

The Regional Municipality of York Committee of the Whole Environmental Services May 8, 2025 FOR DECISION

### Report of the Commissioner of Public Works York Region Sewage Works Collaborative Construction Delivery Model Implementation

#### 1. Recommendation

- Council authorize the Commissioner of Public Works to negotiate, award and execute non-standard construction contracts for the York Region Sewage Works Project including components of the North York Durham Sewage System Expansion Phase 1 and Primary System Expansion Primary Trunk Twinning, pursuant to Section 18.1(e) of the Procurement Bylaw 2021-103.
- 2. Each contract be delivered through a Construction Manager at Risk collaborative contract delivery model, whereby the construction services value is limited to a Guaranteed Maximum Price, as described in Section 5 of this report.

### 2. Purpose

Council authority is sought by the Commissioner of Public Works to apply the Construction Manager at Risk (CMAR) contract model for delivery of components of the York Region Sewage Works project as described in this report, including, for each CMAR contract: awarding the contract to a construction manager publicly procured during Stage 1 – Preconstruction Services; conducting negotiations of the Guaranteed Maximum Price (GMP) with the construction manager; and if negotiations are successful, proceeding with delivery of Stage 2 Construction Services by the construction manager as a non-standard procurement pursuant to Section 18.1(e) of the Procurement Bylaw 2021-103. This request is to enhance the outcomes of these large-scale wastewater infrastructure projects by improving cost control, schedule efficiency, risk management, and overall project quality.

### **Key Points:**

- Traditional Design-Bid-Build (DBB) contracts are suitable for delivery of most smaller scale infrastructure projects, however larger scale infrastructure projects in the Region's 10-Year Capital Plan pose an opportunity to explore more innovative and collaborative contracting methods
- Using a collaborative delivery model, such as CMAR, will increase ability and flexibility to
  expeditiously deliver infrastructure components of the York Region Sewage Works project,
  addressing legislative requirements under the <u>Supporting Growth and Housing in York and
  Durham Region Act, 2022</u>
- The CMAR model promotes an overall competitive, transparent, collaborative and proactive approach to project delivery, resulting in more efficient and cost-effective outcomes
- CMAR model includes financial safeguards through a GMP which caps project costs and provides the Region with budget predictability and reduced financial risk

### 3. Background

# Traditional DBB contracts are suitable for delivery of most smaller scale infrastructure projects

DBB is a long-standing, sequential delivery method commonly used in public contracting and most prevalent for delivery of the Region's Public Works' capital programs. In this linear process, shown in Figure 1, the owner first hires a design engineer to create the project design. Once the design is finalized, the owner initiates a bidding process to select a contractor for construction. The owner maintains separate contracts with both the designer and the contractor. The design engineer's role is to develop a design that meets the owner's specifications, while the contractor's role is to build according to that design. While the DBB approach is suitable for most smaller scale (below \$100 million), shorter-term, less complex capital projects, it poses some limitations in the areas of design constructability, risk sharing and cost certainty. The mix of larger scale infrastructure programs in the Region's 10-Year Capital Plan, such as the York Region Sewage Works, provides an opportunity to explore more innovative and advanced contracting methods.





## Collaborative project delivery models offer potential solutions to traditional DBB challenges for large scale projects

The primary challenges with a DBB project stem from the lack of collaboration between contractors and designers. With DBB, the design is fully complete before bidding and construction start. Although the designer offers a preliminary cost estimate, the firm price isn't known until tendering. Furthermore, as the contractor is not involved during the design stage, at the owner's risk, costs may be subject to change to address constructability issues found during construction. DBB projects could also take longer overall since there is no opportunity for project design and construction stages to overlap.

In a typical alternative collaborative delivery model, a contractor is engaged in the design process from a much earlier stage. This provides the opportunity for contractors to transparently weigh in on costs and constructability matters throughout the design. Crucially, some construction work can begin while elements of the final design are still being completed, which can significantly shorten project duration.

With some variation, most collaborative project delivery models aim to enhance design constructability, risk sharing, schedule efficiency, cost-effectiveness and project outcomes. An overview of the features of each model is provided in Appendix A.

## CMAR model promotes a collaborative and proactive approach to project delivery with several advantages

CMAR is a collaborative delivery method where the owner (Region) engages both a designer and a construction manager under separate contracts. The owner retains significant control over the project while benefitting from the construction manager's expertise early in the

process. As shown in Figure 2, there are two stages in a CMAR contract:

- Stage 1: Preconstruction Services: Includes design and constructability reviews, value engineering, estimating, and scheduling. The construction manager provides these services with input from the designer. Preconstruction concludes when the construction manager and owner agree on the project schedule and Guaranteed Maximum Price (GMP), typically when the design is 60% to 90% complete. If the owner and construction manager cannot agree on price, schedule, or risk allocation the owner can take an "off ramp" to terminate the contract and negotiate with another contractor, either as a replacement construction manager or under a traditional DBB structure.
- Stage 2: Construction: The construction manager assumes the role of general contractor, continues design review, competitively procures subcontractors and vendors, identifies self-performable construction portions, and begins construction, followed by commissioning and startup. The construction manager may subcontract all work or self-perform parts of it, depending on requirements.



#### Figure 2 CMAR Process Model

The CMAR contract model fosters a collaborative partnership between the owner, designer and construction manager with the following advantages:

- Early Involvement and Collaboration: The construction manager is involved early in the design stage, allowing for better collaboration with the project owner and design engineers. This early involvement helps identify potential issues and provides valuable input on constructability, cost estimation, and scheduling.
- **Cost Control:** CMAR provides better cost control as the construction manager commits to delivering the project within the GMP. This commitment encourages the construction manager to manage and control costs effectively to avoid exceeding the GMP. The construction manager is "at risk" because they are financially liable if the project exceeds the GMP. CMAR also offers transparent, "open book" cost estimates throughout design

development, leading to informed decisions and lower contingencies through effective risk management.

- **Risk Mitigation:** The construction manager assumes responsibility for construction and risk management, fostering a culture of accountability and transparency. This approach helps mitigate risks and ensures that the project stays on track.
- Improved Project Scheduling: Early involvement and collaboration lead to more accurate scheduling and planning. The construction manager can make informed decisions on materials, labor, and methods, which helps in minimizing delays and ensuring timely project completion. Timelines may be accelerated through ordering of long-lead time equipment earlier on in the process as well as concurrent design and building for some project components.
- **Reduced Redesigns and Delays:** By identifying potential issues early and providing input during the design stage, the CMAR model helps minimize costly redesigns and delays that can negatively impact project completion.

## Region's Procurement Bylaw supports CMAR delivery as part of non-standard procurements

The CMAR delivery model effectively balances competition, transparency and value for money. The design engineering services are procured through a competitive request for proposal (RFP) process. The services of the construction manager are also secured through a separate competitive RFP process whereby the construction manager is selected based on experience, capacity, cost of Stage 1 Preconstruction Services, and profit margins for Stage 2 Construction Services work. Additionally, the CMAR process mandates the construction manager to adopt an open-book approach to the project's finances, ensuring transparency and value for money.

Council approval under Section 18.1 (e) of the Procurement Bylaw is required to authorize the Commissioner of Public Works to: award each CMAR contract to a competitively procured construction manager during Stage 1 – Preconstruction Services; conduct negotiations of the GMPs with the construction managers; and, if negotiations are successful, proceed with delivery of the Stage 2 Construction Services by the construction managers.

### 4. Analysis

## North YDSS Expansion Phase 1 components and Primary Trunk Sewer Twinning projects are ideal candidates for CMAR delivery

<u>York Region Sewage Works Project Report</u> identified 22 project components for North York Durham Sewage System (YDSS) Expansion to fulfill the Lake Ontario-based servicing solution mandated by the Province in the *Supporting Growth and Housing in York and Durham Regions Act, 2022.* North YDSS Expansion will be delivered in three phases. Phase 1, with a capital budget of over \$500 million, is comprised of seven project components, for which design is underway. Furthermore, the Region secured \$140 million in funding for the Aurora Sewage Pumping Station Gravity Sewer Twinning and 2nd Concession South Gravity Sewer from the Housing-Enabling Water Systems Fund contingent on award of the CMAR contract by September 2025. Adopting CMAR for components of this project would be an ideal strategy in achieving expedited project timelines needed to unlock growth capacity. By engaging the contractor early in the process, the team can ensure greater alignment of all project components during the design and construction while maintaining a clear understanding of cost and schedule.

The Primary Trunk Sanitary Sewer (Primary Trunk) is a critical section of YDSS, collecting wastewater flows from eight municipalities of York Region, Town of Ajax and City of Pickering. The southern section of the Primary Trunk will require a new trunk sanitary sewer parallel to the existing, referred to as "twinning". The twinned sewer, with a capital budget of over \$227 million, is about five kilometres long and will ensure essential service is maintained by increasing conveyance capacity and overall system security. Field studies and preliminary design of the Primary Trunk are being finalized. Implementing CMAR for this project would be a strategic approach given the complexity, scale and critical nature of this infrastructure.

### CMAR model is being applied throughout North America for execution of large, complex infrastructure projects such as YDSS

York Region, and many other Canadian municipalities, have traditionally utilized the DBB contract format for infrastructure projects. While this method has historically been effective, with the current construction environment, tighter regulatory requirements, and increased complexity of projects, owners are implementing collaborative delivery models as tools to provide better value, innovation, control, and cost certainty.

Several municipalities, including the City of Toronto and the Region of Peel, are actively considering adoption of collaborative delivery models for large infrastructure projects. Additionally, the construction industry, through organizations such as the Greater Toronto Sewer and Watermain Contractors Association, is advocating for changes to current practices. Table 1 lists some examples of municipal projects delivered using CMAR in North America.

Location	Type of project	Project Cost
Calgary, AB	Bonnybrook Wastewater Treatment Plant Expansion	\$655M
San Mateo, CA	San Mateo Wastewater Treatment Plant Improvements	\$500M
Detroit, MI	Great Lakes Water Authority Raw Water Line	\$138M

# Table 1Municipal Projects Delivered Using CMAR Model

Location	Type of project	Project Cost
Brampton, ON	City of Brampton Transit Facility	\$175M
Edmonton, AB	Edmonton Development Authority Sewer Trunk Rehabilitation	\$90M

# Implementation of CMAR model is required to accelerate projects on the critical path to unlocking servicing capacity

Delivery of the Aurora Sewage Pumping Station Gravity Sewer Twinning and 2<sup>nd</sup> Concession South Gravity Sewer projects is on the critical path for unlocking about 8000 units of servicing capacity for Towns of Aurora, Newmarket and East Gwillimbury. The CMAR approach will assist with meeting the aggressive 2028 implementation timeline by supporting design and construction phase overlap and allowing construction to advance with early procurement of key materials and equipment. The CMAR model will also eliminate the Region's burden of risk on a lengthy post-design completion tendering process.

#### Region's CMAR advisor navigates the process and safeguards the Region's interests

To assist with CMAR planning, selection and contract management, the Region procured an Owner's advisor through a competitive RFP process. The Owner's advisor is an experienced consultant responsible for ensuring effective execution of the CMAR delivery process. Part of the advisor's responsibilities will be to vet the contract principles and documents, conduct cost validation workshops and provide strategic input for negotiation of the GMP. Where needed, the CMAR advisor may also help to independently mediate any conflicts of interest among the designers and construction managers on the Region's behalf.

### Use of alternative delivery models aligns with Region's Strategic Plan commitment to deliver trusted and efficient services

Recommendations in this report are consistent with ensuring reliable, responsive, effective, efficient and fiscally responsible service delivery. Through early contractor engagement, the use of CMAR poses an opportunity to improve constructability and accelerate delivery of housing-enabling infrastructure. The transparent costing approach promotes accountability and best value for money.

### 5. Financial Considerations

This report does not present current or anticipated financial changes to the Region's budget or fiscal position. However, utilizing CMAR for the identified projects is expected to improve project estimates and cost control, positively impacting overall efficiency in service and infrastructure delivery.

A minimum of two CMAR contracts are anticipated, one for components of the North YDSS Expansion Phase 1 and one for the Primary Trunk Twinning. However, the Commissioner of Public Works may consider dividing the anticipated works under these programs into additional CMAR contracts if it is determined to be in the Region's best interests.

The GMPs for each Stage 2 Construction Services contract component will be transparently negotiated with the construction manager for each contract through an "open book" approach as the design progresses between 60% and 90%. Should a negotiated contract GMP exceed the program's budget or approved capital spending authority under the 10-Year Capital Plan, as presented in Table 2 and subject to future annual budget changes and approvals by Council, a request will be made to Council seeking additional authorization to proceed. Negotiated costs of the Stage 2 Construction Services contract components will be reported to Council through a future Contract Awards Memorandum.

Program	2025 10-Year Capital Plan	Capital Spending Authority
73450: North YDSS Expansion Phase 1	\$492.7M	\$492.7M
75320: Primary Trunk Twinning	\$227.3M	\$11.5M

Table 2Program Budget and Capital Spending Authority1

<sup>1</sup> Subject to updates via annual budget approval process

### 6. Local Impact

Adopting CMAR offers a flexible and efficient approach to accelerate delivery of critical York Region Sewage Works project infrastructure components required to support local municipal growth plans and service delivery for the Region's northern municipalities as prescribed by the *Supporting Growth and Housing in York and Durham Regions Act, 2022.* 

### 7. Conclusion

Adoption of alternative procurement contract models represents a strategic move towards more efficient and collaborative project delivery for certain large complex projects. By leveraging advantages of the CMAR model for delivery of York Region Sewage Works project components, the Region can achieve improved schedule efficiency, better cost control, and balanced risk management for enhanced capital infrastructure project outcomes.

For more information on this report, please contact Pina Accardi, Director, Capital Delivery Water and Wastewater, Public Works, at 1-877-464-9675 ext. 75355. Accessible formats or communication supports are available upon request.

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Appendix A – Overview of Alternative Delivery Models

Delivery	Description	Advantages	Disadvantages
Model			
Design-Bid- Build (DBB)	The Region is fully responsible for the engineering and design of the asset with assistance from engineering consultants. The Region invites bids from pre-qualified contractors and awards construction contracts based on the lowest costs. The asset is commissioned and handed over to the Region for operations and maintenance.	Well-understood and commonly used approach by the public sector due to significant owner control	For large projects, may experience cost overruns, delays and fragmented project responsibilities
Construction Management at Risk (CMAR)	The Region engages a construction manager, through a competitive process, to manage design, documentation and construction works on its behalf. This model allows for some collaboration and input from the construction manager in the design of capital projects. The construction manager may also take on time and/or schedule risks based on an incentive regime.	Effectively balances competition, transparency and value for money. Enhances cost control, allows for early contractor involvement, and improves project scheduling	Potential conflicts of interest between designer and contractor and requires strong project management skills from the owner
Design-Build (DB)	Under the design-build model, multiple bids for the integrated design and construction of the project per defined specifications are obtained from qualified bidders. The successful proponent develops its detailed design in accordance with the output specifications and functional program. Following design approval by the Region, the selected contractor (or a partnership between a designer and construction contractor) proceeds with construction of the asset.	Streamlines project timelines, reduces costs and minimizes disputes	May limit design flexibility and requires careful selection of experienced contractors
Progressive Design-Build (PDB)	The progressive design-bid-build model uses a qualifications-based or best value selection approach to select a design engineer and contractor at early stage of the design and is followed by a process whereby the Region then "progresses"	High level of collaboration between owner, designer and contractor resulting in design that is construction-focused,	Some owners and staff are unfamiliar with PDB procurement

Delivery	Description	Advantages	Disadvantages
Model			
	towards a contract price with the selected team.	reducing risks and increasing constructability. Streamlining the procurement process and saving time	
Fixed Price Design-Build (FPDB)	In the fixed price design-build model, one entity is responsible for both the design and construction services for an agreed-upon price.	Since the design- builder is responsible for both the design and construction, there is a single point of accountability	Difficult to make changes to the design or scope without incurring additional costs. Owners may have less oversight on design quality during the process.
Integrated Project Delivery (IPD)	In the IPD model, owners, engineers and contractors enter into a multi-party agreement from the project's inception. IPD typically involves shared risk and rewards structures, which align the interests of all parties and incentivize them to work towards overall success of the project. IPD is an attractive option for very large (\$500 million plus), complex projects that require a high level of coordination and efficiency.	Fosters a collaborative environment from the project beginning, resulting in high quality projects with reduced costs and accelerated completion as compared to traditional delivery methods	Significant cultural shift with complex contractual terms and steep learning curve for project teams
Public Private Partnerships (P3)	A public private partnership model is a collaborative arrangement between a government and a private sector company to finance, design, build, operate, or maintain a public infrastructure. In this model. Both parties share the responsibilities, risks, and rewards of the project.	Leverages private sector expertise and funding, transfers risk and can accelerate project delivery	Complex contractual arrangements and potential public opposition