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Enhancing Future Capital Delivery: A Comparative analysis of Melbourne Water Corporation's Project Models

Melbourne Water

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1 List of abbreviations and terminologies

The analysis report will use numerous abbreviations and terminologies at various stages. This section will serve as a reference for what do these abbreviations mean alongwith their definitions.

1. **BNI** : Business Need Identifier
2. **PBC** : Preliminary Business Case
3. **BCA** : Business Case Approval
4. **Stage 1** : First stage of project completion
5. **Stage 2** : Second stage of project completion
6. **Stage 3** : Third stage of project completion
7. **FFC** : Final forecasted cost of project
8. **ID** : Unique identification for each individual project
9. **Owner group** : The division within Melbourne Water Corporation responsible for completing the particular project
10. **Delivery Program** : The subdivision within Melbourne Water Corporation responsible for completing the particular project
11. **PS** : Pricing submission period for Melbourne Water's business case to be submitted to Department of Treasury and Finance (DTF)
12. **CDM**: Capital Delivery Model

Table 1: *Project data*

ID	FFC	Delivery Program	Tender Closed	Owner Group	BNI
Q05388	2359288.6	Major Works - Framework	NA	Corporate Services	5/02/2016 5:00:00 P
Q05640	2066075.6	Major Works - Framework	NA	Corporate Services	11/07/2016 5:00:00
Q05641	1066164.9	Major Works - Framework	NA	Corporate Services	24/06/2016 5:00:00
Q05643	1122487.0	Major Works - Framework	NA	Corporate Services	11/07/2016
Q05664	636484.8	Major Works - Framework	NA	Corporate Services	11/07/2016 8:57:00
Q05666	906031.7	Major Works - Framework	NA	Corporate Services	8/07/2016 8:58:00 A

2 Executive Summary

The purpose of this study is to outline the methodology and guidelines for conducting the Capital Delivery Model project data analysis. This analysis aims to develop a reproducible framework that compares the current delivery model with past models, providing valuable insights to enhance future delivery models planned for years between 2026 to 2031, and use these learnings for future pricing submission periods.

By systematically examining past and present performance, the aim is to identify key trends, strengths, and areas for improvement, ensuring that future projects are executed more efficiently and effectively.

For the purpose of the current analysis, Melbourne Water Corporation's project data with business need identifier (BNI) dates between 2008 to 2024 were analysed. The major areas of study for the current analysis are delineated as follows:

1. Distribution of the projects in each delivery model based on the overall valuation of the projects as determined by the final forecast cost (FFC).
2. Distribution of the projects in numbers for each delivery model.
3. Distribution of project duration based on their overall valuations.
4. Project approval duration distribution across different stages of approvals.
5. Forecasted number of projects in the future delivery period from 2026 to 2031.

3 Data Source

The data for the current analysis has been sourced from the "Estimating & Scheduling" PowerBI dashboard in the Major Program Delivery workspace at Melbourne Water Corporation. The data was exported as a CSV file on 19th July, 2024 and as such, contains the latest updated project valuations up to that date. Due to the sensitive nature of the data, there is no public access to this data.

Confidentiality statement

To comply with Melbourne Water Corporation's confidentiality requirements, the data has been de-identified and includes only the relevant fields necessary for obtaining insights for the intended evaluation purpose.

4 Introduction

The construction of large-scale infrastructure projects, commonly referred to as "CAPEX" projects, is highly resource-intensive and typically requires effective collaboration among multiple organizations for successful and timely completion. Peter Hansford (2013) suggests that in a collaborative work environment, teams are required to generate information using standardized procedures and agreed-upon standards and methods. This ensures consistency in form and quality, allowing the information to be used and reused without the need for modification or interpretation. However, in practice, such high level collaboration is often challenging and needs well laid communication as well as contractual frameworks for effective

To initiate, monitor, and deliver these projects, a comprehensive framework is usually developed. This framework assesses the project's valuation and associated risks, and then engages the appropriate service providers to ensure timely project delivery. This framework which governs the delivery route of a project is termed as the Capital Delivery Model.

Each Capital Delivery Model presides over a period of 5 years, after the completion of which, a new Capital Delivery Model initiates. Before the creation of such a model,the host organisation (in this case, Melbourne Water Corporation) is required to submit a proposal of projects to be delivered over the next 5 years to the Department of Treasury and Finance, Government of Australia. Once the list of projects are approved or amended, a Capital Delivery Model is then designed, analysed, iterated and improved over a course of a year, after which, it is finally released to the market, where service providers may decide to get into a partnership with Melbourne Water for delivering the next set of infrastructures.

Garcia et al. (2021) states that a key underlying challenge in today's model-driven approach to engineering is how progress and level of effort are being measured and reported. The goal of the current project is to quantify the key results of the past delivery models and obtain important insights which would allow for to design an improved capital delivery model for the upcoming pricing submission period between 2026-2031. In particular, the analysis would attempt to estimate the

future number of projects and their expected valuations based on the distribution of projects in the current and past deliver models.

5 Motivation of the current study

The process of estimating the mix of the type of projects expected in the new capital delivery model after the 2026 price submission is based on the analysis of the current delivery model (CDM 2021) and the previous delivery model (CDM 2016). The forthcoming 2026 price submission is projected to surpass recent submissions in value, presenting significant challenges in project management. This includes the engagement of service providers for construction, efficient management of key crew resources, and rigorous monitoring to ensure timely infrastructure delivery. The current data analysis review of the projects in CDM 2016 and CDM 2021 will provide an adequate baseline of the expected proportion of the major capital delivery projects based on valuation and duration expected in the future delivery model (CDM 2026), thereby providing insights and eventually aiding in the key decision making for creation of the frameworks.

The current analysis is performed by studying the following key parameters in the project data:

1. Total final forecast cost (FFC)
2. CDM period (2016, 2021 and 2026)
3. Project duration across each stage
4. Delivery Program

6 Significance of the current study

While the detailed data analysis of the CDMs initiated as an abstract idea with flexible scope, however after multiple workshops with the project director and the steering group at Major Capital Delivery division, the key objectives and the scope for the current CDM data analysis project was finalised. These have been delineated as follows:

1. The analysis must provide an estimate of the project breakdown for CDM-26 after the latest price submission in 2026 by analysing the current delivery model (CDM-21) and the previous delivery model (CDM-16). This can be used as a basis for obtaining an informed prior information to design the new capital delivery model (CDM-26).
2. The analysis would supplement the decision making on effective selection of service providers for projects in the future delivery model based on the current distribution of the delivery programs across various FFCs and past CDMs.

3. The breakdown of the projects must allow a conservative estimate of the number of projects that would require approval at each level of authority, thereby indicating the approval duration for the project to be approved and initiated.
4. The analysis should aid in understanding how the proportions of projects in the future delivery model would differ from the benchmarks created by past models upon additional inputs.
5. Insights obtained from the total project duration and the average duration for the critical stages of each project may allow for effective project team planning.
6. The analysis must allow one to quickly detect outliers in the data and investigate these outliers further. (Eg: Projects whose total duration is significantly above other similar projects)

7 Methodology

8 Results and Discussion

9 Conclusion

10 Key areas of improvement

References

Garcia, G, M Golparvar-Fard, JM de la Garza & M Fischer (2021). Measuring progress and productivity in model-driven engineering for capital project delivery. *Journal of Construction Engineering and Management* **147**(4), 04021009.

Peter Hansford, IC (2013). Specification for information management for the capital/delivery phase of construction projects using building information modelling.