THE CO-OPERATIVE REPUBLIC OF GUYANA

Ministry of Public Works

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Project Summary

Replacement of the Existing Demerara Harbour Bridge

Prepared by: Ministry of Public Works

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1. Introduction

Replacing the existing Demerara Harbour Bridge is necessary to provide the country with a sustainable solution for future river crossing as the existing floating bridge has long passed its design life and now attracts regular and costly maintenance to sustain its operation. The exiting bridge has several issues including but not limited to:

1. Long opening times due to the slow retraction process;
2. Limited capacity due to its retraction system;
3. Vulnerability to disruptive incidents from vehicles, vessels and river forces.

As the bridge is the only connection, the West Bank economy and population may suffer significantly in cases where the bridge becomes inoperable.

The Demerara Harbour Bridge (DHB) was constructed by the UK firm Mabey and Johnson and commissioned on July 02, 1978. Apart from providing direct connectivity between Administrative Regions No. 3 & No. 4, it also provides indirect access between Georgetown and the Essequibo County (Regions Nos. 1, 2, 7, 8) – areas where activities such as minerals exploration, logging, ecotourism and rice cultivation account for the majority of Guyana's GDP. The bridge is an important link in the road network that connects the most populated areas, between Charity in the west via Georgetown to the Suriname border in the east.

The pontoon bridge is maintained through tolls. Tolls at the Demerara Harbour Bridge are collected manually in one direction at the Toll Plaza located at the eastern end of the bridge in cash payments only. Tolls are charged based on the vehicle type and weight. The current two-lane steel floating bridge connects the East Bank at Peters Hall with the West Bank at Meer Zorgen. Some 40,000 to 45,000 people (10,000 vehicles per direction) use the bridge each day. The market share of the bridge for the passenger segment is about 85% (the other 15% use speedboats).

The new bridge will replace the existing bridge. As soon as the new bridge goes into operation, the old bridge will be decommissioned and removed.

2. A detailed description of the proposed project, including:

Table 1

2.1	Physical location	The replacement bridge will span the Demerara River from Nandy Park to La Grange, upstream and in close proximity to the existing Demerara Harbour Bridge. This location shall allow an easy connection to the existing access roads on the West Bank of Demerara and new access roads will be constructed on the East Bank of Demerara. On the East Bank, the landing point of the bridge will be adjacent to Republic Park Phase 2. According to Google Earth, the anticipated locations of the abutments of the new bridge are as follows: **Eastern bank:** 6° 45' 45.10" North 58° 10' 31.47" West **Western bank:** 6° 46' 29.95" North 58° 11' 38.61" West Fifty (50) meters of bridge approach roads will also be constructed by the Contractor on both sides of the bridge from the abutments.
	Area of Influence	As depicted in Figure 1, access roads will continue eastward towards the southern border of Windsor Estate then northward to Mandela Avenue, Ruimveldt Georgetown. On the West Bank, the bridge access road will commence at the bank of the river (south of the existing floating bridge) and connect to the existing Demerara Harbour Bridge Access Road. The project will be executed at a distance of 3.3 miles from the Stabroek Market area (on the eastern bank) which is considered as the most significant transport hub in the City of Georgetown and just about 1/3 of a mile from the existing bridge. On the western

		bank, it will have the same approach roads and converge at the same area as the existing bridge which is 2.45 miles from Vreed-en-Hoop which is considered the most significant transport and commercial hub in Region 3.
	Land Use	The land use of the area is generally residential and commercial. On the eastern bank of the river the area to the north of the project is residential with a few lots being mixed use. To the immediate south of the project the land use is commercial. On the western bank of the river the area to the north is a recreational park that is not currently used. To the immediate south the land use is residential with a few lots being mixed use.
	Sensitive Receptors	The Peters' Hall Primary School located 200 meters (to the north) away from the proposed development which can be considered to be within the area of influence.
	Land Use Disputes	There are currently no land use disputes.
	Relocation/Resettlement	An initial assessment of the proposed alignment on the eastern bank of the Demerara river shows that approximately 24 lots of land may be acquired. Approximately 10 plots have concrete/wooden structures erected thereon. There are no properties to be acquired on the western bank of the Demerara river. When it becomes clear which properties will be affected, property owners will be engaged for voluntary acquisition at fair compensation. Subsequent to consultations, a relocation/ resettlement plan will be developed.
	Mangrove replanting/restoration	Approximately 2,360m^2 (47.2m x 50m) of mangroves located mainly along the west bank of the river may be impacted by construction activities. Upon completion of the construction phase of the project, an assessment will be done on the areas in which the mangrove was affected and the area will be replanted/restored.
2.2	Feasible Alternatives	As part of the feasibility study conducted by Liviense CSO in 2017, a number of sites were examined and Government has chosen the La Grange/Nandy Park alignment as the preferred alignment.
2.3	Existing Baselines	The baseline information was acquired from the review of secondary data.
2.4a	Proposed Site	See Figure 1.
2.4b	Closest Town	Georgetown 3.3 miles (5.3 km)
2.4c	Access Roads	**Eastern Bank:** East Bank Public Road and planned connecting roads between Georgetown and Diamond

		including the Ogle/Diamond Highway and Eccles/Mandela four lane road. **Western Bank:** West Demerara Public Road
2.4d	Receiving water bodies	**Not Applicable**
2.4e	Existing discharge structures	**Eastern Bank:** Peters' Hall Koker **Western Bank:** La Grange Koker
2.4	Effluent/Emission discharge point	**Not Applicable**

Figure 1: Proposed Bridge Location and Access Roads

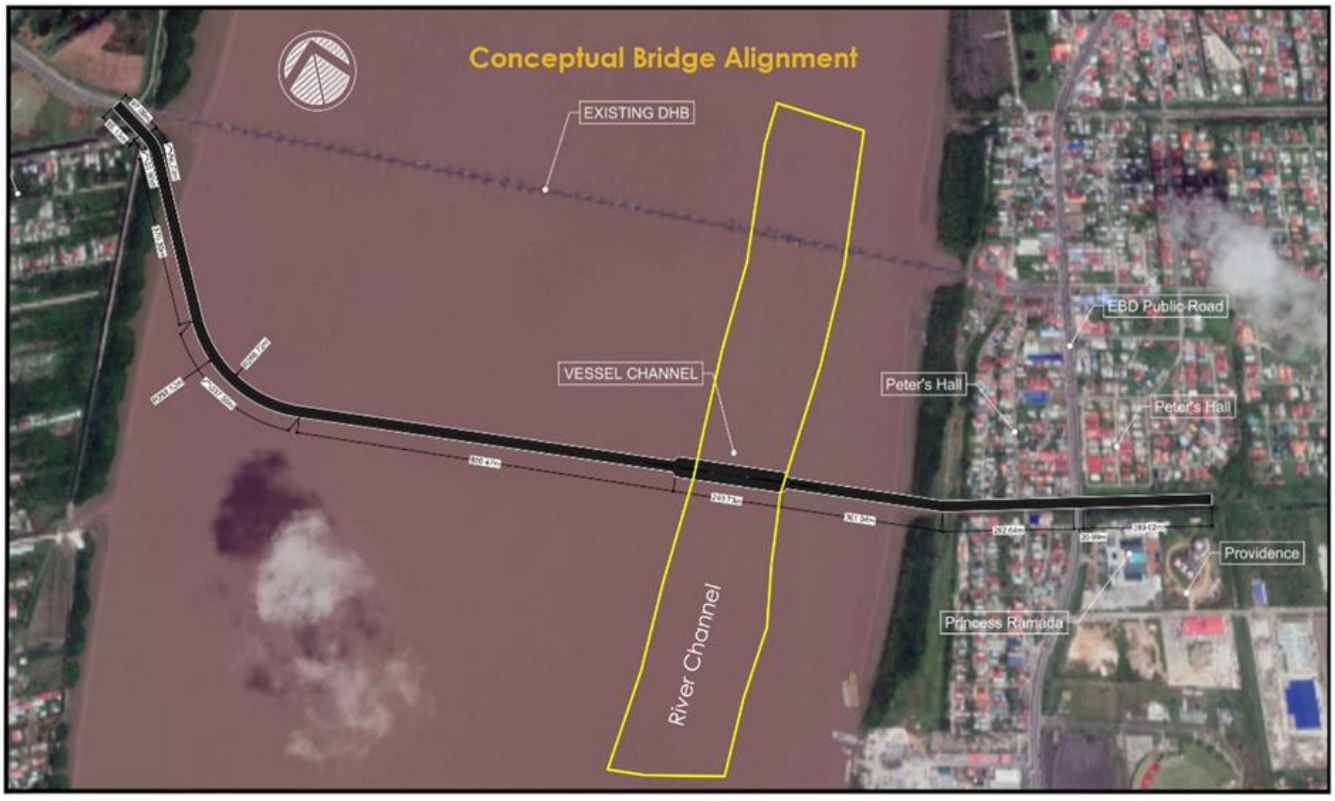

Figure 2: Conceptual Bridge Alignment and Navigational Channel

3. A Description of the design of the proposed bridge.

Table 2

3.1	Design Construction Drawings	Project is a DBF (Design Build Finance) therefore no drawings or specifications are available at this time.
3.2	Project Size	The project estimate is upward of **US$250M** and the duration of construction will be approximately 24 months. It is anticipated that more than 100 persons will be employed during the construction phase and no less than 60 during the operations phase.
3.3a	Project Stages: Operation and production	The project comprises of a construction phase and an operation phase.
3.3b	Project Stages: Raw materials	Construction – Cement, Sand, Aggregate (course) and Steel.

3.3c	Project Stages: Technical description	A description of the stages is shown in Table 3. However, as this is a DBF project, the stages are subject to variations by the Contractor.
3.4	Use of Natural resources	Construction –Sand and Aggregate (course). Quantities to be determined when there is a detailed design by the contractor
3.5	Sources of Utilities	Water – Guyana Water Inc. Electricity – Guyana Power and Light Communication – GTT, Digicel, E-Networks, etc.
3.6	Waste Production	All non-hazardous waste produced from construction activities will be disposed of at a predetermined waste disposal site. Hazardous waste such as paint residues, used lubricants, waste oil and oil filters, oil rags, hydrocarbon contaminated materials and soils, etc. will be segregated from the general waste stream, separately stored in clearly marked containers within an impervious containment area. All other hazardous waste will be safely disposed in keeping with the hazardous waste management regulations of the Environmental Protection Agency (EPA).
3.7	Duration of phases	Construction – 24 months, Operation – over 100 years
3.8	Decommissioning Plan	Not Applicable

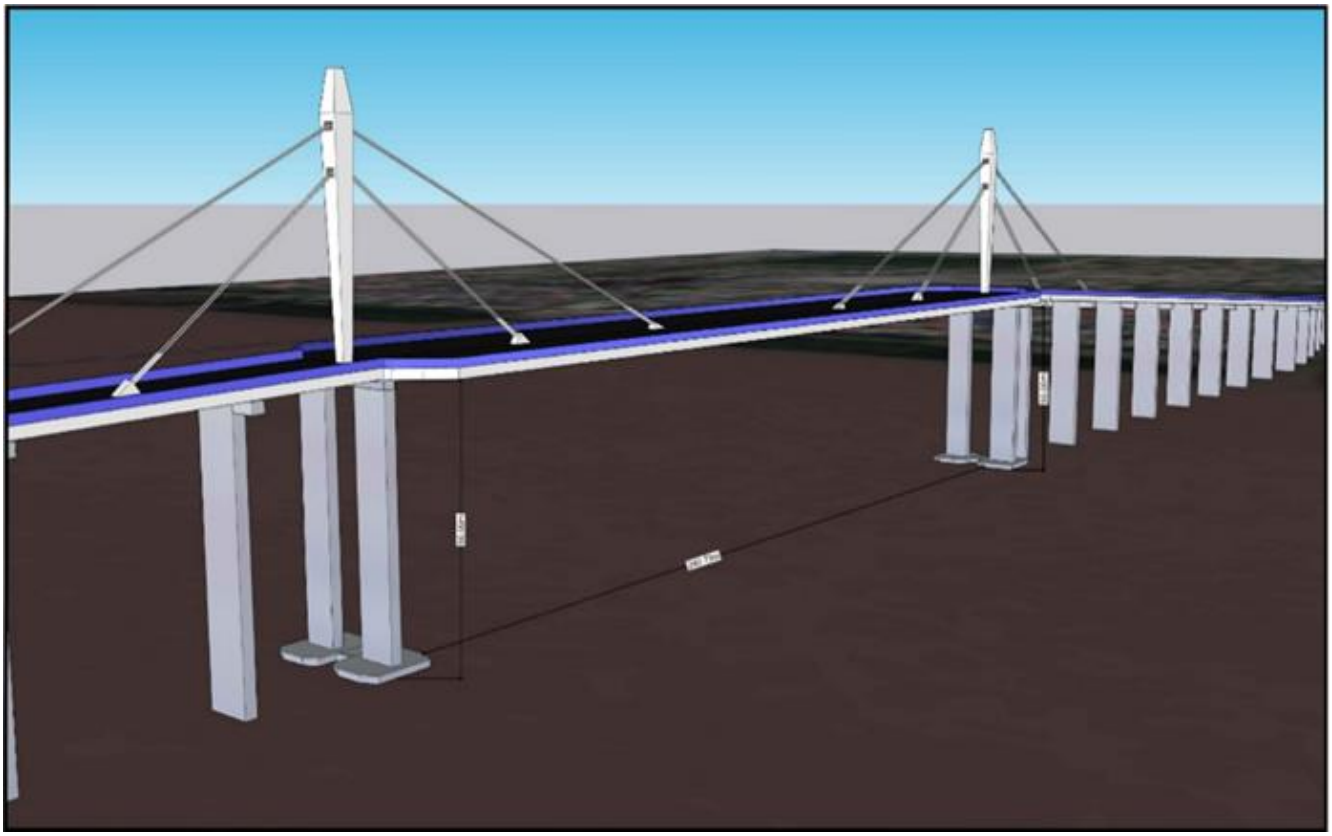

Figure 3: 3-D Concept of the Navigational Span

Table 3 - Major activities in Bridge and Road Construction

Element	Activities	Details
Bridge	Erecting local construction site	Storage of equipment and basic materials, construction and assembling elements.
	Dredging	Dredging temporary sea-lane for construction vessels
	Transport by ship and road	Sand, concrete, cement, etc.
	Pile driving	Fundaments of pillars
	Assembling	Assembling prefab bridge elements
	Pouring concrete	Bridge deck construction
	Installing Utilities	Lighting, lines, railing
	Demolishing	Temporary roads, construction site etc.
Road	RoW Clearing	All existing structures, vegetation, buildings, utilities.

	Waterways	Filling up waterways, excavate and redirect, construct culverts
	Excavation	Topsoil, storage in place and/or transport and recycle
	Subsoil	Transport of and application of appropriate groundwork
	Pavement	Asphalting
	Shoulders	Profiling, construction of drains or ditches
	Installation of Utilities	Lighting

4. Potential Environmental Impacts

4.1 Previous Studies

In 2017, an Initial Environmental and Social Impact Assessment (IESIA) was done as part of a Feasibility study for a new Demerara River Crossing. The findings are as follows:

- The potential environmental and social project impacts for the various bridge locations considered were not perceived to be irreversible and mitigation measures can be (easily) designed.
- Traffic will grow due to economic growth and many other factors, as well as greater ease to cross the Demerara River comfortably.
- The negative impacts of traffic are already felt, for example the road system with its impacts on noise, safety and air contamination. However, during operation, the challenge will be to mitigate these negative effects in an appropriate way.
- The overall social impact of the project will be positive, because it will benefit many especially if links and bypasses are constructed simultaneously.
- The overall environmental impacts of the proposed project were considered to be moderate and manageable from a technical, social and financial point of view.

4.2 Potential Impacts and their Significance

A preliminary environmental assessment was conducted to identify and assess the potential impacts the project may have on the bio-physical environment and mitigation measures are recommended to avoid, minimize or remedy those potential negative impacts.

The methodology used to identify and assess the potential physical and biological impacts of the proposed Project included the following:

i. Characterizing the baseline conditions through the review of secondary data to establish and assess the most likely environmental effects of the Project;
ii. Identifying the source of impacts and the impacts that will be generated by the Project. This was achieved through a desk top analysis and review of relevant literature and the environmental management plans of similar projects.
iii. Rating impacts to determine impact significance; and
iv. Recommending appropriate mitigation to address significant negative impacts.

Impacts were categorized using the definitions below:

- Positive - An impact that results in a positive effect on the receiving environment or resource from activities performed at or by the project.
- Negative - An impact that results in a negative effect on the receiving environment or resource from activities performed at or by the project.
- Direct - An impact created as a direct result of the project.
- Indirect - An impact which may be caused by the project, but will occur in the future or outside the project's AoI.
- Short-term - An impact or activity that is expected to dissipate shortly after the cause ceases
- Long-term - An impact or activity that is expected to continue for significant time after the cause ceases
- Localized - Impact which is limited to the project's AoI
- Extensive - Impact which has extended beyond the vicinity of the project's AoI.

Impact Significance

The importance of an impact was assessed by a combination of the following:

- The significance of the impact on the resources should the impact occur; and
- The likelihood of that impact occurring.

In determining the significance level, consideration was given to the types of impacts from project activity relative to existing baseline conditions. Further, in determining the likelihood levels, consideration was given to the probability of an identified physical or ecological or socioeconomic resource to be impacted by the project. The anticipated likelihood of occurrence of an impact was identified to range from Rare to Certain.

Utilizing the outcomes of both the impact significance ranking and the identified likelihood of impact, the effect of impact causing action on the receiving environment was evaluated. The risk level was assessed by combining the significance column and the probability row in the following Risk Assessment Matrix.

Table 4 Showing levels of Impact Significance

Likelihood	Impact Level				
	Negligible	Minor	Moderate	Major	Extreme
Rare	Low	Low	Low	Medium	Medium
Unlikely	Low	Low	Medium	Medium	High
Likely	Low	Medium	Medium	High	High
Almost Certain	Low	Medium	High	High	Critical
Certain	Low	Medium	High	Critical	Critical

5. Description of proposed environmental management and mitigation measures for all environmental, ecological and social impacts.

A comprehensive environmental Management Plan will be developed to mitigate negative impacts Table 5 details the potential environmental impacts envisaged by MOPW.

Potential Environmental Impact and associated mitigation measures

KEY – Impact Rating parameters

Pos – Positive **Loc – Localised** **Dir – Direct** **ST-Short Term**
Neg – Negative **Ex – Extensive** **Indir – Indirect** **LT – Long Term**

Table 5

Environmental Component	Potential Impact	Impact Type	Impact Level	Likelihood	Significance	Proposed Mitigation Measure
Physical Resources						
Geology and soils	Erosion from construction activities such as land clearing, piling etc.	Neg; Dir; ST; Ext;	Moderate	Likely	Medium	-Phased and planned land clearing -Soil disturbance should be limited to areas only where it is absolutely necessary. -Adequate drainage should be provided at temporary work areas. -Landscaping -Construction of abutments, use of erosion control matting and other physical measures -Landscaping (mainly done during post construction
	Soil compaction from the movement of heavy equipment	Neg; Dir; ST; Loc;	Minor	Likely	Medium	-Soils that have been compacted by heavy-duty equipment during transport of materials and also during site works will be scarified. -Appropriate heavy-duty equipment will be utilised for all works.
Air Quality	The operation of machinery and the stockpiling of material are potential sources of air	Neg; Dir; ST; Loc;	Minor	Likely	Medium	-Machinery will be regularly maintained to reduce air pollutants and stockpiled material will be covered to reduce the escape of fugitive dust particles. -Contractor will also frequently use water to suppress dust.

	pollution and dust emissions respectively.					
Noise	Noise is expected to be generated from the operation of equipment on site and pile driving activities during the construction phase.	Neg; Dir; ST; Loc;	Minor	Likely	Medium	-Heavy duty equipment will be equipped with silencers and mufflers to abate noise level emissions. -Vehicles will be regularly maintained to facilitate effective functioning of equipment. -As far as possible pile driving hammers will be equipped with noise attenuation device.
Water Quality	Potential exists for sedimentation and discolouration due to surface runoff, erosion and pile driving activities;	Neg; Dir; ST; Ext;	Moderate	Likely	Medium	-Erosion control measures will be implemented and construction materials will be stored outside drainage lines in order to minimize sedimentation.
	Contamination of surrounding water bodies from fuel/oil/lubricants spills.	Neg; Dir; ST; Loc;	Minor	Likely	Medium	-Large quantity of fuel will be stored in an impervious, bunded area (secondary containment) to minimize adverse impacts to the environment in the event of spillage.
Biological Resources						
Flora	Deforestation due to the clearance of vegetation for construction	Neg; Dir; ST; Loc;	Moderate	Likely	Medium	-Accurate calculation of area to be cleared -Phased clearing to minimize top soil exposure -Replanting, and revegetation will be done post construction
Fauna	Limited species displacement and loss of habitat resulting from construction works.	Neg; Dir; ST; Loc;	Moderate	Likely	Medium	Water quality will be monitored to ensure ecologically acceptable turbidity, nutrient and sediment levels.

6. Summary of the minutes of any public consultations/meetings held by the Project proponent with key stakeholders expressing their views and concerns

Based on the IESIA done by Liviense CSO (pg. 13-14), the pertinent issues identified were (1) separate carriageway should be given to cyclist and pedestrians, (2) Land ownership for the preferred location, and, (3) bridge design must not be done in isolation, but in conjunction with the road network and traffic streams.

7. A description of any assumptions, uncertainties and gaps in knowledge

To be determined when there is a detailed design by the contractor.

8. A non-technical summary of the project

The New Demerara River Bridge will reduce travel time and allow for greater flows of traffic with little to no build-ups. The bridge and all connecting roads will be four lanes which will reduce bottlenecks currently faced by commuters when they use the current two-lane bridge. The new bridge will take you from La Grange (current location on the western end) and place you at either Eccles Dump Site road or on Mandela Avenue (on the eastern end). As a consequence, much alleviation to queue lengths and waiting time will allow for commuters using the new bridge to have a safer and more comfortable journey everything they use the bridge.