Construction Industry Advisory Committee (CONIAC)

Keeping Pace with Change Working Group

Anticipating and tackling new health and safety challenges

#HelpGBWorkWell

CDM 20-20 Vision - changing the culture

Applying CDM 2015 strategically to diverse projects.

April 2021

Contents page

1.	INTRODUCTION	3
2.	KEY CHANGES IN CDM 2015	3
3.	MANAGEMENT ARRANGEMENTS AND THE CDM STRATEGY BRIEF	5
4.	CASE STUDIES	6
	CASE STUDY 1A – SMALL DOMESTIC- THE SUNBURY EXTENSION	9
	CASE STUDY 1B – SMALL DOMESTIC- THE BISHOPS STORTFORD EXTENSION	12
	CASE STUDY 2 – MEDIUM DOMESTIC -THE CHELSEA MEWS REFURBISHMENT	16
	CASE STUDY 3 – LARGE DOMESTIC -THE CHESHIRE MANSION	19
	CASE STUDY 4A – LARGE COMMERCIAL DESIGN & BUILD PROJECT	22
	CASE STUDY 4B – LARGE MULTIPLE BUILDING COMMERCIAL DESIGN & BUILD PROJECT	26
	CASE STUDY 5 – MEDIUM SIZED COMMERCIAL REFURBISHMENT PROJECT	31
	CASE STUDY 6 – MINOR RIVER IMPROVEMENT	35
	CASE STUDY 7 – SMALL RAILWAY PROJECT – (APPROACH TO BURIED SERVICES)	38
	CASE STUDY 8 – LARGE ENERGY FROM WASTE (EFW) PROJECT	41
	CASE STUDY 9 – THE YORKSHIRE AIRPORT	46
	APPENDIX 1 CDM STRATEGY BRIEF	56
	APPENDIX 2 SECTOR PLANS OF WORK	58
	APPENDIX 3 FREQUENTLY ASKED QUESTIONS	60
	CDM 20-20 REPORT ACKNOWLEDGMENTS	69

1. Introduction

Although the CDM regulations have been in force since March 1995, there is still widespread lack of knowledge, misunderstanding and misinterpretation across the Industry as to how they should be addressed on projects of varying types, size and complexity.

The Keeping Pace with Change report – 'CDM2015 - from Compliance to Consultation and Collaboration' (published April 2019) outlined the efforts by the major professional institutions to address the problem and embed the requirements of the latest version of the CDM Regulations (which came into force on 6th April 2015) into the practices of project teams led by architectural and engineering professionals.

The report also highlighted the difficulties that many attendees on training courses experienced in trying to apply the regulations to their diverse project environments, which do not necessarily conform to the 'standard building project' model with its clear contractual relationships and traditional building processes.

Probably the greatest area that creates confusion is when the work is being carried out for a domestic client but there are also many other types of construction work, where the allocation of duties is not a straightforward exercise, unless the principles underpinning the regulations are clearly understood.

The aim of this guide is to aid the understanding of CDM 2015 by using a combination of 'model' case studies and a list of commonly asked questions.

2. Key changes in CDM 2015

The Principal Designer

The most obvious change was the creation of the principal designer function, to mirror, in the pre-construction phase, the duties of the principal contractor in the construction phase (and the demise of the CDM coordinator function). It has not always been appreciated that the "principal designer is NOT a direct replacement for CDM co-ordinator function; the range of duties is different from those undertaken by the latter under CDM 2007".

Although not fully recognised at the transition stage of the regulations, the principal designer function requires a management capability and understanding of the whole design and construction process which is usually (though not always) best fulfilled by a lead designer.

The previous CDM coordinator function was typically seen as 'an individual' who was often appointed late in the pre-construction process and had little impact on risk management decisions taken by the design team. However, as the 2007 ACOP stated 'On simple projects

one person should be able to provide all the support that clients need, but a team approach will be more common for larger or more complicated projects because of the workload and skills required.'

The creation of the principal designer function was intended to promote a team-based approach to health and safety risk management and consideration of risks from the very start of the project. Increasingly, the principal designer appointment is being made in a timely fashion but there remains a lack of clarity within many project teams as to which party is best placed to lead the function and it is still common to find that an appointment has been made to a party not actively involved in design, which is not what was intended.

Domestic clients

One of the fundamental drivers for the revised regulations was the need to include domestic clients as duty holders, a requirement of the EU directive 92/57/EEC, which had previously been omitted in UK legislation.

Although CDM 2015 does impose duties on domestic clients, in the normal course of events these duties are transferred to whichever of the other duty holders is most appropriate.

There has probably been more confusion and debate surrounding this topic than any of the other changes to the regulations.

The Client and their Management Arrangements

CDM 2015 makes the (commercial) client accountable for the impact their decisions and approach have on health, safety and welfare on the project.

Regulation 4 states 'A client must make suitable arrangements for managing a project and ensure that these arrangements are maintained and reviewed throughout the project'.

This report and associated case studies aim to highlight the importance of ensuring that the management arrangements are suitable for the project, are developed by the client with assistance from their project team and are communicated clearly to everyone associated with the project.

Regulation 8 – General Duties

The duties set out in Regulation 8 represent an addition to the previous 2007 version of the regulations. They apply to all duty-holders and include: -

- Designers and contractors being able to demonstrate their suitability for the roles to which they are appointed (in terms of skills, knowledge, experience and organisational ability) with due weight given to membership of an established professional institution or body and the use of PAS-91 for pre-qualification purposes.
- The obligation to work cooperatively with other parties engaged on the same project or adjoining construction sites. This relates to design stage cooperation as well as during construction.
- Emphasis being placed on project team-members providing 'comprehensible' information relating to CDM, rather than excessive, bureaucratic paperwork, to other members of the team **(i.e., *"unnecessary information that can prevent the clear communication of key messages")***

3. Management Arrangements and the CDM Strategy Brief

The HSE publication 'Managing health and safety in construction' (ref L153) provides guidance on the Regulations and the expected standards which duty-holders should seek to satisfy.

Under the heading 'What must a client do' L153 outlines the key elements of the management arrangements for which the client is accountable and suggests that 'Clients could prepare a 'clients brief' as a way of setting out the arrangements'

To avoid confusion with the use of the term, which has a broader meaning for many clients and construction professionals, both the ICE and RIBA have adopted the term 'CDM Strategy Brief' in their training programmes to describe the development of key information which will form the starting point for establishing suitable management arrangements 'proportionate to the size of the project and risks involved in the work.'

Ideally, the CDM Strategy Brief will be developed in the earliest stages of the project, collaboratively between the leading members of the project team including the client, lead designers and other key influencers, to ensure that everyone understands the requirements of CDM 2015 and how the various duties will be discharged. As the following case studies demonstrate, on projects of differing types and complexity, the allocation of responsibilities can require careful consideration, and this is best done before the detailed project work begins.

See Appendix 1 for a standard CDM Strategy Brief Template.

4. Case studies

In order to demonstrate how the principles underpinning CDM 2015 can be flexibly applied in different scenarios, a number of 'model' case studies have been developed to illustrate that every project has a unique set of characteristics that need to be taken into account so that an appropriate CDM Strategy can be developed by the client and their project team. Each case study has been derived from a real project scenario, but has been modified with names anonymised, locations and some project details altered to provide a guide as to how similar 'real world' projects could adopt a strategic approach to CDM compliance. Each case study incorporates a timeline which illustrates, in a simple format, how the key duty-holdings can be allocated through the various key stages of the project.

The case studies have been split into building and infrastructure categories and the works stages described in Appendix 2 have been condensed and simplified to

Stage 0/1 – Project definition and strategy
2/3 – Design development
4/5 – Detailed design and construction
6/7 – Commissioning and operation

We have come to appreciate over the last five years that a building project may have many more facets and design interface issues to consider than a infrastructure project of a similar value. Therefore, a more detailed analysis and design development process is characteristic of architectural projects when compared with infrastructure or process engineering projects.

Nonetheless, the need to start the process with a strategic analysis, by the key players, addressing the dominant CDM requirements, is applicable whether we are contemplating a small domestic scheme or a major infrastructure programme.

Building case studies

Domestic projects

The following case studies illustrate how different levels of management are required on domestic projects (i.e., where the work is being carried out on the client's home and is not in connection with a business) of varying scales and complexity.

- CS1a &1b – small domestic projects
- CS2 – medium domestic project
- CS3 – large domestic project

Commercial projects

One of the most common questions asked by practitioners relates to the principal designer role when the client intends to appoint a design and build contractor. The assumption that the contractor "designs" the project in its entirety is a common misunderstanding, whereas they often only take on the "contractor design "issues at later stages of the project and after appointment. Consequently, a principal designer appointment is required from the outset of the project to integrate health and safety considerations into the total design. This role can be passed onto the contractor if there is further design required and if they have the requisite skills, knowledge, experience and organisational ability.
The following case studies illustrates this approach

- CS4a & 4b – large commercial Design & Build projects
- CS5 – medium-sized commercial refurbishment

Infrastructure case studies

Infrastructure or process engineering -led projects vary in nature to a much greater degree than building projects, with no common management approach equivalent to the RIBA Plan of Work.

The following case studies illustrate the varying ways the CDM Regulations can be satisfied: -

- CS6 – small river improvement
- CS7 – small rail project
- CS8 – large energy from waste project
- CS9 – multi-project programme- airport expansion

KEY TO TIMELINES USED IN THE CASE STUDIES:

Client duties (Commercial)	
Client duties (Domestic)	
Principal Designer duties	
Designer duties	
Principal Contractor duties	
Contractor duties	

The following project timelines only show significant duty holders.

Case study 1a – Small Domestic- the Sunbury Extension

Project description

Mr and Mrs W. wanted to improve their home to provide a large kitchen/dining area by knocking the existing kitchen and dining room into one and extending the back of the house by 3 metres. The existing integral garage was to be converted into a playroom for their children. The house was to remain occupied throughout the construction period.

Project value - Less than £100K

Key duty holders

As they were having building work carried out on their own home, Mr and Mrs W were not legally responsible for discharging the client duties under CDM 2015.

During stages 2/3, the architectural designer had the duties of the designer and principal designer.

From stage 4 onwards, the builder had the principal designer and principal contractor duties, as well as the client duties.

Plan of work stage	0 – 1	2 - 3	4 – 5	6 – 7
Role				
Client (Domestic)				
Architectural Designer (Principal Designer & Designer)				
Structural Design (Designer)				
Contractor (Principal Contractor)				
Contractor (Principal Designer)				
Contractor (Client duties)				

NB: See appendix 2, for explanation of the plan of work stages.

Management arrangements

Stage 0/1

Mr and Mrs W discussed their requirements with a recommended architectural designer.

Stage 2/3

The architectural designer was employed to draw up the plans for the scheme, which had to be submitted for planning approval. During the lengthy design and planning approval process Mr and Mrs W. interviewed several prospective builders. After a tendering process involving three contractors, they selected HBS to carry out the work.

Stage 4/5

The architectural designer had minimal involvement during the construction phase but was available for consultation if design issues needed further consideration.

- Although HBS carried out most of the work with their own workforce, they employed subcontractors for some of the work (eg, electrical, floor finishes.)
- Minor structural works were carried out by the builder with design checks carried out by a consultant structural engineer.
- The fitted kitchen was designed and supplied by a kitchen manufacturer but installed by HBS.

Design problems encountered when installing the kitchen units were resolved by HBS.

HBS carried out both the principal designer and principal contractor duties and effectively took on the client duties as well. Apart from the Construction Phase Plan produced using the CITB wizard app. there was no specific CDM documentation generated.

Significant Risks

None – works were considered to be normal practice by the contractor.

Health & Safety File

On completion of the works an architectural drawing was marked up by the contractor showing below ground services including electrical, gas supply and drainage.
Also, a separate architectural drawing was marked up by the contractor showing structural elements including the new supporting beams.

Summary

Although Mr and Mrs W had no legal responsibility under CDM 2015 (other than to make principal designer and contractor appointments in writing), they took a keen interest in the safety, health and welfare issues arising from the execution of the works by HBS, including the provision of suitable toilet facilities and the possible presence of asbestos.
Prior to the building contractor taking on the job, the architectural designer could be viewed as having principal designer duties, but as the only designer there was little to do in this function, over and above what they would do as a designer.

The project was not notifiable to the HSE as it did not exceed the five-hundred-person days limit.

Case study 1b – Small Domestic- the Bishops Stortford Extension

Project description

Mrs B. wanted to improve her small terraced, 2 storey, 2-bedroom house to provide a large kitchen/dining area by extending the back by 3 metres. The existing subdivided ground floor planning had a very small kitchen and small lounge dining area. The house was to remain occupied throughout the construction period.

Project value - Less than £50K

Key duty holders

As she was having building work carried out on her own home, Mrs B was not legally responsible for discharging the client duties under CDM 2015.
During stages 2/3, the architectural designer was appointed for the duties of the designer and principal designer. The architectural designer also advised Mrs. B that the CDM client duties needed to be professionally discharged under CDM 2015, and that he was prepared to take on these client duties for a small additional fee.
During Stage 4 an independent professional building surveyor provided a Building Regulations drawing but the architectural designer retained the principal designer duties.
From stage 4 onwards, the builder had the principal contractor duties, but the principal designer duties were retained by the architectural designer as well as the client duties.

Plan of work stage	0 – 1	2 - 3	4 – 5	6 – 7
Role				
Client (Domestic)				
Architectural Designer (Client Duties)				
Architectural Designer (Principal Designer & Designer)				
Structural Design (Designer)				
Building Surveyor Design (Designer)				
Contractor (Principal Contractor)				

NB: See appendix 2, for explanation of the plan of work stages.

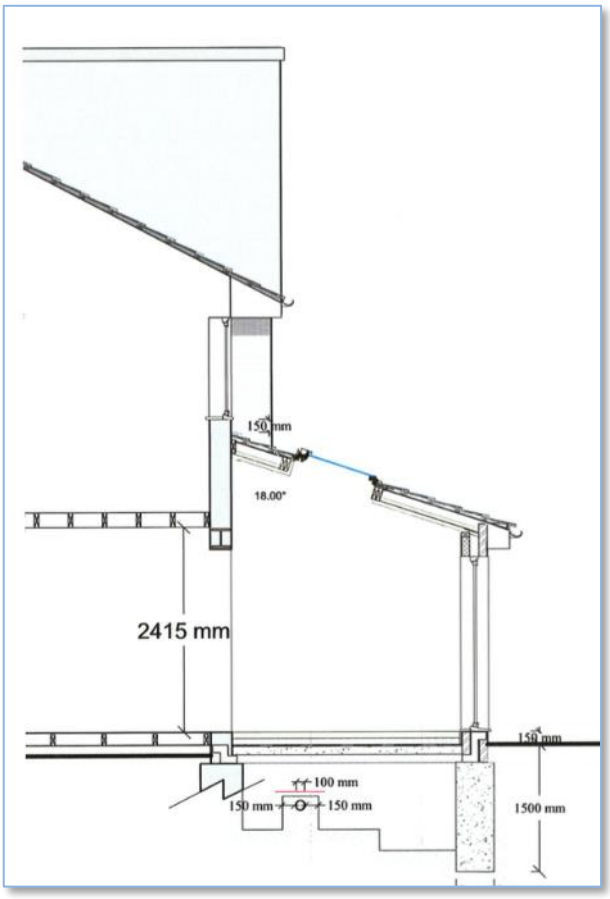
Management arrangements

Stage 0/1

The design brief was agreed between Mrs. B and the architectural designer and a strategy for agreeing permitted development rights with the local planning authority, which was more difficult and took longer than expected. The upper storey extension was omitted and just the ground floor extension developed.

Stage 2/3

Once agreement on planning matters was achieved a sub-contract building surveyor designer prepared a Building Regulations application drawing and submission including structural calculations from a structural engineer.
During the lengthy design and planning approval process Mrs B. interviewed several prospective builders. After a tendering and team interview process involving three contractors, Mrs B. selected GPS to carry out the work.



Stage 4/5

The architectural designer and principal designer expected minimal involvement during the construction phase but were available for consultation if design issues needed further consideration. However, after a start had been made on site and foundation trenches dug, a shared sewer passing below the extension and serving the 2 adjacent houses was discovered to have collapsed and needed replacement. The water utility company investigated and recommended full replacement across the 3 properties, with an earliest start date causing 6 weeks delay. The JCT Minor Works contract permitted this force majeure delay with no consequences to either party. There was also a need to change the design of the ground floor slab from a ground bearing slab to a beam and block spanning construction at additional cost.

- Although GPS carried out most of the work with their own workforce, they employed subcontractors for some of the work (e.g., electrical, floor finishes, and kitchen installation.)
- Minor structural works were carried out by the builder with design checks and design carried out by a consultant structural engineer.
- The fitted kitchen was designed and supplied by a reputable supplier but installed by GPS. Design of the kitchen units were agreed by Mrs. B and the supplier.

GPS carried out the principal contractor duties but not the client or principal designer duties as they did not have the skills, knowledge or experience. Apart from the Construction Phase Plan produced using the CITB wizard app. there was no specific construction stage CDM documentation generated.

Significant Risks

Works were generally thought to be of normal practice for the contractor, but various changes of design and programme phasing were required for public health and structural ground loading conditions. An asbestos and utilities (e.g., Gas and electrics) review had been carried out by the design team with no adverse conditions in this case. It was noted, however, that both these issues are commonly found on domestic projects and need due consideration at design and construction stages of all such projects. Good liaison between

the principal designer and principal contractor negotiated suitable design, cost, utility company requirements and construction changes.
Access to the site for materials, plant and workforce was via a small route to the rear of the terrace gardens which had to be managed to not affect other properties and children who used this route.

Health & Safety File

On completion of the works the construction drawing was marked up by the principal designer showing the revised below ground drainage services and floor construction, including the structural calculations for opening up and a new beam to support the upper floor.
Access to a new SVP rodding eye internally was also indicated on the drawings along with a newly located electrical fuse board.
A separate architectural drawing was marked up by the contractor showing structural elements including the new supporting beams.

Summary

Although Mrs B had no legal responsibility under CDM 2015, (other than to make principal designer and contractor appointments in writing), she took a keen interest in the safety, health and welfare issues arising from the execution of the works by GPS, including the provision of suitable toilet facilities and the possible presence of asbestos.
The architectural designer took on the principal designer and client duties, as the lead designer and although it appeared to be a simple project there were additional design and coordination of health and safety issues that had not been expected. These were covered by the additional principal designer and client duties fee and a good rapport between the commissioning client, design team and the contractor. There was however a signed letter of appointment for all principal designer, client duty and principal contractor functions as well as a Minor Works JCT contract.
The project was not notifiable to the HSE despite the 2 months delay.

Case study 2 – Medium Domestic -The Chelsea Mews Refurbishment

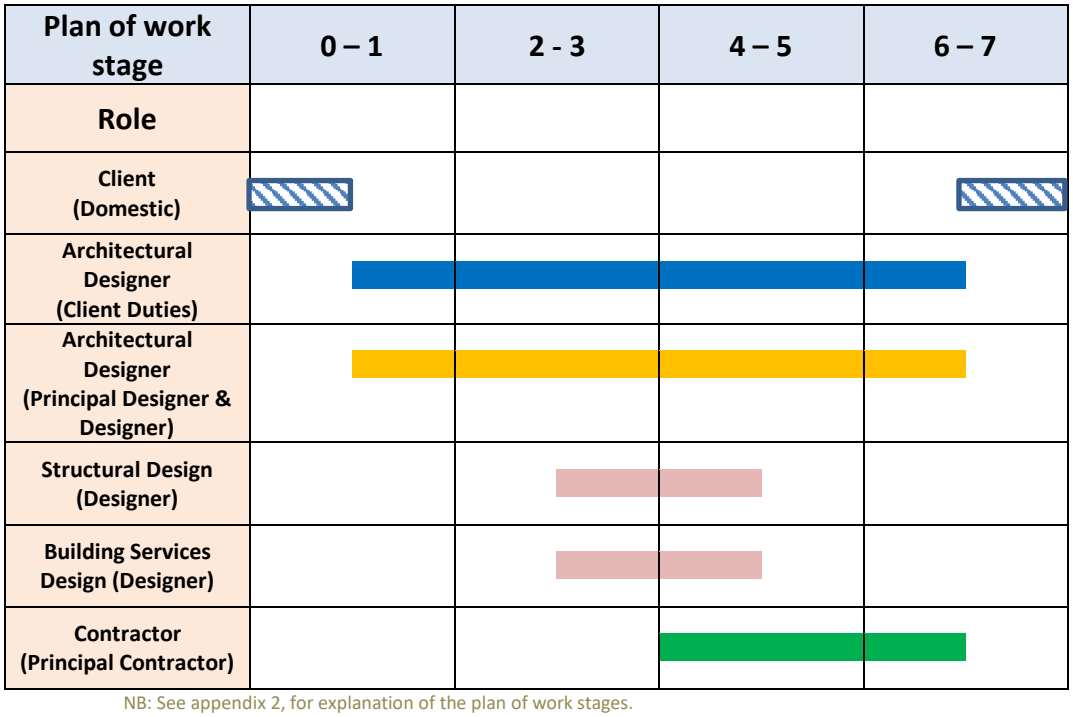
Project description

Remodelling of the existing elevation with new entrances and windows, whilst gutting the building and ensuring stability of the fabric when basement excavation, roof extension and floor removal works were being carried out. A significant amount of demolition and fit-out work was included. Access to the Mews Court for construction vehicles and plant was height and width restricted.

Project value Less than £1.5m

Key duty holders

The client Mrs. D was a businesswoman, moving to the UK with her family. Her aim was to convert the existing mews property into a suitable residence for herself and her children. An architectural practice was employed by the owner to lead the design team which included a structural engineer and building services consultant.
An experienced contractor was appointed as the principal contractor for the construction phase.



NB: See appendix 2, for explanation of the plan of work stages.

Management arrangements

Stage 0/1

The architectural designer explained the requirements of UK legislation to the client and they agreed that the architectural designer should act as principal designer and also take on the duties of the client [regulations 4(1) to (7)] for the duration of the project. They jointly developed a CDM Strategy Brief to set out their joint understanding of the management arrangements for the project. The brief highlighted the structural stability and temporary works; considerations which the designers and contractors would have to take account of in their work.

Stage 2/3

The design team produced a detailed set of design drawings, with significant risk issues highlighted, which a number of experienced contractors were invited to tender against. The requirement to manage the considerable amount of temporary works was made explicit in the tender documentation.

Stage 4/5

The successful contractor provided details of their temporary works procedures in their tender submission and subsequently set out the temporary works requirements in their construction phase plan. The architectural designer continued to project manage the scheme on behalf of the client and monitored the principal contractor's temporary works design performance through liaison with the principal contractor's temporary works coordinator (PC-TWC)

Significant Risks

Stability of structure during remodelling work.
Access for construction vehicles including spoil removal trucks, waste skips, cranes and concrete pump for basement construction due to limited archway access.
Limited rear access to adjoining owner's property behind, to build the roof extension.
Asbestos in the existing fabric, requiring a detailed survey before design work began, paid for by the client
Underground voids and a subterranean river in the road requiring consideration of temporary loading conditions during construction.

H&S File

A simple file was issued to the Client based upon the Pre-Construction Information highlighting any residual risks and referenced to the Contractors O&M Manual.

Notes:
The project was notifiable by F10, submitted by the architectural designer as a client duty.

Summary

This was a relatively small existing building refurbishment but with significant temporary works considerations which needed a suitably experienced contractor to deliver. Access to the site was difficult, the presence of underground voids presented unexpected water ingress and plant loading considerations. The early collaboration between the client and her architect resolved the client duty, principal designer appointment and appropriate principal contractor appointment issues.

Case study 3 – Large Domestic -The Cheshire Mansion

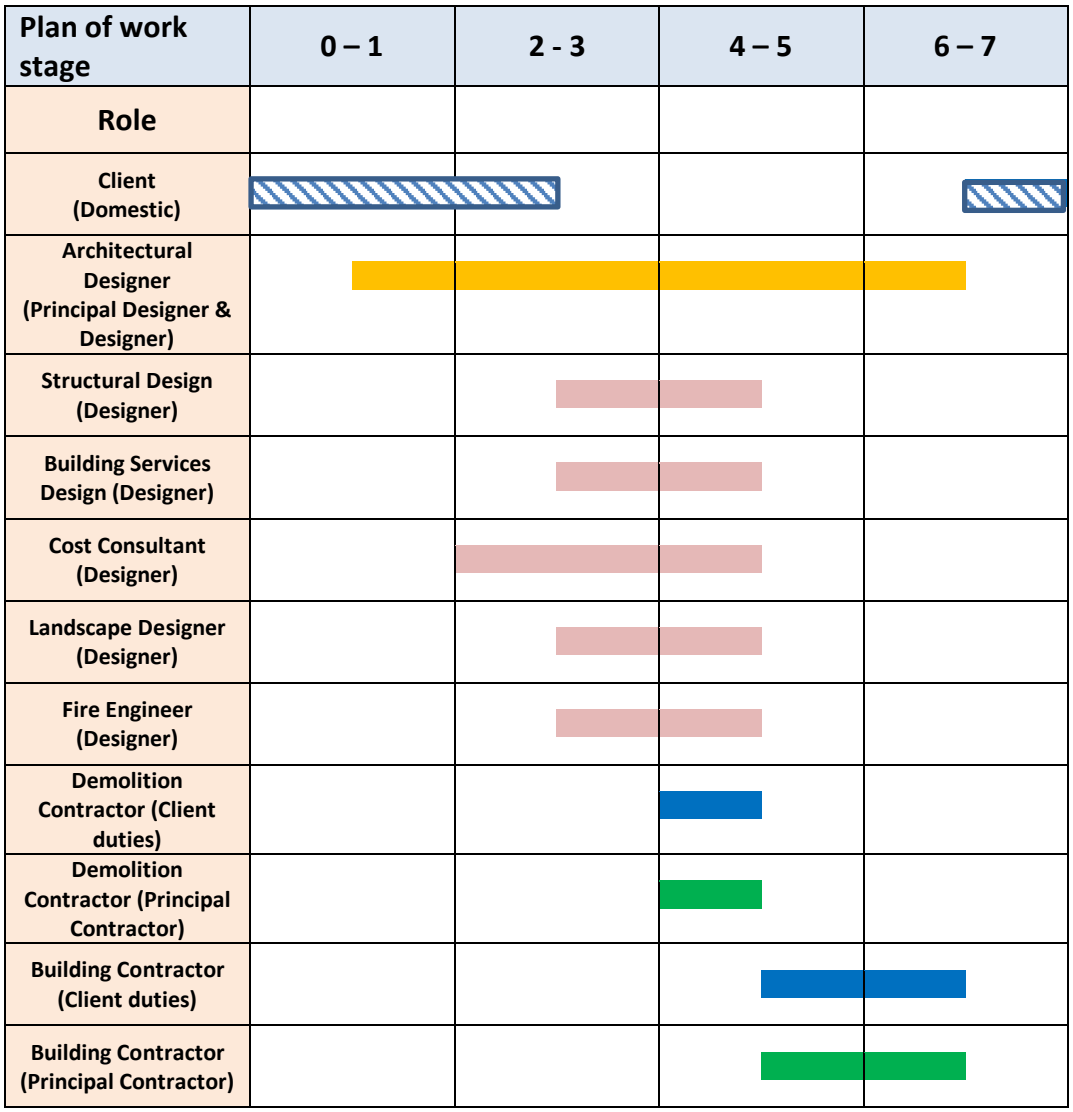
Project description

Demolition of an existing dwelling and associated out-buildings and construction of a new-build house with six bedrooms, five reception rooms and detached garden pavilion. Excavation for basement and pavilion on a narrow sloping site required temporary works consideration. Some large trees were present and retaining walls were required on both flanks due to the sloping site.

Project value Over £1.5m

Key duty holders

The client Mr. L. was a successful British property developer and CEO of a listed construction development business. He appointed a leading regional architectural designer, Merriweather Associates, (MA), to head up the design team which included a cost consultant, structural engineer, services engineer, landscape designer and fire engineer. The construction work was carried out by the same contractor, Bygrave Construction, as on an adjoining housing estate, using traditional construction techniques.



NB: See appendix 2, for explanation of the plan of work stages.

Management arrangements

Stage 0/1

In early discussions between the client and the architectural designer, it was agreed that AHM would take on the principal designer duties for the duration of the project, for an additional fee. However, they were not willing to assume the client duties and as the client had already selected their contractor for the main building work, it was decided that the project management responsibilities would form part of their contract with Bygrave Construction.
Following the development of a CDM Strategy Brief which set out these management arrangements. the F10 notification was issued by the client to the HSE.

Stage 2/3

AHM brought together members of the design team, before detailed design commenced, to review the CDM Strategy Brief and to develop the list of significant issues to be addressed during the design phase. Attendees were reminded to apply the principles of prevention when weighing up the suitability of different options.

Stage 4/5

As part of his procurement strategy, Mr L. opted to let the demolition works as a separate package, ahead of the main works. The arrangements for carrying out the demolition of the existing buildings were recorded in writing before work began.
A full design was worked up and priced by the preferred contractor who negotiated a fixed price contract with the client.

Significant Risks

Asbestos in existing buildings.
Lead paint in existing buildings and on metalwork.
Existing live buried electric and gas services.
Difficult site access due to steep slopes

H&S File

Client used annotated CDM drawings as H&S File.
No significant risks were recorded other than buried services.

Summary

The client realised that the principal designer role entailed more than just talking issues through in meetings and requested the lead architectural designer to analyse the site and design and annotate drawings appropriately as a principal designer output.
These drawings helped all parties to understand how risk issues had been mitigated or minimised by the design team.
As the architect was not willing to take on the client role, the demolition and building contractors each accepted taking on the client duties for their respective phases of the construction programme, in addition to acting as principal contractor (sequentially).

Case Study 4a – Large Commercial Design & Build Project

Project description

The redevelopment of a central London site located at a major highway junction adjacent to a London Underground station

The works consisted of: -

Demolition of one six storey building and two five storey buildings.

Refurbishment of two existing buildings.

Construction of four new buildings consisting of -
Building 01 - 15 storey office building
Building 02 - 5 storey offices with retail units and restaurant at ground level
Building 03 - 4 storey offices
Building 04 - 4 storey residential accommodation with retail units at ground floor

Project value Over £500m.

Key duty holders

A commercial design and build project for a mature commercial client who was a major central London-focused developer.
Client / Developer – Verdent
Architectural designer – Fellowes & Partners
Structural designer – ASK
MEP designer – EMNE
Principal contractor – Maxiplan
Client CDM advisor – Cole & Co

Plan of work stage	0 – 1	2 - 3	4 – 5	6 – 7
Role				
Client / Developer (Commercial)				
Architectural Designer (Principal Designer & Designer)				
Structural Design (Designer)				
Building Services Design (Designer)				
Contractor (Principal Designer)				
Contractor (Principal Contractor)				

Management arrangements

Stage 0/1

During the concept and developed design stages of the project the architectural designer (F&P) took on the duties associated with the principal designer function.

During the early stages of the project, F&P (as PD) ran a project workshop with the client and other designers to map out the health and safety strategy for the project and produced a CDM strategy brief. F&P assisted Verdent in preparing an initial set of pre-construction information that included: -

- The project health & safety strategy
- The CDM Strategy brief
- The schedule of surveys
- The schedule of significant issues

Stage 2/3

F&P also produced, as part of the design development, a CDM analysis and options report which was reviewed with Verdent at each work stage.

The client had determined that they wanted to let a design and build contract and appointed the preferred contractor under a pre-contract service agreement to assist with the design risk management and cost finalisation.

Stage 4/5

Once agreement was reached on the terms of the contract, the principal contractor took over the principal designer function and coordinated the technical design carried out by their sub-contractors, as well as a variety of temporary works design.

Significant Risk Information

- Unexploded Ordnance
- Existing Asbestos
- Northern Line - London Underground
- Existing underground services
- Contaminated ground
- Dewatering and temporary waterproofing - Water ingress, flooding

Structural

- Collapse of building and excavations
- Deep basement excavation and piling
- Basement Retaining Walls
- Uncontrolled collapse of buildings during demolition
- Existing Vaults under pavements
- Complex temporary works during top-down construction

MEP

- Access to service risers during construction
- Access to external extract flue for cleaning and maintenance
- Access to plant and equipment at roof level for maintenance and replacement

Cleaning

- Façade access via BMU restricted by building canopy at building 01
- Access to building 01 atria, internal
- Access to façade behind punched/perforated panels

Replacement

- Access strategy to facilitate building 01 replacement of cladding and glazing - clash with BMU
- Access to façade behind punched/perforated panels
- Strategy to replace external extract flue

H&S File

A H&S file as set out as in appendix 4 of L153 was compiled on an electronic platform.

Any residual risks that remained at the end of the construction phase were recorded within the health and safety file.

Summary

For large, complex building projects typically found in city-centre locations the range of significant risk issues can be considerable. During both the design development stage (2/3) and the technical design/construction stage (4/5) the role of the principal designer is to ensure effective coordination and communication between the various design parties. If the PD duties are to be passed from the lead designer to the principal contractor, careful consideration must be given in developing the CDM Strategy to ensure that the significant risks and the way they will be mitigated is understood by all parties.

Case Study 4b – Large Multiple Building Commercial Design & Build Project

Project description.

The redevelopment of a central Glasgow site located in an area of historic interest adjacent to the financial heart of the city.

The works consisted of: -

Demolition and partial retention of multiple old and dilapidated buildings on a site bounded by a railway cutting and high street and under-sailed by a major Metro (underground) line. The site has archaeological interest below ground and is in a conservation area.
Mixed use development over three plots in a Conservation Area. Proposed new build and refurbished Victorian buildings into office space, retail and residential buildings.

Architectural designer A responsible for buildings 1, 1c and 3.
Architectural designer C and D appointed to end of stage 3 as sub consultants to Architectural designer A on 1a and 1b respectively.
Architectural designer B working on building 2, appointed directly to client.
Landscape designer – Public Realm

Refurbishment and extensions of existing buildings and new build construction with underlying basement areas interconnected.

Construction of 6 new and refurbished buildings consisting of: -

- Building 1 – 11 storey office building and retention of existing Victorian warehouses
- Building 1a – 4 storey office building refurbishment of retained historic building and extension
- Building 1b- 5 storey refurbishment and extension to retained historic building.
- Building 1c- 14 storey new build extension with retained 4 storey rear historic warehouse

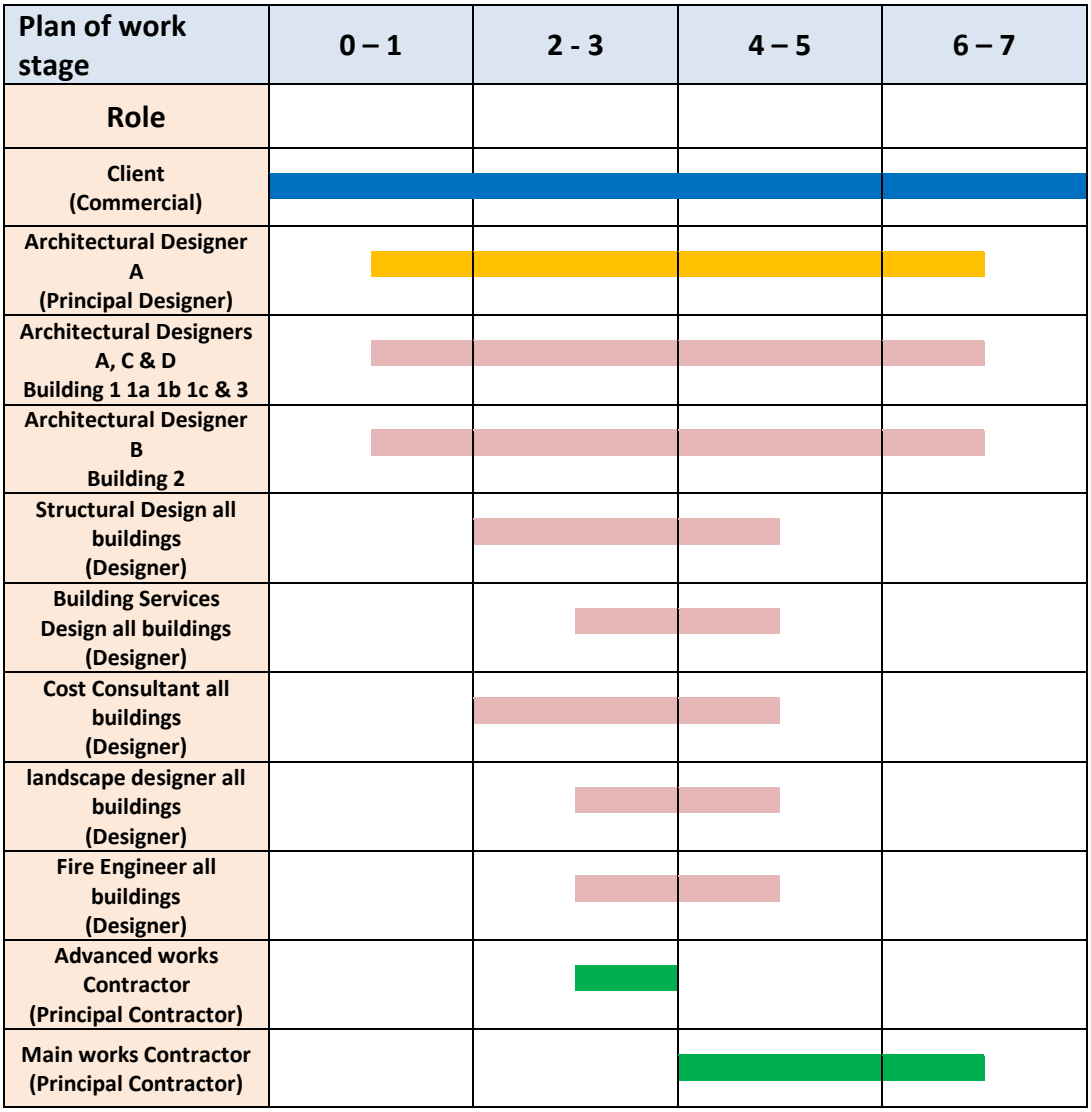
- Building 2 – 9 storey new build offices with retained 4 storey 1927 facade.
- Building 3 – retained historic structure used as site offices and welfare facilities for other buildings on site with new build 6 storey office extension and partially retained structure

Project value

Over £250m.

Key duty holders

A commercial design and build project
Client / Developer – for a mature commercial client who is a major Scottish developer.



NB: See appendix 2, for explanation of the plan of work stages.

Architectural designers: -

A – Large London practice
C & D – Smaller local practices sub-contracted to A
B – Medium sized regional practice

Principal Designer: -

Owing to the complexity of the project there were two lead architects i.e., Architectural designers A and B. Whilst A acted as principal designer for whole project, designer B acted as lead designer for one of the main new structures (building 2). It also became clear that due to the nature of the works associated with buildings 1a and 1b detailed design work would be carried out by two smaller architectural practices with local expertise. As principal designer, architect A agreed the CDM strategy with the client and coordinated the project approach to health and safety risk management, giving guidance to the other designers to ensure the focus of all parties was on the mitigation and visual communication of significant risks.

Structural designer – same large national practice for all buildings
MEP designer – same large practice for all buildings
Principal contractor/s – There were two, as one was required for the site enabling and basement works and one for the main build. On completion of these advanced works, control of the site was passed to the main works contractor.

Management arrangements

Stage 0/1

During the concept and early design stages of the project the architectural designer A took on the duties associated with the principal designer function, capturing all site-wide issues, demolitions and basement construction.

During the early stages of the project the architectural designer A ran a project workshop with the client and the other main designers to map out the health and safety strategy for the project and produced a CDM strategy brief. They also assisted the client in preparing an initial set of pre-construction information that included: -

- The CDM Strategy brief
- The schedule of surveys
- The schedule of significant issues
- CDM Analysis & Options documentation in a visual format of key issues.

Stage 2/3

As part of the design development, the CDM analysis and options report was reviewed with the client at each work stage. When interface coordination was required between buildings architectural designer B revised their report to a more visually explanatory report which clarified a lot of complicated details that were missing in the initial spreadsheet.

The client had determined that they wanted to let a design and build contract and appointed the preferred contractor under a pre-contract service agreement to assist with the design risk management and cost finalisation.

Stage 4/5

Once agreement was reached on the terms of the contract, the principal contractor took over the lead designer function and coordinated the technical design carried out by their sub-contractors, as well as a variety of temporary works design. During this phase of the project the principal designer maintained an overview of developments and provided the principal contractor with an understanding of how design decisions had been arrived at in the earlier stages of the project.

Significant Risk Information

- Unexploded Ordnance
- Existing Asbestos
- Metro Underground
- Existing underground services
- Contaminated ground
- Dewatering and temporary waterproofing - Water ingress, flooding
- Archaeological remains
- Partial retention of existing buildings with temporary works
- Working adjacent to open overground railway cutting
- Working adjacent to busy High Street frontage

Structural

- Collapse of building and excavations
- Deep basement excavation and piling
- Basement Retaining Walls
- Uncontrolled collapse of buildings during demolition
- Existing Vaults under pavements
- Complex temporary works during retained building construction
- Removal of existing cores and additions of new cores

M & E Services

- Access to service risers during construction
- Access to external extract flue for cleaning and maintenance
- Access to plant and equipment at roof level for maintenance and replacement

Cleaning & Maintenance

- Façade access via combination of BMU, long poles, MEWPS and roped access
- Access to building atria, internal
- Access to façade behind punched/perforated panels

Replacement

- Access strategy to facilitate replacement of cladding and glazing
- Access to façade behind punched/perforated panels
- Strategy to replace existing chimneys for heritage reasons
- Lifting, storing and replacement of Granite setts in the roads

H&S File

An H&S file as set out in appendix 4 of L153 was compiled on an electronic platform.

Any residual risks and difficult maintenance that remained at the end of the construction phase were recorded within the health and safety file.

Summary

Owing to the complexity of the design and need for multiple designers for the multiple buildings and the interconnected basement areas, the appointment of one lead designer for the entire project was not appropriate. Whilst different architectural practices had responsibility for developing the design solutions for the different areas, all designers work needed to be coordinated and the risks communicated in a consistent fashion. Architect A had the skills, knowledge and experience to guide the client and the other designers through the complex process of eliminating and reducing health and safety risk from the earliest stages of the project. They were thus best placed to take on the principal designer duties in addition to their main design function.

Case Study 5 – Medium Sized Commercial Refurbishment Project

Project description.

The redevelopment of an outer London site located at a main high street nearby to a London Underground station.

The works consisted of: -

Soft strip and internal structural demolitions for a new core and lifts, and Cat A Fit-out to one existing 5 storey building.

Refurbishment of the existing office building.

Scope

1. Removal of existing windows and replacement with new
2. New stone reveals to front window openings
3. Modifications to core and WC's
4. Improved reception area and new external entrance canopy
5. Revised roof plant room strategy, access and plant enclosure extension
6. Modifications to external ramp enclosure, balustrading, landscape etc.
7. Modifications to rear parking areas with new Electrical Substation
8. Internal office fit –out to Cat. A including chilled beams, ceilings and raised floors
9. Complete new A/C and M&E services
10. Removing screed to existing office floors for maximisation of headroom (except ground floor offices)
11. New Modular Substation installation

Project value Over £15m.

Key duty holders

A commercial design and build project for a mature commercial client who is a major central London-focused developer.
Client / Developer – Wimble
Project Management- LCM
Architectural design – Blue Design
Structural design – TSH
MEP design – BCB
Principal contractor – Internals
Principal Designer- Blue Design

Plan of work stage	0 – 1	2 - 3	4 – 5	6 – 7
Role				
Client (Commercial)				
Architectural Designer (Principal Designer)				
Architectural Designers				
Structural Design (Designer)				
Building Services Design (Designer)				
Cost Consultant (Designer)				
Main works Contractor (Principal Contractor)				

NB: See appendix 2, for explanation of the plan of work stages.

Management arrangements

Stage 0/1

During the concept and developed design stages of the project the architectural designer took on the duties associated with the Principal Designer function.

During the early stages of the project, the project manager set up a workshop on behalf of the client and designers to map out the strategy for the project. A CDM strategy brief was produced and included in the project brief. Blue Design, as architectural designer and principal designer, prepared an initial set of pre-construction information that included: -

- The CDM strategy brief
- Survey information
- Photographs and annotated drawings of Significant Risks, numerically ordered
- Annotated drawings and sketches identifying Significant risks and potential mitigation measures, with associated actions highlighted
- As a result of Design Team meetings and further site analysis these drawings were edited and developed, together with the GA drawings.

Stage 2/3

Blue Design produced, as part of the design development, a CDM analysis and options report which was reviewed with the client and design team at each work stage, and at design team meetings.

The client had determined that they wanted to let a design and build contract and appointed the preferred contractor under a pre-contract service agreement to assist with the design risk management and cost finalisation.

Stage 4/5

Once agreement was reached on the terms of the contract, the principal contractor worked with the principal designer and collectively coordinated the technical design together with their specialist sub-contractors, including some temporary works design.

Significant Risk Information

- Existing Asbestos
- Works adjacent to busy High Street
- Existing underground services to UKPN substation, to be relocated
- Tight urban site with rear open parking area accessed by a curved ramp
- Low floor to ceiling heights

Structural

- Propping of existing core where modified
- Additional plant enclosure on the roof
- Hollow pot floors

MEP

- Access to service risers during construction
- Access to plant and equipment at roof level for maintenance and replacement

Cleaning

- Façade access via long poles as existing

Plant & Window Replacement

- Windows and exterior works carried out from traditional scaffold

- Hoist installed at rear to access roof plant and enclosure areas with manual handling using trolleying and hoisting equipment

H&S File

An H&S file as set out in appendix 4 of L153 was compiled on an electronic platform.

Any residual risks that remained at the end of the construction phase were recorded within the health and safety file, as an extension to the CDM Analysis and Options document.

Summary

Whilst the CDM analysis information showed the detail of each significant risk, a succinct "CDM Risk Register" was developed to help the client and project manager acting on their behalf to manage these risks at meetings, without full reference to the detail. The need to remove the 75mm screed from all upper floor areas to achieve a better clear headroom was recognized as being particularly noisy and dusty, with the excessive vibration potential for operatives. It was agreed that extra acoustic protection and dust extraction measures were required, together with a mechanical floor planer, which was hoisted up the lift shaft.

The client and project manager were very complimentary about the collaboration between the design team and contractor, facilitated and captured by use of the visual information in the CDM Analysis and Options document. The Principal Contractor dealt with all normal routine trade related risk control within their own risk management procedures.

Case study 6 – minor river improvement

Project description

River Restoration/Wetland Creation - Rye Brook, at Ashtead, as it runs through grassland to the east of the M25 Bank; re-profiling to reconnect the stream back to its floodplain. Installation of woody material into the stream to diversify in-stream habitat. Creation of a small wetland on the floodplain.

Project value - Under £100k.

Key duty holders

SRT, a small rivers trust, as hosts of the River Vole Catchment Partnership, received funding from the Environment Agency for the project on behalf of other partners. As SRT had insufficient in-house resource (organisational capability) to supervise a project of this nature, their officers agreed with the County Council that 'The Lower Vole Countryside Partnership' (LVCP), an arm of the Council, would act as their project manager.

A larger, more experienced, river trust SWRT had already been appointed by SRT to carry out the main design work.

Plan of work stage	0 - 1	2 - 3	4 - 5	6-7
Role				
Client (SRT)				
Designer Civils (SWRT)				
Contractor (I & J B)				

NB: See appendix 2, for explanation of the plan of work stages.

Management arrangements

Stage 0/1

SRT developed a CDM Strategy Brief in conjunction with LVCP as a way of setting out the management arrangements for the project and circulated the draft document to other stakeholders for comment.
The client duties were held by SRT and LVCP assisted them in discharging their duties.

Stage 2/3

SWRT carried out the designer duties (A PD appointment would only have been required if there was more than one contractor).

LVCP assisted SRT in developing the brief with the designer, applied for permits and put out the tender for the contractors to bid for the work. They assisted SRT in reviewing the bids and selecting a suitably experienced contractor.

Stage 4/5

Contractor – I & J B (all works carried out by directly employed workforce.)

Significant Risks

Work exposing workers to the risk of drowning (schedule 3 risk)

Sudden increase in river levels during construction
Overhead power lines
Worker safety around excavator and chainsaws
Leptospirosis (Weils Disease)

H&S File

As there was only one contractor, there was no requirement for an H&S file.

Summary

For relatively simple projects, the requirements of CDM 2015 are not particularly onerous. Although relatively rare, where only one contractor carries out the work, principal designer and principal contractor appointments are not required. However, suitable management arrangements still need to be established, to ensure that the significant risks are addressed both at the pre-construction and construction stages. The client (SRT) recognised this and ensured a CDM Strategy Brief was developed to ensure everyone understood how the various duties would be discharged.

Case study 7 – Small railway project – (Approach to Buried Services)

Project description

Replacement of an existing footbridge with a new 'access for all' footbridge, spanning platforms 1-5- including lifts, stairs, reinforced concrete ramps and lighting.

Project value

Under £5 million.

Key duty holders

Client – National Rail
Framework contractor MJ Construction (MJC) selected by National Rail to design and construct the scheme

MMC appointed by MJC for GRIP 3 - options selection

SPT Projects appointed by MJC for GRIP4 (Approval in Principle) - and GRIP5 (Detailed Design)

Plan of work stage	0 – 1	2 – 3	4 – 5	6 – 7
Duties				
National Rail (Client)				
National Rail (Principal Designer)				
MJC (Lead Designer)				
MMC (Designer)				
STP (Designer)				
MJC (Principal Contractor)				

NB: See appendix 2, for explanation of the plan of work stages.

Management arrangements

Stage 0/1

National Rail retained the principal designer role and developed a CDM Strategy Brief in conjunction with MJ Construction.
At the client's kick off meeting and following a review of the available pre-construction information provided by National Rail, the information was communicated formally to the client and principal designer that it was insufficient in detail to support for detailed design work. It was therefore agreed that MJC would carry out site surveys to supplement the previously issued Pre-Construction Information to identify the precise location of all buried services in the vicinity of the proposed works.

Stage 2/3

The scope of the site surveys was agreed with both the designer and the contractor to ensure that sufficient detail would be gained to allow the design to proceed. The survey works consisted of a site wide GPRS scan and associated trail holes to locate suspected or previously identified services. The designer attended on site during the additional works to provide on-site support to ensure enough information was obtained on the single visit.

An intrusive site survey was carried out followed by a topographical survey to ensure existing drawings/maps were updated accurately. This information was issued to both designers and client/principal designer as additional information for inclusion within the pre-construction information.

The design focussed in the first instance on avoiding the area of the known services but in all instances, this could not be achieved so the designer tried to avoid the services identified by several means including relation of excavation activities, service diversions as well as consideration of foundation principles. (Piled/raft etc).

Where services were diverted, revised surveys and maps were issued to all respective parties for design consideration and inclusion within the health and safety file.

Stage 4/5

Identified hazards were suitably managed to an acceptable standard through the use of a Hazard Record; this demonstrated that the design reduced the risk associated with the identified hazards to a tolerable level. This process included both the designer, principal contractor and station operator /maintainer enabling communications, where required, with the utility's provider.
Suitable information added to site construction drawings including piling layouts identifying existing services within the work area. This was done through the use of Hazard Triangles, themselves referring directly back to the Hazard Record.

Significant Risks

- Lack of initial suitable and sufficient pre-construction information relating to buried services
- HV cables and other buried services
- Overhead electric lines (Schedule 3 particular risk)
- Removal and erection of footbridge sections (Schedule 3 particular risk)
- Loss of critical operations/station access (Operational and emergency)
- Use of large plant and equipment adjacent to operational railway (Excavator/piling rig)
- Excavation activities adjacent to running line (risk of loss of track formation)

H&S File

Survey information incorporating any changes were included within the health and safety file. Construction as-built drawings incorporated known service information as a clear residual risk.

Summary

As a major cause of site accidents and incidents, the focus on the identification and avoidance of buried electricity (and gas) services throughout the design process was important. Failure to identify the potential risk at the strategic (stage 0/1) phase could have resulted in inadequate information being available to designers as the design progressed from the options stage through to detailed construction drawings.

Primary focus of the strategic planning was the determination to ensure that Pre-Construction Information (service location information) was provided by the client to enable the design process to address inherently high-risk activities such as excavation and piling works. The designer was able to determine whether the risk could be eliminated at source or, where this was not possible, reduced during the design phase by providing the contractor with working drawings that clearly identified the positions and nature of the buried services. The principal designer in this instance was the key point of contact for ensuring that this aspect of the design was properly considered.
The principal contractor provided a full methodology for constructing the access ramps safely in their construction phase plan (CPP). In addition to the buried services issue, the construction phase plan also set out the arrangements for working near the overhead line equipment (OLE) and for the dismantling and installation of the old and new bridge sections.

Case Study 8 – Large Energy from Waste (EfW) Project

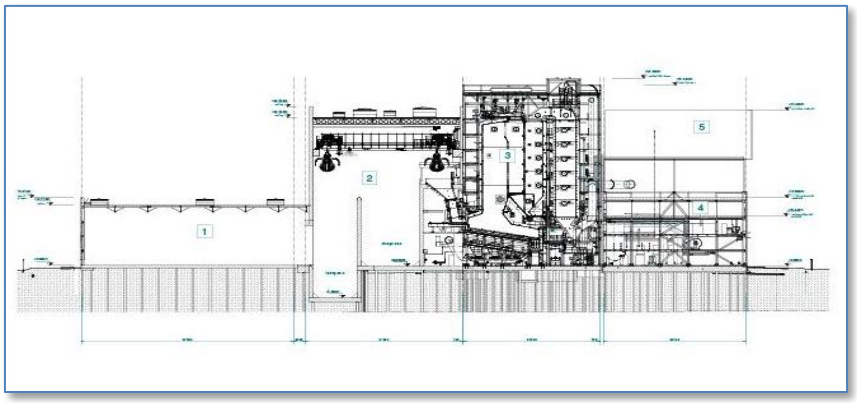
Project description

The design, construction, commissioning and testing of a residual municipal waste, combined heat and power facility (EfW CHP). The facility generates electricity and supplies steam for an adjacent high energy use 'Green' industrial estate.

The facility was built near to an existing EfW plant which was close to the end of its service life and was de-commissioned when the new facility came on stream. This enabled some existing infrastructure to be retained, such as the electrical grid connection, fire water storage and pumps, weighbridges and gate house.

Project value

Over £75million



Key duty holders

The new facility was built for the local waste authority via a new 25-year contract with a waste management company, SVX Environmental Services. The waste is collected by the local authority (LA) and Planning Approval had already been granted for a new facility.

SVX entered into an EPC (Engineer, Procure and Construct) contract with Deutstadt GmbH (DGH) to deliver a fully operational energy plant inclusive of the civils infrastructure. DGH led the technical design and procurement with most of the process design carried out in Europe. The civil works design engineering and co-ordination was carried out in Great Britain.

The works were let as a number of discrete packages with significant elements of off-site fabrication being made in Europe to be delivered to and assembled on site. DGH also led the site construction work with the civils site works being managed by a (GB) construction management specialist who supervised and procured various civils trade packages (some including design elements) on behalf of DGH.

The CDM 2015 client duties were held by SVX. SVX has a GB division with expertise in building EfW plant and therefore elected to formally also hold the principal designer duties. DGH were appointed principal contractor.

Plan of work stage	0 – 1	2– 3	4 – 5	6 – 7
Role				
SVX (Client)				
SVX (Principal Designer)				
DGH (Lead Designer)				
MJS (Civils designer)				
DGH (Principal Contractor)				

NB: See appendix 2, for explanation of the plan of work stages.

Management Arrangements

EfW projects are characterised by being highly integrated, as well as complex, process and civil engineering facilities. It was understood early in the pre-construction phase that there would be numerous designers working on different areas, at various stages, throughout the delivery and construction of the project. It is also normal for the civil works design and construction to be well ahead of the process design because of tight overall project timelines. The timeline also necessitates that the civil works commence before the process designs are complete.

Stage 0/1 Project definition and strategy

Prompted by the civils designer (MJS), because they were GB based and familiar with CDM 2015, SVX organised a CDM strategy workshop with all the key parties to:

- Develop a common understanding of CDM 2015.
- Define and understand the separate CDM duties.
- Engender a team working ethic

Following this workshop SVX prepared a client's brief which outlined the overall aspects of the project, the significant strategic risks (multiple designers, a confined site and adjacent to an operational waste facility) as well as their CDM expectations.

The civils designer then prepared a CDM protocol for use by the whole of the EPC project design team. The intention being to have a unified approach across the board for the numerous designers involved in the project. This protocol also identified that designers would be at different stages within their design development (concept/scheme/detail) following guidance developed from CIRIA guide C662.

SVX recognised that DGH and the majority of their process designers were headquartered outside of GB and therefore the jurisdiction of CDM 2015 was limited to SVX and the residual GB designers. The EPC terms therefore made it clear that DGH had to comply with all relevant regulations including CDM 2015 and their responsibilities were effectively back-to-back with SVX. Any failure in CDM would then be pursued contractually with DGH, if necessary.

Stage 2/3 Design development

The methodology adopted involved using a standard risk matrix approach with individual designers recording their results onto a standard spreadsheet template as the design risk assessments (DRA) to be used across the project. These DRAs would then be passed up to their respective design leaders (process or civils) to be reviewed and collated into a master DRA document for the project. The design leaders within design team meetings, including SVX, discussed the DRAs, to either, agree and ratify; or to amend and agree outcomes for the risks brought forward.
It was essential that the respective design leaders had the necessary knowledge and experience to make appropriate decisions by recognising that on many aspects of civils design DRAs would have an impact on following process works which were not as advanced.
A team-based approach with the client, designers and both process and civils construction management leaders; along with a clear project focus; resulted in rigorous debate and overall acceptance of a unified outcome.
The process was:

1. Identify and bring forward hazards and risk from separated design offices
2. Review as an experienced design management team, with debate as necessary to conclude an assessment
3. Record the outcome as collated by the design lead into the master DRA
4. Issue the master DRA by uploading to the project file server for all to consult and incorporate into their designs

Stage 4/5 Detailed design and construction

The civil and structural works were let in individual packages by a civil works construction manager appointed by DGH. The trade contractors were all UK based. Some of the trade contractors were responsible for the detailed design of their parts.

The process design procurement was managed by DGH also with many packages involving detailed design by the trade contractor.

Construction execution of the civils was managed by the civil works construction manager on behalf of DGH who formally held the PC duty throughout. The process installation was carried out by various European-based contractors working under DGH.

In all trade packages the EPC project CDM protocol was an integral part of the trade package placing an explicit requirement on the trade contractor to complete their DRAs and to submit to their respective design leaders (civils or process), the PD and the Clients project operational team.

The protocol foresaw the need to have regular co-ordination meetings with the leading designers and risks could be reviewed and resolved effectively. Since DGH also held the PC role, significant residual risks coming from the design could be readily carried into the H&S management of the site works.

Significant Risks

The project involved a combination of civil and process elements with significant construction interfaces. The configuration of the facility resulted in work involving a number of the particular risks identified in Schedule 3 of HSE Guidance document L153 and listed in the client's briefing document as:

- Excavations exceeding 5m deep for the waste reception bunker
- Work at height for both civil and process construction activities with concrete structures up to 30m high and steel fabrications rising up to 36m high
- Low levels (<0.001%) asbestos contamination recorded in the made ground before commencement
- Work with ionising radiation during NDT of pressure system components
- Assembly of heavy prefabricated components

The client's brief also identified the significant strategic risks which needed close management by the construction management team:

- Multiple designers
- Very confined site (separated work sites: contractors' village, fabrication and lay down areas, car parking)
- Adjacent to an operational waste facility (traffic and services)
- Numbers of non-English first language workers on site

H&S File

On process intensive projects, there is significant overlap between operation and maintenance (O&M) manuals required for the process and CDM H&S file content. A meeting between SVX and DGH was arranged to agree content and format of the documentation.

It was agreed that the file presentation would be split into two sets of documents – those needed for the day to day running of the plant (traditional O&M manual info) and long-term data for future maintenance, dismantling and so on (design data, drawings, residual CDM risks for maintenance etc.).

Summary

The major challenge for this project team was not so much in relation to the physical risks but in the fact that both the client and the EPC contractor were European organisations with a limited understanding of the requirements of CDM 2015.

To develop suitable management arrangements on similar projects: -

- Identify early on the likely complexity of the project such as multiple roles across various disciplines and potential design services and supply and install packages
- Ensure that all the key parties to the project have a common understanding of CDM so that they can play an effective part in H&S risk management
- Consider the benefit of a team - based approach to sharing responsibility for CDM roles and duties
- Discuss and agree the approach with the client. Communication is essential
- Encapsulate the management plan into a client's strategy brief
- With the principal designer develop a project wide CDM design protocol which can be used to procure and manage multiple design teams
- Use a template to manage and monitor identified CDM risks
- Encourage a team - based approach with the leading duty holders to share, assess and manage significant risks being fed in by multiple disparate designers
- Encourage all duty holders to contribute to discussions and exploit the collective knowledge and experience of the team

Case Study 9 – The Yorkshire Airport

Programme description

Expansion of a regional airport including runway extension, new terminal building and demolition of the existing terminal, new control tower, rail link from existing branch line and dual carriageway link to nearest motorway junction.

Project Value Over £900 Million

Key Duty Holders

The client is Yorkshire Airports Group (YAG). The Programme was privately funded by owner PAM Capital through debt and equity.

Plan of Work Stage	0 – 1	2 - 3	4 – 5	6 – 7
Role				
YAG (Client with coordination responsibility during the various stages of the programme)				
Lead Designer (On airport) (Principal Designer & Designer and Design Supply Chain)				
Lead Designer (Highways) (Principal Designer & Designer and Design Supply Chain)				
Lead Designer (Rail) (Principal Designer & Designer and Design Supply Chain)				
Programme/Project Manager (Principal Designer)				
Principal Contractor (Advanced Works)				
Principal Contractor (On airport)				
Principal Contractor (Highways)				
Principal Contractor (Rail)				
Third Parties – Rail/Road etc				

Existing Management Arrangements

The client had a suite of 'business as usual' construction activities as part of their Asset Management Programme (AMP), which had allocated funding envelopes. The arrangements for management of their AMP works included:

- Contractual requirements for design and construction management
- A process to manage regulatory required appointments
- Administrative requirements for management of pre-construction information, construction phase plans and the health and safety file

Construction management arrangements were based on isolated projects and there were established relationships between YAG and their framework contractors to manage design, construction and bringing into use/handover.

The client had an operations and maintenance programme including:

- Winter operations
- Cleaning / Maintenance
- Ground Service
- Surface access and transportation

There were multiple franchises and concessions within the terminal space for retail outlets.

Airport Expansion Programme Management Arrangements

From the outset of the Expansion Programme, the client recognised that it was essential to strategically analyse their CDM arrangements.
A strategic leadership group (SLG) was established to develop the key management arrangements and to create a programme wide governance structure. 'Hold Points' were built into the programme to enable the effectiveness of the arrangements to be challenged and checked.

Hold Point 1

- Has the client considered the nature of the proposed programme and if existing arrangements transfer to a complex programme (a programme of projects)?
- What is the client's philosophy (strategic brief) for the management of design and construction and is this transferable to a complex programme?
- Has the client the necessary experience to lead on a programme of such magnitude?

The SLG recognised that different phases of the programme may require different management arrangements.

Phase 1 - Preparatory Design

The proposed programme was discussed with the SLG. The client appointed their framework contractor to begin feasibility studies for the various elements of the programme. The YAG 'standard' contract form was used as the mechanism to appoint the framework contractor as a designer and principal designer.

The feasibility study identified multiple stakeholders and design scopes:

- On airport asset owners/maintainers
- Civil Aviation Authority
- Environmental Regulator
- Off airport Road Authorities
- Local Authorities

- Rail Regulator

The client's response was to split the programme into a series of independent contracts, each with targeted design scopes.
Within each contract, the client appointed the lead designer as principal designer for the scope of their works.
From that point the programme had multiple designers, principal designers and design supply chains.
The SLG agreed that these arrangements were suitable for the level of design maturity expected from each contract. However, through the SLG forum, the client was advised that with the multiple appointment approach, YAG (the client) had certain coordination and information management responsibilities across the totality of the programme.

Hold Point 2

- Are the design teams and principal designers clear on what is expected from them?
- Are all parties clear on how risk management is coordinated across the programme?
- Do all parties understand the difference between health and safety coordination and engineering coordination (i.e. the functionality of the design) and could these elements be amalgamated?
- How is progress (in terms of risk management) monitored?
- Will teams of specialists automatically perform as expected and required?
- Does the client need to take a more active role in leading the programme?
- The benefits of induction and onboarding onto programmes is understood. Should this process be extended to the design teams to begin effective two-way communication at the inception/early stages of a programme?

Phase 2 – Developing Design

Design progressed within each contract. The design teams worked to their own management systems in accordance with the contract requirements.

As design progressed, the complexity of the programme and significant interfaces between each stakeholder and contract became more apparent.

Design teams and principal designers were actively communicating with each other; however, the arrangements to coordinate and cooperate were not well defined. Time constraints were beginning to drive decisions.

Discussions began in the SLG about the benefits/limitations of a single principal designer and/or strengthening the coordination and integration arrangements. There was significant confusion regarding the role of the principal designer on a complex programme and

discussions were emotive rather than based on a proportionate application and understanding of the CDM framework. There was considerable debate amongst the design teams relating to responsibility for the engineering functionality of the design.

As the programme progressed, arrangements to commence ground investigation works were agreed.

Hold Point 3

- Can the client call a short 'freeze' and bring all parties together to reassess arrangements?
- Is the advice that the client receives (from advisors/legal counsel) balanced and informed/technically correct?
- Is the programme in a position to adequately manage 'survey/construction' works?
- Which party is accountable for communicating with the construction teams?
- Has the client considered a process to transfer elements of the works to third party clients? How are third party design requirements considered in relation to their effect on other assets within the airport boundary?
- Is risk being adequately managed at each level (focused and programme wide) and how is the information documented, reviewed and challenged?

Phase 3 – Design for Tender (Design and Build Contractor Procurement) and Main Works Management

The client re-evaluated their programme arrangements with the SLG. In preparation for procurement of main works contractors, a risk and opportunity register was created and mapped against the proposed programme of works.

Every permutation was assessed, considering the following points:

- How is risk best managed across the programme?
- How is risk best managed within each project/contract?
- How are the interdependencies of the design best managed?
- Who is best placed to provide independent design challenge?
- Are current multi-appointment arrangements sufficient and sustainable?
- Is the nature of the contractual requirements sufficient, considering input and output based specifications?

The client developed plans for the immediate and future phases of the programme. In the immediate, the client re-established the multiparty appointment approach within an 'Integration Framework'. The framework had documented arrangements for:

- Principal designer collaboration and a best practice forum
- Integration with the client's asset management standards (including health and safety files) and appropriate engineering management forums
- Integration with third party stakeholders and election of third-party clients, including 'memorandum of understanding' and joint assurance agreements
- Design assurance and health and safety support/advice to the client and NEC Project Manager
- Monitoring and measurement (collaborative health and safety dashboards)
- Development of Instruction to Tender documentation

The client continued to develop their arrangements for the longer term with a view to having a set of arrangements capable of managing multiple main works packages. The client issued Invitation to Tender (ITT) documentation to prospective bidders, with a clear description of the arrangements, expected behaviours and roles and responsibilities. Each successful main works tenderer was appointed lead designer and principal contractor for their allotted scope of works with responsibility for their stakeholder management.

While the Integration Framework was proving successful in focusing the team's attention, the maturity of design would significantly develop after main works procurement. Arrangements needed to evolve to reflect this.
In response, and upon award of the multiple main works contracts, the client appointed the NEC Project Manager (the Organisation) as the principal designer for the programme. This was not a replacement for the Integration Framework, but an additional measure to strengthen cooperation and coordination across the programme. The principal designer acted as a focal point for the client. Through a suite of deliverables contracted to each of the successful main works contractors, the responsibilities of each lead designer were clearly described. Each lead designer in each main works contract was required to:

- Manage their interfaces with other designers on the programme and their stakeholders such as the rail and roads authorities
- Attend the engineering and health and safety management forums
- Be accountable for their design and the effects/interdependencies of their design

However, by appointing the NEC Project Manager as principal designer, the client gained an additional level of control and assurance regarding the safe progression of design. Design deliverables were accepted via a Common Data Environment and the principal designer formally accepted or rejected each submission.

This had the following effects:

- The principal designer reviewed information in real time – not as an afterthought
- The principal designer could formally challenge each lead designer, with challenges recorded within the Common Data Environment
- Contractual acceptance of deliverables incentivised the quality of the submission as it was linked to programme and key performance indicators
- The principal designer could focus attention on the more significant issues and allow the expertise in each lead design team to concentrate on detailed elements of the design (for which they were procured)
- Deliverables traditionally associated with the principal designer could be contractually transferred to the lead designer, who was better placed to manage them (such as health and safety file updates)

In effect, the role of the principal designer was split (or shared) amongst the team delivering the programme. Specific duties were allocated to the party best placed to manage them. The number of stakeholders and various assets designed required a bespoke approach that matched output requirements to organisational skill sets.

Significant Risks

Existing arrangements

- From the outset the funding model for the programme placed pressure on asset completion as this builds confidence in the programme and reduces risk for investors
- The funding envelope negotiations had to consider the assumptions made, in terms of ground conditions, contamination, third party asset owner requirements and compensatory works to the community in the face of political lobbying
- The nature of construction risk was understood by the client; however, physical and organisational risk was prevalent at interfaces. The client had to allocate sufficient resources in terms of capability, time and money to fully understand and mitigate these risks

Preparatory Design

- Third party clients had their own asset management programmes which influenced the timing of the runway extension works, such as possessions on the rail or online work on the road network. This could have the potential for development of design without the organisational maturity to manage such works
- The lack of ground investigation data at early stages of the programme could have led to design assumptions that went unchecked without the necessary management arrangements to confirm at later stages of the programme

Developing Design

- Early construction (ground investigation/survey) works posed multiple physical and health risks as well as the reputational risk of an adverse event at the beginning of a major programme. Examples included:

    - Exposure to substances harmful to health (asbestos, lead, chemical, biological)
    - Service damage leading to injury

Although ground investigation/survey works are often considered as routine when compared to the main works, they had the potential to be underestimated in terms of complexity. There is also the 'Bathtub' curve of component or system failure to consider, where adverse events are more prevalent in the early stages of a programme due to the immaturity of systems and monitoring arrangements.

Design for Tender and Main Works

- Routine risks (which the main works contractors had established systems to manage) may have been over analysed
- Non-routine and critical risks were not immediately apparent and potentially underestimated in complexity and potential severity if realised
- The main works contractors were established organisations; however, they had to integrate their systems and expertise with the client's strategic brief, which took a significant amount of time, effort and level of resource
- There was the risk of over intrusion into the main works contractor's approach, leading to the potential transfer of liability to the client

Health & Safety File (HSF)

The client's arrangements for the HSF were discussed during the initial phase of the programme. Assets were broadly split between those that would be owned, operated and maintained by YAG and those that would be owned, operated and maintained by third parties.

Assets owned, operated and maintained by YAG:

- Where an asset category exists, there was no need to create a new 'data file'. The asset was tagged (identified) and relevant asset information was added to the Client's existing database
- The fundamental requirement was to tag the asset and confirm which existing group the asset information was filed with
- There was no need for the traditional Part A of the file describing the project as this information did not support operation and maintenance of the asset
- The process was owned by the client but managed by a 'file' team. At the beginning of the design phase the client and design team identified the relevant parties required to complete the asset information and ensure it was compatible with the existing data models. The principal designer was involved in the process with the Client, relevant design teams and component manufacturers, but not solely responsible

Assets owned, operated and maintained by third parties:

- In respect of the third-party asset owner, the asset information was presented in the format required by that third party and by the required duty holders/teams
- The requirements were agreed in a memorandum of understanding between both clients and design teams prior to works beginning

Summary

Perhaps the most important points to consider when developing arrangements to manage major programmes are:

- A proportionate set of arrangements for the given phase – arrangements that develop as the project evolves and the risk profile changes
- The most effective systems evolve over time – they are not achieved on day one of the programme
- Marginal improvements – a suite of minor improvements will often be more effective than holistic review and change
- Arrangements described in L153 are a framework – the chosen and agreed method of implementation can be moulded to meet the needs of the programme

- Clarity of roles, responsibilities and expectations must be clear – this is more effective than simply making an appointment with little description of requirements
- An agreed balance between prescriptive and goal setting requirements – prescription can lead to consistency, and goal setting requirements to innovation. However, one should not be to the exclusion of the other, and in certain cases the opposite can also be true
- Feedback and reappraisal of arrangements at regular intervals
- CDM is about a team approach (we not you)

Appendix 1

CDM Strategy Brief

The CDM Strategy brief has been incorporated into the training programmes of both the Institution of Civil Engineers (ICE) and Royal Institute of British Architects (RIBA) since 2015. The following structure and prompts can be used as a starting point for discussions between the client and the project team and can be adapted and developed to suit the needs of the particular project. It is not prescriptive but can assist teams in recognising the interconnected nature of decisions made in the formative stage of the project and can help to demonstrate compliance with the CDM 2015 regulations.

Used intelligently, the process of collaboratively developing a CDM Strategy brief can act as a powerful team-building tool.

Template

Project name

Project description

Type – New construction/ refurbishment/asset management/decommissioning
Details of work scope
Location/environment
Anticipated project cost

Client H&S brief

Function and operational requirements
Expected standards of Health & Safety
F10
Late design changes
H&S File format

Project timescales (what are the key stages and how long will they run for?)

Concept/feasibility
Design/planning
Tender/selection
Construction /decommissioning
Commission/ handover

Significant risks (what are the hard to manage or unusual H&S risks?)

Refer to schedule 3 (L153) – work involving particular risks
Major temporary works
Stability considerations
Site logistics/sequencing

Pre-construction information requirements

Refer to Appendix 2 (L153)
Address strategic risk issues(above)

Project Leadership

Client – lead contact and organisation
Principal designer - lead contact and organisation
Principal contractor - lead contact and organisation
Designer 1 - lead contact and organisation
Designer 2 - lead contact and organisation
Designer 3 - lead contact and organisation

Other stakeholders

Other parties who may influence the project

Procurement strategy (how will the project team be assembled?)

Forms of contract being considered
Early contractor involvement
Design and build

Communication strategy (how will key H&S messages be identified and disseminated?)

Team meetings
Induction process
Visual tools/BIM
Use of mobile phones
Use of e-mails

Appendix 2

Sector Plans of Work

The requirements set out in the CDM 2015 Regulations and Guidance (L153) can best be understood as a management process to be applied throughout the period that the project is running, rather than as simply a set of individual duties to be discharged independently of others involved in the project.

A number of sectors within the Construction industry have a defined Plan of Work' which describes the key stages of the process and what should be done at each stage.

The Building Sector

Probably the best known and most widely used model is the Royal Institute of British Architects (RIBA) Plan of Work, the latest version of which was published in February 2020.

The RIBA Plan of Work was initiated in 1963 to provide a framework for architectural designers to use on projects with their clients, bringing greater clarity to the different stages of a project.

The current version describes the key stages as: -

Stage 0 - Strategic definition
1 - Preparation and briefing
2 - Concept design
3 - Spatial coordination
4 - Technical design
5 - Manufacturing & construction
6 - Handover
7 - Use

The concept of a Health and Safety Strategy has been introduced along with other key elements of strategy.

'The Health and Safety Strategy needs to be considered early on in the project because it is key to securing the safe construction, occupation, maintenance and future re-use or demolition of the project. The client's role is fundamental to this, to establish and maintain a health and safety-conscious approach to delivery of the project from the outset. The Health and Safety Strategy should set clear health and safety objectives.'

The Rail Sector

Network Rail developed the GRIP (Governance for Railway Investment Projects) process to manage and control investment projects – ones that enhance or renew the national rail network as opposed to those involved with routine maintenance of the railway. It was developed in order to minimise and mitigate the risks associated with delivering such projects.

GRIP divides a project into eight distinct stages. The overall approach is product, rather than process, driven and, within each stage, an agreed set of products is delivered.

Stage 1 - Output definition
2 - Feasibility
3 - Option selection
4 - Single option development
5 - Detailed design
6 - Construction test and commission
7 - Scheme hand back
8 - Project close out

Other sectors (e.g., Highways) have similar models with slightly different descriptions, relevant to the context in which they work.
To provide a degree of uniformity across the various case studies included within this report the main stages have been simplified and combined as follows: -

Stage 0/1 - Project definition and strategy
2/3 - Design development
4/5 - Detailed design and construction
6/7 - Commissioning and operation

Appendix 3 Frequently asked questions

Frequently asked questions

The CDM 2015 Regulations and supporting guidance set out in L153 have to address a wide variety of construction scenarios from simple building works to complex infrastructure programmes.

The preceding case studies are intended to demonstrate how the requirements of CDM can be met by applying the underpinning principles in a proportionate way by a suitably informed project team.

When delivering training, we have found that a number of questions keep recurring; answering them satisfactorily can depend on whether a 'legal' or a 'professional' interpretation is expected. L153 does not have clear answers to all of these questions, as the response may depend on the context of the question and so professional judgement is required to arrive at an appropriate conclusion.

In order to clear up some of the misunderstandings which are still widespread in the industry, the following questions have been addressed from both a legal perspective where L153 can be employed and from a 'professional' standpoint, based on our collective experience and understanding of what constitutes a 'correct' position.

A. Is the pre-construction phase the period of time before construction starts on site?

L153 - Regulation 2 Interpretation – **'pre-construction phase'** *"means any period of time during which design or preparatory work is carried out for a project and may continue during the construction stage".*
Paragraph 94 A principal designer is the designer as defined in regulation 2(1) (see also paragraphs 72–74) with control over the pre-construction phase of the project. This is the very earliest stage of a project from concept design through to planning the delivery of the construction work. The principal designer must be appointed in writing by the client.

Comment – Some projects have distinct design and construction stages, but design work often continues in parallel with construction activities. A wide variety of design activities take place on a typical project, some of them by contractors (e.g. Building services, facades) as well as for temporary works. The principal designer role is to manage 'pre-construction' activities, the principal contractor has to manage the 'construction' activities. The greater the overlap of activities, the greater the need for the PD and PC functions to work together. This is particularly relevant where advanced works (often referred to as 'enabling works') are carried out before main works packages are let.

B. Which is the most appropriate organisation to take on the principal designer function and why?

L153 - Regulation 5(1) - *"A designer with control over the pre-construction phase "*
Comment - Depending on the nature and complexity of the project, the client, lead designer or another 'person' (who is a designer) with control over the pre-construction activities is the most suitable to take on the function. In legal terms the 'person' can be an individual or an organisation. Every project client must consider what is the best arrangement and this should be done as part of developing the CDM Strategy Brief. The preceding case studies demonstrate the variety of ways in which the requirements of the Regulations can be satisfied.

C. Do designers have to identify all risks?

L153 Paragraph 102 – *"Identifying insignificant risks is not an effective way of alerting other duty holders to important design issues they need to know about. Designers should be able to demonstrate they have addressed only significant risks. These are defined as "not necessarily those that involve the greatest risks, but those (including health risks) that are not likely to be obvious, are unusual, or likely to be difficult to manage effectively".*

Comment – every project team should focus, from the outset, on those areas of the project that could represent a threat to the wellbeing of the workforce and the wider population. There will be a subjective element to this assessment, but the major causes of accidents and ill-health are well recognised in the Construction sector.

D. How far should designers go when mitigating risks?

L153 - Glossary - *So far as is "reasonably practicable" – i.e. "balancing the level of risk against the measures needed to control the real risk in terms of money, time or trouble. However, you do not need to take action if it would be grossly disproportionate to the level of risk"*

Comment – when addressing 'significant risks' project teams have to take into account all relevant factors - and must apply the general principles of prevention to eliminate, reduce or control risks to an acceptable level, which will assist them in determining a satisfactory solution. Provided they have addressed the foreseeable risks, designers should be able to demonstrate a satisfactory level of compliance. Designers do not need to address insignificant routine or normal risks unless heightened by other issues.

E. Do designers have a duty to report health and safety concerns when visiting site?

L153 - Regulation 8(5) - All duty-holders have a duty to report *"anything they are aware of in relation to the project which is likely to endanger their own health or safety or that of others.".*

Comment – apart from this legal duty, construction professionals have a moral duty to alert the contractor or principal contractor in control of the site, if they have any concerns about the safety of site operations.

F. Do health and safety risks take priority over other issues?

L153 – Paragraph 83 - *"Health and safety risks need to be considered alongside other factors that influence the design such as cost, fitness for purpose, aesthetics, environmental impact etc.''*

Comment - Health and safety risk is often viewed as being separate and distinct from other aspects of project risk when in fact health and safety considerations are interwoven into the design and construction process. Many "risks" have considerable "benefit" to projects such as working at height or with large heavy components and could be better described as key issues". A suitable balance of risk and benefit must be considered and agreed by collaborative team working and by the exercise of professional judgement. However significant risks must be addressed as set out within question C above.

G. What is the principal designer role during the construction phase?

L153 – Regulation 11 (7) – "*The principal designer must liaise with the principal contractor for the duration of the principal designer's appointment and share with the principal contractor information relevant to the planning, management and monitoring of the construction phase and the coordination of health and safety matters during the construction phase".*

Comment – although the principal designer and principal contractor duties are different, a collaborative relationship will allow both parties to benefit from the knowledge and experience of the other and discharge their duties more effectively. The greater the volume of design work to be carried out after the commencement of construction works, the more vital that the two major duty-holders form an integrated team.

H. What should the health and safety file contain and who should produce it?

L153 – Reg. 12(5) – *"During the pre-construction phase, the principal designer must prepare a health and safety file appropriate to the characteristics of the project which must contain information relating to the project which is likely to be needed during any subsequent project to ensure the health and safety of any person.*
12(8) If the principal designer's appointment concludes before the end of the project, the principal designer must pass the health and safety file to the principal contractor".

Comment – the purpose, form and required content of a health and safety file should be addressed as part of the development of the CDM Strategy Brief. Appendix 4 of L153 provides guidance as to the range of information which project teams should consider for inclusion - but the list is not exhaustive. Only information that will assist future project teams in planning work so that health and safety is ensured should be provided, 'in a convenient form, clear concise and easily understandable.' If this approach is agreed at the outset of the project, all parties can contribute appropriate information and avoid unnecessary bureaucracy.

I. When and why should a designer offer to take on client duties on a domestic project?

L153 - Regulation 7 (1) – *"Where the client is a domestic client the duties in regulations 4(1) to (7) and 6 must be carried out by—*

(a) the contractor for a project where there is only one contractor.
(b) the principal contractor for a project where there is more than one contractor: or
(c) the principal designer where there is a written agreement that the principal designer will fulfil those duties."

Comment – the guidance to Reg 7 in L153 (para 54) makes clear that in the normal course of events 'the builder' (either the contractor or principal contractor) would be expected to take on the duties normally required of a client: -

- allowing sufficient time and resource
- arranging construction work so it can be carried out safely
- ensuring adequate welfare facilities are provided
- providing pre-construction information.

For domestic projects where there are no complex design issues (eg CS1a and CS3), this approach should work well. However, where the design development needs to take account of challenging site conditions (eg CS1b and CS2), the lead designer may feel it is in the best interests of both the client and the project team to take on what is effectively the project management role. (L153 para 55). This is particularly relevant where there is likely to be a

protracted period before a contractor is appointed and where complex design issues have to be addressed. Any designer contemplating taking this route should be aware that in doing so they would attract additional legal responsibilities so should be confident that they have the capability and resources to discharge their legal and professional duties.
The contractor or principal contractor would still be responsible for site safety, provision of welfare facilities etc. The strategy brief setting out these arrangements should be shared with the domestic client, who can influence the site culture, even without taking on the project management role.

J. Does a designer on a domestic project have to take on the principal designer role?

L153 - Reg 5(1) (1) *Where there is more than one contractor, or if it is reasonably foreseeable that more than one contractor will be working on a project at any time, the client must appoint in writing—*

(a) a designer with control over the pre-construction phase as principal designer;"

Reg 7(2) "*If a domestic client fails to make the appointments required by regulation 5*

(b) the designer in control of the pre-construction phase of the project is the principal designer; "

Comment – unlike a commercial client, if a domestic client does not make an appointment in writing, they do not take on the duties themselves. Any designer taking on a commission for a domestic project should clarify with the client whether they have or intend to make a written appointment. The strategy brief template can be used in the same way as with a commercial client to clarify the management arrangements and ensure all parties are clear where the legal responsibility for managing risk lies. For simple domestic schemes (eg. CS1a & 1b) the PD duties will extend only a little further than the designer duties. However, for more complex schemes with multiple designers (eg.CS2 & CS3) a more detailed analysis of the situation will be required.

K. Can there be multiple principal designers and principal contractors on one project at the same time?

L153 Regulation 5 (1) *"Where there is more than one contractor, or if it is reasonably foreseeable that more than one contractor will be working on a project at any time, the client must appoint in writing—*

(a) a designer with control over the pre-construction phase as principal designer; and
(b) a contractor as principal contractor."

Reg 13 Paragraph 117 – *"There may be occasions where two or more projects are taking place on the same site at the same time but are run independently of one another. Whatever the circumstances, it is essential that there is clarity over who is in control during the construction phase in any part of the site at any given time. Where it is not possible for one principal contractor to be in overall control, those principal contractors involved must:*

(a) cooperate with one another;
(b) coordinate their work; and
(c) take account of any shared interfaces between the activities of each project (e.g., shared traffic routes)."

Comment – The CDM regulations require appointment of a principal designer and a principal contractor where it is foreseeable that more than one contractor will be working on a project at any time.
Complex multidisciplinary programmes are often designed and constructed in concurrent phases, where several quasi-independent projects contribute to the design and construction of a programme. It may not be reasonable in this instance to expect one principal designer and one principal contractor to have the capability to discharge their duties, considering the scale, complexity and diversity of works. (see CS 9).
The CDM Strategy Brief should be used to identify the roles and responsibilities of each appointee at any given phase of works. Where an appointee's scope of works interfaces with another, the brief should be reviewed to ensure the ongoing suitability of the arrangements, with the aim of managing risk effectively at every level and phase of the programme. The CDM Strategy Brief should also be used to document the arrangements for sharing information between parties, ensuring it is understood and consistent.

L. Can principal designer duties be sub-let to independent CDM-advisers or principal designer advisers?

L153 Regulation 8(1) – *"A designer (including a principal designer) or contractor (including a principal contractor) appointed to work on a project must have the skills, knowledge and experience and, if they are an organisation, the organisational capability, necessary to fulfil the role that they are appointed to undertake, in a manner that secures the health and safety of any person affected by the project."*

Comment – All duty holders are expected to maintain their ongoing capability to fulfil their appointment. It is perfectly acceptable for an organisation to seek the advice of others to maintain capability. However, the accountability remains with the appointed duty holder either as an organisation or individual.

M. How far do principal designers have to consider the integration of temporary works into projects?

L153 Regulation 7(2) *A designer is an organisation or individual, who:*

> *(a) prepares or modifies a design for a construction project (including the design of temporary works); or*
> *(b) arranges for or instructs someone else to do so.*

Para.148 *"Where contractors are involved in design work, including for temporary works, they also have duties as designers."*

Regulation 11(4) *"In fulfilling the duties in paragraph (1), the principal designer must ensure all designers comply with their duties in regulation 9."*

Comment – The CDM regulations do not distinguish between temporary and permanent works design. The principal designer has an important role at each stage of the project to ensure other duty-holders understand and meet their responsibilities: -

Stage0/1- The CDM Strategy Brief can be used to aid the client in understanding how their management arrangements should address the management of temporary works, as they constitute strategic and significant CDM issues. The requirement for an additional initial enabling works contract needs to be agreed at an early stage

Stage 2/3 - The principal designer working with other, permanent works designers should consider the need and extent of for temporary works as the design develops. Solutions could eliminate or reduce the need for temporary works by taking into account the principles of prevention.

Stage 4/5 – Whether there is an initial enabling works or a single main contract the client should appoint a principal contractor with the capability to manage temporary works in accordance with the requirements set out in BS 5975:2019.Whilst the principal contractor's temporary works coordinator (PC-TWC) will have the primary role in ensuring that temporary works are designed and checked by suitably qualified engineers, the principal designer will need to be satisfied that, particularly for major temporary works, the work is carried out in accordance with BS5975.This may be done by receiving regular reports from the PC-TWC on their design development status, checking that the temporary works register is being maintained or by meeting with the PC-TWC to jointly consider if there are any significant risk issues relating to the interface between the permanent and temporary works designs.

N. What are the challenges if the lead designer (who is also acting as principal designer) is novated to the principal contractor on a Design & Build project?

L153 Para 94 "*A principal designer is the designer as defined in regulation 2(1) (see also paragraphs 72–74) with control over the pre-construction phase of the project. This is the very earliest stage of a project from concept design through to planning the delivery of the construction work. The principal designer must be appointed in writing by the client."*
Para 95 "*The principal designer can be an organisation or an individual that has: -*

(a) the technical knowledge of the construction industry relevant to the project;
(b) the skills, knowledge and experience to understand, manage and coordinate the pre-construction phase, including any design work carried out after construction begins.

Where the principal designer is an organisation, it must have the organisational capability to carry out the role."

Comment – it is common practice, particularly on commercial building projects, for the client to opt for a design/ build approach with the original design team novated to the principal contractor on their appointment. The question of how the principal designer duties will be discharged beyond this point should be addressed as the CDM Strategy Brief is being developed. Ideally the principal designer should function independent of both individual designers and contractors during the construction phase to ensure that risks are being properly considered, particularly where the original design is being challenged, for example by value engineering exercises.
The transfer of duties from one principal designer to another should be accompanied by clear information on significant risks, the mitigation already in place and the outstanding issues which remain to be resolved.

O. What does the CDM definition of a "designer" actually mean with respect to designer information production and legal responsibilities?

L153 Reg. 2 *designer" means any person (including a client, contractor or other person referred to in these Regulations) who in the course or furtherance of a business—*

(a) prepares or modifies a design; or
(b) arranges for, or instructs, any person under their control to do so,

relating to a structure, or to a product or mechanical or electrical system intended for a particular structure, and a person is deemed to prepare a design where a design is prepared by a person under their control;

"design" includes drawings, design details, specifications and bills of quantities (including specification of articles or substances) relating to a structure, and calculations prepared for the purpose of a design.

Comment - Most design work on construction projects is carried out by suitably qualified individuals and organisations who are employed specifically to provide deliverable design information as part of an overall project design and have a track record that demonstrates their capability. The output from their work should demonstrate an appreciation that information relating to significant risks emanating from their design must be easy to understand and help construction activities to be carried out safely and without risk to health.

However, the Regulations also recognize that other parties, such as clients, project managers and contractors who may, from time to time, make decisions that affect or change the design need to do so without adverse health or safety implications. This is typically, but not always, due to budgetary control described as 'value engineering' but is often little more than a cost-cutting exercise. In making these decisions they need to understand that they carry the same legal responsibility as other designers.

In reality, project designs develop over time with the participation of both active and passive designers, so a focus on collaborating to produce a sound set of design information should be the priority, rather than protecting individual positions.

CDM 20-20 report acknowledgments

The following construction professionals who contributed to the development and peer review of this report: -

Alex Bell – (CEng MIStructE, ICE Health & Safety Registered)
Director- Melia, Smith & Jones

Paul Bussey – (RIBA, FIFireE, FASFP, FIIRSM, IMaPS)
Technical Design Lead Fire and CDM - AHMM Architects

Paul Gotts – (CMIOSH.)
System Safety Assurance Manager, Systra

Laura Hague – (BSc, PhD, CMIOSH)
Group safety manager, Mott MacDonald

Randolph Lavelle – (CMIOSH)
Senior Health & Safety Manager- Jacobs

Alan Mead – (CMIOSH)
Senior CDM consultant- Multiplex

Gary Mees – (PPCIAT MCIAT IMaPS)
CIC Health & Safety Champion, Chair of Keeping Pace with Change CONIAC working group.
Chartered Architectural Technologist and principal at G Mees Architectural Technology.

Tony Putsman – [CEng MICE, ICE Health & Safety Registered (Advanced)]
Risk Management Consultant – Xenophon Project Services Limited

Ty Qureshi – (CMIOSH)
HSQE Operation Safety – Amey UK Plc.

Glen Skelton – (BSc (Hon) Env. Studies)
Wetland Landscapes Officer- Surrey Wildlife Trust

Alex Tait – Head of Technical Practice
Royal Institute of British Architects

Peter Waxman – (RIBA MA TechIOSH IMaPS)
CDM Consultant

C Wheeldon – (BEng, MICE)
Technical Services Director, Volkerfitzpatrick Limited – Rail and Infrastructure Division.

We would also like to thank: -

- (Health and Safety Executive) for their support and guidance.
  Gavin Bull; Chris Lucas; Gordon Crick

- Alford Hall Monaghan Morris for hosting the Teams meetings during and after the Summer 2020 lockdown.

- Sally Mees – Proofreading the documents.

Contact for enquiries: –
Gary Mees email: gamees@gmat-technology.co.uk
Tony Putsman email: tony.putsman@xps.org.uk