

# Construction of Belle Vue Pump Station

Executing Agency: Ministry of Agriculture - National Drainage and Irrigation Authority

Contractor: Tepui Group Inc.

Supervisory Consultant: Caribbean Engineering and Management Consultants - CEMCO

Funded By: Government of Guyana

Duration: 18 Months

Start Date: January 29, 2024

Finish Date: August 29, 2024

Prepared By:  
Tepui Group Inc.

Date: March, 2024

## Site Location and Description

The proposed project site is located at the drainage trench separating Belle Vue and Good Intent Villages on the West Bank of the Demerara River, Region # 3 (Essequibo Islands – West Demerara). This community is a relatively established housing development (or Scheme) through the Wales Sugar Estate.

The site/location is generally flat with mostly clayey soils and light vegetation. The site is located on the West bank of the Demerara River and access from Georgetown and its environs is via the Demerara Harbour Bridge. The project site is accessible via paved roads from the West Bank Main Road. It should be noted that these roads also serve the older communities in the area and there can be a buildup of traffic during peak periods. Traffic within the area is considered light at present. The site is presently surrounded by an earthen perimeter trench which is drained by the sluice at the work site and two others located at the Stanleytown Pump Station. The perimeter drains form a network that then discharges into the primary drainage canals which flows to the outfall of the Demerara River via sluice gates. Maintenance of the earthen drains is key to proper drainage and blockage near unoccupied lots may become problematic. High water level in the main drainage canals during high tide can also result in a backup of water in the drains. Maintenance of the external drainage will be the responsibility of the Neighborhood Democratic Council for the area.

The surrounding lands are mainly used for residential development, with the closest houses located North of the site; a Christian Church to the South. The site has the main drainage trench located to the West and the Demerara River to the East. On the Eastern end of sluice outfall, small amounts of Mangroves have sprouted on both sides of the outfall.



Picture showing Project site – From Google Earth

## Description of Project Works

During the execution of any major work or job, in order to guarantee success, it is recommended that the job be broken down into smaller more manageable jobs. To execute this job, we intend to do the same and break the job into a number of steps or stages.

### Stage 1 - Earthworks and Temporary Works

During this stage, the contractor will do most of the grunt works. i.e. preparation works to the site and for the start of works for the major foundation. The works include the mobilization of staff and equipment to site; construction of coffer dams, one to the East and one to the West in the Demerara River. After the installation of these cofferdams, the site shall be dewatered via pumps and finally the site shall be excavated to grade level as per the designs.

### Stage 2 – Structural Works – Foundation Works

During this stage of works, 400 timber piles spliced to form 201nr. 30m piles shall be driven into the soil to create the pile bed for the structure. After the piles are driven, rebars shall be installed into the piles as per the design, RC pile caps shall be cast. After the pile caps, the foundation rebars shall be curtailed, affixed and concrete poured via "ready-mix" concrete to form the foundation slab.

### Stage 3 - Structural Works – Wall and Top Slab Works

During this stage of the works entails the curtailment of rebars, erection of formworks and pouring of ready-mix concrete to form walls of the structure. The walls shall be done in a number of lifts or layers until final height is achieved. After every lift, the structure shall be backfilled for ease of access and time savings. After which, the top slab rebars shall be curtailed, forms put into place and concrete poured. It is during this stage of the works will produce the largest amount of builders' waste.

### Stage 4 - Structural Works – Pump House and Sluice Works

During this stage of works, the erection of the Steel Pump House and erection of the sluice columns and other components. Installation of pumps and appurtenances, discharge pipe, exhaust pipes.

### Stage 5 - Structural Works – Finishing Works

During this stage of the works, the contractor shall complete all remaining finishing works to the site. This includes land filling, construction of pump attendants' house, access road, fuel bond and test run of the pumps.

## Potential Impacts and Mitigation Measures

- Solid Waste Management– Solid waste is expected to be generated onsite, these include but may not be limited to; plastic bottles, food boxes, packaging materials, etc. Adequate collection receptacles shall be provided onsite and waste will be taken to an approved site for disposal by the Puran Bros. Disposal Services. Disposal sites shall be approved by the local authority such as the Neighbourhood Democratic Councils (NDCs) e.g. the Haag Bosh Landfill. No burning of any type of the wastes generated will be allowed onsite. Workers will be trained of the waste management procedures.
  
- Liquid Waste/Wastewater Management- The Contractor shall provide adequate toilet facilities onsite. NO less than two (02) portable of toilets will be provided from Puran Bros Disposal Services onsite. Provision of water for the toilets and maintenance of the toilets also, since toilets are expected to be well maintained. If portable toilets are to be utilized these will have to be emptied on a weekly basis.
  
- Hazardous Waste Management - The construction works are not expected to generate significant hazardous waste. Hazardous waste generation may be limited to the servicing of heavy equipment onsite and should include waste oil, oil filters and oily rags. If hazardous waste is generated onsite, the waste shall be carefully collected by the Puran Bros. Disposal Services and removed from site on a weekly basis and disposed of in an approved manner. All waste materials shall be stored in suitable containers until removal from site by the disposal services eg. Waste oil shall be stored in 5-gallon pales or 45-gallon drums. A register of hazardous waste generated will be kept onsite by the Contractor.
  
- Construction Waste Management – Construction waste will be generated throughout the construction process and shall be stored in skip bins and emptied on a weekly basis. This waste shall not be allowed to accumulate in significant quantity onsite for extended period (not more than 30 days) and will be consolidated in a designated area. Reusable construction waste shall be separated for reuse and the remainder dispose of at a site approved by the NDC.

- Erosion and Sedimentation Control– Stockpiles of construction materials should be placed away from the drainage systems. Nearby drains should also be regularly checked for accumulation of construction materials and if found to be present the materials should be immediately removed. This is highly unlikely since no materials shall be stored within the boundaries of drainage systems.
  
- Hazardous Materials Management – Fuel and lubricants are to be kept onsite in significant quantity thru out the project life. It is important to prevent fuel and lubricants from contaminating the water table and or aqua culture. Therefore, all fuel and lubricants shall be stored within a contained impervious bond area and workers shall take care and be made aware of the handling practices to avoid spills during the dissemination of these liquids.
  
- Dust Control - There is the potential for dust nuisance to occur which can affect workers and surrounding residents. Dust can be generated from material stockpiles and cement mixing. As such, measures such minimizing the height of sand stockpiles, soaking with water sprinklers, covering of material stockpiles, covering of trucks transporting materials to the sites and providing dust mask to workers shall be considered in addition to the following:
  - All plant and equipment shall be maintained in accordance with manufacturer’s recommendations to ensure emissions to atmosphere are minimized.
  - Any equipment used to cut paving blocks, kerbs, flagstones etc. shall be operated with a water suppression attachment or a dust filter.
  - Engines of plant, machinery, and lorries shall be turned off at all times when not in use.
  - Delivery activities, plant, stockpiled materials and/or any other activities liable to significant dust generation shall be located as far away as possible from the development site boundaries and neighbouring properties.
  - Stored materials liable to dust generation shall be dampened down, covered with tarpaulin, or otherwise contained as far as reasonably possible.

- Drop heights from conveyors, loading shovels, hoppers, and other loading or handling equipment shall be minimized and fine water sprays should be used on equipment where necessary.
  - Skips, chutes, and conveyors shall be covered and if necessary enclosed to ensure that dust does not escape.
  - All vehicles carrying dusty materials shall be securely covered. Water suppression shall be used in dry conditions to reduce dust emissions (e.g. mobile bowsers or fixed sprayers as appropriate). A water suppression contingency plan should be included detailing water supply to site and what equipment will be kept available (e.g. number and size of bowsers, sprinklers, mist canons etc.)
- Noise Prevention – Construction activities can generate noise at levels which can affect workers and nearby residents, and in this regard, measures should be outlined to noise is within the prescribed limit.
- Noise levels shall not exceed 90 dB during the day and 75 dB at nights.
  - Night works should be avoided and must be approved in advance by the Supervisory Consultants.
  - The contractor shall ensure that equipment is in good working order with manufacturer supplied noise suppression (mufflers etc.) systems functioning and should make reasonable efforts not to schedule heavy noise activities for weekends or in the late afternoon and keep the noisy activities for normal working hours (between 8 am and 5 pm).
  - All vehicles and plant used during the development will be maintained in good and efficient working order, and in accordance with manufacturer's specification.
  - All vehicles, mechanical plant, and machinery used during the development shall be fitted with proper and effective silencers (where available AND/OR in compliance with health & safety requirements) and shall be maintained in good and efficient working order.
  - All plant and machinery in intermittent use shall be shut down in the intervening periods between works.

- Plant and machinery capable of generating significant noise and vibration levels will be operated in a manner to restrict its duration.
- Static plant and machinery shall be sited as far away as possible from inhabited buildings or other noise sensitive locations.
- All compressors shall be 'noise reduced' models that are fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use. All ancillary pneumatic percussion tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers.
- Wherever possible mains electricity or battery powered equipment shall be used instead of diesel or petrol powered generators.
- The handling of materials shall be conducted in such a manner that minimizes noise, including minimizing drop heights into hoppers and lorries.
- No stereos or similar amplified devices shall be audible beyond the site boundary.

However, at Belle Vue it should be ensured that noise does not affect the residents which is in close proximity to that site. Where noise is likely to pose an impact to the normal environment surrounding the pump stations compound and the community, the contractor shall inform the Supervisor Consultants and nearby residents should be informed. Workers operating in areas where decibel levels reach more than 85 decibels should use hearing protection.

□ Biodiversity – The site in question has been used as a sluice location for some time now, meaning that water was drained from the land twice daily. This would mean that twice daily the site would be inundated and drained. This would limit the types of flora and fauna that could exist in this area. The following were observed:

- Due to the high level of site in the drainage canal no viable fishing could be done;
- Only grass and river foreshore mangroves exist onsite,
- During the construction period, a section of the mangrove shall be removed to accommodate the structure;

- This section disturbed shall be replaced with gabion basket revetments at the end of the works.

Due to the above mentioned, the contractor shall endeavor to follow all SoP to prevent any environmental issues, since prevention is better than mitigation and shall be open to any reports from all stakeholders.

□ Surface and Ground Waters – the contractor shall make every effort to ensure that the surface and ground waters are not contaminated by construction waste. The following shall be implemented:

- Stockpiles of construction materials should be placed away from the drainage systems.
- Nearby drains should also be regularly checked for accumulation of construction materials and if found to be present the materials should be immediately removed.
- Refueling not to be done in close proximity to water ways, all equipment will be equipped with drip trays.
- Stockpiles to be bermed and will not be placed less than 10m from the watercourse.

□ Soil - the contractor shall make every effort to ensure that the soil is not contaminated by construction waste. The following shall be implemented:

- Refueling not to be done in close proximity to water ways, all equipment will be equipped with drip trays.
- Fuel shall be stored within a contained impervious area and workers will take care and be made aware of the handling practices to avoid spills.
- All excavated materials will be stored and reused to backfill the new structure. The stockpile materials will be stored at an allocated western stockpile area so as to not hinder the progress of work.

□ Workers Health and Safety – Construction activities pose several risks to workers health and safety. It is therefore essential that the Contractor develop and implement systems to ensure workers health and safety are not compromised. A management commitment to monitor safety

and an analysis of the worksite in terms of safety, the potential hazards and prevention and control measures and training for employees. Measures such as the provision and enforcing the use of safety gears by workers, training of workers, identify hazardous areas, etc. All safety activities must be documented, all illness/injury and exposure should be documented on an Incident Form.

- Community Safety – The Contractor will erect a perimeter fence restricting access to the construction zone securing/barricading area, installing the necessary warning signs, ensuring the free flow of traffic around the work site, careful planning when large trucks are accessing the site to allow for minimal disruption and that at no time will there be trucks or other construction equipment left standing on the road way or shoulders without proper safety signs or markers.
  
- Contingency and Emergency Response Plan – A Contingency and Emergency Response Plan address emergencies relevant to the project. The possible emergencies are:
  - a. Accidents – can occur which can result in injuries to workers. At least one First Aid Kit will be provided onsite and arrangements should be in place to transfer serious cases to medical institutions.
  - b. Fires - Fire extinguishers will be placed at the working sites and training should be provided on usage
  - c. Fuel/Chemical Spills - If there is a large spill or release of solvents, fuels, or other kind of hazardous material, then the EPA will be notified and other measures taken. A spill response kit will be provided and kept onsite and workers should be trained to respond to spills through mock spills exercises.
  - d. Flooding – There will be a plan to address floods during the rainy period and maintain the works on the timeline agreed and reduced environmental and social impact.

The Contingency and Emergency Response Plan also to address training of employees, assembly point in case of emergency, emergency contacts, communications, responsible personnel, response procedures and incident reporting.

- Training - Prior to the commencement of works the Contractor will conduct an Induction Training for all workers. The training will be conducted by the Contractor's Environmental Personnel and covers the environmental and social requirements of the project, including the role of workers in pollution control, health and safety and emergency response. Thereafter, all new workers should be adequately briefed on the requirements prior to commencing work onsite. If necessary, refresher training will be conducted.
  
- Site Closure, Decommissioning and Restoration - At the conclusion of works the site will have to be cleaned up and all waste removed and all temporary structures belonging to the Contractor dismantled and also removed.
  
- Monitoring and Reporting –The Contractor is required to report on environmental compliance at the Monthly Progress Meetings and in the Monthly Progress Reports. Further, the Contractor will be responsible to prepare and submit any report requested by the EPA/Client in the Environmental Authorisation and the Client shall ensure that this occurs. The Contractor is will submit a report on environmental, social, health and safety performance at least on a monthly basis. The report shall include but not limited to the following:
  - Environmental incidents or non-compliances observed and corrective actions taken with regards to contract requirements, including waste management, contamination, noise and dust control, traffic management, etc.;
  - Health and safety incidents, accidents, injuries and all fatalities that require treatment and actions taken to improve conditions. Information on number of workers, work hours, PPE provided and usage, and worker violations and follow-up actions taken (if any);
  - Grievances by workers and community, including grievances received, how resolved, those unresolved and plan for resolving these.

In addition to the monthly report, the Contractor will also provide immediate notification to the Project Manager of incidents in the following categories. Full details of such incidents shall be provided to

the Project Manager within the time frame agreed with the Project Manager.

- confirmed or likely violation of any Environmental Permit Conditions or any relevant legislation;
- any fatality or serious (lost time) injury;
- damage to public utilities; or
- any allegation of sexual harassment or sexual misbehavior, child abuse, defilement, or other violations involving children.