



RFP163/2021 City of Joburg Biomethane Project



TENDER BRIEFING



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PROJECT INTRODUCTION

- A **circular economy** initiative funded by **The Global Environmental Facility** and the **City of Johannesburg**.
- Relief needed from rapidly filling landfill space at **Robinson Deep landfill**.
- Utilisation of **old municipal infrastructure**.
- Utilisation of **waste and wasted resources**.
- Service and product delivery between **Municipal Owned Entities** to improve municipal efficiency of service delivery.
- The project will serve as a pilot or demonstration plant with a close cooperation with the **University of Johannesburg**, to ensure information dissemination and training opportunities.



PROJECT LOCATION



Google Earth

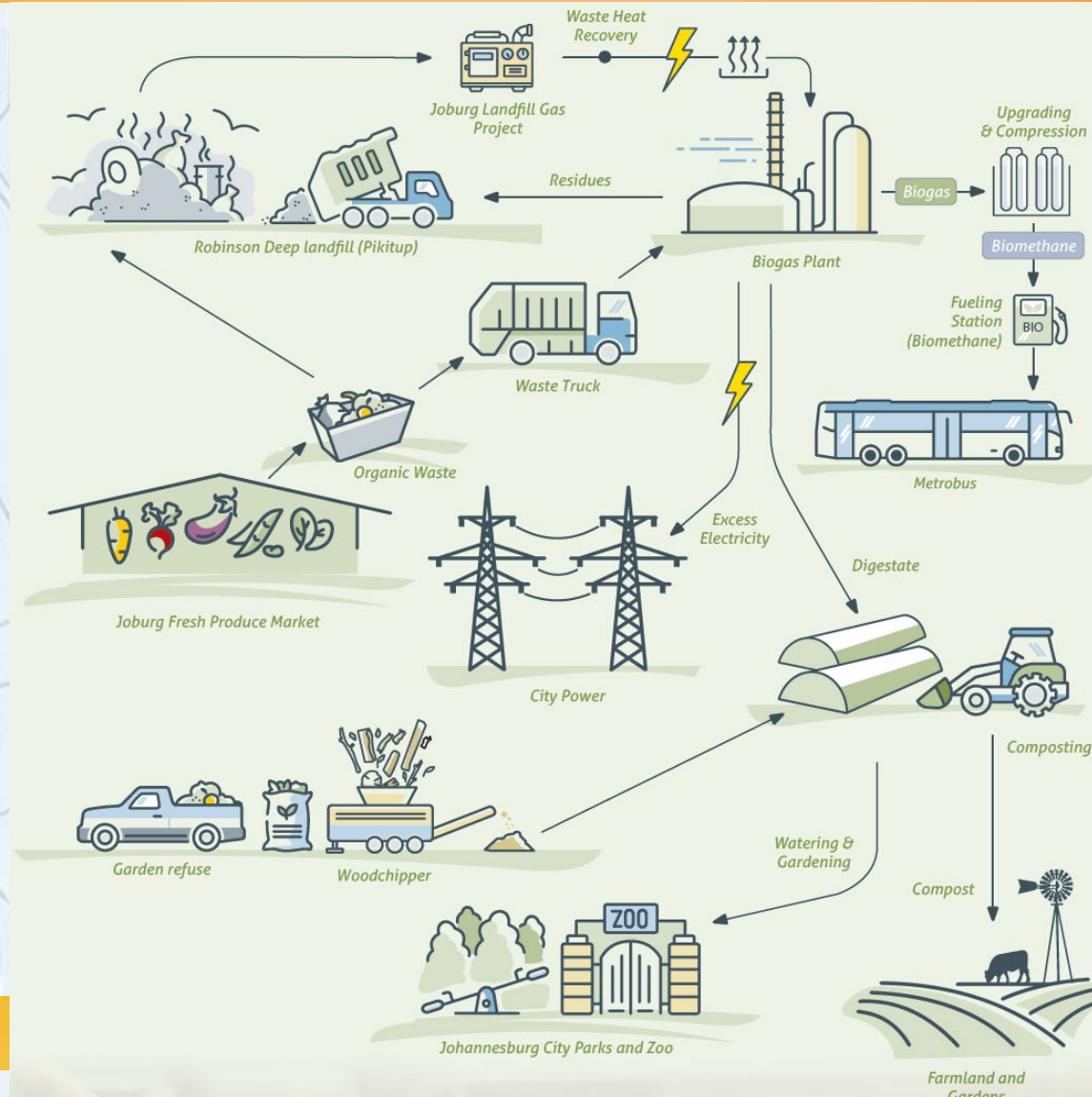
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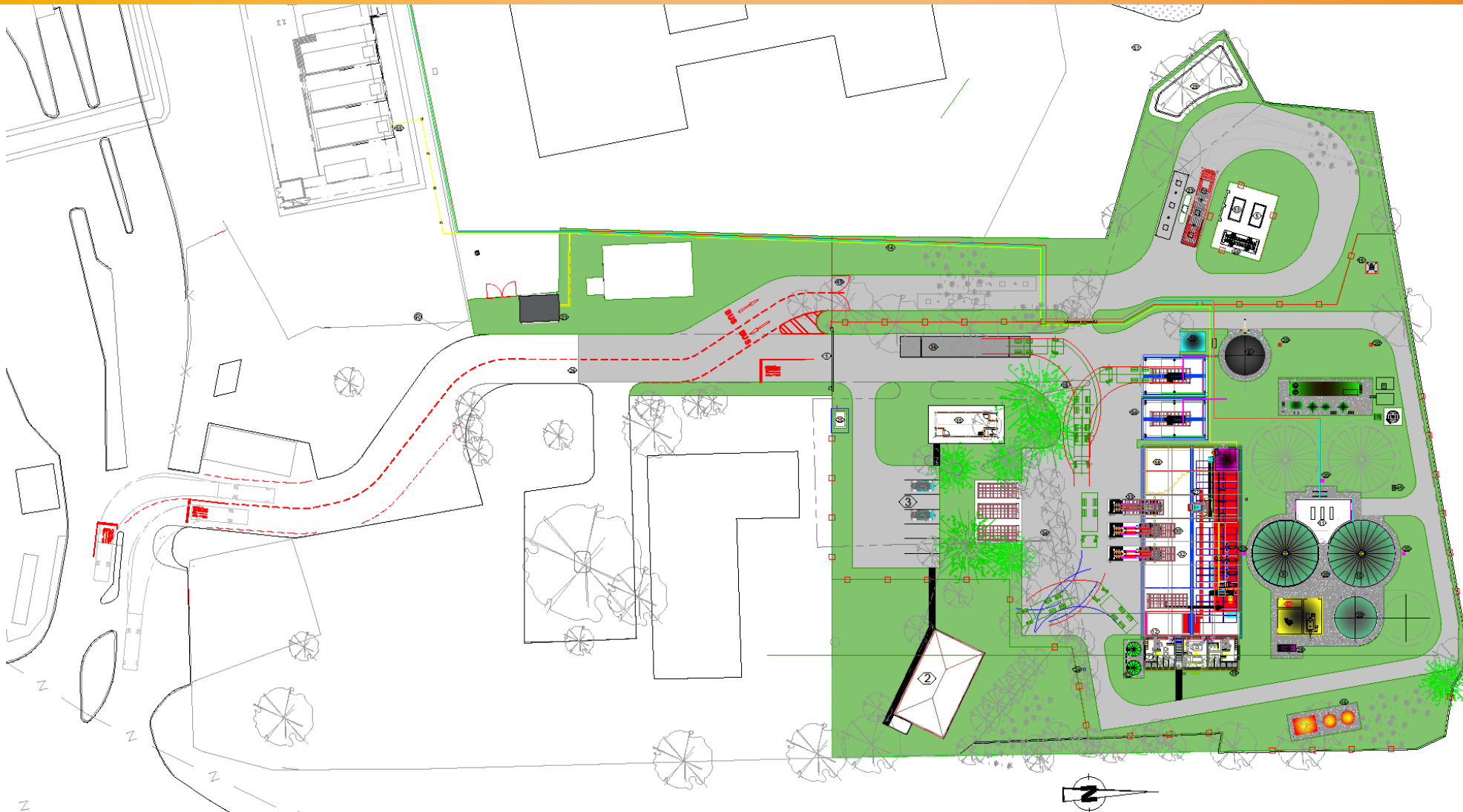
PROJECT LOCATION



PROCESS FLOW



PROJECT LAYOUT



1	Access Control Gate
2	Management building
3	Admin Office parking
4	Back-up Boiler
5	Biogas Compression
6	Biogas Upgrading Plant
7	Control Room, Ablution and Mess
8	Digestate Liquor Storage Tank
9	Digester -Primary
10	Digester -Secondary
11	Pump Room
12	Egoli Gas Connection Point
13	Electrical MCC
14	Pipe & Cable Route
15	Emergency Flare Stack
16	Fire Protection System
17	Future Digester
18	Ground Monitor Borehole
19	Heat Supply
20	Lightning Mast
21	Main Electrical Supply Sub-Station
22	Mascerator
23	Metrobus Fuelling Area
24	Process Water Connection
25	Security Guard Hut
26	Site Access Road
27	Skid-Steer Loader
28	Standby Generator Unit
29	Storm Water Swale
30	Waste Tipping Bays
31	Waste Pre-Processing bays
32	Waste Sorting Plant
33	Waste Truck
34	Waste Truck Turning Area
35	Weighbridge Office
36	Weigh Bridge
37	Workshop & Storage Building
38	Sewer Connection
39	Feed Buffer Tank
40	Gas Storage
41	De-Sulphurization
42	Excess Waste Storage
43	Digestate Dewatering
45	Biogas Blower
46	O2 Supply
47	Biogas Dryer
48	Liquids and Lechate Pit
49	Filling Station Gate
50	Gate to Pikitup MRF
51	Leachate Pond
52	Rain Water Capture
53	Booster Filling Compressor
54	Storage Building (Waste, Digestates, Spares or Consumables)
55	Energy Systems Waste Heat to Energy Electrical Connection
56	Hot Water Supply Point and Cold Water Return Point
57	Biogas Vent Point to Joburg Landfill Gas
58	Waste Pile



PERFORMANCE CRITERIA

- Minimum 350 ton per week fresh waste throughput.
- Minimum 450 GJ/week on specification bus fuel production.
- Suitable digestate solids separation.
- Suitable compost quality for utilisation.
- Suitable digestate liquid quality for municipal uses.
- Priced alternatives for disposal.
- Waste disposal for ALL waste from JFPM (Price schedule for excess).



CONCEPT DEVELOPMENT

- Concept design - Complete
- Geotechnical Report - Complete
- Topographical survey - Complete
- Traffic impact note - Complete
- Major Hazardous Installation study - Complete
- WML for Biomethane Plant - Complete
- WML for decommissioning of HCRW incinerator - Complete
- Partial township establishment for green infrastructure - ongoing
- Site clearance of waste and informal activities – ongoing
- Letters of intent obtained from all interface entities - Complete



SUPPLIERS AND OFFTAKERS

1. Waste Feedstock from **Johannesburg Fresh Produce Market**
2. Biomethane offtake by **Metrobus**.
3. Digestate offtake by **CoJ Social Development, Johannesburg City Parks and Zoo** and **Pikitup**.
4. Heat supply in the form of circulated hot water from **Energy Systems**.
5. Electricity from **Energy Systems**.
6. Residual waste to **Pikitup** landfill.
7. Unutilised biogas to **Joburg Landfill Gas**.
8. Digestate maturing at **JMPD academy**.
9. Backup fuel from **Egoli Gas**.





SCOPE OF WORKS



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Implementation

Contract 1

EPC CONTRACT

The detailed design, operational setup, logistics system implementation, construction and commissioning of the plant

Operations

Contract 2

O&M CONTRACT

The EPC contractor will follow up on the EPC contract with a 3 year contract for managing, maintaining and operating the plant. Additional licenses to be obtained in this period.

Long term operations

Retender of O&M contract

Potential sales of products

IMPLEMENTATION

1. Detail Design

- Confirm and/or update existing process and layout.
- HAZOP review for plant based on contractor final design.
- Statutory signoffs required for gas installation, structural works and electrical work.
- Site development plan submission based on final confirmed design.
- Input into supply and offtake agreements, currently in draft, and signing of these.



IMPLEMENTATION

2. Decommissioning, demolishing and upgrades

- Remove and de-stump trees from site located at weighbridge office location and pavements.
- Removal of old weighbridge.
- Removal of waste from site..
- Removal of lean-to structures to buildings and substandard walls.
- Decommissioning and removal of old HCRW incinerator.
- Removal and rehabilitation of old in ground diesel tanks.
- Replace walls and sheeting where required.



IMPLEMENTATION

2. Decommissioning, demolishing and upgrades (continued)

- Height increase of main process building.
- Repaving of road area and walkway where required.
- Suitable industrial coating for all structures.
- Upgrading old driver training center building for management offices. Rooms as per tender document.
- Upgrade pumphouse
- Upgrade mini substation (ceiling, electrical panels, doors



IMPLEMENTATION

3. Construction

- Installation of weighbridge (22m) and a weighbridge office.
- Procure adequate vehicles, bins and tools for operations.
- Establishment of new road for busses.
- Construct new control room and staff building as annex to main process plant.
- Install perimeter fence, gates and CCTV.
- Install 20 kW Solar PV roof mounted system.
- Construct walkways for safe access between gate, weighbridge, management building, process building and equipment.



IMPLEMENTATION

3. Construction (continued)

- Establishment of composting area at JMPD.
- Provide performance guarantees.
- Procure adequate vehicles, bins and tools for operations.
- Install hot water pipe and cold water return with heat exchangers and pumps (running and standby).
- Install backup natural gas boiler and backup genset.
- Install electrical offtake from Energy Systems to upgraded minisub and from there to the Biomethane plant



IMPLEMENTATION

3. Construction (continued)

- Install a biogas venting pipeline from the facility to the inlet point of the Joburg Landfill Gas facility.
- Install biodigesters and new pumproom in between digesters (allow space for expansion and addition of pasteurisation).
- Install biogas scrubbing and dehydration units.
- Install biogas upgrading plant, THT dosing, emergency flare
- Install biomethane compression, high pressure storage, filling units and priority filling system.



IMPLEMENTATION

3. Construction (continued)

- Install a liquids receiving pit (location of incinerator).
- Install a feedhopper, picking conveyor and pulping equipment.
- Construct drainage on the concrete floor for leachate to be captured into liquids receiving pit.
- Install building HVAC and de-odourising system.
- Install roller shutter doors that close in between truck arrivals with light signalling system for reversing drivers.
- Install partitions and pushwalls inside the main processing building as required.



IMPLEMENTATION

3. Construction (continued)

- Install decanter centrifuge or similar dewatering system at elevation with polymer make-up and feeding system for digestate separation on shed to the west of main building
- Install digestate solids diversion optionality when digestate solids bin is full and being changed out.
- Install effluent retention pit in sewer connection for monitoring.
- Install digestate liquor tank and top and bottom tanker filling points.
- Install rainwater runoff buffer to leachate pond.



IMPLEMENTATION

4. Commissioning

- Commission digesters (first fill).
- Commission online monitoring and reporting system.
- Commission of MRF and Biomethane plant.
- Commission compost area.
- Commission waste collection area.
- Tests after completion.
- Handover plant and as built documentation (drawings, manuals, designs and procedures).



OPERATIONS

Highlights

- Sampling, analysis, datacapture, process parameter measurement, and reporting.
- Procurement of consumables, spares and services required for operations and maintenance.
- Performance of all regulatory and HSEQ tasks .
- HR management and sourcing.
- Sourcing of waste with potential onsite separation activities..
- Digestate management including composting and bagging.



OPERATIONS

Highlights

- Scheduling and schedule management.
- Traffic control.
- Security and access control.
- Waste disposal.
- Sourcing of waste with potential onsite separation activities.
- Digestate maturation next door using mobile composting setup.
- Specific license applications.



PERMITS and CONTRACTS

The contractor should:

- apply for and obtain a gas trading license in the name of the project owner during the 3 year operations period.
- extend the water use license for the leachate pond to include digestate liquor disposal or further alternative uses.
- obtain the building permit and submit suitable plans.
- ensure all submissions to Department of Labour are done.
- enter into suitable supply and offtake contracts with the identified entities.
- conform to all fuel production and dispensing regulations and permits.
- register the site (on behalf of Pikitup) under the City Power SSEG regulations for instances where net electricity production occurs from site.



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