Updated Summa

Project Summary

FLOOD RISK MANAGEMENT PROJECT (AF-FRMP)

DRAINAGE INTERVENTION: REHABILITATION OF THE LILIENDAAL PUMP STATION, REGION 4

General Engineering Supplies and Services Incorporated

LOT 2 COLDINGEN, EAST COAST DEMERARA

Prepared by;

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General Engineering Supplies and Services Incorporated

Initial Submission: March, 2023

Re-submission Date: March, 2024

PROJECT TITLE: DRAINAGE INTERVENTION-REHABILITATION OF THE LILIENDAAL PUMP STATION, REGION #4

Executing Agency	Ministry of Agriculture- Agriculture Sector Development Unit
Contractor	GENERAL ENGINEERING SUPPLIES AND SERVICES INC. (GESS Inc.) Address: LOT 2 COLDINGEN, EAST COAST DEMERARA Contact: 220-2160/ 614- 2121/ 611-1333
Capital Investment	$945,511,848
Proposed Commencement	March, 2023
Duration for Construction	18 Months
Contact Personnel	

Position	Name	Contact Information
Client's Project Manager	D. James	6007811
Client's Project Engineer	L. Carryl	655-1221
Contractor's Project Manager	H. Tulsi	614-2121
Contractor's Project Engineer	R. Kassim	602-0944
Contractor's Environmental Officer	T. Deally	614-8848

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1.0 Introduction

1.1 Company Background

General Engineering Supplies and Services Incorporated, henceforth referred to by its abbreviation GESS Inc., has more than 25 years of experience in the construction of drainage structures, revetments, sea defense and land development. Over the years, the company has been awarded contracts through the Ministry of Agriculture, Ministry of Public Infrastructure and GUYSCO and has become a model company for pump stations locally. At present GESS Inc., is fully staffed with experienced and competent personnel which includes electrical engineers, civil engineers, mechanical engineers, project managers, construction foremen, electrical foremen, mechanical foremen, environmentalists, welders, electricians, carpenters, and labourers.

In addition to its skilled human resources, GESS Inc., has a number of equipment including cranes, bulldozers, excavators, motor lorries, welding gear, vibratory hammers and lifting gear to conduct its work to the highest professional standards hence its award to rehabilitate the Liliendaal Pump Station and construct supplementary facilities under the Flood Risk Management Project (FRMP).

1.2 Purpose of the Project

The existing Liliendaal Pump Station has the capacity to drain 76mm of inland water per day which is adequate for agriculture lands but insufficient for increasing urban development at the expected rainfall depths. Recognizing this growing threat, the Government of Guyana through the National Drainage and Irrigation Authority (NDIA) of the Ministry of Agriculture prioritized the rehabilitation of the Liliendaal Pump Station and construction of

supplementary facilities after receiving an Internation Development Association (IDA) credit from the World Bank in 2020. The project is categorized under **Component 1**: *Priority Works for Flood Risk Reduction* of the Flood Risk Management Project (FRMP) and is expected to increase flood resilience along the developing East Coast once complete.

1.3 Project Summary

In reference to Part 4 Sections 13 and 14 of the 1996 Environmental Protection Act, GESS Inc., as the Contractor is submitting this project summary as a prerequisite for environmental authorization/permission to conduct rehabilitative works on the Liliendaal Pump Station and to construct supplementary facilities under the Ministry of Agriculture's Flood Risk Management Project. The project has two (2) main components;

I. **Rehabilitation of the Existing Facility**

Replacement of the electrical and control panel systems within the existing Liliendaal Pump Station.

II. **Construction of a New Station and Supplementary Facilities**

Construction of a new pump station south of the existing station to enhance inland drainage capacity within the Liliendaal Drainage Catchment area. The station will be constructed to house two (2) electrically driven, vertical line shaft pumps with a total drainage capacity of 135,000 gallons/minute during periods of heavy rainfall. Water will be channeled to the Atlantic Ocean via two (2) stainless steel irrigation pipes situated approximately 25 meters east of the pipes for the existing station.

2.0 Project Location and Land Use

2.1 Location

The existing Liliendaal Pump Station is located in Upper Georgetown, Region # 4 and is bordered by the Atlantic Ocean to the north. The site for the New Pump Station is located south of the existing facility on empty land with no immediate development to the south and east (shown in Figure 2.1).

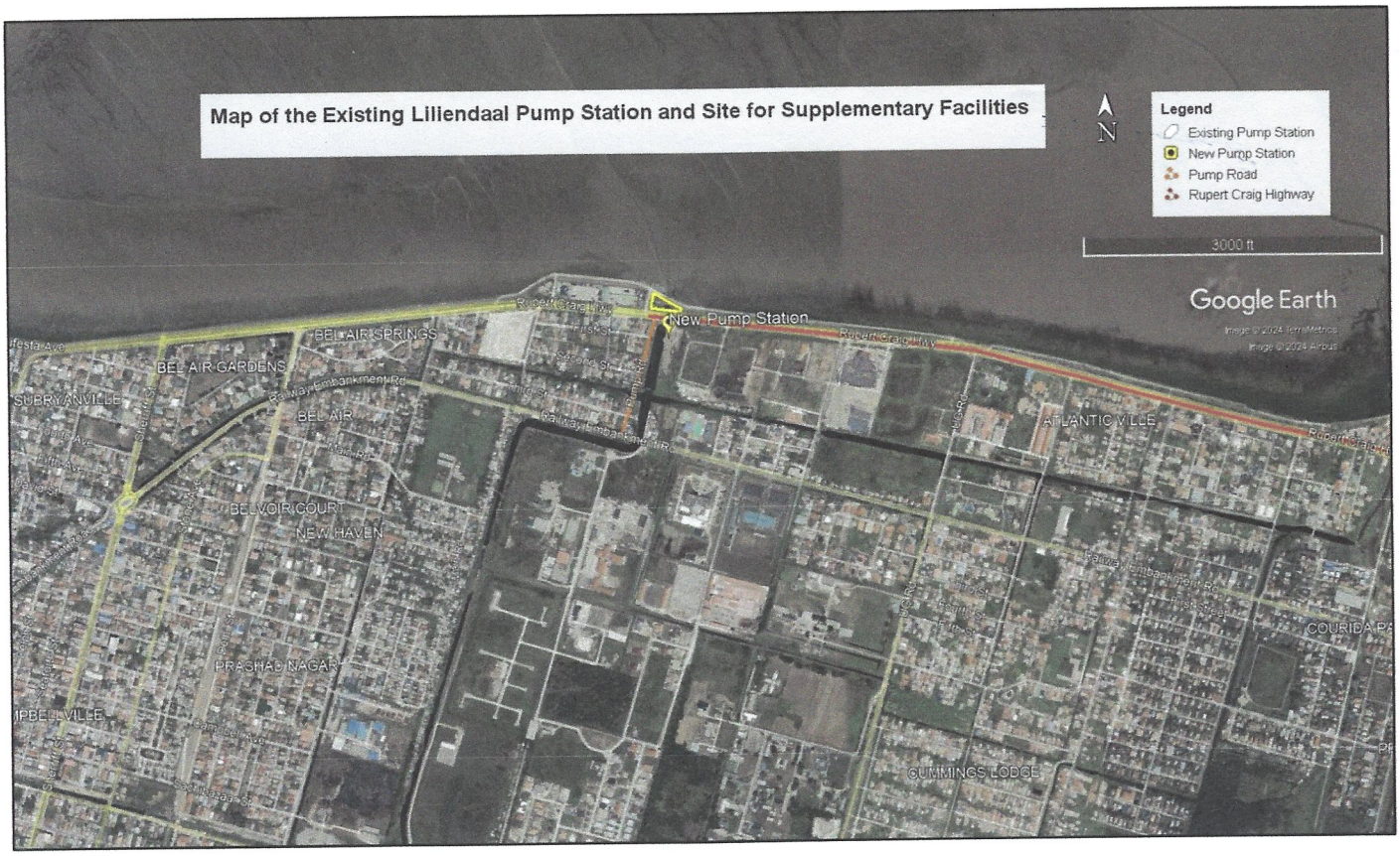

Figure 2.1 Map of the Existing Liliendaal Pump Station and Site for Supplementary Facilities.

2.2 Present Land Use and Contiguous Areas

I. Flora and Fauna- the proposed construction zone is empty with the exception of secondary shrubs, several species of grasses and a few herbaceous plants (shown in Figure 2.2). Faunal diversity is also sparse due to the highly disturbed environs with significant amounts of habitat loss /stresses observed as a result of human encroachment.

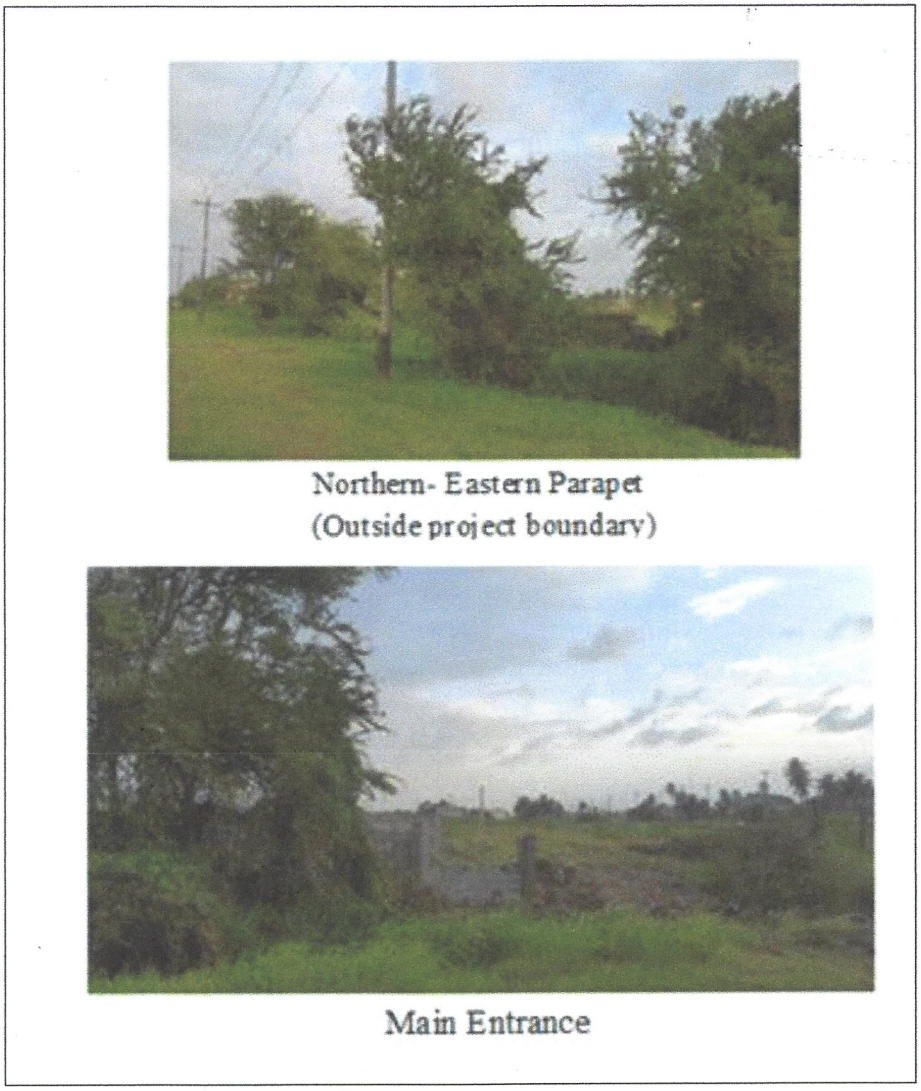

Figure 2.2 Present Land Use at the Proposed Site

II. Population and Demographic- the present pattern of land use at Liliendaal suggests a mixed residential, industrial and commercial setting, principal among these include the Infectious Disease Specialty Hospital, Oriental Suits Hotel, Rubis Gas Station, Movietowne Mall and several private businesses. There is no direct dwelling to the east, south and north of the proposed construction zone. Infrastructure to the West is separated by the existing drainage channel and Pump Road. The closest dwelling is approximately 75 meters west of the proposed site for the New Pump Station and supplementary facilities as shown in Figure 2.3.

2.3 Operation Layout

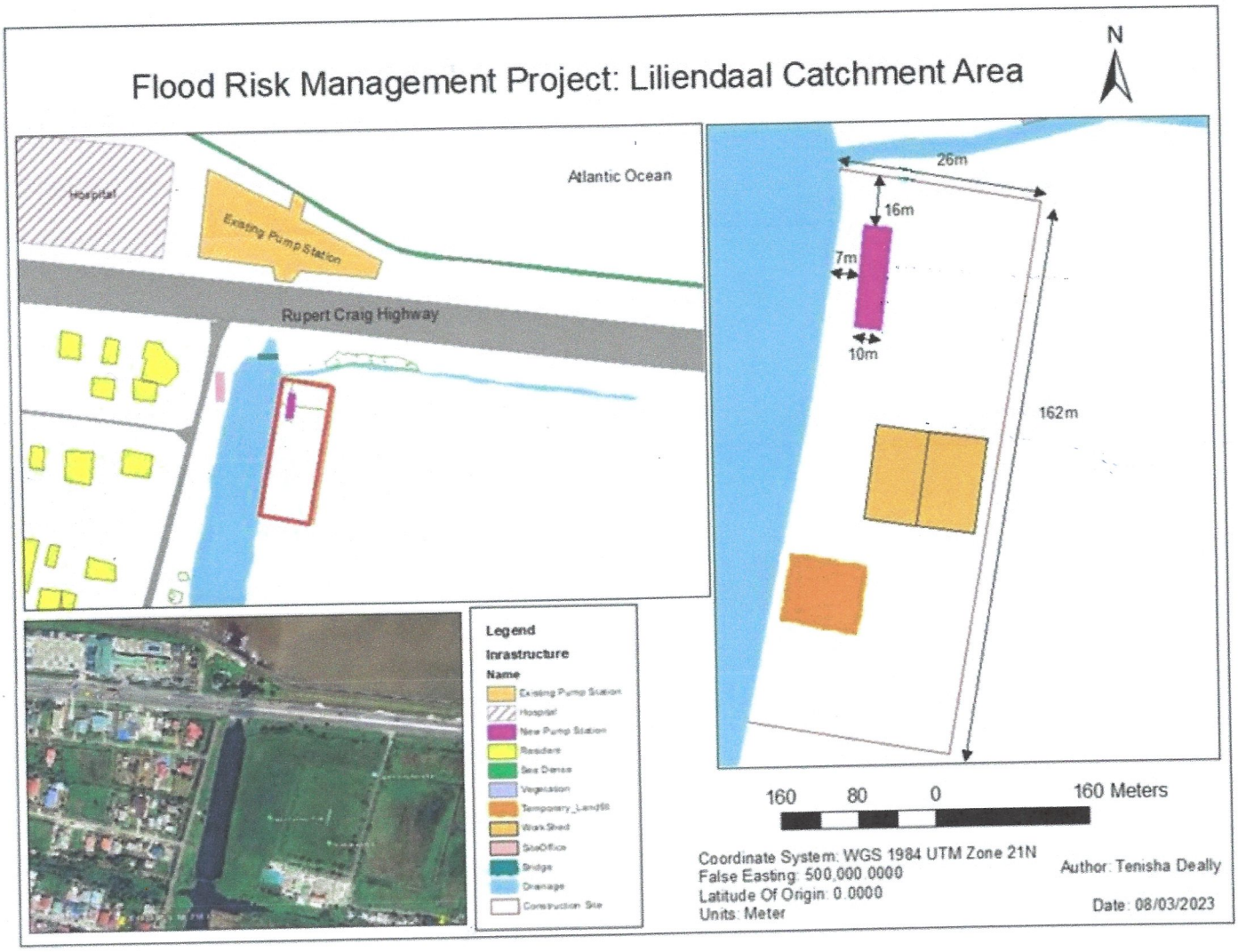

Figure 2.3 Flood Risk Management Project: Liliendaal Catchment Area

The New Pump Station will be constructed 31.2 meters from the Rupert Craig Highway and south of the existing pump station. The new pump station will be 10 meters by 27 meters with a 16 meter distance from the drain to the north and 7 meter distance from the main water channel. The total land area designated for this project is defined on Figure 2.3 as "Boundary" and spans 26 meters by 162 meters. Ancillary facilities necessary during the

construction phase includes a permimeter fence, bridge, stockpile area for spoils, site office, work shed, workers' sanitary facility and security shed which are defined in Figure 2.3.

The New Pump Station as shown in Figure 2.3 will be 85 meters from the sea wall to the north, 132 meters east of the Infectious Disease Specialty Hospital and 53 meters east of the nearest road (Pump Road). There is no immediate infrastructure east of the New Pump Station for 325 meters.

2.4 Land Requirements

The project will require a total land space of 4,212 m^2 on the empty land located south of the existing pump station to construct a new pump station and supplementary facilities under the Ministry of Agriculture's Flood Risk Management Project.

2.5 Identification of Receiving Waters

The Liliendaal Drainage Catchment Area regulates inland water flow across a total area of 9.6 km^2. This system is interconnected to the Ogle Drainage Catchment Area and the Georgetown Metropolitan Drainage System. The existing outlet channel empties into the Atlantic Ocean by way of the existing Liliendaal Pump Station.

2.6 Location of Proposed Intake and Discharge Structures

The New Pump Station will drain water from the existing canal into a newly constructed inlet channel. Water will then be channeled through two (2) stainless steel discharge pipes and empty into the Atlantic Ocean. The location for the new discharge pipes is approximately 25 meters east of the existing pump station pipes.

2.7 Support Services

Water for the facility will be provided by Guyana Water Inc., (GWI).

The Facility will be powered by Guyana Power and Light Inc., (GPL) and 5KVA Solar System. One (1) KVA generator will be installed to provide back up power during the construction phase of the project.

3.0 Scope of Activities

Description	Start Date	Duration	Size of Work Crew
Site Preparation			
• Surveying and delineation of the site boundaries and structure position.	Wed 5/3/23	1 day	3
• Mobilization of storage facilities, site offices, equipment, and sanitary facilities.	Thu 5/4/23	2 days	6
• Land clearing.	Mon 5/8/23	5 days	3
• Construction of main access to the site.	Mon 5/15/23	96 days	3
• Construct cofferdam & revetment.	Mon 5/15/23	25 days	5
• Excavation for pump station base.	Mon 5/15/23	25 days	5
Foundation Works			
• Deliver and drive foundation piles and sheet piles.	Mon 6/19/23	23 days	5
• Constructing the base slab & toe.	Mon 7/3/23	41 days	13
• Construction of walls.	Mon 9/25/23	19 days	13
• Construction of the top slab & bridge.	Thurs 10/12/23	17 days	13
Development of Inlet Channel			
• Construction of the inlet channel.	Tue 8/29/23	54 days	7
• Revetment works.	Mon 9/18/23	40 days	7
Installation of Underground Discharge Pipes			

• Installation of the underground pipes.	Mon 3/18/24	140 days	13
Access Road Works			
• Excavation & Grading of Carriageway	Mon 7/15/24	5 days	5
• Construction of Sub-base and Base Layer	Mon 7/22/24	10 days	13
Pump Station Superstructure Works			
• Construction of the Pump Station House	Mon 3/25/24	70 days	13
Installation of Ancillary Equipment & Electrical Works			
• Installation of Control Panel Systems and Electrical Motors	Mon 9/30/24	10 days	7
• Wiring and Electrical Works	Mon 9/30/24	10 days	5
Miscellaneous Works			
• Rehabilitation of Control Panel Systems & Electricals at Old Pump Station	Mon 9/30/24	10 days	7
Project Close Off			
• Site Reinstatement Works	Thurs 10/10/24	3 days	10
• General/Final Clean Up of Site	Thurs 10/10/24	3 days	5
• Demobilization	Thurs 10/15/24	2 days	7

Table 3.1 Scope of Activities for the Rehabilitation of the Liliendaal Pump Station and Supplementary Facilities

4.0 Potential Environmental Impacts and Control Measures

This section identifies the potential environmental impacts as well as the appropriate control measures which will be applied during the project implementation phase. Impact significance is determined by the probability of occurrence, duration and scope and potential for reversible action shown in Table 4.1.

Impact Significance Rating					
Lo- Localized	LT- Long Term	Sig. – Significant	Rev – Reversible	Av. – Avoidable	M. – Mitigable
Ex- Extensive	ST- Short Term	Insig. – Insignificant	Irr. Irreversible	Un - avoidable	UM – Unmitigable

Table 4.1 Impact Significance Rating

4.1 Air Emission Impacts

Impact	Project Activity Leading to Emission	Significance Rating	Control Measures
Reduced air quality from	Emissions (dust, fumes, etc.,) from land clearing and structural works as	Lo, ST, Sig., Rev, Un, M.	The construction zone will be fenced with a protective lining to contain the spread of dust and fine soil particles.

dust, fumes and exhaust.	well as the use of heavy machinery.		Cement batching and cutting will only be conducted within the construction zone to limit the spread of dust and particles. Workers within the construction zones will be equipped with PPE such as eye goggles, gloves and safety boots and also encouraged to wear appropriate clothing to reduce skin exposure to cement and dust. Unauthorized personnel and those lacking PPE will be denied entry to the construction zone.
	Excessively dry weather can contribute to the circulation of sand and dislodged soil, particularly from the storage of spoils.	Lo, ST, Insig., Rev, Un, M.	The use of PPE will be enforced and maintained to reduce effects on workers. Spoils will be stored downwind and covered to reduce excessive dust particle emission.
	Exhaust emissions from operation of heavy machinery and generators.	Lo, ST, Insig., Rev, Un, M.	Machinery will be regularly maintained and inspected bi-weekly to reduce emissions from defects. Machinery will not be left idol.

Noise Pollution	Generated from the operation of heavy machinery and generators.	Lo, ST, Insig., Rev, Un, M.	Operations will be restricted to the daytime as far as possible and machines will not be left idol.

Table 4. 2 Air Emission Impacts and Mitigation Measures

4.2 Surface Water Impacts

Impact	Project Activity Leading to Emission	Significance Rating	Control Measures
Pollution of the drainage canals from the build-up of construction and domestic waste.	Throughout the implementation phase of the projects.	Lo, ST, Sig., Rev, Av, M.	GESS Inc., will deploy its reduced waste initiative and will as far as possible recycle construction waste. Waste which cannot be recycled will be stored within the work zone North-East (Liliendaal) for easy collection and disposal every 30 days. Collection and disposal rotations will be amended based on the quantity of waste produced. GESS Inc., will utilize a "fat boy" sanitary septic system to reduce any potential effects to the surface water at the Liliendaal Site.

Spoil slippage into the drainage canals.	Improper storage and maintenance of spoils produced from excavation works.	Lo, ST, Sig., Rev, Av, M.	Spoils will be stored and maintained in low traffic areas (South-West in the Liliendaal construction zone) to reduce the potential for slippage and erosion into the canal.
Introduction of muddy water and discharge into the drainage canal at the Liliendaal site.	Installation of the drainage pipes will require the drainage of pits to maintain a clean workspace and prevent inflow of water.	Lo, ST, Insig., Rev, Un, UM.	This impact is generally unavoidable and un-mitigatable however, the scope of impacts will be limited to the final stages of drainage at the existing Liliendaal Pump Station. This practice will not be span beyond the scope of this activity.

Table 4. 3 Surface Water Impacts and Mitigation Measures

4.3 Impacts to the Land & Soil

Impact	Project Activity Leading to Emission	Significance Rating	Control Measures
Soil slippage and erosion.	Resulting from land clearing, structural works and installation of discharge pipes.	Lo, ST, Insig., Rev, Un, M.	Piles will be used to reinforce the foundation of the new Liliendaal Pump Station and prevent soil slippage during construction.

Soil compaction and reduced water flow.	Resulting from the movement of heavy machinery throughout the project implementation phase.	Lo, ST, Sig., Rev, Un, M.	Movement of heavy machines will be restricted within both sites to reduce soil compaction. Scarring methods will be applied during the restoration phase.
Soil displacement.	Prominent during excavation works. Soil displacement can also occur when machines traverse from the site onto the Rupert Craig Highway.	Lo, ST, Sig., Rev, Un, M.	Displaced soil will be utilized in the final stages of the project for rehabilitation and restoration of the site as far as possible. Sand will be placed at the entrance of the worksite to reduce the spread of muddy clays onto the Highway by cement trucks and other heavy-duty machinery.

Table 4. 4 Impacts to the Land/Soil and Mitigation Measures

4.4 Impacts to Biodiversity

Impact	Project Activity Leading to Emission	Significance Rating	Control Measures
Dislocation of birds, insects, grasses, shrubs and other biota within both work zones.	Prominent during land clearing and extended	Lo, ST, Sig., Rev, Un, M.	As part of GESS Inc., decommissioning and restoration plan the soil will be levelled and scarred to promote the regrowth of grass. A tree planting exercise will also be

	throughout construction phase.		conducted to reintroduce insects and biota to the sites.

Table 4. 5 Biodiversity Impacts and Mitigation Measures

5.0 Waste Management Plan

5.1 Types of Waste

GESS Inc., anticipates the generation of the following categories of waste from its activities;

a) Domestic waste/garbage.

b) Sanitary waste/sewage.

c) Construction waste.

d) Cleared vegetation and debris.

e) Hazardous waste from the maintenance of construction machinery and equipment such as used batteries, waste oil, filters and oil/fuel containers.

GESS Inc., will as far as possible mitigate this issue by deploying the following measures:

- First reduce the amount of waste required to be managed during the implementation phase of the project and further apply "reuse" mechanisms.
- Waste generated at the construction site will be collected, segregated (waste to be reused and disposed) and transported to the Lusignan Landfill by the Contractor.

5.3 Managing Domestic Waste

- Burning of waste materials and littering around construction zone will be prohibited.

- Frequent clean-ups will be recommended and monitored by the HSE/Environmental Officer and the Site Supervisor to ensure the work ground is kept tidy.
- Bins will be available onsite for collection and storage of waste materials and would be removed weekly. Disposal frequency will be increased based on the level of waste generated and not left to exceed 30 days.

5.4 Managing Sanitary Waste

One (1) "fat boy" sanitary facility will be positioned south of the Liliendaal facility and one (1) within the Site Office. These structures will be actively maintained by the work crew.

5.5 Managing Hazardous Waste

Though GESS Inc., does not anticipate the generation of large amounts of hazardous waste at its Liliendaal construction site, the following prophylactic measures will be deployed;

- Hazardous waste, including waste oil, will be collected and stored in five gallons buckets. Used filters and oily rags used in machine maintenance will also be collected and stored in drums/ buckets and disposed of by an acceptable method approved by the EPA.
- Used batteries will also be stored in a secured drum until reasonable instructions are communicated by the EPA.
- Storage drums will be inspected weekly for any signs of leakages.

6.0 Conclusion

GESS Inc., has deployed the highest environmental and occupational health and safety standards in its practices throughout the years. The same diligence and approach will be instilled throughout the construction phase for the Liliendaal Pump Station and Supplementary Facilities. Where necessary additional measures will be integrated to ensure environmental compliance.

Annex A- Design of the Proposed Pump Station