CITY OF SURREY
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CORPORATE REPORT

NO: R019 COUNCIL DATE: JANUARY 25, 2021

REGULAR COUNCIL

TO:	**Mayor & Council**	DATE:	**January 15, 2021**
FROM:	**General Manager, Engineering**	FILE:	**0620-20 (CPP19)**
SUBJECT:	**Update on Opportunities to Reduce the Duration and Costs of Capital Infrastructure Projects**		

RECOMMENDATION

The Engineering Department recommends that Council receive this report for information.

INTENT

The intent of this report is to update Council of the actions taken to reduce the duration and costs of the Engineering Capital Infrastructure Projects that were part of Corporate Report No. R233; 2019 that was received by Council on December 16, 2019 (attached as Appendix "I"). This report also provides information regarding the City's 2021 Capital Construction Program, as well as further initiatives to reduce the duration and cost of Engineering Capital Infrastructure Projects planned for 2021.

BACKGROUND

The annual Capital Infrastructure Program (the "Program") delivers projects included in the Engineering Department's 10-Year Servicing Plan (the "Projects"). Annually, the Program typically has a value of $75 to $115 million.

In addition to Projects delivered by the City, there are investments made to City infrastructure through Land Development projects. Furthermore, major infrastructure projects are planned within the City in the near future, such as the:

- SkyTrain extension along Fraser Highway;
- Pattullo Bridge Replacement;
- Metro Vancouver Kennedy Newton Water Main; and
- TransMountain Pipeline Expansion Project.

DISCUSSION

In 2020, staff implemented various actions to reduce construction costs and durations for each Capital Infrastructure Project. These actions can be summarized as follows:

- Permitting road closures;
- Avoiding relocating third-party utilities (BC Hydro, Telus, FortisBC, etc.);
- Innovative contracting techniques;
- Extended hours of work;
- Streamlining the Traffic Obstruction Permit process;
- Avoiding impacts to watercourses, which requires Federal and Provincial environmental approvals; and
- Revised contract provisions.

One of the key measures to illustrate the success of the actions taken in 2020 was to look at the participation levels of the construction industry in a capital infrastructure project. Generally, a higher number of bidders leads to more competitive construction pricing. It is common for public organizations to receive few bidders when the private sector land development industry is busy. The average number of bidders the City has received on past projects has increased in the past few years.

The City has received positive response from the construction industry regarding the actions that were implemented in 2020, which has likely influenced the level of participation in City Projects. Furthermore, external factors, such as the COVID-19 pandemic, also influenced the construction industries participation in the City's projects. Throughout the COVID-19 pandemic, the City has maintained a positive outlook and continued to work with the construction industry to help support the economy by continuing to deliver the City's Engineering Capital Infrastructure Projects to serve Surrey residents and businesses.

The results of the key actions staff implemented to reduce construction costs and durations for each Project in the Program can be summarized as follows:

Permitting Road Closures

Temporary road closures during construction has benefits such as improved safety to workers and the travelling public, improved overall quality of work, reduction in overall congestion in construction areas resulting from the expedited construction schedule, and reduction in the amount of temporary construction needed; however, road closures need to be evaluated for impacts on congestion to the travelling public and businesses. The impact of road closures was demonstrated this year through the construction of the 160 Street road widening from 26 Avenue to 32 Avenue which accelerated the completion of the project by 20% and provided a financial savings of 10%.

Based on the success of accelerating a project and reducing costs by allowing a temporary road closure, staff will evaluate each project planned for construction in 2021 to determine if a temporary road will provide any savings.

Third-party Utility Infrastructure

Capital infrastructure projects can, at times, trigger relocations for external utilities, such as BC Hydro, Telus and FortisBC utilities. The City's road widening projects typically require that BC Hydro power poles be relocated. Relocation of third-party utilities pose construction delay risks to Capital projects, primarily because the relocation is not in the contractor's scope of work. To prevent delays in project completions, this year the City piloted a new initiative to commence the relocation of utility poles in advance of the road widenings, and this approach was successfully implemented on the 64 Avenue road widening between 184 Street and Fraser Highway.

Furthermore, through the City's ongoing collaboration and early involvement with BC Hydro and the telecom utilities, the City has been able to develop project plans to avoid significant relocations for upcoming projects in 2021 such as the 32 Avenue road widening between 154 Street to 160 Street, and the 80 Avenue road widening between 128 Street to King George Boulevard.

Innovative Contracting Techniques

Staff, through discussions with stakeholders, identified opportunities to select contractors not only based on the lowest price but also the shortest duration in which a contractor can complete the project. This form of bidding is commonly called "A+B Bidding", whereby contractors bid on the time and dollar amount to complete a project. The contract is then awarded to the lowest combination of time and cost. This form of A+B Bidding has been successfully used in the United States. The City piloted this form of bidding on the 64 Avenue road widening project between 184 Street and Fraser Highway and realized a 30% reduction in the contract duration from an estimated 12-month contract duration to an eight-month contract duration.

Given the success of A+B Bidding on reducing the duration of a project, project selection for A+B Bidding will be applied on two projects with significant impacts to motorists on arterial roads: 32 Avenue road widening between 154 Street and 160 Street and 80 Avenue road widening between 132 Street and King George Boulevard.

Extended Work Hours

Contactors are generally permitted to work between 7:00 a.m. and 10:00 p.m. Staff explored the opportunity to allow contractors to work 24-hours a day, seven days a week, or beyond typical construction hours, in an effort towards accelerating the delivery and reducing the cost of capital construction projects. The City continued to pilot this opportunity as part of Contract No. 5518-004-11 (District Energy Distribution Piping System Expansion). In this Contract, contractors were required to indicate the cost or savings to the City and a savings in the duration of construction, should the City permit contractors to work 24-hours a day, seven days a week for work along Fraser Highway. Based on the contractors' submissions, it was determined that certain factors lead to marginal time savings and potential increase in cost. The increase in cost was due to labour premiums resulting from longer work hours. The City will continue to explore opportunities for 24-hours, seven days a week construction in non-residential areas.

In 2020, the City allowed extended hours of work and night work for four capital infrastructure projects, and typically, for road paving work on major arterial roads where it is more effective to undertake this work during the night when traffic volumes are lower. The City will continue to allow extended hours of work and night for capital infrastructure projects in 2021.

2021 Initiatives

In addition to the actions implemented in 2020, to continue the City's efforts to reduce the duration and costs of Projects, staff plan to pilot the following new initiatives in 2021:

- A+B Bidding was recently applied the 32 Avenue road widening between 154 Street and 160 Street as well as the 80 Avenue road widening between 132 Street and King George Boulevard;
- Optimize Project design processes in order to advance the property acquisition process earlier for Projects, such as the 152 Street road widening between the Nicomekl and Serpentine River; and
- Review potential alternative Project delivery approaches, such as Design-Build or Construction Management at Risk ("CMAR") that may be applied on some future Capital project. Design-Build is a project delivery method to deliver a project in which the design and construction services are contracted to a single design-build contractor. CMAR is a project delivery method in which the construction services are contracted at an earlier stage of the project design. Both of these project delivery methods provide for a more collaborative project delivery process.

SUSTAINABILITY CONSIDERATIONS

The Engineering Department's actions to reduce the duration and cost of the Program supports the objectives of the City's Sustainability Charter 2.0. In particular, this work relates to Sustainability Charger 2.0 themes of Infrastructure. Specifically, this work supports the following Desired Outcome ("DO"):

- All Infrastructure DO2: Infrastructure systems provide safe, reliable and affordable services.

CONCLUSION

Several actions have been successfully taken in 2020 which have been effective to reduce the cost and duration of the City's Engineering Capital Infrastructure Projects, and several more initiatives are planned in 2021.

Scott Neuman, P.Eng.
General Manager, Engineering

JC/VJ/cc

Appendix "I" – Corporate Report No. R233; 2019

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APPENDIX "I"

CITY MANAGER'S DEPARTMENT

CITY OF SURREY
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CORPORATE REPORT

NO: R233 COUNCIL DATE: December 16, 2019

REGULAR COUNCIL

TO:	**Mayor & Council**	DATE:	**December 12, 2019**
FROM:	**General Manager, Engineering**	FILE:	**0620-20 (CPP19)**
SUBJECT:	**Opportunities to Reduce the Duration and Costs of the Capital Infrastructure Projects**		

RECOMMENDATION

The Engineering Department recommends that Council receive this report for information.

INTENT

The purpose of this report is to advise Council of the actions taken and those that are planned to reduce the duration and costs of the Engineering Capital Infrastructure Projects.

BACKGROUND

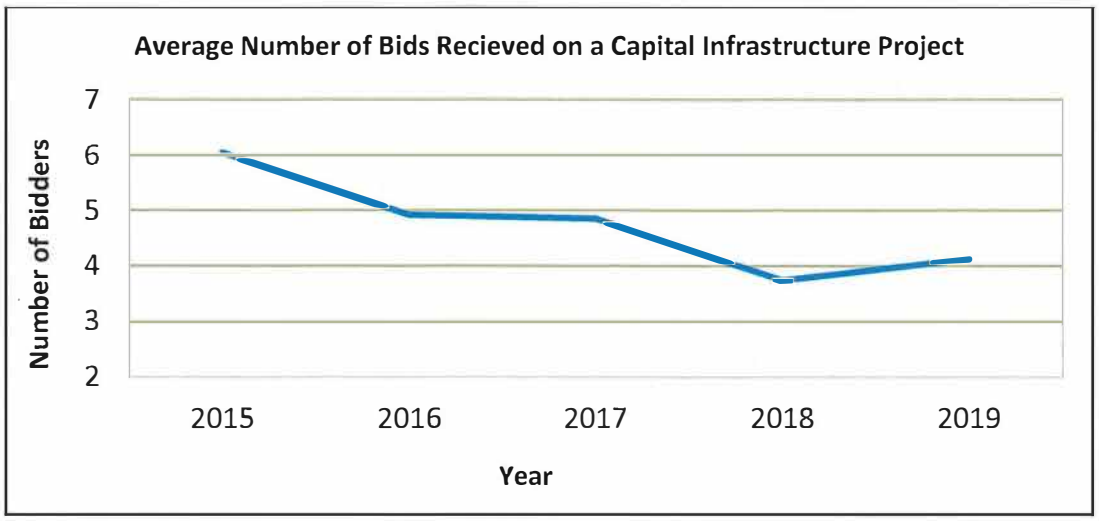
The annual Capital Infrastructure Program (the "Program") delivers projects included in the Engineering Department's 10-Year (2018-2027) Servicing Plan (the "Projects"). Annually, the Program typically has a value of $75 to $115 million. Projects planned for construction next year are outlined in the City's 2020 Capital Construction Program, which is scheduled to be published in January 2020.

In addition to projects delivered by the City, there are investments made to City infrastructure through Land Development projects. Furthermore, major infrastructure projects are planned within the City and within the region in the near future, such as the:

- Skytrain extension along Fraser Highway;
- Pattullo Bridge Replacement;
- Metro Vancouver projects;
- Broadway Subway Project; and
- YVR Airport Expansion.

DISCUSSION

With major regional and municipal capital infrastructure projects planned, the region is competing for resources from the construction industry who have indicated that they are challenged to meet increasing demands for construction services. As a result, the construction industry has increasingly become more selective in the projects pursued and their pricing is reflective of the increase in demand for construction services. As illustrated below, the average number of bidders the City has received on past projects has generally been declining over the past five years.



Although there are other external factors that influence the number of contractors that participate in the City's construction contract bids, there are opportunities for the City to increase participation and address barriers which may discourage a contractor from participating in a bid for a Project.

Delivery of Capital Infrastructure Program

Traditionally, Projects are delivered in a three-stage process of: design by an engineering consultant; bid through a publicly advertised tendering process; and built by a contractor with the contract awarded to the lowest bid price. Typically, it takes two to four years to deliver a Project from when it is initiated, with the design of a project taking one to three years depending on the complexity, the need to acquire lands to construct the project, and external approvals required for the project.

To reduce the cost and duration of each Project, staff consulted with major stakeholders, such as contractors who commonly work for the City, member municipalities, major material suppliers, engineering consulting firms, and conducted a literature research of best practices.

As a result of these efforts, staff have identified various actions for implementation to reduce construction costs and durations for each Project in the Program. These actions can be summarized as follows:

- Permitting road closures;
- Avoiding relocating third-party utilities (BC Hydro, Telus, FortisBC, etc.);
- Avoiding impacts to watercourses, which requires Provincial environmental approvals;
- Revised contract provisions;
- Innovative contracting techniques;
- Extended hours of work; and
- Other minor contract provisions and optimization changes.

A complete summary of each action is described in Appendix "I".

Next Steps

A number of identified actions have been implemented in 2019, and other actions for implementation in 2020 will include:

- Alternative bidding methods, such as A+B Bidding on select projects, to promote innovation, collaboration, and potential to reduce construction costs and durations;
- Disposal of select materials (asphalt and concrete) for certain projects at the City's Stokes Pit site so that the Engineering Operations Division may recycle this material for reuse;
- Modifying project designs to avoid the relocation of utility poles, impacts to watercourses, and land acquisitions on a project case-by-case basis; and
- Optimize the design phase processes by improving the project management process.

To measure the success of these actions, staff have established the following metrics for the Program:

- Number of bidders participating in a capital infrastructure project, with the aim to receive a higher participation for bids in 2020 than in past years;
- Contract durations when measures such as A+B Bidding, road closures, and extended hours of work are implemented, with the aim to reduce the duration of a project;
- Cost associated with third-party utility relocations (i.e., BC Hydro, Telus, FortisBC, etc.) with the aim to reduce the cost of relocations for major road widening projects; and
- Project schedules associated with third-party utility relocations for major road widening projects, with the aim of eliminating project delays associated with said relocations.

SUSTAINABILITY CONSIDERATIONS

The Engineering Department's actions to reduce the duration and cost of the Program supports the objectives of the City's Sustainability Charter 2.0. In particular, this work relates to Sustainability Charger 2.0 themes of Infrastructure. Specifically, this work supports the following Desired Outcome ("DO") and Strategic Direction ("SD"):

- All Infrastructure DO2: Infrastructure systems provide safe, reliable and affordable services; and
- Materials and Waste SD13: Work with local businesses and organizations to maximize the recovery and reuse of local materials and waste products as part of the circular economy.

CONCLUSION

The cost and duration of construction projects have been increasing. Following consultation with the construction industry and other stakeholders, several actions have been taken in 2019, and several more are planned 2020, to reduce the cost and duration of the City's Engineering Capital Infrastructure Projects.

Scott Neuman, P.Eng.
General Manager, Engineering

JA/VJ/cc

Appendix "I" – Opportunities to Reduce Construction Costs

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Note: Appendix available upon request