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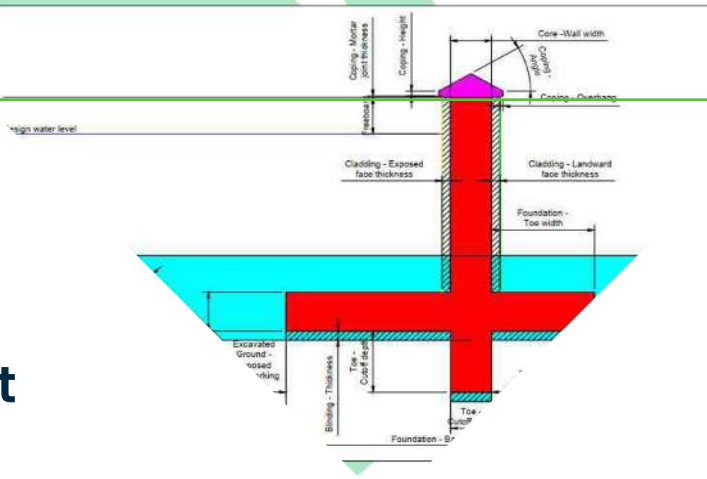
CASE STUDY



Mott MacDonald Develops Smart Object Library for the U.K.'s Environment Agency

Leveraging ProjectWise® Components Center Facilitates Reuse of Digital Content to Save GBP 224,000 and Meet Net-zero Carbon Goals

INCREASING CLIMATE RESILIENCE THROUGH AN INTELLIGENT OBJECT LIBRARY

To increase resilience of people, processes, and business to the risks of flooding and coastal erosion, the Environmental Agency (EA) of England and Wales is investing GBP 2.5 billion in capital projects over the next 10 years. A large portion of these projects will be construction works, necessitating improvements in design efficiency, readily available prototyped solutions, and streamlined information sharing for better asset *lifecycle* decision-making. This situation prompted the EA to develop an intelligent digital process that would maximize the use and reuse of existing design data and models, as well as standardize design content across the organization and supply chain partners.

EA contracted Mott MacDonald to create a standard object library (SOL) that would enable rapid development of designs, ensure that information generated by capital projects is of high quality and consistent, and bring efficiency to asset design and management. "The SOL is a digital library of standardized 3D and data representations of assets that can be dragged and dropped into models to enable the EA to visualize, design, and analyze projects throughout all phases of the design process with ease," said Kyle McLean, civil engineer at Mott MacDonald. The project is part of the EA's flood and coastal erosion risk management program to protect and enhance the environment and contribute to sustainable development. With the help of the SOL, the EA aims to create more climate-resilient infrastructure by 2025, ensuring that the United Kingdom is prepared for flooding and coastal change.

FUNCTIONALITY, ADAPTABILITY, AND INTEROPERABILITY

With the development of their comprehensive data requirements library (DRL) in 2018, the EA had already established its foundational digital strategy and was ready to move forward building its SOL. "The challenge that EA brought to us was to create a centralized library of parametric objects that promotes the use and reuse of design content in a standard way," said Simon Kerr, project lead at Mott MacDonald. The initial request was to create objects that represented 15 asset types from the EA's DRL and would grow in time through Mott MacDonald's content creation service, Moata Intelligent Content, and through direct creation of objects on individual projects. All objects needed to align with EA's asset types and be compliant with the EA's format and standards for conceptual design to support rapid prototyping, optioneering, and associated carbon and cost decisions.

Other requirements included that the library be accessible to the entire supply chain, provide metrics to demonstrate return on investment, and be compatible with common design software. It also needed to feature a vast digital estate of components for a wide range of industries, regularly accommodate newly added components, and allow for quick search, filtering, and data retrieval. Mott MacDonald used their Moata Intelligent Content platform as the SOL's foundation for rapid use and deployment of parametric digital assets. However, they faced integration and coordination challenges when securing cross-organization collaboration, as well as ensuring optimum parametric functionality for each smart object. They evaluated different software applications but found that they lacked the

PROJECT SUMMARY

ORGANIZATION

Mott MacDonald

SOLUTION

Enterprise Engineering

LOCATION

United Kingdom

PROJECT OBJECTIVES

- To deliver a smart object library (SOL) for the Environment Agency (EA).
- To support the EA in designing for efficiency and sustainability to achieve net-zero carbon targets

PROJECT PLAYBOOK

ProjectWise Components Center

FAST FACTS

- The U.K.'s EA contracted Mott MacDonald to create a smart object library (SOL) accessible to the EA and across all suppliers.
- Using ProjectWise Components Center provided an interoperable, data-connected solution, enabling broad access and user onboarding options.
- The SOL facilitates digital content reuse and provides open access to the EA and its suppliers, improving efficiencies and supporting climate resilience.

ROI

- In the initial three-month pilot, the SOL saved the EA GBP 224,000 in costs to achieve a return of three-times the investment.
- Using standardized 3D objects, the EA can optioneer designs for efficiency, sustainability, and ultimately, carbon neutrality.
- ROI over the next two years is expected to increase exponentially, reaching a 25-times return on initial investment.

"The ability to rapidly produce objects in a streamlined and efficient manner will certainly support successful capital project delivery. The time and cost savings can be expertly measured and recorded to showcase the benefits of the SOL and we look forward to discovering more ways to develop the library to encourage improved future designs."
– Kanita Dogra, Project Manager, Environment Agency

functionality and adaptability required to host the smart objects and enable users to fully realize the potential of the SOL. Therefore, the team realized that they needed a comprehensive, interoperable, data-connected solution.

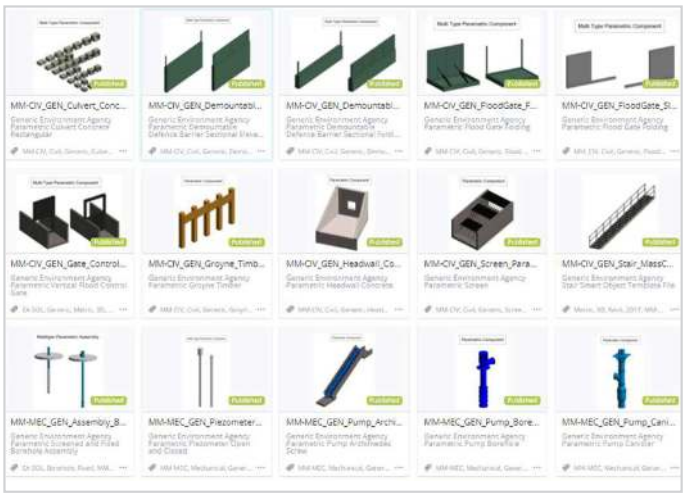
PROJECTWISE UNDERPINS SMART SOLUTION

Already familiar with Bentley applications, Mott MacDonald selected ProjectWise Components Center, which provided greater accessibility and interoperability than other platforms. By using the application, the team was capable of hosting multiple file formats and serving a wide range of project disciplines and suppliers. ProjectWise had the best functionality and adaptability, enabling a well-rounded and data-connected solution to the EA's data requirements for their object library. "ProjectWise Component Center had greater access and user onboarding options than other platforms we evaluated; it helped the SOL deliver on improving productivity and aligning with the United Nations Sustainable Development Goals," said McLean. "Our team manages the object library using the ProjectWise Component Center platform. This involves creating smart objects for the EA and their supply partners, and managing supplier access to the SOL, so smart objects can be accessed by as many partners as possible," said Andy Barnes, product lead for Mott MacDonald's global BIM library solution.

With ProjectWise Component Center's interoperability, EA's library can host multiple file formats, providing a scalable library functionality to enhance existing objects with multisourced wraparound data, and create future objects in any file type. Through the collaboration between Mott MacDonald's Moata Intelligent Content platform and Bentley's ProjectWise application, the SOL has been developed, tailored, and optimized to meet the EA's needs. The integrated digital solution ensures that all users can get the right information at the right time. Additionally, the data from the parametric components can be extracted and applied beyond design, as often as necessary, to ongoing 4D construction scheduling and 5D cost processes. "We aligned Bentley's 'Build, Measure, Learn' development process and believe that we helped to shape ProjectWise Components Center into the product we now use for the EA's library platform," said Barnes.

DESIGNING FOR EFFICIENCY, SUSTAINABILITY, AND CARBON NEUTRALITY

During the initial SOL pilot, within the first three months of deployment, EA saved GBP 224,000 and 4,767 hours by reusing content from downloading, placing, or opening objects by just 27 out of 110 users. It delivered an immediate three-times return on project investment. "With an expected rise to 400 users within two years, and a project adoption target of 80%, the object reuse value generated should show a 25-times return on the initial investment," said Barnes. The ability to reuse the digital content will exponentially increase the return on investment as the library incorporates more smart objects and becomes accessible to more users. Now, the EA can optioneer designs for efficiency, sustainability, and carbon emissions, helping cut costs and meet their net-zero goals.



The U.K.'s EA contracted Mott MacDonald to create a smart object library (SOL) accessible to the EA and across all suppliers..

Image courtesy of Mott MacDonald

Designed to provide open access to the EA and its suppliers and revolutionize the way component libraries are stocked and managed, the SOL will streamline design and delivery for all projects going forward, cutting costs and environmental impact. Having now built, measured, and learned the value of the smart object library, Mott MacDonald's next SOL iteration will expand the DRL data automation process, enhancing smart object capabilities to deliver machine readable, DRL-aligned data output, including carbon estimating and management. "Data extracted from the smart objects can be directly consumed by the EA's carbon calculators, providing decision makers with the evidence they need to select options that not only achieve lowest whole-life cost, but also whole-life carbon," said Kerr.