A diagram of a house

Description automatically generated with low confidence

**Project Plan**

**Name**

**Version: Project Plan #1**

**Release Date: September 6, 2021**

**ENGG 684** **Group #45**

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Table of Contents

1.0 Introduction 2

2.0 Project Integration Management Plan 2

2.1 Introduction: 2

2.2 Project Planning Strategy 2

3.0 Scope of work 3

3.1 Introduction: 3

3.2 Statement of Scope of Work: 3

3.3 Out of Scope Activities 4

Appendix 1: Project Charter 4

Appendix 2: Milestone Schedule 9

Appendix 3: Work Breakdown Structure 10

Appendix 4: WBS Dictionary 11

# 1.0 Introduction

The client, Elaine Musk, needs a vaccine prototype to be developed geared towards combating the global COVID 19 pandemic. To achieve this goal, the client requires that an emergency laboratory be set up in a limited time frame.

This project plan is to support the design and construction of an emergency laboratory to develop the COVID 19 vaccine prototype within the given time constraints. The biomedical design approach would be employed in this project plan. The laboratory, although it would be set up within a short time frame, would be cost effective, most adequate and in compliance with relevant government codes and regulations.

# 2.0 Project Integration Management Plan

# 2.1 Introduction:

The Ignited Mind Solutions has been single-sourced and awarded the contract to set up an emergency biomedical engineering laboratory to develop a vaccine prototype to combat the covid 19 pandemic. Our objective as an organization is to successfully develop a facility that can generate large quantities of vaccine after it gets approved by concerned authorities. The laboratory's unique infrastructure will allow clinical testing support from study design to the finished product.

We will partner with a leading Canadian bioengineering company, procurement contractor, and construction company for a project steering team to achieve the objective. The unit shall identify all requirements, incorporate all provisions in the front-end engineering designs, detailed engineering designs, contracting, construction, vaccine development, and deployment to quality and within the timeframe stipulated by the client. Due to the short timeline, we will develop a detailed scope of work and invite to tender to our top three pre-qualified contractors (for construction and technical procurement of the required equipment) and quickly but efficiently select a contractor using our pre-agreed template. The contractors will deliver both the civil construction of the laboratory and the installation and testing of equipment in two months. The vaccine research and development contractor will also complete his scope of work inclusive of deployment of vaccine to the market with three months.

# 2.2 Project Planning Strategy

In the design development phase, discipline design team members shall identify a detailed set of systems requirements – for example, Biomolecular and Biomimetic materials, System and Synthetic Biology, Biomaterials, Bioprocess Engineering, Regenerative Medicine Laboratories etc. and test them against the project goals, budget, performance, and constructability issues. There will be some iterative loops required to go back and hold further study sessions to meet the requirement. The output of this design phase becomes the input to the contracting documents and the construction phase.

During procurement, construction, and installation of laboratory equipment, the project team follows through with engineering designs and drawings, monitoring and controlling the project execution. The research and development team will adhere to the stages of vaccine development as stipulated by the authorities and secure all approval and licenses for each step of the vaccine development and before the pilot stage and commercial deployment of the vaccine.

There will be active project quality control, ensuring all witness and hold points are adhered to as documented in the project quality plan. We will develop a baseline schedule and cost estimate, which we will monitor, and control throughout the project execution to prevent schedule and cost slippage.

Some identified significant risks for the project: unexpected delay in the release of funds, availability of laboratory equipment in the market, failure in any phase of the clinical trial, requirement for additional equipment during the research phase, changes in the laboratory procedure, and the failure of research will be captured in the risk register, assessed and plan for mitigation evaluated.

The client, regulatory authorities, and relevant government agencies shall be provided weekly progress updates and informed when significant changes occur and when objective impacting issues arise. Other stakeholders: suppliers, contractors, covid vaccine candidates, the public shall be engaged and reported on a need basis.

A project steering committee headed by the project manager who reports directly to the client will meet weekly to provide inputs and review the progress of this project. The members of the project steering committee are representatives of the project management team, construction contractor, procurement contractor, facility manager, and the research and development team.

The agreed acceptance criteria for the procurement and construction contractor will be delivery of the project no more than 5% of cost and delivered on or December 7, 2021, and the sign-off of the approved job completion certificate by the quality control manager and facility manager. The approved acceptance criteria for the research and development team will be the continued licensing of the vaccine post commercial deployment stage with vaccine approval secured on or before February 7, 2022, and for the project team to sign off the project close-out report by the client designate no later than March 7, 2022.

# 3.0 Scope of work

## 3.1 Introduction:

 This project management plan scope of work will include all activities required to set up the laboratory as per the requirements stated by the client in the project charter. These activities shall conform to all local and internationally accepted industry codes and standards and apply all necessary safety precautions during design and execution.

## 3.2 Statement of Scope of Work:

Details of the scope of works are below:

* Identification of all the requirement(s) for the laboratory by the relevant department
* Conduct concept feasibility studies; detail engineering on the selected option; develop, review, and approve engineering drawings and designs.
* Contract all aspects (procurement, construction, medical research) of the work
* Secure all regulatory approvals for the construction and development of the vaccine and sign-off with all stakeholders.
* Construct laboratory (including all utilities, installed and tested equipment, fitted spaces as per agreed requirement) to international standard and quality.
* Review relevant past research related to vaccines development for diseases like SARS and MERS and incorporate lessons learned and avoid mistakes made in this development.
* Review the research procedure and commence vaccine prototype development. Finalize all arrangements for the pre-clinical and clinical groups.
* Carry out pre-clinical and clinical as per agreed procedure and submit the result to relevant authorities for approval.
* Get vaccine approval locally and internationally.
* Commence vaccine deployment – licensing, pilot and commercial-scale production, testing, and monitoring.
* Proper closeout of project.

## 3.3 Out of Scope Activities

Out-of-scope activities include

* acquiring land for the laboratory,
* Hiring and resourcing for medical personnel,
* constructing inter-connecting roads to the facility,
* procuring and installing signages, and
* beautifying the laboratory's exterior
* Results of clinical trials

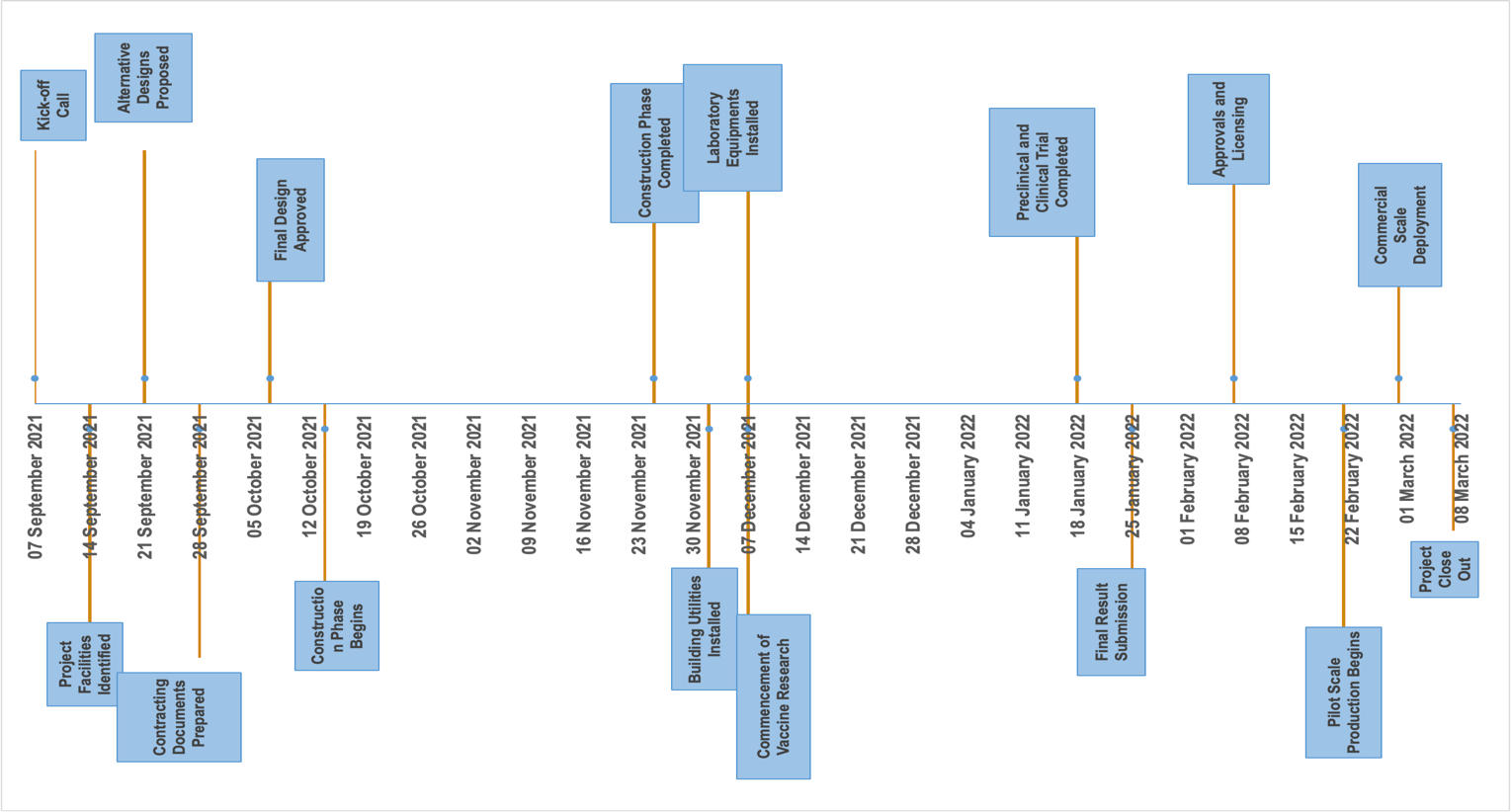
# Appendix 1: Project Charter

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **PROB1: PROJECT CHARTER TEMPLATE** | |  |  |  |
|  | **GENERAL PROJECT INFORMATION** | |  |  |  |
|  | **PROJECT NAME** | COVID -19 Vaccine Laboratory Setup Project | | | |
|  | **PROJECT SPONSOR** | Elaine Musk | | | |
|  | **PROJECT MANAGER** | Kelechi Ibekwe | | | |
|  | **EMAIL ADDRESS** | [kelechi.ibekwe@ucalgary.ca](mailto:kelechi.ibekwe@ucalgary.ca) | | | |
|  | **PHONE NUMBER** | 4034001332 | | | |
|  | **ORGANIZATIONAL UNIT** | Ignited Mind Solutions | | | |
|  | **PROCESS IMPACTED** | COVID 19 Vaccine Supply | | | |
|  | **EXPECTED START DATE** | September 7, 2021 | | | |
|  | **EXPECTED COMPLETION DATE** | March 7, 2022 | | | |
|  | **ESTIMATED COSTS** | $12,000,000 | | | |
|  | **CONTINGENCY (10%)** | $1,200,000 | | | |
|  | **DESCRIBE THE PROBLEM OR ISSUE, GOALS, OBJECTIVES, AND DELIVERABLES OF THIS PROJECT** | |  |  |  |
|  | **PROBLEM OR ISSUE** | As COVID-19 continues to mutate and spread worldwide, the current supply of vaccines is not enough to meet Canada's and the global needs. | | | |
|  | **PURPOSE OF PROJECT** | To set up a laboratory to develop a vaccine prototype to cure COVID 19 | | | |
|  | **BUSINESS CASE** | To improve the domestic availability of vaccines and reduce reliance on foreign suppliers. | | | |
|  | **GOALS / METRICS** | The metric to used would be the vaccination distribution in Canada. It is currently 64 million doses. The goal is to increase the vaccine distribution to 100 million doses. | | | |
|  | **EXPECTED DELIVERABLES** | 1. Project Documentation: This includes project plan, project reports, quality control, change control documents, project closing documents and other project information. 2. Laboratory Design Documents: This includes comprehensive room drawings and specifications for the Laboratory. 3. The COVID 19 Laboratory: This is the primary deliverable of this project.  4. Laboratory Maintenance Documents: This includes complete as-built documents and preventative maintenance procedures. | | | |
|  | **DEFINE THE PROJECT SCOPE AND SCHEDULE** | |  |  |  |
|  | **WITHIN SCOPE** | 1. Identification of all the requirement(s) for the laboratory by the relevant department  2. Conduct concept feasibility studies; detail engineering on the selected option; develop, review and approve engineering drawings and designs.  3. Contract all aspects (procurement, construction, medical research) of the work  4. Secure all regulatory approvals for the construction and development of the vaccine and sign-off with all stakeholders.  5. Construct laboratory (including all utilities, installed and tested equipment, fitted spaces as per agreed requirement) to international standard and quality.  6. Review relevant past research related to vaccines development for diseases like SARS and MERS and incorporate lessons learned and avoid mistakes made in this development.    7. Review the research procedure and commence vaccine prototype development. Finalize all arrangements for the pre-clinical and clinical groups.  9. Carry out pre-clinical and clinical as per agreed procedure and submit the result to relevant authorities for approval.  10. Get vaccine approval locally and internationally.  11. Commence vaccine deployment – licensing, pilot and commercial-scale production, testing, and monitoring.  12. Proper closeout of project. | | | |
|  | **OUTSIDE OF SCOPE** | 1. Acquiring land for the laboratory,  2. Hiring and resourcing for medical personnel,  3. Constructing inter-connecting roads to the facility 4. Procuring and installing signages, and  5. Beautifying the laboratory's exterior 6. Results of clinical trials | | | |
|  | **TENTATIVE SCHEDULE** | **KEY MILESTONE** | **START** |  | **COMPLETE** |
|  |  | Form Project Team / Preliminary Review / Scope |  |  |  |
|  |  | Finalize Project Plan / Charter / Kick Off | Oct. 1 2021 |  | Oct 7 2022 |
|  |  | Define Phase |  |  |  |
|  |  | Measurement Phase |  |  |  |
|  |  | Analysis Phase |  |  |  |
|  |  | Improvement Phase |  |  |  |
|  |  | Control Phase |  |  |  |
|  |  | Project Summary Report and Close Out |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  | **DEFINE THE PROJECT RESOURCES AND COSTS** | |  |  |  |
|  | **PROJECT TEAM** | Project Manager, Scheduler, Accountant, Risk Analyst | | | |
|  | **SUPPORT RESOURCES** | Communications, Policy, Health and Safety Workplace Advisory group, Attraction & Retention working group, Quality Assurance and Control Group | | | |
|  | **SPECIAL NEEDS** | Experts from Alberta Health Services to provide input on Biomedical Laboratory design | | | |
|  |  |  |  |  |  |
|  | **COST TYPE** | **VENDOR / LABOR NAMES** | **RATE** | **QTY** | **AMOUNT** |
|  | **LABOR** | CANA group |  |  | $500,000 |
|  | **BIOMEDICAL EQUIPMENT** | Brock White Canada |  |  | $1,400,000 |
|  | **CONSTRUCTION MATERIAL AND EQUIPMENT** | Caterpillar Inc. |  |  | $1,000,000 |
|  | **FIXED COST (PROJECT MANAGEMENT)** | Salaries, insurance, property taxes, utilities etc. |  |  | $1,000,000 |
|  | **VACCINE RESEARCH AND DEVELOPMENT** |  |  |  | $4,000,000 |
|  | **VACCINE DEPLOYMENT** |  |  |  | $4,000,000 |
|  | **SHIPPING** | Canaan Group |  |  | $100,000 |
|  | **MISCELLANEOUS** |  |  |  | $0 |
|  |  |  | **TOTAL COSTS** |  | $12,000,000 |
|  | **DEFINE THE PROJECT BENEFITS AND CUSTOMERS** |  |  |  |  |
|  | **PROCESS OWNER** | Project Manager | | | |
|  | **KEY STAKEHOLDERS** | Elain Musk, Ignited Mind Solutions, CANA group, Caterpillar Inc. Brock White Canada, Canaan Group, Canadian Government | | | |
|  | **FINAL CUSTOMER** | The client "Elaine Musk" |  |  |  |
|  | **EXPECTED BENEFITS** | Higher domestic vaccination rate | | | |
|  | **DESCRIBE PROJECT RISKS, CONSTRAINTS, AND ASSUMPTIONS** | |  |  |  |
|  | **RISKS** | 1. The project loses funding after the initiation phase.  2. Unavailability of laboratory equipment in market.  3. Failure in any phase of clinical trial, requirement for additional equipment during research phase 4. Change in procedure being carried out in laboratory 5. Failure of research. | | | |
|  | **CONSTRAINTS** | 1. The project must be completed no later than March 7, 2022.  2. Project must use only approved vendors in accordance with government's policies and standards. | | | |
|  | **ASSUMPTIONS** | 1. Business Owner will be sufficiently available to ensure project meets business objectives. 2. This project has full support of the project sponsor and key stakeholders 3. The project sponsor will provide additional resources if necessary | | | |
|  |  |  |  |  |  |
|  | Prepared by: | Kelechi Ibekwe | Date: | September 6, 2021 | |
|  | Project Manager Signature: | K.I | Date: | September 6, 2021 | |
|  | Sponsor Signature: | E.M | Date: | September 6, 2021 | |

**IMPORTANT REMINDER**

A narrative written charter must be circulated and signed by the project sponsors. You can attach a completed version of this template to your narrative written charter in an effort to keep it short and concise. Please make sure you meet with the project team and sponsors before completing this template. Much of the information required will need to come from a discussion with team members and sponsors.

# Appendix 2: Milestone Schedule



# Appendix 3: Work Breakdown Structure

1.Set up of Covid Vaccine Laboratory

1.0 Project Identification and Definition

1.1 Identification of Project-facilities Requirement

1.2 Project Management Plan-Design Phase

1.3 Project Management Plan-Construction Phase

1.4 Feasibilitu and Concept Selection

1.5 Detailed Engineering

2.0 Contracting

2.1 Finalize Contract form and document

2.2 Request for quotes and bid evaluations

2.3 Contracting

2.4 Ordering of long lead items

2.5 Regulatoru Permits/stakeholders engagement and approvals

3.0 Laboratory Construction and Installtion

3.1 Site preparation, Site offices and storage

3.2 Delivery of long lead items /construction materials and equipment

3.3 Building and utilities installation

3.4 Equipment installation and Testing

3.5 Fittings and fninshing

4.0 Vaccine Development

4.1 Exploratory

4.2 Pre-clinical trials

4.3 Clinical Trials

4.4 Result collation and submission

4.5 Approval - local and world authorities

5.0 Vaccine Deployment

5.1 Licensing

5.2 Pilot scale production

5.3 Testing and monitoring

5.4 Commercial scale deployment

5.5 Project Close out

# Appendix 4: WBS Dictionary

**Parent #1**

|  |  |
| --- | --- |
| **Work Breakdown Structure (WBS) Dictionary** | |
| Work Package ID | 1.0 |
| Work Package Name | Project Identification and Definition |
| Responsible Organization/Individual | Project Manager, Facility Manager, Research Director |
| Work Package description/Statement of work | This work package includes identification of facility requirements, review of specification, preparation of facility layout and requirement, and determining the relationship of the various spaces. Identification of equipment requirement and specification. Identification of stakeholders and regulatory requirements. |
| Acceptance criteria | Sign-off by the client, Research manager, manager and the project manager |
| Deliverables | Approved Detailed Engineering Document. Approved Scope of work, approved to construct drawing and specifications |
| Durations | 2 weeks |
| Cost | $250,000.00 |
| Due Date | September 21, 2021 |
| Dependencies | Project Charter |
| Approvers | Client representative, administration manager and facility manager |

**Parent #2**

|  |  |
| --- | --- |
| **Work Breakdown Structure (WBS) Dictionary** | |
| Work Package ID | 2.0 |
| Work Package Home | Contracting |
| Responsible Organization/Individual | Supply Chain manager, Project Manager |
| Work Package description/Statement of work | Preparation of contract documents, request for quotes from prequalified contractors, tender and bid evaluations, contract negotiation and contract execution, securing of regulatory and stakeholders’ approval and permits. Placing orders for long lead items |
| Acceptance criteria | Sign-off by the Construction Manager and Research director |
| Deliverables | Approved Tender Package. Signed Contracts, Regulatory Permits, MoU with Stakeholders |
| Duration | 2 weeks |
| Cost | $750,000.00 |
| Due Date | October 7 2021 |
| Dependencies | Approved Detailed Engineering Document. Approved Scope of work, approved to construct drawing and specifications |
| Approvers | Construction Manager, Project Manager |

**Parent #3**

|  |  |
| --- | --- |
| **Work Breakdown Structure (WBS) Dictionary** | |
| Work Package ID | 3.0 |
| Work Package Home | Laboratory Construction and Installation |
| Responsible Organization/Individual | Architect and Project Manager |
| Work Package description/Statement of work | This work package includes delivery of the underlisted activities as specified in the detailed engineering document: site layout, landscaping, sidewalks, curbing, paving, and vehicle access to the building. The overall building structure, main mechanical and electrical equipment and systems installation, HVAC and control systems, plumbing and wastewater system, Fire protection system, lightning protection system, elevator, emergency lighting system, exterior finish, roof, windows, secondary systems, and interior spaces as specified in the building requirement. |
| Acceptance criteria | Signed job completion certificate for each work package by the Quality Control Manager and the Project Manager |
| Deliverables | Completed structure. Approved construction project closeout report, As-built drawings |
| Duration | 2 months |
| Cost | $3,000,000.00 |
| Due Date | December 7, 2021 |
| Dependencies | Approved Detailed Engineering Document. Approved Scope of work, approved to construct drawing and specifications |
| Approvers | Project Manager, Quality Control Manager |

**Parent #4**

|  |  |
| --- | --- |
| **Work Breakdown Structure (WBS) Dictionary** | |
| Work Package ID | 4.0 |
| Work Package Home | Vaccine Development |
| Responsible Organization/Individual | Research Director |
| Work Package description/Statement of work | Review the research procedure and commence vaccine prototype development. Exploration, pre-clinical trials, clinical trials, securing approvals |
| Acceptance criteria | Sign-off by research director and vaccine approval by regulators |
| Deliverables | Vaccine approval |
| Duration | 2 months |
| Cost | $4,000,000 |
| Due Date | February 7, 2022 |
| Dependencies | Nil |
| Approvers | Director, Canada Center for Disease Control, Director-General,  World Health Organization |

**Parent #5**

|  |  |
| --- | --- |
| **Work Breakdown Structure (WBS) Dictionary** | |
| Work Package ID | 5.0 |
| Work Package Home | Vaccine Deployment |
| Responsible Organization/Individual | Research Director, Project Manager, Marketing Manager |
| Work Package description/Statement of work | Securing license, pilot-scale production, commercial scale production, testing and monitoring, marketing and project close out |
| Acceptance criteria | Signed Project close out report |
| Deliverables | Licensed and accepted vaccine |
| Duration | 1 months |
| Cost | $4,000,000 |
| Due Date | March 7, 2022 |
| Dependencies | Approved vaccine |
| Approvers | Research and Development Director, Sales and Marketing Manager, Project Manager |