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Table of Contents

Part A: Poster	3
Part B: Feedback	4
Part C: Project management plan	5
Introduction:.....	5
Project description:.....	5
Scope:	6
Work breakdown structure (WBS):.....	7
Quad Chart:.....	8
Gantt Chart:.....	9
Stakeholders' involvement: Stakeholder Matrix	10
Allocation of resources:.....	11
Risk Analysis:	12
Conclusion:.....	13
References:	14

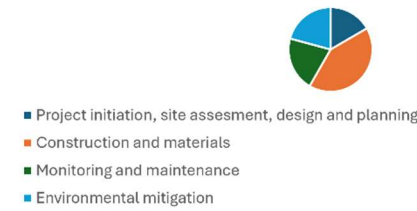
Part A: Poster

In November 2022, British Columbia experienced a catastrophic flooding event associated with an atmospheric river, which caused major flooding and extensive damage to key transport routes, including the Coquihalla Highway and other bridges critical to linking the southern communities of the province to the central and northern communities of British Columbia (Carey, 2023) . The corridor needs to be rebuilt, as it is a major commercial lifeline across Canada for regular commuters and business purposes. To ensure the infrastructure is resilient, the project will employ innovations such as green engineering materials designed to withstand similar future events, as well as generate a lower carbon footprint (Xu et al., 2024).

Risk assessment matrix			
Risk	Possibility	Impact	Modification strategy
Weather delays	High	High	Flexible time and flexible planning
Overspendings	Medium	High	Regular financial audits
Supply chain disruption	Medium	Medium	Local supplier contracts
Environmental damage	Low	High	Environmental monitoring plan
Lack of workforce	Medium	Medium	Workforce training and motivations

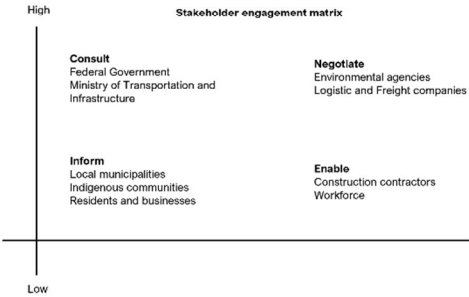
Work breakdown structure WBS	
Task	Deliverables/Results
Project initiation	Feasibility study and funding approval
Site assessment	Damage evaluation and environmental impact report
Design and planning	Engineering designs, permits and obtaining plan
Construction	Bridge rebuilding, road resurfacing and drainage systems
Quality and risk management	Safety audits and progress reports
Project closure	Final inspection and stakeholder handover

Estimated cost breakdown 240 million CAD



Quad Chart	
Purpose • Restore transportation access within 18 months • Design sustainable drainage and flood resistance • Minimise disruption for access to local communities and ecosystems through constructions (Transport Canada,2025) • Green building materials are to be employed while constructing the highway • Maintain regulatory compliance of green material with national standards for both safety and environment	Customers • Ministry of Transportation and Infrastructure • Local municipalities • Indigenous communities • Logistic and Freight companies • Environmental agencies • Residents and businesses • Construction contractors and Workforce • Federal Government
Desired and results • Completed bridge repairs • Alignment with sustainability metrics	Measures of success • Bridge completion stress test • Alignment with building specifications from industry experts • Third party review and approval

Highway development plan	Month 1-3	Month 4-6	Month 7-9	Month 10-12	Month 13-14	Month 15-16	Month 17-18
Gantt chart							
Project initiation							
Site assessment							
Design and planning							
Construction							
Quality Management							
Risk Management							
Project closure							



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Xu, M., Li, G. and Chen, A. (2024). Resilience-driven post-disaster restoration of interdependent infrastructure systems under different decision-making environments. *Reliability Engineering & System Safety*, [online] 241. doi:<https://doi.org/10.1016/j.ress.2023.109599>.

High

Part B: Feedback

I have prepared a poster presentation for a project plan about reconstruction of Coquihalla highway during the flooding and destruction from November 2022. I focused on resilient needs for reconstruction, using green engineering materials and sustainable design. The lecturer said that it was a good presentation demonstrating an understanding of the course but noted two omissions: a stakeholder engagement matrix and cost planning, which I cited myself after the presentation because I noticed that my colleague has them.

During the presentation, I felt confident about the technical content and the choice of references. Using in-text citation references, the lecturer noticed them and gave me congratulations. I was proud to connect academic theory with a real-world case. However, I was a little bit stressed because I used a small font size to try to put more information on the poster, but the lecturer encouraged me that is normal.

The poster clearly communicated the problem, justified why the Coquihalla corridor required resilient rebuilding and supported claims by credible sources. Omitting the stakeholder engagement matrix meant I did not demonstrate planning for social and political dynamics. Also, leaving out the cost planning breakdown meant the poster lacked a budgetary perspective that links technical choice to feasibility.

The strengths reflected a good understanding of engineering theory and the ability to synthesize literature. The weaknesses reveal a gap in applying the broader course framework (stakeholder engagement matrix and cost planning breakdown) to technical work. By not showing how to split the budget and how to engage stakeholders, the poster missed an opportunity to show complete project thinking.

I learned that demonstrating technical understanding is necessary but not sufficient. For an assessment focused on a real-world infrastructure project, evidence of stakeholder engagement strategy and clear budget allocation is essential. Including those elements would have made my presentation more credible and aligned with professional practice.

My action plan for the short term was to update the poster with stakeholders' engagement matrix and budget allocations (pie chart) and, for the long term, to create a checklist with required course elements for the poster project to avoid similar omissions.

Part C: Project management plan

Introduction:

A project management plan can be viewed as an important construct for a project to develop a structured foundation of asset management, capital allocation and resource utilisation. In this regard, the present report is centred on the perspectives of developing a robust project management plan for the development of Coquihalla Highway and other bridges in British Columbia. Subjective understandings are going to be incorporated within the present report concerning different project management measures including “Work Breakdown Structure (WBS)”, quad and Gantt chart. Fundamentally, the assessment is mainly intended to derive structural insights related to stakeholders’ involvement and resource allocation within the project. The final portion of the report is focused on the assessment of potential risks of the project.

Project description:

The Coquihalla Highway reconstruction is considered to have followed the impacts of devastating floods across a massive region of British Columbia. Fundamentally, the rainfall started on November 14, 2021, as the outcome of a "compound climate event", followed by long, narrow bands of moisture originating from the tropical Pacific (UVIC, 2023).

Considering the impulse of quick meltdown of ice due to tropical air, the connection between Lower Mainland and remote locations were disrupted. The reconstruction of Coquihalla highway can be viewed as one of the most feasible channels in terms of reducing the implications of catastrophic events.

Infrastructural collapse can be considered as one of the immediate impacts of the flood in terms of disrupting the entire transport network. The east of Vancouver faced 600mm of rainfall within the timeline of 14 and 15 November 2021, linking to the catastrophic floods across British Columbia. The evidence clearly indicates the implications of tropical air, in escalating the atmospheric floods. As reported by Insurance Bureau of Canada (IBC), the flood caused insured damage of \$675 million, disrupting public infrastructures including major highways and supply chains (IBC, 2022). Based on the insights, the reconstruction of Coquihalla Highway can be viewed as a significant step to deal with the damages of

catastrophic floods. Thus, mitigation of infrastructural collapse can be viewed as an important aspect to carry out the reconstruction of Coquihalla Highway.

Scope:

Environmental restoration can be viewed as an important construct for scope management of the Coquihalla Highway reconstruction project. Project scope can be expressed as an important aspect of a project in confirming the balance within the perspectives of capital allocation and resource utilisation. Fundamentally, the primary objective of the reconstruction project is to restore safety and seamless operation of the freight and passenger corridor within British Columbia (BC Gov News, 2023). The evidence clearly indicates one of the scopes of this project is to ensure a long-term sustainability for the infrastructures. Fundamentally, the Coquihalla reconstruction project is considered to have extended to the permanent restoration and upgradation of Highway 5, around 130 km long corridor between Hope and Merritt (Courtepatte, 2023). Based on the evidence, the combination of long-term network reliability can be viewed as another important scope of the entire reconstruction project of the Coquihalla highway. Therefore, long-term sustainability and network reliability can be considered as two important scopes of the reconstruction project for Coquihalla.

The combination of climate resilient infrastructure and environmental restoration can be considered as two other important scopes of the reconstruction project. For example, in-stream enhancements have been blended to improve fish habitat among three key regions including Juliet Creek, Coldwater River, and Coquihalla River (British Columbia, 2024). Based on the evidence, restoration of environmental attributes can be viewed as an important scope of the project, concerning the improvement to accountability and resilience. A study by (Casady et al. 2024) has conceptualised climate-resilient infrastructure as significant in fostering a high standard of protection and safety, respectively for human lives and public properties. Following the evidence, the construction of climate-resilient highways can be regarded as a feasible choice for the selected project in terms of integrating resilience and sustainability. For instance, four communities have become integral portions to accelerate the reconstruction project including Nlaka'pamux communities, Silyx Nation, Peters First Nation and Yale First Nation (British Columbia, 2024). So, community-driven project management can be viewed as an important record for the selected project to achieve the scope of environmental restoration and climate resilient infrastructure.

Work breakdown structure (WBS):

1. Project initiation	2. Design and planning	3. Construction	4. Quality and Risk management	5. Project closure
Stakeholder's engagement	Hydrological Analysis	Demolition of damaged spans	Safety audits	Final inspection
Damage evaluation	Geotechnical Investigations	Deep foundation works	Progress reports	Demobilization of construction camps
Site assessment	Structural Design	Bridge rebuilding		Stakeholder's handover
Scope definition	Collaborative design	Road resurfacing		
Funding allocation	Permits	Paving and line painting		

In the context of successful project management, asset utilisation and capital allocation can be regarded as two important constructs. According to (Zeng et al. 2022), asset utilisation acts as a mediator in ensuring project success for megaprojects concerning different attributes including complexity, information, resources and knowledge.

Accordingly, the WBS above has outlined stakeholder engagement as one of the most important phases for the entire reconstruction project, involving different deliverables such as structural design and collaborative design.

Quad Chart:

Purpose ● To restore and reconstruct Coquihalla Highway, concerning resilience, reliable transport connectivity and public safety. ● To rebuild climate resilient infrastructure including bridges and embankments, acquiring the ability to endure future extreme weather events.	Customers ● Government of British Columbia (<i>Ministry of Transportation and Infrastructure</i>). ● Local communities such as Merritt & Hope, Nlaka'pamux, Silyx, Peters, and Yale. ● Commercial freight and trucking companies. ● Daily commuters rely on the corridor.
Desired End Result ● Result 1: Fully restored four-lane highway driven by climate-resilient bridges and stabilised slopes. ● Result 2: Incorporation of sustainability measures based on erosion protection and environmental habitat restoration. ● Result 3: Safe, reliable and seamless movement of goods and people with reduced risks regardless of catastrophic weather events.	Measures of Success ● Reconstruction of a large section of damaged sites included in the 130-km corridor. ● Positive environmental and community feedback. ● Structured alliance in relation to contracts and collaboration across the stakeholders. ● Completed construction of climate-resilient bridges acquiring deeper foundations and long-term sustainability.

(Source: Self-developed)

Resource management can be considered as an important construct for a project to ensure project success. As opined by (Herath and Chong 2022) robust foundation of the resource utilisation acts as one of the critical success factors to ensure successful project completion. The evidence mainly indicates the essentiality of resource utilisation to foster structured foundation of capital allocation and asset management. Consequently, the quad chart above

has addressed the reconstruction of damaged sites within the Coquihalla corridor as one of the key measures of success within the reconstruction project.

Gantt Chart:

	Month 1-3	Month 4-6	Month 7-9	Month 10-12	Month 13-14	Month 15-16	Month 17-18
Project initiation Site assessment Design and planning							
Construction							
Quality Management							
Risk Management							
Project closure							

(Source: Self-developed)

The Gantt chart, illustrated in figure above has outlined risk and quality management as two significant metrics, carving the channels of project closure. A study by (Ajibike *et al.* 2022) has addressed the impulse of effective government intervention to accelerate the stances of project success based on quality standards and capital management. Thus, safety audits and demobilisation have been conceptualised as two important metrics within the WBS, escalating project closure through inspection & closeout.

Stakeholders' involvement: Stakeholder Matrix

Stakeholder's	Power	Interest
Federal Government and Ministry of Transportation and Infrastructure	High	High
Local Indigenous First Nations including Nlaka'pamux, Silyx, Peters, and Yale	Medium to High	High
Local Municipal Governments including Hope and Merritt	Medium	Medium to High
Commercial Freight and Truck Companies	Medium	High
Daily Commuters	Low	Medium
Environmental and Wildlife Groups	Low	Medium

(Source: Self-developed)

Table above has outlined a long range of stakeholders, involved within the reconstruction project for Coquihalla Highway. Stakeholder Theory has conceptualised stakeholder engagement as an essential factor to foster a balanced paradigm of project management (Awa et al. 2024).

According to (Dwivedi and Dwivedi 2021), stakeholder involvement plays an essential role in improving different stages of project management including planning, requirement analysis, scope management and WBS. Consequently, the WBS of the selected project has outlined site restoration as a significant segment to ensure permanent reconstruction of the damaged sections.

Allocation of resources:

Resource allocation acts as an important mediator for a project to accelerate project success based on capital and assets. Structurally, human resource can be viewed as an important resource allocated within the project including 300 skilled workers concerning engineers, construction crews, environmental specialists, and project managers (British Columbia, 2024).

Based on the evidence, structured utilisation of human capital can be regarded as a significant paradigm, ensuring successful project success. A study by (Prebanić and Vukomanović 2023) has described stakeholder engagement as the ledger for a project to foster improved resource allocation.

(Tominc et al. 2023) have argued the statement by indicating unstructured stakeholder involvement to disrupt the agile foundation of a project. Despite the contradiction, robust management of human capital can be viewed as a significant measure for the reconstruction project to ensure success, curated through skilled workers, construction professionals and design engineers (BC Gov News, 2023). In future, effective allocation of human capital can be conceptualised as an important measure for the Coquihalla reconstruction project to build a resilient and sustainable footprint.

Risk Analysis:

Risk Description	Likelihood (1–5)	Impact (1–5)	Risk Rating
Extreme weather (snowstorms, landslides, flooding) delaying construction	5	5	25
Environmental protection impact	2	4	8
Budget overrun due to design changes or unexpected issue	3	4	12
Supply chain disruption (material shortage, cost inflation)	4	4	16
Insufficient skilled labour availability	3	3	9

(Source: Self-developed)

Illustrated in table above, extreme weather conditions can be viewed as the most influential risk for the Coquihalla Highway reconstruction project. As opined by (Varajão et al. 2022) structured evaluation of project information acts as a mediator for a project to blur the lines of risks, concerning project management plan.

Internet of Things (IoT) conceptualised as a powerful technology to adopt improved weather visualizations for predicting lack severity and duration of climate events including cloudburst rain, meltdown and precipitation. So, IoT-powered advanced weather monitoring can be viewed as the most feasible strategy to mitigate the risks of extreme weather events, acquiring the highest risk rating.

Conclusion:

The reconstruction of the Coquihalla Highway represents a complex, multi-phase infrastructure project involving structured planning, rigorous risk management, and effective stakeholder engagement. This report has demonstrated that the project's success is dependent upon integrating climate-resilient design principles with sustainable construction practices to address the severe damage caused by the 2022 atmospheric river event. Through a detailed project scope, WBS, quad chart, Gantt schedule, and stakeholder matrix, the report highlights the importance of coordinated governance between provincial authorities, indigenous communities, local municipalities, and industry users. Resource allocation, particularly the deployment of skilled labour and environmental specialists, was identified as essential for maintaining project efficiency and ensuring adherence to safety and environmental standards. The risk analysis further highlighted that extreme weather remains the most significant threat to timely project delivery, reinforcing the need for adaptive technologies such as Internet of Things (IoT) based weather monitoring. The findings collectively underline that successful infrastructure recovery depends not only on technical engineering solutions but also on holistic project management approaches that balance environment, financial feasibility, and social expectations. At last, the Coquihalla reconstruction project serves as a model for resilient highway redevelopment, demonstrating how strategic planning can strengthen long-term transport reliability in the face of increasing climate uncertainty.

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