



REDUCING RISK IN TRANSIT PROJECTS

Driving More On-time and
On-budget Delivery in Canada

FUTURE_{OF}
INFRASTRUCTURE
GROUP



"When we look at markets we make a judgement based on project risk. If there are too many unknowns, or if the risks being put on the contractors are mostly out of our control, we would rather not bid and focus our efforts somewhere else."

"If there isn't enough data on the project, or if bidders are asked to take on risks they have very little control over, it won't deliver value for government. There will be extra costs up front through large contingencies, or later on through claims, or both."

"Every project needs to focus on getting a good start. Any delays or problems in that early phase snowball and reverberate through the project."

"Once a relationship starts to deteriorate it affects the whole project. There needs to be focus on driving the right behaviour on a project and encourage and enable problem-solving. That is probably the most important factor around project success."

"Decisions needs to be made quickly on site to resolve issues and move forward. Thousand dollar issues can quickly become million dollar issues if they aren't resolved quickly. Deal with it and move on so everyone can focus on delivering the project."

"Transit projects are not just about engineering and construction any more, the amount of technology involved adds another level of complexity and risk."

"Operations need to be factored in from day one and integrated into planning. There are a lot of different skills that need to be weaved together or the project can fall at the final hurdle."

RISK = INCREASED COST

Investment in transit in Canada is central to delivering on many of the country's economic, social, and environmental goals. Large transit projects are among the most challenging types of infrastructure to deliver. They have a large footprint with different possible site conditions and touch a large number of people. The longer timescales involved add a layer of uncertainty in planning and working with extensive networks of suppliers, and often these projects have to be delivered around active communities and operations. To maintain the momentum of investment it is increasingly important to identify and implement ways to deliver projects more effectively.

Post-mortems as to why transit projects have been delivered late or over budget often try to lay the blame on individuals, but the consistency of issues and challenges faced in transit project delivery points to a need for a change in the system overall. The largest opportunity to have a positive impact on project costs and on-time delivery is in ensuring that project risks are identified and addressed at every stage.

2 projects in 1,000

Based on research from Oxford University using 80 years of data from around the world, only two rail projects out of every 1,000 were delivered on time, on budget, and with the expected benefits.

x 1.85 increase in cost

A study in New York showed that the poor management and allocation of risk in procurement of a transit project raised costs by a factor of 1.85 against a global project baseline, as bidders sought to protect themselves against potential future losses.

What is Risk?

There are different kinds of project risks. These can include more technical risks related to the actual design and construction, external risks related directly to the project in areas such as permitting, as well as wider economic risks. Many of these risks can be anticipated and avoided, mitigated, or managed, and can be allocated to the group best suited to manage it based on their experience or ability to drive action.

Why Does Risk Matter?

In an active global market where there are many major infrastructure projects being built, as well as a high demand for construction skills in less complex areas such as condo development, companies decide where to focus efforts and resources based on where they think they can deliver a project successfully and make a profit. Risk is a key factor they consider. Where risk is uncertain, or areas of risk allocated to industry in areas where they have little control, it forces bidders to build in contingencies based on worse case outcomes, or could opt to take a gamble and hope that risks do not materialize. The complex supply chains also mean that suppliers may often build in contingencies which further drives up bid costs. Where the low bidders win contracts, if risks do materialize, it often leads to disputes and claims that see project costs rise in any case.

Risk Impacts



Drives **higher bids** as bidders look to cover all likelihoods to make a profit/protect against loss



Bids are priced low to win but if risks are realized companies can make **substantial losses**



Companies declining to bid thereby **reducing competition** and quality of field



Increased likelihood of performance and commercial issues such as **disputes and claims**



Degradation of relationships that further exacerbate project issues



Increased chance of **contract failure or cancellation**



Delays in project completion and the start of operations



Creates **negative perceptions** of a market that drive up future project costs due to precedent



Creates a negative environment making it difficult to **attract and retain talent**



Reduces the number of projects governments can deliver with available budgets



Increased cost or unavailability of **project insurance**

REDUCED RISK = BETTER PROJECTS

Based on experience across Canada, and around the world, there are many actions that can help better identify risks early and ensure it is well handled at every project stage. There are a number of technical risks that frequently cause issues on major projects that can be largely anticipated and mitigated. These relate to areas such as utility relocations, planning and permitting, and site conditions with data collection, early action, and mechanisms to ensure that issues have fixed timelines to provide overall certainty. Beyond those technical risks the project environment at different stages of the project needs to be considered. The greatest opportunity to positively impact projects is in the early stages with strong preparation to set up the right environment through planning and how procurement and contracting processes are set up.



Getting a good start

problems and delays early on can reverberate through the project, it is important to ensure that no time is wasted and the conditions are right for a project to hit the ground running by focusing on the most important work.



Working together

there are many different players involved in project planning and delivery, and interfaces between those players are often the source of issues. Driving collaboration, and having clear governance and clearly delegated responsibilities helps drive problem-solving.



Focusing on the end goal

the operations and end users need to be involved from the start, to help deliver the best value for a transit line that will be used for decades and building in adequate time for testing and commissioning.

There are also some foundational principles that should be considered around effectively tackling risk. Based on the work done by the Future of Infrastructure Group it is clear that people, their behaviours and their capabilities have a major impact on project success and that processes should always focus on encouraging collaboration. There can almost never be too much information collection at the start from engagement and site analysis. Once a project gets moving information sharing and communication needs to be streamlined and consistent, and make it easy for people to understand project status and what is required of them. Finally, time. Time spent up front has an oversized positive impact, good preparation is critical and problems detected early are much more easily resolved. Once construction starts and crews are mobilized on site delays are much more costly.

People

Fostering an environment to promote collaboration and problem solving

Key question for bidders:

is it a positive environment to work in



- Does it drive positive, problem-solving behaviour?
- Does it build capable leaders?
- Is there clear ownership and accountability around decisions?
- Does it enable people to make decisions confidently?
- Does it encourage integration?
- Does it respect and engage local stakeholders?

Information

Driving informed decision-making and shared visibility of project progress

Key question for bidders:

is there enough information to price work accurately



- Does it draw on expertise and experience from across the market and community?
- Is there sufficient data and information to make informed decisions?
- Does it encourage information sharing and enhance visibility of progress?
- Is the data being used to make decisions that are in the best interests of the project?
- Is it leveraging the potential of digital tools to communicate and collaborate?

Time

Focusing on schedule, value of early action and enabling timely decisions

Key question for bidders:

is there any uncertainty on timelines



- Is the project ready to move forward?
- Has everything been done early on to understand risks and plan around them?
- Has every action been taken to put the project in the best possible position for success following contract award?
- Does it track progress against schedules and addressing bottlenecks?
- Does it anticipate future risks, particularly where external stakeholders are concerned?

Reducing risks will have a major impact on costs and timelines. It will however require a full systems-based approach. No one action alone will solve all the challenges faced around risk in major transit projects, but taking any of the actions below will have a positive impact. Overall, risk should be treated as a shared responsibility, regardless of delivery model, with reduction being the priority. Where risk cannot be avoided or mitigated, there should be an environment that encourages all parties to work together to manage risks for the benefit of the project overall. An improved environment will not only benefit individual projects, but also provide confidence to the market that will have a positive impact on bid pricing.



The **Future of Infrastructure Group** gathered insights from across Canada, undertook research and assembled a group of experts to discuss the main risk factors and the best approaches to deal with them for the benefit of all involved. As well as looking at ways to deal with specific technical and stakeholder risks, there was also a clear need to focus on key project stages that represent an elevated risk for projects, as well as the key role human behaviour and information sharing play. Governments should work hard to build processes that encourage collaboration, provide visibility of project progress, enable quick and informed decision-making, and foster a shared problem-solving mindset.

SITUATION IN CANADA: THE IMPACT OF RISK ON PROJECT DELIVERY

Canada is making up for lost time with major rail projects planned, announced, or under construction across the country. Ontario alone has committed \$70.5 billion to transit investment over the next 10 years, Quebec is expected to spend \$41.2 billion in the same period. In the west Alberta has committed \$3 billion to light rail projects in Calgary and Edmonton over the next three years with major plans for regional and intercity rail. In British Columbia the provincial government has committed \$3.7 billion to transit infrastructure over the next three years. Virtually every major city across Canada is expanding their rail network of light rail, subways, or commuter rail. These investments will be transformational for the cities and are critical to accommodate the rapid population growth of Canada as well as economic, social, and environmental policy goals.

Investment in rail infrastructure can play a significant role in unlocking development of housing, helps to attract talent and businesses looking to invest, and can transform cities and regions. Governments recognise the importance of investment in this key infrastructure, but the economic instability of the last few years compounded by supply chain issues has driven up prices for projects. Inflation has caused significant challenges for the construction sector overall, with costs of materials, equipment and labour eating away at overall budgets. Projects in the public sector have seen prices rise further as companies make their decisions about what work to pursue in a busy market and factor in project risk, and the time and resources needed for the procurement process.

There are significant challenges around delivering major transit projects successfully on time and on budget. Research from the University of Oxford, based on 80 years of data from around the world, shows only two rail projects out of every 1,000 were delivered on time, on budget, and with the expected benefits. This points to a systemic issue that needs to be addressed. There are many reasons behind this, not least optimism bias which sees prices underestimated and insufficient up-front planning to secure necessary approvals from government within tight electoral timelines. If a project is not based on a sound business case and robust, evidence-based approval process, and realistic assessment around risk, it can see a project facing an unrealistic budget and schedule from the start, and forced to start construction before adequate preparation has been done. FIG produced a report that outlines the seven fundamentals of a good infrastructure market.

The complex nature of these massive infrastructure projects, the multitude of stakeholders, and the sheer scope of issues that can arise, make it difficult enough to successfully deliver a project on time and on budget. Fortunately, there are many opportunities to identify and tackle project risk for the benefit of government budgets and companies bottom lines.

Project experience points to the need to rethink how we manage risk in planning, procuring, and delivering major infrastructure projects. The sheer complexity and volume of issues faced on these projects point to the need for a systems-based approach to improving the success rate. This requires a concerted focus on the overall system with a methodical approach to identifying and addressing risks, and creating an environment that enables people to work together to reduce them. After a challenging period for delivering major transit projects recent examples in Canada point to a brighter future, with the Réseau express métropolitain in Montreal, the Union Station Enhancement Project in Toronto, and Eglinton Crosstown West Extension also in Toronto showing a way forward.

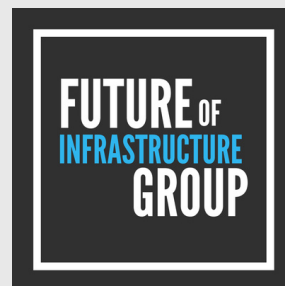
CASE STUDIES

As part of this project, FIG looked at the lessons learned on specific projects in tackling risk. These case studies examine how good practices can be used across different types of delivery model.

1. **Eglinton Crosstown West Extension, Toronto:** the project is being delivered in packages leveraging different procurement models. It uses incentive mechanisms smartly and has taken a diligent approach to proactively addressing risk.
2. **Union Station Enhancement Project, Toronto:** involves complex work to upgrade platforms and tracks in a live environment and is being delivered using an alliance model. Many aspects, particularly around behaviour, could be applied across all projects.
3. **Réseau express métropolitain, Montreal:** delivered using a unique structure where the province's pension fund took on the role of planning, financing, executing and operating the transit line. The organization introduced a number of innovations to reduce project risk including providing certainty around permitting timelines.
4. **Surrey-Langley Skytrain, Surrey:** this extension to the network was based on foundations of strong engagement with the market and local communities to determine the best approach, and incorporated risk workshops upfront, with reports available online to show how input was incorporated into planning.

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ABOUT THE FUTURE OF INFRASTRUCTURE GROUP

The Future of Infrastructure Group brings together industry leaders in the sector to provide a positive, and coherent voice to help governments across Canada deliver the best value from infrastructure investments. To make the most out of Canada's planned investments, this group discusses and shares their expertise on best approaches to prioritizing, planning, procuring, constructing, maintaining, and operating infrastructure.

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A WAY FORWARD: UNDERSTANDING AND ADDRESSING RISK

Large and complex transit projects require a diligent approach to identifying and managing risks that underpins all projects at every stage. While different procurement models may be better suited for different types of projects and their unique local considerations, risk is a constant that must be addressed regardless. There are opportunities to take best practices from different procurement models, and different projects, and apply them more widely.

Tackling project risk would benefit government, industry, and communities living through construction. The solution to handling risk cannot be too reliant on allocating it to others, particularly if these risks are unclear, potentially hard to control, or difficult to quantify. Project teams need to diligently identify and quantify risk from the start, find smart ways to work together to deal with these risks, and restrict the impact they could have on project delivery, and finally identify who is best suited to manage the risk.

These risks are often exacerbated by the ability or confidence to make decisions on site quickly and move on with project work. Unbalanced contracts that push risk to one party and budgets that do not consider the cost of risk can set up a project for failure. Empowered decision-making and a shared commitment to problem-solving help to maintain a positive working environment and good relationships for the benefit of the project. If issues cannot be resolved on site there must be strong governance to reach decisions within specified timelines, and where there are disagreements, disputes should be resolved quickly, fairly, and proactively.

Options for Handling Risk

Many risks can be anticipated in advance, providing a basis to most effectively handle it. Many organizations will review risk up front and assess its probability of being realized, and the severity of impact if it were.

The most effective way to tackle risk is by avoiding it or mitigating it up front by working together through early engagement with industry to come up with different design and construction options for the project overall. With large and complex projects this is not always possible. Risk allocated to an organization better placed to manage it is an effective approach if there is sufficient information and flexibility to resolve risks creatively, and all parties can still play a positive role for the benefit of the project. In some cases risks have to be accepted and appropriately managed through contingency planning.

There are also a range of tools and technologies that offer huge potential in driving more visibility and collaboration in addressing risk. Risk is however dynamic, and the strategy should adjust over time to reflect the changing nature of the project and emerging or retired risks.

AVOID

Take the risk out of the project by different routes, alternative designs, or different materials for example

MITIGATE

Reducing the risk by undertaking early work, advancing permitting, or providing legal backstops to provide timeline certainty

ALLOCATE

Transfer risk to the group best placed to manage it based on their expertise and their ability to impact it

MANAGE

Plan for risks that may be difficult to control or have a relatively low impact by planning contingencies

THE USUAL SUSPECTS

Based on experience across multiple transit projects, there are categories of mainly technical or market risks involving third parties that feature prominently with projects. These risks can ebb and flow with new risks emerging such as market capacity and inflation. They need special attention and include the following main categories, along with a list of potential solutions:

	Description	Major Concerns	Solutions
 Utilities	Electricity and telecommunications cables, water and wastewater pipes, and gas lines all run beneath the ground and in some cases these utilities may have been constructed decades ago and their mapped locations inaccurate. Utilities usually have to be relocated to accommodate transit construction, and priorities and workload for these third-party companies can lead to delays.	<ul style="list-style-type: none"> • Inaccurate or absent location data • Volume of utilities present • Multiple owners of utilities • Ability of utility companies to undertake work quickly • Lack of resources for work 	<ul style="list-style-type: none"> • Quality data on existing locations • Underground asset maps • Early works and relocations • Budget set aside for utilities companies • Hard mandated deadlines for utilities to complete work • Overall project agreements with utilities
 Geotechnical and site conditions	Underground conditions can be mapped but it is very hard to be totally sure of the true site conditions before shovels go in the ground. Different conditions or contamination can present challenges that require remedial actions or alternative approaches.	<ul style="list-style-type: none"> • Quality and accuracy of data • Insufficient data • Unexpected underground conditions • Potential site contamination 	<ul style="list-style-type: none"> • Comprehensive baseline data based on industry engagement • Process to request additional borehole data or pool additional data gathering in high risk areas • Set percentage expectations on site conditions • Specific requirements around claims and relief • Mitigation plans and design alternatives
 Municipal planning and permitting	Projects need to secure a variety of permits from a variety of government ministries, municipal or regional governments, and other parties. Often these teams and processes are under-resourced or not well suited to complex infrastructure projects.	<ul style="list-style-type: none"> • Visibility of requirements • Capacity and experience of municipality • Resubmittals of documentation • Porous and lengthy timelines 	<ul style="list-style-type: none"> • Province/city level agreement as condition of funding • Mapping all requirements • Budget set aside for municipalities • Hard deadlines for approvals • Progressing permitting pre contract award • Introductions from owner to relevant municipal contacts
 Environmental assessments	Despite the environmental benefits of transit, projects have an impact on the natural environment and can require approvals and permits from different levels of government and agencies with often unclear timelines and can require additional approvals if designs or plans change.	<ul style="list-style-type: none"> • Multiple, sometimes overlapping regulators • Changes to environmental regulations • Unclear requirements • Resubmittals and appeal process • Porous and lengthy timelines • Used as a way of delaying projects 	<ul style="list-style-type: none"> • Proactive environment plan • Early action on landscaping and environment mitigation along route • Progressing environmental assessments pre contract award • Providing adequate scope and flexibility to capture potential project changes • Clear identification of permits required, how to obtain them, and timelines involved • Rapid assessment framework New South Wales
 Site access	Delays in accessing work sites and laydown areas prevent work from physically taking place. These delays can come from the need to purchase property for right of ways or requirements to wait for certain times of year to prepare sites for construction.	<ul style="list-style-type: none"> • Delayed access to property to conduct work • Expanded requirements around live corridors • Negative local community sentiment • Complex, fragmented ownership • Length of appeal process 	<ul style="list-style-type: none"> • Advanced expropriation of properties • Clear requirements and certainty around site access for live corridors • Establish real estate protocols and land valuation principles • Site preparation work • Comprehensive community engagement plan • Legal certainty as backstop
 Community and stakeholder	Local residents, local businesses, commuters, community groups, media and local government all have the ability to directly impact project timelines, or can amplify and escalate other issues already faced.	<ul style="list-style-type: none"> • Gaps in early engagement around project options • Lack of input truly representative of community • Overall project fatigue or lack of trust • Localized opposition to construction activities • Lack of information sharing or perceived mistreatment • Escalation of risks in other areas 	<ul style="list-style-type: none"> • Social and economic impact study • Good neighbour policy and dedicated stakeholder leads • Community benefits framework that supports project goals • Broad-based community engagement and multichannel outreach • Responsive, two-way communications demonstrating consideration of input • Incentives and KPIs for reduced disruption of key project elements that involve eg road closures
 Supply chains	Delays in materials and/or equipment can have a domino effect on the overall project schedule. Supply and costs became highly unpredictable through the pandemic and in its aftermath and there remain challenges in managing supply chains that are both complex and extensive.	<ul style="list-style-type: none"> • Cost volatility of key materials and equipment • Unavailability of and delays in materials, equipment, or services • Lack of suppliers for key equipment, materials, or services • Coordination across supply chain 	<ul style="list-style-type: none"> • Long-term planning and sequencing of projects • Early purchase of critical equipment • Supply chain resilience plan and scenario planning • Local supplier engagement and qualified vendor lists • Indexation on materials with remedies if costs go outside agreed range • Incentives to manage cost rises and flexibility to innovate around approach
 Labour and skills	Transit projects require a lot of skilled workers and a number of specialist skills, the unavailability of workers at key points in time can have schedule impacts and also drive up costs for in-demand roles.	<ul style="list-style-type: none"> • Shortages of specialist in-demand skills • Shortages of labour • Busy, competitive market 	<ul style="list-style-type: none"> • Skills development program • Policy incentives to take on and train new workers • Expedited entry for in-demand workers • Focus on measures to save time and improve productivity • Use of digital tools to reduce errors, plan better
 Safety and certification	Before trains can run and accept passengers on a new line, projects need to undergo rigorous safety testing and secure certifications both on track, with equipment, and in stations for areas such as fire safety.	<ul style="list-style-type: none"> • Multiple certificating bodies and complex environment • Compressed timelines for testing and commissioning • Lack of integration with overall project delivery 	<ul style="list-style-type: none"> • Map out all safety certification requirements • Use digital modelling to identify and address safety concerns through design • Early involvement of safety and certification expertise • Advancing work towards testing and certification early during project

TACKLING RISK AT EVERY STAGE

Risk is dynamic, it evolves as a project moves forward, with heightened risk around transition points in the project. The journey of a project resembles a relay. A relay quartet would be nowhere without having the right preparation. Once the race begins it can be lost with a bad start, there is heightened risk around transitions which requires team cohesion, and all the good work can be forgotten if there is a stumble on the final leg.

Based on the workshop, survey feedback, case studies, and research there are four critical areas for focus that can significantly reduce overall project risk. Building the right project environment, getting a good start, working collaboratively, and focusing on the end goal. These form the basis for the report below along with examples of how projects have introduced tools to help address these risk areas.

1

Building the Right Project Environment

Project success is often shaped very early through how procurement and contract documents are crafted, and how the market and community is engaged around the project to identify risks and tapping into the collective project wisdom to best handle risks.



2

Getting a Good Start

There is a lot of work that goes into project planning by government agencies, then through procurement as the contract is awarded it is important that momentum is not lost. Delays early on can reverberate through the project.



3

Working Together

There are very few risks that do not require some degree of support to manage or resolve, and without good communication and working together collaboratively to solve issues, successful project delivery becomes infinitely harder.



4

Focusing on the End Goal

The project will be judged as a success when trains are rolling with passengers, and considering the operations early will provide enough runway for testing and commissioning. All good work is forgotten if the train does not start carrying passengers.



1 BUILDING THE RIGHT PROJECT ENVIRONMENT

The potential to impact a project's outcome is greatest at the earliest stages. Gathering as much project data and input as possible helps provide a full picture on overall risk to guide plans and give the market more confidence. Having a clear stage-gate approach to project development would ensure that a project only proceeds to the next stage when there is adequate data and sufficient progress in design and other preparatory work.

The Premier of New South Wales in Australia set out a [list of expectations for large complex infrastructure projects](#) with a focus on procurement. This included looking at de-risking preconstruction, getting the right procurement approach, and reducing costs and shrinking timelines for procurement. This formed part of the state's overall commitment to improving the working environment in infrastructure through the [10 Point Commitment to the Construction Sector](#). This type of intervention from the top levels of government sets a clear level of expectation across infrastructure projects that filters down to the project level and ultimately builds on best practices. It also recognizes the need to address some of the more entrenched issues and behaviours that enable risks to proliferate and be realized on projects through political or senior government leadership and direction.

Clear Information

Having as detailed a view as possible of on-site conditions, utility locations, and potential risks from the start provides certainty for bidders on what they are pricing, but also provides a platform to address those risks proactively. Creating a dynamic and transparent risk register is a critical early step that can provide a basis for everyone involved to work towards de-risking the project as much as possible for the benefit of all, or find the best ways to handle the risk. This register should be used from day one and frequently updated.

Clarity around anticipated risks provides a basis for costing of those risks and helps determine how best to avoid, mitigate, allocate, or manage them. High risk project elements should be treated in a way that provides incentives for both parties to work together to find solutions. Across the full spectrum of risk there should be some incentive to encourage coordination to resolve issues, there are very few issues that can be resolved without the support of the other party involved.

Projects with this degree of complexity must be built on a digital foundation to ensure that there is true coordination and that risks can be better identified and modeled. Storing project information across multiple files and formats, with multiple versions, makes it near impossible to identify how risks develop over time and how they can be effectively handled. The UK put in place a requirement that government projects utilize Building Information Modeling and Quebec is also introducing similar requirements.

Market & Community Engagement

Actively engaging with the market and key project stakeholders can help to further identify risks much earlier. It provides a platform to draw on the collective expertise of companies through the infrastructure supply chain to help adapt and adjust plans to address and reduce risk in the project from the start. Market engagement can help determine the most appropriate delivery model or models based on the size, complexity, and unique characteristics of the project, and how best to package the project. It also helps to draw out what data would be most helpful to companies in accurately pricing the work or where greater detail would benefit the project overall.

Local community input is also extremely important to help shape plans early to limit the local impact and ensure that projects yield the largest benefit for those communities. People living in the area, businesses operating there, local public and community services, and people needing to travel through the area should all be a focus. Engagement needs to be representative of the community using different methods to reach a wider audience, and transparently reporting back what was heard and how it is being factored into plans.

The pandemic spurred innovation in community engagement with more virtual solutions being deployed. The lessons learned from the deployment of virtual solutions show that this allows cohorts that were not able to connect with previous community engagement efforts to be heard. Deploying virtual solutions in conjunction with more traditional methods can broaden the reach of these efforts and allow for more real time engagement.

Procurement Strategy

Given the size of these projects and the different skillsets involved it makes sense to break these projects up into packages. Early involvement from contractors, designers, suppliers, and operators can help guide the approach. Different procurement models can be used for distinct parts, but it adds extra emphasis on the need for a strong integration role. Regardless of delivery model chosen though, there are good practices that can be applied across any project that can reduce risk. For major complex projects contracting authorities should be wary of using models that rely on lowest cost as the primary selection criteria and should look at elements such as overall value, experience, and prior performance.

There has been a growing use of collaborative behavioural assessments in procurement to select a bidder. The overall evaluation criteria set the tone for the project, and if cost is the overriding selection criteria it can encourage a race to the bottom and impact ongoing relationships between owner and contractor and right through the supply chain. An unrealistically low bid price can drive winning bidders into looking at making more claims or squeezing their suppliers to make up gaps in budgets that can be to the detriment of the project overall. Procurements that encourage innovation and focus on outcomes and value over costs set a platform for more collaborative behaviour that will ultimately benefit the project.

Smart Contracting

Contractually, the treatment of risk must be fair and balanced with a focus on collaboration and a joint responsibility to work towards successful project delivery and operations. Complex, lengthy, bespoke contracts create legal uncertainty and can contribute to hampering decision-making. Greater consistency across contracts reduces the need for legal opinions around day-to-day operations and communications, and helps build trust.

Contracting language needs to be clear around information requirements around potential claims to reduce grey areas and enable claims to be quickly resolved. For the Eglinton Crosstown West LRT there was a baseline with percentage ranges for expected contamination to provide greater certainty. They were also more prescriptive up front on what information was required to ensure that if any unexpected conditions were found a claim could be resolved quickly.

Smart contracts should look to promote and reward information sharing, and incentivize behaviours that add value to the project, while penalizing those that create issues that hinder others. Contingencies can be used as a carrot and provide a foundation for gain share mechanisms that encourage contractors to come forward with solutions to problems rather than relying purely on contingencies to cover costs.

Government Backstop

Governments are increasingly building legislative environments that encourage timely decision-making in key areas around permitting, environmental assessments, utilities, and land appropriation. This helps provide a backstop and ensure that the wider project benefit is an overriding consideration. There should also be consideration for reduced approval timelines for things like environmental assessments for public sector projects that have clearly demonstrated the overall benefit.

There also needs to be proactive efforts on the part of the public and private sector project delivery teams to address legitimate project concerns that may relate to environmental or community impact. Comprehensive environmental plans and community commitments should form a core part of overall project approach to design and construction.

Municipalities that will benefit most from these projects should also commit resources to necessary permits and approvals as a condition of project funding as is the case in British Columbia where supportive policies agreements set clear expectations around responsibility of the municipality up front. Where there is a lack of local municipal capacity or specialist knowledge there may be scope for a hybrid municipal-provincial body to support with necessary approvals for large, complex projects. For utilities upfront agreements can identify mutual expectations and opportunities around areas such as power supply for equipment and systems and be backstopped by government requirements to act within reasonable timeframes.

BUILDING THE RIGHT PROJECT ENVIRONMENT

Project success is often shaped very early through how procurement and contract documents are crafted, and how the market and community is engaged around the project to identify risks and tapping into the collective project wisdom to best handle risks.

Policies & Legislation

	DESCRIPTION	EXAMPLES
Stage-Gate Project Approval Process	Ensuring that investigations provide adequate information, that designs are sufficiently well progressed, and that permits and assessments suitably well progressed will all help significantly reduce project risk by ensuring a project can only advance when it is ready	A standard project delivery process is used in the UK including managing political announcements; New South Wales in Australia has a clearly articulated stage gating process for project announcements
Enabling Legislation	Enabling legislation provides more certainty to ensure that major projects, that are beneficial to wider society, can be built without unnecessary or unreasonable delays. Legal clarity, providing fixed timelines and ability to enforce action as a backstop in critical. This is particularly helpful in areas such as permitting, environmental assessments, utility relocations, land purchases	Ontario's Building Transit Faster Act and Quebec's Acceleration of Certain Infrastructure Projects Act both provide necessary tools to ensure that there are legal backstops that provide greater time certainty for the project
Digital by Default Delivery	Providing a digital foundation for the project through Building Information Modeling helps to ensure all those involved in the project are on the same page and it can also help identify issues far earlier than would otherwise be the case. Increasingly governments are placing BIM mandates on infrastructure projects over a certain size	CDPQ Infra used Building Information Modelling for its 67km Réseau express métropolitain in Montreal. It allowed 800 people working across different disciplines to develop their plans and identify potential clashes early in design. Some jurisdictions such as New South Wales are including BIM capability in procurement criteria and Quebec has laid out a roadmap for BIM adoption

Information

Upfront Project Data Collection	Provide a clear picture of project status, local factors and helps to determine all the potential risks around the project to help inform project planning and gather ideas from the market on what data is missing and how to approach potential risks	The Department of Treasury and Finance Victoria and the Office of Projects Victoria (Australia) produced Project Development and Due Diligence Guidelines , clearly outlining the expected level of information collected before a project can proceed to the next stage
Early Community Engagement and Report	Early community engagement helps identify desired outcomes, potential project pain points, and community priorities. It also helps tap into key local stakeholders for insights and planning. This should be captured in a report on what was heard and how it will be incorporated in design and planning.	Melbourne's Level Crossing Removal Project put a heavy emphasis on community engagement as part of program design from the start. Major projects in British Columbia start with a comprehensive engagement process and transparently report on what was heard. As did REM in Montreal which also had a community charter at the centre of its work.
Market Engagement and Report	A market workshop builds awareness of risk around the project and promotes approaches to de-risk as much as possible through the supply chain, as well as ensuring issues raised are adequately addressed to attract strong bidders	Sydney Metro's project risk workshop with industry, to create alignment, and reporting "what we heard" to explore risks and alternatives (scope, packaging, contracting, design, innovations). BC also publishes reports on market engagement
Early Risk Identification	Started early in the project and regularly updated this comprehensive list of risks would identify, cost, and support a strategy to tackling risks, as well as allocating associated roles for accountability, and tracking when risks can be retired	A comprehensive risk register (including milestones where risk is elevated) is used for identification and assessment of risks by Infrastructure Australia. BC publishes a risk report for major projects after conducting workshops and analysis as a benchmark for planning

Procurement & Contracts

Project Procurement and Packaging	Based on market input and project characteristics, a standard process to determine the best approach to splitting up contracts and the most suitable procurement model to deal with risk would help provide confidence to the market and ensure decisions on how to structure the procurement are taken in the best interests of the project	New South Wales produces guidelines on selecting procurement models with key features of models, list of client/contractor capabilities for each model, and guidance on which is best suited to optimise outcomes, meet technical requirements and handle specific risks. Sydney Metro also uses industry engagement to guide procurement and packaging approaches. Infrastructure BC also took a similar approach for the Surrey Skytrain
Procurement Evaluation Criteria	Selection should avoid putting too much emphasis on cost and heavily factor in other considerations such as value, experience, innovation, prior performance, and behavioural characteristics. Certain traits are critical in delivering highly complex projects in a successful way and it is important that project leaders in both the government and industry can work together collaboratively	The UK's Construction Playbook provides guidance on how to effectively use evaluation criteria to drive more positive project outcomes with an emphasis on areas like lifecycle value, outcomes, and performance. Collaborative behaviour assessments were used as a way to assess team suitability on the Union Station Expansion Project in Toronto
Contracts that Encourage Collaboration	Contracts should be simple, easy to navigate, use plain language, and designed to encourage collaboration. They should have an emphasis on open communications, information sharing, and include incentives to jointly overcome issues. An independent review of contracts can also ensure they are balanced and designed to support project outcomes over legal protection or favouring one party over another	Eglinton Crosstown West used the budgeted contingency as a gain share mechanism to encourage problem solving across the project. The NEC suite of contracts has been widely adopted around the world to provide consistency and encourage collaboration. Network Rail's Dispute Avoidance Process also includes a contract review to take out elements that could drive disputes

Plans & Agreements

Project Environment Plan	An environment plan helps ensure that the project proactively addresses legitimate environmental concerns, demonstrates overall environmental benefits and provides adequate safeguards and highlights positive commitments to replacing any trees removed for example	The Réseau express métropolitain in Montreal put a robust environment plan at the heart of its approach which helped get ahead of many of the issues of concern around the project's impact. The environmental assessment was also flexible enough to allow for more innovation while delivering environmental protection
Community Benefits Plan	Reporting back on priorities raised by local communities and mapping out mitigation measures, this focuses on promoting economic, employment, and training opportunities for local community and businesses to help build broad-based support for the project	Crossrail in the UK saw requirements on community relations were a condition of approval from Parliament and an extensive program, including an emphasis on developing skills and providing opportunities for suppliers
Municipal Agreement	A municipal agreement sets out expectations on resourcing, key contacts, response times, meeting schedules and scope, and any other areas that would reduce risk of delays and disruption for local communities	In BC supportive policy agreements set clear expectations of how the municipality will do everything in its power to ensure the project is a success and ensures interests are aligned
Utility Agreement	Sets out clear shared expectations on timing and notices around work, as well as setting out potential for any longer term partnership opportunities for providing power for vehicles for example	Ontario signed a Memorandum of Understanding with utilities including Toronto Hydro, Hydro One and Enbridge around priority transit projects

2 GETTING A GOOD START

One of the highest risk phases for a major project is the time between contract award and work starting. Momentum can be lost and issues in this phase can snowball and reverberate through the project. Procurement can run for years, during that time progress can be made in key areas to de-risk the project as much as possible, but special focus needs to be placed on the handover as the project team starts construction.

Clarity and information of project briefs are important in providing a solid basis for project teams to hit the ground running with a good understanding of the situation and challenges faced. A process that enables bidders to request information that would benefit the project helps to flush out shared concerns into the open early on.

Given the significant risk posed by utilities, it has become standard practice to undertake this work before contracts for construction work are awarded. This helps to uncover any issues and avoid situations where unexpected, complex issues have knock on effects that can delay construction work. Another area is site preparation.

Clearing land in advance enables construction teams to come in, without having to wait for a nesting season to end for example, which may force them to wait months before a tree can be touched and can delay work starting. If lands need to be appropriated too this is a high risk to leave until construction starts given the major personal impact it has on the individuals involved. Early and potentially challenging enabling work can also be considered as separate contracts.

More complex projects are also increasingly incorporating a development phase, or carving out a period for value engineering. This allows the owner to work closely with designers and contractors to advance the design and identify and reduce risks through smart design or alternative construction methods.

Through procurement and around financial close there is work that can maintain project momentum and ensure the project has been taken as far along as it can be, and as many risks as possible are addressed, before being handed over for construction to begin. Public sector owners are often better placed to liaise on areas that require government approvals such as municipal permitting and environmental assessments for example.

Staged contractual measures that provide budget and enable the selected bidder to order important equipment and start early mobilization before contracts are awarded would help to ensure less time is lost at the start. Special attention should be paid to key equipment such as tunnel boring machines, rail systems, and rolling stock which may have long lead times and could cause significant delays to projects starting.

To focus minds during the early stages milestone incentives can also be highly effective. These visible targets help to get these teams that have been brought together, often for the first time, to focus on what is most important for the project. These incentives should be achievable and specific to the project, for example on Eglinton Crosstown West they set two early milestones that were achievable but critical to gaining early momentum which is easy to lose but hard to get back.

GETTING A GOOD START

There is a lot of work that goes into project planning by government agencies, then through procurement as the contract is awarded it is important that momentum is not lost. Delays early on can reverberate through the project. Here are some of the main risks, and how they have been tackled on projects:



Handover

Early Works

Mobilization

	DESCRIPTION	EXAMPLES
Clarity of Information in Project Briefs	Provide all involved with a clear understanding of current status of project and potential challenges ahead with clear and detailed information, logical document naming, and file structures to make information easy to find	New South Wales provides a clear set of commercial principles that includes reliance on pre-contract information and encourages agencies to engage contractors in project due diligence
Planning and Permitting	Public sector owners move planning approvals and permits as far along as possible with available information handing over complete/almost complete documents and facilitating introductions to key government contacts to avoid delays	The Eglinton Crosstown West LRT mapped out all required permits, studies and approvals, and developed a two-stage process for pre and post contract award. They started working towards getting as many permits as possible in advance and progressing necessary approvals as far as they could go. They also ensured a smooth handover with introductions made to the relevant contact handling the process for the public sector
Community Engagement	Many projects hold extensive engagement with communities to help refine project plans and understand local priorities and concerns. It is important that there is continuity as the contract is awarded and constructors understand those key local considerations and can establish direct relationships	Edmonton Valley Line West had a rigorous approach to community engagement that was used to inform design, and future communications and engagement. The City established relationships with key groups, introduced the contractor to stakeholders, and set out a clear division of roles and expectations for engagement through project delivery
Utility Relocation	Before construction work it is increasingly commonplace to start investigating and relocating underground cables, pipes, and wires in advance. This eliminates many surprises that could cause significant delays	Early utility relocations have become a standard feature of major transit projects with Edmonton Valley Line West , Eglinton Crosstown West, GO Expansion , Calgary Green Line all undertaking significant early work with utilities
Site Preparation	Preparing sites for construction crews by clearing vegetation or buildings prevents delayed access to worksites, that may come as a result of having to wait for permits, or time windows to avoid nesting seasons for example	Eglinton Crosstown West undertook a program of site preparation to ensure that sites were cleared and ready for construction crews to start work immediately
Enabling Work	For transit there are often smaller, more complex project elements that are critical to the overall work and could present a higher risk to project timelines. In some cases it may make sense to parcel this work off and undertake it earlier to reduce any potential for delays to impact the wider project	The GO Expansion project in the Toronto Region used a program of enabling work to take on specific difficult project elements in advance. This included major work on bridges for example to increase width to fit additional track
Associated Infrastructure Work	Often new transit projects cut across areas with aging existing infrastructure. Simply replacing sections directly impacted by construction may not be feasible or practical, or miss an opportunity to undertake work that is required or would be in the short term	For the Hamilton LRT the city laid out the associated work to upgrade infrastructure along the route. This provided a joined up vision with carved out funding to replace sewers, watermains, and private utilities, and upgrade roads and sidewalks as part of a wider program of investment
Budget Carveout	Providing an early contract with budget to undertake key activities such as ordering vital equipment or early site work before final contract award helps to ensure no time is lost early on	Eglinton Crosstown West LRT and Scarborough Subway had a dedicated budget to enable key equipment, notably tunnel boring machines to be ordered, and early design work to continue through an Early Works Agreement before negotiations reached financial close
Early Milestone Incentives	Provide clear and achievable targets for the early days of the project. This helps to focus teams on the most important and impactful project elements and avoid early procrastination	On major rail projects in Ontario such as the Eglinton Crosstown West Extension and Scarborough Subway Extension incentives have been used around key milestones, notably the assembly of the tunnel boring machine and the first 20 metres of tunnel complete

3 WORKING TOGETHER

Transit projects involve a web of companies and organizations, all focused on delivering on their own mandate. As projects progress, issues arise, and the atmosphere can quickly become adversarial which can undermine the project. According to a global survey by KPMG, 86% of projects cited the human element as having influenced the project, but only 40% had soft controls in place as part of their delivery plan. Good relationships across the project are critical to project success and effectively handling risk.

Systems Shape Behaviour

Clear expectations of behaviour also set the tone right across the project. Many projects now start with a shared project charter that lays out commitments for how the overall project team will conduct itself. Having it in writing helps hold people to account and maintain focus. On one project in the UK a mantra of “Best for Bank” relating to an underground station project on London’s subway system. It is one example of how a relatively simple shared goal focused decision-making on the shared responsibility of working towards a positive project outcome above all else.

There are a number of soft actions that can be taken that encourage a collaborative environment. Co-locating in the same office improves internal communications and collaboration. A more nuanced approach to dealing with issues arising, starting with conversations to try to understand each other’s perspective before resorting to letter writing to make issues official helps save time and maintain positive relationships. Pre-submission meetings for design documents and plans can also reduce the number of resubmissions required, with resubmissions being a good metric to track as an indicator of overall project health and where schedules may be slipping.

A major factor in elevating risk is delayed decision making. A small issue can quickly grow if it is not dealt with quickly at the site level. Clearly delegated decision making, and roles help to provide clarity, but those decisions must be supported to the extent that it provides people working on the site confidence. This involves helping to develop internal capacity through training and tools. Big projects can also exceed typical government delegation authorities which need to be taken into account when delegating decision-making to the right level.

Incentives can be a very powerful way of driving the right behaviour across a project by creating more of a problem-solving mentality that can avoid issues going to claims. Without any carrot there is little incentive to be creative in solving issues that arise proactively. Incentive models include using contingencies more creatively to encourage contractors to come forward with solutions with the possibility of sharing in whatever may be left over from contingencies at the end. Enforcement and penalties typically have a negative impact on the environment and relationships around a project and should be used sparingly, and often as a last resort or around a particularly serious or repeated issues.

Building Capacity

As issues arise it is important that they are resolved quickly and fairly so all parties can focus on delivering progress. Unresolved issues can quickly sour relationships and be detrimental to the project overall. A shift away from dispute resolution to conflict avoidance can provide a proactive and cost-effective way to stay on top of issues. This approach involves jointly-appointed experts playing more of an inquisitorial role around issues to investigate the root causes proactively. They then provide recommendations on a way forward and how the issue would likely play out if it went down a formal dispute process, enabling a faster resolution and preserving relationships.

One of the most important elements for a project team is an experienced owner. Projects of this size and complexity are difficult enough to manage for professionals with project experience, but many senior project leaders can be thrust into a completely new role and must find their own way. Increasingly governments are providing training for senior project leaders or by providing professional development and career paths that ease them into leadership roles. Having confidence developed through training and development also helps people make decisions quickly, builds trust, and reduces the need for everyday issues to be escalated.

Maintaining Community Support

Many risks derive from, or are escalated as result of the local community. Many issues are common across projects and can create negative sentiment that impacts the cohesion and performance of the team if not managed well. The local community and their representatives should expect at a minimum an opportunity to provide input, visibility on how feedback was incorporated or why it was not, timely access to information on upcoming work, respectful and timely responses to inquiries, and advanced notification and explanations for why work may be taking longer than expected.

Community impact should be a guiding mantra for the project team with the goal of being a good neighbour through the duration of construction. This should guide the approach to construction to ensure the community impacted is treated with consideration and empathy through a disruptive period and considers different personal circumstances. Every effort should be made to avoid or mitigate local disruption and inconvenience to people's lives as this will help reduce overall project risk and the potential for smaller issues escalating. One area to consider for further investigation is developing mechanisms to reduce the community disruption around projects. Road closures in particular can be very impactful to local businesses and residents. Developing a specific plan with incentives and flexibility that focuses on minimizing the footprint of closures and their duration would buy significant goodwill and reduce the pressure on the project overall that can in turn see risks materialize or escalate.

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WORKING TOGETHER

There are very few risks that do not require some degree of support to manage or resolve, and without good communication and working together collaboratively to solve issues, successful project delivery becomes infinitely harder. Here are some of the main risks, and how they have been tackled on projects:



	DESCRIPTION	EXAMPLES	
Governance	Standard Approach	A clear, standard overall approach to project delivery helps to build capacity and raise standards, by cementing best practices developed through project experience. This provides guidance at each stage around how to approach specific challenges	The UK’s Construction Playbook provides guidance at every project stage, providing clarity to public sector project leads and predictability to contractors with an emphasis of working in the project’s best interest
	Decision-Making Process	Processes that allow and encourage quick, informed decision-making are critical, measuring areas that frequently cause delays can help address bottlenecks eg number of resubmissions	The New Zealand Infrastructure Commission produced Major Infrastructure Project Governance Guidance to help promote the right behaviour and clear, timely decision-making
	Leadership Training	Trained, informed leaders help empower their teams to make decisions and trust counterparts more if they are more confident in their own abilities	The UK Government through the Infrastructure and Projects Authority set up the Major Projects Leadership Academy with the University of Oxford to provide specialist training
Behaviour	Project Charter	A written charter created jointly sets shared expectations and drives good behaviours across the project team to encourage problem solving and collaboration	The Union Station Enhancement Project has a project charter that aims to provide shared expectations across the entire project team and cements a “best for project” mindset
	Team Co-location	Co-locating client and cross functional delivery teams builds organizational relationships and makes communications far easier to help avoid surprises and conflicts	The Union Station Expansion project benefits from a co-located project team and has benefited from better internal communication as a result
	Behavioural Measurement and Training	Increasingly behaviour is being measured as a part of the procurement evaluation. A more collaborative mindset and flexible thinking helps teams work together to overcome challenges. Training provided through the project life can help maintain a positive working environment as teams change	The Construction Industry Training Board in the UK researched the impact of behaviour on successful project delivery and produced a competency framework for behaviour and provides training
Communication	Progress Reporting	Regular progress reporting enables teams to have clarity around overall progress, build internal pride, focus on the right areas and offer help when there are clear challenges	The Canadian Parliament refurbishment project releases quarterly progress reports clearly stating where the project stands in percentage complete terms and challenges faced. California’s High Speed Rail also produces an annual report highlighting progress and challenges
	Internal Communications	Large teams, coming from different companies, with different skillsets, and working in different locations can feel detached from the overall project. A focused internal communications strategy helps to build project pride and awareness	Crossrail in the UK had an extensive internal engagement program to employees and suppliers. This used different tools to reach different parts of the project, and celebrated milestones to build a team ethos
	Community Communications	Maintain two-way engagement with the community from the start of the project. Projects are increasingly adopting “good neighbour” principles to ensure that any plans consider the impact on the community first and foremost. Clear actions in areas like reducing noise, keeping sites presentable, and proactive and responsive communications help maintain community trust and reduce project risk	In the UK the Considerate Constructors provides a code of conduct and suite of tools that drive increased standards around respecting the community, caring for the environment, and valuing the workforce. It has now become a condition to be registered with such a scheme within construction procurements
	Sentiment Tracking	Ensuring that localized issues are not escalating project risk overall and helping inform project team of what is important from a community perspective to guide approach to construction to mitigate local impacts	Edmonton Valley Line West requires regular tracking of community sentiment through enquiries received, as well as a research and evaluation plan to regularly gather more in-depth input on the state, issues emerging, and overall perceptions of the project
	Key Stakeholder Communications	Stakeholder who are well informed and respected tend to be more understanding of project challenges. Where stakeholders do not feel there is good two-way communications issues can arise directly, and other risks can be exacerbated	Edmonton Valley Line West has established regular meetings with key stakeholders along the route to receive updates on upcoming work and stakeholders can directly share insights and concerns to help guide plans. It also has clear communications protocols to ensure quick responses to queries raised
Commercial	Incentive Mechanisms	Incentives designed to encourage problem-solving and collaboration help to ensure issues are not just resolved via claims as a reflex. Using contingencies to work for the project rather than just as a fall back is a smart use of resources that can drive positive behaviour	Eglinton Crosstown West LRT used a smart approach to leveraging contingencies. It set a ceiling by providing a pot that was priced out based on the anticipated risks. Contractors could submit claims and be reimbursed but by providing a carrot of sharing what was left from the pot it encouraged problem solving
	Conflict Avoidance Process	Appointing experts and using a process to proactively identify issues and help resolve them keeps them from bubbling up and going to dispute. This can sour relationships and distract key project leaders from delivery. This can also help to provide greater confidence around decision-making for front line project leaders	Network Rail in the UK developed a process that has seen the number of disputes and claims vastly reduced and lower cost overruns compared to the industry average that do not use conflict avoidance
	Dispute Resolution Process	A fair, transparent, and timely approach helps issues to be resolved quickly and move on to avoid issues festering and impacting working relationships	The Future of Infrastructure Group outlined a list of principles for effective dispute resolution including being simple, fair and impartial, cost-effective, timely, and expert-facilitated
	Inflation Mechanism	Cost inflation can be anticipated, but if it extends beyond a certain threshold it can have a significant impact on project costs. The size and length of transit projects makes cost rises particularly impactful and a source of friction	Many large infrastructure owners and projects use inflation adjustment clauses based on price indices that kick in if costs extend beyond or drop below anticipated normal inflation levels

4 FOCUSING ON THE END GOAL

It is important to recognize that major transit systems are now as much about technology as the infrastructure itself. Safety and signalling systems need to communicate with a range of different components and controls. This provides multiple points of potential failure and needs rigorous testing to iron out any potential problems.

The transition to operations for transit systems has become increasingly fraught due to the growing complexity of the technology involved. Signals and systems need to act in synch, with the risk of a small issue potentially impacting the wider network. The operations, maintenance, and end user experience need to be factored in from day one to reduce the risk in the critical final stages as the trains enter operation, and also to provide a better user experience.

As contracts are increasingly being broken up, integration becomes critically important. There must be a dedicated systems integration role and integrated teams playing a guiding role that incorporate design, construction, technology, and operations. There must also be a clear sense of all the interface points that need to be managed with people being accountable.

The role of technology here must also play an important role. The use of tools such as Digital twins can help identify where issues may arise through virtual simulation to avoid these risks becoming realized once construction has been well-advanced and enables problems to be detected much earlier, reducing the overall project risk substantially. Digital twins provide a virtual replica of the real world and enable solutions to be tested before shovels go in the ground and potentially avoiding significant costs.

Incentives can help to ensure that milestones are hit that enable adequate time for testing and commissioning. Timelines and required access for vehicle and systems testing should be set from the start and provide a clear target for construction.

With major projects a major issue is a lack of visibility around actual project progress. With multiple teams working towards a high-profile deadline there can sometimes be a risk people will try to be overly optimistic on their progress in the hope they can resolve problems and not wanting to let the team down. When one issue comes to light it can lead to a cascade effect of issues coming to light. Independent project monitoring can help reduce this risk. Clear internal project communications and fostering an atmosphere where issues can be discussed and resolved openly can help prevent a situation like this.

Hard dates on project openings can create issues that might otherwise be avoided. Increasingly projects are using a date range and a gradual phase-in of service to enable adequate testing and iron out any kinks that might escalate into major system failures otherwise. Staged opening can help to demonstrate progress, enable adequate bedding in, and avoid high-profile operational issues once transit enters into service.

FOCUSING ON THE END GOAL



The project will be judged as a success when trains are rolling with passengers, and considering the operations early will provide enough runway for testing and commissioning. All good work along the way is forgotten if the train does not start carrying passengers when the line is expected to open. Here are some of the main risks, and how they have been tackled on projects:

Governance

Commercial

	DESCRIPTION	EXAMPLES
Early Operations, Safety, and End User Input	Project leadership needs representation from operations and end users to ensure needs are considered early and end product delivers a better experience. Safety should also be a feature from the start to reduce the amount of work required for the project to receive necessary certifications to start operations	In the latter stages of Crossrail in the UK to address issues of getting the line to be operational a cross-organization group representing different types of competencies was established to drive towards completion and address issues
Digital Project Integration	Leveraging data and technology such as Digital Twins enables the early identification of issues and potential conflicts and enables a much more reliable sharing of real time information	The Réseau express métropolitain was delivered using Building Information Modeling ensuring that different project teams could work closely together seamlessly on one shared platform. Canada Line in Vancouver has a digital twin that guides predictive maintenance and planning
Dedicated Systems Integration Role	Someone with a dedicated role helps ensure all project elements are considered and perspectives incorporated into plans	On Crossrail a System Integration Department and Strategy to weave together the different single project contracts, and focus on high risk project elements and interfaces
Interface Map and Control	Having clear information around all areas where one part of the project or one system interfaces with another ensures that no area is overlooked. Leads allocated to specific points of interface ensures that there is a single point of accountability	Projects in Australia, including the Metro Tunnel in Melbourne , spend a lot of time mapping potential interfaces with work packages and develop strategies to manage them, including establishing commercial frameworks that encourage contractors to work in a cooperative and collaborative way with certainty provided through interface deeds
Independent Progress Reporting	An independent role helps to ensure that progress reports truly reflect actual situation to avoid surprises and focus on cost and schedule variance	The quarterly report on Canada's Parliament Centre Block buildings provides a clear, simple overview of project status that helps to ensure issues are caught early and there is a broad understanding of progress to avoid surprises
Incentives to Provide Access for Testing	Well-designed incentives guided around what is needed for adequate vehicle and systems testing provides enough time to iron out glitches	Ontario's Metrolinx uses tail-end incentives to ensure handover dates are hit for future stages of projects to ensure there is adequate time for each stage to undertake their work
Shared Incentive for Project Completion	A shared incentive mechanism helps ensure everyone is looking out for the interests of the project overall and sees a tangible benefit from supporting a successful project outcome beyond their immediate area of responsibility. It also helps to underpin the "best for project" mentality	The Union Station Expansion in Toronto has a gain share mechanism that sees all benefit if the project is delivered on time under the target price
Phase-in Plan	A rolling plan to test the system without a big hard date takes pressure off delivery and can still provide benefits as vehicles can run limited routes earlier	The UK's Infrastructure and Projects Authority produced guidance including using an evidenced range of dates rather than a single target date which can often be promised before it is clear that it is realistically achievable and the need to build in an adequate test phase that is not used a schedule contingency

CONCLUSION

The ambition around infrastructure spending from different governments across Canada is laudable and an investment in Canada's future. By properly tackling risk it will ensure that overall spending delivers more miles of track and more trains per hour. Risk needs to be placed at the forefront of infrastructure planning, procurement, and delivery. On a complex project it requires all parties to play an active role in managing project risk overall. There are a range of different procurement and delivery models that can be leveraged based on the unique circumstances of the project, all with their own merits, but all must be underpinned by a comprehensive approach to identifying and tackling risk, and incentivizing the right behaviours.

A focus on people, information, and time provides some core principles to base decision-making around when it comes to risk. Handling risk is a shared challenge and a shared responsibility, building an environment that empowers and encourages problem-solving will have a transformational impact on the delivery of major transit projects and benefit all involved.



People

Fostering an environment to promote collaboration and problem solving

- **Behaviour:** Focus on soft skills and encouraging the personality traits and skills that build a collaborative, open, problem-solving environment
- **Leadership:** Invest in people and skills, to those entrusted with delivering the project and provide them with the necessary tools and resources to succeed
- **Accountability:** Be clear around governance and ensuring there is clearly delegated responsibility to act and make decisions
- **Decision-making:** Enable quick, informed decision making by empowering people and providing clear guidance
- **Integration:** Bring together multiskilled teams that represent every stage of the project from design, construction, operations, and maintenance
- **Empathy:** Take into account the impact on, and priorities of, the local community



Information

Driving informed decision-making and shared visibility of project progress

- **Engagement:** Draw on market and community insights to gauge market capacity, refine procurement approach, understand local community considerations, and identify risks
- **Data collection:** Ensure adequate information has been collected to guide informed decision-making at every stage
- **Visibility:** Have clear regular reporting of progress, the evolution of project risks to ensure there is awareness of the current project status
- **Right approach:** Select a procurement and delivery approach, packaging and selection criteria based on project information
- **Digital tools:** Leverage digital tools to provide a single source of truth on the project and enable more seamless sharing of information and ability to collaborate



Time

Focusing on schedule, value of early action and enabling timely decisions

- **Foundations:** Ensure adequate work has been done early around design and handling risks before moving to the next stage
- **Early insights:** Consult early and often in the project inception phase to have the greatest impact on project success by handling risk
- **Early actions:** Take action early to reduce risk overall through early works and moving forward on permits and approvals
- **Schedule:** track schedule progress and where decision-making or existing processes are causing bottlenecks
- **Anticipate:** Anticipate where there are likely to be local community sensitivities and develop plans to proactively address them

IMPLEMENTATION ACROSS GOVERNMENT

There are a lot of actions that can be taken to address risk, as outlined above. For governments this can be split out into chunks with the recommendations incorporated into broader government policies and plans. This requires political leadership, clear overall direction, and empowered organizations and individuals to drive implementation.

Based on the findings from the report many of the recommendations should form the basis of policies and plans that shape the overall market and guide project delivery. Having directions and objectives written down helps not only to set clear expectations around behaviour and processes, it also helps to build greater understanding of best practices across the infrastructure sector to raise standards.

Canada could benefit from introducing post-completion reports of projects to lay out where issues were faced as a result of risk and subsequent learnings. This would provide immense value in refining the approach to effectively tackle risk across the Canadian market as a whole.

We have seen in places like New South Wales, they have laid out very clearly their policies around procurement of major projects, have worked with industry to build a more positive and collaborative environment, and provide a staged process for approvals so projects can only move onto the next stage when they are ready. But in Canada too there are many positive examples.

Through the case studies below, there are a number of innovative ways organizations are tackling risk across Canada. The more these approaches are adopted and become common practice, the sooner we will see more transit projects delivered successfully on time and on budget.

FUNDAMENTALS OF A GOOD INFRASTRUCTURE MARKET

The Future of Infrastructure Group previously analyzed best practices around market governance that helps to provide certainty and stability in the market, and build capabilities and capacity among infrastructure professionals. The seven key market fundamentals are listed below:

- 1 Long Term Infrastructure Plan:** Provides long-term vision for why infrastructure is needed to support the economic success, social wellbeing, and environmental sustainability of a jurisdiction.
- 2 Evidence-Based Project Selection:** Clear metrics, guided by the overall goals of the province or territory ensures projects are well conceived from the start and deliver the most value.
- 3 Published Project Pipeline:** A publicly available list of projects with estimated timings and key details provides certainty for business and enables more coordination across government.
- 4 Specialist Infrastructure Agency:** A government centre of excellence plays a role in planning and delivering the most complex projects and driving innovation across government project delivery.
- 5 Project Delivery Roadmap:** Clear guidance for public sector owners can help improve delivery by providing best practices at every stage, and drive a more collaborative environment.
- 6 Infrastructure Sector Charter:** A commitment to reforms from both government and industry is critical in resetting relationships to drive collaboration and better project outcomes.
- 7 Digital Commitment:** Technology presents an opportunity at every stage of infrastructure lifecycles enabling better designs, more efficient delivery, and reduced operating costs.

CASE STUDY: EGLINTON CROSSTOWN WEST EXTENSION

The Eglinton Crosstown West Extension is a 9.2 kilometre LRT running from Toronto and into Mississauga. The project links into the Eglinton Crosstown and could see a further western extension to Toronto Pearson Airport. The project is a mix of tunnels, elevated sections and a small section at grade. It will add seven stops and link into local and regional transport networks.

Approach

Building on experience from previous major transit projects, this one was split into four different procurements and packaged where there are greatest delivery synergies:

- two advanced tunnels both as a Design Build Finance
- the elevated section as a Design Build
- the Stations, Rail and systems in a procurement model to be determined

This grouping of competencies provides greater understanding of what is going on for the leading companies in a consortium and therefore increases accountability within that specific area. It does add risk for the owner in other ways as integration of all the project elements falls largely on them.

For the advanced tunnel work the Design Build Finance approach provides the appeal to government of greater price certainty from the start, with more risk typically passed to the private sector to manage. This public-private partnership approach also provides more integration between the engineering and construction teams, enabling latitude for innovation as they have greater responsibility for design than in a traditional contract. The finance can provide skin in the game and an additional layer of oversight for the project team to drive performance.



Tackling Risk

Eglinton West took a proactive and creative approach to managing risk, with a number of key actions that both helped reduce uncertainty around the project and drive a more collaborative environment.

1

Permit Certainty

the owner mapped the required permits, studies, and permissions across different levels of government and the associated timelines and started moving towards securing those permits. Through this work they were able to provide a timeline within the project agreement on when permits would be expected, reducing uncertainty in a key project area. The owner developed staffing agreements with Mississauga and Toronto to ensure that they have adequate resources to move things along. Where possible the owner started the permitting process and had progressed through rounds of resubmittals so the permit was in a place that the contractors could sign off and submit for approvals. The owners also provided contacts and introductions to the people responsible for each permit with a checklist of what is required. They also held pre-submission meetings with permitting authorities which significantly cut the number of resubmissions of documentation.

2

Early Contractor Work

to avoid downtime between the winning bidder being selected, financial close, and work starting the owner allowed early work to start, carving out some activities they could be reimbursed for. This included design of certain key features, and ordering the tunnel boring machine. There were also some advanced site preparations, such as clearing areas of vegetation to avoid nesting seasons that could delay site mobilization and construction.

3

Early Milestone Incentives

to focus minds during the early stages the project provided early milestone incentives and payments that included the assembly of the tunnel boring machine on site, and first 50 metres tunnelled. This ensures team that are quickly assembled focus on the most important elements from day one and helps de-risk the rest of the project given the importance of a good start.

4

Clarity on Site Conditions

to provide greater certainty on underground conditions the project provided clear geotechnical baselines providing more comprehensive geotechnical investigations than was typically the case for such projects. They were open with bidders early on to get feedback on what information would be helpful in providing a more fulsome understanding of the underground conditions and enabling them to provide a more accurate bid price. The description of conditions is also more detailed providing expected percentages of contamination at certain sites. They also provided clear requirements around samples to put forward a claim and have it accepted to take away ambiguity and ensure that where unexpected site conditions were encountered, they were fairly treated and resolved.

5

Driving Problem-Solving Mindset

One of the most innovative aspects of the project was how contingency funds were made to work smartly. Typically, if a risk is realized that is not allocated to the contractor there is a claim and potentially a dispute which can eat up time and resources. Eglinton priced out the risks and provided an equivalent contingency pot which the contractor could claim against. The caveat was that if fair claims exceeded the amount they would be paid, but if there was any of the pot left it would be shared 50-50 between owner and contractor, known as a gain-share mechanism. This encouraged the contractor to find workable solutions to avoid having to make a claim and thereby drawing from the contingency pot or working to mitigate impacts to reduce the size of the claim. It also drove a more creative mindset across the project and helped maintain a positive working environment.

Beyond these specific measures, the project also encouraged open dialogue around issues arising to work to resolve them before they escalated. There was an emphasis on having pre-meetings to run through submissions to iron out any kinks before they were formally submitted in writing, cutting down on the number of resubmissions and providing a greater sense of alignment on approach.

CASE STUDY: UNION STATION ENHANCEMENT PROJECT

Union Station is the hub of the Toronto Region's transit network. A large investment to improve capacity to deliver two-way, all-day rail service on the GO Train network that will eventually have to accommodate 80 trains per hour will further cement its position. This specific project requires realignment of track and widening of platforms, better passenger access, and upgraded signals and power systems. All this work has to be completed while the trains continue to run.

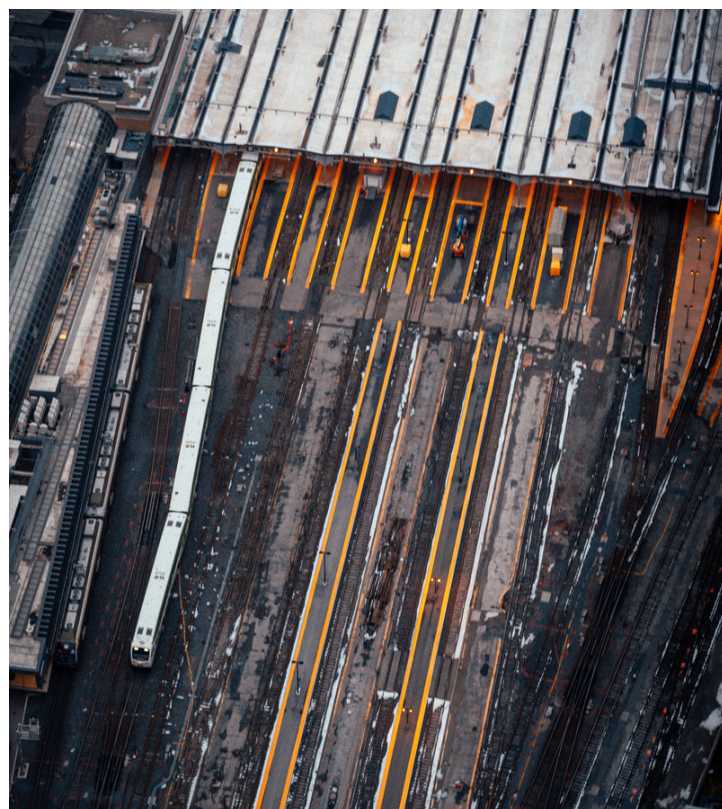
Approach

A busy, active rail station, a large number of stakeholders, and dealing with existing infrastructure built many years ago makes this project highly complex. The work around Union station is critical to the success of a wider investment to turn the current commuter rail system into a frequent, all-day service as part of a \$16 billion contract to build additional track, electrify the system, and make other upgrades to transform the system. This builds on \$10 billion of early works to relocate utilities, prepare sites, and build out enabling infrastructure.

The critical nature of Union Station and its complexity required a highly integrated team that could see the owner work with contractors to identify and tackle risks, and work collaboratively to deliver the work. Based on market feedback the project is being delivered through an Alliance contract.

The Alliance contract ensures that government and contractors work together collaboratively to deliver the project. It involved the following steps:

- Procure process focuses on a balanced combination of team and technical approach, behavioural assessments, and cost
- A bidder is selected to enter a development phase where the owner works with the designers, contractors and other key suppliers to build towards a final design, plan, address risk, and confirm a target price based on a fuller understanding of the situation
- Once there is an agreement the agreement moved into a delivery phase where all parties continues to work together as one team



Tackling Risk

The use of an Alliance delivery model at Union Station introduced a number of unique elements to the Canadian market for complex project delivery. Many of the elements at the core of an Alliance approach could easily be applied more widely to help address project risk, regardless of delivery model.

1

Procurement Evaluation

how a winning bidder is selected has a profound impact through the entire project. Overemphasis on cost drives a low-bid environment that can often lead to a race to the bottom and create an antagonistic environment. For this project evaluation criteria put much more emphasis on competence, approach, and behaviour. On the technical side evaluation factors in the organization and the key individuals, integration with the supply chain, safety, how the project would be mobilized, project controls, and the approach to value engineering. A sizeable portion of points (30%) is also awarded based on collaborative behaviour assessments. The fee accounts for only 30% of overall scoring. This type of assessment looks more at the organization's capacity to adapt and problem solve and work collaboratively which adds value over the life of the contract.

2

Early Supply Chain Insights

one of the primary benefits of the approach used at Union Station is the early involvement of the wider network of companies involved in delivering the project in a development phase. This phase brings together the owner and key organizations involved in the project to share insights, identify and address project risks. For example having a specialist construction company or the provider of signaling technology involved early could provide insights that could avoid a future risk through a simple change in design or approach. The open nature of the discussion enables all parties to share their concerns and experience and jointly work towards solutions in the design and planning phase. It creates realistic expectations around costs and timelines for the project overall, while giving an opportunity for different organizations to suggest workable cost saving solutions.

3

Shared Incentives

at the core of an Alliance model is an incentive mechanism known as painshare/gainshare. This is built around a target cost and hitting certain baseline key performance indicators. The target cost is decided upon jointly early on and if the project is delivered under that target the savings are shared as a reward for collective success, providing an incentive to come up with creative solutions to any risks. If the project exceeds the target cost the contractor is only paid at cost for any overrun with no profit margin. The project also has stretch performance goals which bring about rewards, this could include opening platforms early to reduce the impact on passengers.

4

Use of Key Result Areas

performance is measured on a number of levels to help maintain a focus on the right kinds of actions and behaviours when it comes to addressing the challenges that will inevitably come up on a complex transit project. These Key Result Areas are strategic categories that are defined through the business case that make up critical success factors and are supported through key performance indicators to measure progress. These KRAs look at areas such as stakeholder satisfaction, quality to ensure that work is done right first time, developing a retaining a high performance team, and demonstrating continuous improvement, as well as areas like health and safety, sustainability, delivering against the plan and working within the budget.

5

Fostering a Good Environment

the project has a rigorous approach to finding and promoting ways that encourage collaboration. The project has a shared project charter that sets out expected behaviours across all team members, decisions are made on a "best for project" basis to encourage teams to work together to solve issues, and the incentive mechanism that rewards collective success encourages a more holistic project mindset. Teams are co-located in the same office to blur the lines between any notion of "them-and-us" and promote better communication. There is also a "no-blame, no-dispute" culture that sees all parties sign up to work through issues together rather than resorting to legal channels, which helps maintain focus on successful project delivery.

The Alliance approach carves out a number of ways to drive collaborative behaviour from an early stage, and maintains a solutions-based mindset through the joint team and shared incentives for successful delivery. Risk is shared overall, enabling all parties to play a role where they can add value.

CASE STUDY: RÉSEAU EXPRESS MÉTROPOLITAIN

The Réseau express métropolitain is a 67 km light rail line serving the Montreal region with 26 stations linking the downtown with the southeast and northwest. At \$6.3 billion it is the largest public transit project in Quebec since the Montreal Metro in 1966. It is one of the largest automated rail systems in the world and connects with existing metro, commuter rail, and bus networks.

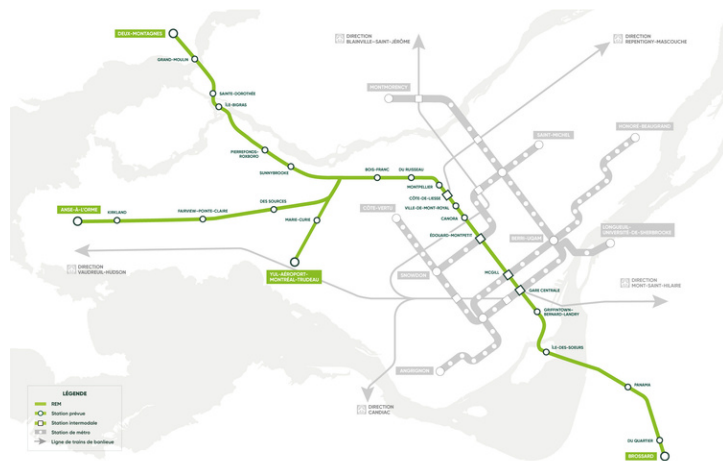
Approach

Phase 1 of the project entered operations in 2023. The project was split into two parts:

1. EPC – infrastructure engineering, procurement and construction
2. RSSOM – provision of rolling stock, systems and operations and maintenance

CDPQ Infra was set up as an infrastructure subsidiary of the province's pension plan to work together with government on project conception, then take a lead on planning, financing, design, construction, through to operations and maintenance. This is a unique role that centres on finding ways to manage project risk that makes it more attractive for institutional investors, such as large public pension plans, to invest in building new transit infrastructure.

Upon award of the contracts the EPC and RSSOM spent a few months working together to harmonize their respective proposals. Delivery aims to draw on international best practices and work with contractors as partners through an open process called continuous engineering. Based on collaboration it seeks out the best ideas to improve the project. CDPQ Infra provides the main parameters, but gives the contractors the latitude to bring forward innovative solutions to address project challenges and provide greater value.



Tackling Risk

The approach used on REM may be difficult to fully replicate in other markets given the unique role of the CDPQ. That role as owner, lead contractor, and operator did however drive a diligent examination of project risks and a robust approach to tackling them. These lessons could apply more widely across projects, particularly when it comes to project governance and certainty around timelines.

1

Technology-Based Collaboration

The scale of REM and interdisciplinary expertise needed to be highly integrated and was built around Building Information Modeling (BIM). With the project involving 10 municipalities, 800 people working on different project elements, and generating around 700 documents each week it required seamless communication, particularly around schedules. This can only be achieved using digital tools. The digital model allowed the wider team to visualize design and construction on one single shared platform. This enabled them to mitigate risks, anticipate challenges, avoid delays, and design a better end user experience.

2

Community Commitment

The project was guided by clear commitments to the local community to communicate, mitigate impacts, propose alternatives, cooperate with projects partners to share information, and to listen and respond quickly. The project engaged early with the community to solicit feedback that informed project design and saw tangible changes to the project including additional stations and a modified route. The project reported back on what was heard from consultations sessions so communities could see how their inputs were incorporated. Throughout the project there was also a commitment to providing timely responses around any issues or inquiries.

3

Environmental Focus and Flexible Assessments

The REM put environmental impact and benefits at its core built around foundational principles of avoid, minimize, and compensate. The project itself was calculated to cut 100,000 tonnes of greenhouse gases per year. Where it was necessary to remove trees the project committed to replant trees at a rate of 110% in the municipal territory or borough impacted, as well as committing to plant 250,000 trees overall to offset emissions produced in the construction phase. REM also factored in the impacts of the project on plants, wildlife, and local environments including local wetlands to inform design or develop mitigation strategies. The environmental assessment and permitting also allowed greater flexibility

4

Providing Timeline Certainty

Securing permits from third parties, particularly municipalities, can be time consuming and often come with drawn out timelines with no fixed end date. To provide greater timeline certainty Quebec introduced legislation specifically for the project that provided a 60-day review period for road access permits that would be automatically granted at that point without the need to provide any compensation. This encouraged the municipality and local agencies to work to find a workable agreement more quickly. CDPQ Infra had to provide adequate information that was clearly stipulated, as well as obligations on both sides, but the asks were clear up front, preventing delays through supplemental requests for information. The legislation has been extended to other major projects to provide greater timeline certainty.

5

Standardized Designs

The route comprises 26 stations which were built to three standard designs, for at grade, elevated, or underground stations. A shift away from each station being unique reduced design costs and allowed each station to be delivered more efficiently with lessons learned along the way. This significantly reduced project risks with only small tweaks required. The standard design allowed for bulk purchasing of materials reducing overall costs and supply chain risks, and speeds up timelines. The project also leveraged offsite construction as much as possible.

For this project CDPQ Infra took on project risks and was responsible for designing and delivering the most effective approach and one that focused on encouraging greater ridership once the train was operational. The integrated responsibility provided a unique perspective on how such an organization would approach risk management for a major transit project, with some approaches already explored and adopted more widely.

CASE STUDY: SURREY LANGLEY SKYTRAIN

The Surrey Langley SkyTrain (SLS) project in British Columbia is a 16-kilometre extension of the existing Expo Line. The project includes an elevated guideway, eight stations, and three transit exchanges. The extension will serve one of the fastest growing areas in the region, travelling through three municipalities south of the Fraser River: City of Surrey, Township of Langley, Langley City. SLS is the catalyst for transit-oriented development that will unlock significant opportunities for new housing and services (such as health care and childcare facilities), commercial/ retail space, active transportation options, and public spaces.

Approach

The project is owned by the Province of B.C., represented by the Ministry of Transportation and Infrastructure (MOTI). Infrastructure BC (IBC) and Transportation Investment Corporation (TIC) are leading the procurement and delivery of the project, and TransLink (Metro Vancouver's regional transit authority) will operate and maintain the extension once it is in service, integrating it into the existing regional SkyTrain network.

The Province prepared a business case that considered whether to procure the project under one single contract or multiple contracts, including an analysis with recommended procurement models. With consideration of the capital value, market conditions at the time of the analysis, and other contract performance-related criteria, the Province elected to deliver the project under three separate contracts, each with a procurement model that offered the best value for taxpayers.

Given the unique nature of the project, these contracts are highly integrated and will interface at key milestones as the project progresses. The contracts are as follows:

- Guideway - includes the substructures, superstructures, roadworks, and utilities. Procured under a Design-Build Finance (DBF) model.
- Stations - includes eight stations, nine propulsion power stations, and 250 metres of guideway at the terminus station. Procured under a Design-Build (DB) model.
- Systems and Trackwork - includes trackwork, power rail and linear induction motor system, communications, automated train control, and power propulsion equipment. Procured using a Design-Build Target Price (DBTP) model.



Tackling Risk

The use of a multi-contract, multi-model approach project delivery was to address strategic objectives around competition and effective risk allocation. Key risks are allocated or shared amongst the Province and all three contractors. The delivery approach is inherently collaborative, irrespective of the contract-level assignment of risks, with an emphasis on win-win solutions to issues that arise during construction, which will benefit all parties. Ultimately, ensuring that interests are aligned, and inter-party communication is effective, is the key to success. Specific examples of how the project has worked to mitigate risk include:

1

Early Risk Identification, Analysis, and Mitigation

The Province developed and continues to actively manage a comprehensive risk register and risk management program for the project that reflects a full range of procurement, commercial, technical, and regulatory risks that are unique to each contract and shared by all three. The Province's approach to risk recognizes that it must be managed effectively to achieve successful outcomes. The Province published a [risk report](#) based on a series of workshops that outlines their approach to guide decision-making for the project overall to prevent and mitigate project risks. Risks were quantified, the probability of occurrence and severity of potential outcomes assessed to inform the overall approach.

2

Contract-Specific Commercial Structures and Market Engagement

Each of the three contracts fall under a unique procurement model that reflects the specific characteristics and risk profile of the work. The Province undertook extensive engagement with the market to explore and confirm interest in the project, which provided important feedback around capacity (i.e. labour issues and competing projects), preferred procurement models, risk tolerance, and project schedule. Market input helped to inform the overall procurement strategy. The province produced an information package with questions in advance with feedback gathered through interviews with identified organizations, and a [market sounding report](#) outlining the input received and how it impacted the overall approach. The project also incorporated a session in the RFP stage with local contractors, suppliers and businesses to help raise awareness among bidders of local capacity and market considerations, and to make connections with companies to work on the project.

3

Multipronged Procurement Evaluation Criteria

Material consideration of the quality of proposal technical elements, with emphasis on those of particular concern in a multi-contract delivery, such as schedule and interface management, formed part of the evaluation criteria in the selection process of preferred proponents for all three contract RFPs. The scored evaluation framework clearly signaled to bidders the Province's priorities while ensuring that price proposals were appropriately balanced against other project requirements.

4

Advanced Works

The project identified a significant package of advance works to undertake before the start of major construction to provide construction contractors with greater certainty about site conditions. This approach supports a more efficient process with respect to project design and construction by mitigating the potential for cost increases and schedule delays. Advance works included major utility relocations, road-widening, and property acquisitions.

5

Municipal-Provincial Agreements

Early in the process, several different agreements, such as [Supportive Policies Agreements](#), were signed by partner municipalities, TransLink, and the Province to demonstrate collective support for the project and the commitment to leverage the significant investment of public dollars by maximizing project benefits. The agreements outline roles and responsibilities, and required actions in areas like transportation services, land use planning, housing, climate action, active transportation, reconciliation, and equity. Such agreements help to ensure that all parties are aligned and commit to the required expertise, resources, and processes to ensure successful outcomes. The process sets out roles and responsibilities, and commits the necessary resources to support the project, including providing certainty around timelines for necessary permits.

To provide a measure of certainty around complex infrastructure projects, the Province applies a robust approach to project planning and risk mitigation throughout the life of the project. This includes an ongoing due diligence process to manage risk, which encompasses strategic planning, diverse engagement, and tactical actions as well as transparency around decision-making. They have a diligent and open approach to project preparation through active engagement, pursuing agreements with key stakeholders like municipalities and utilities, and undertaking early work.



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