

Market Sounding Exercise

DEVELOPMENT OF INTEGRATED WASTE MANAGEMENT FACILITIES PHASE 2 (I•PARK2)

INVITATION TO RESPOND



Environmental Protection Department
Government of Hong Kong Special Administrative Region, China

March 2023



1 Introduction

1.1 Invitation

The Environmental Protection Department (EPD) wishes to invite parties, who may be interested in delivering and operating the Integrated Waste Management Facilities Phase 2 (I-PARK2) to share their level of interest as well as corporate profile, experiences, expertise, and ideas on the Project.

1.2 Terminology

Within this document, the following terms have the meanings set out below:

- **Consultant** means Binnies Hong Kong Ltd.
- **EPD** means Environmental Protection Department of the Government of Hong Kong Special Administrative Region, China.
- **Invitation** means this “Invitation to Respond” document.
- **Marketing Sounding Exercise (MSE)** means the communication of information to and request of response from potential tenderers, prior to the invitation of tender, to gauge the interest of potential tenderers in the Project.
- **I-PARK2** means Integrated Waste Management Facilities Phase 2.
- **Project** means delivering and operating the I-PARK2.
- **Respondent** means an entity making a response, in any form, to this MSE, and potential Respondent means an entity who has received this Invitation or any entity that has contacted the Consultant regarding this Invitation.
- **Response** means information provided to EPD and/or the Consultant during the MSE.

1.3 Disclaimer

This Invitation is solely for the purposes of collecting market information and this document is for reference only.

This is **not** a prequalification process of tenderers. Potential tenderers that have not responded to this MSE will not be barred from tendering for the Project.

This Invitation does not constitute any offer or solicitation of any offer in connection with the Project described herein. Neither this Invitation nor any activities or Response in connection with the MSE will create any legal obligations or liabilities in any way on the part of the EPD, the Government of Hong Kong Special Administrative Region, or EPD’s Consultant; nor will



any of those parties under any circumstances be liable to any fees, costs, expenses, loss or damage whatsoever relating to any Respondent, potential Respondent or any party associated with those entities arising out of or in connection with this MSE and Invitation.

No information and material received from the Respondents will be returned.

Any Respondent or potential Respondent is deemed to have acknowledged the above conditions by taking any action whatsoever regarding this Invitation.



2 The Market Sounding Exercise

2.1 Purpose of MSE

Through the MSE, EPD would like to understand the following from potential tenderers:

- Level of interest in the Project.
- Capability to undertake the Project.
- Ideas on technologies to efficiently recover resources (energy and materials) from residual (i.e., unavoidable or non-recyclable) municipal solid waste (MSW) for beneficial utilisation.
- Ideas on sustainable markets to utilise the resources recovered from I•PARK2.
- Considered views, based on a robust discussion of contracting risks, on the preferred form of public-private-partnership¹ (PPP) for realising the Project.
- Ideas on opportunities (and constraints) to fast-track the delivery of I•PARK2 (i.e., I•PARK2 to be able to receive MSW *by 2030*).
- Preliminary cost and/or financial estimates for realising the Project.

Organisations having capability and experience in undertaking PPP projects involving large scale waste-to-resource facilities in Hong Kong or elsewhere are invited to provide a Response.

EPD will consider the relevant information gained through the MSE and decide on an appropriate procurement model with a view to meeting the Project objectives and suiting good market practice.

This is **not** a tendering exercise to prequalify, shortlist or select any potential tenderers. All information, views, and ideas of any Respondent will be kept confidential and will not be used for any future tender evaluation exercise. Access to such information will be restricted to authorised personnel, including Consultants' staff, strictly on a need-to-know basis. Potential tenderers that do not respond to the MSE will not be barred from the future tendering exercise.

2.2 Responding to the MSE

Interested potential tenderers are encouraged to respond, as far as practicable, to the market sounding questions listed in **Appendix A** (General Questionnaire), **Appendix B** (Technology Questionnaire) and **Appendix C** (Preliminary Cost/Financial Estimates). The submission of any

¹ A Public-Private-Partnership (PPP) is a contractual arrangement involving the private sector in the delivery of public services. For this MSE, the PPP may adopt either the DBO (design-build-operate) model or the DBFO (design-build-finance-operate) model (which has several sub-variants). A more detailed definition of the DBO and DBFO models is provided in Section 3.5 of this document.



information, data, analysis, calculations or plans/drawings in support of Responses is welcome. Relevant views and suggestions in relation to topics not mentioned in this document are welcome insofar as they will potentially enhance the value for money proposition of the Project for EPD.

Responses to the market sounding questions should be returned before **31 May 2023**.

Respondents are encouraged to submit their Responses by electronic means to Mr Franko C.F. Lo / Ms Vanessa Leung (email address: locf@binnies.com and leungv@binnies.com) from the Consultant. Nevertheless, Responses may be posted to the following address if it is not practicable to do so electronically:

Binnies Hong Kong Ltd
43/F AIA Kowloon Tower, 100 How Ming Street, Kwun Tong,
Hong Kong Special Administrative Region, People's Republic of China
(Attention: Mr Franko C F Lo)

Responses to the questions may be returned ahead of the date nominated above to enable early review. EPD will consider the suggestions and comments received through the MSE and may, in light of that consideration, review the procurement (including financing) arrangements. **Respondents may be invited to attend meeting(s) with EPD together with the Consultant, to discuss any points made in their submitted responses on a confidential basis.** Attendance at any such meeting by a Respondent is optional.

Interested potential tenderers or Respondents should check the Project website https://www.epd.gov.hk/epd/english/business_job/business_opp/mse_ipark2.html regularly for any updates of the MSE.

In responding to the MSE, a respondent will be deemed to have agreed to all the terms of this Invitation. Respondents and potential Respondents must accept that the Government of the Hong Kong Special Administrative Region (HKSAR) will not be responsible for any costs, expenses or liabilities whatsoever that may be incurred by any Respondent or potential Respondent in responding to this MSE Invitation.



3 Project Brief

3.1 Context

At present, Hong Kong relies heavily on landfills for direct disposal of municipal solid waste (MSW). The service life of landfills and the after-use of closed landfills are, however, both limited. As land resources are scarce and extremely precious in Hong Kong, landfilling is not a long-term solution to the waste disposal.

Transforming waste into energy is in line with the principle of sustainable development. Modern waste-to-energy technologies can reduce the bulk size of waste by 90 per cent. Transforming waste to energy can also reduce the use of fossil fuel electricity generation, thereby reducing carbon emissions to combat climate change.

In February 2021, the Government promulgated the “Waste Blueprint for Hong Kong 2035”² (the Waste Blueprint). The Waste Blueprint outlines the strategies, goals and measures to tackle the challenge of waste management up to 2035. It sets out the vision of “Waste Reduction • Resources Circulation • Zero Landfill”. Under this vision, the Government will work with the industry and the community to move towards two main targets:

- *Medium-term target.* to gradually reduce the per capita MSW disposal rate by 40 to 45 per cent and raise the recovery rate to about 55 per cent by implementing MSW charging, other policies and legislation as well as waste reduction and recycling initiatives.
- *Long-term target.* to move away from reliance on landfills for direct waste disposal by developing adequate waste-to-energy facilities.

The Chief Executive announced in the Policy Address in 2020 and 2021 that the Hong Kong Special Administration Region (HKSAR) would strive to achieve carbon neutrality before 2050 through the implementation of various actions. The Government also announced in October 2021 “Hong Kong’s Climate Action Plan 2050”³ (the Climate Action Plan), setting out the vision of “Zero-carbon Emissions • Liveable City • Sustainable Development” and outlining four major decarbonisation strategies and measures, namely net-zero electricity generation, energy saving and green buildings, green transport and waste reduction, for achieving carbon neutrality.

As set out in the Waste Blueprint and the Climate Action Plan, development of more advanced waste-to-energy facilities is an important strategy to phase out landfilling for MSW disposal to reduce carbon emissions and turn waste into energy. To move away from the reliance on

² https://www.eeb.gov.hk/sites/default/files/pdf/waste_blueprint_2035_eng.pdf

³ https://www.eeb.gov.hk/sites/default/files/pdf/cap_2050_en.pdf



landfills for MSW disposal by around 2035 and to achieve carbon neutrality in waste management before 2050, it is necessary to build up the waste-to-energy capability in Hong Kong.

Apart from complying with the local requirements as specified in the “A Guidance Note on the Best Practicable Means for Incinerators (Municipal Waste Incineration) BPM 12/1(08)”, the Project aims at achieving more stringent flue gas emission standards with reference to European Union Best Available Techniques Reference Document for Waste Incineration under Directive 2010/75/EU and the Shenzhen City Standard SZDB/Z 233-2017. The Shenzhen City Standard is shown in **Annex I**.

3.2 Purpose of I•PARK2

3.2.1 Mission

In support of the Hong Kong SAR Government’s Waste Blueprint and the Climate Action Plan, the proposed I•PARK2 is to:

- have a processing capacity of at least 5,000 tpd for waste-to-energy treatment of MSW with advanced technology to fully utilise the energy and resources from MSW.
- significantly reduce the volume of MSW requiring landfill disposal, as a step towards zero landfill for MSW disposal and achieving carbon neutrality in waste management and
- integrate with public amenities or green tourism concepts to maximise synergy through co-locating public facilities that can widely benefit members of the public.

EPD is also exploring the feasibility of increasing I•PARK2’s processing capacity to more than 5,000tpd to ensure optimal use of scarce land resources. EPD would like to gauge from the market the maximum MSW treatment capacity that can be realistically accommodated on the Site.

3.2.2 Key Project Development Objectives

Key development objectives for I•PARK2 include:

- *Timeliness* in that I•PARK2 needs to be able to receive MSW *by 2030* to match Hong Kong’s target of moving towards zero landfill and carbon neutrality.
- *Versatility* in that I•PARK2 can effectively process residual MSW with evolving characteristics due to continuing waste reduction and recycling initiatives in future.
- *Reliability* in that I•PARK2 can achieve a high degree of robustness and reliability under the design operating scenarios.
- *Community Value* in that I•PARK2 will integrate with public amenities to fulfil EPD’s vision of developing I•PARK2 into a social asset to the benefit of the local and wider communities.



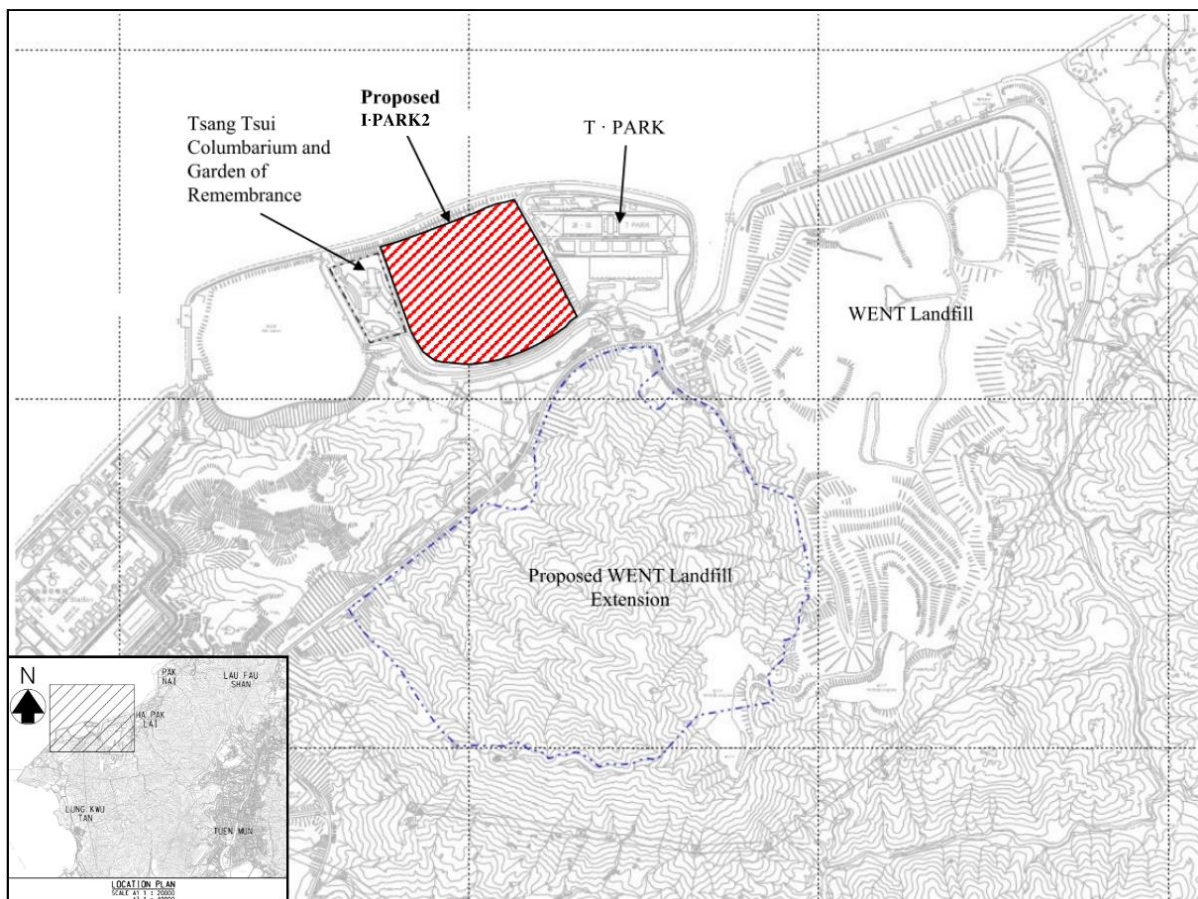
- *Environmental sustainability* in that the proposed scheme is not only environmentally acceptable but also to effectively recover resources from MSW (in addition to waste volume reduction) and obtain the 'Platinum' rating under the Building Environmental Assessment Method (BEAM) Plus New Buildings Version 2.0 as promulgated by the Hong Kong Green Building Council (HKGBC).
- *Value-for-Money* in that the proposed I•PARK2 scheme represents a cost-effective solution to achieving the desired performance and social objectives.

3.3 Project Status

3.3.1 Project Site

The Site for I•PARK2 is located on the middle ash lagoon in Tsang Tsui, Tuen Mun (TTMAL) occupying an area of about 18 hectares (ha), as shown in Exhibit 1.

Exhibit 1 Site Locality



To the north of the Site is Deep Bay. On the land side, the Site is surrounded by the "Tsang Tsui Columbarium and Garden of Remembrance" to the west, T•PARK (sludge treatment facility) to the east, and the proposed WENT Landfill Extension (WENTX) to the south.



The Site was previously leased to the Castle Peak Power Company Limited for storing pulverised fuel ash under a licence agreement issued by the Lands Department (LandsD). The Site was surrendered to the Government in 2015.

The Site is currently vacant, but it will be put to interim use by the Government for temporary relocation of the Y•PARK and temporary stockpiling of construction materials from the WENTX project (and/or other beneficial use) until the construction of I•PARK2 commences.

Power and water supplies to the Site are yet to be arranged to support development and operation of I•PARK2.

Notwithstanding the area available for the development of the Project, the land requirement of I•PARK2 in TTMAL should be minimised as far as practicable to enhance land use efficiency. Any land surplus arising will be reserved for future expansion of the I•PARK2 subject to future waste disposal need in the longer term and/or released for co-locating other compatible waste management facility(ies) to optimise land use.

3.3.2 Waste Delivery and Product Export

Municipal solid waste (MSW) will be delivered to I•PARK2 by various means: (a) in ISO-containers by marine vessels or road trucks and (b) in bulk form by refuse collection vehicles. For marine delivery, a suitable means to receive the containerised waste (such as construction of a new wharf dedicated to I•PARK2, which may be carried out by the Government as advance works for the Project) will be required. For land transport, the Site access and associated road improvement works will need to be developed.

Any residues generated from I•PARK2 will be processed into useful products as much as practicable. In addition, the slag from I•PARK1 (currently under construction) will be delivered by marine means in containers to I•PARK2 for processing. Product markets for beneficial use of the ashes and residues need to be explored.

In summary, the logistics for MSW reception and product export from the I•PARK2 will need to be developed.

3.3.3 Technology

The preferred waste-to-resource technology(ies) to be adopted for I•PARK2 is to be determined in the light of market demand for the recovered products.

3.3.4 Public Engagement

A public engagement campaign to support development of I•PARK2 is yet to commence. Given the size and nature of the Project, it is expected that there will be strong interest shown by a wide range of stakeholders.



3.3.5 Permitting and Approvals

The Site is not covered by any statutory town plan prepared under the Town Planning Ordinance.

The Project is a Designated Project under the Environmental Impact Assessment Ordinance (EIAO). An environmental permit (EP) is required before the construction and operation of I•PARK2 can commence. A statutory EIA report is required to support the application for the EP. The EIA study is being carried out. Any environmental emissions (e.g., air, water, etc) from I•PARK2 must meet relevant local, regional and national standards or regulations.

If construction works (e.g., a new berth, channel dredging) is proposed in the sea (under the high-water mark), approval under the Foreshore and Seabed (Reclamations) Ordinance (FSRO) may be required, depending on the scale of the works. The Government may construct the marine works as advance works for the Project.

3.3.6 Interfaces

Project interfaces include several planned and on-going projects managed by various government departments as well as interim use of the Site (as outlined in Section 3.3.1 above). These include the WENT Landfill Extension (WENTX), Upgrading of Nim Wan Road South and Relocation of Y•PARK. It is necessary to consult the relevant parties to obtain further information and implement the agreed interfacing solutions in the design, construction and operation of I•PARK2.

3.3.7 MSW Charging

The Government is about to implement MSW charging⁴ to reduce the overall amount of waste disposal. Depending on the progress of the relevant preparatory work, EPD expects to implement MSW charging in the second half of 2023 the earliest. The impact of the impending MSW Charging Scheme on MSW to be received by I•PARK2 is uncertain.

3.3.8 Funding Arrangement

Funding for development and operation of I•PARK2 is yet to be secured. The PPP model to be adopted for the Project will have a bearing on the funding arrangement and vice versa.

⁴ <https://www.mswcharging.gov.hk/?lang=en>



3.4 Major Risks and Opportunities

3.4.1 Introduction

To facilitate forming of considered views and inputs by Respondents to this MSE, we have identified the following major Project risks (and opportunities). It is cautioned that the identified risks/opportunities are by no means exhaustive but represent our best assessment of the situation at the time of writing. Respondents are encouraged to conduct their own assessment and raise any other risks/opportunities for consideration by EPD.

3.4.2 Input (Feedstock) Risks

While there will be a high level of certainty on the quantity of MSW to be delivered to IPARK2, there might be inherent uncertainties in characteristics (e.g., composition, energy content) of MSW delivered to I•PARK2 over the operating life of the facility. Amongst the many influencing factors (e.g., climatic, economic, socio-cultural), a relevant consideration is the uncertain and evolving impact of the impending MSW Charging Scheme on MSW reduction and characteristics over time.

3.4.3 Output (Demand) Risks

I•PARK2 is expected to recover from MSW a range of resource products (e.g., energy, materials) for beneficial utilisation.

For the electricity to be generated for export, the grid connection agreement or feed-in tariff would need to be established with the local power companies in due course.

On the other hand, there may or may not be opportunities to recover resources from MSW in a form(s) that can offer enhanced marketability or value. This is uncertain at this stage.

3.4.4 Asset Creation and Performance

Risks associated with this aspect could include construction cost blowout and/or delayed construction progress due to a variety of factors such as unforeseen ground conditions, local shortage of skilled construction workers and construction equipment, limited works areas for on-site assembly yard, highly constrained construction access for delivery of complete assemblies, complex interfaces with other adjacent construction projects or operating facilities, etc.

During operation stage, for example, any underperformance of the adopted technology for waste-to-resource recovery could lead to operation cost blowout and/or under-recovery of revenue from product sales.



3.4.5 Permitting and Other Regulatory Risks

Necessary approvals would be required under relevant statutory requirements (e.g. EIAO, FSRO and fire services requirements), future change to the environmental emission standards and licence conditions, etc.

3.4.6 Social Acceptance

Owing to the nature and scale of I•PARK2, it is likely that some members of the local communities might have a negative view of the Project whether out of ideological, NIMBY or other concerns.

3.4.7 Bankability

For the private sector partner (or the I•PARK2 contractor), “bankability” is key consideration in determining whether it would participate in the Project. This in turn is dependent on how the various contracting risks are allocated to or shared between the parties. In Section 3.5, we outline the PPP options on offer for consideration by Respondents.

3.5 Contract Model Options

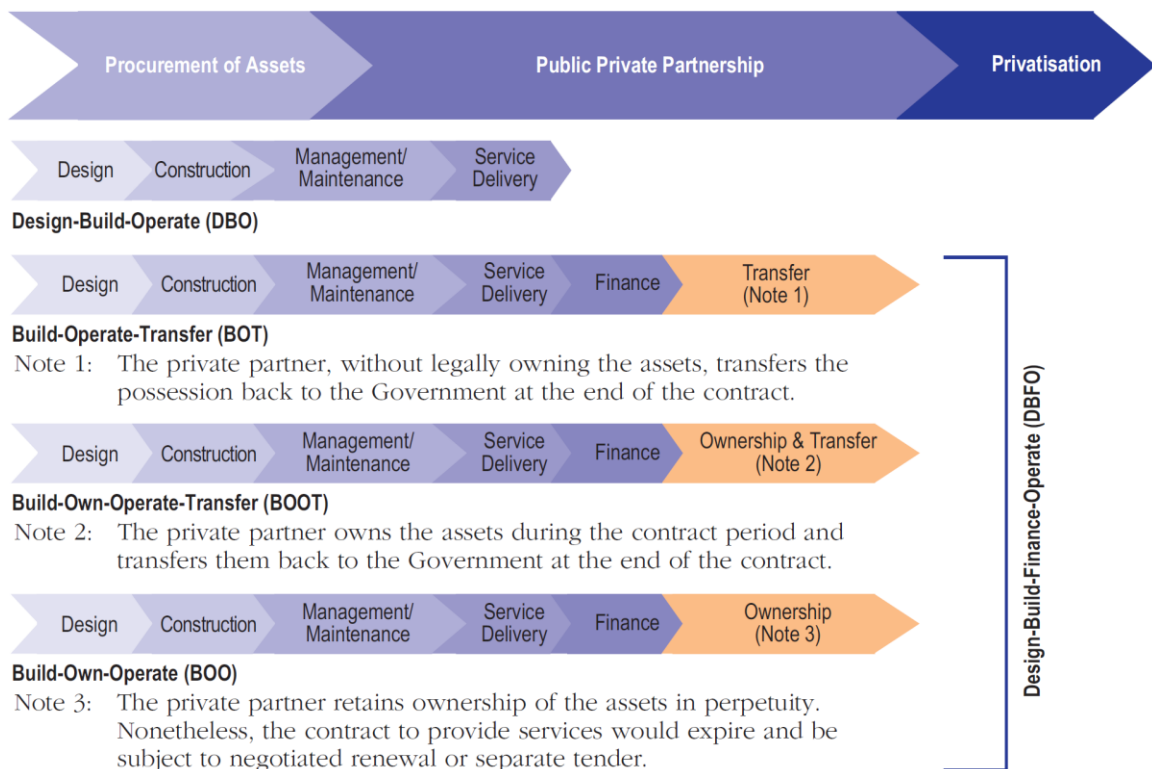
3.5.1 Overview

The Government is intending to develop I•PARK2 by a form of public-private-partnership (PPP). In this MSE, the PPP contract models under consideration (as illustrated in Exhibit 2) are:

- DBO (Design-Build-Operate) and
- DBFO (Design-Build-Finance-Operate) model, comprising the following sub-variants:
 - BOT (Build-Operate-Transfer)
 - BOOT (Build-Own-Operate-Transfer)
 - BOO (Build-Own-Operate)



Exhibit 2 PPP Contract Models



3.5.2 Contract Model Features

In all cases (whether DBO or DBFO (including BOT)), the design, construction and operation of the asset (in this case I•PARK2) will be undertaken by the private sector. The major difference between a DBFO and a DBO, in the Hong Kong context, is the timing and nature of the payments for the asset associated with the service. Under a DBO the capital costs will be paid for on commissioning and subsequent payments will only cover the recurrent costs of the service.

Under DBFO (including BOT), there is a concession agreement where the Government specifies the outputs it requires from the asset, the basis for payment for those outputs, and the risk-sharing arrangements. The private sector is involved in designing, building, providing core and/or ancillary operations services, maintaining, **financing** and sometimes owning the PPP facilities.

In summary, the distinction between the various contract models may be viewed from the points of view of funding source and ownership, as shown in Exhibit 3.



Exhibit 3 Categorisation of PPP Model Options by Ownership and Funding Source

		Design-Build-Finance-Operate (DBFO)	
	GOVERNMENT FUNDED	PRIVATELY FINANCED	
GOVERNMENT OWNED	<ul style="list-style-type: none"> • DBO (Design-Build-Operate) 	<ul style="list-style-type: none"> • BOT (Build-Operate-Transfer) 	
PRIVATELY OWNED		<ul style="list-style-type: none"> • BOOT (Build-Own-Operate-Transfer) • BOO (Build-Own-Operate) 	

The EPD is considering to procure the Project using the PPP model in the form of BOT as one of the viable options. Respondents are asked to comment on their preferred PPP model in Questionnaire A, given the Project objectives, status, and bankability in consideration of the identified risks and opportunities.



4 Enquiry

Potential Respondents may direct any queries to the Consultant's prime contact for this MSE, Mr Andy W.S. Chan at email address chanws@binnies.com or telephone number (+852) 2608 7612.

**Annex I****Emission limit values of air pollutants for new municipal solid waste incinerators in Shenzhen as stipulated in SZDB/Z 233-2017**

Air Pollutants	Unit	Emission Limit for New Facility	
Dust / Particulates	mg/Nm ³	Daily Average Value	8
		Hourly Average Value	10
Total Organic Carbon (TOC)	mg/Nm ³	Daily Average Value	10
		Hourly Average Value	10
Carbon Monoxide (CO)	mg/Nm ³	Daily Average Value	30
		Hourly Average Value	50
Nitrogen Oxides (NO _x)	mg/Nm ³	Daily Average Value	80
		Hourly Average Value	80
Sulphur Dioxide (SO ₂)	mg/Nm ³	Daily Average Value	30
		Hourly Average Value	30
Hydrogen Chloride (HCl)	mg/Nm ³	Daily Average Value	8
		Hourly Average Value	8
Hydrogen Fluoride (HF)	mg/Nm ³	Daily Average Value	1
		Hourly Average Value	2
Mercury (Hg)	mg/Nm ³	Average Value	0.02
Total Cadmium (Cd) & Thallium (Tl)	mg/Nm ³	Average Value	0.04
Antimony (Sb) + Arsenic (As) + Lead (Pb) + Chromium (Cr) + Cobalt (Co) + Copper (Cu) + Manganese (Mn) + Nickel (Ni) + Vanadium (V)	mg/Nm ³	Average Value	0.3
Dioxins & Furans	ng I-TEQ/Nm ³	Average Value	0.05



A General Questionnaire

A.1 Preamble

Respondents are encouraged to respond to all the market sounding questions listed below, as far as practicable, in relation to the Project. Responses to the questions should be returned by 31 May 2023.

All information, views, and ideas of any Respondent will be kept confidential and will not be used for any future tender evaluation exercise. Access to such information will be restricted to authorised personnel, including Consultants' staff, strictly on a need-to-know basis.

A.2 Level of Interest and Capability

A.2.1 Identification of the Respondent

Please provide:

- (a) Name, in Chinese, English and/or your native language, of the Respondent.
- (b) Place and date of incorporation, if the Respondent is a corporation, and the corresponding certified copy of the certificate of incorporation and any certificates of incorporation on change of name.
- (c) Evidence showing the Respondent's overseas business registration, if applicable.

A.2.2 Organisational Information

Please provide:

- (a) Brief description of the history and business of the Respondent, including company brochures as well as its business experience in Hong Kong and/or overseas (Note: If the respondent is a member, e.g., a subsidiary of a group of companies, provide also the same of the group)
- (b) Name of registered and beneficial immediate, intermediate, and ultimate shareholders of the Respondent
- (c) Description of the Respondent's experience and expertise in designing, constructing, financing, operating, and/or maintaining MSW-to-resource facilities that are of similar nature and/or scale to this Project, if appropriate and preferably using the template shown in *Table 1*.



- (d) Description of the Respondent's key personnel in designing, constructing, operating and/or maintaining MSW-to-resource facilities that are of similar nature and/or scale to this Project, if appropriate and preferably using the template shown in *Table 2*.

A.2.3 Basis of Participation in the Project

Please provide your comment or view on the following:

- (a) For a project such as this, in which of the following areas/roles would you be interested in participating?
- (i) Design – General designer / Specialist in MSW-to-resource process engineering
 - (ii) Construction - Main contractor
 - (iii) Construction – Sub-contractor
 - (iv) Construction – Supplier of technology systems, plant and equipment
 - (v) Operation and Maintenance - Operator
 - (vi) Operation and Maintenance - Maintenance service provider
 - (vii) Operation and Maintenance - Specialist service provider
 - (viii) Financing
 - (ix) All, or a combination of, the above.
- (b) Would your company be able to deliver a project of this size and nature by itself? Or would you need to form a team / joint venture; or would you intend to do so for risk management or other purposes?
- (c) What key personnel resources, in terms of area of expertise and length of experience, do you expect to be required to deliver this Project?
- (d) Are there any other issues that are critical to your participation in this Project that you can foresee?

A.3 Views Sought

A.3.1 Risk Allocation and Contract Model

The EPD is considering to procure the Project using the PPP model in the form of BOT as one of the viable options.

- (a) Given the Project objectives, risks and opportunities identified in Section 3 (Project Brief) of this MSE Invitation document and based on your own experience, do you have any



view on which of the DBO, BOT, BOO, BOOT contract model should be adopted? If so, please elaborate on your views of the pros and cons of the alternative options and include a rationale for your views.

- (b) Are there any specific requirements or commercial terms that may deter you from participating in any future tender as a PPP partner? Please elaborate.
- (c) Do you see any significant risks that you, as the private sector partner in the PPP, would not be able to manage cost-efficiently? Please elaborate.
- (d) Is there any other alternative contract model that you think would be able to better share the risks between the Government and the PPP partner to maximise value-for-money? If so, what do you suggest? Please explain your rationale.

A.3.2 Process Technologies and Product Markets

The I•PARK2 will need to process at least 5,000 tpd to (i) significantly reduce the volume of waste requiring landfill disposal and (ii) recover marketable resources (e.g., energy, materials) for beneficial utilisation.

- (a) What are your views on the most appropriate core technology(ies) to be adopted in I•PARK2 to achieve the above objectives? Please provide technical information on your proposed technology(ies) per *Appendix B* to this MSE Invitation.
- (b) For processing of residues e.g. incinerator bottom ash (IBA) as mentioned in Section 3.3.2 of the Invitation document, do you have any suggestion on the treatment method to handle about 1,800 tpd IBA? What would be the water consumption and size of the IBA processing facility? Do you think the IBA processing facility could be co-located within the Project Site or it has to be provided off-site to be operated by the same contractor or other party (please specify if you have any suggested off-site location for the IBA processing facility)?
- (c) Please elaborate on the proposed end markets for the recovered resources from I•PARK2. What are expected demands for the recovered resources? What is the status of these resource product markets (e.g., emerging, mature, saturated)? What is required to develop these markets to take up the recovered resource products from I•PARK2?

A.3.3 Master Layout Plan

The I•PARK2 is required to process at least 5,000 tpd of MSW. At the same time, I•PARK2 will integrate with public amenities to fulfil EPD's vision of developing I•PARK2 into a social asset to the benefit of the local and wider communities.

- (a) Please provide your views on a master layout to achieve both the functional (waste-to-resource) and social objectives in an integrated and harmonious manner. A facility layout concept in the form of a two-dimensional plan or preferably a three-dimensional BIM (building information model), incorporating all core functional and social elements,



access and transport arrangements, and any necessary ancillary facilities such as water, power and residue management systems, etc is welcome to illustrate your view.

- (b) EPD is interested in maximising the utilisation of land resource. To this end, what do you think would be the maximum MSW processing (waste-to-resource) capacity (5,000tpd, 6,000tpd, 7,000tpd, 8,000tpd or higher) that can be **realistically** accommodated on the Site (having a size of 18 ha)? Please illustrate your idea on a preliminary layout plan.

A.3.4 Design and Construction Period

It is highly desirable that the I•PARK2 to be able to receive MSW *by 2030* to meet the Government's policy objectives.

- (a) Considering the uncertainties and constraints mentioned in Section 3 of the Invitation document, do you see any impacts the procurement model on the length of the design and construction programme? That is, do you think the length of the I•PARK2 design and construction period (and hence date for commissioning) would be different for the different contract models (DBO, BOT, BOO, BOOT)? If so, what do you think would be the preferred contract model to achieve the earliest time of commissioning of I•PARK2? Please explain your rationale.
- (b) Based on your response to the question (a) above, what do you think would be a realistic "design and construction" period for the I•PARK2? That is, how long do you think it would need to commission the I•PARK2 at the maximum realistic capacity that you have proposed per Question A.3.3(b) above after award of the DBO/BOT/BOO/BOOT contract? Please provide a preliminary programme of activities to facilitate better understanding of your view, addressing the interlinkage and duration of the key activities of (i) design development, (ii) procurement and manufacturing of long-lead mechanical items, (iii) site preparation works, (iv) foundation works, (v) substructure works, (vi) superstructure works, (vii) installation of various key plant and equipment, (viii) testing and commissioning, (ix) access roads, (x) architectural elements, (xi) landscaping, (xii) public amenities, (xiii) statutory approvals, (ix) social acceptance, etc.
- (c) Do you see any potential issues that could cause delay to the commissioning of I•PARK2? What is your approach to achieving the design and construction programme as outlined above? With due consideration of the uncertainties and constraints mentioned in Section 3 of the Invitation document and based on your own experience, what do you think could be done to shorten the time to complete the design and construction work? What is the expected earliest time of commissioning I•PARK2 by doing so?

A.3.5 Contract Operation Term

The EPD aims to achieve the optimal total cost of asset ownership for the Project.

- (a) What do you think would be an appropriate contract term (i.e., length of the construction and operation periods) to maximise value-for-money? What key considerations you



think should be considered in determining the contract term? Please elaborate on your suggestion and rationale.

A.3.6 Promoting Innovations

- (a) What do you think may be the most effective means to drive innovation in the procurement process to maximise the value-for-money outcome and expedite delivery of the Project?
- (b) What do you think may be the most effective means to drive innovation in the design, construction and/or operation of the I•PARK2 to maximise the value-for-money outcome and expedite delivery of the Project?
- (c) Do you have any suggestion on any research & development aspects and/or advanced technologies that can be put in place in the I•PARK2? Do you have any knowledge or experiences on how this can be implemented?
- (d) Any recommendations on practical designs / solutions that could adequately address stakeholders' concerns and gain stakeholders' support to the Project; and any suggestions on public facilities that could be integrated into the design of I•PARK2 that suit the needs of the community?

A.3.7 Incentives for Outperformance

- (a) What do you think may be the most effective means to incentivise outperformance by the contractor, to maximise the value-for-money outcome during the contract period? This could be during construction, operation or both.
- (b) What incentives do you think should be included in the contract to encourage early (ahead-of-target) commissioning of I•PARK2?

A.4 Concluding Questions

- (a) Based on the information provided above, how likely will you be participating in the Project (e.g., unlikely, likely, highly likely)? What are or will be the factors that influence your decision to participate?
- (b) Are there any significant information gaps that you consider critical to sound risk management and hence realistic pricing and scheduling?
- (c) Is there any other information that you consider critical to the Project but not provided in this MSE document?
- (d) Do you have other issues that you wish to comment on or make suggestions? If yes, what are they?

Do you agree that we may contact you again if we have follow-up questions?



Table 1 Proforma for Listing Relevant Company Experience

Project Title	Brief Description (See Note 1)	Project Value (HKD) (See Note 2)	A. Contract Commencement date B. Contract Completion date (Original) C. Contract Completion date (Extended) D. Actual / Anticipated Completion date				Contract Duration (months)	Client	Plant Capacity	Capacity of Involvement (see Note 3)	Name of the Entity Involved in the Project (see Note 4)
			A (mm/yyyy)	B (mm/yyyy)	C (mm/yyyy)	D (mm/yyyy)					

Notes:

- (1) Please state nature, scope and key features of the contract, e.g., Type of Plant / Equipment Involved and Location.
- (2) Please specify value of design and build; and value of operation and maintenance.
- (3) Please state whether your company was the main contractor, subcontractor, supplier, or a joint venture participant (to state the % of participation by value of work in case of a joint venture).
- (4) Please indicate if you were involved in the project under a different name such as in the case of a subsidiary, sister company or mother company.
- (5) Please provide separate sheets if more space is required.



Table 2 Proforma for Listing Key Staff Experience

Position: _____

Qualifications: _____

Length of post-qualification experience (years): _____

Project Title	Brief Description	Location	Project Value (HKD)	Role of Staff	Key Responsibilities	Start of Involvement (mm/yyyy)	End of Involvement (mm/yyyy)	Duration (months)

Notes:

- (a) For qualification, please state the academic qualification (e.g. degree) and professional qualification (e.g., membership of professional institutions) if applicable.
- (b) Please use a separate sheet for each staff member (e.g., project manager, design/construction manager, operation manager, etc)
- (c) Name of the key personnel is not required to be given.



B Technology Questionnaire

B.1 Preamble

Respondents are encouraged to respond to all the market sounding questions listed below, as far as practicable, in relation to the Project. Responses to the questions should be returned by 31 May 2023.

All information, views, and ideas of any Respondent will be kept confidential and will not be used for any future tender evaluation exercise. Access to such information will be restricted to authorised personnel, including Consultants' staff, strictly on a need-to-know basis.

B.2 Information Sought

We welcome you to provide technical information of your technology that you believe could be deployed in the proposed I•PARK2 (having a processing capacity of at least 5,000tpd MSW) to significantly reduce waste volume for final landfill disposal and to recover resources (e.g., energy, materials) from the MSW for beneficial utilisation.

To facilitate analysis of the information, please present your suggestions under the following headings:

Process Engineering Aspects

- (a) Name of proposed Technology System.
- (b) A process flow diagram that illustrates the relationships between major components of the technology system, showing all key input and output streams in the solid, liquid and air phases as well as material and energy balance calculations.
- (c) Processing Capacity (minimum and maximum tpd of MSW per train, line or module).
- (d) Type and form of energy product, and yield (in terms of kWh per tonne of MSW processed)
- (e) Type and form of material product, and yield (in terms of tonnes of recovered product per tonnes of MSW processed)
- (f) Potable water consumption estimates (total and net after internal water recycling)
- (g) Power consumption estimates (total and net after internal power harvest)
- (h) Types and quantities of air and water emissions to the environment



- (i) Flue gas treatment technology to be adopted to comply with the stringent flue gas emission standards as stated in Section 3.1 of this document and their practicability / cost effectiveness.
- (j) Quantity of residues, by-products or rejects that cannot be beneficially utilised and therefore requiring disposal to landfill or another repository.

Physical Aspects

- (a) Footprint of major process plant and equipment
- (b) Total site area required for a waste-to-resource facility with the maximum MSW processing capacity that can be realistically accommodated on the Site per Question A.3.3(b) in Appendix A (that is, total area to be occupied for a fully functional plant including all ancillary systems, access roads, water management system, power supply/export systems, storage facilities, etc).

Construction Aspects

- (a) What is the lead time for procuring your technology system? That is, how long would it take from "time of order" to "delivery to the Site" of the process equipment?
- (b) Can your technology system be manufactured off-site (in factories) and then delivered in the form of modules to the Site? If so, what are the maximum and minimum module sizes, and how are they typically transported by road or marine means? What are the weight and sizes (dimensions) of each type of module?
- (c) What sort of lifting or other construction equipment/device is required for installation of your technology system? What is the estimated size of the construction staging area that you would need to allow installation and commissioning of your technology system? Is there any "headroom" requirement for installation? Is there any specific requirement for site access by land / marine transportation of complete assemblies or sub-assemblies of the technology system?
- (d) If it is intended to build and install the proposed incineration system on-site instead of delivery of modules prefabricated off-site to the Project Site, would any on-site temporary works area be required in addition to the Project Site and what would be the minimum requirements (e.g. the size of the on-site temporary works area as well as the connectivity by means of road transport or marine reception facility for delivery of materials and equipment, etc.)? What would be the expected numbers of workers (in particular skilled workers) required to work on-site during different phases of the construction period as mentioned in A.3.4(b), Appendix A of the Invitation document?

Operation and Maintenance Aspects

- (a) What is the service life of your technology system? That is, how often will the plant and equipment need to be replaced?



- (b) What is manpower level needed for operation of the technology system?
- (c) What is a typical maintenance plan for your technology system?

Product Markets

- (a) What are the anticipated end markets for the recovered resource products from your technology system?

Anticipated Input by EPD or Others

- (a) What do you think EPD (or other parties) should do to facilitate the success of the Project?

Cost Estimates

- (a) Please provide capital and O&M cost estimates in *Appendix C* to this MSE Invitation for a waste-to-resource facility with the maximum MSW processing capacity that can be realistically accommodated on the Site per Question A.3.3(b) in Appendix A using your proposed technology system.



C Preliminary Cost / Financial Estimates

C.1 Preamble

Respondents are encouraged to respond to all the market sounding questions listed below, as far as practicable, in relation to the Project. Responses to the questions should be returned by 31 May 2023.

All information, views, and ideas of any Respondent will be kept confidential and will not be used for any future tender evaluation exercise. Access to such information will be restricted to authorised personnel, including Consultants' staff, strictly on a need-to-know basis.

C.2 Information Sought

We welcome you to provide non-binding preliminary cost/financial estimates for the Project with the maximum MSW processing capacity that can be realistically accommodated on the Site per Question A.3.3(b) in Appendix A to be contracted under your preferred form of PPP (i.e., DBO, BOT, BOO or BOOT) as proposed in your response to Question A.3.1 in Appendix A to this MSE Invitation and your suggestions regarding technology, layout plan, construction programme, etc in the same Appendix A.

To facilitate analysis of the information, please present your estimates under the following headings:

Asset Creation (Capital) Cost Estimate (in HK\$, please use 2023 prices or another stated price base)

- (a) Design development
- (b) Site formation
- (c) Foundation construction
- (d) Substructure construction
- (e) Superstructure construction
- (f) Procurement and installation of core process engineering systems (please provide a cost estimate of each major system separately)



- (g) Procurement and installation of ancillary mechanical and electrical systems (please provide a cost estimate of each major system separately)
- (h) Architectural and landscaping works
- (i) Public amenities and community facilities within the I•PARK2 site boundary
- (j) Access roads, waterworks, drainage, sewerage, power, telecom and other utilities
- (k) Preliminary items (e.g., insurance, bond, management staff, site accommodation, public relations support, safety and environmental protection measures, permit and approvals, construction consumables, etc)
- (l) Allowance for construction risks (please list separately)
- (m) Allowance for construction cost escalation/inflation and assumed time period of construction
- (n) Return on construction Phase Investment (or markup %)
- (o) Total capital cost based on the breakdown of the above items

Operation Phase (in HK\$, please use 2023 prices or another stated price base)

- (a) Annual cost (\$ per annum) to maintain I•PARK2 in sound working condition (please breakdown in staff/labour cost, plant and materials cost, subcontract cost, insurance, utility costs, etc), *irrespective* of the amount of MSW actually processed in each year.
- (b) Asset replacement cost (assuming the operation period is at least 15 years).
- (c) Cost to convert MSW to resource products (\$/t of MSW processed).
- (d) Revenue from sale of products (e.g., energy, materials) derived from each tonne of MSW. Please separate revenue streams from different products.
- (e) Return on Operation Phase Investment (or markup %)

Financing

- (a) If a DBFO model (including BOT) (where private finance is involved to fund the Project) is proposed, how would you finance the Project? What would be the expected percentages and broad cost of different sources – equity investment and debt financing from private sector? For debt financing from private sector, what would be the expected repayment period and borrowing cost, and would loan guarantee or other forms of financial undertaking from the Government (e.g., Government loan / green bond issuance) be required to enhance the financial viability of the Project?
- (b) For debt financing from private sector, what would be the expected time required for due-diligence scrutiny by the third-party financiers prior to contract award? Please



specify if there are any potential problems that you would anticipate if debt financing from private sector would be required.

- (c) We intend developing a payment mechanism that could achieve value for money through reducing the risk taken by the private sector and the cost of private funding. It could be regular payments including the amortised capital cost and service fees upon commencement of the service delivery, lump sum milestone payments during the construction period to shoulder part of the upfront construction costs, or a combination of these and other options. What is your suggestion and preference on the payment mechanism?
- (d) What sort of pre-tax financial return [Internal Rate of Return (IRR) or other financial performance measure, please specify] you would expect to make on your investment?
- (e) What are the major sources of revenue do you expect from the Project? What would be your expected weighting of these revenue streams in the total income profile? For example, how much would you charge customers (waste generators) for processing each tonne of MSW? How do you propose to market and sell the recovered resources? Please provide an outline business plan on the operation and management of the I•PARK2, including the estimated annual income and expenditure, and ways to enhance the financial / commercial viability of the Project.