

VILVOORDEN INVESTMENT INCORPORATED

- RICE MILLING COMPLEX



**ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE OPERATION OF
A STATE-OF-THE-ART TWELVE (12) METRIC TONNE RICE MILL AND ASSOCIATED FACILITIES
AT PLOT "C" VILVOORDEN, ESSEQUIBO COAST,
GUYANA**

Prepared for

VILVOORDEN INVESTMENT INCORPORATED

Registered Office

Block "K" Golden Fleece,
Essequibo Coast
GUYANA

For submission to

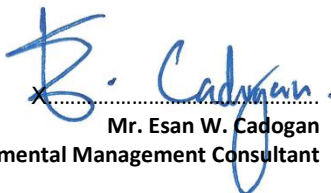
ENVIRONMENTAL PROTECTION AGENCY

Ganges Street,
Sophia
Georgetown
GUYANA

AUGUST 29,2022

**ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR
VILVOORDEN INVESTMENT INCORPORATED - RICE MILLING COMPLEX
AT PLOT "C" VILVOORDEN, ESSEQUIBO COAST,
GUYANA, SOUTH AMERICA**

Prepared and approved by:


Mr. Esan W. Cadogan
Environmental Management Consultant

ENVIRONMENTAL SOLUTIONS

Lot 1765 Pioneer Lane
South Ruimveldt Park
Greater Georgetown
GUYANA

Phone #: (592) 218-2579

Mobile. #: (592) 660-5004

Email: esguyana@gmail.com

Prepared for:

X.....
Mr. Nazeemul Hakh
Proprietor

**VILVOORDEN INVESTMENT
INCORPORATED**

Registered Office

Block "K" Golden Fleece,
Essequibo Coast
GUYANA

Phone #: (592) 774-4135

Mobile. #: (592) 656-9847

Email: nazeemul@goldenfleececerice.com

DOCUMENT CONTROL

Document No:	Revision No	Issue Date
01	00	August 19, 2022

DISTRIBUTION LIST

Revision No.	Issue No.	Issue Date	Section/ Page	Description and Reason for Amendment
00	01	August 19,2022	NA	NA

Revision No.	Distributed to	Date
00		
00		

In keeping with our Company Policy, electronic and hard copy formats of this Environmental Management Plan will be accessible to all staff of **Vilvoorden Investment Incorporated – Rice Milling Complex** located at Plot "C" Vilvoorden, Guyana, South America.

DISCLAIMER

"This Environmental Management Plan (including any enclosures and attachments) is strictly confidential and has been prepared by Environmental Solutions for the exclusive use and benefit of **VILVOORDEN INVESTMENT INCORPORATED** and solely for the purpose for which it is provided. Unless **ENVIRONMENTAL SOLUTIONS** provides express written consent, no part of this report should be reproduced, distributed or communicated to any third party. Environmental Solutions does not accept any liability if this report is used for an alternative purpose for which it is intended, nor to any third party in respect of this report."

LIST OF ACRONYMS AND ABBREVIATION

BOD	Biological Oxygen Demand
CHPA	Central Housing and Planning Authority
CO	Carbon Monoxide
CO₂	Carbon Dioxide
EMP	Environmental Management Plan
EPA	Environmental Protection Agency
GEA	Guyana Energy Agency
GNBS	Guyana National Bureau of Standards
GRDB	Guyana Rice Development Board
GW	Guyana Water Incorporated
MT	Metric Tonnes
NDC	Neighbourhood Democratic Council
PSI	Pounds Per Square Inch
PTCCB	Pesticides and Toxic Chemicals Control Board
VII	Vilvoorden Investment Incorporated
WMP	Waste Management Plan

LIST OF FIGURES

FIGURE 1	Map showing VII – Rice Milling Complex Location on the Essequibo Coast
FIGURE 2	Map Showing Location of Vilvoorden Investment Incorporated – Rice Milling Complex
FIGURE 3	Map Showing Surroundings of the VII Rice Milling Complex
FIGURE 4	Immediate Environs of VII – Rice Milling Complex
FIGURE 5	Aerial View of VII Rice Milling Complex
FIGURE 6	Weigh Bridge Scale
FIGURE 7	Paddy Intake Area with High-Capacity Reception Hopper
FIGURE 8	Grates over Grain Reception Area
FIGURE 9	Chain/ Drag Conveyance System
FIGURE 10	Carrier Bucket Grain Elevator System
FIGURE 11	Paddy Pre-Cleaner System
FIGURE 12	Dust Collector System
FIGURE 13	Wet Paddy Storage Bins
FIGURE 14	Biomass Furnace
FIGURE 15	Continuous Flow Tower Dryer
FIGURE 16	Tempering Bins for Paddy
FIGURE 17	Secondary Dryer
FIGURE 18	High -Capacity Storage Bin
FIGURE 19	Paddy Cleaner
FIGURE 20	Buffer/ Mill Bin
FIGURE 21	Paddy Shellers/ Hullers
FIGURE 22	Paddy Separator
FIGURE 23	Grain Grader
FIGURE 24	High-Capacity Bulk Bin
FIGURE 25	Dispensing Mechanism on Storage Bins
FIGURE 26	Forklift Hoisting Loaded Tonne Sacks
FIGURE 27	High-Capacity Grain Storage Bond
FIGURE 28	Power Generation Area

FIGURE 29	Power Generation Systems
FIGURE 30	Mechanized Rice Husk Furnace #1
FIGURE 31	Mechanized Rice Husk Furnace #2
FIGURE 32	Air Blower and Suction Pump
FIGURE 33	Fluidized Paddy Husk Ash Accumulation Pit
FIGURE 34	Overhead Water Supply Tank
FIGURE 35	Fluidized Ash Transfer Line
FIGURE 36	Compressed Air System
FIGURE 37	Covered Petroleum Storage Area
FIGURE 38	Aboveground Fuel Storage Tanks in Covered Secondary Containment
FIGURE 39	Petroleum Product Storage Area
FIGURE 40	Water Reservoir
FIGURE 41	Water Bowser
FIGURE 42	After Filter Dust Collection Systems
FIGURE 43	Vortex Collection System atop Tower Dryer for Dust Capture.
FIGURE 44	Dust Accumulation Systems at Base of Tower Dryer
FIGURE 45	Cyclone Dust Collector
FIGURE 46	Open Biomass Storage Area

LIST OF TABLES

TABLE 1	Soil Map Unit Characteristics
TABLE 2	EMP Implementation Roles and Responsibilities
TABLE 3	Applicable National Laws and Regulations
TABLE 4	Applicable National Standards and Guidelines
TABLE 5	Significance Framework
TABLE 6	Health, Safety and Environmental Aspects and Impact Register for Vilvoorden Investment Incorporated – Rice Milling Complex
TABLE 7	Emissions to Air – Dust/ Particulate Matter
TABLE 8	Emissions to Air – Gaseous Pollutants
TABLE 9	Noise and Vibration Emissions
TABLE 10	Releases to Land/ Soil
TABLE 11	Categories of Waste Materials Generated
TABLE 12	Measures for Solid Waste Management
TABLE 13	Measures for Liquid Waste Management
TABLE 14	Measures for Hazardous Waste Management
TABLE 15	Risk Control Measures
TABLE 16	Health, Safety and Environment Performance Monitoring Plan

LIST OF BOXES

BOX 1	Management Measures for Particulate Emissions
BOX 2	Management Measures for Gaseous Pollutant Emissions
BOX 3	Management Measures for Noise and Vibration Emissions
BOX 4	Mitigation Measures for Emissions to Land/ Soil
BOX 5	Energy Conservation Measures
BOX 6	Water Supply and Conservation Measures

TABLE OF CONTENTS

DOCUMENT CONTROL	3
DISTRIBUTION LIST	3
LIST OF ACRONYMS AND ABBREVIATION	4
LIST OF FIGURES	4
LIST OF TABLES	5
LIST OF BOXES	5
SECTION 1: INTRODUCTION	10
1.1 Scope.....	10
1.2 Objectives.....	10
1.3 Structure of Environmental Management Plan.....	10
SECTION 2: PROJECT DESCRIPTION	12
2.1 Project Overview.....	12
2.2 Project Background	12
2.3 Project Location	13
2.4 Layout of Vilvoorden Investment Incorporated – Rice Milling Complex.....	13
2.5 Overall Project and Operating Activities.....	19
2.5.1 Environmental Baseline, Current Conditions and Sensitive Receptors	19
2.5.1.1 Physical Conditions.....	19
2.5.1.1.1 Physiography and Geomorphology	19
2.5.1.1.2 Soil Resources	19
2.5.1.1.3 Hydrology and Drainage	20
2.5.1.2 Climatic Conditions.....	20
2.5.1.2.1 Ambient Air Quality and Environmental Noise.....	20
2.5.1.3 Biological Conditions	21
2.5.1.4 Socio-Economic Conditions	21
2.5.1.4.1 Surrounding Land Uses	21
2.5.1.4.2 Population and Demographics	21
2.5.2 Description of Project Activities	21
2.5.2.1 Overview of the Rice Production Process.....	21
2.5.2.1.1 Bulk Rice Production Process	22
2.5.2.1.1.1 Stage 1.1: Paddy Receipt, Grading and Weighting	22
2.5.2.1.1.2 Stage 1.2: Paddy Intake and Grain Elevation.....	23
2.5.2.1.1.3 Stage 1.3: Paddy Pre-Cleaning and Transfer to Wet Storage Bin	25
2.5.2.1.1.4 Stage 1.4: Paddy Drying (Primary).....	27
2.5.2.1.1.5 Stage 1.5: Tempering and Secondary Drying of Paddy	29
2.5.2.1.1.6 Stage 1.6: Transfer of Dried Paddy to High-Capacity Storage Bin	31

2.5.2.1.1.7	Stage 1.7: Transfer of Dried Paddy from High-Capacity Storage Bin to Paddy Cleaner to Buffer/ Mill Bin.....	32
2.5.2.1.1.8	Stage 1.8: Paddy Shelling/ Dehusking	33
2.5.2.1.1.9	Stage 1.9: Paddy Separation.....	34
2.5.2.1.1.10	Stage 1.10: Grading, Sorting, Temporary Holding and Dispensing of Cargo Rice	35
2.5.2.1.1.11	Stage 1.11: Dispensing and Temporary Storage of Bulk Cargo Rice.....	36
2.6.1	Supporting Facilities	37
2.6.1.1	Equipment Controls	37
2.6.1.2	Power Generation Systems	37
2.6.1.3	Heat Generation Systems	39
2.6.1.4	Paddy Husk Ash Transfer System	40
2.6.1.5	Compressed Air Treatment and Delivery Systems	43
2.6.1.6	Petroleum and Petroleum Product Storage Areas.....	44
2.6.1.7	Emergency Water Reserve.....	45
2.6.1.8	Installed Dust Collection Systems	46
2.6.1.9	Open Biomass Storage Area.....	51
2.6.1.10	Wharf Facility	51
2.6.1.11	Staff Facilities	51
SECTION 3:	ENVIRONMENTAL MANAGEMENT FRAMEWORK.....	52
3.1	Overview	52
3.2	Internal Policy Statements.....	52
3.2.1	Environmental Management Policy Statement.....	52
3.2.2	Health and Safety Policy Statement	53
3.3	Institutional Arrangements.....	54
3.3.1	Organizational Structure.....	54
3.3.2	EMP Implementation Roles and Responsibilities	55
3.4	Legal Requirements for the Project.....	56
3.4.1	National Laws and Regulations	56
3.4.2	Applicable National Standards and Guidelines	59
3.4.3	Environmental Permits and Licenses	60
SECTION 4:	ENVIRONMENTAL IMPACTS	61
4.1	Overview	61
4.2	Methodology of Identifying and Rating Environmental Aspects	61
4.2.1	Aspect and Impact Evaluation Framework	61
4.2.1.1	Step 1: Identification of Activities, Processes and Products	61
4.2.1.2	Step 2: Determination of Aspects	62
4.2.1.3	Step 3: Determination of the Impacts of Identified Aspects.....	62
4.2.1.4	Step 4: Assess the Significance of Identified Aspects.....	62
4.2.1.5	Step 5: Ranking of Impacts According to Significance	62
4.3	Aspects and Impact Register for Vilvoorden Investment Incorporated – Rice Milling Complex	64
4.4	Potential Significant Environmental Impacts	91
4.4.1	Environmental Impacts	91

4.4.1.1	Air Emission Impacts	91
4.4.1.1.1	Dust (Particulate Matter)	91
4.4.1.1.2	Gaseous Pollutants	93
4.4.1.2	Noise and Vibration Impacts	95
4.4.1.3	Releases to Land/ Soil	96
4.4.1.4	Waste Management Impacts	97
4.4.1.5	Other Environmental Condition(s) or System(s) Impacts	98
4.4.1.5.1	Occupational Health and Safety Risks	98
4.4.1.5.2	Energy Consumption	99
4.4.1.5.3	Water Resource Consumption	99
SECTION 5: IMPACT MITIGATION AND RISK CONTROL MEASURES		100
5.1	Overview	100
5.2	Description of Environmental Impact Mitigation Measures	100
5.2.1	Air Quality Control	100
5.2.1.1	Dust Management	100
5.2.1.2	Gaseous Pollutant Management	101
5.2.2	Noise and Vibration Management	101
5.2.3	Land /Soil Management	102
5.2.4	Waste Management Control Plan	103
5.2.4.1	Solid Waste Management	103
5.2.4.2	Liquid Waste Management	105
5.2.4.3	Hazardous Waste Management	105
5.2.5	Energy Efficiency Control Plan	107
5.2.6	Water Supply and Conservation Control Plan	107
5.3	Description of Health and Safety Risk Control Measures	107
5.3.1	Occupational Health and Safety (OHS)) Risk Control Measures	107
SECTION 6: MONITORING AND AUDITING		111
6.1	Overview	111
6.2	Monitoring and Auditing	111
6.2.1	Environmental Performance Monitoring	111
6.2.2	Reporting Requirements	116
6.2.2.1	Incident Reports	116
6.2.2.2	Periodic or Annual Performance Reporting	116
6.2.2.3	Internal Audit Reports	116
SECTION 7: ANNEX		117
7.1	Annex 1: Approvals/ Permissions	117
7.1.1	Certificate of Incorporation	117
7.1.2	Planning Permission for Building Works	118
7.1.3	License to Manufacture Rice	120
7.1.4	Petroleum License	122
7.1.5	EMP Required Letter issued on January 29, 2022	123
7.2	Annex 2: Baseline Results	125
7.2.1	Certificate of Analysis for Water Quality Tests	125

7.2.2	Noise Level Testing Results.....	126
7.2.3	Air Quality Monitoring Results.....	127

SECTION 8: BIBLIOGRAPHY	128
--------------------------------------	------------

SECTION 1: INTRODUCTION

This Environmental Management Plan (EMP) has been prepared for use by Vilvoorden Investment Incorporated (VII) with the intention of articulating a project specific plan for managing all the identified potential environmental impacts and health and safety risks associated with the operations of a twelve (12) metric tonne Rice Milling and associated facilities located at Plot "C" Vilvoorden, Essequibo Coast, Guyana.

This EMP has been prepared in accordance with guidance in the "Environmental Guidelines for the Preparation of an Environmental Management Plan" for submission to the Environmental Protection Agency (EPA) as mandated in correspondence issued to the developer dated Jan 29, 2022.

1.1 Scope

This Environmental Management Plan (EMP) will cater for the Operational (Including Maintenance) Phase of the Vilvoorden Investments Incorporated - Rice Milling Complex.

1.2 Objectives

The Objectives of this EMP are to:

- Describe the project location and surroundings;
- Describe the overall project and planned operational activities that are to be undertaken and the features of the Vilvoorden Investment Incorporated - Rice Milling Complex;
- Identify, determine the significance of, and briefly describe the potential environmental impacts and health and safety risks associated with the operations of all of the elements of the Rice Milling Complex;
- Propose implementable mitigation measures to avoid, reduce, restore or compensate for the identified adverse environmental impacts and health and safety risks;
- Define the elements of the Implementation Strategy that will be used to ensure the sustainability of the overall environmental and social management system for the Rice Milling Complex.

1.3 Structure of Environmental Management Plan

This Environmental Management Plan (EMP) has been sub-divided into eight (8) sections:

Section 1 provides an introduction of the Environmental Management Plan (EMP) identifying its scope, objectives and the structure of the document;

Section 2 provides background information on the project, a brief but general description of the project location and context; and a description of all the project elements and the processes employed at the rice milling complex in the production of cleaned paddy and cargo rice.

Section 3 includes information regarding the Company profile, environmental management policies and commitments, project personnel roles in relation to EMS Implementation roles and responsibilities, and legal requirements for the project.

Section 4 elaborates on the significant environmental and health and safety aspects and impacts determination methodology; identifies, determines and briefly elaborates on the significant environmental and health and safety aspects and impacts associated with the operational phase in the lifecycle of the Vilvoorden Investment Incorporated- Rice Milling Complex

Section 5 identifies practical and implementable mitigation measures that will be implemented by Vilvoorden Investment Incorporated to address the potential significant environmental impacts and health and safety risks identified;

Section 6 elaborates on the monitoring and auditing of environmental performance, as well as information on reporting requirements, environmental checklists and monitoring review.

Section 7 is the Annexes of the document which contains all of the supporting documentation referenced in Section 2.

Section 8 presents a Comprehensive bibliographical listing of all material referenced in the preparation of this Environmental Management Plan (EMP).

SECTION 2: PROJECT DESCRIPTION

2.1 Project Overview

Vilvordeen Investment Incorporated (VII) - officially incorporated under the Companies Act of Guyana - is currently operating a modern rice milling complex at Plot "C" Plantation Vilvoorden on the Essequibo Coast, in the County of Essequibo. Operating 24 hours per day during the in-crop and a limited time during the out of crop period, VII - Rice Milling Complex processes raw paddy into cargo rice at a licensed capacity of 12 metric tonnes of paddy per hour.

This state-of-the-art rice mill representing a significant capital investment is presently designed for the production and supply of bulk cargo rice products such as bulk brown rice and bulk brown broken rice from grain that is purchased from rice farmers. On average, since the mill's commissioning and start-up, it has been processing on average annually 40,850 metric tons of paddy per year.

Approximately 37 persons are presently gainfully employed performing a variety of job functions in support of the operations of the rice milling complex. It is anticipated that the rice mill is likely to have an operating life of greater than 25 years.

2.2 Project Background

Vilvoorden Investment Incorporated (VII) is a Guyana registered Private Limited Liability Company (No. 9211) formed on March 15, 2018 under the provisions of the Companies Act, Chapter 55:01 of the Laws of the Cooperative Republic of Guyana.

VII has as its directors: Mr. Nazeemul Hakh (Founder and President) and Mrs. Shareeda Hakh (Co-Founder and Finance Director). Together they possess greater than twenty (20) years of experience as the owners and operators of the Golden Fleece Rice Investments Incorporated - Rice Milling Complex in Golden Fleece on the Essequibo Coast and Ancient County Investments Incorporated - Rice Milling Complex in Tarlogie Farm on the Corentyne Coast, in the County of Berbice.

VII purchased the assets of Sea Rice Caribbean Incorporated in 2018 which included an existing Rice Milling Complex with Wharf Facility at Plot "C" Vilvoorden and a Paddy Purchasing Centre at Paradise, Essequibo Coast. After the acquisition of these properties, substantial investments were made to improve both facilities. With regards to the Rice Milling Complex that was acquired, after the requisite approvals were obtained from the NDC, CHPA and the GRDB, a brand new 12 metric tonne rice mill was installed and a number of upgrades to the existing facilities were performed. Additionally, in an effort to comply with the legal requirements of the EPA, VII submitted an application dated June 11, 2019 for Environmental Authorization to operate the rice mill.

Subsequently, a Waste Management Plan (WMP) was requested by the EPA for submission given that there were observed challenges with the management of paddy husk and rice husk ash.

EPA a couple of years later issued a warning letter to the Management of VII on April 28, 2021 after receiving several complaints from residents downwind of the Rice Mill in Vilvoorden and Fairfield, Essequibo Coast regarding dust and smoke emissions. VII was thereafter required to provide specific information and to implement a number of mitigation measures. To address the dust and smoke emission issues VII did three (3) things: a) engaged a local engineering firm to completely shed all the grain handling, processing, storage and drying equipment to prevent the escape of particulates into the air; b) engaged Kepler Weber - the manufacturer and installer of all VII's grain handling,

processing, storage and drying equipment - to evaluate, advise and implement a technical solution to the air emission problems that were at that time encountered; and c) levelled the paddy husk heaps and ceased open burning of paddy husk on site.

Correspondence was subsequently, dispatched by VII in May of 2021 to the EPA updating on actions that were being taken to reduce the environmental and public health risks associated with the rice mill's operations. In response a verification visit was subsequently conducted by officers of the EPA and the findings presented to the management of VII.

In correspondence dispatched on January 29, 2022 to the management of VII, the EPA requested that an Environmental Management Plan (EMP) be prepared and submitted for the Operation of the Vilvoorden Investment Incorporated - Rice Mill. In response, VII engaged Environmental Solutions in May 2022 to prepare an EMP in accordance with the EPA's Environmental Management Plan Preparation Guidelines.

This EMP submission therefore satisfies the aforesaid requirement of the Environmental Protection Agency and represents the culmination of efforts in this regard.

2.3 Project Location

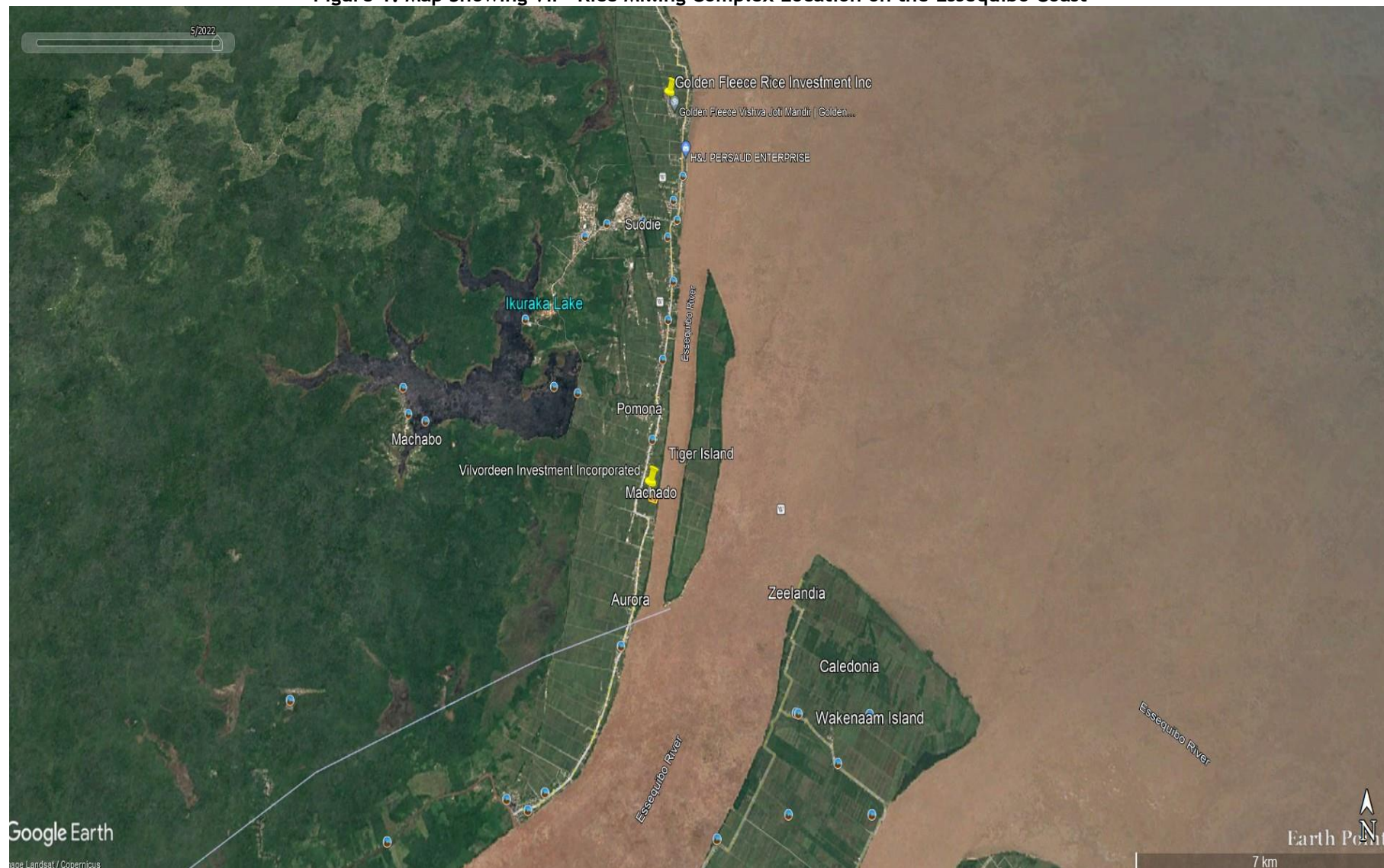
Vilvoorden Investment Incorporated (VII) is currently operating a twelve (12) metric tonner per hour State of the Art Rice Mill at Plot "C," Plantation Vilvoorden within the jurisdiction of the Good Hope-Pomona Neighbourhood Democratic Council (NDC) on the Essequibo Coast in the County of Essequibo.

Occupying approximately 19.48 of 45.781 acres of land, the VII- Rice Milling Complex is immediately bordered to the **North** by company owned residential properties and Agricultural land used for rice cultivation, to the **East** by the Essequibo River; to the **West** by another plot of company owned agricultural land used for rice cultivation and further west by private residential properties that are located along the main public road; and to the **South** by a large swathe of private agricultural land used for the cultivation of rice. (See Figure 1 -3)

2.4 Layout of Vilvoorden Investment Incorporated – Rice Milling Complex

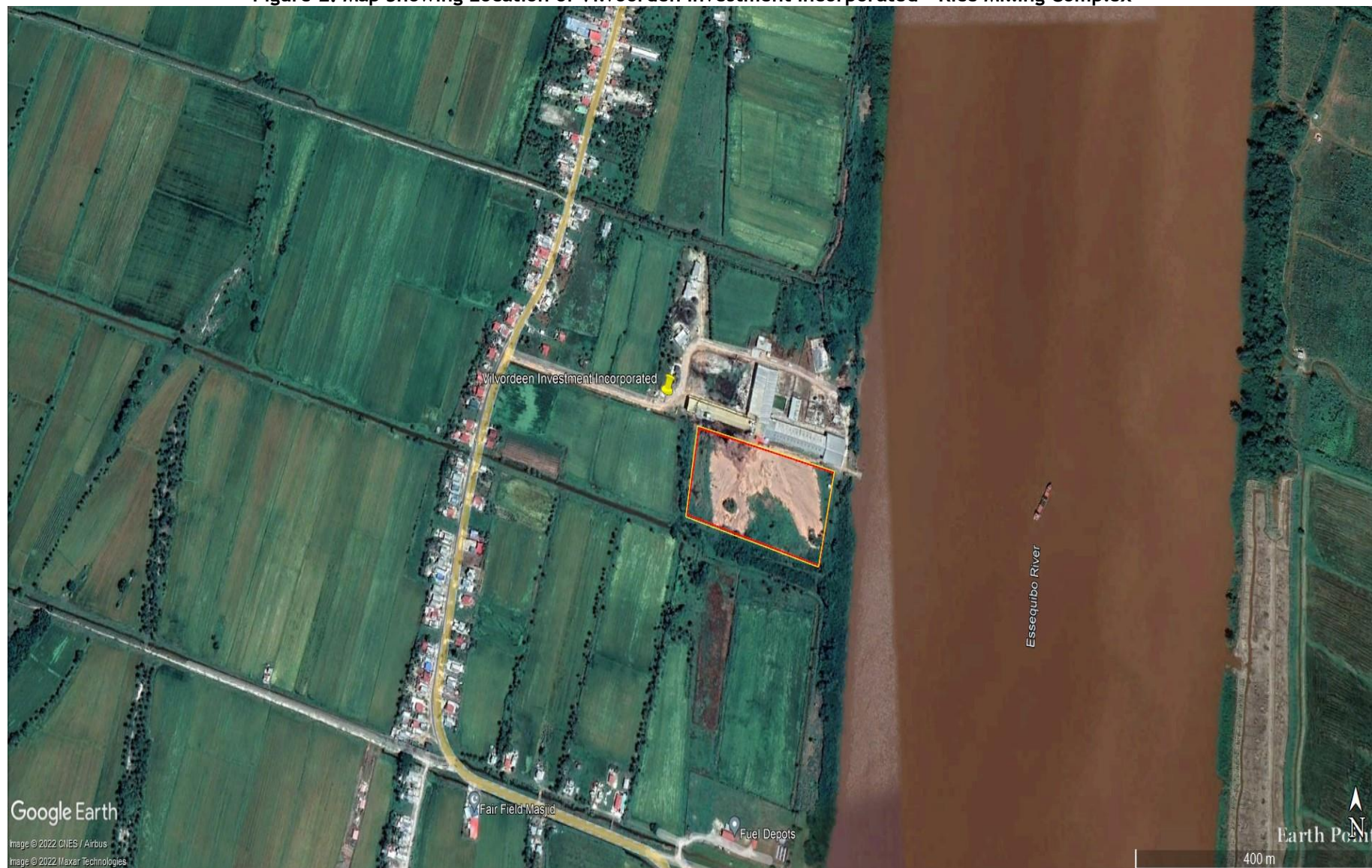
The Vilvoorden Investment Incorporated - Rice Milling Complex is physically laid out as is illustrated in the Google Earth Image referenced at **Figure 4 -5 below**.

<Figure 1: Map Showing VII - Rice Milling Complex Location on the Essequibo Coast>



Source: Google Earth, 2022

<Figure 2: Map Showing Location of Vilvoorden Investment Incorporated - Rice Milling Complex>



Source: Google Earth, 2022

<Figure 3: Map Showing Surroundings of the VII Rice Milling Complex>



Source: Google Earth, 2022

<Figure 4: Immediate Environs of VII - Rice Milling Complex>



Source: Google Earth, 2022

<Figure 5: Aerial View of VII Rice Milling Complex>



Source: Google Earth, 2022

2.5 Overall Project and Operating Activities

2.5.1 Environmental Baseline, Current Conditions and Sensitive Receptors

This section will furnish a description of the environmental context within which the Vilvoorden Investment Incorporated - Rice Milling Complex is situated. As part of this description, the physical, climatic, biological and socio-economic conditions will be elucidated.

2.5.1.1 Physical Conditions

2.5.1.1.1 Physiography and Geomorphology

Vilvoorden Investment Incorporated - Rice Milling Complex is Located at Plot "C" Plantation Vilvoorden, Essequibo Coast. It is situated in one of the four natural/ physiographic regions of Guyana: The Coastal Plain/ Low Coastal Plain. This natural/ physiographic region is part of the flat, low lying coastal lands that extend along the coast of South America from the Amazon River to the Orinoco This area is a narrow belt of land (ranging from between 8 and 65 km in width with a length of 440 km) which stretches from the Corentyne River in the East to the Waini Point in the West. Many areas of the coastland plain are below sea level while other areas are man-made and built up to raise them above the surrounding land level. An elaborate system of sea defenses, along with irrigation canals, is required to protect the area from flooding.

West of the Essequibo River the coastal plain narrows with extensive organic wetland pegasse deposits inland. While these are most extensive in the west of the country (Regions 1 and 2) they also occur scattered between Essequibo, Demerara and Berbice Rivers. (GNLUP, 2013)

2.5.1.1.2 Soil Resources

According to available information on the Soil resources of Guyana obtained from the Food and Agriculture Organization (FAO) mapping in the mid -1960's which produced a soil map of the whole of Guyana at a scale of 1:1,000,000, and the reclassification by National Agricultural Research and Extension Institute (NAREI) of soil units used in the FAO's mapping into current United States Department of Agriculture (USDA) classification soil units (See Table 1), the dominant soils within the project area have been mapped as follows:

- **1a - Low Humic Gleys of high base status, marine phase "Frontlands clay" (hydraquents with sulfaquents, fluvaquents)**
- **2a - Low Humic Gleys of high and medium base status, Fluvio marine phase, riverain soils (Fluvaquents with Endoaquents, Medhemists)**

1a - Low humic gleys of high base status, marine phase "Frontland clay" (hydraquents with sulfaquents, fluvaquents) This type of soil occurs mainly on the coastal plain of eastern Guyana from the Essequibo to the Corentyne River stretching some 32 kilometers inland in places. It contains relatively fertile, poorly drained clayey soils developed on unconsolidated sediments with associated sandy reefs that are old beach ridges. Some saline soils and organic "pegasse" soils also occur in patches. (GNLUP, 2013: 40)

2a - Low humic gleys of high and medium base status, fluvio marine phase, riverain soils (Fluvaquents with Endoaquents, Medhemists). This type of soil occurs mainly between the Berbice and Corentyne Rivers, along the Demerara River as far south as Linden and 100 km up the Berbice

River and at the Essequibo River mouth. These soils are poorly drained, deep, silty loam to silty clay textured soils that have developed over alluvial deposits. The soils have moderate to high fertility which decreases away from the Coast. (GNLUP, 2013: 41)

<Table 1: Soil Map Unit Characteristics>

Map Unit	Texture	Depth	Drainage	Fertility	Erosion Hazard	LCC	Limitations
1a	C-ZC (S-SL)	Deep	Poor	Med-High	None	I-II	Drainage (Salinity, Toxicity, AcS)
2a	ZL-C	Deep	Poor	Med – High	None	I-II	Drainage

2.5.1.1.3 Hydrology and Drainage

The project site is located right on the Bank of the Essequibo River that eventually drains into the Atlantic Ocean. The land in the project area has been physically laid out to facilitate agricultural production - particularly rice production. These lands are served by an expansive network of Irrigation canals which bring fresh water under the influence of gravity from the Ikuraka Lake to lands used for agricultural purposes and drains excess water from these lands via a network of drainage canals into the Essequibo River via an outlet structure.

2.5.1.1.4 Surface Water Quality

A surface water sample collected by IMEX Incorporated from one of the surface drains on the boundary of the project was analysed by IMEX Incorporated for the following parameters: pH, Temperature, Biological Oxygen Demand (BOD), Dissolved Oxygen (DO), Total Suspended Solids (TSS), Chemical Oxygen Demand (COD), Oil and Grease (Total), Total Petroleum Hydrocarbon, Total Metals (Arsenic, Cadmium, Chromium, Copper, Iron, Lead, Mercury, Nickel, Tin, Zinc), Faecal Coliforms, Ammoniacal Nitrogen, Nitrites, and Total Nitrogen) - to establish baseline levels. The prepared results report can be found at **Annex 2**.

2.5.1.2 Climatic Conditions

Just near the equator from about 5 degrees North and 5 degrees South, the northeast trade winds and the southeast trade winds converge in a low-pressure zone known as the Inter Tropical Convergence Zone (ITCZ). Guyana, as a territory, is uniquely positioned within this zone of convergence; and as such its weather and climatic conditions are heavily influenced by the seasonal shifts of this zone. The movement of the Inter Tropical Convergence Zone (ITCZ) over Guyana brings with it heavy rainfall that coincides with the rainy seasons generally experienced between May to July; and November to January, respectively.

Meanwhile when the ITCZ lies outside of Guyana's borders from February to April; and August to October, respectively, much lower levels of precipitation are experienced, which coincide, with the two (2) dry seasons experienced. (Wikipedia, 2022)

2.5.1.2.1 Ambient Air Quality and Environmental Noise

Ambient Air Quality and Environmental Noise Monitoring were undertaken by IMEX Incorporated upwind and downwind of the Rice Milling Complex for a twenty-four (24) hour period to establish baseline levels. Ambient Air Quality Monitoring was performed to establish the parameter levels for the following: Sulphur Dioxide, Nitrogen Dioxide, Carbon Dioxide, Carbon Monoxide, Volatile Organic Compounds and Particulate Matter. Detailed Environmental Noise Monitoring was also performed to

establish the Minimum, Maximum and Average levels for noise. The detailed Ambient Air Quality and Environmental Noise Monitoring Report which has been prepared can be found at **Annex 2**.

2.5.1.3 Biological Conditions

Within the compound of the rice milling complex occurs various types of flora (vegetation) and fauna (animal life) that are common along the coastal regions of Guyana.

The habitat in which these species are found has been altered by humans to facilitate agricultural production. The vegetation present onsite includes: grasses, shrubs, fruit trees: Mango (*Mangifera indica*), Coconut (*Cocos nucifera*) and ornamental plants introduced to improve the aesthetics of the compound. Various endemic bird species were observed, including: The Great Kiskadee (*Pitangus sulphuratus*), The Blue - Grey Tanager (*Thraupis episcopus*), Pale Breasted Thrush (*Turdus leucomelas*), and The House Wren (*Troglodytes musculus*) etc.

2.5.1.4 Socio-Economic Conditions

2.5.1.4.1 Surrounding Land Uses

Lands proximal to and surrounding the Rice Milling Complex in the rural village of Plantation Vilvoorden on the Essequibo Coast are used for mainly two applications: residential/ small business purposes and agricultural land. From observation, agricultural lands around the rice milling complex are used for commercial rice production.

2.5.1.4.2 Population and Demographics

The Country of Essequibo found in the Administrative Region #2: Pomeroon - Supernaam has a total population of (46,810) persons, representing approximately (6.27) percent of the total population of Guyana, which according to the 2012 Census Report has been tallied at 746,955 persons. Plantation Vilvoorden has a total population of 273 persons.

The region has a total land area of 6,195 square kilometers, which represents 2.88 percent of the total land area of Guyana and a population distribution to approximately 7.6 persons per kilometer.

Plantation Vilvoorden is a small rural agricultural village that is within the jurisdiction of the Good Hope / Pamona Neighbourhood Democratic Council (NDC) on the Essequibo Coast in Region 2.

2.5.2 Description of Project Activities

2.5.2.1 Overview of the Rice Production Process

Vilvoorden Investment Incorporated has been licensed for 2022 by the Guyana Rice Development Board (GRDB) to manufacture (mill) and export padi, rice or any other product of padi.

Vilvoorden Investment Incorporated (VII) - Rice Milling Complex currently processes paddy supplied by rice farmers into the following products: Bulk Brown Rice/ Cargo Rice and Bulk Broken Brown Rice for bulk wholesale shipments to markets in Latin America, the Caribbean Community and the Rest of the World.

The sub-sections which follow will briefly describe the processes that are employed by Vilvoorden Investment Incorporated - Rice Milling Complex to transform unprocessed paddy into rice products and byproducts of high quality for export to international markets.

2.5.2.1.1 Bulk Rice Production Process

2.5.2.1.1.1 Stage 1.1: Paddy Receipt, Grading and Weighting

All paddy entering the Rice Milling Complex must first be sampled, graded, weighted and a grading slip given to the paddy supplier for compensation. These functions are performed by three (3) Guyana Rice Development Board (GRDB) licensed paddy and rice grading officers that are onsite.

In the process used by VII, heavy-duty trucks transporting wet/ unprocessed paddy to the rice mill are first directed to the parking area afront the grading station where a representative sample of grain is taken by one of the licensed grading officers and carried to the onsite laboratory with calibrated equipment to be analyzed under the watchful eye of the paddy supplier.

The sampled grain is then taken to the grading station and pulverized using specialized miniaturized milling equipment where a standard methodology for grading and certification of paddy is utilized. In the performance of the grading and certification function, the following factors are assessed by the grading officer: moisture content, damaged kernels (singly or combined), red kernels, heat damaged kernels, green kernels, chalky kernels, milling yield and total milled yield. Depending on the values obtained by the grading officer for each of the above referenced factors, one of the following four (4) grades will be assigned to the sampled paddy: Grade Extra A, Grade A, Grade B and Grade C.

Once grading is performed, the heavily laden truck containing the sampled grain is then directed to drive on the Weigh Bridge Scale (**See Figure 6**) proximal to the grading stations where it is bulk weighted and a Guyana Rice Development Board (GRDB) approved Moisture Deduction Chart used in the computation of the compensation that is to be made to the paddy supplier by the miller. After acceptance of the result of Assessment by the Paddy Supplier, the necessary records are generated for retention by Vilvoorden Investment Incorporated - Rice Milling Complex and the Paddy Supplier and future arrangements for future payment made.

<Figure 6: Weigh Bridge Scale>



Source: Environmental Solutions, 2022

2.5.2.1.1.2 Stage 1.2: Paddy Intake and Grain Elevation

After grading is performed, the loaded truck is directed to the covered paddy intake point from the grading station then drives up to the top of the ramp of the grain intake area where paddy is tipped from the truck tray into a high-capacity mechanical reception hopper situated below ground through perforated grates or baffles. (See Figures 7-8) The paddy deposited within the intake hopper is then mechanically transferred via a tubular screw conveyor at a rate of 96 tonnes per hour to an enclosed carrier bucket elevator assembly at a rate of 96 tonnes/ hour to one (1) of four installed (4) paddy pre-cleaners (See Figure 9-10)

<Figure 7: Paddy Intake Area with High-Capacity Reception Hopper>



Source: Environmental Solutions, 2022

<Figure 8: Grates over Grain Reception Pit>



Source: Environmental Solutions, 2022

<Figure 9: Chain / Drag Conveyance System>



Source: Environmental Solutions, 2022

<Figure 10: Carrier Bucket Grain Elevator System>



Source: Environmental Solutions, 2022

2.5.2.1.1.3 Stage 1.3: Paddy Pre-Cleaning and Transfer to Wet Storage Bin

Paddy that is tipped into the mechanical reception hopper assembly is moist and has a high percentage of dockage (impurities) such as straw, weed seeds, soil and other inert material coming from the field. It is therefore of utmost importance that these impurities be efficiently removed without any grain loss.

Each of the four (4) installed paddy pre-cleaner systems into which grain is transferred performs this function efficiently at a rate of 60 metric tonnes per hour. The paddy pre-cleaning system installed (also known as an enclosed sieving box cleaning machine) has several mechanisms that allow for the efficient separation of impurities from the paddy. **(See Figures 11)** The separation mechanisms include: an aspiration chamber, a rotary sieve and a sieving box.

<Figure 11: Paddy Pre Cleaner System>



<Figure 12: Dust Collector System>



Source: Environmental Solutions, 2022

In the installed paddy cleaning system's operation, a three (3) stage process is employed to systematically remove light, medium and heavy impurities present in the grain that is gravity fed into the machine through an opening at the top. The first stage of the pre-cleaning process involves the aspiration of impurities (such as dust, light impurities and empty grains) in a closed-circuit air system, which allows for the efficient removal of foreign objects and environmental control of dust emissions. The second stage of the pre-cleaning process involves the separation and removal of large impurities such as straw and other foreign materials by means of the rotation action of the rotary sieve with large perforations. And, the final stage of the pre-cleaning process involves the passing of paddy free of light and heavy particulates through sieves which move in a rectilinear oscillation that allows grain to pass through the sieves separating out objects that are larger than the grain.

The light, medium, and large foreign impurities removed from the grain are all conveyed via chutes to four (4) dust collection systems from which impurities can be dispensed into tonne sacks for disposal. (See Figure 12 above) The resulting pre-cleaned paddy exiting the pre-cleaners is then transferred via a completely enclosed bucket elevator and conveyor into a hopper bottom storage silo/ bin for the temporary holding of wet paddy before it is transferred to the paddy dryer. (See Figure 13)

<Figure 13: Wet Paddy Storage Bins>



Source: Environmental Solutions, 2022

2.5.2.1.1.4 Stage 1.4: Paddy Drying (Primary)

The moisture content of paddy that is harvested from privately owned rice cultivations and supplied to the rice milling complex by farmers can vary from as low as twenty (20) percent to as high as twenty-five (25) percent. These moisture content ranges are undesirable for milling purposes making it absolutely necessary for the paddy to be dried to improve its millability.

In order to reduce the supplied grain's moisture content, Vilvoorden Investment Incorporated has installed two (2) Khronos Continuous flow tower dryers capable of drying between 5 to 58 metric tonnes of paddy per hour at temperatures between 45 - 55 degrees Celsius. (See Figure 15)

Wet grain entering the top of the tower dryer is allowed to fall under the influence of gravity over baffles internal to the dryer where heated air is passed allowing for the efficient removal of moisture from the grains.

This grain drying system employs a multi-pass drying procedure that gradually reduces the moisture content of paddy in the first pass from greater than 22 percent to between 16-17 percent moisture content to as low as between 12-13 percent moisture content in the second pass with clean heated air supplied by an installed masonry manual furnace that utilizes biomass (paddy husk) as fuel. (See Figure 14)

Each of the installed the tower dryers employed is equipped with special mechanisms for dust control called aspirators which allow for the effective capture/ collection of particulates as the grain is passed through the grain dryer.

<Figure 14: Biomass Furnace>



Source: Environmental Solutions, 2022

<Figure 15: Continuous Flow Tower Dryer>



Source: Environmental Solutions, 2022

2.5.2.1.1.5 Stage 1.5: Tempering and Secondary Drying of Paddy

After the paddy with the reduced moisture content exists the tower dryer, it is transferred via screw conveyor and enclosed bucket elevation systems into three (3) 250 Metric Tonne (MT) Hopper Bottom Silos for tempering/ Intermittent drying. (See Figure 16).

<Figure 16: Tempering Bins for Paddy>



Source: Environmental Solutions, 2022

During the tempering/ intermittent drying process, grain that was exposed to heat in the continuous flow dryer is allowed to rest for a period of twenty-four (24) hours. During this resting process, moisture which could not be removed from deep within the structure of the grain during the conventional drying process, slowly diffuses outwards allowing for the internal redistribution of

moisture in the grain and the equalization of moisture differences between the grains. This process markedly improves the rate of drying that will take place during the secondary drying process that usually follows. In addition, grain quality is improved and the physical condition of the grain optimized so that a clean separation of germ, bran and endosperm can be achieved (effected) during the milling process (Rice Knowledge Management Portal, 2011).

After the tempering process is concluded, paddy temporarily held in the tempering bins is once again mechanically transferred via enclosed screw conveyor and grain elevator mechanisms into another continuous flow tower dryer for secondary drying of the grain to further reduce the moisture content of the paddy to a desirable level. (See Figure 17)

<Figure 17: Secondary Dryer>



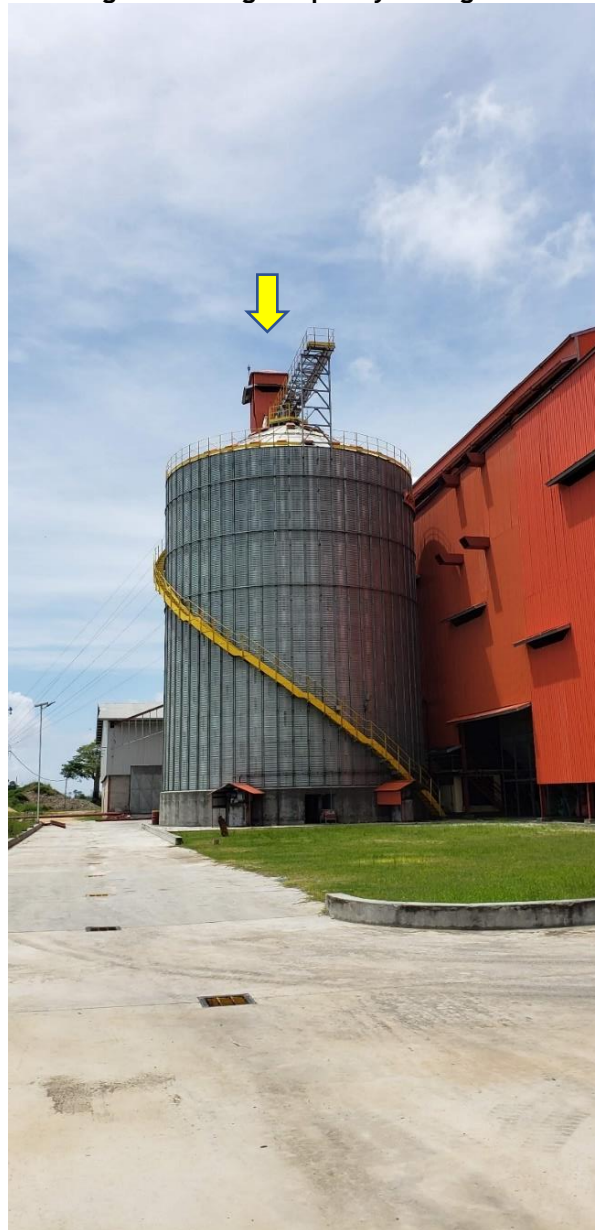
Source: Environmental Solutions, 2022

2.5.2.1.1.6 Stage 1.6: Transfer of Dried Paddy to High-Capacity Storage Bin

After the paddy is passed through the continuous flow dryer for secondary drying and attains the desired moisture content, it is then screw conveyed and elevated via enclosed bucket elevator to a high-capacity flat bottom grain storage silo with a capacity of approximately 80,000 bags (or 6,139.23 metric tons) for preserving grain. **(See Figure 18)**

The high-capacity storage bin is equipped with two (2) aeration fans to the base of the bin that allow for air at ambient temperature and relative humidity to be forced upwards through the dried grain to help maintain moisture, temperature and oxygen content in order to prevent harmful bacterial and fungal growth and excessive shrinkage.

<Figure 18: High-Capacity Storage Bin>



Source: Environmental Solutions, 2022

2.5.2.1.1.7 Stage 1.7: Transfer of Dried Paddy from High-Capacity Storage Bin to Paddy Cleaner to Buffer/ Mill Bin

Dried paddy that is stored in the high-capacity storage silo required for cargo rice production is thereafter transferred via several conveyance mechanisms into the milling section of the complex. Grain entering the Milling section must first pass through a paddy cleaner to undergo secondary paddy cleaning which further cleans the grain that is to be processed and removes all impurities that have the potential to enter milling equipment resulting in serious damage. The fine cleaning process is performed at a rate of 60 metric tonnes per hour. (See Figure 19)

All the light, medium and heavy impurities exiting the paddy cleaner are collected and appropriately managed, while the cleaned dry grain which is free of impurities is transferred via conveyance mechanisms to one (1) mill/buffer bin. The buffer/mill bin which has a capacity of 260.07 metric tons (or 4000 bags), will supply an adequate amount of dried paddy to cleaning and cargo rice milling equipment housed within the confines of the bond. (See Figure 20)

<Figure 19: Paddy Cleaner>



Source: Environmental Solutions, 2022

<Figure 20: Buffer/ Mill Bin>



Source: Environmental Solutions, 2022

2.5.2.1.1.8 Stage 1.8: Paddy Shelling/ Dehusking

After the paddy cleaning process is completed, the cleaned paddy is passed through a huller that removes the shell/ husk of the paddy resulting in an unpolished rice grain. The four (4) paddy shellers are capable of hulling/ shelling on average four (4) metric tonnes of paddy per hour.

In its operation, the paddy is fed into the centre of the paddy sheller through a small hopper. The vertical adjustable cylindrical sieve regulates the capacity and equal distribution of the paddy over the entire surface of the rotating disc. By centrifugal force the paddy is forced between the two discs and as a result of pressure and friction most of the paddy is dehusked (hulled). This process results in the removal of between 90-95 percent of the paddy husk from the grain. The paddy husk/ shell that is removed during this process is directed to a holding area aback the milling complex for eventual utilization. (See Figure 21)

The objective of the Dehusking/ shelling process is to remove the husks from the paddy grain with a minimum level of damage to the bran layer and if possible, without breaking the grain. Unfortunately, given the nature of the process some of the grains become inevitably broken. The unpolished grain, husk and unhusked paddy are then transferred into the paddy separator for additional processing.

<Figure 21: Paddy Shellers/ Hullers>



Source: Environmental Solutions, 2022

2.5.2.1.1.9 Stage 1.9: Paddy Separation

Given that a fraction of paddy would remain unhusked/unshelled after the shelling process, there is need for additional separation. The two (2) installed high-capacity table separator systems capable of processing 24 metric tonnes of paddy per hour separates the paddy from the unpolished grains. (See Figure 22)

<Figure 22: Paddy Separator>



Source: Environmental Solutions, 2022

The motion of the table separator separates the grains based upon their relative densities. The unhusked paddy is heavier than unpolished grains and thus moves downwards and discharges into a pipe for return to the huller for Dehusking. The unpolished grains (cargo rice) are the lightest in the mixture and the grains are transferred via enclosed bucket elevator into the hopper of the cargo rice grader.

2.5.2.1.1.10 Stage 1.10: Grading, Sorting, Temporary Holding and Dispensing of Cargo Rice

After the cleaned shelled grain leaves the table separator, it is transferred by enclosed bucket elevator into the hopper of the cargo rice grader where the grains are separated based on their respective lengths. (See Figure 23) Given the existing tolerances of the international markets supplied by Vilvoorden Investment Incorporated, cargo/ brown rice is classified - with respect to its length - into the following categories: (a) Whole grains; (b) $\frac{3}{4}$ plus grains, and (c) $<\frac{1}{2}$ grains.

<Figure 23: Grader>



Source: Environmental Solutions, 2022

At this particular stage, the rice grader - a rotating drum with indentations in it - separates the grains inputted into it, into whole grains and different types of broken grains (i.e., $\frac{3}{4}$ of a grain) and discharges the differing grades of rice at various exit points on the grader, after which it is transferred into its respective bulk dispensing bins with a capacity of 100 metric tonnes (with 50 MT for Broken Grains and 50 MT for Whole Grains) below the grader for temporary holding until it is bulk dispensed into one metric tonne sacks and readied for export to international markets. (See Figure 24)

<Figure 24: High-Capacity Bulk Bin>



Source: Environmental Solutions, 2022

2.5.2.1.1.11 Stage 1.11: Dispensing and Temporary Storage of Bulk Cargo Rice

Cargo rice transferred to the bulk dispensing bins for temporary holding will be dispensed using specialized mechanisms (See Figure 25) when required directly into high-capacity bags that are capable of holding one (1) metric tonne of Brown/Cargo Rice. These filled bags will then be transferred using hoisting equipment (See Figure 26) and placed on pallets within the designated storage area (See Figure 27) proximal to the dispensing point for temporary holding until it is ready to be loaded onto vessels at the facility's wharf for transport to Ports in Georgetown for International markets.

<Figure 25: Dispensing Mechanism on Storage Bins>



Source: Environmental Solutions, 2022

<Figure 26: Forklift Hoisting Loaded Tonne Sacks>



Source: Environmental Solutions, 2022

<Figure 27: High-Capacity Grain Storage Bond>



Source: Environmental Solutions, 2022

2.6.1 Supporting Facilities

The preceding sub-section sought to provide an explanation of the processes and equipment employed in the production of cargo rice and cleaned paddy for supply to international markets.

The following subsections will provide a brief description of the elements in the confines of the boundary of the Vilvoorden Investment Incorporated -Rice Milling Complex that support the operations of the rice mill. These include the following: equipment control areas, power generation systems, heat generation systems, compressed air delivery systems, petroleum and petroleum product storage areas, emergency water reserves, dust collection systems, open biomass storage areas, wharf facility, and staff facilities inclusive of office facilities for administrative and quality control purposes, male and female changing rooms and washrooms.

2.6.1.1 Equipment Controls

Integral to the operations of the various components of the fully automated rice milling complex are several onsite equipment control points. These control points have switches which activate process control systems for the operation of grain pre-cleaners and dust collection systems, grain conveyance systems, aeration systems on high-capacity storage silos/ bins, biomass furnace and associated continuous flow tower dryers, hullers/ shellers, table separators, and bulk cargo rice dispensers.

2.6.1.2 Power Generation Systems

Electricity required for the operation of the various components of the rice milling complex is self-generated onsite. Four (4) heavy duty diesel power generation systems housed within a permanent structure on the property, with a combined capacity of 3.05 meg watts (MW). The power generated by the units is passed through a power distribution panel for onward supply to the equipment through subsidiary circuits. (See Figure 28)

Each of the power generation units are evenly spaced and mounted on a level floor in a structure that is well ventilated, but sufficiently sturdy to attenuate noise and vibration emissions from the operating units. Each power generation system is supplied independently by a galvanized pipe leading from and connected to aboveground fuel storage tanks located proximal to the power generation area.

<Figure 28: Power Generation Area>



Source: Environmental Solutions, 2022

The exhaust of three (3) of the four (4) power generation sets lack adequate muffler systems. Additionally, these exhaust pipes are not connected to a stack to facilitate the dispersion of exhaust fumes. (See Figure 29) Several fire extinguishers have been pre-positioned for use in case of any emergency situation.

<Figure 29: Power Generation Systems>



Source: Environmental Solutions, 2022

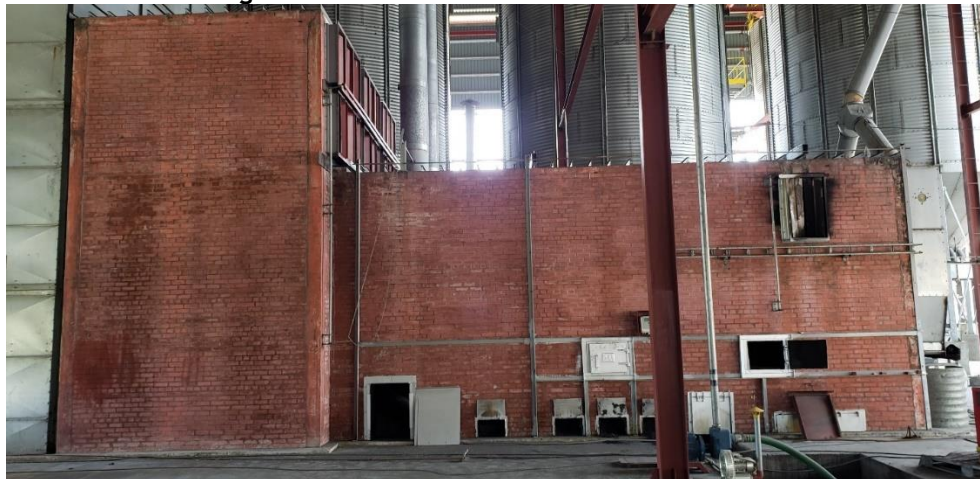
2.6.1.3 Heat Generation Systems

All of the clean heated air that is supplied to the Tower Dryer used in the conditioning of wet and partially dried paddy at Vilvoorden Investment Incorporated - Rice Milling Complex comes from two (2) installed masonry manual furnaces capable of utilizing rice husk and cut logs. One of the furnaces is used for primary drying while the other is used for secondary drying of grain. (See Figure 30 -31)

Both masonry furnaces are supplied with clean dried paddy husk via a transfer mechanism from an installed high-capacity storage silo near to the furnace. The biomass furnaces utilize 3.3 metric tonnes of paddy husk per hour or a total of 80 metric tonnes of paddy for a 24-hr. work day. The furnace has a heating capacity of between 600,00 - 9,300,000 kcal/hr. and is able to deliver clean heated air at temperatures of between 80-85 degrees Celsius for the effective drying of the grains.

The burnt paddy husk ash residue is the only waste material that is generated. This residue accumulates at the base of the furnace which has a slope that facilitates its fall into a pit that has been engineered below the ground level of the furnace. It is in this pit that the ash is fluidized for specialized transfer to the open storage area.

<Figure 30: Mechanized Rice Husk Furnace #1>



Source: Environmental Solutions, 2022

<Figure 31: Mechanized Rice Husk Furnace #2>



Source: Environmental Solutions, 2022

2.6.1.4 Paddy Husk Ash Transfer System

An innovative system has been engineered to enable the transfer of the paddy husk ash generated by the Biomass Furnace to the open storage area on the periphery of the mill site. This system allows for the fluidizing of the paddy husk ash. (See Figure 32-35)

Paddy husk ash that accumulates on the sloped bottom of the furnace is washed down into an accumulation pit with water from an overhead water supply tank located in close proximity where it is mixed by an air pump into a suspension (mixture)

The resulting mixture is then siphoned by a suction pump into a galvanized transfer line that leads all the way to the open storage area where paddy husk and paddy husk ash are accumulated.

<Figure 32: Air Blower and Suction Pump>



Source: Environmental Solutions, 2022

Figure 33: Fluidized Paddy Husk Ash Accumulation Pit>



Source: Environmental Solutions, 2022

<Figure 34: Overhead Water Supply Tank>



Source: Environmental Solutions, 2022

<Figure 35: Fluidized Ash Transfer Line>



Source: Environmental Solutions, 2022

2.6.1.5 Compressed Air Treatment and Delivery Systems

A low-pressure high-volume air compressor has been installed and is currently in operation at the facility. The bulk air compressors have dual pressure air take off points. It will produce both bulk air (at between 25-40 PSI) and general-purpose air (100 PSI) for different applications. Bulk air supplied at between 25 -40 PSI is used to operate pneumatic systems. While general purpose air on the other hand supplied at 100 PSI is used to blow down lines and operate actuators (if installed). (See Figure 36)

<Figure 36: Compressed Air System>



Source: Environmental Solutions, 2022

2.6.1.6 Petroleum and Petroleum Product Storage Areas

VII currently stores Petroleum and Petroleum Products in two (2) designated areas on site. In the first area located just behind the main grain storage area, approximately 10,000 gallons of diesel are stored in covered area containing three (3) aboveground steel tanks. These have all been placed within a concreted secondary containment structure. Fuel supplied by these tanks is transferred via pipeline to the power generation systems for use in the production of electricity required to run all the equipment of the rice mill. (See Figures 37- 38)

<Figure 37: Covered Petroleum Storage Area>



Source: Environmental Solutions, 2022

<Figure 38: Aboveground Fuel Storage Tanks in Covered Secondary Containment>



Source: Environmental Solutions, 2022

The second area located close to the entrance of the property is used for the storage of both drummed lubricating oils and diesel. The drums of lubricating oil have been placed on a wooden rack and on the ground. The diesel is stored in a steel aboveground fuel storage tank located within a secondary containment structure. It also has conspicuously displayed signage displayed on the

exterior of the aboveground fuel storage tank. Fuel from this tank is dispensed into company owned vehicles for use. Generally, the area is covered and well ventilated. (See Figure 39)

<Figure 39: Petroleum Product Storage Area>



Source: Environmental Solutions, 2022

2.6.1.7 Emergency Water Reserve

In the case of an emergency situation involving fire, there are emergency reserves of water for use. There are two reserves on site. One is in an open rectangular aboveground concreted reservoir measuring approximately 75 feet by 54 feet by a height of approximately 4 feet with an estimated volume of 16,200 Cubic Feet or 121,184.42 US Liquid Gallons. (See Figure 40)

The other is a portable emergency reserve the consists of an above ground water storage tank with a volumetric capacity of approximately 700 gallons with a mounted hydraulic pump system and a fire hose with a nozzle. (See Figure 41)

<Figure 40: Water Reservior>



Source: Environmental Solutions, 2022

<Figure 41: Portable Water Bowser>



Source: Environmental Solutions, 2022

2.6.1.8 Installed Dust Collection Systems

Given the nature of the processes used at the rice milling complex to both handle and process grain, particulates are likely to be generated which may pose risks to safety through the creation of an explosive atmosphere as well as risks to the health of workers onsite and residents in proximal communities through particulate emissions to respirable air.

In an effort to mitigate these harmful effects, VII has completely covered its facility and have acquired, installed and been operating a number of systems for dust capture and collection which serve as embedded controls at major dust generation points of the complex. These technologies are namely: a) four (4) after filter dust collectors associated with the paddy pre-cleaners (**See Figure 42**); b) three (3) vortex collection systems associated with each of the installed tower dryer systems (**See Figure 43 -44**); and c) two (2) cyclone dust collector systems associated with the fine cleaning system within the milling section. (**See Figure 45**)

Each of the systems identified above have mechanisms for the accumulation of dust and other impurities removed from the grain in tonne sacks below the units. When sufficiently filled, the sacks are then taken away from each respective area using a forklift where it is transferred to the open accumulation area and contents emptied and disposed of.

<Figure 42: After Filter Dust Collection Systems>



Source: Environmental Solutions, 2022

<Figure 43: Vortex Collection System atop Tower Dryer for Dust Capture>



Source: Environmental Solutions, 2022

<Figure 44: Dust Accumulation Systems at Base of Tower Dryer>



Source: Environmental Solutions, 2022

<Figure 45: Cyclone Dust Collector>



Source: Environmental Solutions, 2022

2.6.1.9 Open Biomass Storage Area

Paddy husk, paddy husk ash, and other light, medium and heavy impurities extracted from the grain that has been processed at the VII Rice Milling Complex is currently being deposited on company owned land to the West of the Rice Mill. (See Figure 46)

<Figure 46: Open Biomass Storage Area>



Source: Environmental Solutions, 2022

The accumulated waste material will be used for several purposes. Some of the rice husk is used as an energy source within the two biomass furnaces on site used to generate clean heated air for grain drying applications. Another fraction of the paddy husk and paddy husk ash is utilized by land owners to raise low land. Another fraction is utilized by subsistence farmers as a growth media and an organic fertilizer for vegetables and other crops, and bedding for chicken and small livestock pens etc. Another fraction of the material is also taken and reincorporated into land used for rice cultivation to improve soil fertility and structure.

Recognizing that a significant portion of the paddy husk which remains can be used as a clean energy source, VII has explored several technological solutions for paddy husk utilization and has determined that it will procure, install and operate a Thermo -Plant that will utilize all of the biomass that is generated currently to produce cheap and clean electricity for utilization.

2.6.1.10 Wharf Facility

Toward the eastern property boundary of the VII Rice Milling Complex is a wooden wharf that allows for the receipt of marine vessels within the Essequibo River. The wharf facility enables the transfer of processed grain stored within the dedicated storage areas on site to the hold of marine vessels. These vessels then transport grain to ports in Georgetown for international shipment.

2.6.1.11 Staff Facilities

Several facilities have been established on site for staff utilization. These include the following: office facilities for administrative and quality control purposes, a lunch room, male and female washrooms and changing rooms. The washroom facilities are linked to an onsite septic tank structures for the biological breakdown of sewage generated on site.

SECTION 3: ENVIRONMENTAL MANAGEMENT FRAMEWORK

3.1 Overview

This Section of EMP articulates the Environmental Management Framework that will influence this project during its life cycle. The operations of the VII Rice Milling Complex will be influenced by several important external and internal instruments, which constitute elements of the Environmental Management Framework. These instruments include: National Legislation and Regulations, Applicable National and International Standards and Guidelines, and the conditions of Approvals, Permits and Licenses, and Internal Company Specific Environmental Management Policies, Procedures and Guidelines.

3.2 Internal Policy Statements

Vilvoorden Investment Incorporated - Rice Milling Complex's operations will be influenced by its own internal policies in relation to Environmental Management and Health and Safety, respectively. These are expounded on in the following subsections.

3.2.1 Environmental Management Policy Statement

Vilvoorden Investment Incorporated recognizes that aspects of its operations have the potential to cause significant impacts to the environment. We recognize, therefore, that our business has an important role to play in protecting and enhancing the environment for future generations, and to help secure the long-term sustainability of Guyana's manufacturing and processing sector.

As such, VII is committing itself to providing the highest quality of rice products to the local and international markets, whilst also ensuring that ample consideration is given to conducting its operations in an environmentally astute and socially conscientious manner. To this end Vilvoorden Investment Incorporated is committed to taking action:

- To comply fully with all applicable legislation with a bearing on environmental management;
- To achieve sound environmental management practices across our entire operation;
- To minimize our waste and to reduce, re-use and recycle the resources consumed by our business, wherever practical;
- To minimize our use of energy, water and materials;
- To reduce our pollution to a minimum and, where appropriate, through the use of control technologies and techniques;
- To ensure that our operations do not adversely affect persons domiciled in communities on the periphery of the rice milling complex; and where local communities are affected ensure that a documented system for dealing with complaints and grievances is instituted;
- To invite our customers, suppliers and contractors to participate in our efforts to protect the environment;
- Where we can, to work with others in the rice industry, in public agencies and the community to achieve wider environmental goals;
- To provide all employees with the training and resources required to meet our objectives;
- To monitor and record our environmental impacts on a regular basis and compare our performance with our policies, objectives and targets, with a view to continuous improvement over time.

In light of the above commitments, we the authorized representatives of Vilvoorden Investment Incorporated - Rice Milling Complex do hereby endorse this policy.

X _____
Mr. Nazeemul Hakh
Founder

Date: _____

X _____
Mrs. Shareeda Hakh
Co-Founder/ Financial Director

Date: _____

3.2.2 Health and Safety Policy Statement

Vilvoorden Investments Incorporated (VII) recognizes that the Health and Safety of its employees is (1) the responsibility of management; and that (2) employees have a vital role to play in ensuring that the company's Health and Safety Policy is effective and properly implemented.

MANAGEMENT

In fulfilling this responsibility, management has a duty to provide and maintain, so far as is practically possible, a working environment that is safe and without risks to the health of all staff, and includes: -

- The formation and effective functioning of worker's safety working group;
- Training and supervision of employees in the correct use of plant, equipment and substances throughout the company;
- Making and monitoring arrangements for the safe use, handling and storage of petroleum products;
- Providing appropriate Personal Protective equipment and safety apparel for all staff;
- Providing information, training and supervision for all employees enabling them to work in a safe and healthy manner;
- Make regular inspections to identify and reduce risks and hazards at the Rice Milling Complex;
- Put measures in place to prevent, record and report accidents and emergency incidents;
- Have regular meetings with employees to ensure that the policy operates effectively, and that health and safety issues are regularly reviewed;
- Must observe and fulfill its responsibility under all Acts and Regulations, which apply to safety and health, and also to the rice industry.

EMPLOYEES

In an effort to ensure that a safe and health work environment is maintained at all times, employees have a duty to:

- Exercise care when performing duties, for their own health and safety, and for that of their fellow workers;
- Follow safe working practices, use and take good care of their personal protective equipment, devices, clothing and other equipment entrusted to them;
- Report any actual or potential risks or hazards to their superiors;
- Not engage in any prank, horseplay or boisterous or dangerous conduct;
- Give full cooperation in realizing the safety and health objectives of the company.

This Health and Safety Policy will be regularly reviewed in the light of new legislation and company changes.

In light of the above commitments, We the authorized representatives of Vilvoorden Investment Incorporated - Rice Milling Complex do hereby endorse this policy

X _____
Mr. Nazeemul Hakh
Founder

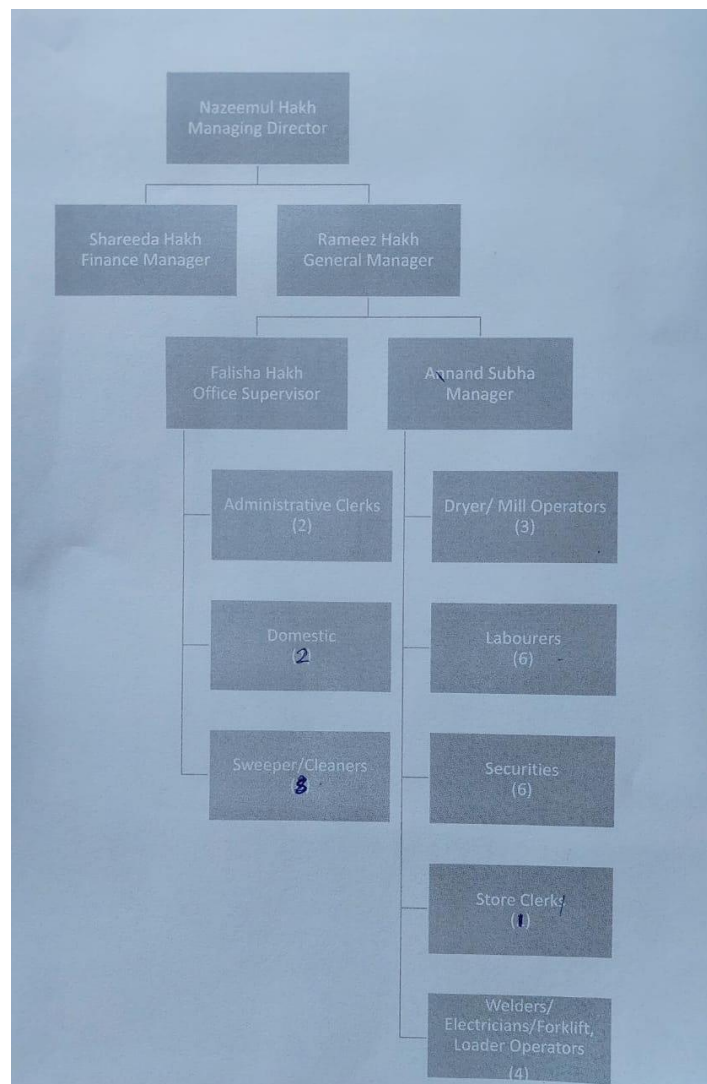
Date: _____

X _____
Mrs. Shareeda Hakh
Co-Founder/ Financial Director

Date: _____

3.3 Institutional Arrangements

3.3.1 Organizational Structure



3.3.2 EMP Implementation Roles and Responsibilities

This section identifies the Environmental Management Plan (EMP) implementation roles and responsibilities of staff in the employ of Vilvoorden Investment Incorporated - Rice Milling Complex. This is show at **Table 2 below**.

<Table 2: EMP Implementation Roles and Responsibilities>

Roles	Responsibilities
<Senior Management> <ul style="list-style-type: none"> • Board of Directors • Company Secretary • General Manager • Accountant 	<ul style="list-style-type: none"> • Approves the Environmental Management Plan (EMP) • Sets the expectation for VII to comply with the requirements of the EMP Maintains awareness of the requirements of the EMP within VII • Provides resources to implement the operational requirements of the EMP • Verifies that VII complies with the EMP requirements • Endorses the Environmental Management Plan on behalf of VII - Rice Milling Complex;
<ul style="list-style-type: none"> • General Manager / Designated Environmental Officer** 	<ul style="list-style-type: none"> • Accountable for implementing the operational requirements of the EMP; • Administrative owner of the EMP Documentation • Jointly accountable with the Supervisors of the different sections of the Complex for the Implementation of the EMP; • Provides technical support to operational staff for Health, Safety and Environmental, and regulatory compliance-related EMP requirements. • Coordinates and Interfaces with the government agencies and external stakeholders on Health, Safety and Environment and regulatory compliance matters • Manages the operations of the company in relation to Health, Safety and Environment in a way that meets the requirements • Responsible for HSE Stewardship and Performance Reporting. • Participation in Risk Assessments associated with the Project • Participation in the execution of emergency preparedness and response at facility. • Ensures the day-to-day implementation of the operational requirements of the Environmental Management Plan.
<ul style="list-style-type: none"> • Environmental Management Consultant 	<ul style="list-style-type: none"> • Independent review of all aspects of the Operations of the Rice Milling Complex; • Review of Environmental Performance of the Rice Milling Complex; • Updating the EMP in keeping with changes that may have occurred at the Rice Milling Complex; • Generation of Compliance Reports periodically on the Company's operations.

3.4 Legal Requirements for the Project

This section provides an overview of the applicable National Policy and Strategic Framework, National Laws and Regulations, International Conventions and Protocols, National and International Standards and Guidelines, and conditions of Environmental Permits and Licenses that constitute the Policy, Legal and Institutional Framework for Guyana which create an obligation on the part of Vilvoorden Investment Incorporated to manage Environmental Impacts and control Health and Safety Risks arising out of the operations of its Rice Milling Complex.

3.4.1 National Laws and Regulations

This section identifies and presents a brief overview of the key legislation currently in force in Guyana that pertains to resources that could be affected by the Project. **Table 3 below** identifies and provides a brief overview of national laws and regulations that are applicable to the operations of the VII- Rice Milling Complex.

<Table 3: Applicable National Laws and Regulations>

NATIONAL LAWS	OVERVIEW
ENVIRONMENTAL PROTECTION	
The Constitution of the Cooperative Republic of Guyana, 1980 and 2003 Reforms	<p>The Constitution of Guyana is the highest governing legal document and supreme law for the country. Articles 25, and 36 of the 1980 Constitution and 149 (J) of the 2003 amendments, outlines Guyana's environment related principles. The importance of protection and management of the environment features prominently in this act. This is outlined as follows:</p> <ul style="list-style-type: none"> • Article 25: <i>"Every citizen has a duty to participate in activities to improve the environment and protect the health of the nation."</i> • Article 36: <i>"The wellbeing for the nation depends upon preserving clean air, fertile soils, pure water and the rich diversity of plants, animals."</i> • Article 149J: (1) <i>"Everyone has the right to an environment that is not harmful to his or her health or wellbeing."</i> • Article 149(J): (2) <i>"The State shall protect the environment, for the benefit of present and future generations, through reasonable legislative and other measures designed to:</i> <ul style="list-style-type: none"> ○ <i>Prevent pollution and ecological degradation;</i> ○ <i>Promote conservation;</i> ○ <i>Secure sustainable development and use of natural resources while promoting justifiable economic and social development"</i>
The Environmental Protection Act, 1996 The Environmental Protection (Amendment) Act, 2005	<p>The Environmental Protection Act 1996 is the first comprehensive environmental legislation in Guyana. The Act, and the Environmental Protection Amendment Act 2005, establishes the basic institutional and regulatory framework within which all activities that may significantly impact on the natural, social, and cultural environments are assessed. The Act established the EPA and the goal of the Act is to <i>"provide for the management, conservation, protection and improvement of the environment, the prevention and/or control of pollution, the assessment of the impact of economic</i></p>

NATIONAL LAWS	OVERVIEW
	<p><i>development on the environment, the sustainable use of natural resources and for matters incidental thereto connected therewith</i>". The EP Act gives the EPA the mandate for the coordination of environmental management and outlines the legal process for undertaking sustainable and effective management of the natural environment.</p> <p>The Act outlines the environmental authorization process for new or existing projects being modified. Part IV of the Act addresses Environmental Impact Assessments (EIAs) and outlines the steps in seeking environmental authorization, the determination of whether a project will require an EIA, and the steps to be followed and scope of the EIA. Part IV, section 11(1) of the Act set out that <i>"A developer of any project listed in the Fourth Schedule²⁵, or any other projects which may significantly affect the environment, shall apply to the Agency for an environmental permit..."</i></p>
<p>Regulation No. 10 of 2000 - The Environmental Protection (Authorization) Regulations, 2000</p>	<p>These Regulations provide rules about the evaluation of an application for an environmental authorization to be made to the Environmental Protection Agency pursuant to sections 11, 19 or 21 of the Environmental Protection Act. They also concern the Register made pursuant to section 36 of the Act and require a holder of an environmental authorization to make all records required by regulation 5. Where an environmental authorization is in force it shall be the duty of the Agency to take the steps needed: (a) for the purpose of ensuring that the activities authorized by the environmental authorization do not cause pollution of the environment or harm to human health or become seriously detrimental to the amenities of the locality affected by the activities; and (b) for the purpose of ensuring that the conditions of the environmental authorization are complied with. In considering an⁵⁷application for the renewal of an environmental authorization, the Agency may: (a) carry out physical inspections of the facility; and (b) specify other standards or conditions with which such facility shall comply.</p>
WATER QUALITY	
<p>Regulation No. 6 of 2000 - The Environmental Protection (Water Quality) Regulations, 2000</p>	<p>Sets effluent standards, reporting requirements, penalties for violations of standards and permitting requirements for stationary and mobile sources. Regulates discharges of controlled substances, which could include substances used during the Project.</p>
HAZARDOUS WASTE	
<p>Regulation No. 7 of 2000 - The Environmental Protection (Hazardous Waste) Regulations, 2000</p>	<p>Establishes requirements for generating, handling, and disposing of hazardous waste as well as penalties for violations of these requirements. Identifies wastes subject to regulation, including several types of waste that could be produced by the Project.</p>
NOISE MANAGEMENT	
<p>Regulation No. 8 of 2000 - The Environmental Protection (Noise Management) Regulations, 2000</p>	<p>Sets noise emission thresholds, reporting requirements, penalties for violations or standards and permitting requirements for noise emission sources. Regulates discharges of noise into the environment from noise emitting devices installed on site.</p>

NATIONAL LAWS	OVERVIEW
AIR QUALITY	
Regulation No. 9 of 2000 - The Environmental Protection (Air Quality) Regulations, 2000	Sets air quality standards, reporting requirements, penalties for violations of standards and permitting requirements for discharges. Regulates discharges of several pollutants which could be emitted during the Project, including smoke, particulates, and carbon monoxide.
LITTER ENFORCEMENT	
Regulation No. 7 of 2013 - The Environmental Protection (Litter Enforcement)) Regulations, 2013	These Regulations, made by the Minister of Natural Resources and the Environment under section 68 of the Environmental Protection Act 1996, define offences such as depositing litter in public places and littering of private premises, establish the post of litter prevention warden (either appointed by a public authority or the Minister of Natural Resources and the Environment and provide with respect to enforcement of the removal of litter. All Litter Prevention Wardens shall report to that body that the Minister designates by publication in the Gazette, as the body responsible for the general management of the Litter Prevention Wardens and that body shall be responsible for monitoring the enforcement of the duties of the Litter Prevention Wardens under these Regulations. "Premises" means land and includes natural water courses and drains.
TOXIC CHEMICALS	
Toxic Chemicals Control Act No.13 of 2000	Provides for the formation of a Pesticides and Toxic Chemicals Control Board. Establishes requirements for registration, licensure, and trade in pesticides and toxic chemicals. Amended in 2007 to provide rules for the exportation of pesticides and toxic chemicals. Establishes regulations pertaining to the use of toxic chemicals and pesticides. Pesticides will not be required for this Project, but small amounts of toxic chemicals may be used
LAND DEVELOPMENT	
Town and Country Planning Act, 1946 (Cap. 20:01, Act 25 of 1946 and Amendments	<p>The Act provides for the (orderly and progressive) development of urban and rural lands and the preservation and improvement of amenities pertaining to such development. Development under the Act is restricted to buildings and road works incidental to buildings. The Act is concerned principally with town planning schemes and regional schemes (out of urban areas). Such schemes comprise of buildings, sanitation, coordination of roads, facilities and public services, provision of amenities and the conservation and development of resources. Implementation and enforcement are vested in the Central Housing Planning Authority (CHPA).</p> <p>The Authority, with the approval of the Minister, has the power to make regulations to implement the Act. CHPA, by resolution, may decide to prepare and adopt a scheme. When a draft scheme is prepared, it is submitted to the Minister for approval. The Minister may approve, modify or require a new scheme to be drafted. The scheme is formally in effect on the date of public notification of approval. The Act provides for cooperation with local authorities, establishment of a register, permit processing for building operations, land acquisition for schemes, compensation, and enforcement of the provisions of a scheme. There is also provision for zoning and the regulation of building</p>

NATIONAL LAWS	OVERVIEW
	and site design, roads, amenities, public services, transport and communications.
SEA DEFENCE INFRASTRUCTURE	
Sea Defence Act, 1883	This Act authorizes the Sea Defence Board to take any and such actions as to secure the maintenance of sea, rivers, and outer dams of properties that abut on or are near the river or sea shore.
RICE SECTOR SPECIFIC	
Act No. 15 of 1994, Guyana Rice Development Board Act, 1994	Provides for the regulation of the manufacture and marketing of rice, for securing effectively the development of the rice industry through the establishment of the Guyana Rice Development Board, and for matters connected therewith.
Act No. 8 of 1998, Rice Factories Act, 1998	Provides for the establishment of rice factories and the regulation and control of rice factories and the manufacture of rice

3.4.2 Applicable National Standards and Guidelines

Several national guidelines and standards identified at **Table 4 below** will be applicable to the operations of Vilvoorden Investment Incorporated - Rice Milling Complex.

Table 4: Applicable National Standards and Guidelines

STANDARDS AND GUIDELINES	RELEVANCE TO THE PROJECT
National Guidelines and Standards	
GYS 207:2002: Guyana National Bureau of Standards Interim Guidelines for Industrial Effluent discharge into the Environment	This standard sets out the allowable limits that should not be exceeded: pH 5.0-9.0; Temperature: <40°C; Chlorine <0.2 mg/l; Total Suspended Solids (TSS): <50 mg/l; Oil and Grease: < 10 mg/l; and Biological Oxygen Demand (BOD) <50 mg/l;
Government Analyst Food and Drugs Department (GAF&DD) Guideline for Potable Water.	This standard establishes the limits within which water quality parameters are not expected to exceed for potable water. These parameters are as follows: E. Coli - 0 and Total Coliform: <3/100 ml
GYS 263:2010 (First Revision) - Guidelines for Noise Emission into the Environment.	This standard specifies permissible/allowable noise levels for commercial, industrial, residential, institutional, educational, construction, transportation and recreational receptors in Guyana. It will operate under the Environmental Protection (Noise Management) Regulation 2000.
GYS 527:2017 (First Revision) - Requirements for the design and construction of septic tanks and associated secondary treatment and disposal systems	This standard gives requirements for the design, location, construction, and maintenance of septic tanks. It includes methods of treatment and disposal of septic tank effluent from domestic sewage. It is also applicable to individual housing units and institutions where the number of users does not exceed twenty (20) persons. For buildings with more than twenty (20) users an alternative treatment method should be considered with the approval from the relevant authorities
GYS 211:2017 - Rice Specification	Adopted ISO 7301: 2011. This International Standard gives the minimum specifications for rice (<i>Oryza sativa</i> L.) which is subject to international trade. It is applicable to the following types: husked rice and milled rice, parboiled or not,

STANDARDS AND GUIDELINES	RELEVANCE TO THE PROJECT
	intended for direct human consumption. It is nether applicable to other products derived from rice, nor to waxy rice (glutinous rice).
GYS 211:2014 (First Revision) - Rice Specification	This standard establishes requirements for grades of paddy, cargo rice, milled rice; cargo parboiled rice and milled parboiled rice. It also specifies the general conditions for sampling and the methodologies for assessing the various factors used in the determination of the quality of rice

3.4.3 Environmental Permits and Licenses

The operation of the rice milling complex will be subject to the terms and conditions found in the following authorizations/ permissions and licenses that are to be or have already been issued:

- Certificate of Incorporation for Vilvoorden Investment Incorporated (Company No: 9211) constituted under the Companies Act of Guyana on 15th March 2018;
- Transport No 518/2018 for Plot lettered "C" all being a portion of a piece or parcel of land known and called Plantation Vilvoorden, in the Good Hope/ Pomona Village District, in the County of Essequibo, in the Republic of Guyana.
- No Objection issued by the Good Hope/ Pomona Neighbourhood Democratic Council (NDC);
- Planning Permission for Building Works to erect a Rice Milling Complex situated at Plot "C" being a Piece or Parcel of Plantation Vilvoorden, Essequibo Coast - Issued by the Central Housing and Planning Authority (CHPA) on October 22, 2020.
- Petroleum License (No. 315/10/7) Issued by the Guyana Fire Service (GFS) to Vilvoorden Investment Incorporated for Storage of Petroleum Products;
- License to Manufacture Rice (License No. 17) issued to Vilvoorden Investment Incorporated by Guyana Rice Development Board to operate a 12.0 mt/hr. rice mill;
- Customer Installation and Storage License issued to Vilvoorden Investment Incorporated by the Guyana Energy Agency (GEA);
- Export License for Rice or any Rice Product or Padi issued by the Guyana Rice Development Board (GRDB);
- Environmental Authorization (Operation Permit) to be issued by the Environmental Protection Agency to Vilvoorden Investment Incorporated.

SECTION 4: ENVIRONMENTAL IMPACTS

4.1 Overview

This Section of the document presents an assessment of the potential Environmental impacts (inclusive of Health and Safety Risks) associated with the Operational (Including Maintenance) Phases of the Vilvoorden Investment Incorporated - Rice Milling Complex. This section of the document will have three (3) sub-sections. The first sub-section will briefly describe the methodology used to: (a) determine the Environmental Aspects of Vilvoorden Investment Incorporated's products, services and activities, taking into account current and planned activities, covering the aspects that it can both control and influence; (b) determine the environmental impacts of each aspect; and (c) assess the significance of these aspects and impacts. The second sub-section will present the resulting Impact Assessment Matrix which identifies the Significant Impacts. And, the last sub-section will briefly describe the significant Environmental Impacts and Health and Safety Risks.

4.2 Methodology of Identifying and Rating Environmental Aspects

In order to identify and rate environmental and social aspects, it is important to understand first and foremost what "aspects" are with reference to an organization that is seeking to implement an Environmental Management System (EMS) to manage environmental impacts. The ISO 14001:2015 Environmental Management Systems (EMS) Standard defines **an aspect** as an element of an organization's activities, products or services that interacts or can interact with the environment" and **an impact** as a "change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects. Simply put, an aspect is a cause or reason and an impact is an effect or the result on the environment. Therefore, an organization's aspects originate from its activities, products and services. Once these aspects are identified, the impacts can easily be identified also. The consultant utilized an appropriate Aspect and Impact Evaluation Framework to accomplish this.

4.2.1 Aspect and Impact Evaluation Framework

The Aspect and Impact Evaluation Matrix utilized by the Consultant adapted from **Hoagland -Grey, Anderson and Ward (2011)** allowed for the evaluation to be performed following a five (5) steps process. The steps are as follows:

1. **Identification of activities, component processes and products;**
2. **Determine the Aspects of the Identified Activities;**
3. **Determine the Impacts of these Aspects;**
4. **Assess the significance of these impacts; and**
5. **Rank the Impacts according to their Significance.**

4.2.1.1 Step 1: Identification of Activities, Processes and Products

In order to identify activities¹, service² and product³, an analysis of what the organization does had to be undertaken. This was achieved by describing all of the organization's activities and component

¹ An activity is a part of the core business (e.g., production process steps).

² Service means an auxiliary service that supports core activities (e.g., boilers, heating & cooling, maintenance)

³ A product is the goods you offer for market.

processes, whether performed by the organization's own employees or by engaged contractors and suppliers. **Column A of Table 6, identifies** the activities performed by staff of VII or contractors and suppliers.

4.2.1.2 Step 2: Determination of Aspects

Each identified activity performed by the organization's own staff or contractors and suppliers can potentially interact with the environment in a variety of ways and present a variety of health and safety risks to site personnel, visitors and the public. Each of these interactions is termed an aspect. For the purposes of this assessment, environmental aspects⁴, as well as health and safety aspects⁵. Have been defined for all identified activities. **Column B of Table 6 captures** the Environmental and Health and Safety Aspects.

4.2.1.3 Step 3: Determination of the Impacts of Identified Aspects

Each identified aspect will have a specific resulting interaction with the environment. For the purposes of this assessment, several Categories of Impacts have been defined at **Column C of Table 6**, namely: Air Pollution, Land Pollution, Water Pollution, Depletion of Natural Resources/ Materials, Nuisance, Loss of Amenity, Loss of Ecosystem/ Biodiversity Habitats, Human Health and Indirect Impacts. The appropriate sub columns were ticked in the intersecting row. Further, a brief summary was given of the identified impact at **Column D of Table 6**.

4.2.1.4 Step 4: Assess the Significance of Identified Aspects

For each aspect's impact, the significance of the impact was assessed and documented. In the framework utilized, significance was determined to be the product of severity of impact and probability of occurrence. With both aspects of the formula having specific criteria to select an appropriate rating based on specific criteria. **(See Table 5 below)** These aspects were considered under normal, abnormal and emergency conditions. Once a score is rewarded based on the set criteria for severity of impact and probability of occurrence for the impact under normal, abnormal and emergency conditions, the product of that score is recorded in the appropriate sub-column of **Column E**.

4.2.1.5 Step 5: Ranking of Impacts According to Significance

Lastly, once a score has been arrived at for probability of occurrence and Impact severity based on professional judgement, the **5 x 5 Scoring Matrix** is utilized to determine which aspects are of low, medium or high significance. The use of the Scoring matrix allows for the award of a maximum score of 25, where impacts with a score of between 1 -4 are deemed of LOW SIGNIFICANCE; those with a score of between 5 -10 are deemed of MEDIUM SIGNIFICANCE; and those with a score between 12 to 25 are deemed of HIGH SIGNIFICANCE. The resulting scores were then captured at **Column (E) of Table 6**.

⁴ Environmental aspects include consideration of each activity's interaction with air (e.g., controlled and uncontrolled emissions), water (e.g. controlled and uncontrolled discharges), waste (e.g. solid and other types), soils (e.g. land use or contamination), vegetation and resource depletion, aesthetics (noise, dust, vibration, aesthetic and visual aspects), indirect aspects (use of land, water resources and energy), cumulative impact aspects, beneficial aspects associated with the activities, and consideration of present and future conditions, and normal and abnormal conditions (e.g. weather, emergencies, etc.)

⁵ Health and Safety aspects would include for each activity, all health and safety hazards and risks to site personnel, visitors and the public/ community associated with the performance of the activity. A hazard is defined as something or a situation with the potential to cause injury or illness to people, damage to property, or disruption of productivity. Hazard Identification is the process of recognizing that a hazard exists and defining its characteristics.

<TABLE 5: SIGNIFICANCE FRAMEWORK>

[SIGNIFICANCE = SEVERITY OF IMPACT X PROBABILITY OF OCCURRENCE]

I SIGNIFICANCE FRAMEWORK: ASSESSMENT OF IMPACT SEVERITY

SCALE	1. NEGLIGIBLE/ MINOR	2. MODERATE/ SERIOUS	3. SERIOUS	4. MAJOR	5. CATASTROPHIC
ENVIRONMENTAL	<ul style="list-style-type: none"> Impact of insignificant scale No consequences to the environment Immediate recovery after termination of aspect No stakeholder interest, Insignificant resources required to correct impact 	<ul style="list-style-type: none"> Impact limited to a small area within the organization Minor impact on the environment Short time period is needed for recovery Low potential for complaints, Moderate resources required to correct impact. 	<ul style="list-style-type: none"> Impact that spreads across the whole organization Noticeable impact on the environment Long time period is needed for recovery and sanitation, Issue of concern to stakeholders, Major resources required to correct impact. 	<ul style="list-style-type: none"> Impact outside of the organization Serious impact on the environment, Recovery is possible only by enforcing appropriate actions (recultivation, remediation, and other type of sanitation) and will require a significant amount of time Issue of concern to stakeholders Major resources required to correct impact. 	<ul style="list-style-type: none"> Impact that affects the regional area Critical consequences to the environment Recovery isn't possible, issue of concern to stakeholders, Critical resources required to correct impact.
HEALTH AND SAFETY	<ul style="list-style-type: none"> Negligible potential to result in excursions from legal limits. First aid only required 	<ul style="list-style-type: none"> Temporary excursion outside of legislative limits. The injury will require treatment by a doctor 	<ul style="list-style-type: none"> Significant non-compliance with legislation. Injured person will result in loss of time off work 	<ul style="list-style-type: none"> Major non-compliance with legislation. May suffer a permanent disability. 	<ul style="list-style-type: none"> May be fatally injured

II. ASSESSMENT OF PROBABILITY OF OCCURRENCE

PROBABILITY	1. Improbable - Not happened before but theoretically possible	2. Low Probability Occurs rarely, once a year	3. Probable - Occurs more than once a year	4. Highly Probable - Occurs every month	5. Definite - Occurs every day or every time the activity is executed
-------------	--	---	--	---	---

This method results in the following scoring matrix

Probability	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5
		1	2	3	4	5
		Impact				

Key
Low Significance
Medium Significance
High Significance

This methodology gives a maximum score of 25 points. Significant aspects are defined as those where the impact has a score of 12 points or more.

4.3 Aspects and Impact Register for Vilvoorden Investment Incorporated – Rice Milling Complex

<Table 6: Health, Safety and Environmental Aspects and Impact Register for Vilvoorden Rice Investment Incorporated - Rice Milling Complex>

Table 6: Health, Safety and Environmental Aspects and Impact Register for Villavetan Rice Investment Incorporated - Rice Milling Complex														
(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	© Categories of Impacts								(D) Summary of Impacts	(E) Severity of Impact			
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
OPERATIONAL PHASE														
Operation of Rice Milling Complex														
Production of Cargo Rice														
Activity: Paddy Receipt, Grading and Weighting	Use of Fuel (Operation of Heavy-Duty Trucks)				X						Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Use of Energy (Operation of Equipment in Administrative Office, Weigh Bridge Scale)				X					X	Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Combustion Gases)	X					X		X		Air Pollution (PM, CO, CO2, NOx, SO2, VOC)	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X			X		Nuisance: Increase in Noise Levels onsite resulting from Heavy duty vehicle movements.	1	5	5
	Generation of Solid Waste		X				X				Challenges with the disposal of solid waste	1	5	5
	Health and Safety Risks								X		Vehicle movements and the potential for onsite accidents with staff and /or grain suppliers; Staff Exposure to Particulates; Staff Exposure to Noise Emissions Staff Exposure to Gaseous Pollutants (Combustion Gases)	3	5	15
Activity: Offloading of Wet Paddy into Intake Hopper and Grain Elevation	Use of Fuel (Operation of Truck)				X						Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Use of Energy (Operation of Mechanical Reception Hopper and Grain Elevation Mechanism)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	2	5	10

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Emissions to Air (Combustion Gases)	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	2	5	10
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Potential for Unintended Release of Hydraulic Fluids in cases of malfunction as heavy-duty truck unloads paddy		X								Potential for the Pollution of Soil and Surface Water	2	2	4
	Health and Safety Risks								X		Unloading Hazards; Staff Exposure to Noise Emissions; Exposure to Dust/ Particulates; Staff Exposure to Combustion Gases	3	5	15
Activity: Primary Cleaning of Wet Paddy in Pre-Cleaner and Transfer of Cleaned Paddy to Temporary Wet Storage Bin	Use of Energy (Operation of Paddy Pre-Cleaner)				X					X	Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance and paddy cleaning equipment	2	5	10

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Generation of Solid Waste										Pollution of Land, Challenges with the disposal of impurities removed from the grain.	1	5	5
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions Potential for Grain Dust Explosion	3	5	15
Activity: Transfer of Wet Cleaner Grain from Temporary Holding Silo to Continuous Flow Tower Dryer for drying with clean heated air supplied by Biomass Furnace.	Use of Energy (Operation of Grain Conveyance and Elevation Systems; Aeration Fans)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Health and Safety Risks								X		Staff Exposure to Noise/ Vibration Emissions Staff Exposure to Particulates	3	5	15
Activity: Primary Drying of Paddy in Continuous Flow Tower Dryer	Use of Energy (Operation of Continuous Flow Tower Dryer and Biomass Furnace)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emission to Air (Combustion Gases)	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	© Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Emissions to Air (Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Increase in Noise Levels onsite resulting from the operation of Continuous Flow Tower Dryer.	2	5	10
	Emissions of Heat Energy						X				Changes to local ambient air temperatures	2	5	10
	Generation of Solid Waste (Impurities)	X	X								Challenges with the disposal of impurities removed from the grain.	2	5	10
	Health and Safety Risks								X		Staff Exposure to Heat; Potential for Grain Dust Explosions; Risk of Fire	2	5	10
Activity: Transfer of Partially Dried Grain from Continuous Flow Tower Dryer to Tempering Bin	Use of Energy (Operation of Grain Conveyance and Elevation Systems; Aeration Fans)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Health and Safety Risks								X		Staff Exposure to Noise/ Vibration Emissions Staff Exposure to Particulates	2	5	10
Activity: Transfer of Unprocessed Tempered Paddy from Tempering Bin to Continuous Flow Tower Dryer for Secondary Drying;	Use of Energy (Operation of Grain Conveyance and Elevation Systems; Aeration Fans)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	1	5	5
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions	2	5	10
Activity: Secondary Drying of Paddy in Continuous Flow Tower Dryer	Use of Energy (Operation of Continuous Flow Tower Dryer and Biomass Furnace)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emission to Air (Combustion Gases)	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	1	5	5
	Emissions to Air (Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Emissions of Heat Energy	X					X				Changes to local ambient air temperatures	2	5	10

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment and Tower Dryer	2	5	10
	Generation of Solid Waste (Impurities)	X	X			X	X		X		Challenges with the disposal of impurities removed from the grain.	2	5	10
	Health and Safety Risks								X		Staff Exposure to Heat; Potential for Exposure to Particulates; Staff Exposure to Noise Emissions; Potential for Grain Dust Explosions; Risk of Fire	3	5	15
Activity: Transfer of Dried Paddy to High- Capacity Storage Silo	Use of Energy (Operation of Grain Unloading and Conveyance and Elevation Systems; Aeration Fans)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions	2	5	10

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
Activity: Holding of Grain in High- Capacity Storage Silo	Use of Energy (Operation of Grain Stirring Mechanism, Operation of Aeration Fans)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Health and Safety Risks								X		Potential for Electric Shock; Staff Exposure to Noise/ Vibration Emissions	2	5	10
Activity: Transfer of Dried Grain to Paddy Cleaner	Use of Energy (Operation of Grain Unloading and Conveyance and Elevation Systems)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions	2	5	10
Activity: Cleaned Grain Subjected to Secondary Drying Process	Use of Energy (Operation of Paddy Pre-Cleaner)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Noise and Vibration Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Generation of Solid Waste (Impurities)	X	X			X	X				Challenges with the disposal of impurities removed from the grain.	2	5	10
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions	3	5	15
Activity: Transfer of Grain from Paddy Cleaner to Buffer/ Mill Bin	Use of Energy (Operation of Grain Unloading and Conveyance and Elevation Systems)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions	2	5	10
Activity: Transfer of Paddy from Paddy Cleaner to	Use of Energy (Operation of Grain Unloading and Conveyance and Elevation Systems)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
Dehusker/ Sheller for Hull/ Shell Removal	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions	2	5	10
Activity: Dehusking/ Shelling of Paddy	Use of Energy (Operation of Paddy Sheller/ Dehusker, Operation of Dust Collection System)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	2	5	10
	Noise Emissions					X	X		X		Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Generation of Solid Waste (Removed Husk/ Shell)	X	X			X	X		X		Challenges with the disposal of paddy husk removed from the grain.	3	5	15
	Health and Safety Risks								X		Staff and Community Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions	4	5	20

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
Activity: Transfer of Cargo Rice and Unhusked Paddy to Table Separator	Use of Energy (Operation of Grain Conveyance Systems)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	2	5	10
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Generation of Solid Waste (Impurities)	X	X			X	X		X		Challenges with the disposal of impurities removed from the grain.	2	5	10
	Health and Safety Risks								X		Staff and Community Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions	3	5	15
Activity: Separation of Unhusked/ Husked Grain	Use of Energy (Operation of Separator, Grain Conveyance System, Dust Collection System)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	2	5	10
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	© Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Generation of Solid Waste	X	X			X	X		X		Challenges with the disposal of impurities and paddy husk removed from the grain.	3	5	15
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions	3	5	15
Activity: Transfer of Cargo Rice from Separator to Grader for sorting and Temporary Holding of Cargo Rice in Bulk Dispenser Bins	Use of Energy (Operation of Grain Conveyance Systems)				X					X	Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Noise/Vibration Emissions	2	5	10
Activity: Grading of Grain Received from the Separator and	Use of Energy (Operation of Grader and Grain Conveyance System)				X					X	Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
Deposition into Bulk Storage Bin	Noise Emissions					X					Nuisance: Increase in Noise Levels onsite resulting from the operation of grading and grain conveyance equipment	2	5	10
	Emissions to Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Noise/ Vibration Emissions	2	5	10
Activity: Dispensing of Cargo Rice from Bulk Storage Bin into One (1) Metric Tonne Bags for International Shipment	Use of Fuel (Operation of Fork Lift)				X						Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Combustion Gases)	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of Fork Lift	2	5	10

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Health and Safety Risks								X		Staff Exposure to Noise Emissions Staff Exposure to Combustion Gas Emissions Ergonomic injury Loading/ Unloading Hazards Potential for Accidental Collision with Staff operating dispensing mechanism on Holding Bin Potential for Crush Injuries	3	5	15
Activity: Transfer of Bagged Bulk Cargo Rice to Designated Storage Areas within Storage Bonds Onsite	Use of Fuel (Operation of Fork Lift)				X						Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Combustion Gases)	X							X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	1	5	5
	Health and Safety Risks								X		Staff Exposure to Noise Emissions; Staff Exposure to Combustion Gas Emissions; Loading/ Unloading Hazards; Potential for Accidental Collision with Staff in vicinity	3	5	15

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
Activity: Transfer of Metric Ton Sacks from Storage Area to Vessel at Wharf aback Facility	Use of Fuel (Operation of Fork Lift)				X						Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air (Combustion Gases)	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of fork lift	1	5	5
	Health and Safety Risks								X		Staff Exposure to Noise Emissions; Staff Exposure to Combustion Gas Emissions; Loading/ Unloading Hazards; Potential for Accidental Collision with Staff in vicinity; Working Near Water – Drowning	3	5	15
Supporting Facilities														
Activity: Operation of Administrative Facilities Onsite	Use of Energy				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Use of Water Resources				X						Use of Limited Freshwater Resources	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of air conditioning units, equipment in onsite laboratory	1	5	5
	Generation of Liquid Waste										Disposal of Liquid Waste	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Generation of Solid Waste										Disposal of Solid Waste	1	5	5
	Generation of Hazardous Waste										Disposal of Hazardous Waste; Health Effects from Exposure;	1	5	5
	Health and Safety Risks								X		Risk of Fire	3	5	15
Activity: Onsite Storage of Fuel (Diesel) In Aboveground Fuel Storage Tank	Emissions to the Air: Volatile Organic Compounds (Fuel Vapours)	X					X		X		Air Pollution (VOC)	1	5	5
	Discharges to Surface Water (Storm water accumulated within the Secondary Containment/ Discharges from Oil Water Separator)			X							Potential for the Contamination of Surface Water	1	5	5
	Potential for Unintended Releases of Fuel to the Ground during storage tank loading procedures and dispensing into vehicles		X	X							Potential for Contamination of Land/ Soil	1	5	5
	Health and Safety Risk								X		Risk of Fire and Explosion; Exposure to Fuel Vapours	2	5	10
Activity: Operation of Onsite Power Generation Systems	Use of Fuel				X						Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Emissions to the Air: Combustion Gases	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	2	5	10
	Emissions to the Air: Volatile Organic Compounds (Fuel Vapours)	X					X		X		Air Pollution (VOCs)	3	5	15
	Emissions to Air: Heat	X				X					Changes to Local – Air Temperature	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Noise and Vibration Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of power generation equipment	3	5	15
	Health and Safety Risks								X		Potential for Electric Shock Risk of Fire and Explosion Staff Exposure to Heat Staff Exposure to Noise Emissions	3	5	15
Activity: Operation of Air Compression Systems	Use of Energy (Operation of Air Compression and Air-Drying Systems)				X					X	Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Noise and Vibration Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of Air Compressor and Air-Drying System	2	5	10
	Health and Safety Risks								X		Potential for Electric Shock; Bodily Harm; Tissue Injury; Potential for Internal Injury; Fire Hazard; Staff Exposure to Noise Emissions; Potential Risk of Explosion	3	5	15
Activity: Operation of Biomass Furnace	Use of Fuel (Biomass – Rice Husk)				X						Utilization of Rice Husk Ash as an Energy Source			
	Use of Fuel (Transfer of Paddy Husk from Open Storage Area to Loading Point)				X						Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Use of Energy (Operation of Husk Conveyance Components)				X					X	Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air – Heat	X				X					Changes to Local – Air Temperature	2	5	10
	Emissions to Air – Particulates (Ash)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	10
	Emissions to Air -Combustion Gases	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	1	5	5
	Noise Emissions (Paddy Husk Conveyance Mechanisms)					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of equipment associated with the biomass furnace.	1	5	5
	Generation of Solid Waste – Rice Husk Ash		X								Challenges with the Disposal of Rice Husk Ash	3	5	15
	Health and Safety Risks								X		Staff Exposure to Heat Staff Exposure to Noise Emissions Staff Exposure to Particulates	3	5	15
Activity: Operation of Rice Husk Ash Transfer System	Use of Energy (Operation of Aeration System and Suction Pump)				X					X	Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Use of Water Resources				X						Use of Limited Water Resources	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of Aeration System and Suction System.	2	5	10
	Generation of Liquid Waste (Fluidized Rice Husk Ash)		X				X				Disposal of Fluidized Rice Husk Ash to Open Storage Area; Leaching of Nutrients through the Soil of Open Storage Area	3	5	15
	Health and Safety Risks								X		Staff Exposure to Noise Emissions	3	5	15
Activity: Open Storage of Paddy Husk and Paddy Husk Ash	Emissions to Air – Dust/ Particulates	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	4	5	20
	Health and Safety Risks								X		Risk of Fire; Staff Exposure to Particulates; Community Exposure to Particulates	2	5	10
Activity: Leveling of Paddy Husk and Paddy Hush Ash Heap in Open Storage Area	Use of Fuel (Operation of Front-End Loader)				X						Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air – Combustion Gases	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	1	5	5
	Emissions to Air – Particulates	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	3	5	15
	Noise Emissions					X	X		X		Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Health and Safety Risks								X		Risk of Fire; Staff Exposure to Particulates; Community Exposure to Particulates	3	5	15
Activity: Use of Effluent Treatment System: Septic Tank	Use of Water Resources				X						Utilization of Freshwater Resources	1	5	5
	Emissions to Air – Odours					X					Changes to Local Air Quality – Short Term	1	5	5
	Generation of Liquid Waste (Sludge)			X							Disposal of Treated Untreated Waste	2	5	10
	Discharge to Surface Water			X							Changes to Local Water Quality	1	5	5
MAINTENANCE PHASE														
Services: Maintenance of All Grain Handling, Storage and Processing Equipment.	Use of Energy (Operation of Hand Tools)				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Use of Fuel (Operation of Mobile Equipment)				X						Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Use of Water Resources										Use of Limited Fresh Water Supplies	1	5	5
	Noise and Vibrations					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Emissions to the Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	2	5	10
	Emissions to Air (Combustion Gases)	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	2	5	10

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Generation of Solid Waste: Obsolete Spare Parts etc.		X				X				Challenges with the Disposal of Metal Wastes generated	2	5	10
	Health and Safety Risks								X		Staff Exposure to Noise and Vibration Emissions Fire and Explosion Risk as a result of hot work or welding operations; Potential for Electric Shock; Potential for Fall from Height of Ladders, Stairs, Scaffolding etc. Risks associated with entry into and work within confined spaces Potential accidental machinery related injuries	4	5	20
Services: Maintenance of Mobile Heavy-Duty Equipment (e.g., Power Generation System)	Use of Energy				X					X	Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Use of Water Resources				X						Use of Limited Water Resources	1	5	5
	Emissions to Air (Dust)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Emissions to Air (Combustion Gases)	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	1	5	5
	Emissions to Air (Fuel Fumes)	X					X		X		Air Pollution (VOCs) – Changes to Local Air Quality	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Noise and Vibration Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	1	5	5
	Generation of Liquid Waste		X	X			X				Challenges with the treatment and disposal of liquid waste	1	5	5
	Generation of Solid Waste		X				X				Challenges with the treatment and disposal of solid waste materials	1	5	5
	Generation of Hazardous Waste		X				X				Challenges with the treatment and disposal of Hazardous waste materials	1	5	5
	Potential for unintentional releases of fuel, oil onto the ground		X								Potential for Contamination of Land/ Soil	1	5	5
	Health and Safety Risks								X		Staff Exposure to Particulates Staff Exposure to Chemicals in Fuels, Oils etc.	2	5	10
Services: Maintenance of Fuel Storage Systems (Including connections and pipeline)	Use of Energy				X					X	Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	1	5	5
	Emissions to Air (VOCs)	X					X		X		Air Pollution (PM, CO, CO ₂ , NOx, SO ₂ , VOC)	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Generation of Solid Waste		X								Challenges with the disposal of Solid Waste Materials generated	1	5	5
	Generation of Hazardous Waste		X								Challenges with the disposal of hazardous Waste materials generated.	1	5	5
	Health and Safety Risks								X		Staff Exposure to Noise Risk of Fire/ Explosion Staff Exposure to Chemical Agents (VOC)	3	5	15
Services: Maintenance of Heated Air Generation System (Biomass Furnace)	Use of Water Resources				X						Use of Limited Freshwater Supplies	1	5	5
	Use of Energy				X					X	Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Use of Fuel (Acetylene Gas)				X						Depletion of Non-Renewable Resources – Fossil Fuels	1	5	5
	Emissions to Air – Dust/ Particulates	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Emissions to Air – Combustion Gases	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	1	5	5
	Generation of Solid Waste: Paddy Husk Ash		X								Challenges with the disposal of paddy husk ash	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Generation of Liquid Waste			X							Challenges with the disposal of liquid wastes generated	1	5	5
	Discharges to Land/ Surface Water		X	X							Changes to Local Surface Water Quality	2	5	10
	Health and Safety Risks								X		Exposure to Noise/ Vibrations Exposure to Particulates	2	5	10
Services: Maintenance of Air Compression and Air-Drying System	Use of Energy				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Use of Water				X						Use of Freshwater Resources	1	5	5
	Emissions to Air – Dust / Particulates	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	1	5	5
	Generation of Liquid Waste – Rinse Water			X							Challenges with the disposal of liquid waste	1	5	5
	Generation of Solid Waste (Filters, Old Belts, Old Hoses)		X								Challenges with the disposal of solid waste materials generated	1	5	5
	Generation of Hazardous Waste (Spent Lubricating Oil)		X								Challenges with the disposal of hazardous waste materials	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	© Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Health and Safety Risks								X		Electrical dangers; Fumes Flying Particles, High Pressures and High Noise Levels	3	5	15
Services: Maintenance of Paddy Hush Ash Transfer System	Use of Energy				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Use of Water Resources				X						Depletion of Freshwater Resources	1	5	5
	Emissions to Air – Dust/ Particulate	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	1	5	5
	Generation of Liquid Waste		X	X			X				Challenges with the disposal of liquid waste materials	1	5	5
	Generation of Solid Wastes		X				X				Challenges with the disposal of solid waste materials	1	5	5
	Health and Safety Risks								X		Exposure to Noise Emissions; Fall Injuries in Depression in Ground	2	5	10
Service: Maintenance of Waste Water Treatment System (e.g., Septic Tanks)	Use of Fuel				X						Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Use of Water Resources				X						Use of limited Freshwater Resources	1	5	5
	Emissions to the Air – Odours	X					X				Changes to Local Air Quality	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	(C) Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Noise Emissions					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	1	5	5
	Generation of Liquid Waste			X							Challenges with the disposal of liquid waste	1	5	5
	Health and Safety Risks								X		Potential exposure to airborne biological agents Potential for skin contact with sewage sludge	2	5	10
Services: General Cleanup of Rice Milling Complex Environs	Use of Fuel (Operation of Mobile Equipment)				X						Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Use of Energy				X					X	Depletion of Non- Renewable Resources – Fossil Fuels	1	5	5
	Use of Water Resources				X						Use of Limited Freshwater Resources	1	5	5
	Noise and Vibrations					X	X		X		Nuisance: Increase in Noise Levels onsite resulting from the operation of grain conveyance equipment	2	5	10
	Emissions to the Air (Dust/ Particulates)	X					X		X		Changes to Local Air Quality (Increases in the levels of particulates)	1	5	5
	Emissions to Air (Combustion Gases)	X					X		X		Air Pollution (PM, CO, CO ₂ , NO _x , SO ₂ , VOC)	1	5	5

(A) Activity, Products Or Services	(B) Environmental and Health and Safety Aspects	© Categories of Impacts									(D) Summary of Impacts	(E) Severity of Impact		
		Air Pollution	Land Pollution	Water Pollution	Depletion of Natural Resources/ Materials	Nuisance	Loss of Amenity	Loss of Ecosystem/ Biodiversity Habitat	Human Health	Indirect Impacts		Normal		
												Severity (of Impact)	Probability	Significance (Severity X Probability)
	Generation of Liquid Waste		X	X			X				Challenges with the treatment and disposal of liquid waste	2	5	10
	Generation of Solid Waste		X				X				Challenges with the treatment and disposal of solid waste materials	2	5	10
	Generation of Hazardous Waste		X				X				Challenges with the treatment and disposal of Hazardous waste materials	2	5	10
	Health and Safety Risks								X		Staff Exposure to Noise and Vibration Emissions; Potential for Electric Shock; Potential for Fall from Height of Ladders, Stairs, Scaffolding etc. Risks associated with entry into and work within confined spaces (Pits, Bins, Solos etc.); Potential accidental machinery related injuries	3	5	15

4.4 Potential Significant Environmental Impacts

This section of the EMP identifies as well as provides a brief analysis of the potential significant environmental impacts as identified in the above matrix as originating from activities carried out by Vilvoorden Investment Incorporated - Rice Milling Complex during the operational and maintenance phases.

4.4.1 Environmental Impacts

Given the nature of the range of activities that are to be performed at the Vilvoorden Investment Incorporated - Rice Milling Complex in the production of processed rice products for export, the following significant environmental impacts are likely to arise during the lifecycle (i.e., from Operation and Maintenance phases) of the Project: (a) Emissions to the Air; (b) Noise and Vibration Impacts; (c) Releases/ Discharges to Land/ Soil, (d) Waste Management Impacts arising from the generation and disposal of Solid, Liquid and Hazardous Wastes; (e) and other environmental conditions or system impacts such as Occupational health and safety risks, Energy Consumption and Water Resource Consumption.

The sub-sections which follow will provide additional detail on each of the aforementioned categories of identified significant environmental impacts.

4.4.1.1 Air Emission Impacts

The Rice Milling Complex operated by Vilvoorden Investment Incorporated at Plantation Vilvoorden on the Essequibo Coast is strategically located on land situated in a rural agricultural area within the heart of a major rice production Region 2: Pomeroon - Supernaam. A number of residential dwellings are located some distance away from the Western Boundary of Rice Milling Complex along the main road corridor. The closest residential dwelling proximal to the western boundary of the Rice Milling Complex is approximately (171.50) metres away from the boundary of the rice milling complex. All of the other dwellings are located at distances greater than the lone dwelling identified above.

Based on the assessment of the activities to be performed at the Rice Milling Complex, it has been determined that there would be emissions to the air in the form of dust or particulate matter and gaseous pollutants. These emissions (if unabated/ unmitigated) have the potential to affect negatively the quality of air in the operational areas of the facility as well as areas downwind and proximal to the rice milling complex. The subsections which follow will provide additional information.

4.4.1.1.1 Dust (Particulate Matter)

Emissions to the Air in the form of particulate matter is likely to originate from a number of point and non-point (diffuse) sources around the complex during normal operations. During the operational and maintenance phases, dust emissions are likely to come from several identifiable sources. (See Table 7 below)

<Table 7: Emissions to Air – Dust/ Particulate Matter>

Phase	Emission Source
Operational Phase	Movement of Heavy-Duty Vehicles/ Equipment over Unpaved / Paved Traversable Surfaces

Phase	Emission Source
	Covered Grain Intake Area
	Paddy Husk Intake Area for Biomass Furnace
	All Grain Handling Systems (Screw Conveyors, Chain Conveyance Systems, Enclosed Grain Elevators)
	All Paddy Cleaning Systems (Pre-Cleaning and Fine Cleaning Systems)
	All Dust Collection/ Capture Systems (Vortex Collection Systems atop Continuous Flow Tower Dryers, After Filter Dust Collection System and Cyclone Dust Collectors)
	All Grain Storage Silos (Wet Storage Bins, Tempering Bins, High-Capacity Storage Bin)
	Grain Conditioning Equipment (Continuous Flow Tower Dryers for Primary and Secondary Drying)
	Biomass Furnace Exhaust System
	Grain Processing Equipment (Paddy Shellers/ Dehuskers, Table Separators and Grading System)
	Rice Husk and Rice Husk Ash Discharge Pipe leading to the Open Storage Area
	Open Holding Area with Rice Husk and Rice Husk Ash Heaps
Maintenance Phase	Cleaning of Unpaved/ Paved Surfaces
	All Grain Handling Systems (Screw Conveyors, Chain Conveyance Systems, Enclosed Grain Elevators)
	All Paddy Cleaning Systems (Pre-Cleaning and Fine Cleaning Systems)
	All Dust Collection/ Capture Systems (Vortex Collection Systems atop Continuous Flow Tower Dryers, After Filter Dust Collection System and Cyclone Dust Collectors)
	All Grain Storage Silos (Wet Storage Bins, Tempering Bins, High-Capacity Storage Bin)
	Grain Conditioning Equipment (Continuous Flow Tower Dryers for Primary and Secondary Drying)
	Biomass Furnace
	Grain Processing Equipment (Paddy Shellers/ Dehuskers, Table Separators and Grading System)
	Rice Husk and Rice Husk Ash Discharge Pipe leading to the Open Storage Area
	Lowering of Rice Husk and Rice Husk Ash Heaps in Open Holding Area

<Analysis>

Operational Phase

- This modern state of the art rice milling facility installed by Vilvoorden Investment Incorporated has been engineered with the best available industrial grain handling, processing and storage technology to improve grain handling, processing and storage capabilities while substantially reducing the likelihood of fugitive dust emissions to the air;
- Several dust capture technologies have been installed to significantly limit emissions from major dust emission points around the rice milling complex. These include the following:
 - Four (4) After Filter Dust Collectors associated with the four (4) Paddy Pre-Cleaner systems;
 - Six (6) Vortex Collection systems associated with the two (2) Continuous Flow Tower Dryers operated onsite;
 - Two (2) cyclone dust collector systems associated with the fine cleaning system within the Milling Section.
- Several process modifications have been made to specific sections of the rice milling complex to significantly minimize the likelihood of dust emissions. These include the following:
 - Full Coverage of the Entire Rice Milling Facility Components: Intake Areas, Grain Cleaning Areas, Grain Drying Areas, Wet Storage Bins, Tempering Bins. Continuous Flow Tower Dryers, Biomass Furnaces
 - Receiving Pit Engineered with Covering Grates and Short Free Fall Distance;

- Installation and Operation of Fully Enclosed Grain Elevation and Conveyance Systems;
- Installation and Operation of Dust Tight Grain Cleaning and Processing Equipment;
- Installation and Operation of Grain Drying Systems with Dust Capture/ Collection Technology;
- Flanged Inlets and Outlets on all Spouting Transitions and Hoppers;
- In light of the abovementioned dust collection systems installed and the process modifications made to the facilities of Vilvoorden Investment Incorporated at its Rice Milling Complex dust emissions to the air from the process areas is likely to be minor, localized and reversible.
- However, given the current challenge experienced with the management of rice husk and rice husk ash in the open holding area during dry periods and periods when there are prevailing windy conditions, it is likely that particulates suspended and transported in the air would affect persons occupying residential dwellings along the main roadway. Managing the rice husk and rice husk ash heaps within the open storage area is likely to substantially reduce the likelihood of negative impact to air quality of the neighboring communities.

Maintenance Phase

- Maintenance to the different parts of the rice milling complex is performed during the out of crop period. The General Maintenance activities that are likely to result in emissions of dust to the air include:
 - a) Servicing of grain elevators including checking elevator buckets and motors;
 - b) cleaning of grain conveyance systems, storage systems and processing systems;
 - c) cleaning of dust capture systems and;
 - d) general cleaning of the compound and surrounding areas, inclusive of managing shell and paddy husk ash heaps.
- Given the nature of the above activities performed, emissions to the air are likely. For activities (a) -(c) impacts to the air are likely to be short term, localized and reversible. It is anticipated that the quality of respirable air in the environs of the equipment that is being maintained may be reduced for a short period of time necessitating the use of personal protective equipment by staff.
- For activity (d) impacts are likely to be short term, impact areas outside of the organization, requiring major resources to correct same. Once the heaps are leveled and wet suppression methods utilized during this process and afterwards, impacts can be significantly reduced to the point where it no longer creates a nuisance for residents on the periphery of the rice milling complex.

4.4.1.1.2 Gaseous Pollutants

Emissions to the Air in the form of Gaseous Pollutants is likely to originate from a number of stationary and mobile sources around the complex during normal operations. During the operational and maintenance phases, Gaseous Pollutants are likely to come from several identifiable sources. (See Table 8 below)

<Table 8: Emissions to Air - Gaseous Pollutants>

Phase	Emission Source
Operational Phase	Exhaust from Heavy-Duty Vehicles Operational in the Confines of the Rice Milling Complex
	Exhaust from Onsite Heavy-Duty Vehicles/Equipment Operated onsite
	Exhaust from Biomass Furnaces used to supply Heat to Continuous Flow Tower Dryer
	Exhaust from Power Generation Systems

Phase	Emission Source
Maintenance Phase	Venting from Aboveground Fuel Storage Tanks
	Venting from Septic Tank Systems
	Equipment used to Perform maintenance activities
	Exhaust Fumes from Arc Welding Systems
Maintenance Phase	Exhaust from Onsite Heavy-Duty Vehicles/Equipment Operated onsite
	Spontaneous Combustion and/ or Controlled Burning of Biomass in Open Paddy and Paddy Husk Ash Holding Area

<Analysis>

Operational Phase

- Several pieces of stationary and mobile sources of emission are owned and operated/ utilized by Vilvoorden Investment Incorporated. The operations and utilization of these pieces of equipment/ structures result in the emission of gaseous pollutants in the form of combustion gases and vapour releases.
- Combustion gas emissions are likely to originate from the following sources:
 - Heavy duty vehicles owned and operated by Grain Suppliers coming into the rice milling complex to offload paddy;
 - Heavy duty vehicles and equipment owned and operated by the company within the confines of the rice milling complex;
 - Biomass Furnaces used to generate clean heated air to the Continuous flow tower dryers operated;
 - Power Generation Systems used to generate power for all process and non-process equipment used at the rice milling complex.
 - Spontaneous combustion of rice husk heaps in the open storage area during extremely dry and hot periods;
- Vapour releases are likely to originate from the following sources:
 - Venting from Aboveground Fuel Storage Tanks used for the storage of bulk fuel for use in the generation of electricity to power process and non-process equipment at the Rice Milling Complex;
 - Venting from Septic Tank Systems utilized onsite for the collection and biological treatment of human excreta and urine.
- Several emission control systems to limit pollutant releases are utilized on site to address significant emissions from the power generation systems operated.
- Given the fact that for the significant sources of emission there are embedded controls to limit pollutant concentrations impacts are expected to be localized, short term and reversible.

Maintenance Phase

- During the maintenance phase, several pieces of heavy-duty hoisting equipment, welding sets, pressure washing systems, motor blowers et cetera are operated to aid in the performance of maintenance activities to the various components of the rice mill. In the process of operating these pieces of equipment, combustion gases are generated.
- Given the fact that for the significant sources of emission there are embedded controls to limit pollutant concentrations impacts are expected to be localized, short term and reversible.
- In cases where there is controlled burning/ or spontaneous combustion of biomass held within the open storage area during extremely dry periods, smoke generated depending on the prevailing wind direction is likely to negatively affect residents that are downwind of this area.

4.4.1.2 Noise and Vibration Impacts

Noise and vibration Impacts are likely to originate from a number of Stationary and Mobile sources around the complex during normal operations. During the operational and maintenance phases, emissions are likely to come from several identifiable sources. (See Table 9 below)

<Table 9: Noise and Vibration Emissions>

Phase	Emission Source
Operational Phase	All Heavy-Duty Vehicles/ Equipment operated onsite
	All Grain Handling Systems (Screw Conveyors, Chain Conveyance Systems, Enclosed Grain Elevators)
	All Paddy Cleaning Systems (Pre-Cleaning and Fine Cleaning Systems)
	All Dust Collection/ Capture Systems (Vortex Collection Systems atop Continuous Flow Tower Dryers, After Filter Dust Collection System and Cyclone Dust Collectors)
	Grain Moving and Aeration Systems on All Grain Storage Silos (Wet Storage Bins, Tempering Bins, High-Capacity Storage Bin)
	Biomass Handling Systems
	Biomass Furnace (Biomass Feeding Mechanisms)
	Rice Husk Ash Transfer System (Aeration System and Suction Pump)
	Grain Conditioning Equipment (Continuous Flow Tower Dryers for Primary and Secondary Drying)
	Grain Processing Equipment (Paddy Shellers/ Dehuskers, Table Separators and Grading System)
	Power Generation Systems
	Air Compression System
Maintenance Phase	Equipment used in the Performance of Maintenance Activities onsite
	Handheld Tools used in the performance of Maintenance Tasks
	All Heavy-Duty Vehicles/ Equipment owned and operated onsite
	Contracted Suction Truck used to Empty Septic Tanks

<Analysis>

- Noise emissions are likely from the following identified sources: (a) Heavy duty trucks transporting unprocessed paddy to and bagged cleaned dried paddy and cargo rice from the rice milling complex; (b) mobile material handling and lifting equipment - forklifts; (c) rice handling ,processing and storage systems - (i) elevation and conveying equipment, (ii) paddy cleaners, (iii) Continuous flow tower dryers and associated equipment; (iv) unprocessed and processed grain storage bins ;(v) biomass furnace and associated equipment; (vi) fluidized ash transfer system and associated equipment; (vii) rice milling equipment - paddy shellers, table separators; (viii) bulk grain unloading and discharging systems; (d) an air compression system and (e) power generation systems;
- The various classes of vehicles, heavy duty equipment and the power generation systems which are likely to be operated onsite are equipped with their own noise emission control technology which will limit noise emissions considerably;
- In addition, to procuring and installing equipment with low noise and vibration emission ratings, all process and non-process equipment have either been (a) positioned in such a manner as to limit or attenuate the noise emitted therefrom or (b) situated within the confines of the main structure of the facility which significantly attenuates noise emissions;
- In light of the above facility features and equipment specifications, and the total distance of the rice mill complex from the nearest sensitive receptor noise emission levels are expected to be localized and minor. The neighbouring residences are unlikely to be adversely/ negatively affected by the goings on in the compound of the rice milling complex.

- However, staff working in close proximity to rice processing and conveyance equipment are likely to be exposed to noise emissions during the working day and as such hearing protection will have to be provided

4.4.1.3 Releases to Land/ Soil

Several potential impacts to land have been identified in **Table X below** as resulting from activities that will be performed within the confines of the Vilvoorden Investment Incorporated - Rice Milling Complex.

Table 10: Releases to Land/ Soil

Phase	Specific Releases
Operational Phase	Fuel Spill/ Leakage from Aboveground Fuel Storage Tanks, associated pipework and dispensing mechanisms
	Leakage of Lubricating Oils from Drums
	Leakage of Hydraulic Oil from Heavy Duty Trucks
	Releases of Fluidized Rice Husk Ash onto the Open Storage Area for Rice Husk and Rice Husk Ash
Maintenance Phase	Leakage of Fuel, Coolants, Lubricating Oils from Power Generation Systems undergoing maintenance.

<Analysis>

- Several potential releases to land have been identified in **Table 10 Above**.
- With regards to Petroleum, approximately 11,000 gallons of diesel is currently stored onsite in aboveground fuel storage tanks for utilization in heavy duty vehicles and in the power generation systems which currently supply all the electricity needed for the functioning of the rice handling and processing elements of the Vilvoorden Investment Incorporated - Rice Milling Complex. Diesel will out of necessity have to be regularly transported by registered fuel suppliers to the project site in bulk transport trucks and offloaded into the company's aboveground fuel storage tanks. Further, there is potential for leakage of fuel onto the ground in dispensing areas while performing vehicle fuel tank filling procedures.
- Several circumstances make it highly unlikely that significant quantities of the fuel would contaminate soil/ land:
 - Strict adherence to and utilization of procedures by registered fuel suppliers to prevent the spillage of fuel during above ground fuel storage tank replenishments;
 - Presence of two (2) concreted secondary containment structures around the two (2) aboveground fuel storage tanks with stop off valves for the isolation of fuel spills;
 - Concreted surfaces in the vicinity of the two (2) aboveground fuel storage tanks;
 - Use of spill containment materials.
 - In light of the above realities, there is limited potential for the leakage of small quantities of fuel onto the concreted ground.
- With regards to Petroleum Products such as Lubricants, Hydraulic Fluids, there are Three (3) potential release possibilities: (1) Trucks transporting potential unprocessed paddy to the rice milling complex may develop a range of mechanical problems that may potentially result in the leakage of hydraulic oil or lubricating oil on the ground causing contamination of soil; (2) Releases of spent lubricating oil during routine maintenance of Company owned Vehicles and Heavy-Duty Equipment. (3) Unintended releases of lubricating oil from 45 Gallon drums in the storage area.
- Several circumstances make it highly unlikely that significant quantities of lubricant would contaminate soil/ land:
 - Concreted surfaces in the vicinity of the two (2) aboveground fuel storage tanks;

- Use of Drip Trays beneath Equipment;
- Use of spill containment materials to contain, recover and clean up releases
- In light of the above realities, there is limited potential for the leakage of small quantities of fuel onto the concreted ground.
- With regards to Fluidized Rice Husk Ash that is directly discharged in the Open storage area, this material is non-toxic and biodegradable. However, when the Rice Husk Ash dries after the liquid is absorbed into the ground or dried in open air, there is potential for the upwelling of particulates into the air.

4.4.1.4 Waste Management Impacts

With specific reference to the rice milling complex, it is anticipated that wastes of different categories will be generated during the operational and maintenance phases of this project. **Table 11 below** identifies the categories of waste and the specific types of wastes generated.

<Table 11: Categories of Waste Materials Generated>

#	Waste Category	Waste Types
1	Solid Waste	General and Domestic Trash (Wood, Paper, Cardboard, Glass, Aluminum Cans, Plastic, Scrap Metal, Empty Aerosol Cans, Tree Trimmings and Vegetative Residues)
		Rice Processing Wastes: Rice Husk and Straw
		Burnt Rice Husk Ash
		Obsolete Mechanical Parts from Vehicles
		Obsolete Parts from Grain Handling and Processing Equipment
		Old Tires from Various Classes of Vehicles and Heavy-Duty Equipment
2	Liquid Waste	Human wastes: Excreta and Urine
		Grey Water from Washroom and Other Areas
3	Hazardous Waste	Liquids
		Spent Lubricating Oil
		Spent Transmission Fluid
		Spent Hydraulic Fluid
		Solids
		Steel/ Plastic Drums/ Pales with Lubricating Oil, Transmission Fluid, Hydraulic Fluid and Coolant Residues
		Oil Filters
		Grease Tubes
		Special Wastes
		Fluorescent Light Bulbs and Ballasts
		Old Batteries (Lead Acid)
		Electronic Waste Materials

<Analysis>

- Three (3) categories of waste are generated by Vilvoorden Investment Incorporated - Rice Milling Complex. These include: a) Solid Waste; b) Liquid Waste; and c) Hazardous Waste.

<Solid Waste>

- Given that bulk cargo/ brown rice is produced at the VII Rice Milling Complex, significant quantities of Rice Husk (RH) and Rice Husk Ash (RHA) are likely to be generated.

- From literature reviewed, rice husk accounts for approximately 22 percent of the weight of the paddy that is processed. (CPCB, Ministry of Environment, Forest and Climate Change, 2012)
- From wet paddy intake figures for the Vilvoorden Investment Incorporated - Rice Milling Complex on average for the past three (3) years, approximately 40,850 metric tonnes were processed. This therefore means that approximately 8,987 metric tonnes of rice husk were generated as waste on an annual basis.
- VII has installed and been operating two (2) biomass furnaces that utilize rice husk to supply clean heated air to the two Installed Continuous Flow Tower Dryers Each of the furnaces utilize approximately 3.3 metric tonnes of rice husk per hour, which approximates to 80 metric tonnes of paddy husk for a 24-hour day.
- VII is also planning to acquire, install and eventually operate a Thermo Plant which will use rice husk as
- Although it has not been exactly computed how much Rice Husk Ash is generated by the biomass furnaces operate, it is understood from Literature that Rice Husk Ash is likely to account for 5.5 percent of the total volume of paddy processed. This therefore means that approximately 2,246.75 metric tonnes of Rice Husk Ash is generated annually.

<Liquid Waste>

- Rice mills producing parboiled rice typically require and utilize large volumes of water in the parboiling process that has to be eventually discharged as waste water (effluent). This waste water (effluent) contains high concentrations of organic and inorganic substances which can radically alter the water quality of receiving water bodies. Given the lack of parboiling capability, currently, at Vilvoorden Investment Incorporated - Rice Milling Complex, wastewater (effluent) will not be discharged from these facilities.
- The only effluent that is likely to be discharged is Waste Water discharge from one onsite septic tank structure that will be used for the biological degradation of human excreta and urine.

<Hazardous Waste>

- Hazardous waste materials are likely to be generated during the operational and maintenance phases of the project.

4.4.1.5 Other Environmental Condition(s) or System(s) Impacts

4.4.1.5.1 Occupational Health and Safety Risks

From an assessment of the likely occupational health and safety risks associated with the implementation of activities associated with all phases of the operations of the Vilvoorden Investment Incorporated - Rice Milling Complex, the following health and safety risks have been identified:

- Potential for Slips/ Trips
- Potential for Falls from Height - Off Ladders, Stairs and Vehicles
- Potential for Vehicular Accidents (Onsite and Offsite)
- Potential for Fire and Explosions from Grain Dust Accumulation
- Potential for Ignition of suspended grain dust by improperly selected, installed or maintained electrical equipment;
- Staff Exposure to hazardous chemicals
- Staff Exposure to Thermal Energy Emissions
- Employee contact with electrical energy that may result in injury or death

- Risks associated with Staff entry into and work within confined spaces: Pits, Bins, Silos such as:
 - Potential for Suffocation from Grain Engulfment; and
 - Potential for asphyxiation due to the lack of respirable atmosphere
- Fire and Explosion Risk as a result of hot work or welding operations
- Risks associated with the operation of Mechanical Equipment in Rice Mill such as: (a) Crushing injuries and amputations from grain handling equipment;
- Potential for Noise Induced Hearing Loss
- Potential for staff exposure to dust/ particulates and the potential for the development of pulmonary and other non-pulmonary disorders which are as follows:
 - Pulmonary health disorders including: Acute respiratory symptoms, Acute and chronic airway obstruction, Asthma, Chronic bronchitis, Pulmonary fibrosis, and Allergic alveolitis;
 - Non-Pulmonary health disorders including: Grain fever (flu - like symptoms), Dermatitis (inflammation of the skin), Conjunctivitis (inflammation of the mucous membranes that line the eyelids and cover the front of the eye ball), Rhinitis (Inflammation of the nose and nasal mucous membranes) and Chemical poisoning.

4.4.1.5.2 Energy Consumption

Fossil fuel-based power generation systems will be used to supply electricity needed for the functioning of the rice handling and processing elements of the Vilvoorden Investment Incorporated - Rice Milling Complex.

It is estimated that the power generation equipment will operate as long as 24 hrs during the peak rice processing periods which coincides with the two (2) major rice harvesting periods in Guyana which are from March - April and September - October each year. Based on actual consumption approximately 54,600 Litres of diesel will be consumed per month during the crop for power generation. While approximately 2,766 Litres of diesel would be utilized as fuel for vehicles owned by VII.

For the non-process functions of the rice milling complex, electricity supplied by Guyana Power and Light Limited will be utilized.

4.4.1.5.3 Water Resource Consumption

Water resources are not used in the rice production process at the Vilvoorden Investment Incorporated - Rice Milling Complex. As such the water utilization rate at this complex is projected to be on par with non- commercial (domestic) consumption levels.

Potable water supplied by the Guyana Water Incorporated (GWI) via water main to the premises, will be used by staff for a number of domestic purposes such as for drinking (of course after treatment), cooking, upkeep of personal hygiene (bathing), washing articles of clothing and dishes, and for the maintenance of general site sanitation etc.

SECTION 5: IMPACT MITIGATION AND RISK CONTROL MEASURES

5.1 Overview

This section of the Environmental Management Plan will identify and detail the mitigation measures that will be implemented by Vilvoorden Investment Incorporated to address the identified negative potential significant environmental impacts and health and safety risks associated with all activities to be performed during the Operational and Maintenance phases at the Rice Milling Complex.

5.2 Description of Environmental Impact Mitigation Measures

This subsection provides a description of the mitigation measures that will be implemented by Vilvoorden Investment Incorporated to address the significant environmental aspects identified in **Section 4** above in regard to the operations of all elements of the Rice Milling Complex. The mitigation measures identified are based on the best available management practices and technologies that will eliminate or minimize impacts to the environment and health and safety risks.

The mitigation measures that will be proposed for implementation in the following sub-sections will address: Air Emission Impacts, Noise and Vibration Impacts, Noise and Vibration Impacts, Releases to land, Waste Management Impacts, Occupational Health and Safety Risks, Energy Consumption and Water Consumption.

5.2.1 Air Quality Control

Vilvoorden Investment Incorporated will implement the following mitigation measures articulated in the following sub-sections to address the impacts associated with emissions to the air. The mitigation measures identified for implementation will apply to entire life cycle of the project.

5.2.1.1 Dust Management

Vilvoorden Investment Incorporated will implement the following measures to manage potential impacts on air quality caused by dust/ particulate emissions as listed in **Box 1 below**.

<Box 1: Management Measures for Particulate Emissions>

- All mobile and stationary equipment must be operated and maintained in accordance with their respective manufacturers' specifications;
- All dust generating equipment must be located away from sensitive receptors
- All vehicles and equipment must be regularly inspected and maintained in accordance with standardized procedures and in accordance with the company's own preventative maintenance schedules.
- Excessive idling of vehicles/ equipment will be limited whether operated onsite or offsite
- Low Sulphur fuel will be procured, if available, and utilized in all equipment operated on site.
- All dust generating activities must be performed in location(s) away from sensitive receptors,
- All areas where dust generating material loading activities are performed must be: (a) sufficiently shielded from high winds; (b) fitted with the best available dust capture /collection or suppression technologies to prevent emissions of dust/ particulates to the air; and (c) immediately cleaned upon completion of the task (s) or cleaned at the end of the workday depositing the removed material into a covered bin for ultimate safe disposal.

- All installed dust collection systems must be regularly inspected and cleaned to ensure optimal functioning;
- All dust/particulate accumulations on paved areas must be regularly cleaned;
- Water or other dust suppressant should be considered for application on traversable unpaved areas on the project site;
- Vehicle movements must be limited and speed limits enforced onsite to minimize kick up dust
- All paddy husk and rice husk ash stockpiles must be sited where it can be afforded protection from excessive wind;
- The height and slope of all waste material stockpiles must be limited
- The duration of stockpile usage must be minimized;
- If there is difficulty from a practical standpoint to enclose, cover or fence waste material stockpiles, dust suppressants may be used
- Minimize the drop heights for all material loading and unloading operations.

5.2.1.2 Gaseous Pollutant Management

VII will implement measures to manage potential impacts on air quality caused by gaseous pollutant emissions as listed in **Box 2 below**.

<Box 2: Management Measures for Gaseous Pollutant Emissions>

- All mobile and stationary vehicles/equipment will be operated and maintained in accordance with their respective manufacturers' specifications, including regular servicing;
- All vehicles, storage vessels, and heavy-duty equipment must have emission control devices installed to limit gaseous pollutant emissions, where necessary.
- All vehicles and equipment must be regularly inspected and maintained in accordance with standardized procedures and in accordance with the company's own preventative maintenance schedules.
- Excessive idling of vehicles/equipment will be limited whether operated onsite or offsite
- Low Sulphur fuels will be procured, if available, and utilized in all equipment.

5.2.2 Noise and Vibration Management

Noise and Vibration Emission impacts identified will be managed using the following mitigation measures identified in **Box 3 below**.

<Box 3: Management Measures for Noise and Vibration Emissions>

- All new machinery or equipment must be assigned a Source Rating in cases where equipment is suspected to generate noise levels at or above 85dBA. Quieter equipment will be prioritized (for procurement) over louder equipment;
- The following hierarchy of controls inclusive of engineering, administrative controls and Hearing Protection Devices must be applied to the extent that they are deemed feasible for noise management.
 - **Engineering Controls:** The following engineering controls may be applied:
 - a) Use of Sound Adsorbing Material;
 - b) Use of Barriers (Sound Walls and Curtain),
 - c) Enclosure or Isolation of the Noise Source;
 - d) Enclosure or Isolation of the Employee in a Room or Booth,
 - e) Use of Mufflers or Silencers,
 - f) Maintenance and Lubrication of all Machinery and Equipment.

- **Administrative Controls:** These will be applied when the engineering controls do not reduce noise levels below 85 dBA, or less. Administrative controls include, but are not limited to:
 - a) Operation of noisy machines during shifts when fewer employees are exposed
 - b) Limitation of the amount of time employees spend at a noise source
 - c) Increasing the distance between the employee and the noise source. Doubling of distance between the noise source and the worker decreases the worker by 6 dBA
- **Hearing Protection Devices (HPDs):** These will be made available and worn by all affected employees who are exposed at or above 8-hour Time Weighted Average (TWA) of 85 dBA. HPDs include, but are not limited to: Earplugs, Earmuffs and Radio Communication Headsets with an assigned Noise Reduction Rating (NRR)
- **In addition to the aforementioned requirements, (a)** All mobile and stationary noise emitting equipment must be operated and maintained in accordance with their respective manufacturers' specifications; (b) All noise emitting equipment must be located away from sensitive receptors, (c) All vehicles and equipment must be regularly inspected and maintained in accordance with standardized procedures and in accordance with the company's own preventative maintenance schedules; (d) Restricting the operations of equipment with noise and vibration impacts to between certain hours, and (e) limiting excessive idling of vehicles/ equipment whether operated onsite or offsite.

5.2.3 Land /Soil Management

Emissions to Land and Ground Water (and surface water) impacts identified will be managed using the following mitigation measures identified in **Box 4** below.

<Box 4: Mitigation Measures for Emissions to Land/ Soil>

- **Provision of Secondary Containment:** All bulk storage tanks must be provided with some means of secondary containment. This system typically consists of a reinforced impervious concrete floor and wall, and a blind collection sump in the bund floor. The flooring of this and all chemical storage areas should be constructed of reinforced impervious concrete of sufficient strength and structural integrity to prevent the leaching or penetration of the active agents in any stored chemical. The bund wall forming the perimeter and floor of the area containing the high-capacity above ground storage tanks should be designed and constructed of reinforced impervious concrete of sufficient strength and structural integrity to prevent the leaching or penetration of the active agents into the soil and ground water, contain spills and leaks and facilitate clean-up operations. The containment wall should be from 0.5 m to 1.5 metres high and this containment area should be able to hold 110 percent of the volume of the largest tank. Lastly, the bund should also have a blind collection sump in the bund floor to make it easy to remove accumulated fluids, and the floor should be graded in such a way that liquids collect in the sump. This sump should not be connected to surface drainage systems – it is only to be a collection point from which to pump out the liquid. Accumulated liquids resulting from spills or vessel ruptures may be able to be collected and reused onsite. However, where this is not possible or appropriate, the liquid should be collected and disposed of by an authorized waste management service provider. Accumulated rainwater, on the other hand, since it may be contaminated, should not be disposed of to the drainage system without prior treatment. HGI has engineered a reinforced concrete secondary containment structure with a blind collection sump. During this structure's useful life, the structural integrity of all its elements must be routinely inspected (at least quarterly) by a certified structural engineer with the view of identifying defects for corrective actions to be promptly taken.
- **Bulk Tank Inspection and Maintenance Requirements:** The installed high-capacity aboveground storage tanks must be impervious and compatible with the fluid stored and the conditions of storage. These tanks cannot exhibit any visible signs of active leaks. Leaking tanks must be identified, documented and repaired as quickly as possible. Therefore, these tanks must be thoroughly inspected and maintained on a regular schedule.

- **Routine Tank and Tank Support Inspections and Integrity Tests:** All tanks and tank supports must be periodically inspected and tested for integrity. The integrity testing performed should include visual inspection combined with a non-destructive test method and comparison records retained.
- **Activation of Failsafe Devices to Prevent Overflow Spills:** A minimum of one fail-safe device/process to prevent tank overflow must be active during all fluid transfers (in and out of tanks) and regularly tested/ reviewed.
- **Protective Measures Applied to Piping:** All piping whether installed aboveground or underground must be coated, wrapped and cathode protected or otherwise treated to prevent corrosion.
- **Appropriate Spill Response Equipment must be available:** Appropriate spill response equipment to contain or neutralize a spill shall be identified, documented, or located in or adjacent to chemical storage and transfer areas. Each spill kit should have the following: (a) protective clothing (gloves, overalls, overshoes, safety goggles); (b) absorbent materials (paper towels, spill pads, spill socks); (c) disposable bags with tape or twist ties; (d) dustbin and polypropylene boom and (e) a container for the soiled material that is to be disposed.
- **Spill Reporting Arrangements:** Spills are to be reported both internally and externally. Spills below a certain reporting threshold must be reported as an environmental incident and reported internally. Spills that exceed local jurisdiction reporting thresholds must be reported to the local regulatory authorities in accordance with their requirements and timeframes.
- **Spill Investigation:** All environmental incidents involving chemical spills must be investigated;
- **Inspection of Spill Response Equipment:** All Spill Response equipment will be inspected monthly by an authorized person to ensure sufficient materials are available for response.
- **Spill Response Training:** All employees must be trained in Spill Response activities

5.2.4 Waste Management Control Plan

Solid, Liquid and Hazardous wastes generated by activities to be performed at the Vilvoorden Investment Incorporated - Rice Milling Complex will be managed using the approaches identified in Section 5.2.4.1, 5.2.4.2 and 5.2.4.3 below.

5.2.4.1 Solid Waste Management

Solid wastes generated by activities performed at the Vilvoorden Investment Incorporated - Rice Milling Complex -identified in Section 4.4.1.4 above will be managed using the following approaches identified in **Table 12** below.

<Table 12: Measures for Solid Waste Management>

Waste Category	Waste Types	Recommended Mitigation Measures
Solid Waste	General and Domestic Trash (Wood, Paper, Cardboard, Glass, Aluminum Cans, Plastic, Scrap Metal, Empty Aerosol Cans, Tree Trimmings and Vegetative Residues	<ul style="list-style-type: none"> • This waste stream will be collected in bins strategically placed around the rice milling complex and the contents of these bins routinely emptied into larger bins which will be emptied on a weekly basis by a private waste collection company.
	Foreign Materials – Pebbles, stones, dust, straw, wind paddy, paddy prickle, weed seeds, thrash, metallic objects etc	<ul style="list-style-type: none"> • Impurities/ foreign materials discharged from the fine's impurities outlet, large impurities outlet and light impurities outlet of installed paddy cleaning equipment will be accumulated onsite and transported via truck to land owned by the company and utilized in land filling activities.

Waste Category	Waste Types	Recommended Mitigation Measures
	Rice Processing Wastes: Rice Husk and Straw	<ul style="list-style-type: none"> • Rice husk discharged from the rice husk outlet of the paddy hullers/ shellers will be conveyed to two (2) 50 Metric Tonne (MT) installed paddy husk storage silos which supply paddy husk to the two (2) biomass furnaces for combustion to generate clean heated air for use in the installed Continuous Flow Tower dryers used to dry paddy; • VII proposed to acquire, install and operate a thermo plant for the utilization of the rice husk as a biomass source for the production of clean energy. • Excess rice husk will be stockpiled aback the rice milling complex where a system will be instituted for ensuring that rice husk stockpiles are routinely kept to a minimum recommended height not exceeding two (2) metres or 6.5 feet; • Continue systematic removal of excess rice husks and ash from the complex and utilize in filling up low agricultural lands; • Install a vegetative windbreak to ensure that significant particulate uplift as a result of high velocity winds from the rice husks heaps aback of the rice milling complex does not occur; • Install sprinkler system for wet suppression of rice husk and ash heaps; • Institute a system for ensuring that complaints regarding fugitive dust emissions are taken from the surrounding communities and meaningfully addressed
	Burnt Rice Husk Ash	<ul style="list-style-type: none"> • The Rice Husk Ash discharged by the automatic ash collection system at the bottom of the biomass furnace will be temporarily accumulated on site. The rice husk ash stockpiles will be routinely kept to a minimum recommended height not exceeding two (2) metres or 6.5 feet; • During the period of accumulation, wet suppression techniques will be periodically utilized to prevent the Rice Husk Ash from becoming airborne; • Since the rice husk ash generated by the biomass furnace is useful as a soil ameliorant given its chemical properties, rice husk ash heaps will be routinely lowered with loaders that will transfer the rice husk ash to the trays of trucks contracted/owned by the company. These trucks will then transport the rice husk ash to agricultural lands owned by the company, where it will be discharged and incorporated during land preparation.
	Obsolete Mechanical Parts from Vehicles	

Waste Category	Waste Types	Recommended Mitigation Measures
	Obsolete Parts from Grain Handling and Processing Equipment	<ul style="list-style-type: none"> Obsolete spare parts will be accumulated and arrangements made with an authorized scrap metal exporter to routinely collect and ship recyclable metal fragments to international recyclers.
	Old Tires from Various Classes of Vehicles and Heavy-Duty Equipment	<ul style="list-style-type: none"> Worn tires will be accumulated in a covered storage area on site and arrangements made with a private waste collection company for the collection and disposal in keeping with guidance furnished by the Environmental Protection Agency

5.2.4.2 Liquid Waste Management

Liquid wastes generated by activities performed at the Vilvoorden Investment Incorporated - Rice Milling Complex identified in Section 4.4.1.4 above will be managed using the following approaches identified in **Table 13** below.

<Table 13: Measures for Liquid Waste Management>

Waste Category	Waste Types	Recommended Mitigation Measures
Liquid Waste	Human wastes: Excreta and Urine	<ul style="list-style-type: none"> All human excrement and urine will be discharged from toilets in onsite washroom facilities via plumbing to an installed septic tank system with filter box for the treatment of waste water. This system should be built in conformance to the Guyana National Bureau of Standards (GNBS) "Code of Practice for the Design and Construction of Septic tanks and Associated Secondary Treatment and Disposal systems" The installed septic tank system will be routinely inspected every twelve (12) to eighteen (18) months and desludged by an approved private waste collection company every two (2) years to maintain operational efficiency; The removed sewage will be collected and disposed of by a contacted waste collection company in accordance with practices approved by the Environmental Protection Agency at designated locations prescribed by the Guyana Water Incorporated.
	Grey Water from Washroom and Other Areas	<ul style="list-style-type: none"> Grey water will be discharged into surface drains for eventual discharge to the Essequibo River.

5.2.4.3 Hazardous Waste Management

Hazardous wastes generated by activities performed at the Vilvoorden Investment Incorporated - Rice Milling Complex identified in Section 4.4.1.4 above will be managed using the following approaches identified in **Table 14** below.

<Table 14: Measures for Hazardous Waste Management>

Waste Category	Waste Types	Recommended Mitigation Measures
Hazardous Waste	Liquids	
	Spent Lubricating Oil; Spent Transmission Fluid; Spent Hydraulic Fluid	<ul style="list-style-type: none"> This waste stream will be collected separately by maintenance technicians in drip trays placed under the equipment during the performance of routine maintenance; After the maintenance procedure has been performed, waste oil collected in the drip tray will be poured into a labelled 45 Gallon Drum for temporary storage. A contracted approved waste disposal service will be engaged and the drum filled with waste oil collected and disposed of in a manner approved by the Environmental Protection Agency, Guyana
	Solids	
	Pesticide Containers	<ul style="list-style-type: none"> Pesticide storage containers will be securely stored on site in a location with restricted access; Before pesticide storage containers are disposed of, a triple rinse procedure will be used to ensure that containers are safe for disposal. The following procedures will be astutely followed: <ul style="list-style-type: none"> Read and follow label directions. Wear the required protective clothing and equipment. Allow empty pesticide container to drain into the sprayer tank for at least 30 seconds. Fill container one quarter full of clean water or appropriate spray rinse diluent. Replace cap securely and roll, swirl and shake the contents vigorously for at least one full minute to rinse all surfaces! Remove container cap and empty rinsate into the spray tank. Allow the container to drain for at least 30 seconds. Repeat the fill, shake and drain procedure two (2) more times, using clean water. Properly dispose of the rinsed containers as soon as possible
	Steel/ Plastic Drums/ Pales with Lubricating Oil, Transmission Fluid, Hydraulic Fluid and Coolant Residues	<ul style="list-style-type: none"> Ensure containers are emptied of all their contents; A contracted approved private waste disposal service will be engaged and the emptied containers collected and disposed of in a manner approved by the Environmental Protection Agency, Guyana
	Oil Filters	<ul style="list-style-type: none"> This waste stream will be collected by maintenance technicians during the performance of routine equipment servicing. Efforts will be made by the maintenance technician to ensure that the removed oil filter is allowed to gravity drain for 12-24 hours gasket side down into a drain pan. After the oil is drained from the oil filter

Waste Category	Waste Types	Recommended Mitigation Measures
		it will be placed into a sealed leak proof bin proximal to the area where maintenance is performed; <ul style="list-style-type: none"> The sealed garbage bags will then be discarded with general solid waste
	Grease Tubes	<ul style="list-style-type: none"> Clean before disposal into Domestic Waste Stream
	Special Wastes	
	Fluorescent Light Bulbs and Ballasts	<ul style="list-style-type: none"> Dispose of in domestic waste stream
	Old Batteries (Lead Acid)	<ul style="list-style-type: none"> Lead Acid Batteries will be accumulated on site and periodically taken by an engaged authorized Lead Acid Battery Recycler
	Electronic Waste Materials	<ul style="list-style-type: none"> Dispose of in domestic waste stream.

5.2.5 Energy Efficiency Control Plan

Energy Consumption Impacts identified will be managed using the following mitigation measures identified in **Box 5** below.

Box 5: Energy Conservation Measures

- An energy conservation programme must be implemented to minimize wastage of energy resources.

5.2.6 Water Supply and Conservation Control Plan

Water Consumption Impacts identified will be managed using the following mitigation measures identified in **Box 6** below.

Box 6: Water Supply and Conservation Measures

- A water conservation programme must be implemented to minimize wastage of freshwater resources.

5.3 Description of Health and Safety Risk Control Measures

5.3.1 Occupational Health and Safety (OHS) Risk Control Measures

The following health and safety risk control measures identified in **Table 15** below will be adopted by the Vilvoorden Investment Incorporated - Rice Milling Complex to address the Health and Safety Risks identified at **Section 4.4.1.5.1** above.

<Table 15: Risk Control Measures>

Health and Safety Risks	Risk Control Measures
Potential for Falls from height – off vehicles	<ul style="list-style-type: none"> Strict vehicle usage procedures will be imposed. These impositions are intended to prohibit any staff from riding in the tray of vehicles transporting paddy to and in the confines of the rice-milling complex.
Potential for Falls from height – off Ladders and stairs of Silos	<ul style="list-style-type: none"> Staff will be required to utilize bottom entry access points fitted on the silos; Staff will be required to utilize fill level indicators, and self-sealing lids that can be operated from the ground to reduce the need to climb the silos;

Health and Safety Risks	Risk Control Measures
	<ul style="list-style-type: none"> • Before silos are filled with paddy, silos that have been damaged or rusted will be inspected and repaired; • Before the ladders mounted on the silos are climbed, hand rails and ladders will be checked and repairs made if damage is detected; • Before work is undertaken on top of silos, ensure that provided safety harnesses are worn and attached to the silo
Potential for Vehicular Accidents (Offsite)	<ul style="list-style-type: none"> • Strict vehicle usage procedures will be imposed. This imposition will require all drivers contracted by the Vilvoorden Investment Incorporated - Rice Milling Complex to limit vehicle speeds to a set maximum speed limit.
Potential for Vehicular Accidents (Onsite)	<ul style="list-style-type: none"> • Imposing a speed limit for vehicles bringing paddy into the rice-milling complex; • Ensuring strict observance of imposed speed limit by truck drivers utilizing access pathways in the confines of the rice-milling complex. • Ensure that each truck driver is assisted by an attendant who will review conditions onsite before and during vehicle movements
Loading and Unloading Hazards	<ul style="list-style-type: none"> • Institute a system to ensure that an attendant who will review conditions in the vicinity of the unloading area before, during and after all type of loading and unloading activities performed onsite.
Potential for Grain Dust Explosions	<ul style="list-style-type: none"> • All staff will be prohibited from smoking or using naked flames in silos when loading and unloading trucks and moving grain; • A rigorous housekeeping and sanitation programme will be maintained for the inside of all installed grain elevation structures. • Regular maintenance of Installed dust aspiration systems at grain transfer points will be performed; • Dust collection systems will be cleaned at intervals recommended by the manufacturer; • Training will be provided to employees on the dangers and prevention of dust explosions
Staff Exposure to Excessive Noise Emissions and the potential for noise induced hearing loss	<ul style="list-style-type: none"> • Staff required to work near noise emitting devices will be required to wear provided hearing protection; • Staff not required to perform tasks near noise emitting devices will be kept away from this area.
Staff Exposure to Particulates and the potential for the development of pulmonary and other non-pulmonary disorder	<ul style="list-style-type: none"> • Staff engaged in grain handling will be required to wear provided respiratory protection at all times.
Staff Exposure to Chemicals for Rodent Control	<ul style="list-style-type: none"> • Only pest control companies authorized by the Pesticide and Toxic Chemical Control Board (PTCCB) to apply rodenticides will be utilized; • Only staff that have been specifically trained and certified by the PPTCCB will be allowed to apply pesticides; • Pre-Prepared Baits will be utilized for rodent control. The baits will be handled and applied as described on the rodenticide label; • Personal Protective Clothing and equipment will be provided for utilization, including gloves and respiratory protection when handling and laying baits.
Staff Exposure to Thermal Energy Emissions	<ul style="list-style-type: none"> • Efforts will be made to ensure that heat condition blocking methods are utilized to substantially reduce thermal energy emissions;

Health and Safety Risks	Risk Control Measures
	<ul style="list-style-type: none"> • Efforts will be made to ensure that these areas have adequate ventilation or heat extraction systems to remove excess heat; • Efforts will be made by the company to ensure that staffs are not required to work for prolonged periods in areas where high levels of heat are emitted; • Efforts will also be undertaken to ensure that all staff have adequate access to cooled drinking water supplies for rehydration.
Employee contact with electrical energy that may result in injury or death.	<ul style="list-style-type: none"> • Staff performing functions that involve contact with electricity will be required to utilize provided personal protective equipment at all times.
Risks associated with Staff entry into and work within confined spaces: Grain Bins/ Silos such as: (a) Potential for Grain Engulfment; and (b) Potential for asphyxiation due to the lack of respirable atmosphere	<ul style="list-style-type: none"> • Turn off and lock out all powered equipment associated with the grain silos/bins, including augers used to help move the grain, so that the grain is not being emptied or moving out or into the bin. • Prohibit walking down grain and similar practices where an employee walks on grain to make it flow. • Provide all employees a body harness with a lifeline and ensure that it is secured prior to the employee entering the bin. • Provide an observer stationed outside the bin or silo being entered by an employee. Ensure the observer is equipped to provide assistance and that their only task is to continuously track the employee in the bin. Prohibit workers from entry into bins or silos underneath a bridging condition, or where a build-up of grain products on the sides could fall and bury them. • Train all workers for the specific hazardous work operations they are to perform when entering and working inside of grain bins. • Test the air within a bin or silo prior to entry for the presence of combustible and toxic gases, and to determine if there is sufficient oxygen. • If detected by testing, vent hazardous atmospheres to ensure that combustible and toxic gas levels are reduced to non-hazardous levels, and that sufficient oxygen levels are maintained
Fire and Explosion Risk as a result of hot work or welding operations	<ul style="list-style-type: none"> • Ensure all equipment used in the performance of welding or cutting is clean and in good operating condition; • Welding operations are to be conducted during the cooler morning hours, if possible • All equipment in the work area must be shut down while welding and/or cutting tasks are being performed; • Continue to monitor or observe the area for fire where hot work was performed at least 30 minutes after the task has been completed; • The observer must be equipped with a proper fire extinguisher • Equipment on which hot work is being performed must be: (a) cleared of all combustible material; (b) protected by shields in flammable areas; and(c) purged of all flammable vapours; • Remove combustible materials from the opposite side of all heat conducting materials receiving hot work; • Use sheet metal or other approved shields to protect all combustible materials in hot work areas; • Use metal containers to catch molten metal from welding or cutting; • Maintain proper oxygen pressure when cutting to reduce the production of extra sparks and slag;
Risks associated with the operation of Mechanical	<ul style="list-style-type: none"> • A preventative maintenance programme will be implemented to reduce the potential for mechanical equipment to become a source of ignition

Health and Safety Risks	Risk Control Measures
Equipment in Rice Mill such as: (a) Source of Ignition;	for fires and explosions. This programme should implement procedures to (a) document regularly scheduled inspections of all mechanical and safety control equipment; and (b) lubricate and maintain equipment as recommended by the manufacturer or a determined necessary by prior operating records;
Risks associated with the operation of Mechanical Equipment in Rice Mill such as: (b) Serious Injury or death caused by limbs getting caught in moving parts	<ul style="list-style-type: none"> • All mechanical equipment present in grain mills with moving parts should be properly guarded. These guards will prevent accidental staff contact with moving parts. Additionally, these guards should never be removed while equipment is operating. Employees should ensure that all guards are in place before starting any machinery; • Implement lockout/tag out procedures to all energy sources – electrical, mechanical, hydraulic and pneumatic, etc. • After equipment is locked out and tagged, test the controls to ensure that the equipment cannot be started; Except under specified conditions, only the authorized employee who installed the locks and tags may remove them; • The lockout procedures of the employer must always be followed.

SECTION 6: MONITORING AND AUDITING

6.1 Overview

This section of the document describes the health, safety and environmental performance monitoring and auditing programme that will be operationalized by Vilvoorden Investment Incorporated during the operational life of the Rice Milling Complex in order to ensure that all activities with the potential to cause significant adverse environmental and health and safety impacts, are conducted in a manner that protects and maintains environmental quality and controls health and safety risks.

6.2 Monitoring and Auditing

6.2.1 Environmental Performance Monitoring

In an effort to ensure that the impact management and risk control systems established by Vilvoorden Investment Incorporated function optimally, the **General Manager** (or a suitable designee appointed) will be responsible for the coordination of the performance monitoring functions of this Rice Milling Complex in collaboration with Environmental Solutions.

Dedicated personnel - as defined in **Table 16** below will render support for these vital functions that must be performed.

Special attention will be placed on the following elements in the Rice Milling Complex's health, safety and environmental performance monitoring system in an effort to determine the effectiveness of mitigation options proposed for implementation.

- a) **Air Quality Management (Dust/ Particulates, Gaseous Pollutants)**
- b) **Noise and Vibration Management**
- c) **Land/ Soil Management**
- d) **Waste Management (Solid, Liquid and Hazardous Waste)**
- e) **Occupational Health and Safety Risk Control**
- f) **Energy Conservation**
- g) **Water Conservation**

This system will not only allow for the generation of useful information to adjudge the Vilvoorden Investment Incorporated - Rice Milling Complex's Health, Safety and Environmental Performance, but this information will also be used to determine when corrective actions are required.

Table 16 below identifies the Health, Safety and Environmental Performance Monitoring Plan that will be operationalized by Vilvoorden Investment Incorporated.

<Table 16: Health and Safety and Environmental Performance Monitoring Plan>

Operational Area	Source of Monitoring Requirement	Monitoring Requirement	Parameter(s)	Threshold Levels	Measurement Methods	Responsibility	Frequency	Location(s)
PARAMETER 1: AIR QUALITY (DUST/ PARTICULATES, GASEOUS POLLUTANT EMISSIONS)								
Dust/ Particulates								
	Operations Permit to be issued by the Environmental Protection Agency	Monitor emissions to the Air	Particulate Matter (PM) PM2.5 PM10	25Ug/m3 hour mean 50 ug/m3 hour mean	Fence line Monitoring Methods	General Manager Environmental Solutions Contractor: IMEX Incorporated	Annually	Boundaries of the Property Within the Project Area
Gaseous Pollutant Emissions								
	Operations Permit to be issued by the Environmental Protection Agency	Monitor emissions to the Air	Carbon Monoxide (CO) Nitrogen Dioxide (NO2) Sulphur Dioxide (SO2)	35 ppm 200 mg/m3 hour mean 20 mg/m3 24 hour mean	Fence line Monitoring Methods	General Managers Environmental Solutions Contractor: IMEX Incorporated	Annually	Boundaries of the Property Within the Project Area
PARAMETER 2: NOISE AND VIBRATION MANAGEMENT								
	Operations Permit to be issued by the Environmental Protection Agency	Monitor noise emissions	Noise Level Readings in Decibels (dB)	Industrial Limits: 100 dB (daytime: 6:00 -18:00 hrs.) 80 dB (Night-time: 18:00 – 06:00 hrs.)	Use of the decimeter to take noise level readings at a distance of 50 feet from the source of emission or at a property boundary	General Manager Environmental Solutions Contractor: IMEX Incorporated	Weekly	Boundaries of the Property Within the Project Area

Operational Area	Source of Monitoring Requirement	Monitoring Requirement	Parameter(s)	Threshold Levels	Measurement Methods	Responsibility	Frequency	Location(s)
PARAMETER 3: LAND/ SOIL MANAGEMENT								
	Internal Requirements	Provisions in place for containment of releases to Land	<ul style="list-style-type: none"> Condition of Secondary Containments around High-Capacity Storage Tanks Bulk Tank and Inspection and Maintenance Requirements Bulk Tank and Tank Support Inspections and Integrity Tests Condition of Fail Safes on Tanks Condition of Piping, Loading and Unloading Connections Availability of Spill Response Equipment Spill Reporting, Response and Remediation Arrangements Spill Investigation Reports Maintenance Records 	Full Adherence to Requirements	Comprehensive Review of Records generated	General Manager Environmental Solutions	Quarterly	Fuel /Lubricant Storage Areas
PARAMETER 4: WATER QUALITY MANAGEMENT								
<u>Surface Water</u>								
Surface Drains Onsite	Operations Permit to be issued by the	Monitor all effluent discharges into	<ul style="list-style-type: none"> pH Temperature 	5.0-9.0 <40°C <150 mg/l	Grab Sample Collection at Identified	Operations Manager	Biannually	Surface Drain

Operational Area	Source of Monitoring Requirement	Monitoring Requirement	Parameter(s)	Threshold Levels	Measurement Methods	Responsibility	Frequency	Location(s)
	Environmental Protection Agency	the Environment	<ul style="list-style-type: none"> Biological Oxygen Demand (BOD) Chemical Oxygen Demand (COD) Total Suspended Solids (TSS) Oil and Grease Surfactant Total Dissolved Solids (TDS) 	<p><250 mg/l</p> <p><100 mg/l</p> <p><20 mg/l</p> <p>< 0.2 mg/l</p> <p>< 40 mg/l</p>	Sample Point and Chemical Analysis of the sample at the Analytical Laboratory of IMEX Incorporated	<p>Environmental Solutions</p> <p>Contractor: IMEX Incorporated</p>		
PARAMETER 5: WASTE MANAGEMENT (SOLID, LIQUID AND HAZARDOUS WASTE)								
	Internal Requirements	Monitor Waste Storage, Handling, Transportation and Disposal Practices	<ul style="list-style-type: none"> Condition of Waste Storage Receptacles Condition of Waste Storage Areas; Records generated to track the quantum of waste materials generated Records of Third-Party Contractors used to Transport material to Waste Disposal and Treatment Facility Training provided to Critical Staff 	Full adherence to Waste Management Procedures	Visual Appraisal of areas and review of records generated	<p>General Manager</p> <p>Environmental Solutions</p>	Weekly	Waste Storage Areas
PARAMETER 6: OCCUPATIONAL HEALTH AND SAFETY RISK MANAGEMENT								
	Internal Requirements	Monitor HSE Conditions in the Workplace	<ul style="list-style-type: none"> Use of HSE Procedures Use of Personal Protective Equipment/ Safety apparel by staff Provision of Training 	Full Adherence to Occupational Health and Safety Requirements	Routine Audit of HSE System Performance	<p>General Manager</p> <p>Environmental Solutions</p>	Quarterly	All aspects of the operations of VII – Rice Milling Complex

Operational Area	Source of Monitoring Requirement	Monitoring Requirement	Parameter(s)	Threshold Levels	Measurement Methods	Responsibility	Frequency	Location(s)
			<ul style="list-style-type: none"> • Presence of Signage and Security Measures • Condition of Emergency Supplies • Availability of Emergency Supplies • Adherence to Working Procedures, Standards etc. • Testing of Emergency Response Plan 					
PARAMETER 7: ENERGY CONSERVATION								
	Internal requirements	Monitor energy consumption	Energy consumption in KW/h		Review of Energy Consumption levels	General Manager Environmental Solutions	Monthly	All aspects of the operations of VII – Rice Milling Complex
PARAMETER 8: WATER CONSERVATION								
	Internal Requirements	Monitor water consumption	Water Consumption in cubic meters		Review of Water Consumption Levels	General Manager Environmental Solutions	Monthly	All aspects of the operations of VII – Rice Milling Complex

6.2.2 Reporting Requirements

Vilvoorden Investment Incorporated will be required to generate the following reports as part of its own organizational efforts to track Health, Safety and environmental performance and as part of the Environmental Protection Agency's compliance requirements given its status as a prospective permit holder.

For internal and external purposes, the following reports would be required: incident reports, annual environmental reports and Internal audit reports.

The following sub-sections will elaborate on the types of reports that will be generated by VII for its Rice Milling Complex.

6.2.2.1 Incident Reports

In the event of the occurrence of an emergency incident with actual and potential significance for impacts on the environment, the Operations Manager or a duly authorized designate of the Rice Milling Complex will notify the Environmental Protection Agency and other relevant authorities immediately and provide an Incident report outlining the details of the incident within twenty-four (24) hours of the incident.

Incident Reports will be filed with the Environmental Protection Agency for the following: incidents: Fuel or Chemical Spills, Accidents and Injuries sustained and other events that led to non-compliance with Environmental Standards or requirements.

6.2.2.2 Periodic or Annual Performance Reporting

Vilvoorden Investment Incorporated will prepare and submit to the Environmental Protection Agency on an annual basis, an Annual Environmental Report (AER) on the previous year's activities.

The above referenced report (s) will be prepared in accordance with the guidance furnished in the Environmental Protection Agency's "Guidelines for the preparation of an Annual Environmental Report," and it will contain information on: (a) initiatives taken by the management of the Vilvoorden Investment Incorporated - Rice Milling Complex to adhere to the terms and conditions specified therein by thematic areas of the permit.

6.2.2.3 Internal Audit Reports

In an effort to ensure that the Health, Safety and Environmental performance of the Vilvoorden Investment Incorporated Rice Milling Complex is maintained to a high standard, a number of internal reviews will be periodically undertaken during the course of the operating year and made part of the institution's mandatory quality improvement efforts. The Operations Manager will facilitate these internal reviews monthly.

The findings and results documented during this internal review process will be presented to the Board of Directors in the form of an Internal Audit Report for comprehensive review and eventual consideration for corrective action.

SECTION 7: ANNEX

7.1 Annex 1: Approvals/ Permissions

7.1.1 Certificate of Incorporation



The image shows a formal Certificate of Incorporation from Guyana. At the top center is the coat of arms of Guyana. To its right, the text "Company No. 9211" is printed. Below the coat of arms, the title "COMPANIES ACT OF GUYANA" is centered, followed by "CERTIFICATE OF INCORPORATION" and then "VILVOORDEN INVESTMENT INC." in a larger font. A paragraph of text states: "I hereby certify that the above-mentioned Company, Articles of Incorporation of which are attached, was incorporated under the Companies Act of Guyana on the 15th day of March, 2018." Below this text, on the left, is a circular official stamp of the Registrar of Companies, Guyana. On the right, there is a handwritten signature over a horizontal line, with the printed name "Registrar of Companies (Ag)" underneath. At the bottom right, the date is given as "Dated this 19th day of March, 2018".

Company No. 9211

COMPANIES ACT OF GUYANA
CERTIFICATE OF INCORPORATION

VILVOORDEN INVESTMENT INC."

I hereby certify that the above-mentioned Company, Articles of Incorporation of which are attached, was incorporated under the Companies Act of Guyana on the 15th day of March, 2018.

REGISTRAR OF COMPANIES
GUYANA

[Signature]
Registrar of Companies (Ag)

Dated this 19th day of March, 2018

7.1.2 Planning Permission for Building Works



CENTRAL HOUSING & PLANNING AUTHORITY

41 Brickdam and United Nations Place,
Stabroek, Georgetown.
Tel: 226-2265 Fax: 225-4991
Email: info@chpa.gov.gy

Tel: (592) -227-7233

26th October, 2020

Nazeemul Hakh
For Vilvoorden Investment Inc.
Plot 'C' being a portion of a Piece
Or Parcel of Plantation Vilvoorden
Essequibo Coast

Dear Sir/Madam,

RE: PLANNING PERMISSION FOR BUILDING WORKS

Please be advised that your application No.P-2B/ 20/2020 dated 6th August, 2020 for planning permission to erect a building situate at Plot 'C' being a portion of a Piece or Parcel of Plantation Vilvoorden, Essequibo Coast, for the purpose of:

A Rice Milling Complex (ONLY)

has been **approved** by the Central Housing and Planning Authority at its meeting held on 22nd October, 2020.

You are required to visit the **Chairman, Good Hope / Pomona NDC** to collect a copy of the approved plan and be issued the required building permit.

Please note the following:

1. You are required to comply with the regulations and by-laws enforced by the other relevant agencies relating to the operation of :

A Rice Milling Complex (ONLY)

2. In the event that you propose to establish another line of business at the same location, you would have to re-apply to the Central Housing and Planning Authority for further approval.
3. In the event that you do not establish the business within **two (2) years** of this approval, you would be required to re-apply for planning permission.

Yours truly,

Note: Approval on the following conditions:

1. *The development does not pose a nuisance to the surrounding residents with respect to dust, noise, traffic congestion and encumbrance of the road reserves and driveways of neighbouring properties.*
2. *The developer must adhere to mitigations measures as stipulated by the Environmental Protection Agency.*

Secretary (ag)

Central Housing and Planning Authority

SECRETARY

- c. The Chairman, Good Hope / Pomona NDC.
The Licence and Revenue Officer, GRA.
The Chief Fire Officer, GFS.
The Executive Director, Environmental Protection Agency.

Promoting a functional and aesthetically pleasing environment

Rect 26728

02-08-2020

APPLICATION

TO ERECT A BUILDING AT

IN THE GOOD HOPE / POMONA NEIGHBOURHOOD DEMOCRATIC COUNCIL

Name of applicant.

Present address.

Works to be don

Location of work

Owner of land.

Is the land laid out for building purposes?

Date on which work is to begin.

Height of structure from ground.....⁹⁵.....feet, pillars, blocks

Of..

Materials to be used in construction of:

Walls.

Roof.

Floor

Dimensions of existing buildings

Dimensions of purposed building

(Boundary of lot.

Least distance of any part (

Of the structure from

(Drainage trench.

(Any other building

Area of lot.

Total area to be covered by building

Other details..

I declare the above to be a true statement of all the works I wish to carry out.

Date 29 July 2020

Site inspected and details checked

Date.....03rd Aug. 2020.....

Approved subject to compliance with building by laws.

Signature Nayemeh Hahn
For VILVORDEN INVESTMENT INC

Signature.....

Date.....03rd Aug 2020.....

RECOMMENDED

CHAIRMAN
GOOD HOPE / POMONA LOCAL AUTHORITY
Chairman of L.S.A. of

Good Hope/ Pomona Neighborhood
Democratic Council

7.1.3 License to Manufacture Rice

GUYANA RICE DEVELOPMENT BOARD

Ministry of Agriculture Complex, Guysuco Compound,
LBI East Coast Demerara,
Email: info@grdb.gy
Tel: 220-4732 Fax: 225-6486



LICENCE TO MANUFACTURE RICE

LICENCE No: **17**

MILL No: **18/010/12**

REGION: **2**

NAME AND ADDRESS OF HOLDER: **VILVOORDEN INVESTMENT INC.**

VILVOORDEN, ESSEQUIBO COAST, GUYANA.

SITUATION OF RICE FACTORY: **AS ABOVE**

TOTAL MILLING CAPACITY: **12.0 mt/hr**

This Licence is issued to the above named person to manufacture rice at the rice factory stated in this licence.

This Licence expires on the 31st day of December 20 **22**

LICENCE FEE: **\$200,000**

DATED THIS **7TH** DAY OF 20 **22**


.....
GUYANA RICE DEVELOPMENT BOARD



Receipt No:1659

CONDITIONS OF LICENCE

This licence is granted subject to the following conditions, namely that:-

- (a) The Licensee shall purchase or receive padi for manufacture of rice at his factory at any time during the working hours of the factory, subject to availability of storage accommodation;
- (b) The rice factory and all machinery and equipment shall be in serviceable condition;
- (c) A schedule of services offered, milling fees and deductions to be made shall be displayed prominently at the premises of the rice factory;
- (d) The Licensee shall carry out such pest control, hygiene and safety measures as may be directed by the Board;
- (e) The licensee shall ensure that the scales and the grading equipment used at the rice factory are accurate, efficient and approved by the Board and that moisture meters and scales used in the purchase of padi and rice are tested and calibrated before the commencement of each crop.
- (f) The licensee shall submit to the board at the end of every calendar month daily records of the rice entering and leaving the factory; and shall keep proper records of the quantity of all padi and rice graded and shall make information available to the GRDB Quality Control or Extension staff on request.
- (g) The holder of the license shall grade padi and rice, at all times, in accordance with the procedures set out in the Guyana Standard GYS: 211:2002. Rice Specifications, Sampling, Test and Analysis.
- (h) The licensee shall comply with such other directions regarding compliance with this Act and any regulations made hereunder, as are given to him from time to time by the Chairman, Deputy Chairman or General Manager of the Board, or any other employee authorized by the Board.

7.1.4 Petroleum License

File No. 315/10/171

PETROLEUM LICENCE

Ordinance No 7 of 1930 Amendment Ordinance No. 19 of 1932, Amendment No. 28 of 1932,
Amendment Ordinance No.13 of 1943, Amendment Act No 12 of 1982 Petroleum Regulations, 1930; and
Petroleum (Amendment) Regulations (1932)

LICENCE is hereby granted to **Nazeemul Hakh**
(Vilvoorden Investment Inc)

Of Plot 'C' Vilvoorden to store 18,400 litres Dieselene [Only]
Essequibo Coast Eighteen thousand four hundred litres of dieselene

The petroleum is in connection with a storage facility


At Plot 'C' Vilvoorden
Essequibo Coast

6 (3)
under Section of the principal ordinance

The Licence is issued subject to the following conditions:

1. Eighteen thousand four hundred (18,400) litres of Petroleum other than that in the tank of the said engine may be stored on the premises in securely closed metal containers (tanks).
2. The petroleum is to be kept in as follows:
One above ground storage tank.
3. No other stores may be kept in the storage area.
4. **Two 6kg Dry Chemical Fire Extinguishers and two fire buckets of sand must be kept in the area provided.**
5. A copy of this Licence shall be affixed in a conspicuous position in the storage area.
6. This Licence will expire on the 31st of December, 2022 and any application for this renewal should be made not less than fourteen days before its expiration.

Dated this 21st day of January 2022


J. Wickham
Chief Fire Officer (Ag)

N.B.- Sections 8 & 9 of Ordinance No. 7 of 1930, Amendment Ordinance No. 19 of 1932 and
7. (1) Petroleum shall not be received into or delivered from any licensed building except between the hours of six o'clock in the forenoon and six o'clock in the afternoon except, with the permission of the person in charge of the nearest Police Station.

Provided that this subsection shall not apply to Petroleum required for the bonafied locomotion of vehicles and delivered by means of a sealed pipe-line, so controlled that it is unnecessary to open the enclosure in which the storage receptacles are situated.

(2) If any Petroleum is received or delivered contrary to this section, the license of such building shall be liable to penalty not exceeding five hundred dollars.

8. (1) No lighted candle, lamp, lantern or naked light to any kind, no match, no article or an explosive or highly flammable nature, other than petroleum shall under any pretence or for any other purpose whatever be taken into a dangerously near any licensed building, warehouse, or vehicle used for the hawking of Petroleum; and no wire as a fixture or as a wandering lead used as a conductor for electricity shall be so taken into any licensed building or warehouse.

(2) No person shall under any circumstances smoke in or dangerously near any licensed building ware house, or vehicle used for the hawking of petroleum.

(3) Any person contravening any of the provisions of this section shall be liable to fine not exceeding five hundred dollars or a imprisonment for a period not exceeding six months.

MIN: of H. A - No.: 21



7.1.5 EMP Required Letter issued on January 29, 2022



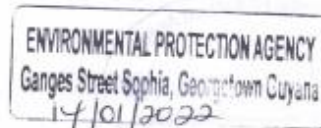
Government of the Co-operative Republic of Guyana
Environmental Protection Agency



December 28, 2021

Mr Nazeemul Hakh
Proprietor
Vilvoorden Investment Inc.
Block 'K' Golden Fleece
Essequibo Coast.

JAN 29 2022



Dear Mr Hakh,

Re: Environmental Management Plan (EMP) Required for the Operation of Rice Mill – Vilvoorden Investment Inc.

The Environmental Protection Agency conducted a follow-up complaint inspection of your Rice Mill located at Plot 'C' Vilvoorden, Essequibo Coast, Guyana on October 4, 2021, in regards to complaints of smoke, dust and paddy ash emanating from the facility.

Officers from the Agency investigated the facility and the findings were as follows:

1. Evidence of black ash was observed and documented in and around the premises of several nearby residents within the Vilvoorden community.
2. Paddy chaff heaps exceeded the recommended height (2 meters).
3. Accumulated paddy ash remains were improperly managed.

Owing to the numerous complaints of dust and smoke nuisance in receipt of the Agency from nearby residents downwind of facility; the Company is required to submit an Environmental Management Plan (EMP) to the Agency on or before March 30, 2022. The EMP should address **ALL** current and projected environmental impacts to the environment and sensitive receptors and identify feasible and cost-effective measures to mitigate against impacts identified. Attached herein is a guideline for the preparation of EMP.

Furthermore, the Agency seeks a meeting with Vilvoorden Investment Inc, on January 13, 2022, via Zoom to discuss the way forward regarding the continued operation of Rice mill.

Should you have any questions or need clarification, please do not hesitate to make contact with **Mr. Ronn Sullivan – HOD, Agriculture Unit** on telephone number 225-5467 (Ext. 2343) or email rsullivan@epaguyana.org.

Ganges St., Sophia, Georgetown, GUYANA.

Tel: (592) 225-5467/5471-5472/6044/6048 | Fax: 225-5481

epa@epaguyana.org | www.epaguyana.org | Environmental Protection Agency - Guyana

"The Environment is Everybody's Business"



Government of the Co-operative Republic of Guyana
Environmental Protection Agency



Kemraj Parsram
Executive Director

Cc: General Manager, Guyana Rice Development Board.
Chairman, Good Hope/Pomona Neighbourhood Democratic Council.
Regional Environmental Health Officer, Region 2.

Attached -
Guideline for the preparation of EMP

Ganges St., Sophia, Georgetown, GUYANA.

Tel: (592) 225-5467/5471-5472/6044/6048 | Fax: 225-5481

 epa@epaguyana.org |  www.epaguyana.org |  Environmental Protection Agency - Guyana

"The Environment is Everybody's Business"

7.2 Annex 2: Baseline Results

7.2.1 Certificate of Analysis for Water Quality Tests

7.2.2 Noise Level Testing Results

7.2.3 Air Quality Monitoring Results

SECTION 8: BIBLIOGRAPHY

1. American Conference of Governmental Industrial Hygienists (1998), Industrial Ventilation: A Manual of Recommended Practice, 23rd Edition
2. Central Pollution Control Board (CPCB) Ministry of Environment and Forests, Government of India, (2012) Guidelines for (i) Siting of Rice Shellers/ Mills; (ii) Handling and Storage of Rice Husk and (iii) Handling, Storage and Disposal of Ash generated in boiler using rice husk as fuel"
3. Charles E. Billings, et. al. (1970), Handbook on Fabric Filter Technology, Volume 1. Fabric Filter Systems Study
4. Environmental Protection Agency - Guyana, (2013) Environmental Guidelines for Preparation of an Environmental Management Plan
5. Environmental Protection Authority, Australia Capital Territory. (2013) Environmental Guidance for Preparation of an Environmental Management Plan
6. Government of Guyana (2013), Guyana National Land Use Plan.
7. Government of Guyana. The Constitution of the Cooperative Republic of Guyana
8. Government of Guyana. The Energy Agency Act (56:05)
9. Government of Guyana. The Environmental Protection Act No. 11 of 1996
10. Government of Guyana. The Environmental Protection (Water Quality) Regulations No. 6 of 2000
11. Government of Guyana. The Environmental Protection (Hazardous Waste Management) Regulations No. 7 of 2000
12. Government of Guyana. The Environmental Protection (Noise Management) Regulations No. 8 of 2000
13. Government of Guyana. The Environmental Protection (Air Quality) Regulations No. 9 of 2000
14. Government of Guyana. The Environmental Protection (Authorizations) Regulations No. 10 of 2000
15. Government of Guyana. The Petroleum Act (Cap 92:01)
16. Government of Guyana. The Guyana Fire Service - Fire Prevention (Cap 22:01)
17. Government of Guyana, Developers Manual
18. Government of Guyana, Guidance Notes for the Development of Gas/ Service Stations
19. Guyana National Bureau of Standards, Interim Guidelines for Noise Emission into the Environment
20. Guyana National Bureau of Standards, Interim Guidelines for Industrial Effluent Discharge into the Environment

21. Guyana National Bureau of Standards, (2007) Codes of Practice for the Design and Construction of Septic Tanks and Associated Secondary Treatment and Disposal Systems
22. Guyana National Bureau of Standards, (ISO14001:2004)-Environmental Management Systems - Requirements with guidance for Use, 2004
23. Guyana National Bureau of Standards, (ISO14004: 2004)-Environmental Management Systems - General Guidelines on Principles, Systems and Support Techniques, 2004
24. Guyana National Bureau of Standards, GYS 209 - Guidance for the Design, Construction, Modification and Maintenance of Petrol Filling Stations
25. Guyana National Bureau of Standards, GYS 259:2004- Occupational Health and Safety Management Systems: -Specification with guidance for use
26. Hillary Hoagland - Gray, Lynn Arneson, Natasha Ward, (2011) Inter-American Development Bank, Environmental and Social, Health and Safety Management System (ESHSMS) - Small Hotels and Resorts
27. Safety and Environmental Standards for Fuel Storage Sites - Buncefield Standards Task Group (BSTG) Final Report
28. S.M Ahuja, Air Pollution Control from Rice Shellers - A Case Study, World Academy of Science, Engineering and Technology, International Journal of Chemical, Molecular, Nuclear, Materials and Metallurgical Engineering Volume 9, No. 6, 2015
29. SENES Consultants Limited, CEA Limited, Environmental Protection Agency, (2006): Environmental Protection Agency/ Inter-American Development Bank Environmental Management Programme - Phase II: Regulation of Existing Industry for Pollution Abatement and Control - Volume 2: Rice Processing.