Higher Nationals

Construction and the Built Environment

Unit Study Guide

Unit 6: Construction Information (Drawing, Detailing, Specifiction)

Higher National Certificate Lvl 4

Higher National Diploma Lvl 5

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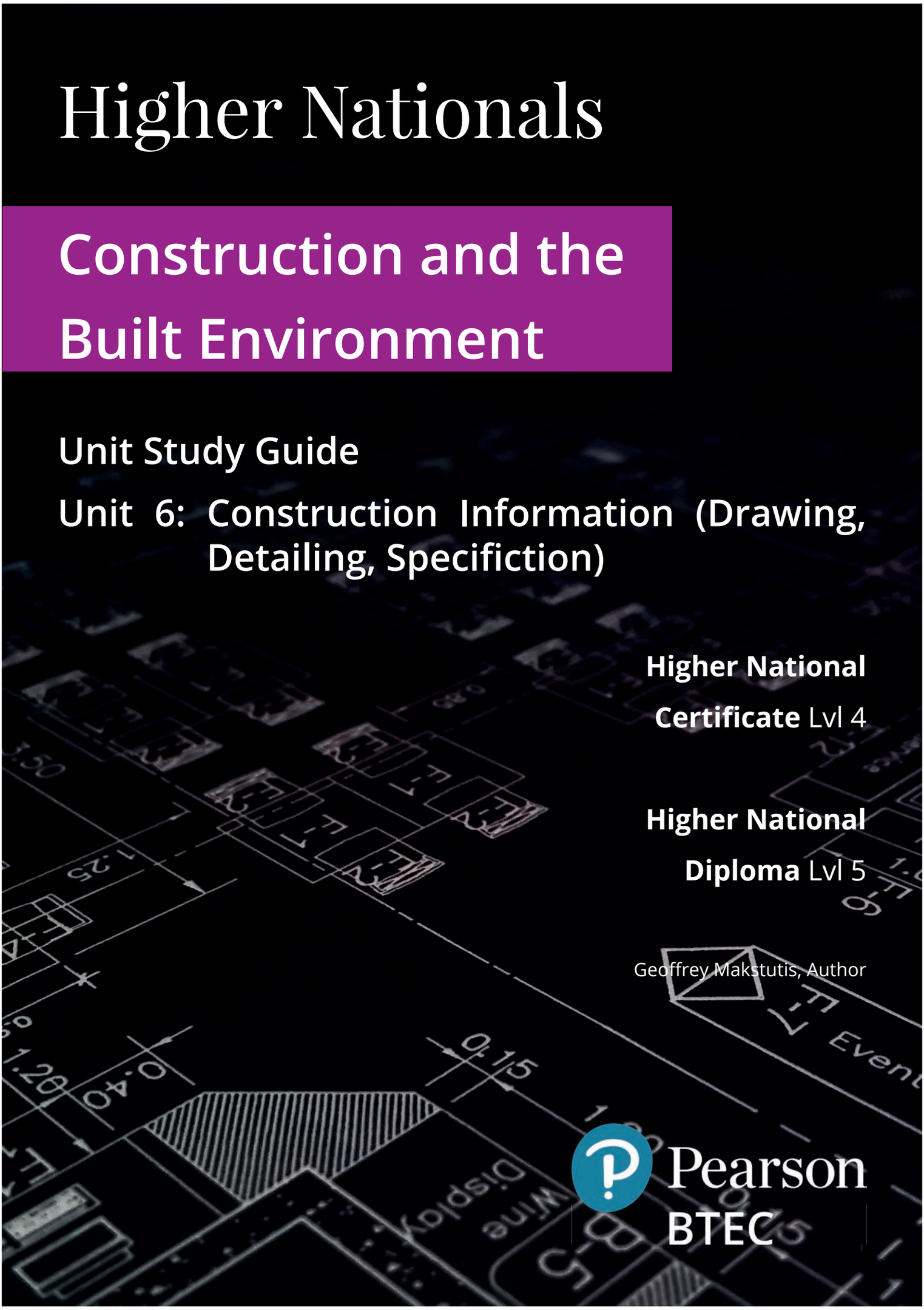

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About this Unit

Construction information is, in many ways, the most important material in the development of successful building projects. Whether it is a small house, a large office building, a bridge or other major infrastructure project, the ability to build; what can often be, very complex structures relies on our ability to present information that is accurate and coordinated.

The term 'construction information' refers to much more than just drawings. While drawings provide a graphic representation of information that is needed to assemble and erect structures, it relies on a range of other forms of information that, together, define the different aspects of the project. Some of these will be graphical (as in drawings, models, etc.), others will be written (such as, specifications) while others are very specific forms of lists (schedules) that provide information about types of material, equipment, costs, etc.

As construction projects have become more complex, the ways that we prepare, assemble, distribute and manage information has had to become more robust. When we have many different individuals and companies working on a project, each undertaking specialist tasks, it is very important that we are able to ensure the reliability and coordination between different bodies of information. While computers have revolutionised that way that we are able to generate, store, transmit and track information, these digital tools are just a more modern version of the systems that have been in place for a very long time.

LO1 Evaluate different types of construction information in the context of diverse project types

Essential Content

Topic: Construction drawings

What is the role of construction drawings?

How is a site plan used?

What do we include in general arrangement drawings?

Why do we draw sections?

Things to Remember

One of the most common forms of construction information is the drawing. For many people, the 'blueprint' is the thing they think of when asked what kind of information is needed to construct something. The cliché of a person in a hard hat, with a roll of drawings, is often used as a proxy for 'construction'.

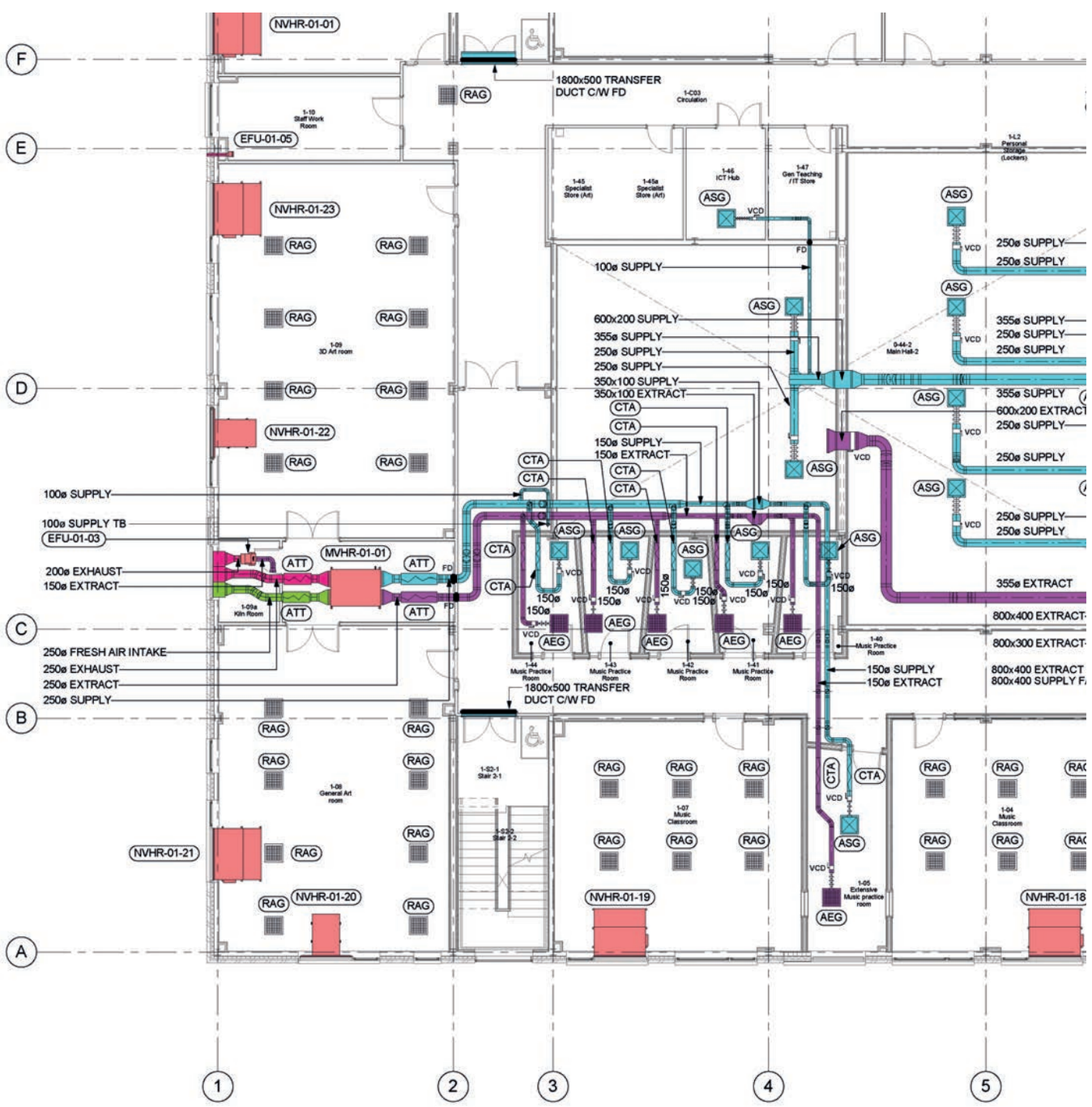
However, construction drawings are not simply drawings of a project. They are a highly specialised form of technical communication. They enable a construction professional to understand many different aspects of a project and to interpret the information that will allow them to undertake the operations necessary to construct the finished project.

Increasingly, site operatives will view construction drawings on computer screens or tablets, rather than referring to printed drawings. However, the conventions associated with the graphical presentation of project information remain.

A **site plan** is a top-down view of the overall area of the project. Typically, this will include the entire area of the site (where works will take place) and some adjacent areas. Site plans are usually drawn at a very large scale, so they can show the full extent of the site (and adjacent areas) within a given drawing size. Site plans are often begun following initial investigation and desk studies, with additional information added as it is obtained from site surveys and further investigation. Site plans show:

- site boundaries
- existing structures
- trees and vegetation
- roads, footpaths, ramps and parking areas
- proposed buildings or infrastructure
- dimensions
- topographic information (levels, benchmarks, etc.).

Construction drawings are not intended to be attractive or to have particular aesthetic character. They are a form of information. In this sense, they are different from **presentation** drawings, which aim to show the character of the project. When preparing construction drawings, don't get caught up in trying to make them beautiful; rather, concentrate on ensuring the information they provide is clear and precise.



Topic: Assembly drawings and detail drawings

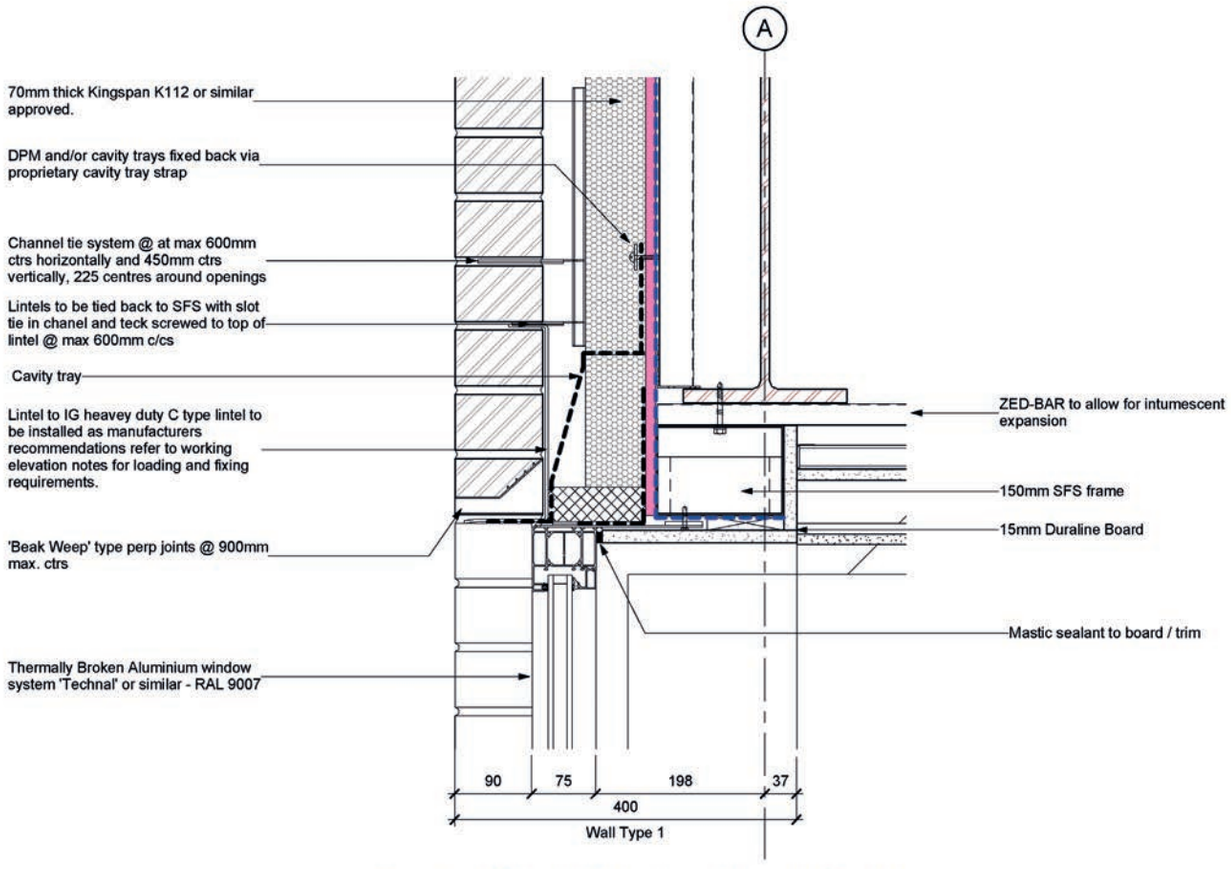
What is the difference between a detail drawing and an assembly drawing?

What scale might be use for a detail?

Things to Remember

Assembly drawings are used to show how multiple elements combine to form a single item. For example, a kitchen cupboard is comprised of a number of different parts. In a general arrangement drawing, the overall shape and size of the cupboard will be shown. An assembly drawing will show how the different parts (carcass or body, door, legs, etc.) fit together to form the cupboard.

Detail drawings (or Component Drawings), like assembly drawings, show how different parts of a system are put together. However, while assembly drawings are generally used to show how parts fit together to make a whole, detail drawings show how different elements are brought together to form part of a structure; this may include assemblies. For example, a wall detail will show how the different parts of a wall are put together. This may include the outer material (such as brick or timber siding), the internal structure (timber framing, steel, concrete, etc.), any insulation within the wall (if a cavity is present), inner finishes, etc. Similarly, a roof detail may show the junction between the wall and the roof, illustrating how the roof is supported on top of the wall and showing the different materials and their arrangement to construct the roof.



3 Typical Bwrk Window Head Detail
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Activity

Activity 1

Many local/regional government planning departments have online systems that allow you to view general arrangement drawings (submitted with planning applications). Find a recently completed small building in your area, and see if you can download or view the drawings submitted for planning.

- What type of information do these drawings provide?
- Is it sufficient for construction?
- If not, what else would be needed?

Activity 2

Based on the drawings you found for Activity 1 (or for another small project), choose a part of the construction work that will be required and prepare a simple bill of quantities, by taking measurements from the drawings.

- What materials will be required?
- How much of each material will be needed?
- How can you quantify the material (linear metres, square metres)?

LO2 Develop construction drawings, details, schedules and specifications in support of a given construction project	
Assessment Criteria	**Areas for consideration**
P3 *Develop* a set of general arrangement drawings, selected details and door/window schedules	Note that this is not intended to be a complete set of construction drawings; instead, you are asked to prepare specific types of drawing. Your tutor may assign you a project, or you will choose a project, for which you will produce this information.
P4 *Produce* an outline bill of quantities	As with P3, you do not need to produce a complete bill of quantities. Rather, you are asked to produce an approximate or *outline* bill of quantities. (Note, the term 'outline' can refer to something that is described in general terms, without too many details.)
M2 *Compose* a schedule of works	Using the drawings you prepared for P3, you are asked to develop a schedule of works. As above, this will not be a complete schedule (since you won't have all the information). Instead, your aim is to develop a schedule of works that provides clear information about the types of work required.
D1 *Justify* the use of specific types of construction information in support of a given project	For the given project you have been using to develop drawings, a bill of quantities and a schedule of works, you are asked to justify the types of information you would use for the project. Note that this criterion is shared with LO1, so your justification will be based on both your investigations into and production of different types of construction information.

Topic: Clash detection

What is clash detection?

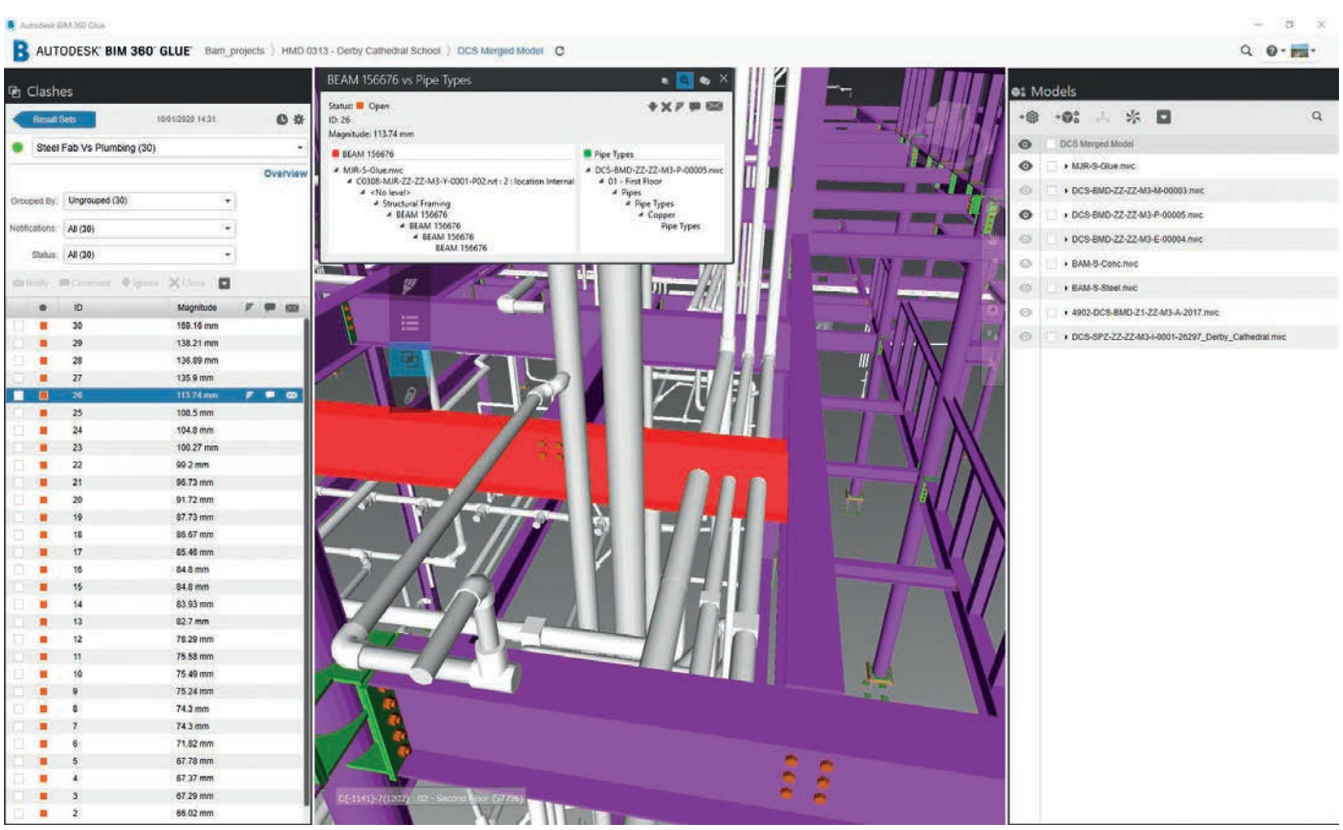
How do we manage clashes?

Things to Remember

In modern construction, for complex projects, there is always a need to ensure there are no 'clashes' between different parts of the project. Digital systems have made the process of clash detection more manageable and more accurate.

At its simplest, clash detection involves looking at a construction project and highlighting situations where systems that should be separate are intersecting. For example, an air conditioning system should be uninterrupted, with continuous ducting from source to exhaust point. If a heating pipe or duct intersects with (or runs too close to) the air conditioning pipework, the efficiency of the system will be compromised. This will lead to increased operational costs.

Modern clash detection systems use model data to find and highlight places where models intersect (or 'clash'), so the design and technical teams can address any issues before they are discovered on site. With the use of BIM data, clash detection can be much more nuanced and finely tuned; some BIM systems even have clash detection integrated within the software.



Many of the large CAD/BIM software vendors also provide tools for clash detection. These companies often have promotional videos that show how clash detection software works. These videos will provide a good overview of the principles of digital clash detection.

LO4 Assess ways in which construction professionals collaborate in the production of construction information.

Essential Content

Topic: Project roles

What are the common roles for individuals (and teams) in a construction project?

How do different roles relate to each other?

Things to Remember

As we know, there are many different roles within a construction project. In this topic, we are not interested in an exhaustive list of everyone involved. Rather, we are interested in those groups that have direct engagement with the production and management of construction information. However, this list itself may extend to numerous different teams.

The RIBA Plan of Works (2013) includes a Project Roles Table that lists 31 different individuals/groups, not taking into account any sub-contractors or manufacturers.

To simplify, we might consider the following roles as the key information participants:

- client and client adviser
- designers (including lead designer, lighting designer, master planner, etc.)
- lead/general contractor
- architects (including interiors, landscape, etc.)
- engineers (structural, civil, services, acoustics, highways, etc.)
- cost consultant/quantity surveyor
- manufacturers
- facilities management (FM) advisor
- project manager
- other consultants (party wall surveyor, cladding consultant, planning consultant, etc..)

These people, and many others, will be involved in the generation and/or review of construction information.

! Recognising the roles of individuals and groups within a project is only one part of understanding the flow of information. We must also consider the nature of the relationships between the various parties. In some cases, these relationships are contractual; in other cases, they are based almost completely on the flow of information.

Topic: Document sharing and distribution

How do we share documents in construction?

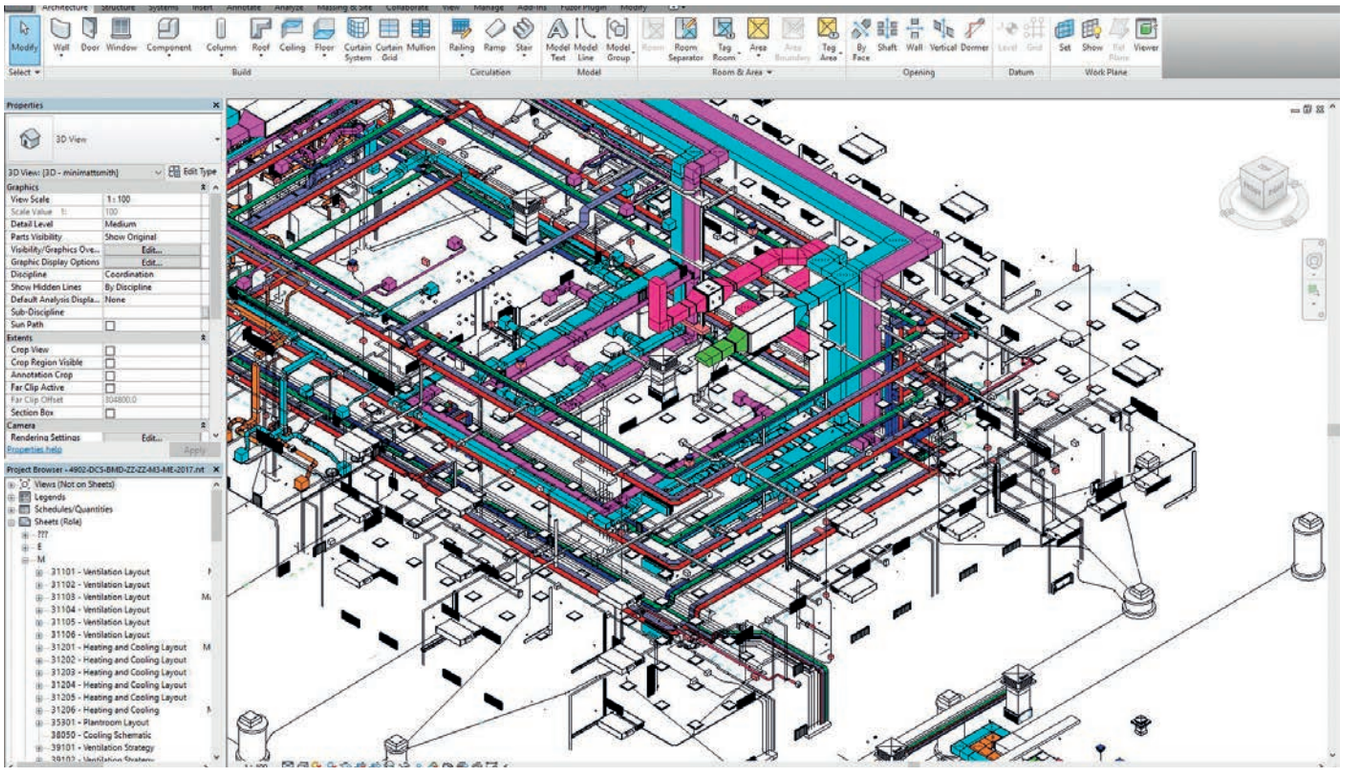
Why is it necessary to track information?

Things to Remember

To facilitate the collaborative sharing of information, various systems have been adopted to track and manage the transmission of information. These systems are intended to provide an assured method of tracking the movement of information between different collaborators.

The traditional approach to sharing construction information between different parties is to use a **transmittal**. This is a document that can (depending on the circumstances) be considered a legal document. It records the formal despatch of information from one party to others. In some cases, the transmittal will simply be to update the other parties – for example, when drawings have been updated or changed. In other cases, the transmittal may require formal approval of the information that is being transmitted, and the approved documents must be returned.

As computers have become a common feature within the offices of clients, architects, consultants, contractors, etc., the methods for sharing and distributing information have become much more dynamic. However, even with digital communication (email, FTP, etc.) we need to track the flow of information. In fact, as it becomes easier to update and transmit changed information, it becomes more important to know you have the latest information and that your latest updates have been integrated by others. Digital systems often keep very detailed information about the materials that are being transferred – effectively, the system creates a digital transmittal.



Additional Resources

Additional resources, to accompany this Study Guide, can be found on **HN Global** here:

https://hnglobal.highernationals.com/study-guide-unit-6-construction-information

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