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Reconnecting British Columbia: Highway 5 Reconstruction – Post-Flood Infrastructure Recovery Project

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In November 2022, British Columbia suffered catastrophic flooding caused by an atmospheric river that destroyed vital infrastructure, including multiple bridges and sections of Highway 5 (the Coquihalla). This route is the province's main transportation link between the Lower Mainland and the Interior. The flooding stopped trade, stranded communities, and disrupted supply chains across Canada. This project aims to reconstruct and reopen Highway 5 using modern, climate-resilient infrastructure to restore economic stability and strengthen community connections.

Quad Chart Summary

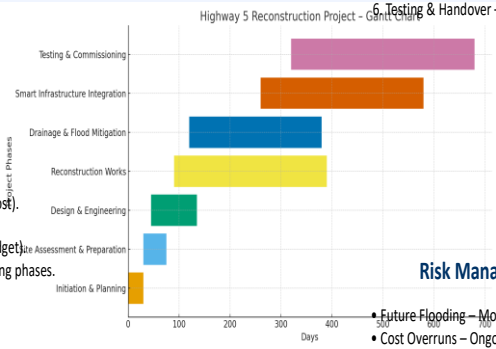
- Purpose: Rebuild and reopen Highway 5 to reconnect British Columbia's economic and social lifeline.
- Stakeholders: Government of BC, Ministry of Transportation, local communities, farmers and companies.
- Desired Results: Safe, climate-resilient operations within 18 months.
- Measurements: Milestones met on schedule, ≤5% budget variance, environmental and safety compliance achieved.

Work Breakdown Structure (WBS)

1. Initiation & Planning – Define objectives, approvals, stakeholder consultations.
2. Assessment & Site Prep – Damage surveys, debris clearance.
3. Reconstruction – Bridge rebuilding, road paving, structural reinforcement.
4. Drainage & Flood Control – Install modern drainage and slope stabilisation systems.
5. Smart Infrastructure – Deploy IoT sensors and real-time monitoring systems.
6. Testing & Handover – Safety inspections, certification, and official reopening.

Resource Allocation

- Human Resources: 450 engineers, planners, and field workers.
- Materials: Steel, asphalt, concrete, drainage systems (35% of total cost).
- Financial: CAD \$650 million (federal investment).
- Equipment: Excavators, cranes, monitoring sensors (20% of total budget).
- Timeframe: 18 months, including planning, reconstruction, and testing phases.



Risk Management & Prevention

- Future Flooding – Modern design and more secure drainage.
- Cost Overruns – Ongoing cost tracking and relative funding.
- Supply Shortages – Early use of local suppliers.
- Environmental Impact – Compliance with BC Environmental Assessment standards.

Expected Results

- Bettering the transportation between Lower Mainland and Interior BC.
- Restored trade and mobility across Western Canada.
- Creation of 2,000+ jobs and local economic stimulation.
- Increased flood resilience and improved emergency responses.



Activity	Start	End	Duration (Months)
Initiation & Planning	Jan 2023	Mar 2023	3
Site Assessment & Preparation	Apr 2023	Jun 2023	3
Design & Engineering	May 2023	Sep 2023	5
Reconstruction Works	Jul 2023	Mar 2024	9
Drainage & Smart Systems	Oct 2023	Apr 2024	7
Testing & Handover	May 2024	Jul 2024	3



“Rebuilding Bridges. Restoring Lives. Reconnecting British Columbia.”

Feedback from poster

During my first run of producing my business proposal poster, it was clear that I had either missed out a couple of key things or had not gone into more detail in certain areas of my poster. Initially some of the things I had included in my poster were quite good such as in my chart summaries my peers had said that I had effectively included all the relevant stakeholders that were directly involved in this business project. Additionally, the moderator had said I had included effective expected results, results that looked realistic for the future after the completion of this business project such as the increase in almost 2,000+ jobs seemed to be an accurate representation. Another one of the things that was a positive in my poster was stated to be the inclusion of the risks and how to minimise the potential risks within the project. By describing some of the potential risks in the future such as 'future flooding' whilst also giving potential reasons and solution to stop these risks from occurring, my peers all collectively agreed that this was a positive inclusion within my business proposal poster.

First, the introduction to my poster for the business proposal was deemed to be too brief by the moderator. This is because the message to the reopening of highway was not clearly displayed in this introduction therefore it left the reader quite confused. What I had done was provide more specific information about what the floods did to the communities in Columbia, like hurting the supply chains across different countries or trades to other countries. The second part of feedback I received was providing specifics for resource allocations for the job. This was to ensure that the right number of resources are being provided, and it can be tracked. I was also advised to include this information as it highlights the importance and urgency of this project. My peers also recommended me to add this information as it helps my business project poster have that more professional presentation and feel to it which was also one thing I needed to improve on. I also was recommended by both moderator and my peers to include a work breakdown structure. This was to provide the step by step briefly on how to carry out the project. This was advised to me as my project poster beforehand didn't demonstrate the necessary steps needed for this poster proposal to be successful. Finally, my last point of improvement was my presentation of my project. Initially my layout was deemed to be quite basic and not keen on the eye, and my peers and moderator had deemed it to be quite unengaging to them as they struggled to pay attention. Therefore, I was required to change the layout to something that was quite intriguing and snappy which would hopefully keep people engaged whilst listening.

Task C (Project plan)

Introduction

During 2022, there was a very serious natural disaster occurring in British Columbia. What happened was there was an extremely powerful river which at the time had been producing extreme rainfall, this caused flooding around the area of British Columbia. The flooding had damaged a wide range of landslides whilst also causing damage to the structure of buildings and in this case also highways.

This flooding caused damages to the structure of Highway 5 which is a very important factor in connecting Canada from the mainland's. This caused losses in the economy and had realised that British Columbia had extreme vulnerability in relation to climate related hazards.

Being the project manager who has been assigned to the construction of Highway 5, my responsibility is to ensure that the highway is built correctly whilst also maintaining its long-term sustainability for the future. This project plan will give a structured approach to make these goals happen. There will be quite a few principles being used such as frameworks relating to PRINCE2 which relates to co-ordination across the stakeholders involved.

The reasoning for this project plan is simple; it is to reconnect British Columbia by rebuilding the highways which will allow communities and trading across other countries to be possible whilst also making sure that the rebuilds are able to withstand any future disasters. whilst also being more secure to the changing climates.

Project description

The highway 5 is a key factor for many vehicles or trucks who transport imports between different areas. 2022 floods had caused this to stop which ended up causing a disruption to supply of some imports, or food shortages in some areas. These floods caused a large decrease in the economy during this time.

The key to this project succeeding is trying to help build back the community that was destroyed. By modernising the highways, it helps cars transport more conveniently. It is important to rebuild the highways so it can be resilient to the climate, preventing future disasters.

This project will reconstruct the structure of highway 5 to help withstand any of the future disasters that can adapt to the changing climate. Some of the specific reworks would be:

- We must rebuild the broken bridges or any of the roads and improve the drainage systems that are up to modern day standards.
 - To reduce the chances of future floods damages by improving the toughness of materials used
 - We have an 18-month deadline
 - We will have local employment from those communities directly affected by this
 - We will be required to design the structure to be able support long-term
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- 1) There will need to be a minimum of 60km of highway reconstructed
 - 2) Rebuilding of five bridges that meet standards which can withstand future floods
 - 3) Better drainage systems
 - 4) Requirement to have and environmentally friendly certification as well as opening of highway 5

Because of the damages to highway 5, this means the vehicles that are transporting imports must divert their route. This causes heavy traffic jams which raises the costs for different industries. This project restores all these things whilst trying to bring the economy back to stability.

Projects scope

It is very important to be aware of the project's stakeholders and include what is necessary for the project responsibilities.

- We must analyse the site and clear any remaining debris
- The bridge must be reconstructed as well as the road
- Better drainage systems and slopes
- Climate resilience features
- Testing for safety

By managing the damages and site, we can know where the heavy damages are. Therefore we have a clear view of what aspects require much more restructuring and resilience. Additionally, to remove the debris as well.

A total of at least 5 bridges is required to be reconstructed. It is important to use sturdy concrete alongside better sub materials whilst also ensuring that the materials remain water resistant. This is to prepare for future floods.

Moving on, the drainage systems will also get a rework by modernising the designs. It is extremely vital that the drainage systems can withstand long-term erosion and rust.

Afterwards there will be testing the highways to ensure that they are meeting the standards of protection. Due to the reconstruction undergoing. The affected habitats by the floods must comply with the Environmental protection assessment acts.

The final thing that is important is to constantly test the restructuring. It is very necessary to do thorough tests before reopening the highways for the public to operate. This step is very important as it ensures that the highway is safe enough for people to operate on daily.

There will be updated designs for all aspects of the highway. Such as bridges, pavements and including the drainage systems. It must comply with the Canadian regulations and rules. The physical rebuilding of the highway and bridges must try to use some of the local materials that can be found if possible.

Moreover, the erosion management will need to be regularly tested to make sure that the drainage systems are not vulnerable to future climate changes. This will cause the environment to also get back to its regular state. Often testing for materials will be done as well as safety training for the workers. It must comply with the health and safety standards.

This project scope needs to be structured whilst also managing the costs that are outgoing. The justification for restructuring the highways was that the highway was very important because of its economic importance. It was a key factor for imports and exports in different areas. Any delays in this project will cause major delays for important supplies and timings for deliveries of these supplies.

Work breakdown structures

The first phase of the project will have many different aspects:

Firstly, developing the project which includes the objective, risks and resource requirements. This phase also includes stakeholder engagement with the local communities and associates. Additionally include a cost management analysis. Lastly what is needed is the approval of this project management plan.

Secondly, many assessments for the site will happen to help awareness of areas that need to be worked on. Remove any debris or any of the bridge materials that have been destroyed. Must lock off the traffic routes temporarily and construction access to roads. Lastly there must be site safety barriers and containment so that nothing will end up leaking causing more damage.

Thirdly, it is vital to develop designs that are flexible to the changing climates whilst replacing the damages and ensuring that it remains secure for the future. Designs for the bridges must fall under the Canadian highway regulations, same with the walls. Must add models that allow bridges and roads that can withstand many future floods if they happen. Compliance with the regulators which allows us to approve our designs and construction.

Fourthly, the movement of the construction equipment and the manual labour workers consisting of about 450. The reconstruction of the five major bridges will use the reinforced concrete and corrosion resistant steel. Road construction will cover 60km and required to have layouts. The slope rework will retain the walls and will meet the safety inspections and quality tests at each period.

Fifthly, the poor drainage had contributed to the disaster, and this is to prevent that for the future. Installing things that will have a purpose to prevent extreme rainfall in large amounts. Slope

rebuilding using materials to prevent the erosion. The newer drainage systems will try to use modern day technology which allows for the management of water being absorbed.

To justify the uses of the working breakdown structure, it gives us a clear view of all the tasks required with detailed descriptions on how to accomplish. This visual structure also allows us to have some cost estimates whilst also being able to schedule our resources. Moreover, it allows teams and other staff to work more clearly without confusion. Finally, it is very useful for future risk assessments to track threats and eliminate these threats.

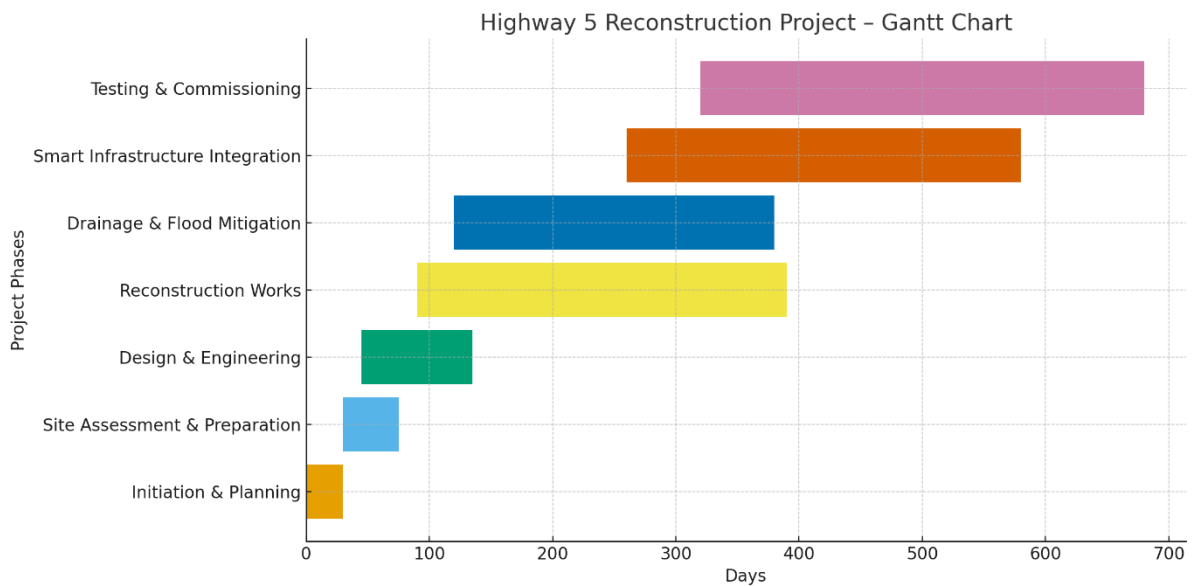
Quad chart

The main purpose for this project would be to restore the highway back to its original reliable conditions. The reason it is so important to restore this highway, is because the floods caused economic decrease also caused delays in supplies being imported. Moving on past the actual construction it also needs to factor in the economic flows and give confidence towards the public with the structure systems.

Stakeholders such as the government are involved. Because there must be hazard monitoring and emergency responses in case of any future disasters. The reconstruction must also comply with the Canada regulations and environmental assessments. These government stakeholders are very important as they act as co-funders for the project. We must also factor in the local communities who were affected by the roads and disruptions. Lastly any delivery trucking or any other vehicles which rely on Highway 5.

The projects main goal is to restore the highway within 18 months of schedule whilst making improvements to ensure it's flood resistant for the future. The bridges and roads must be rebuilt with the climate resilient schedules. Lastly, we must modernise the structures of the bridges and pavements and by doing this modern technology must be implemented. Giving a much more secure approach.

Gantt chart



Stakeholder involvements

Having effective stakeholder involvement is very vital towards the delivery of Highway 5 reconstruction. It is important as it's project that holds a lot of public importance therefore it is vital to attend to those affected by British floods. These projects typically require active communication and collaboration which will contribute to the success of this project. Lastly, stakeholder involvement is not only government based but it allows for the project's public acceptance and long-term sustainability.

The regulation stakeholders involved will link with the government stakeholders such as the ministry of transportation and structure. This stakeholder is the project owners, funders and will see over the whole project operations. There will also be emergency teams that are included to be more prepared for any future concerns.

The transportation for Canada and Structures for Canada is also involved. This is because the highway 5 relates to the route of Canada and plays an important role in the imports of supplies to Canada. The involvement will allow this project to comply with the national reconstruction standards. Additionally, there will be environmental assessors who will monitor and prevent any of our processes if they are not classed as eco-friendly.

There are a lot of local communities who are affected by this reconstruction project. First local businesses are affected as they would be dependent on highway 5's route to receiving and

distributing the supplies. Furthermore, some of the producers would be also negatively impacted by some of the flood damage, Moreover, services such as fire, police and ambulance services will also be relevant in this project as they are there to provide safety.

Highway 5's reconstruction passes through some of the local communities meaning that engagement from local communities is very important. First, there must be some consultation with those who are responsible for the rights of those who operate in the local communities. This will act as the opportunity to include those who are the locals by offering opportunities to help with the project. To conclude, there must be clear communication regarding how the project will be done to ensure there is no confusion across the people who are involved.

Stakeholders have direct roles in the designs as they were done after the feedback from local communities and it was highlighted that it was needed to be more designed to comply with the environmental standards. Construction schedules were based off the community and their concerns for noise and congestion. There will be restrictions on imports and exports on supplies given by the truckers. Local emergency services are contributing heavily to the safety of planning and any emergency routes that are required. Concerns, risks and any recommendations will be communicated to ensure satisfaction of all the stakeholders whilst also tracking these to make It clear.

However, there will be conflict management required because there will be conflicts that occur. This is because there are so many varieties of stakeholders meaning it can be very difficult to meet all demands without causing conflicts with others. To counter these arguments, we must be completely transparent about the decisions being made. It also necessary for the stakeholders to express their opinions about the decisions whilst also making recommendations or questioning the risks. This can help form better business decisions to prevent these future risks ever being noticeable. It is also extremely important that these decisions are not favouring any stakeholders more therefore eliminating any forms of favouritism or bias. Evidence must also be provided to justify any decisions being made.

Resource allocation

Resource Type	Key Resources	Why They Are Needed	How They Will Be Used
People	Project manager, engineers (civil, structural, geotechnical), construction workers, environmental staff, Indigenous liaison officers	To plan the project, design the repairs, rebuild the damaged areas, protect the environment, and communicate with local communities	Assigned to tasks based on their skills and the Work Breakdown Structure (WBS)

Resource Type	Key Resources	Why They Are Needed	How They Will Be Used
Construction Equipment	Excavators, bulldozers, graders, dump trucks, cranes, compactors, paving machines	To remove debris, rebuild roads and bridges, stabilise slopes, and resurface the highway	Brought in from approved contractors; used at each stage of construction
Materials	Concrete, steel, asphalt, gravel, geotextiles, riprap rock	Needed to rebuild bridges, strengthen slopes, repair road surfaces, and protect the corridor from future floods	Ordered through government-approved suppliers and delivered according to the project schedule
Environmental & Safety Gear	Erosion-control barriers, spill kits, wildlife protection fencing, water-testing tools	To make sure the project meets BC environmental laws and keeps workers and wildlife safe	Used on-site during construction, especially near rivers and sensitive areas
Technology & Monitoring Tools	Drones, surveying equipment, flood and landslide sensors, weather monitoring systems	To inspect the damage, track progress, and detect any early signs of danger (like slope movement or rising water levels)	Set up along the damaged corridor and checked regularly
Financial Resources	BC government funding, federal disaster assistance, project contingency budget	To pay for labour, materials, equipment, environmental work, and unexpected costs	Managed through a budget plan, spending reports, and regular financial reviews
Logistics & Site Support	Temporary access roads, traffic control teams, worker facilities, transport vehicles, fuel supplies	To keep the project running smoothly and make sure work crews and equipment can reach the damaged areas	Coordinated by site supervisors and updated as the project moves forward

Risk analysis

The risks that would be most common with a project like this are usually risks doing with the environment such as heavy landslides. Floods can also be more common due to older drainage systems as well as heavy erosion from older structured materials. There will also be many unpredictable situations which will further amount to work stoppages. Other risks consist of the weather which can be unpredictable and lead to work stoppages or increase the chances of the previous risks happening. Lastly it is also necessary to factor in the costs of these risks directly towards the project or indirectly.

Finally, to ensure the operations are being done safely, we must have weekly site safety meetings always going over what can be safer or risks that are beginning to emerge. It is also important to report these risks and incidents because it can allow for much quicker responses to them preventing the risks from becoming to major which can cause harm to labour or the project. Must track the slopes and drainage systems water levels.

Conclusion

By having clear objectives, we were able to break the work down into multiple stages which allowed us to give resources properly. Gives us a foundation which leads to the involvement of all types of stakeholders which ensures reconstruction is done safely and efficiently. It will also give the highway a long-term resilience to future hazards and not just rebuilding the same highway with no improvements.

Risk management will also factor in the unpredictable climates as well as help us deal with the problems that rise quite quickly which can prevent them becoming too major. The risks are managed from constant monitoring.

Lastly, the highway is much more than just repairs, it is meant to support the economy whilst it is in recovery and ensure that it can withstand the increasing weather conditions. This project has been done with collaboration and commitment to produce the long-term results for the public who depend on these routes.

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