PowerPoint Speaker Notes

Case Study: Thames Tideway

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Some of the contributions the construction industry has made to society often go unseen, but without them life would be very different, as indeed it was in the early 19th century. In cities such as London, Bristol, Birmingham, Manchester, Liverpool and Leeds it would not be uncommon for streets to be covered in waste and sewerage to be disposed of directly into watercourses.

In the mid-1800s John Bazalgette, who was chief engineer of the Metropolitan Board of Works, designed an extensive sewerage system in London, which is still the heart of the sewerage system in the capital. The sewers were constructed using a range of different approaches, as can be seen in the photographs.

What approaches could be used for constructing a modern sewerage system?

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You have come up with many ideas for how sewers are constructed. Many of you considered the traditional approach of digging trenches and then filling these back in once the sewers have been built - this is a cut and cover approach and can be used when works are quite close to the ground surface, or when the area is not built up.

But how do you construct a super-sewer under London? London is one of the busiest cities in Europe, with lots of housing and offices. In addition, there

are other things to think about such as the Underground, electricity cables and water mains.

Well, the approach that is being taken to construct the Thames Tideway tunnel is the use of tunnel boring machines which are lowered in to the ground and they then tunnel to the next access shaft.

These are specialist pieces of construction equipment that have a rotating cutter head that cuts through the ground and creates the concrete walls of the tunnel using pre-cast segments of concrete. The machine also removes the spoil from where the tunnel has been bored using a conveyor system. Access shafts will also be positioned along the route of the tunnel, some in excess of 60m in depth.

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The Thames Tideway Tunnel is one of the largest civil engineering projects in the United Kingdom. A 25km tunnel is being constructed under London that aims to provide extra capacity to the existing London sewer system that was designed in 1858.

Since then the population of London has grown from 2 million people to nearly 9 million. At the same time, the amount of open spaces has reduced which reduces the ability of rainwater to soak into the ground.

The Thames Tideway Tunnel is designed to intercept sewerage and transport from west London eastwards, at depths of up to 60m below the ground using only gravity to move the waste.

Once completed, the Thames Tideway Tunnel will reduce the amount of waste flowing into the River Thames during times of heavy rainfall, which in turn will improve the quality of river water for wildlife.

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The ground conditions for the Thames Tideway tunnel are complex. Starting with london clay in the west, the middle section of the tunnel will pass through variable ground conditions, which include sand and gravel layers between layers of rock, as the tunnel travels east the ground then becomes mostly chalk.

As well as variable ground conditions there are many sources of contamination in the soil and ground throughout the area.

To obtain full details of the ground conditions along the line of the route bore holes were drilled to gather samples. These were then analysed to determine the exact form of the ground where the tunnel will be bored.

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The Thames Tideway project is very complex and covers not only a large geographical area, but also types of work as such, effective project management is very important.

As a whole, the project is being procured by Tideway, who have appointed Main Work Tier 1 contractors. These contractors are responsible for packages of work that have been divided by locations:

West section: A joint venture of BAM Nuttall, Morgan Sindall and Balfour Beatty Group.

Central section: A joint venture of Ferrovial Agroman UK and Laing O'Rourke Construction.

East section: A joint venture of Costain, Vinci Construction Grands Projets and Bachy Soletanche.

These Tier 1 contractors then procure goods and services from suppliers and contractors. For example, the west section will have subcontractors working on electrical installations in control rooms at various sites.

Each of these will require careful and effective project management if the tunnel is to be completed on time.

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There are many different ways in which projects can be procured, often depending on the nature and scope of the work that is being completed.

For the Thames Tideway a competitive procurement process was conducted to select an independent infrastructure provider to finance, build and maintain the tunnel based financial requirements, commercial factors and deliverability.

This contract was awarded to Bazalgette Tunnel Limited.

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Over the next few weeks you are going to work with me to learn more about infrastructure projects.

Let's look together at what you are going to be learning

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You are going to have the opportunity to investigate an infrastructure project for a given site in your local area.

This could be a project that is already in the planning stage, one that has been identified as being necessary or something completely new. You will be given details of the project location and scope.

You will learn about site investigations, how to address project constraints and how to procure and plan project outcomes.

There are wider improvements that will benefit society that are associated with the Thames Tideway project. The project as a whole will benefit the

economy and society by providing employment during the construction phase, including jobs for apprentices. The project will provide leisure and recreation facilities, such as at Barns Elms where existing changing facilities are to be relocated and rebuilt as part of the project.

Chambers Wharf near Tower Bridge on the banks of the River Thames is a brownfield site that previously had warehouses and similar buildings on it. The site is surrounded by residential properties and a primary school. The development of this site will also contribute in several ways to the local economy. Firstly, there will be some regeneration of the area which has the potential to increase wealth for the economy. There will also be contributions to infrastructure in the form of new cycle and foot paths, as well as the key aim of the project to provide water management through the sewer system to allow the site to accommodate London's growing population.

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You will look at ways in which site investigations are carried out.

This will include desktop studies where existing records from investigations can be used, along with consulting maps and other documents to find out about the previous and current use of land.

You will then investigate methods that the site could then be investigate during on-site surveys. You will research the use of levels and theodolites as well as modern surveying methods such as drones and 3D scanning.

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You will examine the site for your infrastructure project and the constraints that are associated with the site, such as the layout, geography and surrounding buildings.

You will then consider the social and economic constraints that impact on construction projects and sources of funding that are available for completing infrastructure projects.

You will also develop an understanding of the importance of the legal, statutory and regulatory constraints that would apply to construction projects. You will focus on the importance of these for your infrastructure project.

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Finally, we need to plan the outcomes for your infrastructure project.

You investigate materials that could be used for the project, and then look at one of these in much more detail by carrying out a life cycle assessment.

You will look at the importance of the project team and the interactions between team members and then suggest an approach for procuring the project.

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All this is going to help you pass your T-Level in Construction. The tasks that you are undertaking help you develop your knowledge and understanding for the Core Component. This knowledge and understanding is tested in the written examination paper 1 and paper 2 for the qualification. In addition to this, you will also be learning key skills to help you pass the Employer Set Project of the qualification.

For instance, you will acquire as part of the work we are about to undertake knowledge of how site investigations are carried out. You will also gain experience of interpreting information and producing presentations and reports for specific audiences. Being able to interpret information to produce a report or presentation is important for the Employer Set Project, whilst understanding ground conditions will help you in the Core exams.