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Project Management

LCLM5003

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A Project portfolio

REOPENING OF HIGHWAY 5 (COQUIHALLA HIGHWAY)

After the 2022 British Columbia Flooding

Problem Background

In 2022, British Columbia experienced catastrophic flooding caused by an atmospheric river event, resulting in major landslides and structural failures along Highway 5.



Quad Chart: Reopening of Highway 5

Problem / Background 2022 atmospheric river flooding - Landslides & structural failures - Major transport disruption	Project Aim - Reopen highway & bridges - Partial access in 1 month - Full rebuild in 6-9 months - Climate-resilient design
Scope - Damage & geotechnical surveys - Debris clearing & slope stabilization - Bridge & roadway repairs	Outcomes / Benefits - Safe reopening of Highway 5 - Restored supply chains - Improved flood resilience - Effective disaster response

Project Aim

To restore, structural assessment of damaged sections and bridges within 2.

- Remove debris and stabilize landslide zones to enable partial access within 1 month.
- Rebuild key bridge structures using rapid construction techniques within 6-9 months.
- Implement climate-resilient design features to reduce future flood vulnerability.
- Reopen Highway 5 to commercial and public traffic safely and effectively.



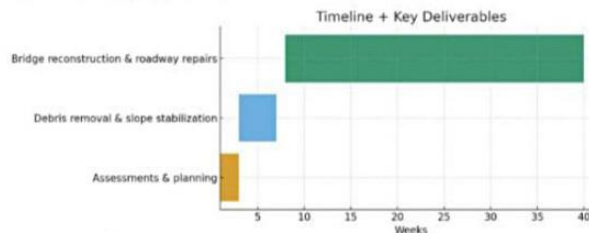
Scope

In-Scope:

- Damage assessment and geotechnical surveys
- Clearing debris and stabilizing slopes.
- Safe roadway reopening

Conclusion

The reopening of Highway 5 after the 2022 British Columbia flooding represents a critical milestone in restoring the province's transportation lifeline and ensuring the safe movement of people, goods, and emergency services. The rapid and coordinated response involves assessments, debris removal, and accelerated bridge restoration while assessing environmental hazards.



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Part B (Reflection on Feedback)

My colleagues gave me feedback on my first poster when I finished it, pointing out both its advantages and disadvantages. Peers noted that the poster was visually clear, well-structured, and effectively covered all of the project's main aspects. Overall, the feedback was positive. They emphasized that the billboard successfully presented the reopening of Highway 5 following the flooding in British Columbia in 2022 and that the underlying context, project goals, scope, and outcomes were all properly communicated. This evaluation verified that my poster's main ideas were sound and that I had achieved the task's main goals. But my colleagues frequently pointed out that the poster's lack of a quad chart hindered its usefulness as a succinct visual presentation. Even though the poster featured all the information needed, readers had to read through several sections in order to rapidly grasp the whole project because there was no quad chart. This criticism was helpful because it brought attention to two crucial elements of visual communication: immediacy and clarity. Posters are frequently viewed quickly in academic and professional contexts, and elements like quad charts make it easier for viewers to quickly understand the main point. I added a quad chart to the poster in response to this criticism. The project was graphically separated into four distinct areas by the quad chart: problem background, project goals, scope, and outcomes. This addition greatly enhanced the poster's overall organization and usability. The quad chart's balanced 2x2 structure made it possible for viewers to swiftly grasp the goals, actions, and advantages of the project without having to read the full poster. This made the poster more interesting and more in line with the professional standards that are frequently applied in engineering and project management settings. As I think back on this process, I see how crucial peer review is to enhancing academic work. Despite my initial confidence that the poster was finished, the comments showed that there was a disconnect between correct material and the best manner to convey it. The quad chart greatly improved the way that information was conveyed, but it had little effect on the content of my work. Excellent visual design is just as vital as excellent textual content, especially when conveying complicated information to a large audience, as this experience reaffirmed. To sum up, the criticism I got was helpful and helped me make my poster better. I fixed the primary flaw pointed out by my colleagues and improved the poster's professionalism, clarity, and visual impact by including a quad chart. I now have a deeper understanding of the importance of peer review and iterative design thanks to this reflective approach, which has also

given me insightful knowledge that I can utilize in my upcoming academic and professional presentations.

Part C (Project management plan)

Introduction

An atmospheric river event caused severe and unprecedented flooding in British Columbia in 2022, which severely damaged vital infrastructure throughout the province. Intense rainfall over a brief period of time was brought on by the harsh weather, overloading the drainage systems already in place and causing multiple landslides and erosion occurrences. The shutdown of Highway 5, also referred to as the Coquihalla Highway, which serves as a major transportation route linking the Lower Mainland to the rest of Canada, was one of the disaster's most important effects. The highway is essential for public transportation, emergency services, and commercial freight, all of which contribute to regional connectivity and economic activity. The highway's infrastructure suffered significant damage as a result of the flooding, including catastrophic road washouts, slope instability, and the collapse of multiple bridge sections. Long stretches of the corridor were rendered impassable by these malfunctions, so severing vital supply links and limiting the flow of people and products between important areas. Businesses, local communities, and emergency response capabilities were all immediately and significantly impacted by the outage. The supply of commodities was impacted by freight transportation delays, which also raised logistical expenses and put further strain on alternate routes that weren't built to handle such heavy traffic levels. Restricted access also presented serious safety issues, especially for populations who depend on the corridor for emergency aid and medical services.

The extended shutdown of Highway 5 posed significant economic, social, and safety difficulties for British Columbia due to its strategic importance to the province's transportation network. Therefore, prompt and efficient intervention was crucial for promoting economic recovery and public well-being in addition to restoring mobility. However, a meticulously planned and coordinated approach to recovery was required due to the complexity of post-disaster situations, continued weather uncertainty, and environmental limits. The reopening and reconstruction of Highway 5 in the wake of the 2022 flooding are outlined in this Project Management Plan in an organized and methodical manner. The plan is created from the viewpoint of a skilled project manager entrusted with completing a crucial infrastructure recovery project under difficult and

urgent circumstances. To guarantee that the project is completed effectively, securely, and sustainably, it makes use of accepted project management concepts and techniques. This plan's main goal is to give stakeholders a thorough framework that covers scope definition, scheduling, resource allocation, stakeholder involvement, and risk management. The plan also emphasizes the incorporation of climate-resilient design strategies to improve the transportation corridor's long-term dependability and lessen susceptibility to future extreme weather events.

Project Description

The goal of the Highway 5 reopening project is to repair a crucial transportation route that was badly damaged by disastrous floods during the atmospheric river event in 2022. Widespread landslides, roadway washouts, and serious structural failures along the route, including the collapse of numerous important bridge structures, were caused by this intense weather event. Large portions of the corridor became impassable as a result, significantly affecting regional and national logistics networks and isolating communities in British Columbia's interior. Highway 5's shutdown hampered the flow of commercial freight, emergency services, and necessities, highlighting the corridor's vital importance in preserving both economic stability and public safety. The project has been designated as a high-priority emergency infrastructure recovery program as a result of these concerns. The project consists of a number of interconnected and technically challenging tasks intended to facilitate the highway's prompt and safe reopening. To ascertain the amount of damage and identify potential safety hazards, the initial stages entail thorough damage assessments, including structural inspections and geotechnical investigations. In order to create safe working conditions, site stabilization actions like slope reinforcement and debris clearance are informed by these assessments. In order to expedite delivery while upholding stringent safety, quality, and regulatory standards, subsequent phases concentrate on the extensive rehabilitation of bridges and road segments using quick and modular construction techniques. By using improved drainage systems, slope stabilization techniques, and climate-adaptive design concepts, the project seeks to increase Highway 5's long-term resilience in addition to restoring pre-flood performance. These upgrades are meant to enhance infrastructure performance and lessen susceptibility to extreme weather occurrences in the future. In order to ensure that technical, environmental, and social considerations are taken into account throughout the project lifecycle, government authorities,

engineering consultants, construction contractors, environmental agencies, and local communities must effectively coordinate and collaborate.

Scope

The project's scope gives all parties engaged in carrying out the Highway 5 reopening initiative a defined framework and establishes the limits of work necessary to accomplish the stated project objectives. In a post-disaster recovery setting, when time constraints and conflicting stakeholder expectations can raise the risk of scope creep, establishing a clearly defined scope is crucial. Following the significant flood-related damage in 2022, the project scope includes all works required to securely reopen Highway 5 and restore its fundamental functionality. This entails thorough structural and geotechnical evaluations to precisely determine the degree of damage and pinpoint possible danger areas, guaranteeing that all reconstruction efforts are supported by trustworthy scientific information. In order to lower the likelihood of future failures, the scope also involves stabilizing impacted slopes and removing debris and unstable materials brought on by erosion and landslides. Along with roadway repairs, resurfacing, and the restoration of crucial safety features including barriers, signage, and road markings, the project's main focus is the reconstruction of collapsed and damaged bridge structures. To improve long-term performance and lessen susceptibility to future extreme weather events, better drainage and erosion control systems are also installed. The project scope includes the implementation of strict health and safety procedures to safeguard workers and the public throughout the project lifespan in addition to actual construction operations. To guarantee adherence to legal criteria, environmental protection procedures are also incorporated, such as erosion control and habitat preservation strategies. Before certification and reopening, quality assurance procedures and final inspections are carried out to verify that all work satisfies necessary criteria. However, capacity extension beyond pre-disaster conditions, non-essential cosmetic upgrades, and long-term maintenance activities after the initial reopening are specifically excluded from the project scope. Stakeholder alignment, efficient resource allocation, and project delivery are all supported by clearly establishing these limits.

Work Breakdown Structure

The Highway 5 reopening project can be hierarchically broken down into manageable and well-defined components using the Work Breakdown Structure (WBS), which facilitates efficient planning, scheduling, and management throughout the project lifetime. The WBS helps the project manager to organize complex recovery tasks in an organized way and guarantees that all necessary work is recognized by methodically dividing the project into smaller components. At the highest level, the project is broken down into significant stages that correspond to the recovery effort's logical evolution from start to finish. Project commencement and planning, damage assessment and surveys, debris removal and site preparation, roadway repairs, structural reconstruction, climate resilience enhancements, testing and safety certification, and project closure are some of these steps. Each of these stages is further broken down into discrete tasks that can be delegated to accountable groups, planned within the overall timetable, and tracked for output and advancement. For example, in order to develop safe and knowledgeable reconstruction solutions, the damage assessment phase includes comprehensive structural inspections, geotechnical investigations, and environmental assessments. In a similar vein, roadbed repair, pavement replacement, and bridge rebuilding are all part of the structural reconstruction phase and are crucial to the restoration of highway functionality. By connecting tasks to necessary labor, supplies, and equipment, the WBS facilitates precise cost estimation and resource planning. It also offers a clear foundation for performance reporting and progress tracking, allowing for early detection of problems or delays and prompt remedial action throughout the project.

Quad Chart

The quad chart is mainly used as a strategic communication tool for senior stakeholders and decision-makers, providing a high-level visual summary of the Highway 5 reopening project. Its goal is to provide complicated project information in a clear and understandable manner so that the project's purpose, scope, and expected value can be quickly grasped. The quad chart enables efficient decision-making and promotes alignment across various stakeholder groups by grouping the project's important components into four distinct sections. The quad chart's problem context section describes the devastating floods that occurred in British Columbia in 2022, which led to widespread landslides, structural failures, and the closing of Highway 5. The importance and urgency of the project are established in this part. In addition to emphasizing

the integration of resilience strategies to enhance long-term infrastructure performance, the project objectives also focuses on restoring safe and dependable transportation access within specified timeframes. The main operational and technical tasks needed to accomplish these goals, such as safety certification, reconstruction, and assessments, are outlined in the scope and activities section. The restoration of supply chains, enhanced emergency access, assistance for economic recovery, and decreased susceptibility to future extreme weather events are all highlighted in the outcomes and benefits section. All things considered, the quad chart fosters stakeholder participation across the project lifetime, promotes consistent messaging, and improves clarity.

Gantt Chart

The Highway 5 reopening project schedule is represented time-based by the Gantt chart, which makes it easy to see the order, length, and overlap of tasks across the project timetable. Given the urgency of repairing this vital transportation corridor while upholding the necessary safety and quality requirements, the project is scheduled to take around nine months to complete. In order to inform later construction decisions, the program starts with quick damage assessments and thorough planning activities in the first few weeks. In order to create safe and stable conditions for reconstruction, these first actions are followed by slope stabilization and debris clearance. Bridge reconstruction and large roadway repairs are the project's most time-consuming phase since they call for specialized engineering knowledge, substantial resources, and rigorous adherence to safety and legal standards. In order to minimize total downtime and expedite project delivery, these tasks are scheduled concurrently wherever possible. Roadway surface, line marking, inspections, testing, and certification are all part of the schedule's last phase, which culminates in the highway's gradual reopening. By highlighting important milestones, dependencies, and essential routes, the Gantt chart facilitates efficient project management. It makes it possible for the project manager to keep an eye on developments, foresee possible setbacks, and promptly carry out corrective measures. To balance speed, safety, and quality throughout project delivery in the context of disaster recovery, a comprehensive yet adaptable timetable is crucial.

Stakeholders' Involvement

The Highway 5 rehabilitation project's wide-ranging social, economic, and environmental ramifications make stakeholder involvement essential. The British Columbia Ministry of Transportation and Infrastructure, the federal government, engineering and construction contractors, environmental regulatory agencies, local communities, emergency services, commercial transport operators, and regular highway users are just a few of the many parties impacted by the project. To guarantee the effective completion of the project, each of these stakeholder groups must have their unique interests, duties, and degrees of influence appropriately controlled. While contractors and consultants are in charge of technical execution and safety, government agencies are in charge of finance, supervision, and regulatory compliance. Project outcomes, construction consequences, and access restrictions directly impact local communities and highway users. Throughout the project lifecycle, continuous communication, consultation, and transparency are necessary for effective stakeholder participation. Stakeholders are kept informed about project advances, timeframes, and any interruptions by regular status reports, coordination meetings, and public information releases. During the healing process, this strategy aids in controlling expectations, resolving issues, and lowering ambiguity. Early and regular stakeholder engagement facilitates cooperative decision-making and enables the early detection and resolution of possible problems. Maintaining stakeholder and public confidence is crucial in a high-profile infrastructure recovery effort like this. Therefore, minimizing disagreement, fostering collaboration, and promoting the project's overall success and acceptance all depend heavily on effective stakeholder management.

Allocation of Resources

The efficient distribution and administration of financial, human, and material resources throughout the project lifetime is essential to the Highway 5 reopening project's success. In order to guarantee that the project is completed safely, effectively, and in accordance with legal criteria, human resources are essential. Project managers, civil and structural engineers, geotechnical experts, construction workers, environmental consultants, and health and safety officers make up the interdisciplinary team that works on the project. In order to handle the

technical complexity and safety hazards involved with post-disaster infrastructure rehabilitation, each function provides specialized expertise. To sustain productivity and guarantee sound decision-making, team members must clearly define their roles and coordinate with one another. To support building activities, the project needs substantial physical resources in addition to human resources. These include construction supplies like concrete, steel, asphalt, and geotechnical reinforcing systems, as well as heavy equipment like loaders, excavators, and cranes. To enable safe and effective operations, temporary infrastructure is also needed, such as access roads, traffic management systems, and safety barriers. Maintaining the project timeline depends on these resources being available and being deployed on time. The project's funding is mostly provided by federal and provincial emergency recovery funding initiatives. To keep an eye on spending, handle emergencies, and guarantee value for money, strong financial management and cost control procedures are put in place. Allocating resources effectively promotes productivity, improves safety results, and allows the project to be completed within predetermined time and financial limits.

Risk Analysis

Because post-disaster environments are characterized by high levels of unpredictability, risk management is an essential component of the Highway 5 reopening project. Risks that could impact project results are more likely due to the dynamic nature of recovery conditions as well as technical, logistical, and environmental difficulties. Unforeseen geological instability that would necessitate more engineering interventions and unfavorable weather that could impede construction activities and create schedule delays are two major hazards. Another major risk is supply chain interruptions, especially when it comes to the availability of specialized equipment and building supplies. Additionally, unforeseen site conditions or longer building schedules may result in budget overruns, and operating in sensitive ecological areas may present environmental compliance issues. Throughout the course of the project, mitigation techniques are applied in an organized and proactive manner to handle these risks. The project budget and timeline also include contingency planning to give flexibility in handling unforeseen circumstances. In order to detect emergent problems early on and enable prompt intervention, ongoing monitoring and site inspections are carried out. Proactive stakeholder engagement promotes efficient communication and coordinated decision-making, while flexible scheduling enables the project team to modify sequencing and resource allocation in response to changing

circumstances. To evaluate the possibility and impact of risks and to adjust mitigation strategies as needed, regular risk reviews are conducted. In addition to improving project resilience, this proactive approach to risk management greatly raises the possibility of accomplishing project goals within predetermined budget, schedule, and quality restrictions.

Conclusion

Following the flooding in British Columbia in 2022, the reopening and restoration of Highway 5 is an intricate and risky infrastructure recovery project. This project management plan offers a thorough and organized method for completing the project in a way that puts sustainability, efficiency, and safety first. The plan guarantees precise scope definition, efficient scheduling, prudent resource allocation, and proactive risk management by utilizing proven project management techniques. Additionally, the rebuilt highway will be more resilient to future extreme weather occurrences thanks to the incorporation of climate-resilient design concepts. The strategy shows how methodical project management may facilitate quick recovery while providing long-term benefits to enterprises, communities, and the overall economy. All things considered, this project management plan gives stakeholders assurance that the project can be completed successfully in a difficult post-disaster environment.

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