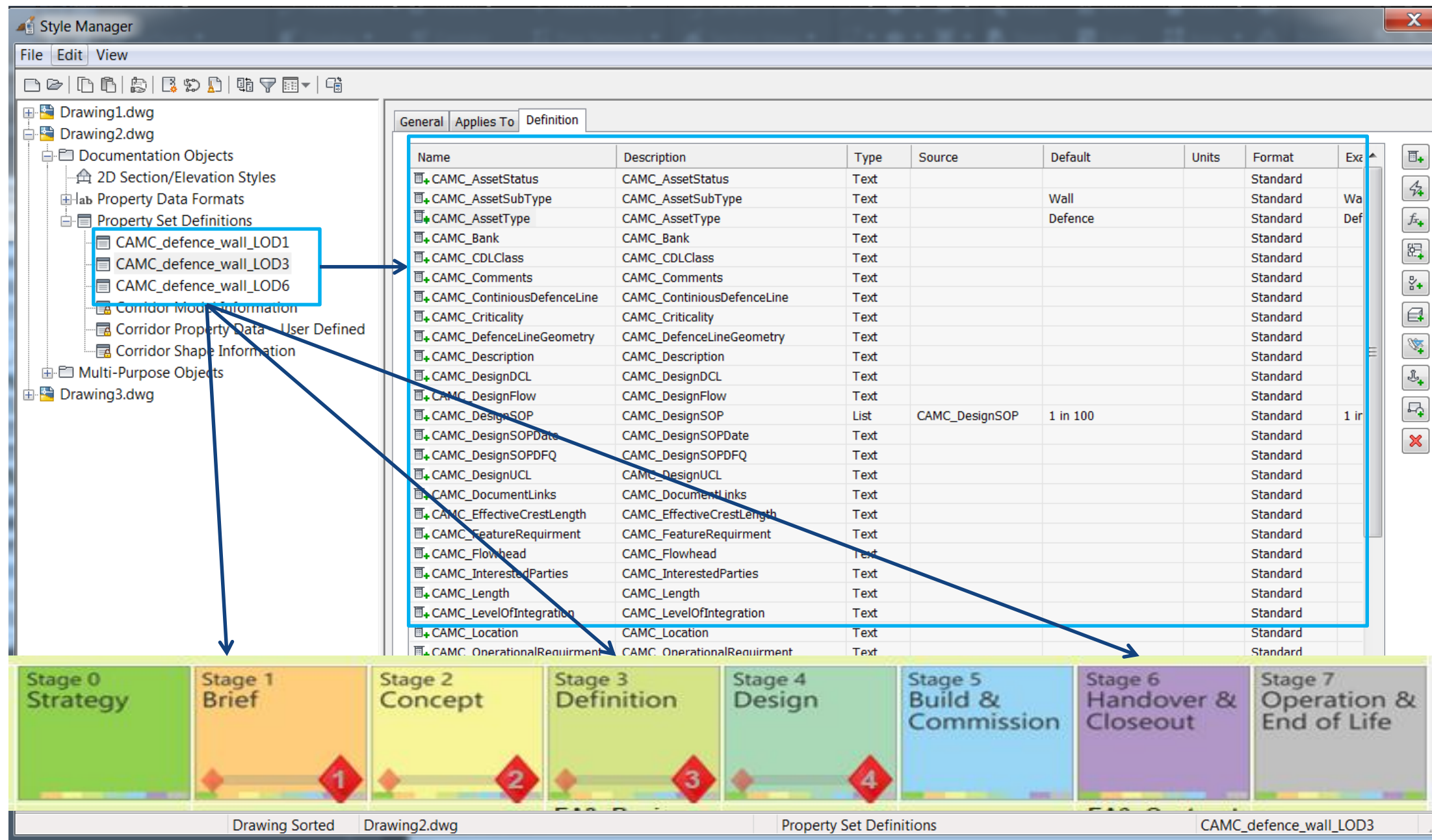
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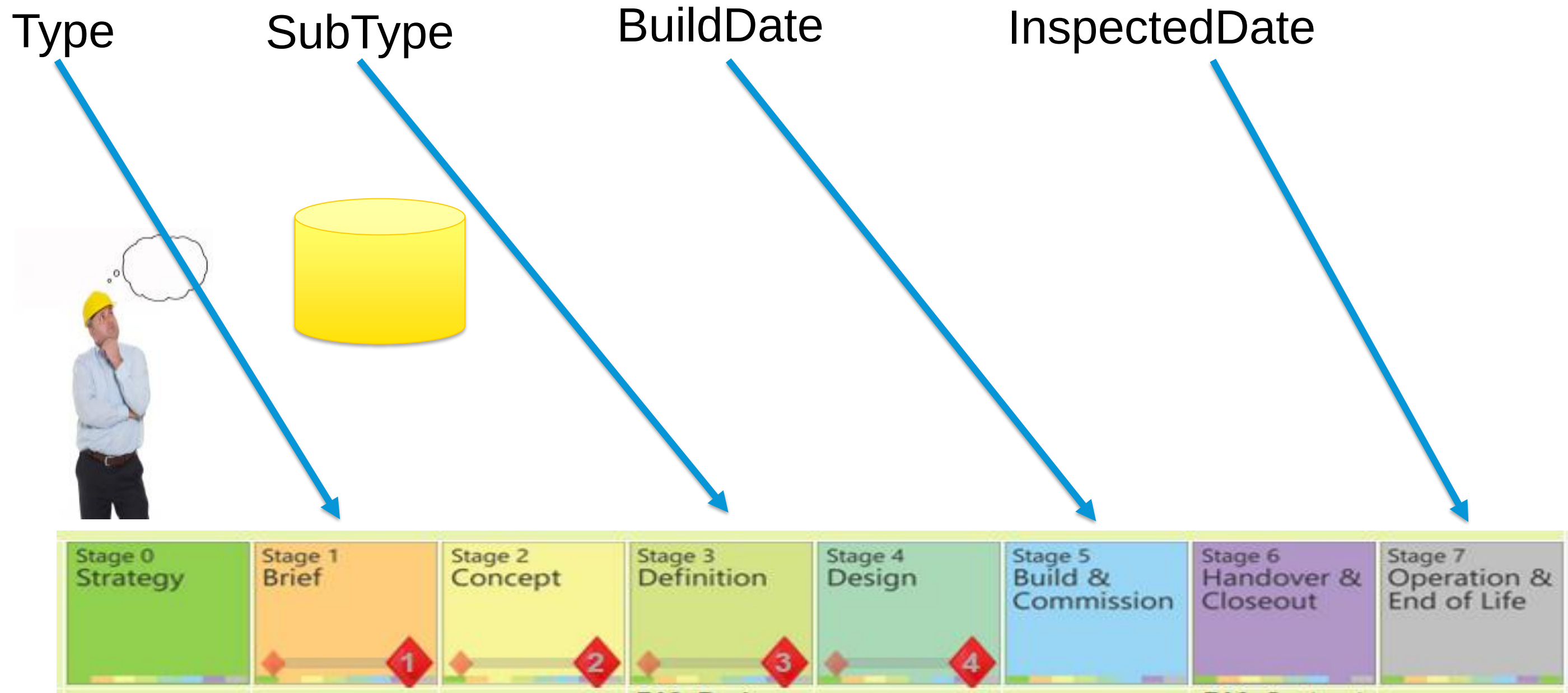
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Adding Asset Information to a Civil 3D model

Step 3 – Creating Property Sets for Assets



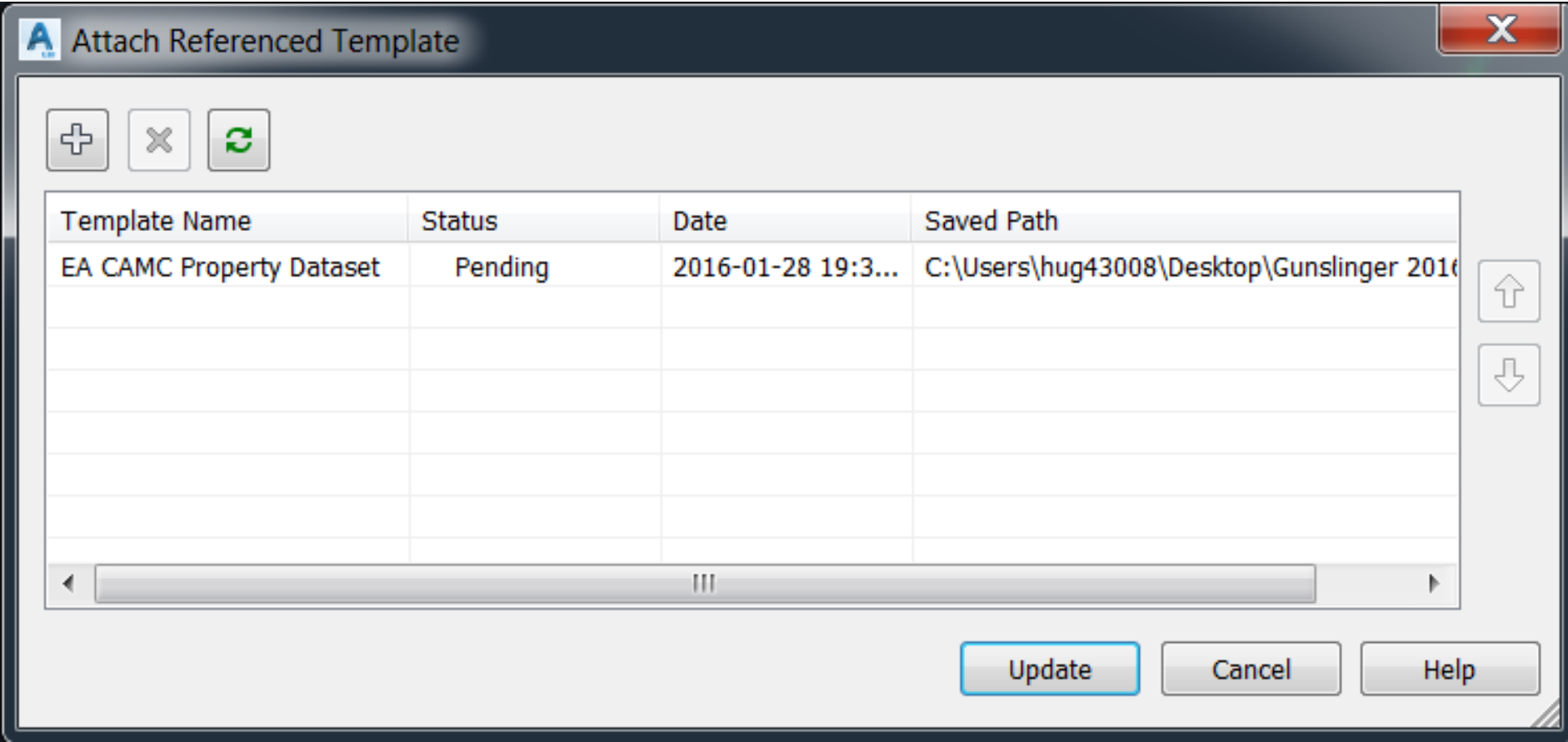
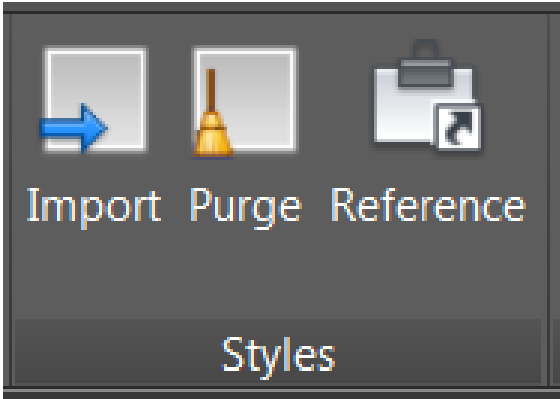
Call back 2



‘How many plate girder bridges, over 40 years old, have not been inspected in the last 12 months?’

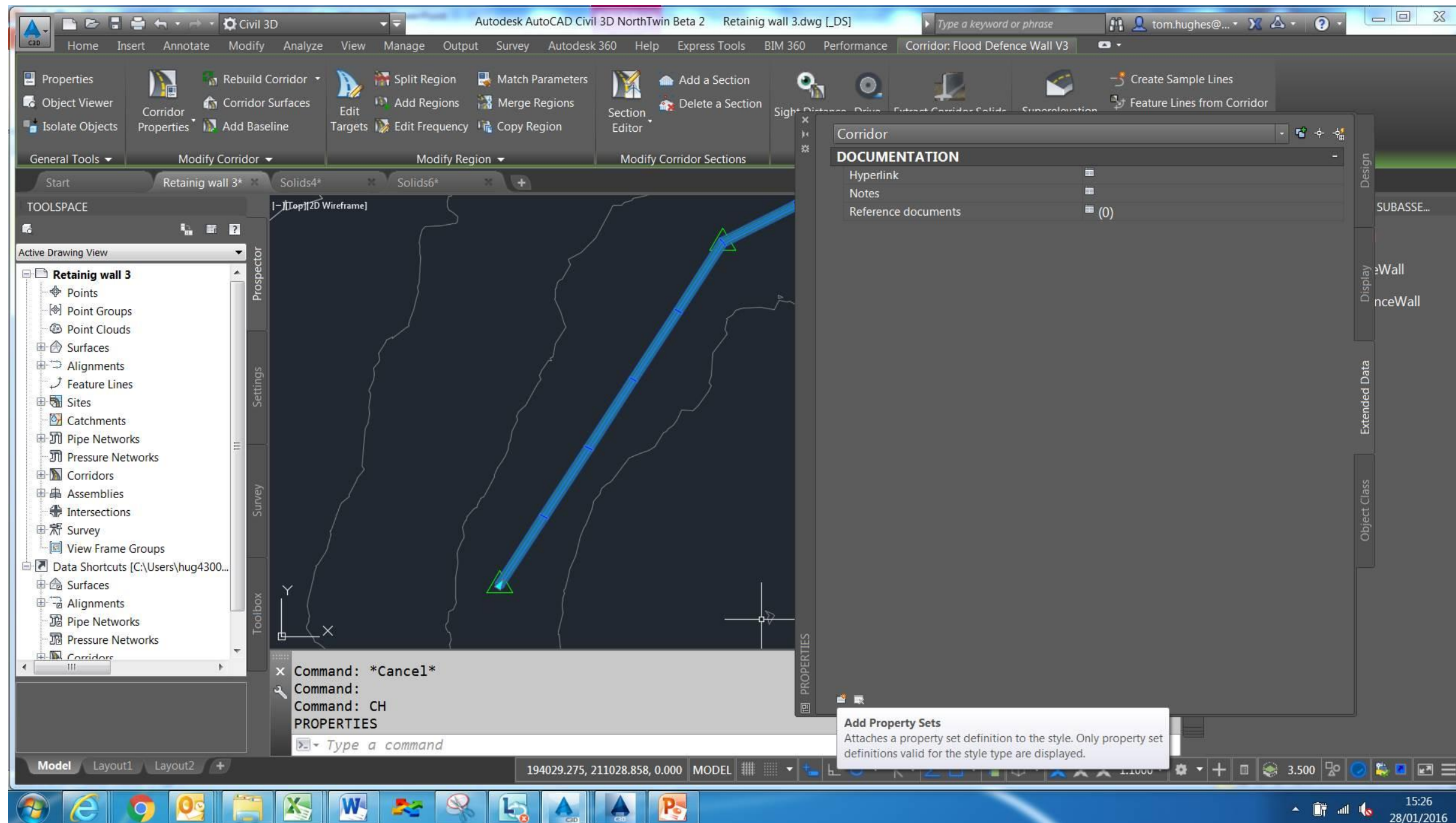
Adding Asset Information to a Civil 3D model

Step 4 – Reference Styles



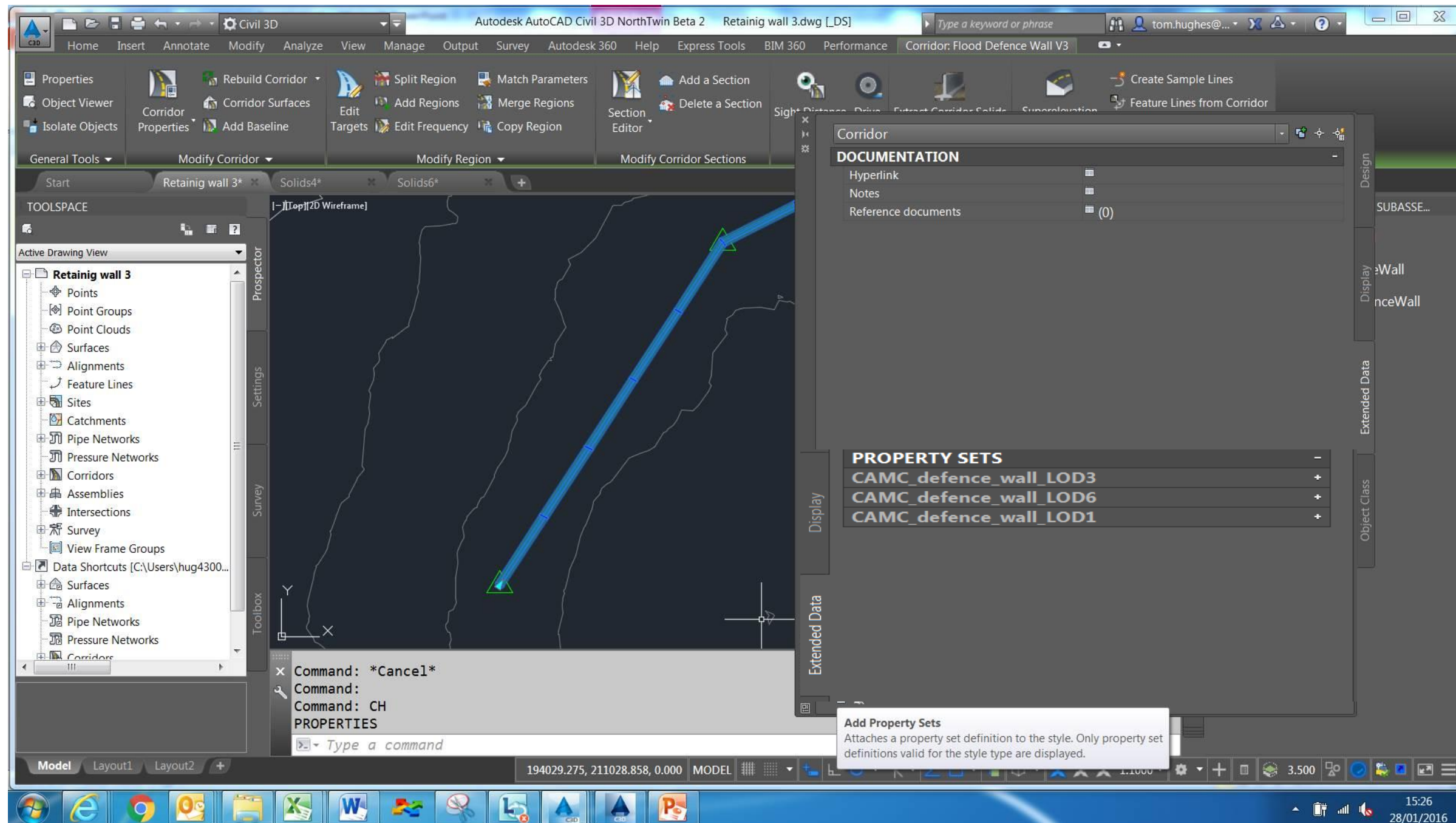
Adding Asset Information to a Civil 3D model

Step 5 – Adding data sets



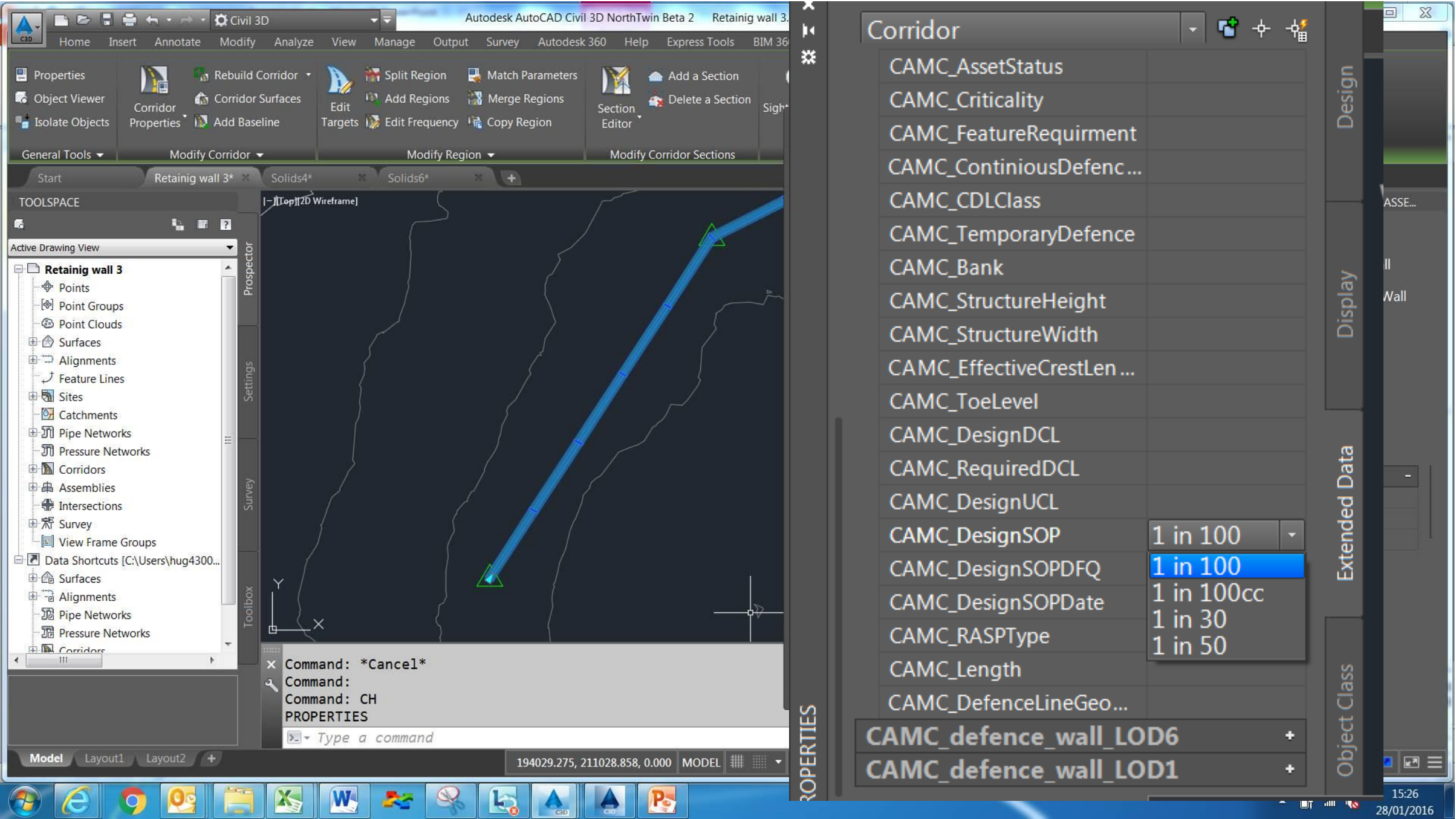
Adding Asset Information to a Civil 3D model

Step 5 – Adding data sets



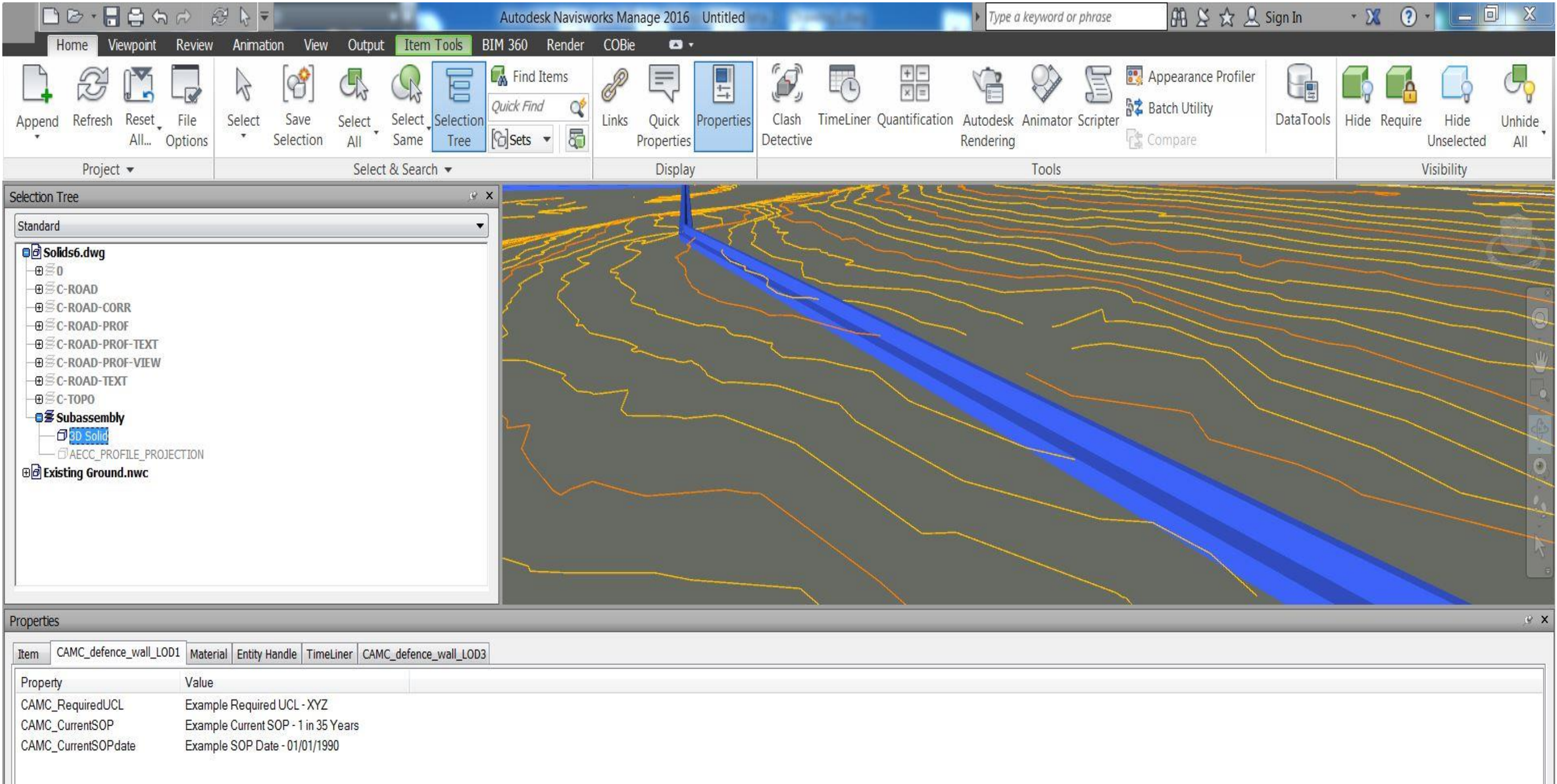
Adding Asset Information to a Civil 3D model

Step 5 – Adding data sets



Viewing Information Down Stream

Navisworks



COBie for Navisworks Tool



Home Autode

« Virtual Reality in AEC: An Idea Whose Time Has Come | Main | Quantification with BAM

08/10/2016

COBie for Navisworks tool now upda

Great news, we have an update to the COBie exporters for biggest requests we had was to support colours from the CO

COBie Data

Drop 1, 2, 3, 4

Load existing COBie Drop from SQLite or Excel file

Create a new empty SQLite database

Import data from the Navisworks model using an XLSX file as a template

Currently loaded SQLite database / XLSX file

No Data loaded

V0.73

To learn more about the tool, look at our original article announcing the launch of the COBie for Navisworks tool. Links to the latest installers to download are available below, or in the previous blog.

[CobieExtensionSetup_Manage2016.zip](#)

[CobieExtensionSetup_Simulate2016.zip](#)

<http://beyonddesign.typepad.com/posts/2016/04/new-cobie-for-navisworks-tool-now-available.html>

Rendering for Construction, how to improve Health and Safety

Autodesk University 2016 – just around the corner

Dynamo for Construction

Hey Chicago! The BIM 360 Food Truck Visits

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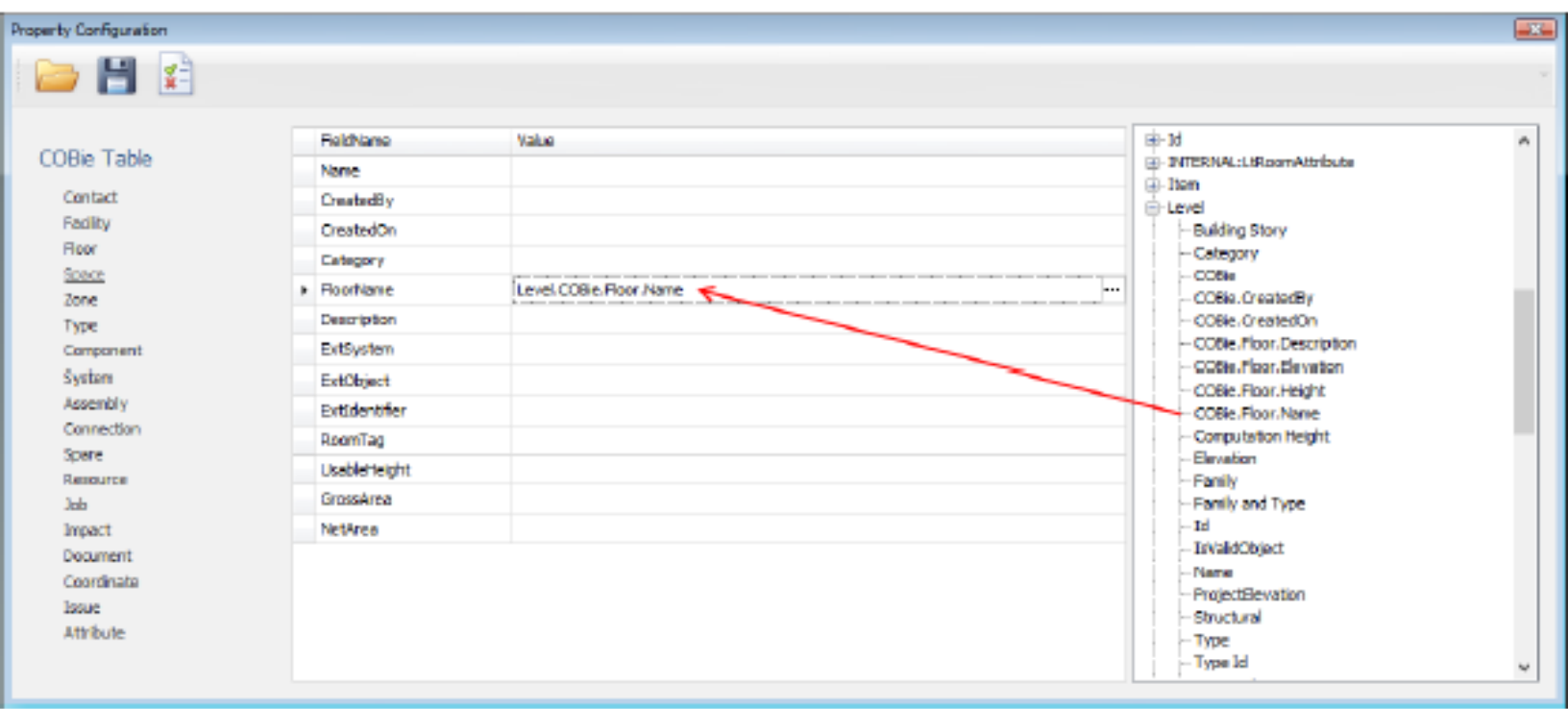


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Configuring COBie for Navisworks Tool



Autodesk COBie Extension for Navisworks 2017
Quick start guide (V1.0)



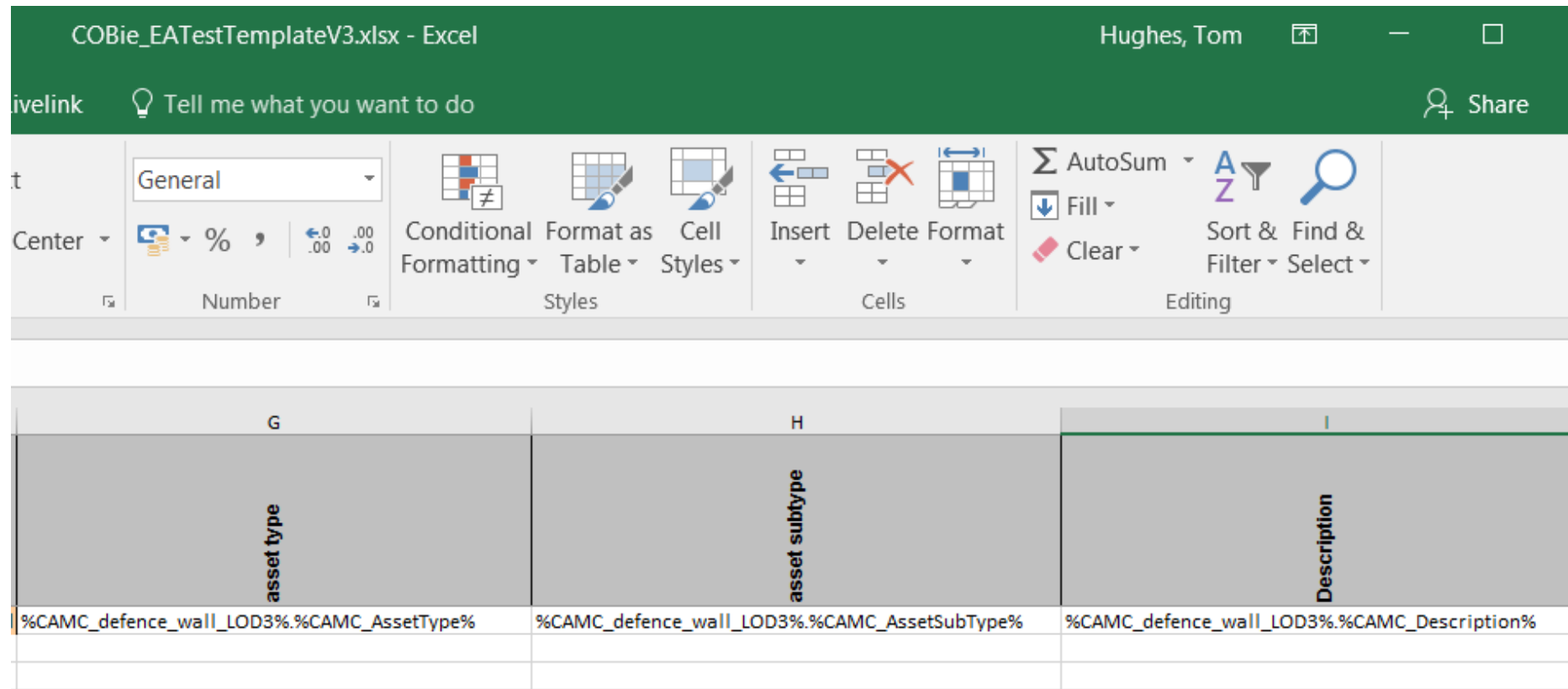
What if I don't need COBie?



Configuring COBie for Navisworks Tool

The data extraction format is simply;

`%PropertySetDefintion%.%PropertyName%`



asset type	asset subtype	Description
%CAMC_defence_wall_LOD3%.%CAMC_AssetType%	%CAMC_defence_wall_LOD3%.%CAMC_AssetSubType%	%CAMC_defence_wall_LOD3%.%CAMC_Description%

Exporting the information

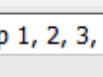
COBie Data



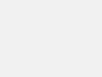
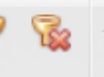
Drop 1, 2, 3, 4



COBie Data



Drop 1, 2, 3, 4



Attribute

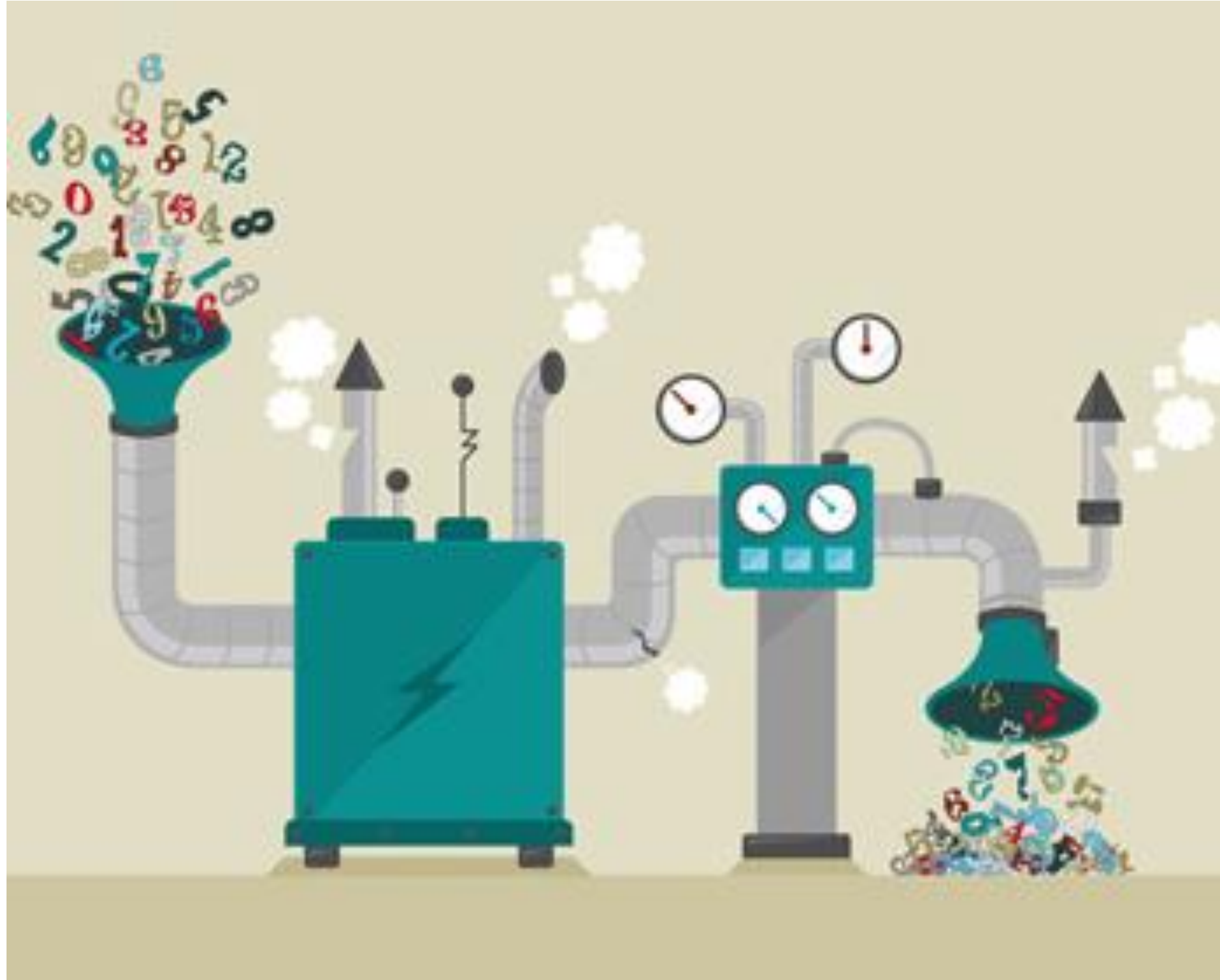
	A	B	C	D	E	F	G	H	I	J	
1	Name	CreatedBy	CreatedOn	Category	SheetName	RowName	asset type	asset subtype	Description	current SOP	current SC
2	CAMC_defence_wall	tom.hughes@mottmac.com	2016-01-28T09:00:00	Requirement	Feature	CAMC_defence_wall	Flood Defence	Wall	Reinforced Concrete Flo	1 in 100 years	(
3											
4											
5											
6											
7											

C:\Users\hug43008\Desktop\Gunslinger 2016\Datasets\Property Data Sets\COBie_EATestTemplateV3.xlsx

PropertiesCOBie Data



Data In – Data Out



Class Recap

Change perspectives

My objective of this class was to change perspectives about 'Asset Information' for infrastructure projects.

I hope that this class has increased your understanding of what asset information is, why it is valuable, and how Civil 3D and Navisworks can be used to create it.

Add rich data to an infrastructure model

We looked at how the ability to create property set definitions and then add them to Civil 3D objects

This opens up huge opportunities to add much more asset data to your models.

Configure the Navisworks COBie Extension based on client asset information requirements

We looked at how the user-defined spreadsheet template can be set-up to match the client asset information requirement.

The COBie exporter tool much more versatile than you may think.

Set-up and manage property set definitions

Property set definitions can be set-up to match client asset information requirements and data drops.

Different types of property set definitions can be used to structure the asset data enter and add intelligence.

By setting up property set definitions in a referenced template we showed how these can be managed and applied to multiple design files.

Use several features in AutoCAD Civil 3D 2017

- Referencing Style Templates
- Using a feature line as a corridor baseline and
- Adding property data sets to Civil 3D objects

are all new feature in Civil 3D 2017.

Thank-you

I hope that this class has been useful and that you will find opportunities to use these examples on your own projects to add more value to the work you deliver.



We **open** opportunities
with **connected** thinking.



Questions

