UNIVERSIDAD PARA LA COOPERACION INTERNACIONAL
(UCI)

PROJECT MANAGEMENT PLAN FOR THE MANAGEMENT OF MERCURY WASTE IN BELIZE

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This Final Graduation Project was approved by the University as partial fulfillment of the requirements to opt for the Master in Project Management (MPM) Degree

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DEDICATION

To my mother who has always encouraged me to accomplish my very best despite any challenges I have endured towards the completion of this project.

I would like to express my gratitude to another special person who gave me the encouragement to see the completion of this project; I thank you.

To my fellow colleagues who in some way or another have helped me through my time at UCI.

ACKNOWLEDGMENTS

“No problem
can be solved
from the same consciousness
that created it”- A. Einstein

First, I would like to thank God for giving me the strength and determination to complete this degree. The recent months have been a tremendous challenge both professionally and personally.

I would like to thank the UCI professors, and the Academic Assistant, considering this past year has given me the knowledge and ability to grow professionally.

My gratitude is extended to the Head of Project’s Unit at the Department of the Environment for providing me access to a wealth of information. I also want to acknowledge the Head of Information Unit for guiding me along this area of environmental management as it relates to the country.

Thank you to everyone who provided words of encouragement, especially during does sleepless nights as I was balancing a full-time job and schoolwork. Thank you for the patience you gave to me during these past months.

ABSTRACT

The objective of this document is to develop a project management plan for the management of Mercury waste in Belize, and comply with an International Environmental Agreement, the Minamata Convention. Chemical waste by mercury and its compounds from mercury added to consumer products produce highly toxic chemicals when released into the environment. When released into the ecosystem, mercury can bio accumulate, and bio magnify in the food chain which affects human's health.

The final product of this project consists of a study for the sustainable management of mercury waste. This study is made up of the final deliverables of the project that correspond to the management plans for scope, schedule, costs, quality, resource, communications, risks, procurement, and stakeholders. For this, an analytical methodology and the guide provided by the Project Management Institute are used.

As a result of the project, it identifies that the development of this project is highly required as part of the project management processes, including tools and techniques to ensure the success of the project. The project management methodologies, included in this project for the management of mercury waste, provided the framework and benchmark for future projects for the Department of the Environment. It is recommended to submit the project with all the subsidiary plans to secure the project funding and guarantee its successful implementation.

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ABBREVIATIONS AND ACRONYMS

BCRC	Basel Convention Regional Center
DOE	Department of the Environment
EPA	Environmental Protection Act
FGP	Final Graduation Project
GEF	Global Environmental Facility
GIS	Geographic Information System
IEA	International Environmental Agreement
ISLANDS	Implementing Sustainable Low Non-Chemical Development States
ISO	International Organization for Standardization
MC	Minamata Convention
MIA	Minamata Initial Assessment
MSDCCDR	Ministry of Sustainable Development, Climate Change & Disaster Risk Management
NEAP	National Environmental Action Plan
PEU	Project Execution Unit
PMBOK®	Project Management Book Of Knowledge
PMI	Project Management Institute
PPG	Project Preparation Grant
PSC	Project Steering Committee
POP	Persistent Organic Pollutants
SC	Stockholm Convention
UNIDO	United Nations Industrial Development Organization
UNEP	United Nations Environment Programme
WHO	World Health Organization

EXECUTIVE SUMMARY

Environmental pollution by anthropogenic activities within the past decades have given rise to various environmental problems. As a result, the increase of waste produced directly relates to the exponential rate of population growth. Waste products contaminate the environment with the release of heavy metals. Heavy metals are persistent environmental pollutants with detrimental effects to all living organisms. The release of heavy metals into the environment cannot be broken down, but instead these metals are absorbed into the cells of living organisms. One of the most toxic heavy metal, mercury is known to cause harmful, health problems. The effects of mercury cause deformities in fishes which have been discovered in aquatic life, and in studies found. These effects also affect the nervous system in humans due to its high toxicity. As a result, mercury pollution is addressed by an international agreement, referred to as Minamata Convention on Mercury. The convention is an international environmental agreement, whose objective is to protect human health and the environment from releases of mercury and its compounds. This convention is soon to be ratified by Belize; thus, it is important to address these environmental sources of pollutants.

This project management plan became an asset for the Department of the Environment as an implementation plan to the Minamata Convention on Mercury. The project for the management of mercury waste is critical due to the increased risk of toxic chemical leakage into the environment. The Project Management Plans facilitated the process by using best practices and methodology, including various document templates and process plans to address mercury pollution.

The general objective was to develop a project management plan for the management of mercury waste in Belize. The specific objectives were to create a: project charter to formally authorize and provide the Department of the Environment with the authority to utilize the resources and produce a project management plan, and a scope management plan that documents all the work for the success of the project. There are also other plans included, such as, a schedule management plan to support the development of projects that are schedule to ensure the project is completed within the time constraints. There is a cost management plan to define the processes for developing and managing the project budget to ensure the project is completed within the budget constraints. A quality management plan is required to identify the quality requirement for the project in order to ensure results meet expectations for approval within the time, cost and scope constraints. A resource management plan will help to ensure that all resources are identified and managed effectively to complete the project within time, cost, and scope constraints. A communication management plan is needed to ensure the timely and effective communication of the project status and other key information. There is a need for a risk management plan to identify and examine risks for the successful completion of the project and develop plans to minimize the likelihood of the risks. A procurement management plan is needed to obtain products, services or results required by the project. Lastly, there is a need for a stakeholder management plan to identify and support all the project stakeholders to ensure effective stakeholder engagement.

The methodology for this research was analytical by quantitative and qualitative research methods. The management plans were standardized by using the project management methodology, according to the Project Management Institute's Project Management Body of Knowledge Guide (PMBOK® Guide), Sixth Edition.

In conclusion, the project has indicated that the project management processes along with the techniques and tools have been based on the PMI's Standard for Project Management which were successfully achieved. The project management plan provided an asset to the DOE and delivered value to the organization. In addition, the project created a change in the Ministry and the Department, influencing a transition towards the standardization of projects. The subsidiary plans for the project were successfully completed, using the framework of the PMBOK® Guide, Sixth Edition.

It is recommended that the Department of the Environment implements the project management plan to add value and change to the organizational assets of the Ministry of Sustainable Development, Climate Change, & Disaster Risk Management. Furthermore, the recommendation from this project is to provide support to the Department to align principles, oriented towards a project management by utilizing PMBOK® as a guide.

1. INTRODUCTION

1.1. Background

The Ministry of Sustainable Development, Climate Change & Disaster Risk Management contains various portfolios, including the Department of the Environment (DOE). Since the DOE's establishment in 1989, the DOE's major tasks are to recommend national policies which promote improvements in environmental quality as well as recommend priorities among environmental programs, and to assist in achieving international cooperation while addressing environmental problems (Department of the Environment, 2020). The Project Execution Unit (PEU) within the DOE executes all-related, project activities, and successfully implements several International Environmental Agreements (IEAs). As a result, the Department of the Environment (DOE) is the focal point to several International Environmental Agreements (IEA).

International Environmental Agreements (IEA) that protects human health against hazardous chemical includes Stockholm Convention (SC), and Minamata Convection (MC). According to the United Nations Industrial Development Organization (n.d.), the SC is an international environmental treaty that aims to protect human health and environment from hazardous chemicals, such as, persistent organic pollutants (POPs). The MC aims to protect human health from the releases of mercury, and its compounds (Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean, 2021). The Global Environmental Facility (GEF) administers several trust funding, and is the interim financial mechanism (UNIDO, n.d.). The GEF Implementing Sustainable Low and Non-chemical Development in Small Island Development States (ISLANDS) Programme is funded through GEF; it has one of the largest, chemical management focal areas. The project is in the Project Preparation Grant (PPG) Phase in which the project will be developed in consideration of the country's national priorities.

Presently, the Department of the Environment (DOE) submitted the first draft of the national baselines of mercury within the report of the Minamata Initial Assessment (MIA) in May 2020. Subsequently, the assessment led to discussion of national priorities, and the development of Belize's priority areas. The general components of the GEF ISLANDS project includes, "Preventing the future build-up of chemicals in SIDS, safe management and disposal, safe management of products entering SIDS and knowledge management and communication" (Global Environment Facility, n.d.). The DOE must produce a Project Management Plan, incorporating the four components of the GEF ISLANDS, uniquely addressing national priorities areas of waste. The Project Management Plan serves as a formal document, outlining the scope, budget, timeline, objectives, and deliverables to successfully complete the project.

- **Implementing Agencies**

The United Nations Environment Programme (UNEP) works closely with the Global Environment Facility (GEF) to manage significant environmental problems. In the United Nations, UNEP plays a huge role as being its environmental body and as an environmental governance system (United Nations environment Programme, n.d.). Several multilateral environmental agreements are hosted by UNEP of which GEF is the financial mechanism (UNEP, n.d.). GEF funds are available to assist the country's government projects to order to meet international environmental agreements (Global Environmental Facility, n.d.). Funding is available for countries which are eligible. In other words, unless the country has ratified a convention, then GEF has available funding. In addition, the proposed country's project must be of national priority and executed by the country. However, GEF has priorities required to render support by focusing on several areas, but chemicals and waste remain at the top list of priorities.

1.2. Statement of the problem

Mercury is the most, toxic, heavy metal, causing harmful effects on the nervous, digestive, lungs, kidneys, and immune system. The World Health Organization (WHO) has listed mercury as one of the top ten chemicals of major health concerns (as cited by BCRC, 2021). When mercury enters the ecosystem, it can bioaccumulate and biomagnify in the food chain. This can result in different concentrations of mercury in food resources that can affect humans.

According to the initial assessment report, Development of the Minamata Initial Assessment in the Caribbean Belize approximately 95.72 kg of mercury was released in Belize in 2018, mainly from general waste (Basel Convention Regional Centre for Training and Technology Transfer for the Caribbean, 2021). The initial results demonstrated that the most, significant source of mercury-release was found to be in the consumption of products with mercury and its disposal. Figure 1. shows mercury release for the year 2018. The initial assessment is a guide for the identification of future assessments.

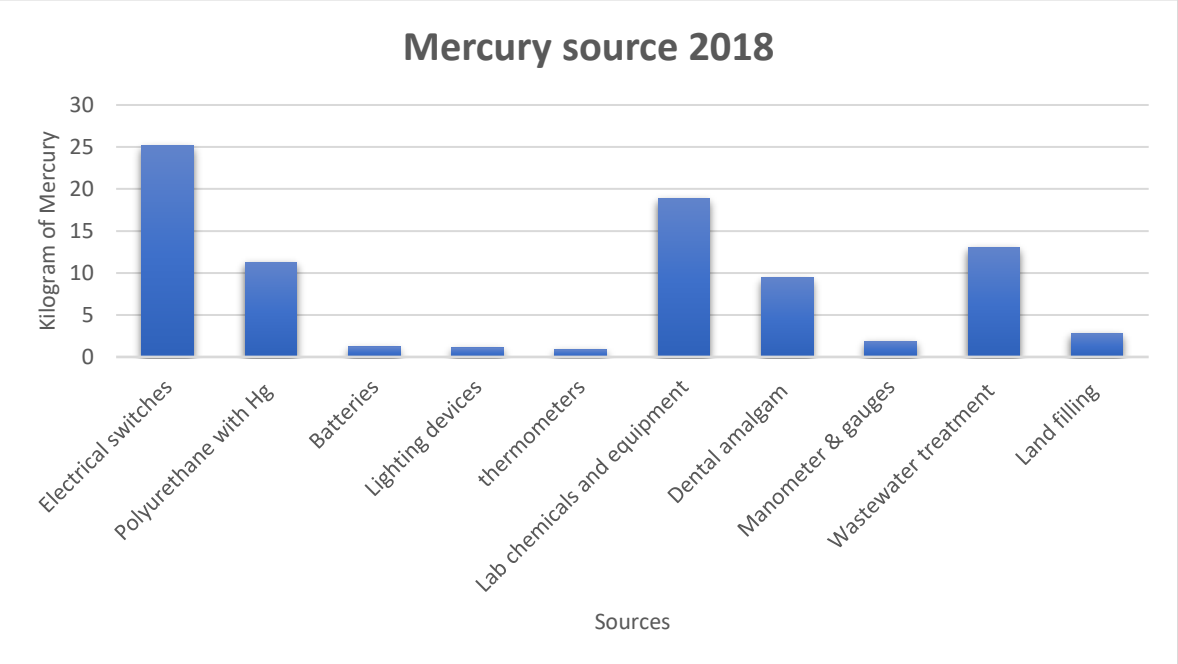


Figure 1 Mercury source releases for 2018 (Source: BCRC, 2021)

However, through a Project Management Plan for the management of mercury waste in Belize, this will provide a plan for the mitigation of the waste and reduce the release of toxic chemicals into the environment. In addition, this will be developed through the best practices of project management with the tools, and techniques and the processes in order for the successful delivery of expected results.

1.3. Purpose

The purpose of this project is to create a project management plan that integrates sustainable principles to enable conditions and the environment for the management of mercury. A project for the management of mercury is critical due to the increased risk of toxic chemical leakage into the environment.

This management plan will become an asset for the Department of the Environment to be used for submission to secure funding for future projects under the GEF ISLANDS Programme. With this project, Belize will assume its responsibilities, reduce toxic waste, and be in compliance with the Basel Convention that requires countries to reduce the movements of hazardous waste between nations. The Management Plan will include the methodology to plan, execute, monitor, control, and close processes for the project. This project will contain mitigation activities to address chemical management to prevent environmental pollution and health damage caused by mercury.

1.4 General objective

To develop a Project Management Plan for the management of Mercury waste in Belize to comply with the Minamata Convention.

1.5 Specific objectives

1. To create a scope management plan that documents all the work activities for the success of the project.

2. To create a schedule management plan for the planning developing, managing, executing, and controlling for the timely completion of the project.

3. To create a cost management plan for the planning, budgeting, managing, and controlling costs in order that the project can be completed within the established budget.

4. To develop a quality management plan to manage the quality requirements are met by the project and the results are acceptable.

5. To create a resource management plan to identify and manage all the resources effectively in order to complete the project within the time, cost, and scope.

6. To develop a communication management plan to ensure the information is communicated within a timely manner, relating to the project status and other key stakeholders.

7. To create a risk management plan to identify, analyse, monitor, and respond to those risks for better chances of the project's success.

8. To develop a procurement management plan to acquire products, services, or results, required by the project.

9. To develop a stakeholder management plan to identify all project stakeholders in order to ensure an effective stakeholder engagement.

2. THEORETICAL FRAMEWORK

2.1. Company/Enterprise framework

2.1.1 Company/Enterprise background

Belize is the only English-speaking country in Central America. Mexico borders the country along the north and west, and Guatemala along the west and south and with the Caribbean Sea on the east. The land area is of 8,866 square miles and with more than 1,000 cayes. Rich in biodiversity and pristine natural resources, recognized by UNESCO's World Heritage Site, Belize is the home to the largest continuous barrier reef in the Western Hemisphere.

For this reason, Belize has made tremendous efforts in the sustainable management of its natural resources, and of the protection of its environment (Department the Environment, 2014). With the growing population, challenges are seen in managing and sustaining the resources and protecting the environment for future needs.

There is an imperative focus for the protection of the environment within the Belizean Constitution, as cited by the DOE (2014), "…*the people of Belize require policies of state which… protects the environment, promotes cooperation among nations and respect for international law and treaty obligations*." In 1992, the Environmental Protection Act (EPA) was developed and legislated, incorporating issues of Environmental Management in one. The EPA gave way for the establishment of the Department of the Environment, mandated to address modern environmental pollution issues (DOE, 2014).

Until recently, the Department of the Environment (DOE) is part of the newly formed Ministry of Sustainable Development, Climate Change & Disaster Risk Management (MSDCCDR). Environmental issues from unsustainable practices are a growing concern for the Department. Therefore, the development, ratification, and implementation of environmental policies to mitigate climate change's impacts are crucial.

2.1.1.1 National Environmental Action Plans (NEAP)

The NEAP is an action plan, developed by the DOE in which it incorporates strategic goals and targets which address environmental issues. The NEAP 2014-2024 identified Green, Clean, Resilient and Strong as the four strategic clusters (DOE, 2014). The second strategic cluster, Clean, highlights the concerns related to pollution. Clean has specific strategic goals and targets on issues of waste management, reducing pollution and sound Chemicals Management (pg. 54). By including these issues, it promotes the identification of best practices and technology that will help curb these issues. In addition, this strategy binds the Department and the government to seek connections among the private sector, and other stakeholders in pollution control efforts (DOE, 2014).

2.1.1.2 International Environmental Agreements

The Department of the Environment is mandated to address environmental issues from anthropogenic activities. Belize is a party to many International Environmental Agreements (IEAs), related to the environment of international concerns. A few of the major IEAs and Conventions includes:

- The Basel Convention is an international treaty, designed to reduce movements of hazardous waste.
- The Rotterdam Convention aim is on the Prior Informed Consent Procedure (PIC) on the importation of hazardous chemicals.
- The Stockholm Convention on Persistent Organic Pollutants aims to protect human health of the effects of persistent organic pollutants (POPs).
- Minamata Convention[1] is designed to protect human health and the environment on releases of mercury and its compounds.

[1] Minamata Convention will be ratified by December 2021.

2.1.2 Mission and vision statements

Mission Statement

The Department of the Environment's mission statement originates from the EPA to monitor and implement. The Department's mission it "to ensure that Belize's development is sound through effective environmental management for present and future generations" (DOE, 2014).

Vision Statement

In the most recent DOE's National Environmental Action Plan, it outlines the vision of the Department as "to be leaders in environmental stewardship for sustainable development both nationally and regionally" (DOE, 2014).

2.1.3 Organizational structure

The Department of the Environment (DOE) is relatively a small department with a huge responsibility in environmental management. The DOE is staffed with nineteen (19) permanent and established staff. The DOE is led by the Chief Environmental Officer, Mr. Martin Alegria, with its Deputy Environmental Officer and Senior Environmental Officer among its Environmental Officers, Environmental Technicians and two (2) of its staff, employed as the Ozone Officer and Project Manager.

The DOE has primarily five (5) units with only one Project Manager. However, when needed consultants and project managers are hired for their services. In Figure 2. below is the organization chart for DOE.

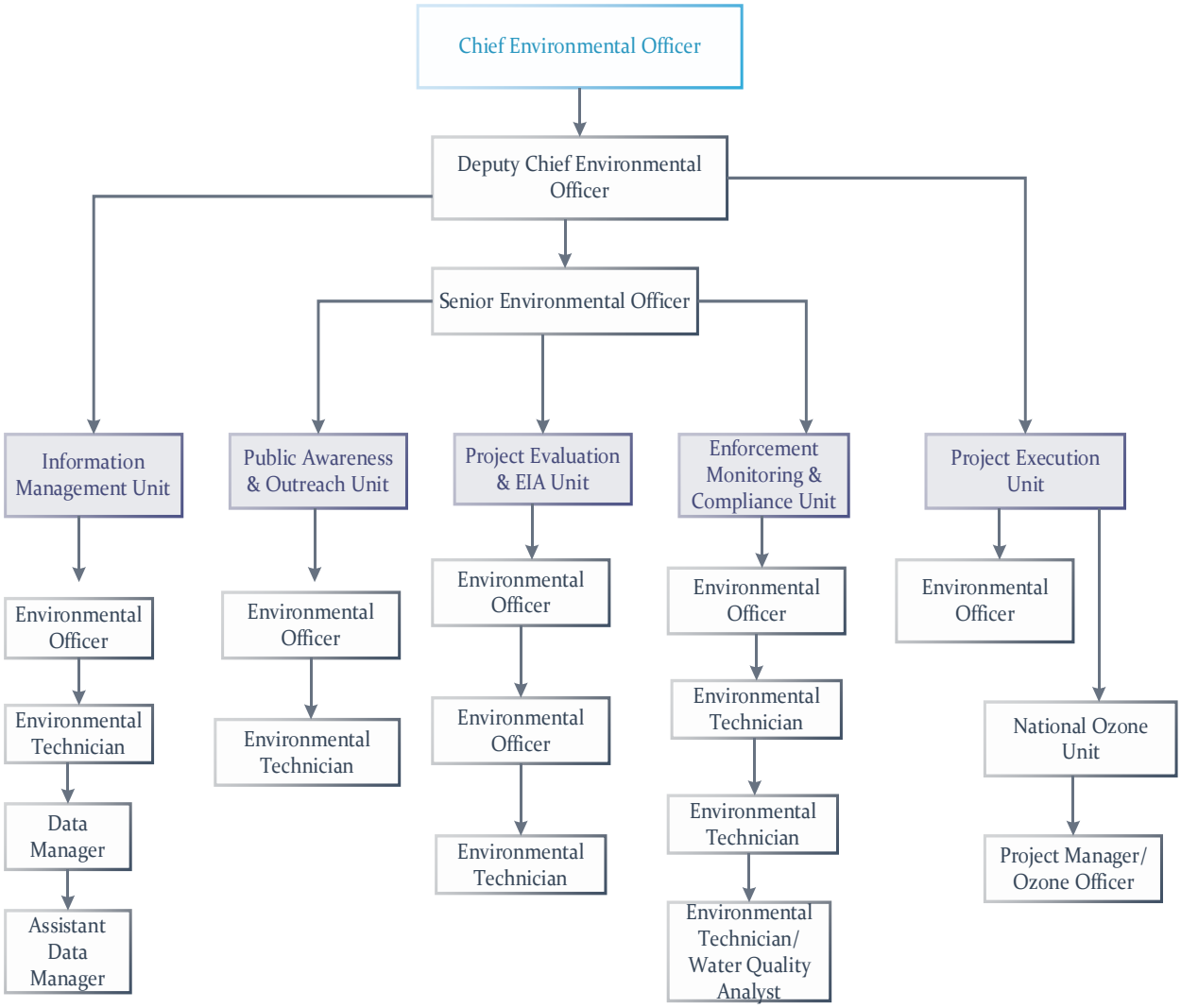


Figure 2 Organizational structure (Source: Department of the Environment, n.d.)

2.1.4 Products offered

The Department of the Environment offers several services, related to environmental management:

- Disaster Risk assistance
- Water Quality analysis
- Capacity- building for enforcement officers
- Environmental Clearance to projects

- Importation Permits and Licenses for regulated commodities
- Monitoring and compliance of environmental projects
- Community Outreach Programs- Finance clean up campaigns for communities and schools

2.2. Project Management concepts

2.2.1 Project

A project is a temporary endeavour undertaken to create a product, service, or result (PMI, 2017, p. 4). The authors, Sholarin & Awange (2015, pg. 32) mention that an environmental-based project is distinguishable from other projects by achieving a specific sustainable, environmentally oriented objective and goal. As a result, an environmental-based project becomes a daily environmental management activity for the organization (Sholarin & Awange, 2015). That being the case, this project will develop a project management plan that integrates sustainable principles to enable conditions and environment for the management of Mercury waste in Belize. The project management plan will focus on mitigation efforts by applying sustainable principles to pollution control of mercury from wastes.

2.2.2 Project management

The PMBOK® Guide defines project management as "*the application of knowledge, skills, tools and techniques to project activities to meet the project requirements… is accomplished through the appropriate application and integration of the project management processes identified for the project*" (PMI, 2017, p.10).

A project management office does not exist at the DOE within the Ministry for proper standardization of methods for the monitoring, control, project execution performance and implementation of project management tools.

Therefore, the use of the Project Management Body of Knowledge (PMBOK® Guide) will provide the framework for this project. The PMBOK® Guide is a collection of processes, terminologies, best practices and guidelines and methodology is accepted as a standard

for managing projects. Therefore, through the project management methodology of the PMBOK® Guide, this project will use its standards. The methodology will look at the five project processes, such as, initiation, planning, monitoring, controlling, and closing.

2.2.3 Project life cycle

The PMBOK® Guide explains a project life cycle as “a series of phases that a project passes through from its start to its completion” (PMI, 2017, p.19). For this project, the project scope, time, and cost will be determined in the early phases of the life cycle, thus, it will be a predictive life cycle. This collection of phases consequently transforms the initial concept into a product or service. Each phase is a collection-related project activity, ending with the production of deliverables. These phases provide a basic framework for the managing of the any project work. Sholarin & Awange (2015) states that the project life cycle phases will include the following:

- Initiation or conceptual phase;
- Planning phase;
- Execution or implementation phase; and
- Close-out or finalization phase.

The project phases interact over the project life cycle as seen by the Figure 3.

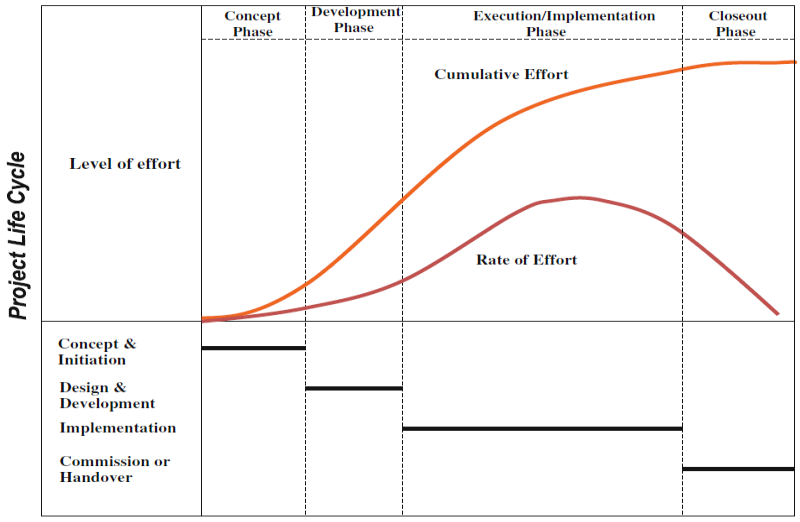


Figure 3 Life cycle of the project (Source: Sholarin & Awange, 2015)

- **Initial or Conceptual Phase**

Normally, in the initial or conceptual phase, first and foremost, the need is identified, followed by the background information which is gathered for the project (Sholarin & Awange, 2015). The conceptual phase is considered to be one of the most critical phases of the project. The triple project constraints are involved with details of the project, and is developed to include cost, schedule, and estimates. The result of this phase is the approval of the proposal, such as, the project charter, the project cost, and the schedule. In this case, the Minamata Initial Assessment identified, the national mercury inventory will play a crucial part of the project.

- **Planning Phase**

In the phase, more planning occurs, with the identification of the need to include other people in various disciples as part of the project requirements. As the work packages are dissected, the responsibilities are assigned, the work is broken down, and timeline charts and the risks are developed (Sholarin & Awange, 2015).

- **Execution or Implementation Phase**

In this phase, the planned activities are now executed and implemented as agreed in the project. The work packages identified in the planning stage turns into deliverables that satisfies the project requirements (PMI, 2017). The project is implemented within the parameters of the cost, schedule, and time.

- **Close-Out of Finalization Phase**

The phase indicated where all the deliverables, expected results and project needs are satisfied, thus, culminating the project. In the end, documents are signed and archived as lessons learned. Notably, “whenever another environmental problem is identifying, a new project emerges and the life cycle starts up all over again” (Sholarin & Awange, 2015).

2.2.4 Project management processes

Project Management framework in the PMBOK® Guide outlines five process groups as seen below. For the execution of this project these processes will be incorporated.

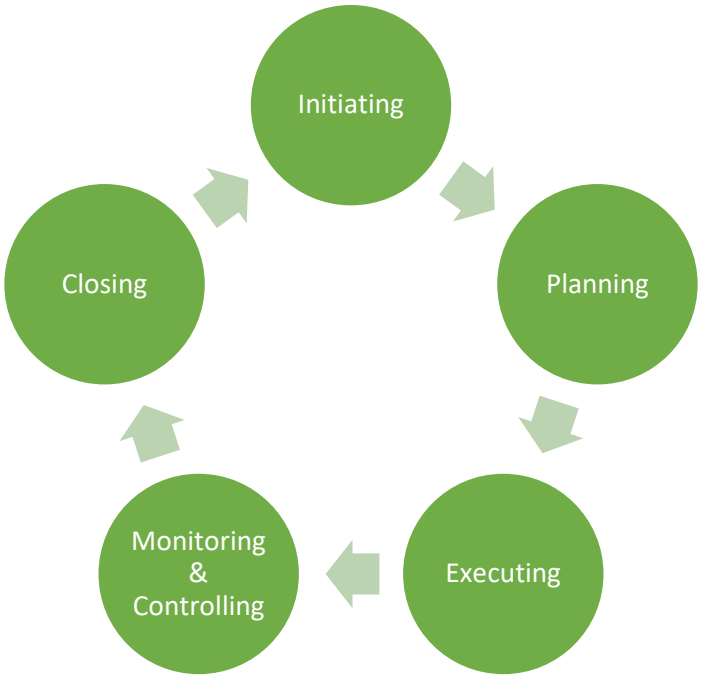


Figure 4 Project Management Process Phases (Author: PMI, 2017)

- **Initiating Process Group**

For a new project, formal authorization from the sponsor is required before the project starts and the assigning of the project manager. The processes will seek to align with the strategic objectives of the organization. In addition, this process group outlines all the necessary phases to successfully complete the project. PMI (2017) mentions the initial scope, initial resources and stakeholders will be captured.

- **Planning Process Group**

This Process Group will establish, define, and refine the objectives of the project. However, more significantly, this group will develop the plan based on the way the

objectives will be achieved. The project management plan and other subsidiary plans will be developed (Iqbal, 2019). In addition, the planning group will comprehensively establish the scope of the project for its execution. As a result, the project deliverables will be established following the initiating process group.

- **Executing Process Group**

With the project management plan developed during the planning processes, it will serve as a guide during the executing process where the actual work is done. During the executing of the project management plan, the resources, budget, and time are used (PMI, 2017, p. 23).

- **Monitoring & Controlling Process Group**

Deviation from the project management plan, if any, is monitored during the monitoring & controlling process group. The PMBOK® Guide (2017) describes this process group that *"consists of processes to track, review, and regulate the progress and performance of the project; identify any areas in which changes to the plan are required" (p.613).* This process group, in addition, measures the performance of the project and is analysed to identify variances from the project management plan.

- **Closing Process Group**

In this group of processes, it primarily consists of the formal complete or close of a project. After verification that the processes are completed within all other process groups, then the project is officially closed.

2.2.5 Project management knowledge areas

A Knowledge Area is the knowledge requirements necessary for that process regarding project management. Therefore, Knowledge Areas are components that include processes, practices, inputs, outputs, tools, and techniques.

- **Develop Project Management Plan**

The PMBOK® Guide defines this process as a process that produces a comprehensive document and contains all the basis of the project work and how the work will be performed (PMI, 2017, p. 82). The plan is a formal and approved document that outlines the execution, monitoring and control of the entire project.

- **Project Scope Management**

The Scope Management contains the processes that involve the defining all work activities required to complete the project (PMI, 2017, p 129.). Two processes within Scope Management will be used for the Plan Scope management, and the scope management plan and Create WBS.

- **Plan Scope Management**

A document that defines the project's scope will be defined, validated, and controlled.

- **Project Schedule Management**

Includes processes that manage the timely completion of the project (PMI, 2017, p. 173). The schedule management plan provides guidance, based on the way the progress will be measured and duration of activities. Both will be the basis of establishing a baseline for the project. The plan will contain ways to mitigate any variances of the schedule. A change control procedure will be described to manage schedule changes. For this project, an activity list with the duration estimates will be identified within the Schedule Management Plan.

- **Project Cost Management**

Planning, estimating, budgeting, financing, funding, managing, and controlling costs are the processes involved so that the project is within the approved budget (PMI, 2017, p. 231). The cost management plan and cost estimate will be included for the project.

- **Project Quality Management**

The organization's quality policy regarding planning, managing and control including quality requirements in order to meet stakeholder's objectives will be in this process (PMI, 2017, p. 271). This project will include the developed, quality management plan.

- **Project Resource Management**

The PMBOK® Guide provides guideline of processes that ensure that the necessary, required resources will be available to the project manager when needed (PMI, 2017, p. 307). The processes will identify, acquire, and manage the resources for the successful completion of the project. For this knowledge area, it will only include the Plan Resource Management.

- **Project Communications Management**

Managing communications within the best practices of project management includes: the process whereby that information needs of the project, and its stakeholders' needs are met (PMI, 2017, p. 359). Through various activities, communication will be designed to achieve an effective information exchange. A communication management plan will be developed from these processes.

- **Project Risk Management**

A project's success can be hindered by uncertainties during its execution; however, project risk management takes into consideration the processes of conducting risk management planning, identification, analysis, response planning, response implementation and monitoring risk on a project (PMI, 2017, p. 395). The following processes will be used for the development of the Risk Management, Plan Risk Management, Identify Risks, Perform Qualitative Risk Analysis and Plan Risk Responses.

- **Project Procurement Management**

The required needs or service that are external from the project team will include project procurement management processes. These processes are necessary to purchase or acquire products, services (PMI, 2017, p. 459) used for the development of Plan Procurement Management.

- **Project Stakeholder Management**

The PMBOK® Guide defines a stakeholder as "*an individual, group, or organization that may affect by, or perceive itself to be affected by a decision, activity, or outcome of a project, program, or portfolio"* (PMI, 2017, p.723). Therefore, "*the project team will analyse the stakeholder's expectations, assess the degree to which they impact or are impacted by the project, and develop strategies to effectively engage stakeholders in support of project decisions and the planning and execution of the work of the project"* (PMI, 2017, p. 503). The project will include: the process groups, Identify stakeholders, and Plan Stakeholder Engagement.

2.3. Other applicable theory/concepts related to the project

This section includes information, related to solid waste management, and its hazards to the environment and human health.

2.3.1 Environmental Project Management

This project's framework incorporates the tenets of project management; however, additional principles will guide this project towards an environmental project management. The concept of Environmental Project Management is relatively new term, and to some, its definition is managing the environment as a project. However, the authors, Sholarin & Awange (2015) describe environmental project management as "a concept that uses project management principles, methods, and processes, to manage and improve an element of the ecosystem in order to achieve a sustainable outcome."

The framework of environmental project management gears towards environmental compliance, environmental management, and environmental project planning. The framework aims to achieve the following:

- Protect human health and the environment
- Facilitate more effective and efficient environmental monitoring and remediation of contaminated sites and
- Provide a social benefit for people and the community (Sholarin & Awange, 2015, p.94)

Environmental issues occur in space, and as such, are area-based, therefore, an analysis of environmental pollution issues need to be taken spatially. As a result, environmental problems should be analyzed at a regional scale. Tools, such as, Geographic Information Systems (GIS) can provide the necessary solution. GIS are systems of hardware, software, data, people, organizations, and institutions for collecting, storing, analyzing and disseminating information about areas of Earth (Loh & Tapaneyakul, 2012). For this project, GIS as an environmental project management tool shall be used as outlined in Figure 5.

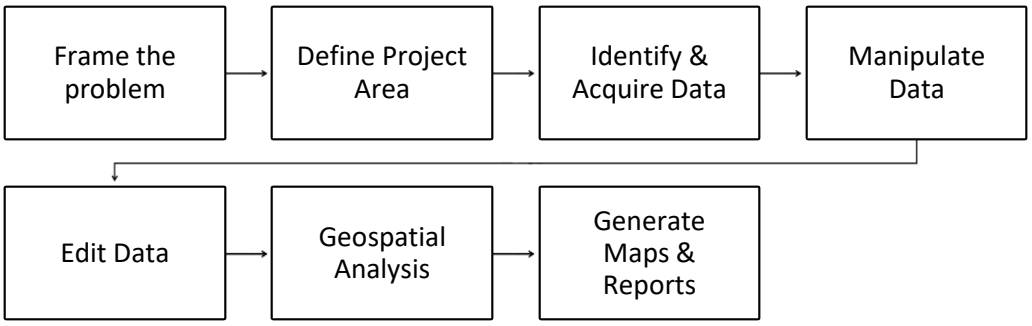


Figure 5 Diagram of problem-solving steps with GIS (Source: Loh & Tepaneeyakul, 2012).

2.3.2 Solid Waste Management

Solid waste management practices vary within countries; moreover, waste management approaches encourage the reduction of waste generation through recycling, re-use, and safe disposals at landfills. However, these are not often practiced. Waste management

practices is a reflection of the country's laws and policies that governs waste management and the extent of its enforcement. The collection of waste has a final destination to dumping sites which are usually on the outskirts of the towns or cities. However, village dump sites are normally collected and dumped at the nearest dumping site. At times, the items at the dumping sites are scavenged, such as, for recycling. Solid waste composition is quite complex as it may contain industrial, medical, electronic, and human waste. Waste classification is made into two groups mainly organic and inorganic.

2.3.3 Exposure to solid waste

Poor solid waste management has had a link to health concerns over the years. Exposure to solid waste can be in the form of direct contact, penetrating injuries, inhalation, or ingestion (Ziraba et. al., 2016). Hazardous materials at dumpsites or collection centres of solid waste can cause heavy metal poisoning, such as, mercury. Residents who live next to dumpsites are not only affected by the stench but are exposed to hazardous chemicals.

2.3.4 Standards for the detection of mercury

In addition to the project management standards, this project will be following the ISO Standards for the detection of mercury. This project will uphold to the ISO Standards, according to ISO standards which are described as "a formula that describes the best way of doing something… are the distilled wisdom of people with expertise in their subject matter" (ISO, n.d.). Therefore, the standards *ISO 12846:2012 Water quality- Determination of mercury- Method using atomic absorption spectrometry (AAS) with or without enrichment* will be used as the best form of procedures for testing.

3. METHODOLOGICAL FRAMEWORK

3.1 Information sources

The sources where information is obtained it referred to as information sources. Various information sources are in the form of grey literature, interviews, project reports, including the World Wide Web.

3.1.1 Primary sources

Primary sources are defined as "*those sources which contain original information that has been published, reported or recorded for the first time"* (National Institute of Open Schooling, n.d.). The primary sources are periodicals, technical reports, webinars, and Interviews.

3.1.2 Secondary sources

The University of New South Wales explains secondary sources as "*an analysis, interpretation … often involve generalization, synthesis, interpretation, commentary or evaluation"* (UNSW Sydney Library, n.d.). Secondary sources are:

- Environmental project management books
- A Guide to the Project Management Body Of Knowledge Guide (PMBOK Guide)

Chart 1 Information sources (Source: Author)

Objectives	Information sources	
	Primary	Secondary
To create a scope management plan that documents all the work activities for the success of the project.	Technical reports and government documents, journal articles, OPA	PMBOK® Guide, textbooks, literature reviews, government reports

Objectives	Information sources	
	Primary	Secondary
To create a schedule management plan for the planning developing, managing, executing and controlling for the timely completion of the project.	Technical reports, personal interview with Head of Project's Execution Unit, meetings	PMBOK® Guide and Practice Standard for Scheduling Third Edition, internet, literature review
To create a cost management plan for the planning, budgeting, managing and controlling costs so that the project can be completed within the established and approved budget.	Technical report, personal interviews, historical data	PMBOK® Guide, literature review and internet
To develop a quality management plan to manage the quality requirements are met by the project and the results are acceptable.	Scholarly articles, technical reports, government reports,	PMBOK® Guide, literature review, historical data,
To create a resource management plan to identify and manage all the resources effectively in order to complete the project within the time, cost, and scope.	Technical report, interview with project manager, personal communication	PMBOK® Guide

Objectives	Information sources	
	Primary	Secondary
To develop a communication management plan to ensure the information is communicated within a timely manner on the project status and to other key stakeholders.	Journal articles, Organizational Process Assets (OPA), technical report	Internet, government reports, PMBOK® Guide, textbook
To create a risk management plan to identify, analyse, monitor, and respond to those risks for better chances of the project's success.	Project manager, government reports,	PMBOK® Guide, textbook
To develop a procurement management plan to acquire products, services or results required by the project.	OPA, technical report, Project Manager	PMBOK® Guide, textbook
To develop a stakeholder management plan to identify all the project stakeholders and to ensure an effective stakeholder engagement.	Interview, technical reports, emails,	Historical data, internet, textbooks, international environmental agreement website, PMBOK® Guide

3.2 Research methods

Scholars define research methods as "A research method is a way of conducting and implementing research" (Adams, Hafiz, Raeside, and White, 2007). For research projects, there are different forms of designing research. This directly depends on the problem the project aims to answer.

Research methods are all those techniques used for the collection of information of research. Techniques for research are the behaviour and instruments used during observation, data collection and processing data (Manzoor, n.d.). There are two main types of research: Qualitative Research and Quantitative Research.

3.2.1 Qualitative Research

Uses a variety of methods and techniques that cannot be quantified (Miller & Yang 2007). The method of qualitative research uses data collection and analysis with the aim of social relation (Adams, et. al, 2007). Authors Adams, et. al (2007) mention that “this method generally describes reality as experienced by the respondents.” Qualitative research is characterized by various research methods, such as, interviews.

- **Interviews**

A qualitative research technique occurs by asking the participants open-ended questions. The author, Leavy (2017) explains open-ended questions to be those kinds of questions in which a participant’s response is expressed in their own language and can go in any direction.

3.2.2 Quantitative Research

Quantitative research, based on the author, Neuman (2014) mentions that this research “uses a systematic and follows a linear research path.” This research is a “methodological approach to deductive designs to refute or build evidence in favour of specific theories and hypotheses” (Leavy, 2017). For example, surveys are one of the most used research methods of quantitative research.

- **Surveys**

Specific methods or tools used to collect data which can be grouped into larger genres or design. Thus, a research method is a tool for data collection (Leavy, 2017). In the book, written by Neuman (2014), he explains that surveys can be used for exploratory,

descriptive or explanatory research. However, Neuman (2014) states that in surveys the categories can overlap to explore the following: behaviour, attitudes/beliefs, characteristics, expectations, self-classification, and knowledge.

For the purpose of designing the research for this project, and to address the main problem, both analytical research methods will be used.

Chart 2 Research methods (Source: Author)

Objectives	Qualitative research method	Quantitative research method
To create a scope management plan that documents all the work activities for the success of the project.	This method used will provide the necessary information to develop the scope management plan.	Through conversation, data is gathered either through structured or semi-structured questions.
To create a schedule management plan for the planning, developing, managing, executing and controlling of the timely completion of the project.	Secondary research will be used to collect existing information for the development of this objective.	
To create a cost management plan for the planning, budgeting, managing, and controlling of costs, so that the project can be completed within the established and approved budget.	The objective will be met by using existing information and collecting other information.	This will be achieved by employing interviews with structured and semi-structured questions in order to fully understand and complete this objective.

Objectives	Qualitative research method	Quantitative research method
To develop a quality management plan to manage and ensure that the quality requirements are met by the project, and the results are acceptable.	Secondary research from various sources will integrate the information necessary for this objective.	A survey using questionnaires will facilitate the information for the development the quality management plan.
To create a resource management plan to identify and manage all the resources effectively in order to complete the project within the time, cost, and scope.	With the use of secondary research, this method will assist to achieve this objective.	
To develop a communication management plan to ensure the information is communicated within a timely manner on the project status, and to other key stakeholders.	Interviews via telephone, e-mail or in person will ensure the achievement of this objective.	
To create a risk management plan to identify, analyse, monitor and respond to those risks for better chances of the project's success.		A survey with questionnaires will collect the information for the development of the risk management plan.
To develop a procurement management plan to acquire products, services, or results required by the project.	Interviews and secondary research will facilitate the completion of the procurement plan.	

Objectives	Qualitative research method	Quantitative research method
To develop a stakeholder management plan to identify all the project stakeholders to ensure an effective stakeholder engagement.	To complete this objective, interviews as a research method will provide the data required.	

3.3 Tools

Research instruments uses tools as part of the research studies to gather the data. However, the PMBOK® Guide (PMI, 2017, p.725) describes tools as “something tangible, such as a template… used in performing an activity to produce a product or result.” This project has identified the tools to be used as seen below. There are six tools and techniques groups used in the PMBOK® Guide (2017, p. 868).

- Meetings- for the discussion of problems and finding a solution, to exchange information and build a relationship with the participants
- Data analysis- used to organize, assess, and evaluate data and information
- Project management information system
- Reserve analysis- used to determine and establish a reserve for the schedule duration, budget, estimated cost or funds for the project
- Communication requirement analysis- for the transfer information between stakeholders
- Risk categorization- used to determine the areas of the project most exposed to the effects of certainty
- Source selection analysis- to review the competing demands for the project before deciding
- Stakeholder analysis- results in a list of stakeholders and their positions in the organization
- Document analysis- assessing the available project documentation and lessons learned
- Prioritization of stakeholders- a method to categorize stakeholders

- Expert judgement- making judgement based on skill, specialized knowledge in an area
- Activity list template- depicts a list of activities for the project
- Quality Management plan template- outlines the development of the quality management plan
- Cost management plan template- outlines the cost management plan for guidance

The following chart shows the identified tools used in order to meet the objectives described.

Chart 3 Tools used as part of the project (Source: Author)

Objective	Tools
To create a scope management plan that documents all the work activities for the success of the project.	- Meetings - Expert judgement from the project manager - Data analysis using requirements traceability matrix template - Scope management plan template
To create a schedule management plan for the planning developing, managing, executing and controlling for the timely completion of the project.	- Meetings - Expert judgement from Environmental Officers - Rolling wave planning - Project management information system - Activity list template - Schedule management plan template
To create a cost management plan for the planning, budgeting, managing, and controlling costs so that the project can be completed within the established and approved budget.	- Data analysis - Meetings - Expert judgment - Reserve analysis - Historical information review - Cost management plan template

Objective	Tools
To develop a quality management plan to manage and ensure that the quality requirements are met by the project and the results are acceptable.	- Inspection planning - Data analysis - Meetings - Data gathering - Quality management plan template
To create a resource management plan to identify and manage all the resources effectively in order to complete the project within the time, cost, and scope.	- Decision making - Data analysis - Expert judgement - Data gathering
To develop a communication management plan to ensure the information is communicated within a timely manner on the project status and to other key stakeholders.	- Expert judgement - Communication requirement analysis - Communication methods - Project reporting
To create a risk management plan to identify, analyse, monitor and respond to those risks for better chances of the project's success.	- Expert judgment - Data analysis - Risk categorization - Data gathering
To develop a procurement management plan to acquire products, services, or results required by the project.	- Source selection analysis - Market research - Expert judgment
To develop a stakeholder's management plan to identify all the project stakeholders to ensure an effective stakeholder engagement.	- Stakeholder analysis - Data gathering - Document analysis - Power/interest grid - Prioritization of stakeholders

3.4 Assumptions and constraints

3.4.1 Assumptions

The PMBOK® Guide defines assumption as "*a factor in the planning process that is considered to be true, real, or certain without proof or demonstration"* (PMI, 2017, p. 699).

3.4.2 Constraints

As described in the PMBOK® Guide, a constraint is *"a limiting factor that affects the execution of a project, program, portfolio, or process"* (PMI, 2017, p. 702). The following chart of assumptions and constraints that affects the execution of the project.

Chart 4 Assumptions and constraints (Source: Author)

Objectives	Assumptions	Constraints
To create a scope management plan that documents all the work activities for the success of the project.	It is assumed that the Department of the Environment (DOE) will be supportive for the development of the scope management. It is assumed that the scope management plan will be in line with the DOE's mandate.	Scope creep due to changes in scope.
To create a schedule management plan for the planning developing, managing, executing, and controlling for the timely completion of the project.	It is assumed that the project will be completed within the 18 months.	The project completion should not go beyond 18 months.

Objectives	Assumptions	Constraints
To create a cost management plan for the planning, budgeting, managing and controlling costs, so that the project can be completed within the established and approved budget.	It is assumed that the funding will be by the Global Environment Facility (GEF) ISLANDS Programme. It is assumed that the project will be executed within the budget baseline.	Unidentified professional services to achieve objectives may cause a change in budget.
To develop a quality management plan to manage the quality requirements to see that these requirements are met by the project and the results are acceptable.	It is assumed that the stakeholder's quality requirements are documented.	Quality requirements may change during the project.
To create a resource management plan to identify and manage all the resources effectively in order to complete the project within the time, cost, and scope.	It is assumed that all the resources needed for the completion of the project will be sourced locally.	Resources needed may not be available.
To develop a communication management plan to ensure the information is communicated within a timely manner on the project status and to other key stakeholders.	The support from the Department of the Environment will be made available with the provision of historical data.	The Department of the Environment may not have an established communication method with key stakeholders.

Objectives	Assumptions	Constraints
To create a risk management plan to identify, analyse, monitor and respond to those risks for better chances of the project's success.	It is assumed that all risks will be identified and budgeted.	Resources not available to address the risks.
To develop a procurement management plan to acquire products, services or results required by the project.	It is assumed that the goods and services needed will be obtained locally.	Limited suppliers and the requirements are not met.
To develop a stakeholder management plan to identify all the project stakeholders to ensure an effective stakeholder engagement.	It is assumed that all relevant stakeholders for this project will participate and become available.	The interest of the stakeholders may change during the project.

3.5 Deliverables

According to the PMBOK® Guide (2017), it describes a deliverable as *"any unique and verifiable product, result, or capability to perform a service that is required to be produced to complete a process, phase, or project"* (p. 704). The following chart depicts the deliverables of the project management plans.

Chart 5 Deliverables (Source: Author)

Objectives	Deliverables
To create a scope management plan that documents all the work activities for the success of the project.	Scope Management Plan
To create a schedule management plan for the planning developing, managing, executing, and controlling for the timely completion of the project.	Schedule Management Plan

Objectives	Deliverables
To create a cost management plan for the planning, budgeting, managing, and controlling costs so that the project can be completed within the established and approved budget.	Cost Management Plan
To develop a quality management plan to manage the quality requirements are met by the project and the results are acceptable.	Quality Management Plan
To create a resource management plan to identify and manage all the resources effectively in order to complete the project within the time, cost, and scope	Resource Management Plan
To develop a communication management plan to ensure the information is communicated within a timely manner on the project status and to other key stakeholders.	Communication Management Plan
To create a risk management plan to identify, analyse, monitor, and respond to those risks for better chances of the project's success.	Risk Management Plan
To develop a procurement management plan to acquire products, services or results required by the project.	Procurement Management Plan
To develop a stakeholder management plan to identify all the project stakeholders to ensure an effective stakeholder engagement.	Stakeholder Management Plan

4 RESULTS

SCOPE MANAGEMENT PLAN FOR MANAGEMENT OF MERCURY WASTE IN BELIZE

DEPARTMENT OF THE ENVIRONMENT

BELIZE, C.A.

4.1 Scope Management Plan

4.1.1 Introduction

The Scope Management Plan provides a framework for the Management of Mercury Waste (MMW) Project in Belize. The purpose of the Scope Management Plan is to document a defined scope management approach, and the processes during the planning as well as identify roles and responsibilities of stakeholders. The document includes the Work Breakdown Structure (WBS), Defined Scope, the validation of the deliverables, scope baseline, and the change management of the scope.

4.1.2 Scope Management Approach

The purpose of the Scope Management Plan is to ensure that all the work required for the successful completion of the project is outlined. The Plan will outline how the scope will be defined, verified and controlled. The Scope Management Plan includes the scope management approach; it will also define the roles and responsibilities of stakeholders and provide the process to manage and control scope changes.

The Project Manager will be responsible for the scope management. The Scope statement and the Work Breakdown Structure (WBS) define the scope. The Project Sponsor, Stakeholders and the Project Manager will approve and establish the work performance measurements and deliverable quality checklists.

4.1.3 Roles and responsibilities

The Project Manager, Sponsor and the team have vital roles in managing the scope of this project. They have responsibilities in order to ensure that the work performed is within the established scope for the entire project. The table below outlines the roles and responsibilities for the scope management.

Chart 6 Roles and Responsibilities for the scope management (Source: Author)

Role	Responsibility
Project Sponsor (Global Environmental Fund)	▪ Provides the finance
GEF Implementing Agency (United Nations Environment Programme)	▪ The Partner of the Donor Agency acts as the Project Sponsor ▪ Provides the disbursement of the funds ▪ Ensures the project delivers the deliverables as agreed ▪ Provides additional funds if the changes are agreed ▪ Reviews the decisions of scope changes ▪ Supervises financial audits of the project ▪ Supervises midterm review and final project evaluations ▪ Provides technical support compliance assistance through the Compliance Assistance Program (CAP)
Project Director (National Executing Agency)	▪ The Focal Point and will represent as the National Executing Agency ▪ Supervises the project activities ▪ Provides support to the management of the project
Project Manager	▪ Manages project scope ▪ Manages scope change requests ▪ Organizes and facilitate scheduled change control meetings ▪ Communicates results of scope change requests
Project Team	▪ Assists the Project Manager ▪ Communicates the results of scope change requests
Project Steering Committee	▪ Approves or Deny changes in the scope ▪ Accepts project deliverables
Stakeholders	▪ Main provider of the requirement to develop the scope

4.1.4 Scope Definition

The Scope was defined through the process of documenting and managing the requirements of the stakeholders in order to meet the objectives. The requirements were carried out by the Partner (UNEP) along with the Executing Agency, the Department of the Environment (DOE). An assessment was completed as an enabling activity for the ratification and/or implementation of the Minamata Convention on Mercury. This project revised all relevant information for the development of the project management of the management of mercury waste.

4.1.5 Scope Statement

The Scope Statement provides a well-defined description of the product scope, major deliverables and exclusions. The Statement will include the scope description, deliverables, and acceptance criteria.

4.1.5.1 Scope description

The scope of the project is to provide the Department of the Environment with a project management plan for the management of mercury waste in Belize. The project will also seek to establish a management system to monitor mercury release and emissions and its sources. The release of mercury into the environment has a negative impact to the surroundings due to its high toxicity and damaging to the health of all living organisms. The initial assessment conducted by the project “Development of Minamata Initial Assessment in the Caribbean: Belize” reported 2018 data.

Belize currently has no restriction on the consumption of mercury products and penalties for releasing into the environment. As one of the components of the project is *Component 1: Legislative framework & institutional strengthening to support mercury elimination* will address the gaps the Environmental Protection Act (EPA). With this project, a current baseline of mercury products and an inventory will be developed as a result of the project activities. As a result, *Component 2: National Inventory of mercury* will address the data gaps from 2019-2021 to establish a baseline. This baseline will serve for future phase out of mercury products.

With the information gathered, the project will also establish Belize's Environmental Management System of mercury. Component 3: Environmental Management System (EMS) will assist to create a system to identify where there are existing mercury sites; see Figure 6 On the map below, sites will be spatially mapped, and new sites will be identified as potential hotspots.

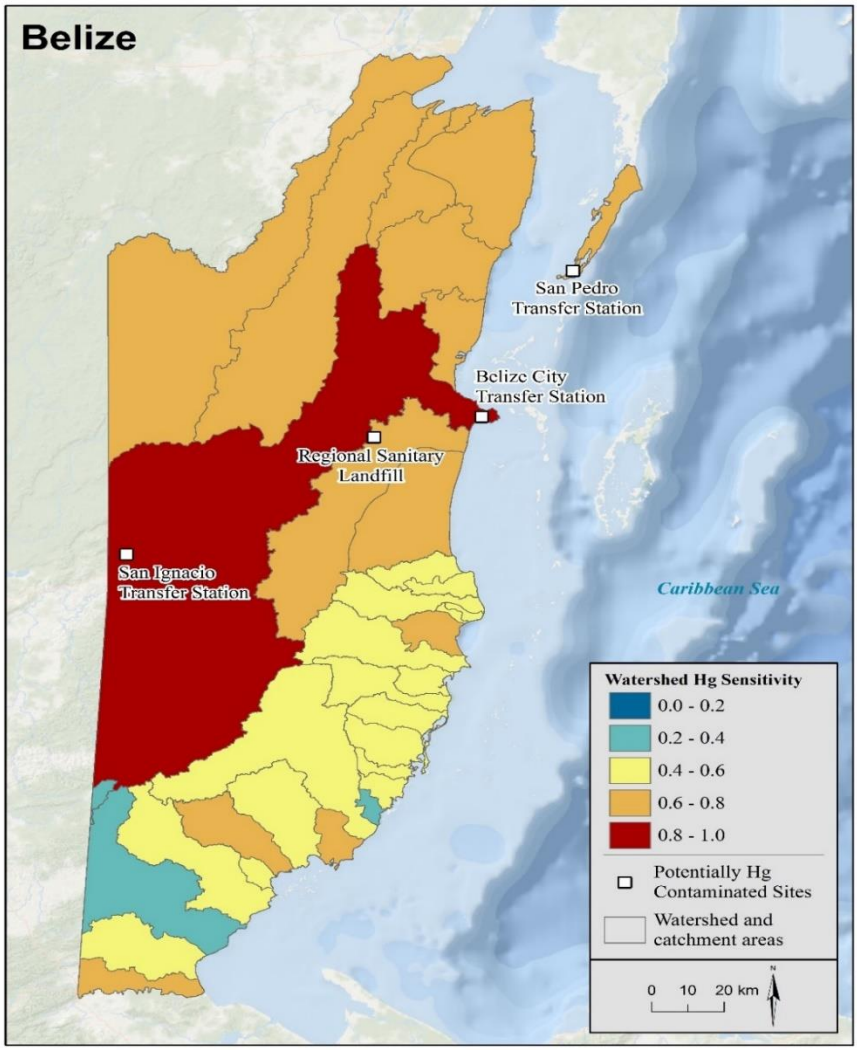


Figure 6 Watershed Mercury Sensitivity Map in Belize. (Source: as cited from BCRC, 2021)

The mercury monitoring network will assist to monitor mercury sensitive areas in Belize in order to reduce the contamination, especially at the watersheds. This component will serve to set a system to monitor and control the importation of mercury products and

promote the mercury alternative products. The final component of this project is the Component 4: Capacity Building. This component will target importers, Custom Officers, DOE personnel and other regulating agencies the training program within this component will serve as a vital tool for the sustainability of the project after its completion. The public will be sensitized about the effects of mercury in the body, its diseases, and the effects on the environment.

4.1.5.2 Project deliverables

There are several project deliverables for this project and failure to complete all of the following will deem the project as unsuccessful. The project manager will be responsible to ensure that all the deliverables are completed described in Chart 7.

Chart 7 Deliverables of the project (Source: Author)

1. National Capacity Building	
1.1 *Ratification to Minamata Convention*	1.1.1 Legislative framework assessment 1.1.2 Minamata Convention Instrument
1.2 National Policy on Hazardous waste	1.2.1 Management and Handling Strategy 1.2.2 Standards for storge and disposal of mercury products 1.2.3 Legal & regulatory 1.2.4 Purchasing Policies
2. National Mercury Sources	
2.1 Baseline for mercury products	2.1.1 Identification of mercury sources
	2.1.2 Identification of mercury importing companies
2.2 Mercury release	2.2.1 Medical waste site
	2.2.2 Landfill site

3. Environmental Management System (EMS)	
3.1 Mercury monitoring network	3.1.1 Monitor & Control of mercury
	3.1.2 Identification of mercury contamination sites
3.2 Phase-out mercury-based products	3.2.1 non-mercury alternatives introduction
	3.2.2 Identification of mercury products with harmonized code
3.3 GIS Mapping	3.3.1 Spatial patterns of mercury
	3.3.2 Models of mercury contamination sensitive area
4. Public Information Campaign	
4.1 Training Programme	4.1.1 Training for Custom Officials and DOE personnel
	4.1.2 Harmonized Code of mercury products training for Custom Officers
4.2 Public Awareness	4.2.1 Sensitization of mercury effects
	4.2.2 Awareness of alternative products non-mercury

4.1.6 Project Scope Definition

The MMW Project aims to prevent chemical wastes of mercury and its compounds to be leaked into the environment. The project will assist with the country's obligation of the Minamata Convention on Mercury. The project has been designed to be achieved through four (4) project components.

4.1.7 Acceptance Criteria

The acceptance criteria required the deliverables should be defined by the outputs of the work packages as described. As described below, it shows an overview of the deliverables and acceptance criteria.

- **Legislative framework on mercury**- The acceptance criteria is the development of legislation that depicts the control and restriction on the use and import of mercury products.
- **Inventory of mercury products**- The criterion for acceptance lies that a proper inventory system is elaborated and identified mercury sources
- **Environmental Management System (EMS)**- The acceptance criteria of the system that supports the management of all environmental activities related to mercury.
- **Public Awareness & Capacity building**- The criterion of acceptance is to sensitize the public on issues of importance about mercury effects on human health and the impacts on the environment. As an additional criterion is to perform training and enhance the capacity of enforcers and regulators of the EPA.

4.1.8 Work Breakdown Schedule (WBS)

The WBS contains the division of the project deliverables and project work as seen in Figure 7.

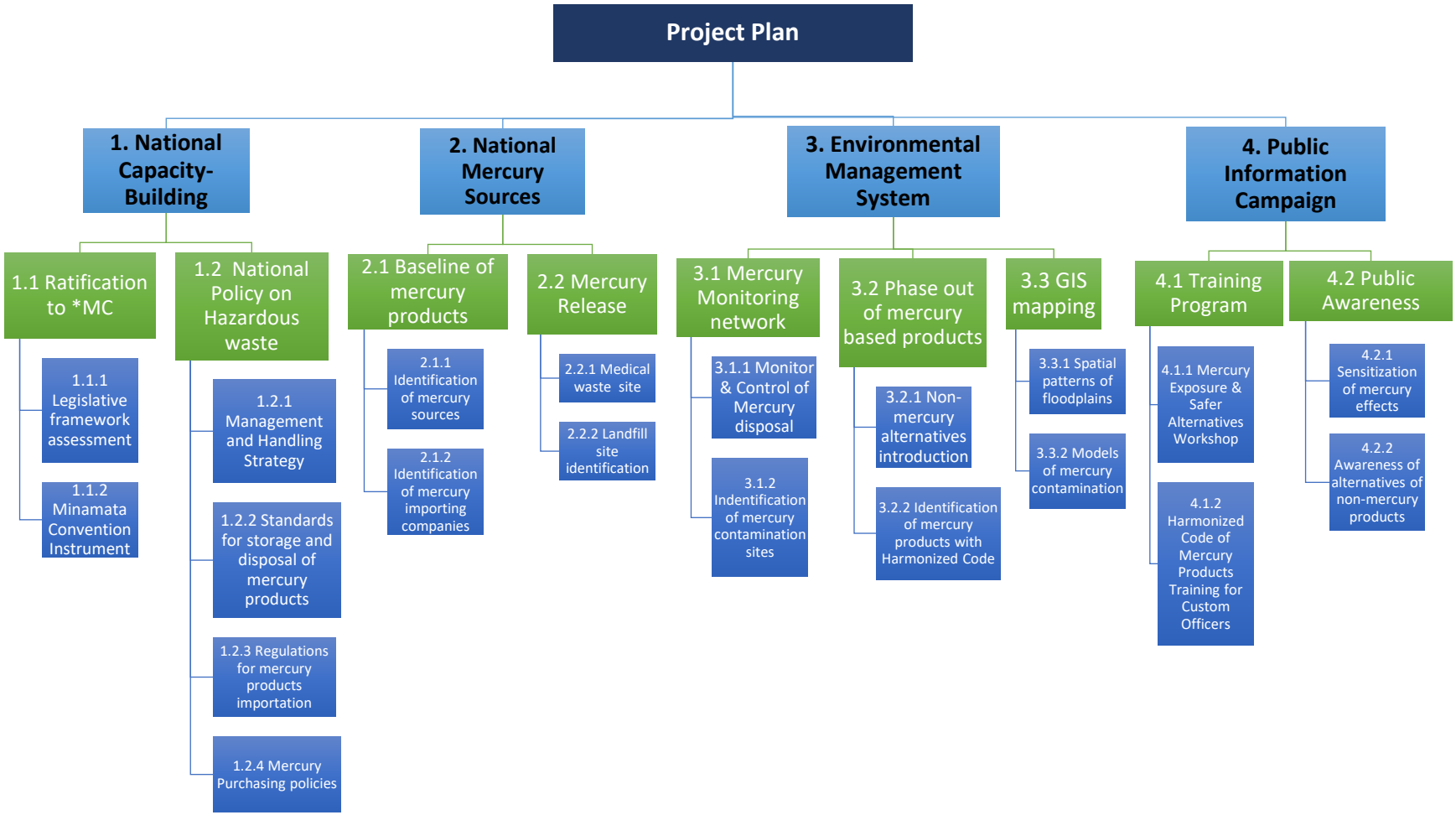


Figure 7 Work Breakdown Schedule (WBS) for the project (Source: Author)

*Minamata Convention

4.1.9 Work Breakdown Schedule Dictionary

The WBS Dictionary contains a detailed deliverable, activity, resources for each project component.

Chart 8 Work Breakdown Schedule Dictionary for the project (Source: Author)

Deliverable	WBS Code	Work Package Name	Description of Work	Activities	Resources required
Ratification to Minamata Convention	1.1.1	Legislative framework assessment	The ratification process for the country to submit to the National Assembly	1. Review of the current Environmental Protection Act (EPA) 2. Gaps of EPA for amendment	Legal consultant, Project Manager, Project Director, and team
	1.1.2	Minamata Convention Instrument	A policy paper for ratification of MC for submission	1. Cabinet paper written 2. Endorsement of the White paper by Cabinet	Legal consultant
National Policy on Hazardous waste	1.2.1	Management and Handling Strategy	Strategy on handling contaminated materials of mercury. Policies that establish a control on the use of mercury-based products	1. Meet to gather information on mercury contamination 2. Policy revision of Solid Waste Management Act	Legal Consultant
	1.2.2	Standards for storage and disposal of mercury products	Policy of safety to properly dispose mercury-based products	1. Engage with Bureau of Standards 2. Solid Waste Management Authority consultation	Chemicals Expert

Deliverable	WBS Code	Work Package Name	Description of Work	Activities	Resources required
	1.2.3	Regulations for mercury products importation	Reporting requirements for the importation	1. Reporting requirement engagement by importers 2. Update database of mercury	Legal consultant/drafter
	1.2.4	Mercury Purchasing Policy	Materials and mercury equipment imported will be under the policy based on its use	1. Know current consumption of mercury products 2. Investigate equipment and materials that contain mercury	Legal consultant, Environmental Technician
	2.1.1	Identification of mercury sources	List all sources of mercury from products used to equipment containing mercury	1. List of Historical information from Customs 2. Interpret data from Customs dividing the sources as equipment and products	Environmental Technician
	2.1.2	Identification of mercury importing companies	A list of importers will be documented along with address	1. Make a List of importers 2. List Mercury importing equipment 3. List of mercury products with their importers	Environmental Technician

Deliverable	WBS Code	Work Package Name	Description of Work	Activities	Resources required
	2.2.1	Medical Waste	Communication with Ministry of Health for Medical waste incarnation sites	1. Meet with Medical Health Authority 2. Visit areas of medical waste disposal 3. Test for mercury in area	Environmental Technician, Project Manager, Chemicals Expert
	2.2.2	Landfill site identification	Communication with Solid Waste Management Authority (SWAMA) and Transfer Station	1. Visit Landfill sites 2. Check on mercury disposal	SWAMA technician, Project Manager
Environmental Management System	3.1.1	Monitor & Control of Mercury disposal	Communicate with Transfer Stations on the disposal of empty mercury products containers, batteries, and broken thermometers	1. Transfer Station to get engaged 2. Demonstration of batteries disposal procedure form SWAMA 3. Engage SWAMA into safely dispose mercury-based products and equipment	SWAMA Director, SWAMA Technician, Environmental Technician, Project Manager
	3.1.2	Identification of mercury contamination site	Communicate with Town Council, City Council and SWAMA on dumping sites	1. Town Council and City Council to get engage on dumping sites 2. Visit dumping sites and any illegal dumping sites	GIS specialist, Project Manager, SWAMA Technician

Deliverable	WBS Code	Work Package Name	Description of Work	Activities	Resources required
				3. Make a list and add GPS location on map	
	3.3.1	Spatial patterns of floodplains	Map of floodplains especially at watershed	1. Select floodplains 2. Collect GPS points at the sites 3. Model development 4. Map floodplains	GIS expert
	3.3.2	Models of mercury contamination	Using GIS platform to make models of contamination sites of mercury	1. Select site 2. Visit site and make observational notes 3. Observe effects of mercury 4. Engage community nearby	Project Manager, GIS expert, community chairman or alcade
Public Information Campaign	4.1.1	Mercury exposure & safer alternatives workshop	Information is shared with communities near dumping sites, transfer stations, and observed contamination sites	1. Communicate with Village Council, Town Council and City Councils 2. Engage public in general	Chemicals Expert and Project Team
	4.1.2	Harmonized System Code (HS) of Mercury Products training for Custom Officers	To receive advise from Senior Custom Officers on the HS Codes to target and trigger for DOE	1. Involve Senior Custom Officers 2. Review HS code Tariff codes for mercury 3. Identify codes to trigger mercury products	Custom Officer, Project Team

Deliverable	WBS Code	Work Package Name	Description of Work	Activities	Resources required
	4.2.1	Sensitization of mercury effects	Information on the effects of mercury is communicated to general public	1. Select site to film video on mercury contaminated sites 2. Visit the transfer station for video 3. Identify interviewers for video 4. Publish video to media houses 5. Produce flyers, newspaper advertisements, social media post on mercury exposure and its effects	Video Producer, Graphic Designer
	4.2.2	Awareness of alternatives of non-mercury products	Information on mercury alternatives is to be shared to consumers	1. Brochures are printed on available alternatives 2. Meeting with importers on existing alternatives of non-mercury products	Project Team, Project Managers

4.1.10 Verification of Scope

The Project Manager is responsible to review and verify all the deliverables of the project with the agreed Scope Statement and the WBS. Once verified, the Project Manager will seek the acceptance of the Project Steering Committee. In the end, the Project Steering Committee will sign the deliverables of the Project.

4.1.11 Scope Control

The monitoring of the status of the project and the Scope baseline is maintained throughout the project. The scope will be controlled by the Project Manager and the team, according to the baseline, WBS and Scope Statement.

Change request of the project scope during the project if needed can be observed with the provision of the estimate cost of those changes. The Project Director and the Project Manager shall review the changes and will approve or reject the changes after consultation with the Project Steering Committee. A formal change request can be submitted by using the template in Appendix 2.

SCHEDULE MANAGEMENT PLAN FOR MANAGEMENT OF MERCURY WASTE IN BELIZE

DEPARTMENT OF THE ENVIRONMENT

BELIZE, C.A.

4.2 Schedule Management Plan

4.2.1 Introduction

The Project Schedule Management includes the processes required to manage the timely completion of the project. Processes for schedule management include: the schedule management, defining the project activities, an estimation of the project activities duration, the development of the schedule, and the how the schedule will be controlled, (PMI, 2017, p. 173). The project schedule is the tool that communicates what work needs to be performed, the resources required to perform the work, and the time needed to be performed. The schedule for this project is a reflection of all the work associated with delivering the project on time and its progress.

4.2.2 Schedule Management Approach

The project schedule shows the planned project work activities that are needed to achieve the agreed project activities. Tools and techniques will be employed to monitor and control the project schedule and the progress of the project activities. The schedule was created using the scheduling tool, Microsoft Project 2019. The Project Manager will report on the project schedule performance during project status meetings. Status meetings will be scheduled regularly in the event of change; an analysis of the project information about the current progress of the project, and especially its performance will be shared (PMI, 2021, p. 180). Any deviations of the schedule are reported at the status meetings and the Project Sponsor will approve any schedule changes brought through the Project Change Control process.

4.2.3 Responsibility Assignment Matrix (RAM)

The Responsibility Assignment Matrix shows the project resources assigned to each work package. It delineates levels of control and responsibility and indicates the authority and responsibility levels for the project. (Sholarin & Awange, 2015, p. 44)

4.2.4 Schedule Baseline

The schedule baseline for the project is the approved version of the schedule model and can only be changed through a formal change control procedure along with the accepted and approved schedule baseline with baseline start dates and baseline finish dates (PMI, 2017, p. 217). Any variances to the schedule will be determined during the monitoring and control phase of the project.

4.2.5 Activity List and Durations

This section provides a list of activities and tasks that will be implemented to establish and manage the project schedule. The estimated activity durations are used to determine the amount time each activity will take to be completed. However, these estimations imply the combination of assigned resources and constraints.

Chart 9 Activity list and duration with resource names (Source: Author)

Deliverable	WBS Code	Work Name	Duration	Activities	Resources required
Ratification to Minamata Convention	1.1.1	Legislative framework assessment	5 days	• Review of the current Environmental Protection Act (EPA) • Gaps of EPA for amendment	Legal consultant, Project Manager, Project Director, and team
	1.1.2	Minamata Convention Instrument	1 day	• Cabinet paper written • Endorsement of the White paper by Cabinet	Legal consultant
National Policy on Hazardous waste	1.2.1	Management and Handling Strategy	30 days	• Meet to gather information on mercury contamination • Policy revision of Solid Waste Management Act	Legal Consultant
	1.2.2	Standards for storage and disposal of mercury products	20 days	• Engage with Bureau of Standards • Solid Waste Management Authority consultation	Chemicals Expert
	1.2.3	Regulations for mercury products importation	45 days	• Reporting requirement engagement by importers • Update database of mercury	Legal consultant/drafter
	1.2.4	Mercury Purchasing Policy	46 days	• Know current consumption of mercury products • Investigate equipment and materials that contain mercury	Legal consultant, Environmental Technician

Deliverable	WBS Code	Work Name	Duration	Activities	Resources required
	2.1.1	Identification of mercury sources	30 days	• List of Historical information from Customs • Interpret data from Customs dividing the sources as equipment and products	Environmental Technician
	2.1.2	Identification of mercury importing companies	15 days	• Make a List of importers • List Mercury importing equipment • List of mercury products with their importers	Environmental Technician
	2.2.1	Medical Waste	30 days	• Meet with Medical Health Authority • Visit areas of medical waste disposal • Test for mercury in area	Environmental Technician, Project Manager, Chemicals Expert
	2.2.2	Landfill site identification	30 days	• Visit Landfill sites • Check on mercury disposal	SWAMA technician, Project Manager
Environmental Management System	3.1.1	Monitor & Control of Mercury disposal	120 days	• Transfer Station to get engaged • Demonstration of batteries disposal procedure form SWAMA • Engage SWAMA into safely dispose mercury-based products and equipment	SWAMA Director, SWAMA Technician, Environmental Technician, Project Manager

Deliverable	WBS Code	Work Name	Duration	Activities	Resources required
	3.1.2	Identification of mercury contamination site	120 days	• Town Council and City Council to get engage on dumping sites • Visit dumping sites and any illegal dumping sites • Make a list and add GPS location on map	GIS specialist, Project Manager, SWAMA Technician
	3.3.1	Spatial patterns of floodplains	120 days	• Select floodplains • Collect GPS points at the sites • Model development • Map floodplains	GIS expert
	3.3.2	Models of mercury contamination	120 days	• Select site • Visit site and make observational notes • Observe effects of mercury • Engage community nearby	Project Manager, GIS expert, community chairman or alcalde
Public Information Campaign	4.1.1	Mercury exposure & safer alternatives workshop	10 days	• Communicate with Village Council, Town Council and City Councils • Engage public in general	Chemicals Expert and Project Team
	4.1.2	Harmonized System Code (HS) of Mercury Products training for Custom Officers	5 days	• Involve Senior Custom Officers • Review HS code Tariff codes for mercury • Identify codes to trigger mercury products	Custom Officer, Project Team

Deliverable	WBS Code	Work Name	Duration	Activities	Resources required
	4.2.1	Sensitization of mercury effects	40 days	• Select site to film video on mercury contaminated sites • Visit the transfer station for video • Identify interviewers for video • Publish video to media houses • Produce flyers, newspaper advertisements, social media post on mercury exposure and its effects	Video Producer, Graphic Designer
	4.2.2	Awareness of alternatives of non-mercury products	20 days	• Brochures are printed on available alternatives • Meeting with importers on existing alternatives of non-mercury products	Project Team, Project Managers

4.2.6 Milestone List

The Project has significant events that are required.

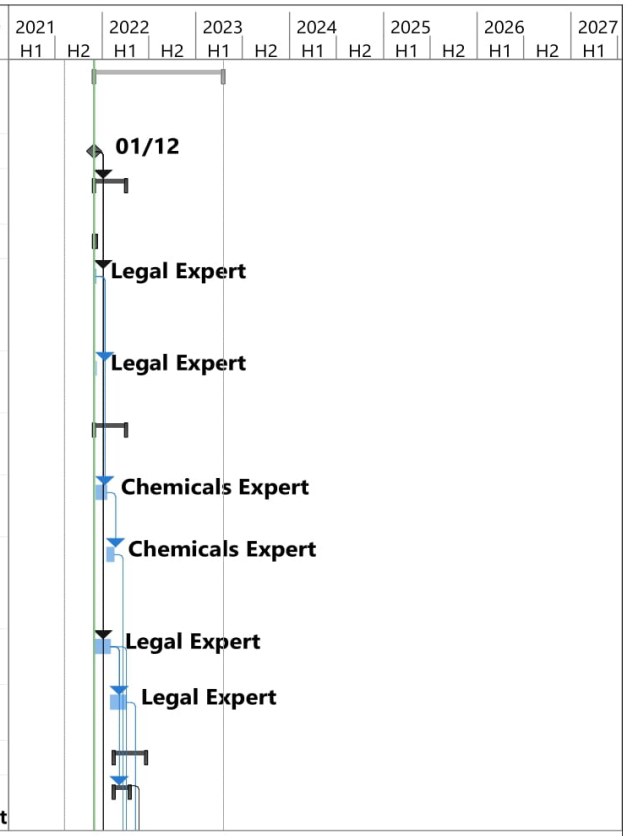
- Established regulations and policies on control of mercury 05/04/2022
- Mercury Products Baseline achieved 19/07/2022
- Mercury monitoring network and database established 17/05/2022
- Training Programme and Public Awareness 21/10/2022

4.2.7 Schedule Network Analysis

4.2.7.1 Critical Path

The Critical Path method is used to estimate the minimum project duration and determine the amount of scheduled time on the network path within the schedule model. The Critical Path is the sequence of activities that represents the longest path through a project and determines the shortest possible project duration. The critical path method used in the project will be used to calculate the critical paths and the amount of total schedule flexibility on the network paths of the schedule model (PMI, 2017, p. 210).

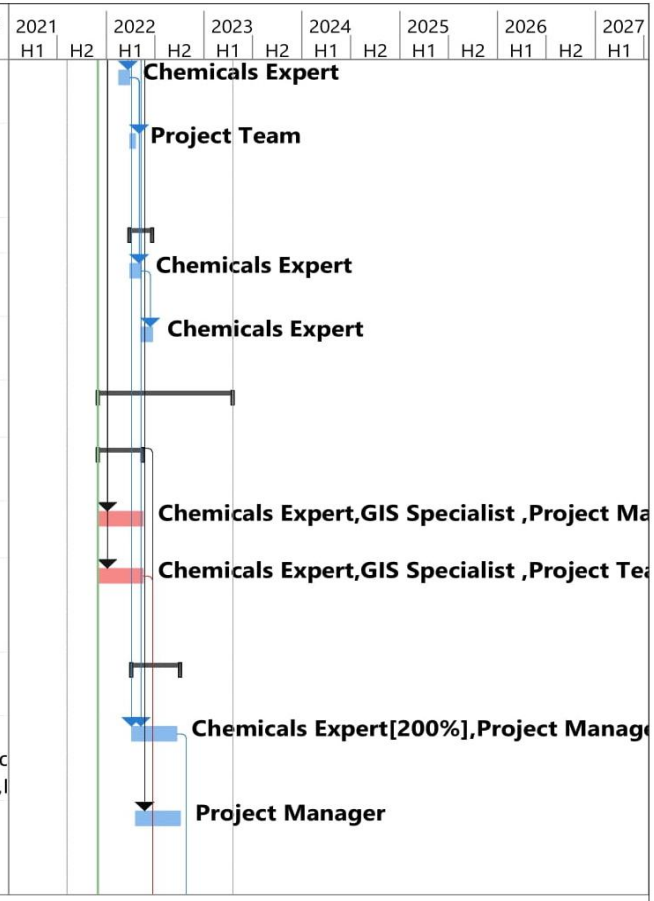
ID	Task Mode	Task Name	Duration	Start	Finish	Predeces	Resource Names
0		**Project Management for Management of Mercury Waste in Belize**	**360 days**	**Wed 01/12/21**	**Tue 18/04/23**		
1		Signing of project documer	0 days	Wed 01/12/21	Wed 01/12/21		
2		**1. National Capacity Building**	**90 days**	**Wed 01/12/21**	**Tue 05/04/22**	**1**	
3		**1.1 Ratification to MC**	**6 days**	**Wed 01/12/21**	**Wed 08/12/21**		
4		1.1.1 Legislative framework assessment	5 days	Wed 01/12/21	Tue 07/12/21	1	Legal Expert
5		1.1.2 Minamata Convention	1 day	Wed 08/12/21	Wed 08/12/21	4	Legal Expert
6		**1.2 National Policy on Hazardous waste**	**90 days**	**Wed 01/12/21**	**Tue 05/04/22**		
7		1.2.1 Management and Handling	30 days	Wed 08/12/21	Tue 18/01/22	4	Chemicals Expert
8		1.2.2 Standards for storage and disposal of	20 days	Wed 19/01/22	Tue 15/02/22	7	Chemicals Expert
9		1.2.3 Legal & Regulatory	45 days	Wed 01/12/21	Tue 01/02/22	1	Legal Expert
10		1.2.4 Purchasing Policies	45 days	Wed 02/02/22	Tue 05/04/22	9	Legal Expert
11		**2. National Mercury Sourc**	**90 days**	**Wed 16/02/22**	**Tue 21/06/22**		
12		**2.1 Baseline for Mercury Products**	**45 days**	**Wed 16/02/22**	**Tue 19/04/22**	**9**	**Project Manager,Project**



Project: Project Manag
Date: Tue 30/11/21

Task	Inactive Summary	External Tasks
Split	Manual Task	External Milestone
Milestone	Duration-only	Deadline
Summary	Manual Summary Rollup	Critical
Project Summary	Manual Summary	Critical Split
Inactive Task	Start-only	Progress
Inactive Milestone	Finish-only	Manual Progress

ID	Task Mode	Task Name	Duration	Start	Finish	Predeces	Resource Names
13		2.1.1 Identification of mercury sources	30 days	Wed 16/02/22	Tue 29/03/22	8	Chemicals Expert
14		2.1.2 Identification of mercury importing	15 days	Wed 30/03/22	Tue 19/04/22	13	Project Team
15		**2.2 Mercury release**	**60 days**	**Wed 30/03/22**	**Tue 21/06/22**		
16		2.2.1 Medical waste site	30 days	Wed 30/03/22	Tue 10/05/22	13	Chemicals Expert
17		2.2.2 Landfill site identification	30 days	Wed 11/05/22	Tue 21/06/22	16	Chemicals Expert
18		**3. Environmental Management System**	**360 days**	**Wed 01/12/21**	**Tue 18/04/23**		
19		**3.1 Mercury monitoring network**	**120 days**	**Wed 01/12/21**	**Tue 17/05/22**		
20		3.1.1 Monitor & Control of Mercury	120 days	Wed 01/12/21	Tue 17/05/22	1	Chemicals Expert,GIS
21		3.1.2 Identification of Mercury contamination	120 days	Wed 01/12/21	Tue 17/05/22	1	Chemicals Expert,GIS Specialist
22		**3.2 Phase-out mercury based**	**130 days**	**Wed 06/04/22**	**Tue 04/10/22**		
23		3.2.1 Non-Mercury Alternatives Introduction	120 days	Wed 06/04/22	Tue 20/09/22	9,10	Chemicals Expert[200%],Prc Manager[200%],I
24		3.2.2 Identification of Mercury products with	120 days	Wed 20/04/22	Tue 04/10/22	12	Project Manager



Project: Project Manag
Date: Tue 30/11/21

Task	Inactive Summary	External Tasks	
Split	Manual Task	External Milestone	
Milestone	Duration-only	Deadline	
Summary	Manual Summary Rollup	Critical	
Project Summary	Manual Summary	Critical Split	
Inactive Task	Start-only	Progress	
Inactive Milestone	Finish-only	Manual Progress	

Figure 8 Schedule baseline of the project (Source: Author)

4.2.8 Control schedule

The schedule is controlled by maintaining the schedule baseline throughout the project. Any changes to the schedule baseline can only be approved through the Perform Integrated Change Control Process. With the control schedule process, it will allow to determine the status of the project schedule, review project schedule, and determine a change of the project schedule and manage changes. The project team will be required to monitor schedule activities, change control process and schedule status. The monitor of schedule activities will be reported during the weekly project status updates and on schedule deviations. In order to control the schedule throughout the project, a variance analysis such as schedule variance will be applied within the Earned Value Management (EVM). The schedule variance is denoted by the schedule performance index (SPI) as a measure of how close the project is about to be completed compared to the schedule. However, if the SPI is less than one indicates that the project schedule is behind, and if the schedule is equal to one, then it is on schedule. But, if the SPI is more than one, then the project is ahead of schedule

COST MANAGEMENT PLAN
FOR
MANAGEMENT OF MERCURY WASTE IN BELIZE

DEPARTMENT OF THE ENVIRONMENT

BELIZE, C.A.

4.3 Cost Management Plan

The Project Cost Management includes the processes involved in planning, estimating, budgeting, financing, managing, and controlling costs, so that the project can be completed within the approved budget (PMI, 2017, p. 231). Primarily the Cost Management Plan is concerned with the cost of the resources needed to complete project activities.

4.3.1 Cost Management Approach

The costs of this project will be managed at the fourth level of the Work Breakdown Structure (WBS). The cost estimates will be at the fourth level of the WBS. Cost variances of +/- 0.1 in the cost and schedule performance indexes will change the status of the cost to cautionary; as such, those values will be changed to yellow in the project status reports. Cost variances of +/- 0.2 in the cost and schedule performance indexes will change the status of the cost to an alert stage; as such, those values will be changed to red in the project status reports (see Appendix 5). Corrective actions will require a project change request and must be approved by the Project Implementing Partner before it can become within the scope of the project.

4.3.2 Roles and Responsibilities for Cost Management

For this project, responsibilities are identified for the benefit of and success of the project. The project team comprised as seen in Chart 10 is crucial and will effectively contribute to the success of the project.

Chart 10 Roles and responsibilities for cost management

Role	Responsibilities
Project Manager	Meet with Implementing Partner, organize meeting with project team, control the budget and plan the project budget
Project Sponsor	Approve or reject the estimate of activity, perform change requests

Role	Responsibilities
Implementing Partner (UNEP)	Perform Estimate of Activity costs and provide the estimate to the project manager, prepare disbursements
UNEP Program Assistant (UNEP)	Update the Project Manager on the status of the disbursement, organize project status meetings

Figure 9 detailed how the funds flow from the sponsor (funding agency) to the Project Director & Project Manager.

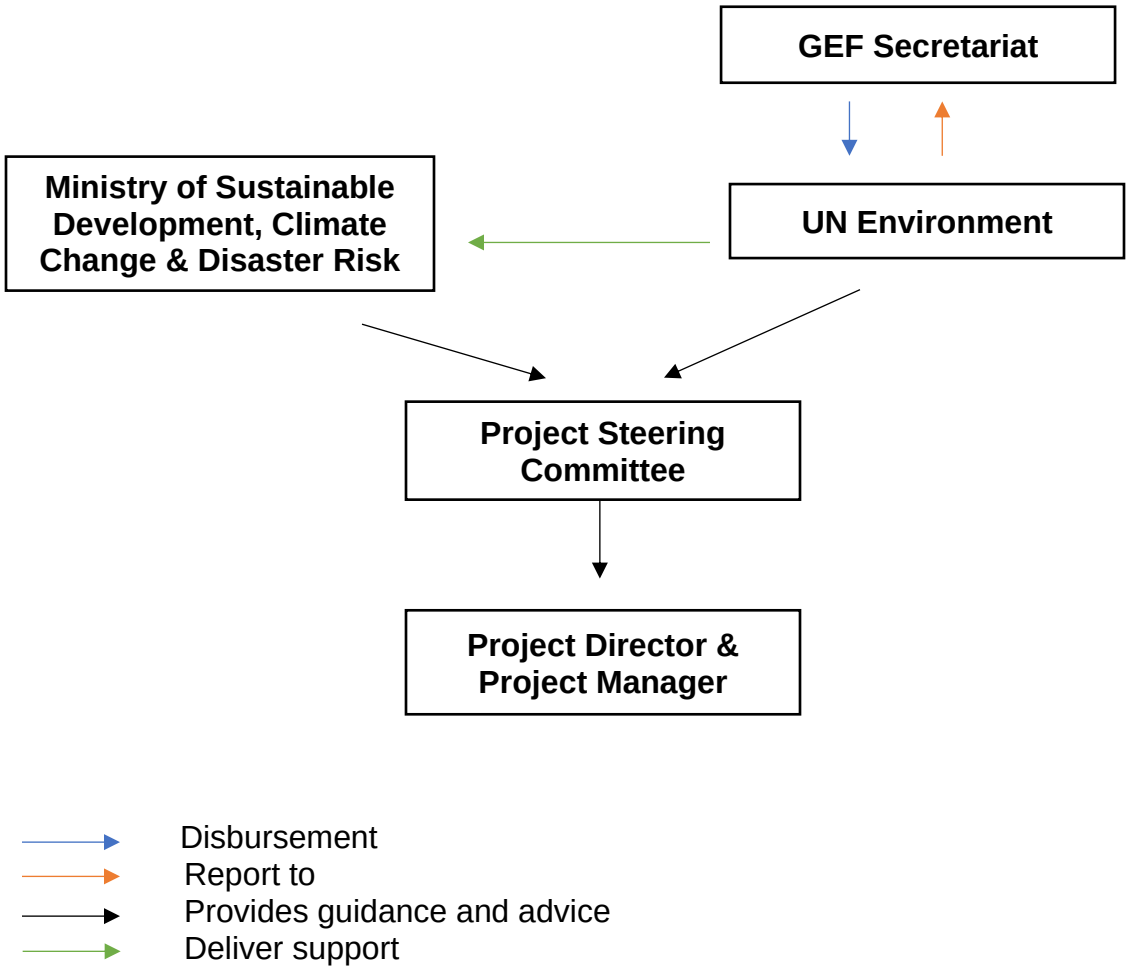


Figure 9 Flow of funds for the project.: (Author, 2021)

4.3.3 Performance Metrics and Earned Value Analysis (EVA)

The Project Manager will be responsible for managing and reporting on the project's cost throughout the duration of the project. The Project Manager will present Interim Financial Report on the third quarter from project's start date. The Project Manager will present quarterly and review the project's cost performance monthly. The performance will be measured using earned value. The following earned value measurements are the performance metrics will be used:

- Schedule Variance (SV) is a measurement of the project's schedule performance
- Cost Variance (CV) is a measurement of the project's budget performance
- Schedule Performance Index (SPI) measures the progress achieved against that which was planned
- Cost Performance Index (CPI) measures the value of the work completed compared to the actual cost of the work completed.

The Earned Value Analysis compares the performance measurement baseline to the actual schedule and cost performance. The Earned Value Management integrates the scope baseline with the cost baseline and schedule baseline to form the performance measurement baseline (PMI, 2017, p. 261).

4.3.4 Earned Value Management Metrics

1. Earned value (EV) is the measure of the work performed as expressed in the budget authorized for the work.
2. Planned value (PV) is the authorized budget cost of the planned work.
3. Actual cost (AC) the cost for the work performed during a specific time period.
4. Cost Variance (CV) is the measurement of the budget performance for a project.

   CV=EV-AC

If CV is zero, then the project is perfectly on budget. If CV is greater than zero, the project is earning more value than planned thus it's under budget. If CV is less than zero, the project is earning less value than planned thus it's over budget.

5. Schedule Variance (SV) is a measurement of the schedule performance for a project.

   SV= EV-PV

The measurement shows if the project is ahead or behind schedule, according to the project plan. If the SV is greater than zero, the project is on schedule. If the SV is more than zero, then it is ahead of planned schedule but if the SV is less than zero then the project is behind schedule.

4.3.5 Performance indices

The EVM Schedule is the measurement of performance indices, based on ratios and provide information on the current performance.

Cost Performance Indices (CPI) is a measure of the cost efficiency of budgeted resources expressed as the ratio of EV to actual cost.

CPI= EV/AC

- CPI equals budget of work accomplished/ actual cost of work accomplished.
- CPI measures how much work is being produced for each unit of cost incurred.

Schedule Performance Indices (SPI) is a measure of efficiency regarding the time consumed with the amount of work accomplished.

SPI= EV/PV

- SPI equals the amount of work accomplished/amount of work planned to be accomplished
- SPI measures the actual rate at which the work is being accomplished relative to the expected work rate in the baseline.

4.3.6 Control Threshold

For this project, there is a CPI or SPI of less than 0.8 or greater than 1.2. If the project reaches one of these Control Thresholds a Cost Variance Corrective Action Plan is required.

4.3.7 Estimate Costs

Estimate Costs is the process of developing an approximation of the cost of resources needed to complete project work (PMI, 2017, p. 240). This assessment is based on the cost for resources that are required to complete each activity. The Cost Estimate is expressed in Belize Dollars, and the staff hours based on days of activity duration will be considered in order to achieve optimal costs for the project. The estimation of the cost of the project is through analogous estimating and Bottom-up estimating of similar project previously executed. The Project Manager and the Project Director at the Department will review the cost of the previously executed project. The project budget should not exceed BZD $ 662,400 for a total of 3 years. The project will be hiring several experts for various aspects of the project, and a Project Manager is included in the project. Most of the budget is associated with the Execution Phase of the project.

4.3.8 Budget Development

Once the budget has been determined, it will be used to calculate the cost baseline. This process aggregates the estimated costs of the individual activities or work packages to establish an authorized cost baseline (PMI, 2017, p. 248). This budget includes all the funds authorized to execute the project. The Project Budget will be calculated as follows:

Project Budget = Cost Baseline + Contingency Reserve

The following chart shows the cost estimated for the activities of the project according to its deliverable.

Chart 11 Budget for the activities of the project

WBS ID	Deliverable	Activities	Duration	Resources required	Estimated cost (BZD)
1.1.1	**Ratification to Minamata Convention**	• Review of the current Environmental Protection Act (EPA)	5 days	Legal consultant, Project Manager, Project	2,000

WBS ID	Deliverable	Activities	Duration	Resources required	Estimated cost (BZD)
		Gaps of EPA for amendment		Director, and team	
1.1.2		• Cabinet paper written Endorsement of the White paper by Cabinet	1 day	Legal consultant	0
1.2.1		• Meet to gather information on mercury contamination • Policy revision of Solid Waste Management Act	30 days	Legal Consultant	$2000
1.2.2		• Engage with Bureau of Standards • Solid Waste Management Authority consultation	20 days	Chemicals Expert	$3000
1.2.3		• Reporting requirement engagement by importers Update database of mercury	45 days	Legal consultant/ drafter	$2000
1.2.4		• Know current consumption of mercury products • Investigate equipment and materials that contain mercury	45 days	Legal consultant, Environmental Technician	$3000
2.1.1	**National Mercury Sources**	• List of Historical information from Customs Interpret data from Customs dividing the	30 days	Environmental Technician	$2000

WBS ID	Deliverable	Activities	Duration	Resources required	Estimated cost (BZD)
		sources as equipment and products			
2.1.2		• Make a List of importers • List Mercury importing equipment • List of mercury products with their importers	16 days	Environmental Technician	$3000
2.2.1		• Meet with Medical Health Authority • Visit areas of medical waste disposal Test for mercury in area	30 days	Environmental Technician, Project Manager, Chemicals Expert	$8000
2.2.2		• Visit Landfill sites Check on mercury disposal	30 days	SWAMA technician, Project Manager	$10000
3.1.1	**Environmental Management System**	• Transfer Station to get engaged • Demonstration of batteries disposal procedure form SWAMA • Engage SWAMA into safely dispose mercury-based products and equipment	120 days	SWAMA Director, SWAMA Technician, Environmental Technician, Project Manager	$2,500
3.1.2		• Town Council and City Council to get engage on dumping sites	120 days	GIS specialist, Project Manager, SWAMA Technician	$2,500

WBS ID	Deliverable	Activities	Duration	Resources required	Estimated cost (BZD)
		• Visit dumping sites and any illegal dumping sites Make a list and add GPS location on map			
3.2.1		• Research on non mercury alternatives • Have engagement of major importers	120 days	Project team	$3000
3.2.2		• List all mercury products imported within the last 5 years • Custom Officers meeting to trigger mercury products	120 days	Project team, Project Manager and Custom Officer	$2000
3.3.1		• Select floodplains • Collect GPS points at the sites • Model development Map floodplains	120 days	GIS expert	$12,000
3.3.2		• Select site • Visit site and make observational notes • Observe effects of mercury Engage community nearby	120 days	Project Manager, GIS expert, community chairman or alcalde	$8000
4.1.1	**Public Information Campaign**	• Communicate with Village Council, Town	10 days	Chemicals Expert and	$4000

WBS ID	Deliverable	Activities	Duration	Resources required	Estimated cost (BZD)
		Council and City Councils Engage public in general		Project Team	
4.1.2		• Involve Senior Custom Officers • Review HS code Tariff codes for mercury • Identify codes to trigger mercury products	5 days	Custom Officer, Project Team	$2000
4.2.1		• Select site to film video on mercury contaminated sites • Visit the transfer station for video • Identify interviewers for video • Publish video to media houses Produce flyers, newspaper advertisements, social media post on mercury exposure and its effects	40 days	Video Producer, Graphic Designer	$6,000
4.2.2		• Brochures are printed on available alternatives Meeting with importers on existing alternatives of non-mercury products	20 days	Project Team, Project Managers	$8000
				TOTAL COST ESTIMATE	**85,000**

The following chart shows a summary of the budget for each project deliverable.

Chart 12 Budget per project components (Source: Author)

Project Deliverables	Cost
National Capacity Building	$12,000
National Policy on Hazardous waste	$23,000
Environmental Management System	$30,000
Public Information Campaign	$20,000
Total Cost Estimate	**$85,000**

The following chart shows the human resources budget required for the project.

Chart 13 Budget breakdown for human resources of the project (Source: Author)

Quantity	Resource	Unit Price (Belize Dollars)	Total Price (BZD)
1	Salary for Project Manager for 18 months	$3,000	$54,000
1	Salary for Chemicals Expert for 18 months	$2,500	$45,000
1	Legal Expert for 45 days @ $1000 per day	$4,000	$4,000
1	Technical Assistant for 18 months	$1,500	$27,000
1	Solid Waste Technician for 3 months	$1,200	$3,600
1	GIS Specialist for 12 months	$1,500	$18,000
1	Water Quality Analyst for 10 months	$1,500	$17,500
1	Chemicals Assistant for 18 months	$1,200	$28,800
1	Project Administrative Assistant 18 months	$1,500	$27,000
3	Field Personnel for 12 months	$1,000	$36,000
1	Custom Officer Consultant for 3 months	$2,000	$6,000
1	Video Producer for 15 days	$200	$3,000
1	Manage System Developer for 3 months	$2000	$6000
		Total	**$275,900**

The following chart shows the total cost of the human resource and the activities of the project.

Chart 14 Budget for activities and human resources (Source: Author)

	Cost BZD
BUDGET FOR ACTIVITIES	$ 85,000
BUDGET FOR HUMAN RESOURCES	$ 275,900
TOTAL PROJECT COST	**$ 360,900**

4.3.9 Cost Baseline

The Cost Baseline is the approved version of the time-phased project budget and a contingency reserve and excluding the management reserve (PMBOK, 2017, p. 254). For this project, the cost baseline was for all the scheduled activities is a total of BZD $368,953.

Total Cost Estimate= $ 360,900

Contingency Reserve 1.22% = $4,400

Cost Baseline= Total cost Estimate + Contingency Reserve

= $ 360,900 + $4,400

= $ 365,300

Management reserve (1% of Cost baseline) =$ 3,653

Budget (Baseline plus Management Reserve) = BZD $ 368,953

The Contingency reserve is the part of the budget of BZD $ 4,400 that will be used to address identified risks of the project, see Chart 27. There is the possibility that that the project will incur additional expense as a result of the samples that will be collected and possibly sent abroad during water quality in the mercury hotspots. This reserve will be available for use by the Project Manager.

The Management Reserve is part of the budget of 1%, but not of the cost baseline and makes a total of BZD $ 3,653 which is reserved for unforeseen work that is within the

scope of the project. The low percentage will be added of 1% to the cost baseline due to the low uncertainty of the experience, and expertise of the Implementing Agency, UNEP.

The management reserve will be controlled by the Project Director and the Project Implementing Agency and will not be available unless approved by the Project Sponsor (GEF).

4.3.10 Cost Control

The control costs will monitor the status of the project to update the project costs and managing changes to the cost baseline (PMBOK, 2017, p.295). Updating the budget requires knowledge of the actual costs spent to date. Any increase to the authorized budget can only be approved through the Change Control process. Project cost control includes (PMI, 2017, p. 297).

- Influencing the factors that create changes to the authorized cost baseline;
- Ensuring that all change requests are acted on in a timely manner;
- Managing the actual changes when, and as they occur;
- Ensuring that cost expenditures do not exceed the authorized funding by activity and in total for the project;
- Monitoring cost performance and understanding variances from the approved cost baseline;
- Monitoring work performance against funds expended;
- Preventing unapproved changes from being included in the reported cost;
- Bringing expected cost overruns within acceptable limits.

The cost control is managed by the Project Manager who manages and foresees potential risks during the project. Cost control techniques employed in the project will:

1. Plan the project budget,
2. Keep track of the costs, including change requests,
3. Establish time management by keeping the important deadlines of the project;
4. Implement change control systems,

5. Create Earned Value by identifying the value of the work carried out. (Source:Tutorialspoint.com)

The performance of the project can be displayed using the earned value, planned value and actual cost, using the S-curve analysis.

4.3.11 Change Request Control

The change request control is the formal proposal to modify the cost baseline when issues are identified during the project work. The request may include a corrective action of an activity for the project work. The request will be submitted by the Project Manager, and approved by the Project Director. The Implementing Agency will review and authorize or deny the request.

QUALITY MANAGEMENT PLAN FOR MANAGEMENT OF MERCURY WASTE IN BELIZE

DEPARTMENT OF THE ENVIRONMENT

BELIZE, C.A.

4.4 Quality Management Plan

The project quality management plan is the management of the project, and the deliverables of the project. The purpose of the quality management plan will describe the actions and measures that will be taken to ensure the quality of the project (PMI, 2017, p. 273).

4.4.1 Quality Management Approach

The approach for the quality management plan describes the manner in which the quality of the project will be managed. The plan quality management process is concerned with the quality of the work that needs to occur along with the quality processes throughout the project. Quality requirements will be identified, and will be assessed under evaluation instruments. These quality requirements will be verified during control quality to ensure that these quality requirements are met by the project (PMI, 2017, p. 272).

The purpose of the quality management plan is to ensure that the satisfaction of the results are delivered to the Implementing Agency (IA). The results should conform to the requirements of the project as it was intended to be produce. In order to ensure continual satisfaction and improvement, the quality management plan outlines the quality improvement method used. The project manager and the team will ensure that that quality is maintained during the project.

The Project Quality Management Plan will consist of four main processes:

- Quality Objectives
- Quality Assurance
- Quality Control
- Quality Improvement Method

4.4.2 Quality Objectives

The project quality management objectives for this project are as follows:

- Deliverables meet the requirements of the Implementing Agency

- Deliverables are suitable for web delivery and for dissemination activities
- Deliverables are easy to understand and contain all the information needed by the Partners to allow them to request clarification, and input of missed data if necessary

4.4.3 Quality Criteria

The following describes the quality criteria for project deliverables, project status reports, workshops reports, and reports for public accessibility. The deliverables will be evaluated according to the following criteria:

Content

The content will depend on the type of deliverable and should contain all the information relevant to the activity needed by the Implementing Agency.

The author should meet the following requirements:

(a) Completeness. The information must be reliable and complete, and supported with the relevant references.
(b) Accuracy. Information should be presented on key issues.
(c) Relevance. Information should be relevant for the achievement of the project objectives.
(d) Language. The information of the final version should be proofread.

4.4.4 Quality roles & responsibilities

The roles and responsibilities in project quality management will be performed to assure the quality of the deliverables are according to the quality criteria.

Chart 15 Roles and Responsibilities in quality management plan (Source: Author)

Role	Responsibilities
Project Manager	Manage quality and use quality tools to ensure quality requirements

Role	Responsibilities
Project Team	Oversee that quality requirements are maintained
Project Director	Analyse status reports, quality metrics, and identify areas of improvement
Implementing Agency	Ensure project requirements are to their expectations, and is responsible to accept and approve the deliverables
UNEP Programme Assistant	Provide templates, guidelines and policy

4.4.5 Quality Assurance

Quality Assurance is using project processes effectively by meeting the standards to meet the project requirements (PMI, 2017, p. 289). The quality assurance in this project will be followed by using the International Standards Organization (ISO) Standards. Quality standards are documents that provide requirements, specifications, guidelines or characteristics that can be used consistently to ensure that processes are fit for their purpose (ASQ, n.d.). The standards provide the procedures to meet the objective of the quality test.

The testing for the presence of mercury in waste stream will conform to the **standards ISO 12846:2012 Water quality- Determination of mercury- Method using atomic absorption spectrometry (AAS) with or without enrichment.** This will be the quality control measurements used to create the measurements and validate the actual measurements to determine the level of correctness (PMBOK, 2017, p. 291).

4.4.6 Quality Audit

At the end of the project, a project audit will be performed of both operational and financial activities. The guideline for the audit will be provided by the IA, UNEP. The audits will be used of reports to be submitted to the Sponsor, GEF. Recommendations and lesson learned of the project audits will be provided from IA, UNEP for corrective actions if needed.

4.4.7 Quality Metrics

For this project, the quality metric which verifies compliance is the percentage of tasks completed on time.

Chart 16 Quality Metrics and Assurance (Source: Author)

#	Activity	Frequency	Responsible
1	Establishment of project baselines	Once/Initiation Phase	Project Manager & Team
2	Establishment of budget	Annually	Project Team & IA
3	Development of Legislative framework	Once	Legal Expert and project manager
4	Inventory and establishment of baseline Report	Quarterly	Chemicals Expert and Project Team
5	Chemicals Assessment report on hotspots and contamination	Quarterly	Project Manager and team
6	Existing Capacity Report	Annually	Solid Waste Management technician and Project team
7	Water Quality report on mercury	Monthly	Water Quality Analyst, and Project Manager
8	Custom Officer Meeting	Quarterly	Project Team
9	Stakeholder Meeting	Quarterly	Project Team
10	Review of Work Plan and Budget	Bi-annually	Project Manager and IA
11	Annual Review and Planning	Bi-annually	Project Manager
12	Status Report	Bi-monthly	Project Manager
13	Project Evaluation	Last quarter	Project Team and IA
14	Terminal Report	3 Months after the end date of the project	Project Manager, Team and IA

4.4.8 Quality Control

The purpose of the control quality process is to determine the correctness of the deliverables (PMI, 2017, p. 305). The project manager and team will hold meetings to discuss:

- The successful elements of the project,
- What elements can be improved;
- What new elements can be incorporated into the project

4.4.9 Quality Improvement Methods

Quality improvement can occur based on the findings and recommendations form the IA from the quality control processes (PMI, 2017, p. 296). For this project, the Plan-Do-Check-Act improvement method will be used to analyse and evaluate opportunities for improvement (PMI, 2017, p. 296). The Plan-Do-Check-Act cycle is iterative for continuous improvement. It involves:

- Plan- Recognize an opportunity and plan a change;
- Do- Carry out a small-scale study;
- Check- Analyse the results and identify what have been learned;
- Act- Take action based on what was learned.

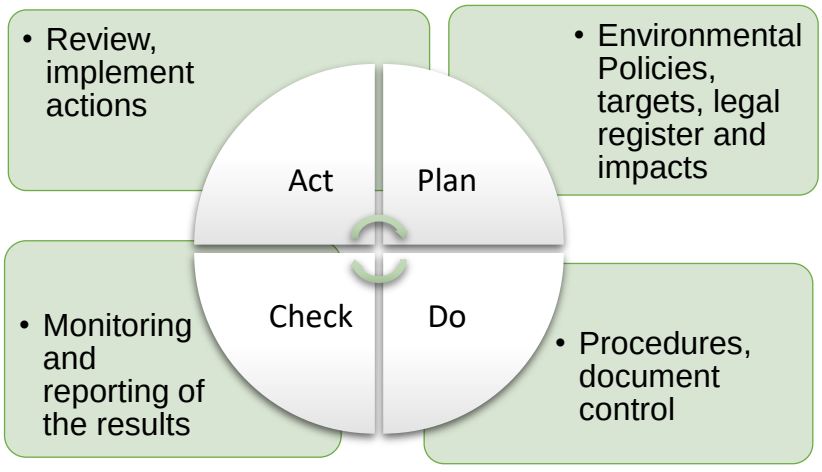
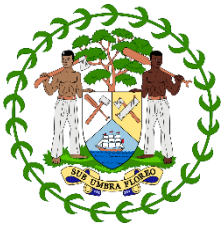


Figure 10 PDAC Cycle for the project (Source: Author)



RESOURCE MANAGEMENT PLAN FOR MANAGEMENT OF MERCURY WASTE IN BELIZE

DEPARTMENT OF THE ENVIRONMENT

BELIZE, C.A.

4.5 Resource Management Plan

For the project, the purpose of the resource management plan includes the processes that identifies, acquires, and manages the resources needed for the successful completion of the project. These processes will ensure that the right resources will be available for the project manager, and team at the right time (PMI, 2017, p. 307).

4.5.1 Roles and Responsibilities

For this project, a project team will be assembled mainly comprised of the following:

Chart 17 Roles and Responsibilities in resource management plan (Source: Author)

Role	Responsibilities
Project Director (PD)	The Project Director is responsible for supervising the overall management of project activities and for accountability.
Project Manager (PM)	Project Manager is responsible for the overall success of the project. The project manager also authorizes, approves the project expenditures and work activities. The project manager is also responsible to communicate to stakeholders. Project status reports will be developed by the project manager. The project manager will be responsible to acquire human resources in coordination with the project director and the Administrative Officer (AO) of the Ministry. The Contractor General will be responsible to contract the consultants. The project manager will be responsible to supervise the work of the consultants.
Administrative Assistant (AA)	Assist in the logistical arrangements for the organizations of meetings, seminars, training and workshops; assist in maintaining project documentation, and filing systems; assist in preparing evaluation reports, annual project reports, update project file, and prepare minutes of project meetings.

Role	Responsibilities
Consultants	The consultant must have the expertise which the project requires, and any specific information required by the consultant will be obtained by communicating with the relevant stakeholders.
Responsible Partner (UNEP) Sponsor Implementing Agency	Is known as the Responsible Partner, who acts on behalf of the sponsor, therefore, is the Implementing Agency (IA). The IA will oversee that the project's deliverables are as agreed in the Project Management Plan.
Implementing Partner (IP) Executing Agency	The Executing Agency is also the Implementing Partner and will be through the Chief Environmental Officer of the Department of the Environment. The IP has the authority and is accountable for the entire project. The IP is responsible to oversee the implementation of the project activities as agreed in the Project Management Plan.

4.5.2 Resource management method

Resource management is using the resources optimally and efficiently. Human resources include the processes that organize, manage, and lead the project team who may have varied skill sets (Lewis, 2016). At the Department of the Environment, the Kaizen method will be employed to improve the work environment to be more efficient and effective while creating satisfaction of a fulfilling job (Mohammed, 2017). The Kaizen method will provide continuous improvement, based on guiding principles, such as:

- Good processes bring good results,
- Go see for yourself to grasp the current situation,
- Speak with data, manage with facts,
- Take action to contain and correct root causes of problems,
- Work as a team. (Mohammed, 2017)

The implementation of the Kaizen method will occur in the following stages:

1. Encourage participation: Training sessions for all will bring awareness and encourage the involvement of team members.

2. Training and education: Team leaders should be trained to understand the Kaizen method, and be taught about the impartiality of evaluations amongst the team members.

The purpose of implementing the Kaizen method at the Department of the Environment will help promote a culture of improvement, and have each member seek ways to improve their own performance within the project.

4.5.3 Responsibility Assignment Matrix (RAM)

The RACI chart (responsible, accountable, consult and inform) is the tool used to ensure clear assignment of roles and responsibilities for internal and external resources. The Matrix below shows all the activities accountable for any task in order to avoid any confusion.

Chart 18 Responsibility Assignment Matrix (RAM) for the project (Source: Author)

Project Tasks	PD	PM	AA	Con	IA
Legislative framework	A	C	I	R	I
Baseline for mercury products	C	A	I	R	I
Mercury Monitoring Network	A	A	I	R	I
Phase-out mercury products	A	C	I	R	C
GIS mercury sensitive area	C	A	I	R	I
Capacity Building	A	R	I	C	I
Public Awareness	A	R	I	C	I

Key:

R- Responsible for completing the work

A-Accountable for ensuring task completion/sign off

C- Consulted before any decisions are made

I-Informed when an action/decision has been made

PD- Project Director

PM- Project Manager

AA- Project Administrative Assistant

Con- Consultants

IA- Implementing Agency (UNEP)

4.5.4 Resource estimate

All materials related to the Management of mercury waste project is based on the scope requirements are defined and estimated by the project manager.

Chart 19 Resource estimate of materials (Source: Author)

Element name	Materials
Legislative Framework for mercury	Conference room, catering (2-3 meetings)
Inventory Control & Management	Conference room, catering (2-3 meetings)
Environmental Management System	licenses Arc GIS software, conference room (4-5 meetings) 2 laptops ***Chemical Reagents:*** Stannous chloride Bromine chloride Potassium Chloride Hydrochloric acid Nitric Acid ***Equipment***: 1000 ml volumetric flask Beakers Pipets
Public Awareness & Capacity Building	Promotional items Brochures Flyers Newspaper advertisements Video airing minutes Billboards Vinyl Banners

4.5.5 Acquisition of Team Members

For the project, the project staff will consist of a few internal resources, but also subcontract experts externally. The project manager along with the Project Director will identify and assign the resources for the project. All subcontracts will be performed with a signed contract/agreement for the services or activities. All the subcontractors will be stationed at the Department of the Environment.

- **Qualifications/Skills**

The subcontracting will take place by outsourcing the consultants/experts to be performed within the scope of the project. The acquiring method for the subcontracts will be based on experience, and skills presented in the resumes. The subcontracts will be tendered after the approval of the Project Director. However, the contracts will be reviewed by panellists composed of the following:

- A representative from the Procurement Unit of the Ministry of Finance
- The Administrative Officer of the Ministry of Sustainable Development, Climate Change & Disaster Risk Management (MSDCC&DRM)
- The Finance Officer of MSDCC&DRM
- The Senior Environmental Officer of the Department of the Environment
- Project Director

The Project Manager and the Administrative Assistant will assist in the acquisition of the experts.

- **Virtual Teams**

For this project, the use of virtual teams will be very beneficial for less travel, and relocation expenses and for the undertaking of precautionary health measures during this COVID-19 pandemic. The use of this technology will create an online team environment where suppliers, and other key stakeholders can be involved to discuss issues (PMI, 2017, p. 340).

4.5.6 Resource Calendar

The resource calendar for this project is for 18 months, with 5 working days from start to end of normal business hours. The resource calendar below shows the number of hours required to complete the project for each resource.

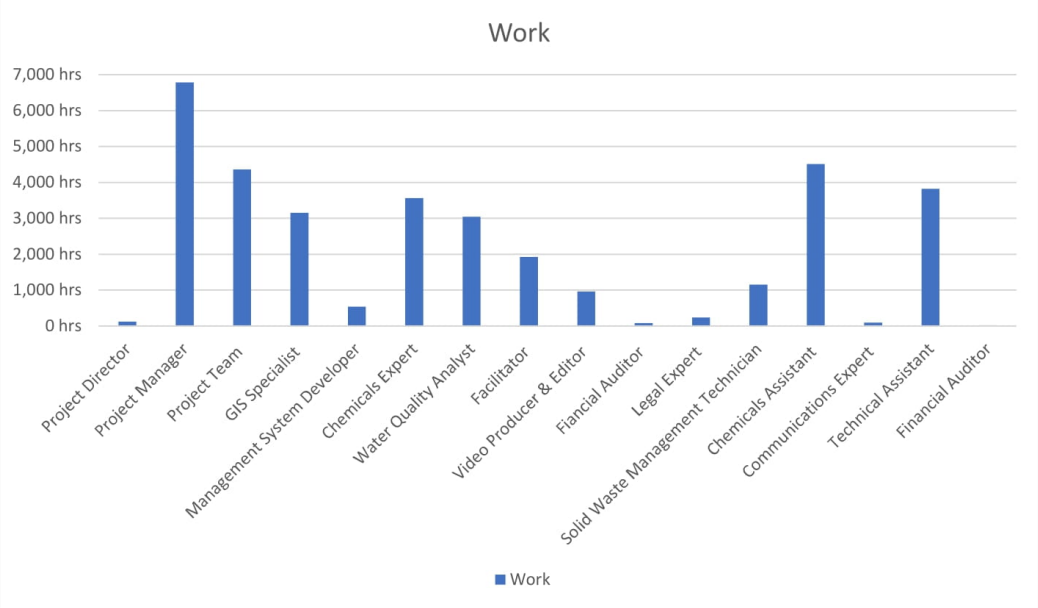


Figure 11 Resource calendar with working hours (Source: Author)

4.5.7 Management of team

The project team will work within the Department of the Environment; therefore, gender equality will be encouraged to have a diverse culture. The Department of the Environment focuses on developing and sustaining the project team throughout life of the project. The development of the project team will improve the people skills, technical competencies, work environment, and most of all, project performance (PMI, 2017, p.338). The model of team development used is the Tuckman Ladder which describes the five stages of team development (PMI, 2017, p. 338):

1. Forming- This is the phase where the team meets and learns about the project and their formal roles and responsibilities.
2. Storming- Here, the team begin to address the project work, make technical decisions, and assume a project management approach;

3. Norming- In this phase, the team members begin to work together and adjust to their work habits and behaviours to support the team.
4. Performing- Here, the teams that reach the performing stage function as a well-organized unit.
5. Adjourning- In this phase, the team completes the work and moves on from the project.

4.5.8 Training

There is training scheduled with regards to the Project for the Environmental Officers and Technicians since the organization will benefit from specialized trainings provided by the experts.

4.5.9 Performance Assessments

The project manager will review each team member's assigned work activities at the onset of the project and communicate all expectations of work to be performed. The project manager will then evaluate each team member throughout the project to evaluate their performance to determine how effectively they are completing their assigned work. The Project Director will provide feedback for each team member's project performance. The project Director will then perform a performance appraisal for each team member as seen in Appendix 6.

4.5.10 Recognition and Rewards

Granted, the project does not allow for monetary rewards; however, there are several planned items for recognition and reward for project team members.

- Upon successful completion of the Project, a recognition will be provided in accordance with the Labour Laws and Public Service Regulations of Belize.
- Team members who successfully complete all of their assigned tasks will have their photo taken for inclusion in the Department of the Environment social media Facebook page.
- A Certification of Appreciation will be given to the team members, followed by a celebration party with the DOE's staff, Chief Environmental Officer and other guests.

COMMUNICATION MANAGEMENT PLAN FOR MANAGEMENT OF MERCURY WASTE IN BELIZE

DEPARTMENT OF THE ENVIRONMENT

BELIZE, C.A.

4.6 Communication Management Plan

The communication management plan for this project will ensure that the communication activities are based on the needs of each stakeholder.

The information to be communicated to stakeholders will be in the official language: English. This plan includes a communication requirement to effectively and efficiently communication with stakeholders. Based on the RACI Matrix (see Chart 20) chart there are six (6) key stakeholders:

- Project Director- responsible of information exchange and authorizing information sharing
- Project Manager- responsible of assuring quality of reports, including information presented and grammatically reviewed reports
- Project Administrative Assistant (AA)- responsible of communicating the approved information to the public or other stakeholders
- Consultants- they are responsible of providing reports, meeting reports and other required documents
- Responsible Sponsor Implementing Agency (IA)- provides the final approval and distributes to the sponsor
- Implementing Partner (IP)- provides support

The communication requirements for the Management of mercury waste are described in Chart 20.

Chart 20 Communication requirement based on each stakeholder (Source: Author)

Communication	Audience	Goals	Frequency	Format	Responsibility	Method of communication
Inception meeting	All project stakeholders	Introduction of the project to stakeholders	One time event	Meeting, project charter document presentation	Project manager	Oral- formal & Written- formal
Steering Committee	Steering committee, project director, IA, IP, consultants	Review project status, manage performance, clear issues	Weekly	Project charter and project management plans	Project Manager and AA	Oral-informal
Status reports	Project director, IP, IA, and consultants	Report on the project progress, issues, constraints, and risk	Weekly, one day before the steering committee meeting	Email, Report	Project Manager and AA	Written-formal
Team meeting	Project Team	Report status, identify issues	Weekly, one day before the status reports are due	Meeting and status report	Project Manager	Written- informal
Team Stand-up	Project Team	Quickly coordinate work for the day	Twice a month	Staff meeting	Project Manager	Oral-informal

Communication	Audience	Goals	Frequency	Format	Responsibility	Method of communication
Milestone Review	Steering committee, Project Director, consultants and IA	Review status, feedback	At project milestones	Meeting review	Project Manager	Written-formal
Lessons Learned	Project Team	Review success and failure for future improvements	Closing of the project	Meeting, press releases	Project Manager	Written-formal

4.6.1 Communication methods

The communication method used for this project to share information among project stakeholders will include the following approaches:

- Interpersonal communication which is communication exchanged between individuals face to face, such as, between the Project manager, Administrative Assistant, and consultants.
- Small group communication will occur within three to six people in which meetings will take place to review project status or to address risks or other issues.
- Public communication will be effective during the inception meeting.
- Mass communication will take place to share results regarding the project through press releases and information deemed necessary.
- Social media communication will be used to share newsletters, press releases, or announcement of consultations.

The communication model used for the project will be an interactive communication model as message sent by the sender is understood and feedback is provided to ensure that the communication is correctly interpreted. The project will use communication media such as: telephone, emails, videoconferences, social media messages and instant messaging.

4.6.2 Monitor Communication

The monitor of communication will determine if the planned communication activities are supporting the project's deliverables and expected outcomes. Thus, the project's communication should be carefully evaluated to ensure that the right message with the right content is delivered to the right audience (PMBOK, 2017, p. 389). Therefore, the communication plan can be amended to improve its effectiveness. Through meeting with the project team and internal stakeholders the evaluation required will be achieved. The chart below shows the coordination among the project team to discuss critical issues, challenges or concerns.

Chart 21 Coordination meeting communication (Source: Author)

Meeting	Frequency	Duration	Objective
Stand-up meeting	Everyday	10-15 mins	To coordinate the week's activities
Coordination meeting	Once a week	30-45 mins	To raise issues of concern, review team's performance, discuss delays (if any) and other concerns
Milestone meeting	Once a month	20-30 mins	To discuss the project's achieved milestones and the upcoming milestones
Team performance assessment	Once every 3 months	10-15 mins	Discuss the team member assessment and any other grievances (If any)

RISK MANAGEMENT PLAN
FOR
MANAGEMENT OF MERCURY WASTE IN BELIZE

DEPARTMENT OF THE ENVIRONMENT

BELIZE, C.A.

4.7 Risk Management Plan

The Risk Management Plan (RMP) is the process carried out by the project team to identify potential risks, estimate its impact, and define a response to those risks. A risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives (PMI, 2017, p. 720). The RMP for this project will contain the risks identified and describe the way it will be monitored during the project.

4.7.1 Risk Management Approach

Risk Management is an important process for this project; the project team will continuously update the risk management approach through the life of the project. The management of the risks is one of the most important aspects of the project. The unknowns of the project can place the project in jeopardy, and therefore, there are many risks that will require assessments. For this reason, risk management is both a proactive and reactive process to identify, analyse and respond to the risks (Scavetta, 2019).

A risk register will be developed to record the risks and continual identified risks by the project manager. The project team will, therefore, be responsible for monitoring and responding accordingly to those risks.

The identification of risks performed by the project team will be through discussions, and brainstorming during meetings with the stakeholders. Data analysis techniques, such as, SWOT analysis will be used to examine the project from each of the strengths, weakness, opportunities, and threats (SWOT) perspectives. The risk will be categorized with a risk breakdown structure (RBS) as a representation of the potential risks of the project (PMI, 2017, p. 405).

Once the risks have been identified, the project team will proceed to analyse its possibility of occurrence, and their impact on the project objectives, based on information gathering techniques. As a result, a risk response strategy will be developed during this process to address the identified potential risks either as threats or opportunities to reduce the risks.

4.7.2 Risk categories

The following risk categories have been identified of the project:

- Technical risk,
- Management risk,
- Commercial risk,
- External risk.

4.7.3 Risk Breakdown Structure (RBS)

The RBS is a representation of the potential risks that may affect the project identified by the project team during the brainstorming sessions.

Chart 22 Risk Breakdown Structure for the project (Source: Author)

RBS Level 0	RBS Level 1	RBS Level 2	RBS Level 3
All sources of project risk	1.Technical risk	1.1 Technical skill	1.1.1 Information management skills
		1.2 Technology	1.2.1 Computing infrastructure
	2.Management risk	2.1 Project management	2.1.1 Performance
			2.1.2 Communication
	3.Internal risk	3.1 Contractual terms and conditions	3.1.1 Contract signature
		3.2 Human resource	3.2.1 Conflicting priorities
	4.External risk	4.1 Weather	4.1.1 Natural disaster
		4.2 Human health	4.2.1 Exposure to mercury
	5. Operational risk	5.1 Resources	5.1.1 Staffing
		5.2 Logistical	5.1.2 Transportation of samples

4.7.4 Qualitative Risk Analysis

The qualitative risk analysis for this project will establish a prioritized project risks in order to plan risk responses. The analysis will identify a risk owner who will be responsible for the planning of a risk response and its implementation. During the analysis, the identified risks will be prioritized, based on their probability of they are occurring, and the impact it will have on the project objective if it occurs. Therefore, an impact of each identified risk will be assessed, and risks with low probability and impact will be included in a risk register to be monitored. Individual risks are assigned to a priority level based on the combination of their assessed probability and impact, using a probability and impact Matrix.

4.7.5 Probability and Impact definitions

The Chart below provides defines the various description of probability and impact for the project.

Chart 23 Probability definitions for the project (Source: Thorhallsdottir, n.d.)

Description	Probability	Numerical
Very Likely	A definite hazard that has a highest frequency, generally more than 80%, and will be revealed during certain project stages.	0.9
Likely	Risks that lie among 60-80% chances of occurrence	0.7
Possible	Hazard which has a 50/50 likelihood of occurrence	0.5
Unlikely	Unlikely risks will occur and contain low probability of occurrence of 20-30%	0.3
Highly unlikely	Unlikely risks which have a rare level occurrence, such as, less than 10%	0.1

Chart 24 Impact definitions for the project (Source: Kendrick, 2015)

Description	Impact	Numerical
Very High	An impact that would result negatively on project outcomes, and the project budget, and with an increase to cost of more than $2000	0.8

Description	Impact	Numerical
High	Any impact that would threaten the project's objective (failure to meet one or more of the triple constraints parameters) or that might lead to significant, measurable in long term impact, and with an increase to cost of $1501-$2000	0.4
Moderate (3)	Any impact that would result in significant project replanning or that would lead into a noticeable and inconvenient effect with an increase to cost of $1001-$1500	0.2
Low	Any impact that can be managed within the project team and whereby functions are noticeably reduced with an increase of cost of $100-$1000	0.1
Very Low	Any impact that can have a negligible effect on the project cost less than $100	0.05

4.7.6 Risk Prioritization

The project team has defined the acceptable scales and probabilities of possible risk and their impacts on project cost.

Chart 25 Definitions for Probability and Impacts (Source: PMI, 2017, p. 407).

Scale	Probability	Impact on Cost (BZD)
Very High	> 80%	>$2000
High	60-80%	$1501-$2000
Medium	More than 50%	$1001-$1500
Low	20-30%	$100-$1000
Very Low	<1-10 %	< $100

Chart 26 Probability x Impact Matrix (Source: Author)

Probability	Impact					
		Very low (0.05)	Low (0.1)	Medium (0.2)	High (0.4)	Very High (0.8)
	Very Likely (0.9)	0.05	0.09	0.18	0.36	0.72
	Likely (0.7)	0.04	0.07	0.14	0.28	0.56
	Possible (0.5)	0.03	0.05	0.1	0.20	0.40
	Unlikely (0.3)	0.02	0.03	0.06	0.12	0.24
	Highly unlikely (0.1)	0.01	0.01	0.02	0.04	0.08

Chart 27 PxI Scale (Source: Author)

Risk Level	Rate
Very low	<0.05
Low	0.05 - 0.13
Medium	0.14-0.25
High	0.26 >

Chart 28 Project Risk Register (Source: Author)

RBS Code	Cause	Risk	Consequence	Probability	Impact	PxI	Owner	Risk Response Strategy	Cost of Strategy (BZD)
3.1.1	Several projects are coordinated at in the same Ministry	Schedule delays	Delay the commencement of the project	0.7	0.2	0.14	Project Manager	**Mitigate:** Prepare the contracts of consultants with sufficient time	0
4.2.1	Inappropriate use of personal protection equipment (PPE)	Mercury exposure and contamination	Contamination and health risk	0.5	0.4	0.2	Chemicals Expert	**Mitigate:** Training for the safe handling and protection of equipment will be provided by the expert	$1500
3.2.1	Overburden Administrative Officers (AO) within the Ministry	Poor performance	Contract Approval delayed	0.5	0.2	0.1	Project Manager	**Mitigate:** Liaise with the AO in order to work effectively.	0
4.1.1	Hurricane season and flash floods	Cause validity and sample error	Water samples when scheduled will not be available	0.5	0.4	0.1	Water Quality Analyst	**Mitigate**: Regular weather patterns and disturbances are observed	$1500
5.1.1	Lack of sufficient team members	Unmotivated team	Poor performance	0.5	0.1	0.05	Project Manager	**Mitigate:** Create an environment for team members to work towards the same goal	$1000
1.1.1	Not enough training in information management	Poorly collected, stored, and managed information handling	Lack of information on mercury waste	0.1	0.1	0.01	Project Manager	**Mitigate:** Strengthen the information systems appropriately and providing consultation with an expert.	$100

RBS Code	Cause	Risk	Consequence	Probability	Impact	Pxl	Owner	Risk Response Strategy	Cost of Strategy (BZD)
1.2.1	Inappropriate computer infrastructure	Cannot implement environmental management system (EMS)	Increase cost for EMS implementation	0.3	0.1	0.03	Management System Developer	**Mitigate:** Within the project plan, include a test for the infrastructure of computer systems**.**	$100
2.1.2	Limited feedback from steering committee	Delays in schedule	Delay in making decisions for the project	0.1	0.05	0.01	Project Manager	**Mitigate:** Consult with the project steering committee with enough time	0
5.1.2	Logistical delays due to improper documentation	Erroneous sample data	Samples delayed for analysis	0.3	0.1	0.03	Project Manager	**Mitigate:** Memo of Understanding is made with the Excise & Customs Department on the importance of samples to be exported for analysis.	$100
2.1.1	Poor recruitment	Staff does not have the sufficient knowledge in project management	Delays in the project	0.1	0.05	0.01	Project Manager	**Mitigate:** Strengthen the project team to enhance their skills	$100
								Total	**$4,400**

4.7.7 Risk Management Strategy

The risk management strategy reflects the Ministry, and the DOE will manage risk including policies, procedures used to identify, assess, respond to, and monitor the risks. In the response planning the risk owners, project team and project manager will be responsible to reduce the probability and impact of risks.

4.7.8 Monitor of risks

The monitor of risk includes processes of monitoring the implementation of agreed-upon risk response plans, tracking identified risks, identifying, and analysing new risks, and effectively evaluating risk process throughout the project (PMBOK, 2017, p. 453). During the project execution, the information generated will be used to monitor risks and determine if:

- Implemented risk responses are effective,
- Level of overall project risk has changed,
- Status of identified individual project risk have risen,
- Risk management approach is still valid,
- Contingency reserve for cost or schedule requires modification (PMBOK, 2017, p. 454).

The Implementing Agency (UNEP) will be informed during weekly project status reviews, including the risk management plan.

PROCUREMENT MANAGEMENT PLAN FOR MANAGEMENT OF MERCURY WASTE IN BELIZE

DEPARTMENT OF THE ENVIRONMENT

BELIZE, C.A.

4.8 Procurement Management Plan

The Procurement Management plan will document the project procurement decisions, its approach, and identify potential sellers to acquire goods and services (PMBOK, 2017, p. 466). The management of mercury waste in Belize is an environmental project that aims to monitor and control the waste of toxic chemical mercury as well as the goods and services required to complete the outcomes will be outlined in the procurement plan.

4.8.1 Procurement Management Approach

The project manager and the project assistant will be responsible to develop the procurement plan. The procurement approach will assist the likelihood of the right bidders to participate, receive better bids, and increase the chance of receiving value for money. Essentially, the approach will provide better delivery of the project outcomes within budget, time, and quality.

The following bid documents will be used in the procurement plan:

- Bids
- Tender
- Quotations (Request for Information, Request for Quotation, Request for Proposal)

For the Management of mercury waste project, the Project Manager will be responsible to identify the goods and services required for the completion of the project. The procurement process to acquire the goods and services will be followed by using the Public Procurement Procedures- Standardized Procurement Procedures (PPP) Handbook. The PPP handbook outlines the principles of Value for Money, Fairness and Equal Treatment, Transparency and Accountability, and Ethical Standards (Ministry of Finance, 2013).

4.8.2 Procurement Definitions

In this section, items listed will be procured to ensure the timely completion of the project.

Chart 29 List of items to be procured based on service or goods (Source: Author)

Item	Goods or Service	Justification	Needed By
Legal Expert	Service	Development of policy and regulations	
Chemical Expert	Service	Identification of mercury products and establish a baseline, phase out mercury containing products	
Technical Assistant	Service	Provide technical support to chemicals expert	
Solid Waste Management Technician	Service	Waste dump site identification and monitoring and address domestic waste disposal	
Water Quality Expert	Service	Test for presence of mercury at different sample points	
GIS Expert	Service	Remote sensing for mapping of mercury in hotspots	
Management System Developer	Service	Develop environmental management system	
Video Producer & Graphic Designer	Service	Production of promotional videos for public awareness	
Financial Auditor	Service	Perform financial audits	
Conference room	Service	For Consultation meetings	Legal Expert
Catering	Goods	Food and snacks for participants of meetings	Legal Expert
Office Supplies	Goods	Office Supplies for the Department	Project Manager
Project Manager & AA uniform	Goods	Uniform for Project Manager & Project AA	Project Manager
Subsistence Allowance	Service	Subsistence Allowance for experts, PM and AA during travels including accommodation	Chemicals Expert, GIS Expert, Water Quality Analyst

Item	Goods or Service	Justification	Needed By
Advertising services	Service	Advertising of TOR for consultancies in newspaper	
Office equipment	Goods	Desktop computer, laptop and printer	Project Manager
Sundries	Goods	Expenses for office	Project Manager
Reagents to test mercury: Stannous chloride, Hydrochloric Acid, Bromine Chloride, Potassium Bromide	Goods	To test for the presence of mercury in water	Water Quality Analyst
Sampling equipment	Goods	To collect samples of water	Water Quality Analyst

4.8.3 Cost Determination

The Cost determination outlines the manner costs will be determined. A Request for Quote will be issued to the sellers/vendors containing the needs and requirements for the service or goods and asking them to submit a bid for their service or goods. This process is crucial as costs is a determining factor and a criteria for selection.

4.8.4 Procurement for goods

In the Public Sector, the funds are required to be managed in a transparent and accountable manner. Therefore, the procurement of goods will be performed by the Project Administrative Assistant (AA) and will require obtaining three quotes while following the selection criteria by receiving the best value for money. The Project Director will proceed to select the best value for money and approve. The Project AA proceeds to prepare the Purchase Order as seen in Appendix 7. for the selected company. The Project Director will approve and sign the Purchase Order as the Request for Direct Payments

for less than $5000.00. For payments above the threshold, approval will be sought from the Project Steering Committee.

4.8.5 Procurement for Services

The Management of Mercury Waste Project requires consultancy services for the completion of project objectives. The following list identifies the eleven (11) experts, required to provide professional services:

- Legal Expert
- Chemicals Expert in mercury
- Geographic Information System (GIS) Expert
- Water Quality Analyst
- Video Producer & Editor
- Solid Waste Management Technician
- Management System Developer
- Technical Assistant
- Financial Auditor
- Technical Assistant

4.8.6 Contractual Procedures

The Terms of Reference (TOR) and the Request for Proposal (RFP) will be developed by the Project Manager and will contain the tasks the experts will be required to perform. The TOR and RFP will contain the data that needs to be submitted for approval and contains a detailed list of all data and services that will be provided in the contract. The Project Steering Committee will be submitted for its approval. Subsequently, the RFP will be published through all forms of communication, such as, the government emails, newspaper, Department of Environment website, and social media platform for a duration of three weeks.

The submission of RFP will be reviewed, and a panel of examiners will evaluate the proposal packages. The panel consists of three members mainly: one member from the

Department of the Environment (DOE), one from the Ministry of Finance, specifically from the Procurement Unit, and one Finance Officer at the Ministry of Sustainable Development, Climate Change, & Disaster Risk Management. The panel will evaluate the packages, using an evaluation sheet as seen in Appendix 10. The selected contractor along with the Evaluation Report as seen in Appendix 12 will then be forwarded to the PSC for approval. Once approved, the preparation of the contract will commence after all documentation is submitted to the Contractor General's (CG) Office. The CG will then approve the agreement between DOE, and the selected contractor will sign the contracts and commence with other proceedings. The signed contract is forwarded to the AA, and the disbursement of money then commences, and, if agreed in the contract, this disbursement will occur at once.

4.8.7 Type of Contracts

The Project will support awarding service contracts, based on a firm, fixed price with well-defined requirements. The Project Manager and the AA will define the quantities, type of items required, and the time required for its use in order to complete the project's outcomes. The AA is tasked to make the request for proposals and request for quotations from various sellers.

4.8.8 Procurement Documentation

The use of a standard procurement documentation will be prepared by the Project AA and the Project Manager. The documentation will contain with details of the requirements when issuing an RFP and will be beneficial for the selection process when the comparison for the best value of money is observed.

The standard list of templates for procurement documentation for this project:

(a) Terms of Reference (see Appendix 7)

(b) Request for Proposal (see Appendix 8)

STAKEHOLDER MANAGEMENT PLAN FOR MANAGEMENT OF MERCURY WASTE IN BELIZE

DEPARTMENT OF THE ENVIRONMENT

BELIZE, C.A.

4.9 Stakeholder Management Plan

2.9.1 Introduction

Stakeholders are people who directly or indirectly participate in a project and are affected by the decisions, project execution and its results. The Plan contains processes that support and analyse stakeholder expectations, assesses the degree to which they impact or are impacted by the project, and develops strategies to effectively engage stakeholders in support of project decisions, planning and execution of the work of the project. In order to ensure project success, it is necessary to identify all key stakeholders in this project. The identification of stakeholders leads to the understanding of each stakeholder's preferred medium of communication and their needs.

2.9.2 Stakeholder Identification

The stakeholder's identification is performed through a stakeholder analysis in order to plan stakeholder communication. Stakeholders of this project are those that will be positively or negatively be affected both internal and external by the results of the project. This management plan will engage persons in the project team that has a knowledge of the waste, and mercury products end users will identify the relevant stakeholders.
The approach to identify the stakeholders will be performed by a Stakeholder analysis that will consider all the relevant actors in the project. The following stakeholder analysis will be in the following steps:

- Identification of all primary and secondary stakeholders
- Classification of the stakeholder group through the assessment of their interests in relation to the project, their impact of the project on their interests, and their influence or power that will affect the project
- A stakeholder register based on this information

2.9.3 Stakeholder analysis

Stakeholder analysis identifies stakeholders and analyse their needs and requirements of the project in order to deliver the products (PMI, 2017, p. 512). The analysis uses information of each stakeholder and assess their interest, power, influence and impact each have on the project. By performing the analysis assists in identifying risks, requirements that are required. In addition, the analysis identifies who all need to be consulted in various phases of the project.

The attitude of stakeholders has an impact on project success and thus knowing stakeholder expectations is critical. Stakeholder analysis metrics are performed by prioritization of stakeholders. This method places stakeholder based on their interest levels, influence, power, and impact. The following figure of stakeholders are analyzed based on power and interest.

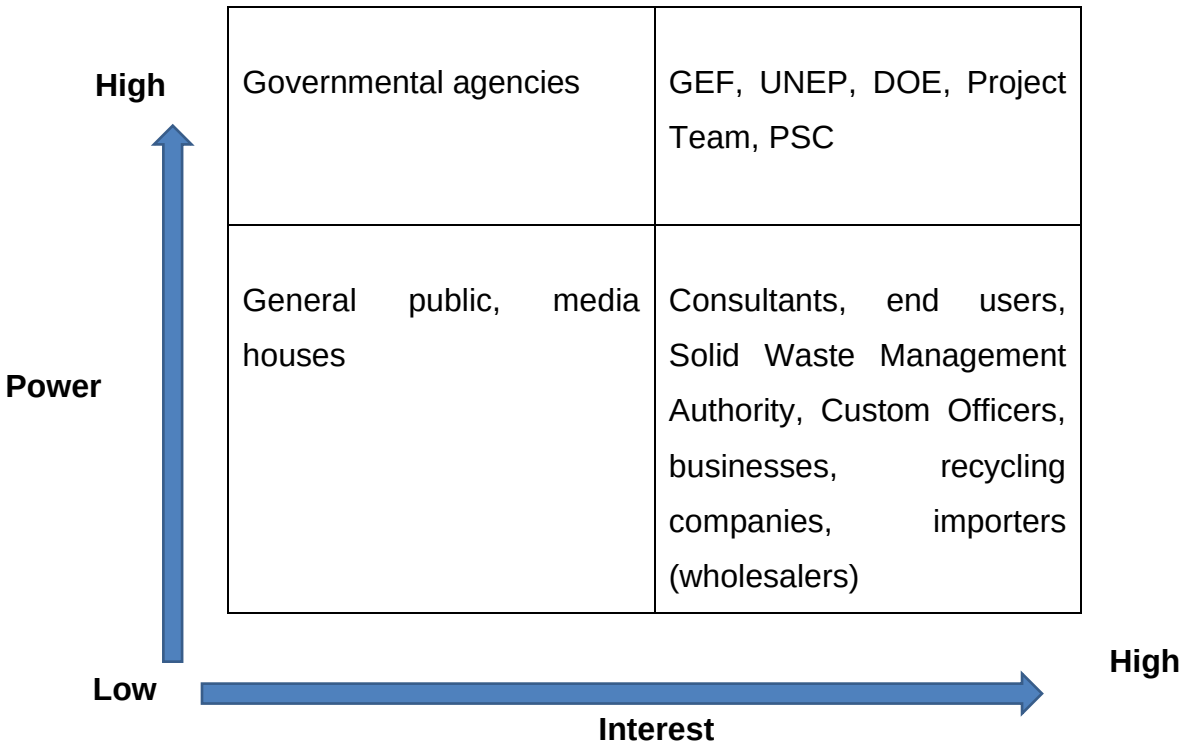


Figure 12 Power-Interest grid matrix (Source: Author)

The following figure analyzes stakeholders based on power and their influence on the project.

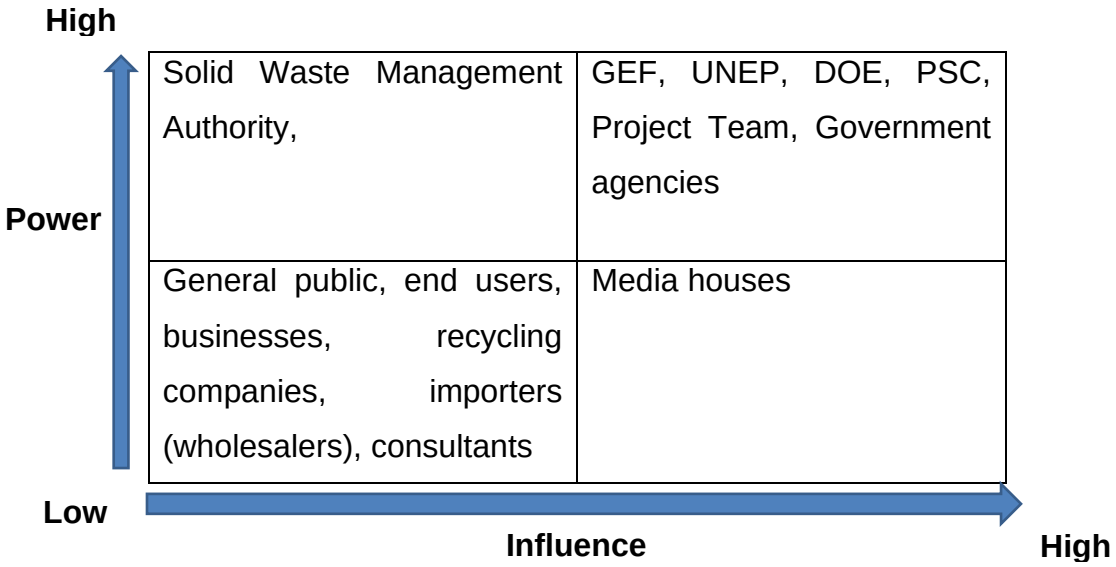


Figure 13 Power-Influence grid matrix (Source: Author)

The following figure seen below analyzes stakeholders based on their influence on the project and their impact.

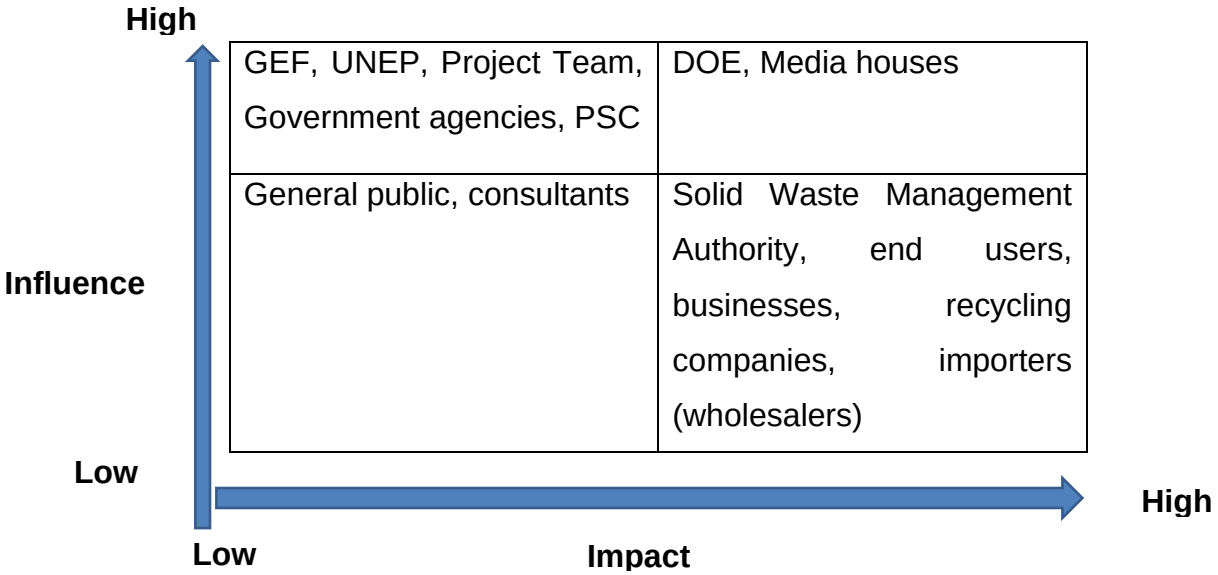


Figure 14 Influence-Impact matrix (Source: Author)

The chart below shows the stakeholder register for the project with their specific requirements.

Chart 30 Stakeholder Register for the Management of mercury waste project (Source: Author)

Stakeholders		Organization	Contact information	Roles & responsibilities	Main Expectations	Major Requirements	Influence (Low,Med, High)
1	Dr. Kenrick Williams	Chief Executive Officer, Ministry of Sustainable Development, Climate Change & Disaster Risk Management	ceo@environment.gov.bz	Authorize project at the National Level	Project is completed on time and within budget	The project is completed including stakeholders' expectations	High
2	Kevin Helps	Senior Programme Officer, UN Environment GEF Coordination Office	kevin.help@unep.org	Over sees investments to reduce harmful chemical pollution	Initiates the project and provides the budget	The project is completed successfully	High
3	Leo Heilman	UNEP	metals@un.org	Director and Regional Representative for Latin America	Acting Project Sponsor, Implementing Agency	The project is completed according to the agreed time and budget.	High

Stakeholders		Organization	Contact information	Roles & responsibilities	Main Expectations	Major Requirements	Influence (Low,Med, High)
4	Martin Alegria	Chief Environmental Officer	doe.ceo@environment.gov.bz	Implementing Partner	Supervises & coordinates national activities of the project	Oversees resources and funds efficiency	High
5	Cindy Cunil	Project Manager	chemicalwaste@environment.gov.bz	Planning, Monitoring and execution of the project	Execution of required project management and activities	Execution of project within budget and time	High
6	TBA	DOE, Project Administrative Assistant	chemicalwaste@environment.gov.bz	Timely execution of project activities	Reports delivery, liaise with stakeholders	Plan budget for activities and monitor execution	High
7	Dr. Lumen Cayetano	Director, Solid Waste Management Authority	cayetanolu@gobmail.gov.bz	Project Steering Committee member and regulator	Coordination	Involvement for successful completion of project activities	Low
8	Martha Pohl	Renco Battery Recycling	recycle@belizebatteryrecycling.com	Retail and distributor of lead acid batteries	Coordination and positive impact for the project	Involvement of project activities	Low

2.9.4 Manage Stakeholder Engagement

This process approaches to involve project stakeholders to meet their needs and expectations for the success of the project. The stakeholder register will be updates regularly in the effort to reflect changes to the stakeholder community (PMI, 2017, p. 518). Stakeholder's requirements will be logged during meetings, prioritized and ranked by the project team.

A stakeholder engagement assessment will be performed to support the comparison of the current engagement level and the desired engagement level for a successful project delivery (PMI, 2017, p. 521) One way to classify the engagement level of stakeholders is shown in Chart 31 below.

Classification Engagement Level (PMI, 2017, p. 521)

- Unaware- Unaware of the project and potential impacts
- Resistant- Aware of the project and potential impacts, but resistant to any changes that may occur as a result of the work or outcomes of the project thus will be unsupportive
- Neutral- Aware of the project, but neither supportive nor unsupportive
- Supportive- Aware of the project and potential impacts, and supportive of the work and its outcomes
- Leading- Aware of the project and potential impacts, and actively engaged in ensuring that the project is successful

C- Represents the current engagement level of each stakeholder
D- Indicates the desired level to ensure project success

Chart 31 Stakeholder Engagement Assessment matrix (Source: Author)

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
CEO	C			D	
Chief Environmental Officer				C, D	

Stakeholder	Unaware	Resistant	Neutral	Supportive	Leading
Project Sponsor				C, D	
Project Manager					D
Project Team				C. D	
End users	C			D	
Recycling companies	C			D	
Importers	C			D	
SWMA	C			D	

2.9.5 Monitor Stakeholder Engagement

Throughout the lifecycle of the project, stakeholders will be engaged to obtain and maintain their continued commitment towards the project. Effective communication is crucial; thus, the communication strategy will be utilized to clarify and resolve issues that may arise. All issues will be logged, using the template in Appendix 13.

4. CONCLUSIONS

1. The Department of the Environment (DOE) is a project-oriented department therefore, maintaining all project related activities is necessary for the project's success. This scope management plan will provide the DOE the guidance required to execute the project.

2. The Department has had challenges in controlling and maintaining project's schedule. Scope creep has been one of the consequences of poorly managed scope and thus projects have fallen behind from their schedule. For this reason, the Schedule Management Plan has a detailed plan of activities with their duration was identified along with the milestones. The Schedule Management Plan includes a detailed timeline with an estimated time for each activity. The scope management plan will provide the Department with the process of planning the scope based on the sponsor's requirements.

3. Projects executed at the Department would only include a breakdown of the allocated budget but has little information on the control measures. Therefore, the Cost Management Plan for this project results in providing a management and control of the costs of the project. The Cost Management Plan proves to be very useful which includes a cost baseline that will be able to be used to measure the performance with an earned value analysis. Any variations of the project will be monitored and controlled thus keeping the project's cost in track.

4. In the Quality Management Plan for this project contains quality metrics that assures and satisfies the sponsor. The process of planning quality management will be very beneficial to the Department for projects to provide the value it is expected. By defining quality metrics within the project, the Department will benefit to obtain the best from project's deliverables and assure its quality.

5. At the Department, sourcing for resources whether it is equipment or supplies on time when required has been a challenge. As a result, due to poor resources planning cause delays to the project. The Resource Management Plan provides to the Department the ability to maximize the demands of the required resources in an effective and efficient way.

6. Communication within the Department plays a vital role to ensure that the information is shared, and feedback is obtained. The Communication Management Plan will merge with the Department's communication procedures. However, the management plan will benefit because it includes the strategy required to maintain a relationship with the stakeholders.

7. The Department does not acknowledge the need to produce a risk management plan for most projects. Through this Risk Management Plan, it will provide a tool and a guide for reporting risk and increase the impact of opportunities to Senior management. This will prove to be very beneficial since it encourages a proactive management practice for the project's success.

8. The Department's formal procurement procedures are absent thus with the Procurement Management Plan it will provide a guide on the management and control processes for contracts, procure goods and services. The management plan includes procurement bidding documents and contract templates along with an evaluation sheet that will serve as a tool to evaluate vendors for best quality. This management plan can provide the Department with a standardized process for contracting vendors, procuring goods and services.

9. The relationship among stakeholders of the project is vital for its success. The Department has prided on engaging stakeholders throughout a project's life. However, as the Department extends to other stakeholders it is crucial to maintain existing and new stakeholders engaged. The Stakeholder Management Plan provides a new and very beneficial way to engage

stakeholder based on their interests, and impact on the project. Stakeholder analysis performed will provide for future project within the Department with the tool to effectively identify, assess and manage it stakeholders.

5. RECOMMENDATIONS

1. The Department of the Environment (DOE) lacks a Project Management Office (PMO), therefore, the project manager and team, including the Senior Environmental Officer should be trained on project management practices.

2. The Chief Environmental Officer of the DOE should encourage the Environmental Officer as the Head of the Project's Execution Unit (PEU) to implement the project management best practices and process guided by the PMI.

3. The Head of PEU and other Environmental Officers should use this Project Management Plan as a template for future project proposals.

4. The Chief Environmental Officer should use the lesson learned of this project should be applied for planning in future projects.

5. The Project Manager of this project should monitor the risk register based on the quantitative risk analysis and update if required.

6. The Project Manager of this project should monitor the stakeholder's engagement to ensure a fully engaged stakeholders.

7. The Chief Environmental Officer should encourage and invest in training all staff in the use of Microsoft Project for better tracking status of activities.

8. The Head of the Information Management Unit and the Data Manager at DOE should create a repository system for easy access of current and future projects.

9. The Head of the PEU should encourage the implementation of a standard template of subsidiary plans with this project management plan as its reference.

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7. APPENDICES

Appendix 1. Project Charter

Project Charter	
Date:	**Project Name:**
July 26th 2021	Project Management Plan for the management of Mercury waste in Belize
Knowledge Areas / PM Processes:	**Application Area (Sector / Activity):**
Knowledge Areas: Scope, Schedule, Cost, Quality, Resource, Communications, Risk, Procurement, and Stakeholder **PM Processes:** Initiating, Planning, Executing, Monitoring & Controlling, and Closing	Environment, Chemical Management
Project Start Date:	**Project Finish date:**
July 26th, 2021	October 19th, 2021
Project Objectives (General and Specific):	
General Objective: A Project Management Plan for the management of Mercury waste in Belize to comply with the Minamata Convention. **Specific Objectives:** 1. To create a scope management plan that documents all the work for the success of the project. 2. To create a schedule management plan to support the development of a project schedule to ensure the project is completed within the time constraints. 3. To create a cost management plan to define the processes for developing and managing the project budget to ensure the project is completed within the budget constraints. 4. To develop a quality management plan to identify the quality requirements for the project in order to ensure results meet expectations for approval within the time, cost, and scope constraints. 5. To create a resource management plan to ensure that all resources are identifies and managed effectively to complete the project within time, cost, and scope constraints. 6. To develop a communication management plan to ensure the timely and effective communication of the project status and other key information.	

7. To create a risk management plan to identify and examine risks to the successful completion of the project and develop plans to minimize the likelihood of the risks.
8. To develop a procurement management plan to be used to obtain products, services or results required by the project.
9. To develop a stakeholder management plan to identify and support all the project stakeholders to ensure effective stakeholder engagement.

Project purpose or justification (merit and expected results):

The Project Management Plans would facilitate the process by using best practices and methodology, including various document templates and process plans. The project for the management of mercury waste is critical due to the increased risk of toxic chemical leakage into the environment. This project management plan will become an asset for the Department of the Environment to be used for submission to secure funding for future projects.

Description of Product or Service to be generated by the Project – Project final deliverables:

The project management plan with all its subsidiary management plans. The Project Management Plan will incorporate good practices recommended by the Project Management Body of Knowledge (PMBOK 6th Edition). The subsidiary plans will include Scope Management Plan, Schedule Management Plan, Cost Management Plan, Quality Management Plan, Resource Management Plan, Communication Management Plan, Risk Management Plan, Procurement Management Plan, and Stakeholder Management Plan.

Assumptions:

The project can be completed in three (3) months.

The project plan can be completed by the project manager.

It is assumed that the funding for the project will be through Global Environmental Facility

It is assumed that the scope will not be changed within the time of the project duration.

It is assumed that with the knowledge from the previous project management courses and PMBOK will be sufficient to complete the final graduation project.

It is assumed that the support from the Department of the Environment will be made available with provision of historical data.

That all relevant stakeholders will participate and become available.

Constraints:

Scope creep due to changes in the scope.

The interest of the stakeholders may change during the project.

The scope will be within the time duration of the project.

Preliminary Risks:

If the schedule of the milestones is not adhered to then the project management plan may not be completed in three (3) months.
Weather conditions such as hurricane season is a risk that can affect the project.

Budget:

It was determined that the budget is approximately BZD $370,000.

Milestones and dates:

Milestone	**Start date**	**End date**
Project Start	3-Jan-22	13-Dec-23
Project Management Plans		
a. Scope management plan	05-Jan-22	10-Jan-22
b. Schedule management plan	11-Jan-22	17-Jan-22
d. Risk management plan	18-Jan-22	25-Jan-22
e. Quality management plan	26-Jan-22	1-Feb-22
f. Procurement management plan	2-Feb-22	8-Feb-22
g. Cost management plan	9-Feb-22	15-Feb-22
h. Communication management plan	16-Feb-22	22-Feb-22
k. Project Management Plan	23-Feb-22	1-Mar-22
Chapter V: Conclusions	2-Mar-22	4-Mar-22
Chapter VI: Recommendations	7-Mar-22	9-Mar-22

Relevant historical information:

The project is to develop the Project Management Plans for the Management of Mercury waste in Belize and effectively create the management plans for the executing, monitoring & controlling and closing processes. The Global Environmental Facility (GEF) has recently approved funding for projects with the objective to take measures to ensure that persistent organic pollutants (POPs) are managed in an environmentally sound manner. Therefore, the development the management plans for the management of Mercury waste in Belize will create an environmentally sustainable for proper waste management.

Stakeholders:

Direct stakeholders:
General Public, Businesses, Government, International organizations, Private sector (industrial, commercial, Solid Waste Management Authority, Custom & Excise Department, Department of the Environment.

Indirect stakeholders:
FGP Tutor- Mr. Jorge Trejos
Project Manager: Cindy Marily Cunil

Approval:

Project Manager: Cindy Marily Cunil	Signature:
Authorized by:	Signature:

Appendix 2: Change Request Form

Project Name			
Requested By		Date	
Request No.		Name of Request	
Change Description			
Change Reason			
Status	In Review	Approved	Rejected
Approval Date			
Approved By			

Scope Acceptance

Approved by: Date:

_____ _____

Implementing Partner (UNEP)

Appendix 3: Project Status Report

Reporting period:		**Project title:**	
Date of report:		**Project Manager:**	
Report Author		**Project Sponsor:**	

Narrative summary of Status	**On Schedule:**	**Y/N**	**On Budget:**	**Y/N**	**Issue:**	**Y/N**

WBS ID	**Project Milestones**	**Status**	**Expected completion**	**Issues Exist (Y/N)**

Reporting Author: _____

Project Director comments:

Adapted from https://www.stakeholdermap.com/project-templates/project-status-report-template.html

Appendix 4: Consultant Quality Control Certification

Project Name: _____

Consultant: _____

Document Version: ☐ Draft ☐ Final

Project Manager:

_____

Fill in date the review was completed for review of the report, and date of verification was performed, and all comments were addressed or resolved, as appropriate.

	Date QC Review Completed	Reviewer (Print Name)	Verification Date

All technical studies and reports have been satisfactorily reviewed by assigned specialists in their areas of expertise. I have performed the required quality control reviews for this project and find that this Document satisfactorily meets the requirements, as applicable, and is consistent with the Department's procedures and scope of services for this project.

Project Manager			/ /
	Print Name	Signature	Date

I have reviewed this Document and find that it was prepared consistent with the Department's procedures.

Project Director			/ /
	Print Name	Signature	Date

Appendix 5: Performance Appraisal Report Form

PUBLIC SERVICE OF BELIZE
END-OF-YEAR

Part 1: GENERAL INFORMATION

Ministry/Department/Unit	
Period of Report	From_____/_____/_____ to_____/_____/_____ D / M / Y D / M / Y

Part 2: PERSONAL INFORMATION

Name: Last Name _____First Name _____ Middle Initial _

Date of Birth: __/___/_____/____ Sex: ☐ Male ☐ Female
D / M / Y

Social Security Number: _____

Date entered Service: _____/_____/_____ Date entered Ministry: _____/_____/_____
D / M / Y D / M / Y

Substantive Post: _____ Date entered: ____/_____/_____
D / M / Y

Present Posting: _____ Date entered: ____/_____/_____
D / M / Y

Acting Post (if Applicable): _____ Date entered: ____/_____/_____
D / M / Y

Incremental Date: _____/_____ Salary Scale:_____ Current Salary:_____

Part 3: TASKS, GOALS OR PROJECTS ASSIGNED FOR REPORTING PERIOD

The Officer should list tasks, goals or projects assigned and agreed with Supervisor. The Supervisor should complete table with performance criteria previously agreed and performance achievement.

Tasks, Goals, Projects	Quantity[1]	Quality[1]	Timeliness[1]

Place criteria in top row and performance in bottom row.

Agreed on: _____ Signatories:

Supervisor: _____ Employee: _____

Other factors influencing performance

_____

_____

_____

Part 4: ASSESSMENT OF PERFORMANCE IN ACTIVITY ELEMENTS

In this part, the Officer's immediate Supervisor will assess the performance of the Officer according to agreed Activity Elements based on the Continuous Assessment during the Appraisal Period in relation to the tasks, goals and/or projects assessed in Part 3. Assessment will be based on a ten-point system as follows:

Performance Rating A: 9 to 10 points
Performance Rating B: 7 to 8.99 points
Performance Rating C: 5 to 6.99 points
Performance Rating D: 1 to 4.99 points.

Guidance is given below in relation to each Element on how a rating may be determined.

Weighting will be given to each criterion according to the post of the Officer and the rating should be multiplied by the weight to obtain the assessment of the Officer on that activity element.

Element 4.1 <u>PRODUCTIVITY</u> RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Consistently plans and organizes work to take care of more important tasks. Completes work quickly, efficiently and on schedule.

B - Does a good job of scheduling work; usually completes work on time.

C - Produces work that is behind time but is showing progressive improvement.

D - Tends to waste time; fails to meet deadlines and is showing no signs of improvement.

Element 4.2 <u>JOB ATTITUDE</u> RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Sustains motivation to do best possible job. Does more than his share of work when required and comports himself well.

B - Usually conscientious; enthusiastic in performing assigned tasks; makes a real effort toward overcoming difficulties.

C - Reasonably satisfactory without sufficient interest but makes effort to improve.

D - No real interest; makes no effort to overcome difficulties.

Element 4.3 <u>QUALITY OF WORK</u> RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Consistently meets standards; work is thorough, accurate and precise.

B - Usually meets standards; seldom makes serious errors; seldom makes the same mistake twice.

C - Some aspects of performance below standard but makes effort to improve.

D - Standard of performance poor and makes no effort to improve.

Element 4.4 DEPENDABILITY RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Consistently carries out responsibilities without being checked on; but apprizes Supervisor on difficulties and action taken.

B - Usually reliable and may need Supervisor's oversight on more complex aspects of work.

C - Satisfactory but requires checking from time to time on routine matters, does not always keep Supervisor informed.

D - Unreliable.

Element 4.5 INITIATIVE RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Self-starter; improvises solutions; full of ideas which provide fresh insight and broader perspectives.

B - Usually goes ahead on his own but does not always visualize what needs to be done; occasionally offers suggestions.

C - Sometimes acts on his own but does not always visualize what needs to be done; rarely offers suggestions.

D - Waits to be told what to do; has no ideas; never offers suggestions.

Element 4.6 PUBLIC RELATIONS AND COOPERATION RATING [ ] x WEIGHT [ ] = [ ]

The weighting for all posts in this Element is 10.
(In relation to all Public Officers and the general public)

A - Consistently cooperative, helpful and supportive in achieving objectives; goes out of his way to be constructive and helpful.

B - Usually pleasant with others; cooperates willingly

C - Usually cooperates, but prefers to work alone.

D - Unfriendly, discourteous; unwilling to assist others.

Element 4.7 COMMUNICATION SKILLS RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Consistently demonstrates effective interpersonal oral and written skills; and consistently utilizes appropriate channels of communications.

B - Usually demonstrates effective interpersonal oral and written skills; and usually utilizes appropriate channels of communications.

C - Sometimes demonstrates effective interpersonal oral and written skills; and sometimes utilizes appropriate channels of communications.

D - Weak in interpersonal oral and written skills; and weak in utilizing appropriate channels of communications.

Element 4.8 <u>PUNCTUALITY</u> RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Consistently punctual to work and begins work immediately.

B - Usually punctual to work and usually begins work immediately

C - Occasionally late to work but usually begins work promptly on arrival.

D - Frequently late to work and does not begin work promptly on arrival.

Element 4.9 <u>RELIABILITY UNDER PRESSURE</u> RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Unflustered, calm and reliable at all times; capable of dealing with crises and emergencies without losing balance.

B - Usually able to cope with any situation; sometimes gets flustered in unusual crises.

C - Can cope with normal day - to – day problems; unable to function effectively under heavy pressure.

D - Easily excitable; unable to perform under pressure.

Element 4.10 <u>APPRAISING ABILITY</u> RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Sets goals and assigns duties; does continuous supervision and assessment; keeps relevant notes on Employee's performance; gives fair and objective appraisal

B - Sets goals and assigns duties; does supervision and assessment on an irregular basis; keeps relevant notes on Employee's performance; tries to be objective but is influenced by biases sometimes.

C - Goals set and duties assigned not clearly defined; gives general advice occasionally but not continuous supervision and assessments; not truly objective and easily influenced by subjective considerations.

D - Does not set goals and duties; does not perform continuous supervision and assessment; does not keep notes; appraisal very subjective.

Element 4.11 <u>MANAGEMENT OF FINANCIAL AND MATERIAL RESOURCES</u>: RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Demonstrates excellent management of financial and material resources; uses very effective budgeting techniques; decentralizes management of resources and maintains high standards of transparency in accounting for resources.

B - Demonstrates average management of financial and material resources; makes average use of effective budgeting techniques; management of resources is fairly decentralized and average transparency in accounting for resources is displayed.

C - Management of resources not too strong, weak decision making capacity, budgeting and financial accountability.

D - Very weak management of resources; indecisive, budgeting and financial accountability almost non-existent.

Element 4.12 <u>MANAGEMENT OF STAFF</u>: RATING [ ] x WEIGHT [ ] = [ ]
The weighting for all posts in this Element is 10.

A - Consistently empowers others; promotes organizational values and desired results, training and self development of staff; manages performance and change; plans and implements effective staff development strategies.

B - Usually empowers others; promotes organizational values and desired results, training and self development of staff; manages performance and change; plans and implements effective staff development strategies.

C - Sometimes empowers others; promotes organizational values and desired results, training and self development of staff; manages performance and change; plans and implements effective staff development strategies.

D - Weak in empowering others, does not promote organizational values and desired results; does no training and self development; does not manage performance and change; does not plan and implement effective staff development strategies.

Part 5: OVERALL APPRAISAL (TO BE VERIFIED BY THE OFFICE OF THE SERVICES COMMISSION)

SCORING SECTION

1. Numerical Appraisal (brought down) =

2. Divided by total applicable weighting =

3. Equals overall numerical Appraisal Value =

Category 1: OUTSTANDING (9 THRU 10) [ ]

Category 2: ABOVE AVERAGE (7.0 THRU 8.99) [ ]

Category 3: AVERAGE (5.0 THRU 6.99) [ ]

Category 4: BELOW AVERAGE (3.0 THRU 4.99) [ ]

Category 5: POOR (0 THRU 2.99) [ ]

4. Increment Granted Yes [ ] No [ ]

Full increment is to be granted for performance in category I thru 3 and no increment is to be granted for performance in category 4 or 5. Category 4 and 5 require mentoring and guidance in the first instance since a repeat of this performance could adversely affect the officer's career.

Part 6: TRAINING NEEDS AND PERSONNEL DEVELOPMENT
(These elements are not part of the scoring section.)

Element 6.1 JOB KNOWLEDGE

A - Well versed on unusual and complex aspects of the job. Frequently consulted by others.

B - Above average knowledge of job; generally knows what to do and how to do it.

C - Fairly good knowledge of job but could benefit from training.

D - Job knowledge and skills are limited; lacks understanding of routine procedures; in desperate need of training.

Element 6.2 <u>ORGANIZATIONAL KNOWLEDGE</u>

A - Comprehensive knowledge of vision, mission, policies, programs and structure of the organization.

B - Working knowledge of vision, mission, policies, programs and structure of the organization.

C - Conversant with the vision, mission, policies, programs and structure of the organization.

D - Unfamiliar with the vision, mission, policies, programs and structure of the organization.

Element 6.3 <u>TRAINING NEEDS</u>

(i) Based on the foregoing Appraisal could the Officer's performance **in his present post** be improved by training?

YES [ ] NO [ ]

(ii) If the answer to (i) is yes specify nature of training required.

_____

(iii) If no training is required for the Officer in his present post is training required to qualify him for promotion to his next career level?

YES [ ] NO [ ]

(iv) If the answer to (iii) is yes specify nature of training required.

_____

(v) Can the training requirement specified above be provided by:

a) the officer's Ministry/Department/Division? **YES [ ] NO [ ]**
b) the Office of Governance? **YES [ ] NO [ ]**
c) Any organization or institution within the Country of Belize?
YES [ ] NO [ ]

(vi) If the answer to (v) (c) is yes, specify:

a) the organization or institution:
_____

b) whether the training will require full-time or part-time attendance with brief details;
_____

c) the duration of time required to complete the training:
_____

d) the degree, or other qualification to be received at successful completion of training.
_____

(vii) If the training is only available abroad, specify the duration required to complete the course of training and the qualification to be received on successful completion.

Element 6.4 <u>DEVELOPMENT POTENTIAL</u>

Based on the Performance Appraisal and the training needs, this section assesses the potential for advancement in the service and the Officer's promotability.

1. In the light of the Officer's training needs, does he possess the matriculation requirements (if applicable) to undertake the course of training specified?

NOT APPLICABLE [ ] YES [ ] NO [ ]

2. If the answer to (1) is no, what arrangements if any, will the Officer make to acquire the necessary matriculation requirements?

_____

3. What training courses or seminars have the Officer attended and/or what qualifications have the Officer obtained during the year prior to this Report?

_____

4. Taking into account the total Appraisal so far what is the Officer's present fitness for promotion to the next career level?

(Specify post: _____)

WELL FITTED [ ] FITTED [ ] LIKELY TO BECOME FITTED [ ]
NOT FITTED [ ]

Part 7: CERTIFICATES

Element 7.1 CERTIFICATION OF THE FIRST REPORTING OFFICER

I hereby certify as follows:

1. **I am the immediate Supervisor of the Officer to whom this Report relates;**

2. **I have supervised his work for at least three months and where part of the Appraisal Period has been under the supervision of another person, I have consulted with that other supervisor concerning the Officer's performance under his supervision before the Appraisal interview;**

3. **This report has been prepared with the full participation of the Officer reported on, and his particular attention has been drawn to the items of the Report showing his strengths and weaknesses.**

Signature _____ Date of

Signature_____

Print Name _____ Title of

Post_____

Element 7.2 CERTIFICATION OF THE SECOND REPORTING OFFICER

I hereby certify as follows:

1. **I am the immediate Supervisor of the First Reporting Officer.**

2. **I am in full agreement with the Appraisal of the First Reporting Officer;**
YES [ ] NO [ ]

3. I am not in agreement with the Appraisal of the First Reporting Officer and have therefore made emendations in red alongside the first Appraisal but without making any changes in the Appraisal itself.

YES [ ] NO [ ]

Signature _____ Date of

Signature_____

Print Name _____ Title of

Post_____

Element 7.3 CERTIFICATE OF CHIEF EXECUTIVE OFFICER/HEAD OF DEPARTMENT

i. I have scrutinized the report and am of the view that it presents a balanced picture of the officer's performance during the period under review. OR

ii. I am not in agreement with the Appraisal and am making my comments thereon.

Signature _____ Date of

Signature_____

Print Name _____ Title of

Post_____

Element 7.4 CERTIFICATE OF OFFICER UNDER APPRAISAL

The officer is required to sign the certificate indicating by marking an X in one of the blocks labeled "YES" or "NO" his response to the statements listed. Any comments from the Officer must be prepared separately and attached to the Performance Appraisal Report. No comments can be accepted from the Officer unless he has signed the Certificate to show that he has seen the Report.
I hereby certify as follows:

1. The Appraisal was done during an interview in which I had full participations;

YES [ ] NO [ ]

2. I consider the Appraisal to be objective and reasonable;

YES [ ] NO [ ]

3. The Appraisal is generally acceptable, and although I have minor disagreements with some details I do not wish to make any comments thereon;

YES [ ] NO [ ]

4. I have major disagreements with the Appraisal or find the Appraisal to be unacceptable, and am herewith attaching my comments in rebuttal.

YES [ ] NO [ ]

Signature _____

Appendix 6: Purchase Order

PURCHASE ORDER

National Ozone Unit
Department of the Environment
Market Square
Belmopan
Phone: 828-4856

Fax: 822-2860

Date	P.O. No.
dd/mm/yy	DOENOU-00

VENDOR	SHIP TO
Tel:	Chief Environmental Officer Department of the Environment Market Square Belmopan

Vendor ID	Delivery Date	Ship Via	Terms of sale	Terms of payment	Currency
DOENOU00			Immediate	Cheque	BZD
					$

Comments: Administrative

Subtotal:	$
GST 12.5%	$
Grand Total	**$**

_____
Martin Alegria
Project Director

Appendix 7: Terms of Reference for Consulting services

INSERT PROJECT LOGO

Terms of Reference for Consulting Services

For
[insert procurement title]

Ref No: [insert ref #]

Submission date:

Terms of Reference (TOR)

[Title: briefly describe the required services in one or two lines]

Duration: *[Insert months or years]*

Duty Station: *Department of the Environment*

Reporting Officer: *[Indicate direct reporting Officer]*

Country background

[Provide information on the situation in the country to the degree that it is relevant to the proposed project. This includes economic, social factors as well as recent developments that may affect the overall project or the assignment for which these TOR are issued.]

Background on project

[Include information on the technical and financing background of the project with a summary description of the different components of the project.]

Background of the consulting service

[Main features of the project/assignment.]

Overall objectives

[Information on the overall objectives of the project.]

Objectives of the assignment

[General and specific objectives of the services to be procured.]

Scope of work

[The list of the tasks will be outlined clearly and detailed and should be ordered either in in order of importance or chronologically. The list of tasks should make reference to any reports which the contractor is required to prepare.

Reports and schedule of deliverables

[List of reports and other deliverables required as a result of the activities/tasks defined in the scope of work with dates and prospective recipients of the reports]

Consultant's qualifications and experience

[Define the (qualification and) experience requirements for each key expert of the firm or for the individual consultant. Experience must be expressed in instances

and/or number of years. Include other required factors such as regional experience, language, etc.]

Qualifications and skills

[Include requirements as appropriate. Minimum and preferred requirements need to be distinguished clearly.]

General professional experience

[Include requirements as appropriate. Minimum and preferred requirements need to be distinguished clearly.]

Specific professional experience

[Include requirements as appropriate. Minimum and preferred requirements need to be distinguished clearly.]

In case of selection of an individual consultant, only the qualifications of one expert shall appear under this section.

Language
[Include desired language: English for communication]
Computer Skills
[Insert required computer skills]

Adapted from International Fund for Agricultural Development, https://capmf.cdt.ca.gov/files/CA-PMF_Planning_Templates_with_Instructions/Procurement_Management_Plan_Template_with_Instructions.docx

Appendix 8: Request for Proposals

INSERT PROJECT LOGO

Request for Proposals

For
[insert procurement title]

Ref No: [insert ref #]

Issue date:

Section I. Letter of Invitation Requesting Proposals

[city, country]
[month, day, year]

Re: *[insert name and ID number of procurement]*

Dear Madam/Sir,

The Department of the Environment invites proposals ("proposals") to provide the following services ("services"): *[insert name of services assignment]*. More details on these services are provided in the terms of reference – Section VI. A consultant will be selected using *an* evaluation procedure in accordance with the Public Procurement Procedures Handbook of the Ministry of Finance.

The RFP includes the following sections:

Part 1 – Proposal and Selection Procedures

Section I	Letter of Invitation Requesting Proposals (LOI)
Section II	Instructions to Consultants (ITC)
Section III	Proposal Data Sheet (PDS)
Section IV	Qualification and Evaluation Criteria
Section V A	Technical Proposal Forms
Section V B	Financial Proposal Forms
Section VI	Terms of Reference

Proposals must be delivered to the address and in the manner specified no later than *[insert local time and date]*. Late proposals will not be accepted under any circumstances. Electronic proposals *shall* be accepted.

Upon receipt of this letter and before *[insert date]*, please inform us in writing, or by electronic mail, at the address shown below:

(a) that you received the request for proposals; and
(b) whether you will submit a proposal alone or in association.

Yours Sincerely,

_____
Project Director

Tender Acceptance/Decline Letter

Date:

Martin Alegria
Department of the Environment
First Floor Old Land's Building
Market Square, Belmopan City
Belize C.A.

Sender's Company/Individual name
Address
Subject: Response to the tender invitation for the project [Insert name]

Dear Mr. Alegria,

I have received your tender invitation and hereby acknowledge that I

- □ Intend
- □ Do not Intend

to submit the requested proposal. Again, thank you for sending us a tender invitation.

Best regards,

_____
Name

Preparation of Proposals

Cost of Proposal
The consultant shall bear all costs associated with the preparation and submission of its proposal, and the client shall not be responsible or liable for those cost, regardless of the outcome of the proposal process.

Language of Proposal
Proposal shall be submitted in English.

Preparation of Proposal

In preparing their proposal, consultants are expected to examine in detail the documents comprising the RFP. Failure to provide the information requested may result in rejection of a proposal.

While preparing the technical proposal, consultants must give particular attention to the following:

(a) The available budget is provided in the Proposal Data Sheet (PDS), and the financial proposal shall not exceed this budget.

(b) The Curriculum Vitae (CVs) of the key professional personnel signed by the staff themselves and/or by the authorized representative.

Consultants are required to submit a technical proposal, which shall provide the information indicated in the following:

- A brief description of the consultants' organization and an outline of recent experience of the consultant and of each associate, if any, on assignments of a similar nature is required
- A description of the approach, methodology and work plan for performing the assignment covering the following subjects: technical approach and methodology, work plan, and organization and staffing schedule. The work plan should be consistent with the work and deliverables schedule.

The Financial Proposal shall be prepared by listing all costs associated with the assignment, including (a) remuneration for key experts and non-key experts and expenses associated with assignment implementation.

Only one Proposal
Consultants shall submit only one proposal as a sole consultancy firm or as an individual consultant. If a consultant participates in more than one proposal, all such proposals shall be disqualified.

Currencies of Proposal
Consultants must submit their financial proposals in the currency or currencies specified in the **PDS**. Consultants will be paid in the currency specified in the **PDS**.

Period of Proposal Validity

Proposals shall remain valid for the period specified in the **PDS** after the proposal submission deadline. During the period of proposal validity, consultants shall maintain the availability of key professional personnel identified in the proposal.

Sealing and Marking of Proposals

The “original” and each “copy” of the technical proposal shall be placed in a sealed envelope/parcel clearly marked “technical proposal”. Similarly, the “original” and each “copy” of the financial proposal shall be placed in a separate sealed envelope/parcel clearly marked “financial proposal”.

Each envelope/parcel shall bear the name and address of the client as stated in the **PDS**, the name and address of the consultant (in case they may have to be returned unopened), and the name and reference number of the assignment as stated in the **PDS.**

The client shall not be responsible for misplacement, losing or premature opening if the outer envelope/carton and/or marked as stipulated. This circumstance may be cause for proposal rejection.

Deadline for Submission of Proposals
Proposals must be received by the client before the submission deadline specified in the **PDS.**

Late Proposals
Any proposals received by the client after the deadline for submission of proposals shall be declared late, rejected, and returned unopened to the consultant.

Proposal Opening

The client shall open the outer envelopes in the meeting at the address, date and time specified in the **PDS** as soon as possible after the deadline for submission and sort the proposals into technical proposals or financial proposals as appropriate. The client shall ensure that the financial proposals remain sealed and securely stored until such time as the opening of financial proposals takes place.

Evaluation of Proposals

Confidentiality

Information relating to the evaluation of proposals and recommendations of contract award shall not be disclosed to consultants or any other persons not officially concerned with the process, until the publication of the award of contract.

Evaluation of Technical Proposals

The client's Evaluation Committee (TEC) shall evaluate the technical proposals based on their responsiveness to the terms of reference, applying the evaluation criteria, sub-criteria, and point system specified. Each responsive proposal will be given a technical score (St). A proposal may be rejected at this stage if it does not respond to the RFP or if it fails to achieve the minimum technical score indicated.

Evaluation of Financial Proposals based on Quality & Cost-based Selection

The financial proposal opening shall take place at the location indicated in the **PDS**. The notification shall also advise those consultants whose technical proposals did not meet the minimum qualifying mark.

The Technical Score (St) and only the total proposal price, as stated in the financial proposal submission form (form FIN-1) shall be read out aloud and recorded.

For Quality and Cost Based Selection (QCBS), the lowest evaluated Financial Proposal (Fm) will be given the maximum financial score (Sf) of 100 points.

Proposals will be ranked according to their combined technical (St) and financial (Sf) scores using the weights (T = the weight given to the technical proposal; F = the weight given to the financial proposal; T + F = 100%) indicated in the PDS. S = St x T% + Sf x F%.

Award of Contract

After the completion of the evaluation report and having obtained all the necessary internal approvals and Ministry of Finance's no-objection as per the Public Procurement Procedure Handbook, the client shall send the notice of intent to award to the successful consultant. The notice of intent to award shall include a statement that the client shall issue a formal notification of award and draft contract agreement after expiration of the period.

At the same time, it issues the notice of intent to award, the client shall also notify, in writing, all other consultants of the results of the selection process.

Commencement Dates

The consultant is expected to commence the assignment on the date and at the location specified.

Adapted from International Fund for Agricultural Development, https://capmf.cdt.ca.gov/files/CA-PMF_Planning_Templates_with_Instructions/Procurement_Management_Plan_Template_with_Instructions.docx

Appendix 9: Example of a Proposal Data Sheet

	General
Client	*Department of the Environment*, is the entity designated by the government to sign and manage the resulting contract.
Government	Government of *Belize.*
Project Title	*Management of Mercury Waste in Belize*.
Selection Method	*Quality & Cost-Based Selection* method.
Assignment	The name of the assignment is: *[insert title of assignment]* Reference number of the assignment is: *[insert reference number]*
Language	English
Period of Proposal Validity	Commencing on the submission date is 90 days.
Preferred Currency of	Belize Dollars (BZD)
Contact Details for Submitting Clarifications	Focal Person: doe.ceo@environment.gov.bz Martin Alegria Address: Department of the Environment Old Land's Building Market Square, Belmopan City Direct Line: 00-501-8284856
No. of copies of Proposal that must be submitted	Original: 1 Copies 4
Proposal Submission Address	Department of the Environment First Floor, Old Land's Building Market Square, Belmopan City Belize
Deadline of Submission	Date and Time
Conditions of Submission	Hand delivery **or** Electronic submission
Conditions for Electronic Copy	e-submission: cindy.cunil@environment.gov.bz Format: PDF files ONLY, password protected Password must be provided to the Department until the date & time of Opening No. of copies to be transmitted (1)
Date, time and venue for opening of Proposals	Date and Time: Venue: Department of the Environment Conference Room
Evaluation method for selecting Proposal	Lowest financial offer of technically qualified Proposals
Commencement date	Date
Criteria for Contract Award	Combination of scoring method

Adapted from UNDP https://procurement notices.undp.org/view_file.cfm?doc_id=223894

Summary Technical Evaluation Forms

Summary of Technical Proposal Evaluation Forms	Score Weight	Points
Firm/Organization	30%	
Proposed Methodology, Approach and Implementation	40%	
Key Personnel	30%	
Total		

Appendix 10: Technical Proposal Evaluation

Technical Proposal Evaluation (Source: UNDP)

Form 1		Points obtainable
Expertise of the Firm/Organization		
1.1	Reputation of Organization and Staff / Credibility / Reliability / Industry Standing	50
1.2	General Organizational Capability which is likely to affect implementation - Financial stability - loose consortium, holding company or one firm - age/size of the firm - strength of project management support - project financing capacity - project management controls	90
1.3	Extent to which any work would be subcontracted (subcontracting carries additional risks which may affect project implementation, but properly done it offers a chance to access specialized skills.)	15
1.4	Quality assurance procedures, warranty	25
1.5	Relevance of: - Specialized Knowledge - Experience on Similar Programme / Projects - Experience on Projects in the Region	120
		300

Technical Proposal Evaluation Form 2		Points Obtainable
Proposed Methodology, Approach and Implementation Plan		
2.1	To what degree does the Proposer understand the task?	30
2.2	Have the important aspects of the task been addressed in sufficient detail?	25
2.3	Are the different components of the project adequately weighted relative to one another?	20
2.4	Is the proposal based on a survey of the project environment and was this data input properly used in the preparation of the proposal?	55
2.5	Is the conceptual framework adopted appropriate for the task?	65
2.6	Is the scope of task well defined and does it correspond to the TOR?	120
2.7	Is the presentation clear and is the sequence of activities and the planning logical, realistic and promise efficient implementation to the project?	85
		400

Technical Proposal Evaluation Form 3				Points Obtainable
Management Structure and Key Personnel				
3.1	Expert			100
	General Qualification		90	
	Suitability for the Project			
	- Technical Experience	25		
	- Training Experience	25		
	- Professional Experience in the area of specialization	35		
	- Knowledge of the region	5		
	- Language Qualifications		10	
			100	

Adapted from UNDP https://procurement-notices.undp.org/view_file.cfm?doc_id=223894

Proposal Submission Letter

[Insert: Date]

To: [insert: Name and Address of Focal Person]

Dear Sir/Madam:

We, the undersigned, hereby offer to provide professional services for [insert: title of services] [insert: title of services] in accordance with your Request for Proposal dated [*insert: Date*] and our Proposal. We are hereby submitting our Proposal, which includes the Technical Proposal and Financial Proposal sealed under a separate envelope.

We hereby declare that:

a) All the information and statements made in this Proposal are true and we accept that any misrepresentation contained in it may lead to our disqualification;

We confirm that we have read, understood and hereby accept the Terms of Reference describing the duties and responsibilities required of us in this RFP for Professional Services.

We agree to abide by this Proposal for *[insert: period of validity as indicated in Data Sheet].*

We undertake, if our Proposal is accepted, to initiate the services not later than the date indicated in the Data Sheet.

We fully understand and recognize that the Department of the Environment is not bound to accept this proposal, that we shall bear all costs associated with its preparation and submission, and that the Department will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the evaluation.

We remain,
Yours sincerely,

Authorized Signature [*In full and initials*]: _____
Name and Title of Signatory: _____
Name of Firm: _____

Adapted from UNDP https://procurement-notices.undp.org/view_file.cfm?doc_id=223894

Appendix 11: Job Interview Score Sheet

Chemicals Expert (mercury) Consultancy

Name of Applicant: _____

	Questions	Excellent 5	Good 4	Average 3	Below Average 2	Poor 1	No Answer 0	Comments
1	Describe your qualifications and academic achievements							
2	Tell us why you think would be fit for this job. Describe your strengths and weaknesses							
3	List two challenges you faced in previous work experience and how you resolved such challenges.							
4	What is your understanding of the management of mercury waste Project and what do you anticipate will be the key roles of the Chemicals Expert?							
5	Tell us about your experience in the field specifically about project management, stakeholder engagement and other							

	Questions	Excellent 5	Good 4	Average 3	Below Average 2	Poor 1	No Answer 0	Comments
	associated activities.							
6	Tell us about your knowledge on policies and legislation associated with environment management in Belize							
	Total Points (max 30)							

Name of Evaluator (Print): _____

Organization of Evaluator: _____

Signature of Evaluator: _____

Date (dd / mm/ year): _____

Appendix 12: Evaluation Report

EVALUATION REPORT
For the Procurement of a Chemicals Expert for the project, "Management of Mercury Waste Project"
Department of the Environment
Ministry of Sustainable Development, Climate Change and Disaster Risk Management

Part 1: Basic Information: Project Background and Relevance of the Requirement		
1	The Department of the Environment (DOE) within the Ministry of Sustainable Development, Climate Change and Disaster Risk Management is undertaking the procurement process for a Chemicals Expert to provide project coordination and capacity-building for the project.	
2	**Category of Procurement**	ServicesServices
3	**Type of Contract**	Contract for professional servicesContract for professional services
	Is this a Long-Term Agreement?	☐Yes ☒ No
4	**Funding Source/Project ID**	United Nations Environment Programme through the Global Environment Facility
5	**Assignment Period**	
6	**Amount of Funds available for this Contract**	
7	**Purpose of Contract or brief scope (description of services)** This project entitled: "Management of Mercury Waste" the project focuses on providing support to for the sound management of mercury waste to address the proper disposal and reduce the use of mercury-based items. The project aims to support Belize's commitments and environmental obligations of the Minamata Convention. The implementation of the project will provide a	
8	**Name of Direct Beneficiary/End-user**	The direct beneficiary is the National Ozone Unit at Department of the Environment.

9	**Project Background: Provide concise information of the project objectives, context, output and linkages to the proposed contract and expected result of implementation.**	
Part 2: Planning and Preparatory Work		
10	**Source of Technical Specifications TOR (describe how TOR was developed)**	
11	**Was there an internal cost estimate prepared prior to initiating the procurement process?**	☐Yes ☒ No
	What was the source of the internal cost estimate?	
Part 3: Procurement Process Information		
12	**Procurement Method Applied – Request for Proposals (RFP)**	RFPRFP
13	**Type of competition (*Open International, Limited International, National)***	NationalNational
	Describe the process of selection of bidders for sending RFP.	
14	**Issue date**	
15	**Deadline for submission of Proposals (final date if there were extensions)**	n/a
16	**Date of expiry of Quotes or expiry of original Contract (in case of amendment)**	n/a
17	**Mode of Quote Submission**	E-tenderingE-tendering
Part 4: Bids Received		
18	**No. of Quotes received (including late Quotes)**	2
19	**No. of Late Quotes received and returned unopened (if any)**	0

Part 5: Evaluation of Bids								
20	**Evaluation procedure applied**	RFP – Quality Cost Based Selection						
21	**Composition of Evaluation Team**	Name 1. 2. 3.	Name of Organization					
22	**No. of Bids rejected during preliminary examination**		None					
23	**No. of technically responsive bids after evaluation *See detailed scoring matrix/sheets*)**		n/a					
	No. of technically non-responsive quotes after evaluation		0					
24	**Overall Results of Evaluation *(include all bids including those deemed as technically non-compliant*)**	Name of Applicant	Total Score	Rank				
		A.						
		B.						
25	**FINAL RECOMMENDATION TO AWARD THE CONTRACT**							
Part 6: Value for Money Analysis								
26	The recommended person for the post of Stakeholder Engagement Expert for the Preparation of the Stage II HPMP project is the most suitable person based on qualifications and experience in the field of project management and experience which are two major requirements as per the TOR.							

Part 7: Quality Assurance and Contract Management Mechanism:	
27	How would the contract and performance be managed for quality of goods/services? Capacity to manage the contract. Any performance security requirements?
Part 8: Recommendation	
28	**Prepared by:** _____ Mr. Martin Alegria Chief Environmental Officer Department of the Environment Evaluation Committee Member

Attachments to this Evaluation Report:
Attachment 1: Consultancy Notice
Attachment 2: TOR
Attachment 3: Technical evaluation / Scoring Forms / Matrix signed by all Evaluation team members.
Attachment 4: Applications of 2 applicants shortlisted.
Attachment 5: Copy of newspaper advertisement.
Attachment 6: Copy of draft contract.

Appendix 13: Issue Log

ISSUE LOG

Project Title:

_____

Date:

_____

ID	Status (Open, In Progress, Closed)	Priority	Issue Description	Actions

Due Date: _____

Additional Comments:

_____

_____

Appendix 14 Philologist letter

Flamingo Ave.
San Ignacio Town,
Cayo District,
Belize

October 13, 2021

Academic Advisor
Master's Degree in Project Management
Universidad para la Cooperacion Internacional

Dear Academic Advisor,

Re: Philosophical Review of Final Graduation Project submitted by Cindy Cunil in partial fulfilment of the requirements for the Masters in Project Management Degree.

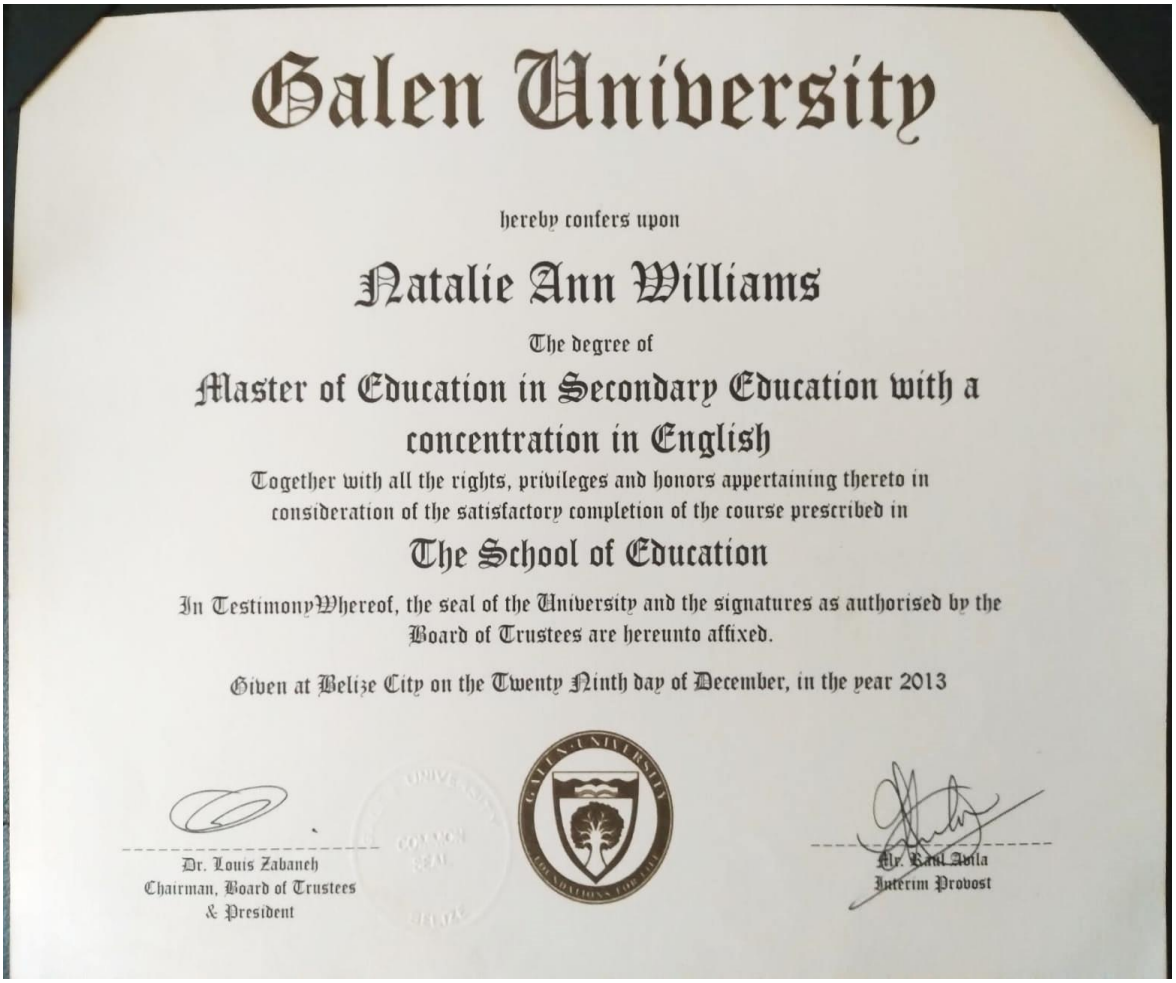
I hereby confirm that Cindy Cunil has made all the required corrections and improvements suggested to the project entitled "Management of mercury waste in Belize" document as I have recommended. In my judgment, the document meets the literary and linguistic standards required of a student studying for a degree at the Masters level.

Sincerely,

Natalie Williams

Natalie Williams, M.Ed.
Lecturer of English

Appendix 15 Philologist Credentials



Galen University

hereby confers upon

Natalie Ann Williams

The degree of

Master of Education in Secondary Education with a concentration in English

Together with all the rights, privileges and honors appertaining thereto in consideration of the satisfactory completion of the course prescribed in

The School of Education

In TestimonyWhereof, the seal of the University and the signatures as authorised by the Board of Trustees are hereunto affixed.

Given at Belize City on the Twenty Ninth day of December, in the year 2013

Dr. Louis Zabaneh
Chairman, Board of Trustees
& President

Mr. Raul Avila
Interim Provost