Department of Transportation and Infrastructure
Municipal Infrastructure Division

Risk Management Framework
for
Municipal Infrastructure Publicly Funded Projects

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1 INTRODUCTION

1. Risk management is a fundamental component in ensuring the successful completion of municipal infrastructure projects. This document outlines the risk management processes, tools, and strategies to effectively manage risks, ensuring that municipal infrastructure projects are completed in scope, on time, within budget, and meet the required standards. It aligns with Federal expectations on risk management requirements, which aim to enhance project transparency, accountability, and long-term sustainability.
2. Risk management starts when a project is initiated and finishes with project closeout. As the projects flows through various stages, the risk profile will shift.
    a. At the beginning there will be more risks associated with understanding the requirements, developing accurate estimates.
    b. During the design and construction, the risks will likely be focused on resources, scope challenges, maintaining budget, technology availability,
    c. During closeout, the risks will focus on testing, verification, acceptance and handover.
3. Addressing risk takes a strategic approach
    a. For known risks, they are managed through a risk analysis and response plan.
    b. For unknown risks, a contingency plan, including both financial and schedule contingencies should be employed.

1.1 Requirements for Publicly Funded Projects

1. Funding Recipients will be responsible for the submission of a risk register on **all** projects. This is a requirement of the funding programs offered by Transportation and Infrastructure – Municipal Infrastructure.
2. Municipal Infrastructure may assist with this process on request by the funding recipient and approval by the Director of Municipal Infrastructure.

2 RISK MANAGEMENT PRINCIPLES

1. Risk management for municipal infrastructure projects must be based on the following core principles:
    a. **Proactive Identification**: Risks should be identified early in the planning stage to allow for appropriate mitigation.
    b. **Holistic Approach**: Risk management should consider the entire project lifecycle, including planning, design, construction, operation, and maintenance.

c. **Stakeholder Engagement:** Involving all relevant stakeholders (government agencies, contractors, community groups, indigenous groups, and financial entities) in the risk management process.
d. **Continuous Monitoring:** Ongoing risk assessment should be conducted to identify emerging risks and address any changes in project conditions.
e. **Sustainability and Resilience:** The approach should prioritize risks that impact the long-term sustainability of the project and the resilience of the infrastructure.

3 OBJECTIVES

1. The primary objectives of this risk management framework are to:
    a. **Risk Identification:** Identify potential risks associated with municipal infrastructure projects.
    b. **Risk Probability and Impact Assessment:** Assess and prioritize risks based on their potential impact.
    c. **Rank Risks:** using the risk assessment rank the risks in order or severity/priority utilizing at risk matrix.
    d. **Risk Mitigation:** Develop strategies to avoid, mitigate, transfer, or accept identified risks.
    e. **Monitor and Report:** Ensure consistent monitoring and reporting throughout the project lifecycle.

4 RISK MANAGEMENT PROCESS

4.1 Step 1 - Risk Identification

1. Risk identification is the first step in any risk management strategy.
2. As the project progresses new risks are identified, existing risks evolve and change.
3. Potential risks, both external and internal, should be assessed across the following categories:
    a. **Technical Risks**: design flaws, construction errors, technology failure.
    b. **Financial Risks:** budget overruns, funding shortfalls, changes in interest rates.
    c. **Regulatory Risks:** compliance with codes, standards, guides, legislation, regulations and permits.
    d. **Political/Stakeholder Risks:** changes in government policies, public opposition.
    e. **Operational and Maintenance Risks**: supply chain delays, workforce shortages, equipment failure.
    f. **Environmental Risks:** adverse weather, environmental contamination, natural disasters.

g. **Legal Risks:** terms and conditions of contracts are not robust, infringement on private citizen rights or access.
h. **Schedule Risks:** A combination of qualitative and quantitative methods (e.g., brainstorming, expert judgment, historical data analysis) should be used to identify risks.

4. A combination of qualitative and quantitative methods (e.g., brainstorming, expert judgment, historical data analysis) should be used to identify risks.

4.1.1 Risk Register

1. A Risk Register is a document or tool used in project management and risk management to systematically identify, assess, and track potential risks that could affect the success of a project, process, or organization. It serves as a central repository for all identified risks, helping teams to manage and mitigate them effectively.
2. The key components typically included in a risk register are:
    a. **Risk ID/Number:** A unique identifier for each risk.
    b. **Risk Description:** A clear explanation of the risk.
    c. **Risk Category:** The type or source of the risk (e.g., financial, operational, technical, legal).
    d. **Probability:** The likelihood of the risk occurring, often categorized as low, medium, high, or very high.
    e. **Impact:** The potential severity or consequence of the risk, also categorized as low, medium, or high.
    f. **Risk Score:** A ranking or assessment of the risk based on its likelihood and impact, helping to prioritize mitigation efforts.
    g. **Response Plan:** The actions or strategies to minimize or address the risk.
    h. **Risk Owner:** The person responsible for managing and monitoring the risk.
    i. **Status:** The current state of the risk (e.g., open, mitigated, closed).
    j. **Date Identified:** When the risk was first recognized.
    k. **Monitoring/Review Date:** When the risk will be reviewed or reassessed.
    l. **Risk closed Date:** When the risk has adequately been mitigated.

3. The Risk Register is a dynamic document that should be regularly updated throughout the life of the project or organizational process to ensure that new risks are identified, and existing risks are appropriately managed.
4. A sample Risk Register can be found in the Appendices. To use the sample:
    a. Delete any risk that are not applicable to the project.
    b. Add any project specific risks that may not be identified.
    c. Complete assessments of each risk as they apply to the specific project.
    d. Utilize the register to track the status of each risk and the mitigating actions.

4.2 Step 2 - Risk Impact Identification

1. The impact of risks can be categorized into broad categories as listed below; some risks may impact more than one category:
    a. **Cost:** Increased expenses from unexpected risks or poor planning.
    b. **Schedule:** Delays due to approvals, disputes, or rework.
    c. **Quality:** Compromised infrastructure due to rushed work or technical missteps.
    d. **Reputation:** Loss of public trust and political support.
    e. **Health, Safety and Environment:** Affects to public safety and delays caused by failure to follow proper procedure. Potential shut down while waiting for safety documents, permits, or due to accident.
    f. **Performance:** effects the final performance of the project, infrastructure fails to operate in a manner that meets expectations.
    g. **Compliance:** Regulatory or legal penalties for failing to meet environmental/social norms.
    h. **Legal:** risk could result in legal action by a secondary party.

4.3 Step 3 – Risk Probability and Impact Assessment

1. Once risks have been identified, they should be assessed in terms of probability and impact to prioritize them. This can be done using a Risk Matrix that classifies risks based on probability of occurrence and potential consequences.
2. This helps organizations focus on addressing the most critical risks first.
3. A Risk Matrix is a tool used to assess and prioritize risks in a systematic way. It is often used in risk management to determine the severity and likelihood of risks, informing decisions about how to mitigate and/or address those risks.
    a. Probability: This axis shows how likely it is that a risk will occur
    b. Impact: This axis shows the potential severity of the risk's impact

Risk Matrix		Impact				
		Insignificant 1	Minor 2	Moderate 3	Major 4	Severe 5
Probability	Rare 1	1 Low	2 Low	3 Low	4 Medium	5 Medium
	Unlikely 2	2 Low	4 Medium	6 Medium	8 High	10 High
	Possible 3	3 Low	6 Medium	9 High	12 High	15 Very High
	Likely 4	4 Medium	8 High	12 High	16 Very High	20 Very High
	Almost Certain 5	5 Medium	10 High	15 Very High	20 Very High	25 Very High

4. To assess a risk, identify the probability it will occur, and then the impact on the project should it occur. Using the matrix above, a risk rating will be identified as:
    a. **Low:** unlikely to occur and would have minimal impact if they did.
    b. **Medium:** moderate probability of occurring and could have a moderate impact.
    c. **High:** likely to happen and would have a serious or critical impact.
    d. **Very High:** high likelihood and a severe impact, requiring immediate action.

4.3.1 How to use a Risk Matrix

1. **Identify Risks:** List all potential risks.
2. **Assess Probability:** Rate how likely each risk is to occur.
3. **Assess Impact:** Rate how severe the impact would be if the risk occurred.
4. **Plot Risks:** Place the risks on the matrix according to their likelihood and impact.
5. **Prioritize Mitigation Actions:** Focus on unacceptable risks (e.g. often the high and very high-risk items) for mitigation and incorporate mitigative strategies.
6. **Re-examine Risks:** Re-evaluate risks after the mitigative strategies are incorporated and establish whether they're within tolerable limits.

4.4 Step 4 – Determine Risk Response

1. For each identified risk, appropriate response strategies should be developed. These strategies include:
    a. **Avoidance:** Taking steps to prevent the risk from occurring (redesigning a project component to avoid a known risk).
    b. **Mitigate:** Implementing controls to reduce the likelihood or impact (selecting a more resilient material).
    c. **Transfer:** Shifting the risk to another party, such as through insurance or contractual clauses (performance bonds, indemnity clauses).
    d. **Acceptance:** Acknowledging the risk and preparing contingency plans to deal with the consequences if the risk occurs (setting aside contingency funds).

4.4.1 Contingency Planning

1. It is essential to prepare for unforeseen events that may arise during the project lifecycle. Contingency planning involves setting aside resources (e.g., financial reserves, additional labour) to respond to high-impact risks. The planning process should include:
    a. **Contingency Budgets:** Allocating contingency funds to cover potential cost overruns.
    b. **Response Plans:** Developing specific action plans for dealing with identified risks if they materialize, with clear responsibilities and timelines.

4.5 Step 5 - Risk Monitoring and Reporting

1. Risk management does not stop after mitigation strategies are implemented. Continuous monitoring is essential to ensure the effectiveness of risk controls and to identify new or emerging risks. The following methods should be employed:
    a. **Regular Risk Reviews:** Scheduled reviews with the project team to assess the status of identified risks and evaluate the effectiveness of mitigation strategies.
    b. **Reporting Mechanisms:** Establishing a formal reporting structure that includes regular updates to stakeholders. Reports should be transparent and highlighting both positive and negative developments.

APPENDIX A EXAMPLE OF POTENTIAL RISKS

1. The following sections of this document outline some of the many possible risks to a Municipal Infrastructure Project. These should be reviewed in the context of a project and listed on the Risk Register and assessed as necessary. The possible risks are not limited to those listed here; Project Owners are encouraged to take a fulsome approach to analyzing the risks to projects.

A.1 Ultimate Recipient Risks

1. **Definition:** project planning and execution roles of the Ultimate Recipient impacts the success of a project.
2. **Example:** Ultimate Recipient, the Owner, does not have qualified staff to manage a project and allows political interference.

A.1.1 Possible Impacts

1. Delays
2. Increased costs
3. Project cancellation
4. Budget reallocations
5. Poor planning
6. Design flaws

A.1.2 Potential Mitigation Actions

1. Ensure town elected representatives understand their role and operate within that role once the project has been initiated.
2. Engage relevant consultant expertise in the areas lacking within the Owner's organizational framework.
3. Ensure Owner's staff are current regarding legislative and occupational health and safety requirements.
4. Maintain an infrastructure improvement project list that is manageable by the Owner in terms of financial responsibility and operational capacity.

A.2 Application Quality

1. **Definition:** The application submitted to Municipal Infrastructure for funding is incomplete, it does not show the full extent of the project requirements and has not fully developed an estimate that reflects the probable cost.
2. **Example:** The UR fails to include sufficient excavation costs in the estimate, during construction existing interfering infrastructure is discovered, or does not include allowable contingencies and escalation.

A.2.1 Possible Impacts

1. Delays
2. Insufficient funding
3. Project that does not meet public expectations

A.2.2 Potential Mitigation Actions

1. Include all work for the project in the estimate
2. Engage a consultant to evaluate the problem and scope a suitable solution
3. Utilize current estimating practices and data
4. Detail the project scope based on field data, not google earth

A.3 Project Management Risk

1. **Definition**: Risks associated with the planning, coordination, and execution of the project.
2. **Example**: Poor planning, lack of coordination, mismanagement of resources, scope creep, and/or inadequate documentation and reporting.

A.3.1 Possible Impacts

1. Delays
2. Budget overruns
3. Poor-quality outcomes
4. Project failure
5. Work stoppages
6. Subpar work

A.3.2 Potential Mitigation Actions

1. Implement effective project management tools
2. Develop a clear project plan
3. Assign roles and responsibilities
4. Continuously monitor project progress
5. Realistic scheduling, including buffer time
6. Change Management Process
7. Develop and implement detailed quality assurance plans that include monitoring, inspections, and testing at key project milestones
8. Regular Inspections and Audits
9. Comprehensive Documentation
10. Experienced Project Managers

A.4 Land Acquisition Risk

1. **Definition:** Risks associated with the ownership, lease, or use agreement, or lack thereof of land identified for use on a project.
2. **Example:** Owner has not purchased the land from a private owner prior to starting the project. Once that process is started, it is discovered that wills need to be quieted, and there will be a long delay in starting the project.

A.4.1 Possible Impacts

1. Project Delays
2. Scope changes to relocate planned infrastructure
3. Consultant Change Orders to address new locations
4. Increased costs

A.4.2 Potential Mitigation Actions

1. Ensure land is owned by the project Owner, or a land use agreement is in place prior to starting project

A.5 Financial Risk

1. **Definition**: Risks related to the availability, management, and expenditure of funds for the project.
2. **Example**: Budget overruns, unexpected costs, or failure to secure enough financing.

A.5.1 Possible Impacts

1. Project delays
2. Reduction in scope
3. Need for additional funding, which may not be available

A.5.2 Potential Mitigation Actions

1. Accurate cost estimation
2. Secure sufficient financing before starting
3. Create a detailed budget
4. Establish a contingency fund
5. Monitor spending closely
6. Diverse Funding Sources

A.6 Schedule Risk

1. **Definition**: Risks related to the timeline of the project, particularly regarding delays or missed deadlines.
2. **Example**: Delays due to unforeseen circumstances like poor weather, labour shortages, or late delivery of materials.

A.6.1 Possible Impacts

1. Extended project timelines
2. Increased costs
3. Potential loss of stakeholder support

A.6.2 Potential Mitigation Actions

1. Develop realistic timelines with buffer periods
2. Develop a realistic timeline with input from all stakeholders, including contractors, engineers, and suppliers
3. Ensure that all aspects of the project, including design, procurement, construction, and testing, are thoroughly planned
4. Regularly track progress against the schedule
5. Adjust resources as needed to keep the project on track

A.7 Scope Creep

1. **Definition**: Risks associated with the gradual expansion or uncontrolled changes in the project scope.
2. **Example**: Adding additional features or changes to the design after the project has started. Inadequate evaluation of existing infrastructure or site conditions resulting in additional work requirements.

A.7.1 Possible Impacts

1. Increased costs
2. Extended timelines
3. Failure to meet the original project objectives
4. Potential conflicts between stakeholders regarding changes
5. Potential code, regulatory, or funding violations

A.7.2 Potential Mitigation Actions

1. Clearly define the project scope at the start including specific deliverables, timelines, and budgets.
2. Include existing condition assessments, hazardous material studies, Environmental assessments, site survey, and ownership review during the project scope development prior to project approval.
3. Implement a formal change management process
4. Communicate scope changes with all stakeholders
5. Obtain approval for change in scope prior to implementation

A.8 Quality Control Risk

1. **Definition:** the potential for issues or problems to negatively impact the quality of a product or service during its production or delivery process.
2. **Example:** poor quality of construction, use of substandard materials, insufficient supervision, design flaws, rushed timelines.

A.8.1 Possible Impacts

1. Increased cost
2. Delays
3. Repeat work
4. Reputational damage

A.8.2 Potential Mitigation

1. Shop drawing review
2. Field Testing
3. Geotechnical Testing
4. Monitoring
5. Specification and Drawing peer review
6. Implement and monitor Quality Control processes

A.9 Quality Assurance Risk

1. **Definition**: Risks associated with ensuring that the infrastructure meets the required quality standards.
2. **Example**: Poor workmanship or substandard materials used in the project.

A.9.1 Possible Impacts

1. Safety issues
2. Future maintenance problems
3. Reputational damage

A.9.2 Potential Mitigation Actions

1. Establish a quality control program
2. Conduct regular inspections
3. Test and Commission systems prior to startup
4. Ensure that all materials meet required standards
5. Specification and Drawing peer review

A.10 Resource Management Risk

1. **Definition**: Risks related to the availability and allocation of resources, including labour, materials, and equipment.

2. **Example**: Shortages of critical materials, skilled labour, or equipment failure.

A.10.1 Possible Impacts

1. Delays
2. Reduced quality
3. Increased project costs

A.10.2 Potential Mitigation Actions

1. Develop a comprehensive resource management plan
2. Establish reliable supply chains
3. Ensure adequate staffing
4. Regularly monitor resource usage
5. All project stakeholders read the relevant documents for the project

A.11 Consultant, Contractor and Subcontractor Risk

1. **Definition**: Risks associated with the performance and reliability of consultants, contractors and subcontractors.
2. **Example**: A consultant/contractor failing to meet deadlines, poor workmanship, or disputes over payments. Underqualified or inexperienced workers

A.11.1 Possible Impacts

1. Delays
2. Cost overruns
3. Legal disputes
4. Lower Quality of work

A.11.2 Potential Mitigation Actions

1. Carefully select consultants, contractors and subcontractors
2. Define clear contracts with performance metrics
3. Establish regular oversight of their work
4. Establish a process for quickly resolving disputes between contractors, subcontractors, or other project stakeholders
5. Establish experience and qualification standards

A.12 Inadequate Documentation and Reporting

1. **Impact:** Lack of proper documentation and reporting can lead to confusion, errors, or disputes about the project's progress, scope, and costs.
2. **Example:** Missing or incomplete reports, failure to track budget expenditures, or insufficient record-keeping of changes made to the project.

A.12.1 Possible Impacts

1. Poor decision-making
2. Disputes
3. Difficulty in tracking progress or assessing project health
4. Cost, cashflow, and/or payment issues

A.12.2 Potential Mitigation Actions

1. Ensure that all project activities, decisions, and changes are properly documented, including contracts, financial records, change orders, and meeting minutes.
2. Implement a regular reporting system to update stakeholders on project progress, budget status, and key risks.
3. Keep an audit trail of key decisions and actions taken throughout the project to maintain transparency and accountability.

A.13 Technology and Innovation Risk

1. **Definition**: Risks arising from the use of new technologies or innovations that may not perform as expected.
2. **Example**: The use of new construction methods or technologies that result in unexpected technical issues.

A.13.1 Possible Impacts

1. Delays
2. Additional costs for redesigns
3. Failure to meet project specifications, codes, or legislation
4. Decreased efficiency
5. Safety issues
6. Material failure
7. Lack of knowledgeable resources to manage/operate new technologies

A.13.2 Potential Mitigation Actions

1. Conduct pilot testing of new technologies
2. Involve experienced experts in the selection process
3. Prepare for the possibility of technological failure
4. Conduct multiple design reviews to ensure systems meet required standards
5. Adopt advanced technologies
6. Ensure that the project is managed by experienced professionals who can identify and solve technical challenges
7. Implement strict quality checks for materials, machinery, and labour to minimize defects
8. Ensure resources are properly trained on new methods/technologies

A.14 Weather and Natural Disasters Risk

1. **Definition**: Risks associated with extreme weather events or natural disasters that may affect the project.
2. **Example**: Heavy rainfall or floods delaying construction or causing damage to the project site.

A.14.1 Possible Impacts

1. Delays
2. Increased costs for repairs
3. Potential damage to the construction site or equipment

A.14.2 Potential Mitigation Actions

1. Account for seasonal weather patterns in scheduling
2. Build weather-resistant infrastructure
3. Develop disaster preparedness and response plans

A.15 Supply Chain Risk

4. **Definition**: Risks related to delays or disruptions in the supply chain for materials, equipment, or services.
5. **Example**: Delays in the delivery of construction materials or equipment due to logistical issues or global supply chain disruptions.

A.15.1 Possible Impacts

1. Delays in project timeline
2. Additional costs
3. Subpar materials used in construction

A.15.2 Potential Mitigation Actions

1. Secure multiple suppliers
2. Maintain buffer stock of critical materials
3. Establish contingency plans for supply chain disruptions

A.16 Environmental Risk

1. **Definition**: Risks arising from the environmental impacts of the project or unforeseen environmental challenges.
2. **Example**: Unanticipated weather events (flooding, storms), environmental degradation, or contamination during construction, failure to complete Environmental or Hazardous Material assessment.

A.16.1 Possible Impacts

1. Project delays
2. Increased costs due to necessary environmental mitigation measures
3. Environmental damage
4. Project redesign

A.16.2 Potential Mitigation Actions

1. Conduct environmental impact assessments (EIA)
2. Complete Hazardous Material Assessment
3. Develop mitigation plans
4. Monitor weather conditions
5. Use resilient construction practices
6. Incorporate sustainable and environmentally friendly materials and processes
7. Design infrastructure with climate resilience in mind, including flood defenses or earthquake-resistant features

A.17 Communication Risk

1. **Definition**: Risks related to the project's communications protocols between stakeholders.
2. **Example**: Lack of timely updates, unclear instructions, or failure to share important information such as changes to the schedule, budget, or scope. Access to sensitive information by unauthorized entities.

A.17.1 Possible Impacts

1. Cost
2. Schedule Delay
3. Performance
4. Quality

A.17.2 Potential Mitigation Actions

1. Establish clear and reliable communication channels between all parties involved in the project
2. Hold regular project status meetings and ensure that all stakeholders are informed about progress, challenges, and any changes to the project plan.
3. Use project management tools to document and track communication, ensuring that everyone has access to the same information in real time.

A.18 Social Risk

1. **Definition**: Risks related to social impacts on the community and local residents.

2. **Example**: Displacement of residents, protests, social inequity, exclusion, cultural heritage impacts, social identity loss, or opposition to the project.

A.18.1 Possible Impacts

1. Delays to permits, project progress
2. Increased costs
3. Project cancellation due to social unrest
4. Require modification to the design
5. Social inequalities

A.18.2 Potential Mitigation Actions

1. Engage and communicate with the community, including cultural leaders early
2. Provide compensation and relocation plans
3. Address concerns through consultations and feedback mechanisms
4. Modify the project design based on feedback to reduce negative impacts
5. Ensure that affected individuals are provided with adequate compensation
6. Ensure the project addresses the needs of all social groups, particularly marginalized communities, by integrating social equity into the design and decision-making process
7. Conduct thorough cultural and heritage assessments to understand and address potential impacts on local traditions, sacred sites, and historical landmarks
8. Ensure that public infrastructure, such as transit or healthcare, is accessible to all residents, including vulnerable groups

A.19 Community and Stakeholder Engagement Risk

1. **Definition**: Risks due to poor communication with key stakeholders (e.g., local residents, business owners, contractors).
2. **Example**: Lack of transparency or engagement with local communities, resulting in opposition.

A.19.1 Possible Impacts

1. Delays
2. Protests
3. Legal challenges
4. Damage to the project's reputation

A.19.2 Potential Mitigation Actions

1. Regularly update stakeholders
2. Hold public meetings
3. Provide transparent information
4. Address concerns promptly

5. Develop and implement a Communication Plan outlined what type of information is to be shared with whom and the frequency

A.20 Cultural Heritage and Social Identity Risk

1. **Definition**: Risks related to the project's impact on cultural heritage sites or local social identity.
2. **Example**: Construction disrupting historically significant sites or the cultural traditions of local communities.

A.20.1 Possible Impacts

1. Public opposition
2. Legal challenges
3. Loss of support from the local community

A.20.2 Potential Mitigation Actions

1. Conduct cultural and heritage impact assessments
2. Engage with cultural leaders and local communities
3. Modify the project design to avoid cultural conflicts

A.21 Indigenous People and Lands Risks

1. **Definition:** Risks related to the potential impact of the project on Indigenous communities, their land, rights, cultural heritage, and resources.
2. **Example**: Lack of engagement with Indigenous groups, failure to recognize their rights, or conflicts over land use and resource allocation.

A.21.1 Possible Impacts

1. Legal challenges
2. Protests
3. Project delays
4. Project cancellation
5. Displacement
6. Loss of livelihood

A.21.2 Potential Mitigation Actions

1. Consultation and Engagement
2. Land use agreement reviews
3. Impact Assessments
4. Involve Indigenous leaders and knowledge holders in project planning and review
5. Workers complete Cultural Sensitivity Training
6. Formal agreements with Indigenous communities
7. Utilize sustainable practices to reduce harm to local ecosystems and traditional lands

A.22 Legal and Regulatory Risk

1. **Definition**: Risks associated with the project failing to comply with legal and regulatory requirements.
2. **Example**: Failure to secure necessary permits, complete necessary environmental assessments, non-compliance with zoning laws, or changes in regulations.

A.22.1 Possible Impacts

1. Delays due to legal challenges
2. Project halts
3. Fines
4. Permitting delays

A.22.2 Potential Mitigation Actions

1. Ensure that all regulatory requirements are identified and adhered to early
2. Engage legal experts
3. Obtain all necessary permits before beginning construction
4. Compliance monitoring
5. Early engagement with Authorities

A.23 Political Risk

1. **Definition**: Risks associated with changes in political climate, policies, or government leadership that can affect the project.
2. **Example**: Change in local or national government, leading to a shift in project priorities or funding cuts, changes in policy, regulations.

A.23.1 Possible Impacts

1. Delays
2. Loss of funding
3. Budget cuts
4. Changes in regulations
5. Project cancellation

A.23.2 Potential Mitigation Actions

1. Monitor political developments
2. Engage with political stakeholders early
3. Maintain flexible project plans that can accommodate changes in political direction

A.24 Reputation and Public Perception Risk

1. **Definition**: Risks related to how the project is perceived by the public, stakeholders, or the media.

2. **Example**: Negative media coverage due to delays, cost overruns, or environmental concerns.

A.24.1 Possible Impacts

1. Damage to the project's reputation
2. Loss of public support
3. Increased scrutiny from stakeholders

A.24.2 Potential Mitigation Actions

1. Engage in proactive public relations
2. Maintain transparency
3. Address concerns openly
4. Demonstrate the benefits of the project to the community

A.25 Health and Safety Risk

1. **Definition**: Risks related to the health and safety of workers or the general public during the construction and operation phases.
2. **Example**: Accidents on site, exposure to hazardous materials, or public safety concerns during construction.

A.25.1 Possible Impacts

1. Worker injuries
2. Legal liabilities
3. Project delays
4. Public relations issues

A.25.2 Potential Mitigation Actions

1. Comprehensive site-specific safety plan
2. Implement strict health and safety protocols
3. Provide training for workers
4. Monitor safety conditions regularly
5. Regular safety talks
6. Public safety notices

A.26 Security Risk

1. **Definition**: Risks related to theft, vandalism, or sabotage during construction or operation.
2. **Example**: Equipment theft, site vandalism, or protests that disrupt construction activities.

A.26.1 Possible Impacts

1. Increased costs
2. Delays
3. Damage to the project site

A.26.2 Potential Mitigation Actions

1. Implement security measures such as surveillance cameras
2. Secure fencing
3. Personnel monitoring
4. Work with local authorities to ensure the site's safety

APPENDIX B RISK REGISTER

Risk Identification				Impacts to Project												Risk Rating			Owner				Response		Monitoring	
ID	Phase	Risk Category	Description	Increased Cost	Schedule / Project Delay	Poor Quality	Health and Safety	Performance Issues	Compliance	Legal /Disputes	Reputation or Stakeholder support	Project Cancellation	Budget Shortfall or Reallocation	Design Errors or Omissions	Scope Creep	Impact	Probability	Risk Score	Owner	Contractor	Sub- Contractor	Consultant	Response Approach	Response Plan	Status	Risk Closed Date