DRAFT TERMS OF REFERENCE

CONSULTANCY SERVICES FOR A FEASIBILITY STUDY, DETAILED DESIGN AND INTEGRATED SOLID WASTE MANAGEMENT STRATEGY FOR ANTIGUA AND BARBUDA

1. BACKGROUND

1.01 Antigua and Barbuda, a twin-island nation of approximately 93,000 people in the Eastern Caribbean, is experiencing increasing pressures on its solid waste management system. Rapid urbanization, demographic change and an expanding tourism economy bringing nearly one million visitors annually have intensified waste generation and placed a strain on outdated infrastructure. These challenges are compounded by the country's high vulnerability to climate change and natural hazards, including hurricanes, storm surges, flooding, and droughts, which create substantial volumes of disaster debris and periodically disrupt waste services.

1.02 Solid waste management is governed primarily by the National Solid Waste Management Authority (NSWMA), operating alongside the Antigua Public Utilities Authority (APUA), Central Board of Health (CBH). In practice, and particularly during disaster situations, the National Office of Disaster Services (NODS), among other stakeholders, also plays a role in managing waste. While these agencies share responsibility for waste collection, disposal, environmental health and disaster management, the existing institutional arrangement is hindered by outdated legislation, weak enforcement mechanisms, and insufficient technical and financial capacity to meet growing service demands. The regulatory framework anchored in the Solid Waste Management Act (2005) has not kept pace with current environmental, climate, and public-health imperatives, nor does it fully support emerging circular economy approaches.

1.03 Cooks Sanitary Landfill, constructed in 2003 and the country's sole engineered disposal facility, now operates beyond its intended capacity. The site receives an estimated 140,000 tonnes of waste annually, nearly half of which is organic, including more than 21,000 tonnes of green waste. Key containment and monitoring systems such as landfill gas collection, leachate management, and environmental control infrastructure are inadequate or absent. This increases risks of groundwater contamination, soil degradation, greenhouse gas emissions, and recurring fire events that have produced hazardous smoke plumes and threatened nearby institutions, including the expanding University of the West Indies Five Islands Campus.

1.04 The current system also lacks cost-recovery mechanisms that would incentivize resource recovery and discourage disposal of high-volume waste streams. Free tipping of green waste, for example, contributes to increased landfill volume, equipment damage, and fire risk, and undermines opportunities for composting and soil regeneration. Yet previous initiatives including a 2021 composting pilot, demonstrated that organic waste diversion is both technically feasible and supported by key stakeholders. However, scaling such interventions requires stronger public education, clearer regulations, targeted investment, and revised procurement policies that support circular economy objectives.

1.05 Broader systemic challenges persist, including limited data on waste generation and composition, insufficient coverage in some communities, inadequate disaster-debris management capacity, and the absence of a comprehensive Integrated Solid Waste Management Strategy. Persistent issues in septage and wastewater management, including limited infrastructure and

weak regulatory enforcement, further compound environmental and public health risks. Addressing these challenges requires an inclusive approach that explicitly integrates gender, youth, and vulnerable populations as a guiding principle or cross-cutting theme. These groups face differing levels of exposure to environmental hazards and unequal access to waste-related employment opportunities, making their perspectives essential to equitable service delivery and to building resilient, sustainable waste management systems.

1.06 Antigua and Barbuda stands at a critical juncture. Modernizing the solid waste management system presents an opportunity to improve public health, environmental quality, climate resilience, and economic sustainability. Strengthening institutional capacity, updating the policy and regulatory environment, integrating climate-resilient infrastructure, expanding resource recovery, and aligning with national development priorities, including the Nationally Determined Contributions (NDCs) and commitments to pollution reduction, are essential steps for building a robust, future-ready system.

1.07 This consultancy will therefore provide the technical, institutional, financial, and environmental analyses required to guide strategic decision-making, establish investment priorities, and design a modernized, climate-resilient integrated solid waste management system for Antigua and Barbuda.

2. OBJECTIVES

2.01 The consultancy seeks to strengthen solid waste management in Antigua and Barbuda by achieving the following objectives:

- Assess the current integrated waste system (solid and liquid), identifying technical, financial, institutional, environmental, and social gaps and opportunities.

- Complete a feasibility study of prioritized options (collection, transfer, recycling, composting/organics, treatment, sanitary landfilling, septage/sewage interfaces, hazardous/special waste, port/cruise wastes), including climate and disaster-risk considerations.

- Prepare detailed engineering designs, cost estimates, and bidding documents for modernized solid waste management facilities, plant and equipment, including expanded and/or new sanitary landfill sites, land closure and remediation of existing disposal sites, and the management of green waste.

- Develop an Integrated Solid Waste Management Strategy (ISWMS) to provide a long-term framework for sustainable operations and resource recovery embedding climate resilience and circular economy principles, whilst ensuring financial sustainability.

- Recommend institutional, regulatory, and financial frameworks (including PPP pathways) and public awareness initiatives, to ensure effective governance, enforcement, and sustainability of solid waste management.

3. SCOPE OF SERVICES

3.01 The team of consultants will carry out the activities described hereunder and any other activities necessary to accomplish the stated objectives of the consultancy assignment, whether or not a specific activity is cited in these Terms of Reference. The scope of services includes, but is not limited to:

- **Assessment of the Current Solid Waste Management System**

    - Review policies, legislation, institutional arrangements, and enforcement mechanisms; map interagency roles (NSWMA, APUA, CBH, MoF) and identify reform needs aligned with climate resilience and DRR;
    - Quantify and classify waste streams, including seasonal tourism impacts and disaster debris. Identify hazardous/special categories, port and cruise ship wastes, municipal solid waste, waste oil, sewage/septage interfaces, and construction/demolition materials (including metals and crushing). Implement systems for volume management, recycling, tiered risk-based categorization, and tracked collection schedules;
    - Audit infrastructure and operations: collection, transfer, treatment, sanitary landfill(s), leachate/gas systems, septage interfaces, and data systems;
    - Identify service gaps, environmental compliance issues, financial sustainability constraints, institutional capacity limitations, and community/stakeholder dynamics;
    - Conduct stakeholder analysis and mapping, identifying key actors, roles, interests, and engagement mechanisms across government, private sector, civil society, and community groups; and
    - Prepare an Inception Report setting out the work plan, detailed methodology, data collection approach, stakeholder engagement plan, and project timeline for the Government of Antigua and Barbuda (GOAB) review and approval, drawing on a desk review of applicable policies, legislation, plans, and studies.

- **Feasibility Study of Solid Waste Management Options**

    - Conduct technical alternatives analysis for prioritised waste management options;
    - Undertake environmental and social impact assessment;
    - Complete climate risk and vulnerability assessment;
    - Conduct financial and economic analysis, including cost-benefit analysis; and
    - Recommend preferred solution(s) based on resilience, sustainability, and

long-term feasibility.

- **Engineering Design and Procurement Support**

    - Based on preferred infrastructural solution, prepare detailed engineering designs for modernized solid waste management facilities (e.g., sanitary landfill, recycling centres, composting facilities, transfer stations);
    - Develop technical specifications, bills of quantities, and cost estimates for works, plant and equipment;
    - Propose operational and maintenance plans;
    - Design strategies for closure and remediation of existing disposal sites;
    - Support GOAB to prepare bid documents to facilitate the procurement of goods and works for the capital investment phase of the programme in accordance with the Procurement Policies for CDB Financed Projects and Procurement Procedures for CDB Financed Projects.

- **Landfill Management & Environmental Protection**

    - Verify boundaries, map cells, and quantify remaining capacity through spatial analysis;
    - Implement leachate control, stormwater management, liner adequacy, air quality mitigation, and ecosystem protection considering environmental safeguards; and
    - Define operating hours, access control, inspection protocols, cell sequencing, burn protocols, permits, and compliance monitoring for safe operations.

- **Waste Oil Management System**

    - Design a national system for generator registration/licensing, safe collection/transport, approved storage, treatment/export, chain-of-custody tracking, and PPP options.

- **Standard Operating Procedures (SOPs)**

    - Develop SOPs for generation, collection/transport, transfer, treatment, and disposal; and
    - Integrate digital tracking and quality assurance/quality control.

- **Emergency Preparedness & Disaster Risk Management**

- Site-specific emergency response for fire, flood, hazardous spills, leachate breaches, and equipment failure; and
- Incorporate climate resilience and business continuity planning.

- **Operational Plan**
  - Define staffing structure and capacity needs;
  - Identify equipment requirements and maintenance schedules;
  - Establish monitoring/reporting systems;
  - Propose financial sustainability mechanisms; and
  - Strengthen institutional and governance frameworks, including accountability and interagency coordination.

- **Development of an Integrated Solid Waste Management Strategy and Implementation Plan**
  - Formulate a framework for sustainable operations and resource recovery;
  - Provide a long-term roadmap incorporating climate adaptation, mitigation, and circular economy principles;
  - Align strategy with national development priorities and selected environmental safeguards;
  - Develop phased interventions with climate risk considerations in short-, medium-, and long-term implementation plans;
  - Provide risk assessment and mitigation strategies; and
  - Establish monitoring and evaluation mechanisms that track climate impacts, emissions reductions, and resilience outcomes.

- **Institutional, Regulatory, and Financial Frameworks**
  - Conduct organizational needs assessment of National Solid Waste Management Authority (NSWMA), including assessments of its goals and specific safety needs;
  - Conduct staffing needs assessment of NSWMA, including recommending changes to its structure of staffing to achieve its strategic and operational objectives;
  - Recommend improvements to governance, enforcement mechanisms, and regulatory frameworks;
  - Propose financial models and mechanisms for sustainable operation

including opportunities for public private sector participation; and

- Provide estimated costs for proposed measures and identify potential funding sources and financing strategies.

- **Capacity Building and Stakeholder Engagement**

  - Develop institutional reform and training programmes;
  - Promote public awareness and community participation;
  - Strengthen collaboration among stakeholders, including private sector, civil society, and port/cruise operators; and
  - Enhance inter-agency coordination and information management.

4. SUMMARY OF DELIVERABLES (52 -WEEK TIMELINE)

- **Inception Report:** *within four (4) weeks of the award of contract*

  - Work plan, methodology, timeline.
  - Initial stakeholder mapping and institutional review.

- **Baseline Assessment Report**: *within eight (8) weeks of the receipt of comments on the inception report*

  - Full solid waste management system assessment.
  - Waste stream analysis, infrastructure audit, stakeholder dynamics.

- **Feasibility Study Report:** *within eight (8) weeks of receipt of comments on the Baseline Assessment Report*

  - Technical, Financial, Climate Risk and Vulnerability Assessment, Environmental and Social Impact Assessment.
  - Preferred solutions identified.

- **Capacity Development and Institutional Strengthening Report**: *within eight (8) weeks of receipt of comments on the Feasibility Study Report*

  - Institutional/regulatory/governance framework review and report.
  - NSWMA organizational/staffing needs.
  - Governance, PPP models, training and stakeholder engagement.

- **Draft Solutions Report including Preliminary Engineering Design Package:** *within eight (8) weeks of receipt of comments on the Feasibility Study Report*

- Preliminary engineering designs.
- Draft technical specs, bills of quantities, cost estimates.
- Initial O&M plans, SOPs, landfill/environmental measures, waste oil system.

- **Final Solutions Report including Final Engineering Design Package, Proposed ISWMS and Implementation Plan**: *within twelve (12) weeks on receipt of comments on the Draft Solutions Report*

  - Final engineering designs: (Detailed Designs, Technical Specifications, Bills of Quantities, Cost Estimates, and Bid Documents).
  - Detailed operational plan.
  - Integrated strategy & phased implementation roadmap.
  - Emergency preparedness protocols.
  - Closure/remediation strategies.
  - Monitoring & evaluation framework.

4.01 A minimum period of two (2) weeks should be allowed for the receipt of comments on the six (6) key deliverables.

5. REPORTING REQUIREMENTS

5.01 The consultant will report to the designate of the NSWMA for technical matters, while maintaining a line to the Ministry of Finance or a designated PMU for financial and contractual oversight. The consultant will be required to attend monthly meetings with GOAB on project progress. In the fulfilment of all reporting requirements, data and information presented shall, to the extent practicable, be disaggregated by appropriate measure at minimum: by gender, by community/district and waste stream type.

5.02 Reports shall be submitted in PDF as complete documents, as well as in Microsoft Word and Excel and/or other formats used in their creation. Electronic copies of all data used in the preparation of the reports shall also be submitted to GOAB in formats that readily allow further analysis of the data.

6. DURATION

6.01 The assignment is to be completed over a period of approximately 52 weeks.

7. QUALIFICATIONS AND EXPERIENCE

7.01 It is the Consultant's responsibility to ensure that their team has an appropriate mix of key and non-key experts required to satisfy the full requirements of the TOR. Key experts must have excellent communication and interpersonal skills; have experience working on projects

financed by MDBs; be fluent in English; and possess relevant computer skills. As a guide only, it is considered that the consulting team is likely to need to include key experts with minimum qualifications and experience as follows:

- **Key Expert 1 – Team Leader/Solid +Liquid Waste Management Specialist:** The candidate should hold a post-graduate degree or equivalent professional certification with demonstrated experience in Environmental Engineering, Civil Engineering, or Waste Management. A minimum of 15 years' experience in solid waste management projects, including integrated system assessments, feasibility studies, and strategy development. Demonstrated experience in SIDS or the Caribbean context would be an asset.

- **Key Expert 2 – Social Safeguards Specialist:** The candidate should hold a post-graduate degree or equivalent professional certification with demonstrated experience in Social Development. A minimum of 10 years' experience in social impact assessments for infrastructure projects, including experience in at least one solid waste infrastructure project. Experience with MDB safeguard policies and stakeholder engagement processes is essential. Experience in integrating *'waste-pickers'* in a solid waste management system would be an asset.

- **Key Expert 3 – Environmental and Climate Change Specialist:** The candidate should hold a post-graduate degree or equivalent professional certification with demonstrated experience in Environmental Science, Climate Science, Environmental Management, Engineering. A minimum of 10 years' experience in conducting environmental assessments for infrastructure projects, including experience in at least one solid waste infrastructure project, and in climate risk and vulnerability assessments and climate resilience planning for infrastructure projects, preferably including solid waste management is essential.

- **Key Expert 4 – Financial and Economic Analyst:** The candidate should hold a post-graduate degree or equivalent professional certification with demonstrated experience in Economics, Finance, or Business Administration. A minimum of 10 years' experience in financial and economic analysis of infrastructure or environmental projects. Demonstrated expertise in cost-benefit analysis, financial modelling, and sustainable financing mechanisms for waste management projects is required.

- **Key Expert 5 – Civil / Environmental Engineer (Solid Waste Infrastructure Design):** The candidate should hold a post-graduate degree or equivalent professional certification with demonstrated experience in Civil Engineering, Environmental Engineering. A minimum of 10 years' experience in engineering design, including the design of solid waste facilities such as sanitary landfills, transfer stations, recycling centres, and composting plants. Experience in preparing technical specifications, bills of quantities, cost estimates and operational plans is required.

- **Key Expert 6 – Policy and Institutional Specialist:** The candidate should hold a post-graduate degree or equivalent professional certification with demonstrated experience in Public Policy, Environmental Law, or Institutional Development. A minimum of 10 years' experience in reviewing and reforming policies, legislation, and institutional frameworks related to environmental management. Experience in governance reform and regulatory strengthening in the waste management sector will be an advantage.

7.02 The Team Leader may be one of the Key Experts and must have satisfactorily performed the function of Team Leader on at least two similar projects within the past ten years. Proven experience in leading multidisciplinary teams and managing MDB-funded assignments is required. It is envisaged that inputs would be required from **non-key experts** that will include but may not be limited to:

- **Procurement and Contract Specialist** to support bidding document preparation and MDB procurement compliance;

- **Capacity Development and Training Specialist** to design training programs and institutional strengthening initiatives;

- **Community Engagement Specialist** to develop public awareness campaigns and stakeholder participation strategies;

- **Monitoring and Evaluation (M&E) specialist** to establish M&E frameworks, risk assessment, and reporting mechanisms;

- **Mechanical Engineer** to advise on plant and equipment specification and maintenance; and

- **GIS Specialist** to provide geospatial analysis, mapping, and spatial data management to support planning, monitoring, and decision-making.

8. COMMENTS BY THE CONSULTANT

8.01 The Consultant is required to make any comments on, and suggestions for, improvements to these TOR. The financial implications, if any, of these recommendations should be indicated in the Financial Proposal.

9. BUDGET AND PAYMENT SCHEDULE

9.01 Payments will be linked to deliverables. A detailed budget to be agreed upon with the contracting authority. A suggested payment schedule is shown below:

Deliverable	**Suggested %**
Inception Report	10%

Baseline Assessment Report	15%
Feasibility Study Report	20%
Capacity Development and Institutional Strengthening Report	10%
Draft Solutions Report including Preliminary Engineering Design Package	20%
Final Solutions Report including Final Engineering Design Package, Proposed ISWMS and Implementation Plan	25%

10. REFERENCES

- National Solid Waste Management Authority. (2005). *Solid Waste Management Act*. Government of Antigua and Barbuda.

- National Solid Waste Management Authority. (2024, June 27). *Immediate response to Cook's Landfill fire and equipment issues* [Press release]. Government of Antigua and Barbuda.

- Department of Environment & National Solid Waste Management Authority. (2022). *Sound land-based waste management technologies leading towards a pollution-free marine environment in Antigua and Barbuda: Final report of the ReMLit Project*. OECS Commission & Government of Norway.

- National Solid Waste Management Authority. (2021). *Annual report 2021*. Government of Antigua and Barbuda.

- Department of Environment. (2020). *Environmental impact assessment for the UWI Five Islands Campus expansion*. Government of Antigua and Barbuda.

- Case Study - Cooks Landfill Antigua: *Landfill disposal of green waste and impact on uPOPs emissions*. RWA Group.

- Antigua and Barbuda, *Updated Nationally Determined Contribution for period 2020 -2030* (September 2021).