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A Project portfolio

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Poster



Reopening of Highway 5 (Coquihalla Highway) Post-Flood Reconstruction in British Columbia

Background

In November 2022, British Columbia suffered catastrophic flooding caused havoc, bridge collapses, and destruction of several highways

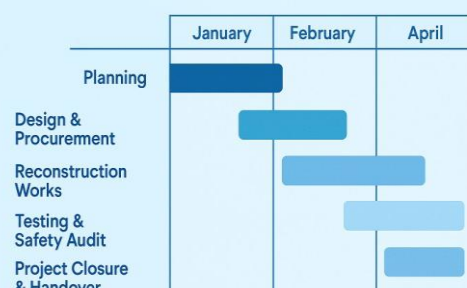
Scope of Work

- Reconstruct damage sections of highways and bridges.
- Stabilize areas and improve drainage systems.
- Increase flood resilience through upgraded design standards.
- Conduct environmental and safety assessments.

Project Objective

To reconstruct and reopen Highway 5 as a safe, by reopening highways with resilient and climate-adaptable infrastructure, ensuring continuity of trade and mobility across British Columbia.

HIGHWAY 5 REOPENING



Stakeholders

	High	Low
Power	High Power High Interest Government of British Columbia (Ministry of Transportation and Infrastructure) Transport Canada	High Power Low Interest Indigenous communities
Low	Low Power High Interest Local businesses Local municipalities	Low Power Low Interest Local residents

Sustainability Focus

- Use of recycled and eco-friendly materials
- Improved drainage to mitigate future flooding

Budget and Risk Management

Estimated Budget: CAD \$450 million

Major Risks and Mitigation Strategies:

- Landslide recurrence – Slope stabilisation systems
- Weather disruptions – Flexible scheduling
- Material shortages – Local suppliers
- Environmental concerns – Continuous monitoring

Government of British Columbia. (2023) Flood recovery and infrastructure rebuilding plan. Available at: <https://www2.gov.bc.ca/>
 Infrastructure Canada. (2022) Resilient infrastructure funding for disaster recovery. Government of Canada.
 Environment and Climate Change Canada. (2023) 2022 Atmospheric River Event Report. Government of Canada.
 Transport Canada. (2023) Transportation recovery and corridor rehabilitation initiatives. Government of Canada.

Reflection on Feedback

Delivering my presentation on the Reopening of Highway 5: Post-Flood Reconstruction in British Columbia was valuable experience that strengthened both my communication and project management skills. The purpose of the session was to explain the impact of the 2022 floods and outline a reconstruction plan using project management principle such as stakeholder analysis, risk management, and sustainability planning. This reflective report discusses the feedback I received, my strengths, areas improvement.

Overall, the feedback from my lecturer was very positive. One of the first comments I received was that its good presentation, he mentioned saw that I took time to prepare for it. I organised the session logically, starting with the disaster background and then moving through the project objectives, scope of work, risks, sustainability, and stakeholders. Presenting the information in short, well-formatted sections made it easier for the class understand each part of the project without feeling overwhelmed. This reinforced the importance of clarify and simplicity, especially when communicating technical or complex information.

The lecturer also highlighted that I communicated all relevant information required for the task. Another strong point of feedback related to my explanation of the stakeholder groups. I used the Quad chart – Consult, Negotiate, Inform and Enable – to classify the Government of British Columbia, Transport Canada, local municipalities, indigenous communities, and residents. I explained the reasoning behind each placement. The lecturer commented that this explanation showed a clear understanding of stakeholder engagement. I also felt this way my strongest part because I used simple language and examples so the class could understand why each stakeholder belonged in each category.

The lecture also said that my poster design was good but mentioned there were a few minor design flaws, but not much. I understood this as a reminder to pay closer attention to layout, spacing, or alignment when designing posters. Although the overall feedback was positive, this feedback helped me realised that small design details can make presentation look even more professional.

In conclusion, this presentation experience enhanced my confidence and helped me recognise the value of structured content, consistent design, and thoughtful stakeholder explanation. I believe the presentation was successful, because in the final the lecture said, “The presentation was nice”. The feedback helped me understand what I did well – such as explaining stakeholders and what small areas I need to work on, like design details. The feedback I received will help me improve future presentations to continue improving my skills.

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Project Management Plan

Reopening of Highway 5 (Coquihalla Highway) Post-Flood Reconstruction

1. Summary

The November 2022 flooding in British Columbia caused widespread destruction to Highway 5, a major transportation corridor. The reconstruction project aims to restore mobility, strengthen climate resilience, and ensure long-term functionality. This report presents a Project Management Plan detailing the project description, scope, work breakdown structure, stakeholder involvement, resource allocation, quad chart, Gantt chart, and risk analysis. The plan demonstrates the application of recognised project management principles to achieve controlled, efficient, and sustainable delivery. The project is funded at CAD \$450 million and adopts structured approach that aligns with PMBOK and PRINCE2 guidelines. Risk, sustainability, stakeholder engagement, and environmental compliance are addressed throughout the plan.

2. Introduction

Infrastructure is a critical enabler of economic stability, social mobility, and regional connectivity. When transportation systems are disrupted by natural hazards such as flooding, the consequences extend far beyond local inconvenience; they interrupt supply chains, damage communities, and weaken economic resilience. In November 2022, British Columbia experienced catastrophic flooding that caused widespread destruction, including major damage to Highway 5, also known as the Coquihalla Highway. As one of the province's most important transportation corridors, the Coquihalla connects the Lower Mainland with the Interior and northern regions, enabling the movement of goods, emergency services, and people.

A Project Management Plan supports consistent decision-making, cost control, and risk reduction during reconstruction. This report provides a comprehensive plan that guides project execution and demonstrates the application of recognised approaches such as PMBOK knowledge areas, stakeholder analysis, and risk management frameworks. The plan prioritises public safety, climate resilience, and sustainability.

3. Project Description

The proposed project focuses on the construction and reopening of Highway 5 following the 2022 flooding disaster. The project addresses the collapse of bridges, roadway washouts, unstable slopes, and inadequate drainage systems exposed by the atmospheric river event. The objective extends beyond simple repair and incorporates climate-resilient design standards to reduce vulnerability to future extreme weather events.

The project involves reconstructing damage highway sections, rebuilding bridges, stabilising slopes prone to landslides, and upgrading drainage infrastructure. Environmental assessments guide construction activities to minimise ecological damage and ensure compliance with provincial and federal regulations. The project also includes continuous monitoring and stakeholder communication to maintain transparency and public trust.

The estimated project budget is CAD \$450 million, funded by the Government of British Columbia with federal support through infrastructure Canada. The expected duration of the project is 18 to 24 months, depending on seasonal weather conditions and environmental approval timelines.

4. Project Scope

In-Scope

The scope includes all activities required to restore safe and resilient highway operation:

- Reconstruction of damage highway sections
- Rebuilding or reinforcing damage bridges
- Geotechnical stabilisation of slopes
- Drainage upgrades including culverts and water-management systems
- Environmental assessments and monitoring
- Procurement of materials and labour
- Project communication and reporting
- Risk monitoring and mitigation
- Final inspection and handover

Out-of-Scope

Out-of-Scope elements include:

- Construction of new highway routes outside the existing corridor
- Long-term maintenance after project completion
- Broader regional flood-mitigation initiatives
- Utility infrastructure not directly linked to roadway reconstruction

Constraints

- Limited construction windows due to weather
- Environmental regulation requirements
- Access restrictions in damage areas
- Supply chain shortages of construction materials

Assumptions

- Funding allocations remain consistent
- Required regulatory approvals are granted in expected timeframes
- Local suppliers maintain material availability
- Weather remains within seasonal averages

5. Work Breakdown Structure

The Work Breakdown Structure in Figure 1 divides project tasks into manageable work packages to support scheduling and cost control.

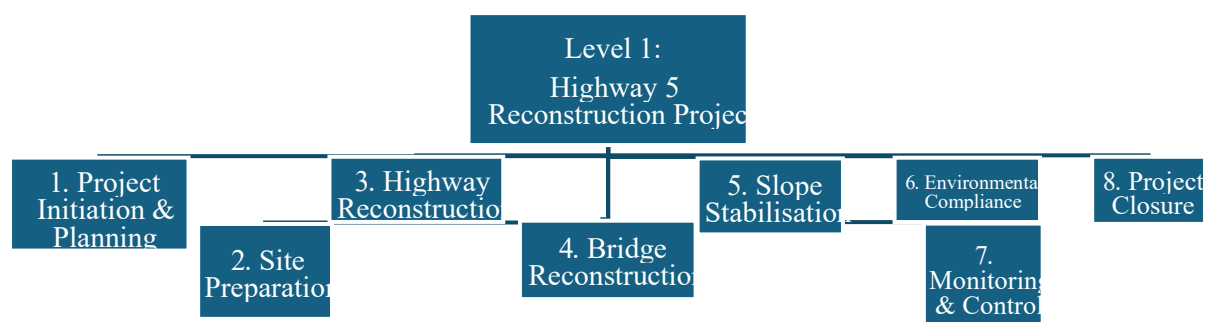


Figure 1

Level 1: Highway 5 Reconstruction Project

1. Project Initiation and Planning

- 1.1 Define scope
- 1.2 Develop project schedule
- 1.3 Conduct feasibility and environmental assessments

2. Site Preparation

- 2.1 Debris clearance
- 2.2 Access stabilisation
- 2.3 Temporary structures

3. Highway Reconstruction

- 3.1 Roadbed restoration
- 3.2 Pavement works
- 3.3 Culverts and drainage systems

4. Bridge Reconstruction

- 4.1 Demolition
- 4.2 Foundation reinforcement
- 4.3 Structural construction

5. Slope Stabilisation

- 5.1 Geotechnical analysis
- 5.2 Soil reinforcement
- 5.3 Retaining structures

6. Environmental Compliance

- 6.1 Monitoring
- 6.2 Sediment control
- 6.3 Post-construction assessment

7. Project Monitoring and Control

- 7.1 Progress reporting

7.2 Quality checks

7.3 Risk reviews

8. Project Closure

8.1 Final Inspection

8.2 Documentation

8.3 Handover

6. Quad Chart

Figure 2 summarises core project attributes in a concise format consistent with engineering project-planning practices.

Figure 2. Quad Chart

Project Overview Reconstruction of Highway 5 following 2022 floods; includes road, bridges, slopes, and drainage.	Objectives Restore safe transport; enhance climate resilience; support economic continuity ensure compliance.
Key Risks Weather, landslides, material shortages, environmental delays.	Cost & Timeline CAD \$450 Million; approximately 18-24 months.

Figure 2

7. Gantt Chart

Figure 3 presents a simplified Gantt chart covering a projected 18-month duration. The chart supports schedule control and milestone tracking.

Figure 3. Gantt Chart (18-Month Project Timeline)

Activity	Months 1-3	4-6	7-9	10-12	13-15	16-18
Project Initiation						
Environmental Assessments						
Site Preparation						
Highway Reconstruction						
Bridge Reconstruction						
Slope Stabilisation						
Drainage Improvements						
Environmental Monitoring						
Final Inspection & Handover						

The Gantt chart illustrated in Figure 3 presents the planned schedule for the Highway 5 reconstruction project across an 18-month timeline. The chart provides a visual representation of key project activities, their durations, and the sequence in which they are executed. This scheduling tool supports effective time management by allowing stakeholders to understand how activities overlap and how resources are coordinated throughout the project lifecycle.

The project begins with project initiation, which occurs during the first three months and establishes governance structures, confirms scope, and finalises planning arrangements. Environmental assessments commence concurrently and continue into the second quarter, ensuring that construction activities comply with regulatory requirements and environmental protection standards. Early completion of these assessments reduces the risk of delays during later construction phases.

Site preparation activities are scheduled during months four to six and include debris clearance, stabilisation of access routes, and installation of temporary structures. These activities provide the foundation for subsequent construction works and enable safe access to affected areas.

Highway reconstruction works are programmed between months four and twelve, reflecting the scale and complexity of roadbed restoration, pavement works, and drainage installation.

The phased approach allows construction activities to proceed in parallel with other work streams, improving efficiency and minimising downtime.

Bridge reconstruction activities extend from months four to fifteen due to the technical complexity involved in demolition, foundation reinforcement, and structural construction. This extended duration reflects the need for specialised engineering processes and strict safety controls. Overlapping bridge works with highway reconstruction optimises resource utilisation and shortens the overall project duration.

Slope stabilisation occurs alongside major construction works between months four and twelve. Scheduling these activities concurrently reduces the likelihood of landslides affecting newly constructed road sections and supports overall project safety.

Drainage improvements are scheduled between months four and nine, ensuring that water management systems are operational before peak rainfall periods. This sequencing supports long-term flood mitigation and protects newly reconstructed infrastructure.

Environmental monitoring is conducted throughout the entire project duration, from initiation to completion. Continuous monitoring ensures compliance with environmental regulations and enables timely corrective actions if adverse impacts are detected.

The project concludes with final inspection and handover activities during months thirteen to eighteen. These activities include quality assurance inspections, documentation completion, and formal transfer of responsibility to the relevant transportation authorities. Completion of these tasks ensures that Highway 5 is reopened safely and meets all regulatory and performance requirements.

Overall, the Gantt chart functions as a critical project control tool, enabling progress tracking, coordination of activities, and communication with stakeholders. By clearly illustrating timelines and dependencies, the schedule supports timely delivery and effective management of project risks.

8. Stakeholder Involvement

Stakeholders are identified and managed using a Power-Interest Matrix, as shown in Figure 4.

The matrix categorises stakeholders based on their level of influence over the project and their level of interest in its outcomes. Proper engagement ensures cooperation, regulatory compliance, and community acceptance.

Figure 4. Stakeholder Table



Figure 4

High Power – High Interest (Manage Closely)

- Government of British Columbia
- Transport Canada

These stakeholders provide funding, regulatory oversight, and strategic decisions.

High Power – Low Interest (Keep Satisfied)

- Indigenous communities

They hold influence over land and environmental decisions and must be consulted respectfully.

Low Power – High Interest (Keep Informed)

- Local businesses
- Municipal councils

They rely on highway access for economic activity and require regular updates.

Low Power – Low Interest (Monitor)

- Residents

They require general information about traffic, closures, and safety.

Stakeholder Engagement Methods

- Regular briefings with government agencies
- Consultation meetings with indigenous leadership
- Public communication via digital platforms
- Environmental reporting to regulatory bodies

Stakeholders' communication aligns with PMBOK communication-management principles to support transparency and collaboration.

9. Allocation of resources

Human Resources

The project employs civil engineers, geotechnical specialists, environmental scientists, construction supervisors, skilled labourers, safety officers, and administrative staff. Resource planning supports efficient sequencing and task allocation.

Material Resources

Key materials include:

- Concrete
- Steel bridge components
- Asphalt
- Drainage systems
- Slope reinforcement materials
- Heavy machinery (excavators, cranes, trucks)

Financial Resources

The CAD \$450 million budget covers:

- Construction
- Labour
- Environmental compliance
- Equipment
- Contingencies

Time Resources

Time allocation follows the Gantt chart schedule to minimise disruption and maintain productivity during favourable weather periods.

10. Risk Analysis

Risk management is a critical component of infrastructure reconstruction projects, particularly those undertaken in environmental affected by extreme weather events. The Highway 5 reconstruction project faces a range of strategic, operational, environmental, and financial risks that may impact cost, schedule, quality, and safety. A structured risk management approach is applied in accordance with PMBOK risk management principles, including risk identification, assessment, mitigation, monitoring, and control.

Risks are assessed based on their likelihood and impact, allowing the project team to prioritise responses and allocate contingency resources effectively.

Landslide Recurrence Risk

The mountainous terrain surrounding Highway 5 presents a high risk of landslide recurrence, particularly during periods of heavy rainfall. Landslides may cause damage to reconstructed road sections, delay construction activities, and pose significant safety hazards to workers and road users.

Likelihood: High

Impact: Severe

Mitigation Measures:

- Detailed geotechnical surveys conducted prior to construction
- Installation of slope stabilisation systems such as retaining walls and soil reinforcement
- Continuous slope monitoring using sensors and visual inspections
- Avoidance of high-risk construction activities during adverse weather conditions

Extreme Weather and Climate Risk

Climate variability remains one of the most significant risks affecting the project. Heavy rainfall, snowstorms, and freezing temperatures may restrict site access, slow construction progress, and increase costs.

Likelihood: High

Impact: High

Mitigation Measures:

- Flexible project scheduling to accommodate seasonal weather patterns
- Inclusion of weather-related contingency allowances within the project timeline
- Use of climate-resilient materials and construction techniques
- Development of emergency response procedures for severe weather events

Environmental Compliance Risk

Highway reconstruction activities may affect surrounding ecosystems, waterways, and wildlife habitats. Failure to comply with environmental regulations may result in legal penalties, project delays, and reputational damage.

Likelihood: Medium

Impact: High

Mitigation Measures:

- Early environmental impact assessments and regulatory approvals

Implementation of sediment control and erosion prevention measures

- Ongoing environmental monitoring throughout the construction phase
- Engagement with environmental agencies and indigenous communities

Material Supply and Logistics Risk

Supply chain disruptions may lead to shortages of critical materials such as steel, concrete, and asphalt. Delays in material delivery may affect project sequencing and increase costs.

Likelihood: Medium

Impact: Medium

Mitigation Measures:

- Prioritisation of local suppliers to reduce transportation delays
- Advance procurement and bulk ordering of essential materials
- Identification of alternative suppliers
- Continuous monitoring of inventory levels

Financial and Cost Overrun Risk

Large-scale infrastructure projects are susceptible to budget overruns due to unforeseen site conditions, design changes, and inflationary pressures.

Likelihood: Medium

Impact: High

Mitigation Measures:

- Establishment of a contingency budget
- Regular financial audits and cost tracking
- Strict change-control procedures
- Transparent reporting to funding authorities

Health and Safety Risk

Construction activities in unstable terrain expose workers to significant health and safety hazards, including equipment accidents, falls, and exposure to extreme conditions.

Likelihood: Medium

Impact: Severe

Mitigation Measures:

- Implementation of comprehensive health and safety management plans
- Mandatory safety training and induction programmes
- Regular site inspections and risk assessments
- Enforcement of personal protective equipment (PPE) requirements

Stakeholder and Community Risk

Insufficient communication with stakeholders may result in opposition, misinformation, or reduced public trust. Delays in consultation, particularly with indigenous communities, may affect project approvals.

Likelihood: Low

Impact: Medium

Mitigation Measures:

- Regular stakeholder briefings and consultations

- Transparent communication strategies
- Clear grievance and feedback mechanisms
- Inclusion of stakeholder representatives in decision-making processes

Risk Monitoring and Control

Risk monitoring is conducted throughout the project lifecycle. A live risk register is maintained and reviewed during progress meetings. Emerging risks are assessed promptly, and mitigation strategies are updated to reflect changing conditions. This proactive approach supports timely decision-making and minimises disruptions.

Risk Summary

The Highway 5 reconstruction project faces complex and interconnected risks typical of post disaster infrastructure recovery. Through early identification, structured mitigation strategies, and continuous monitoring, the project reduces uncertainty and enhances resilience. Effective risk management contributes directly to improved safety, cost control, schedule reliability, and long-term project success.

11. Conclusion

The reconstruction and reopening of Highway 5 represent a critical infrastructure recovery initiative following the severe flooding experienced in British Columbia in 2022. The atmospheric river event exposed the vulnerability of key transportation corridors and highlighted the need for structured, resilient, and well-governed project delivery approaches. This Project Management Plan provides a comprehensive framework for addressing the complex technical, environmental, and stakeholder challenges associated with post-disaster infrastructure reconstruction.

The plan applies recognised project management methodologies to define project objectives, scope, and deliverables clearly. The use of tools such as the Work Breakdown Structure, Gantt chart, and quad chart supports effective planning, scheduling, and control throughout the project lifecycle. These tools enable the coordination of multiple activities, facilitate efficient allocation of resources, and provide transparency to stakeholders regarding progress and performance.

Stakeholder engagement is treated as a central component of project success. The structured identification and management of stakeholders using a Power-Interest Matrix ensures that regulatory authorities, Indigenous communities, local businesses, and affected residents are engaged appropriately. This approach supports regulatory compliance, promotes social acceptance, and reduces the risk of conflict or delays arising from inadequate consultation.

Risk management plays a vital role in enhancing project resilience. The identification, assessment, and mitigation of risks related to weather, landslides, environmental compliance, supply chains, health and safety, and financial control reduce uncertainty and support informed decision-making. Continuous risk monitoring and adaptive management ensure that emerging threats are addressed promptly, safeguarding project objectives.

Overall, the Highway 5 reconstruction project demonstrates how disciplined project management practices contribute to effective disaster recovery. By integrating technical excellence, stakeholder collaboration, sustainability considerations, and risk-based decision-making, the project supports the restoration of essential connectivity, economic stability, and public safety. The successful delivery of this project strengthens infrastructure resilience and provides a model for future post-disaster recovery initiatives in Canada.

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