



**delterra**   
Real Change, At Scale.

## **REQUEST FOR PROPOSAL**

CONSULTING SUPPORT FOR DEVELOPING  
AN OPTIMIZED WASTE MANAGEMENT  
FLOW IN A BALI REGENCY, INDONESIA  
FOR AN INTERNATIONAL NON-PROFIT  
ORGANIZATION

# GENERAL INFORMATION

**Organization Overview.** Delterra is an independent non-profit founded in 2018 by the global consultancy, McKinsey & Company. Delterra's mission is to redesign human systems for the good of the people and the planet by developing innovative scalable solutions. Today, we are reimagining and redesigning the waste management and recycling systems in Argentina and Indonesia and expanding into Brazil.

In Indonesia, we have successfully intervened at village-level waste management systems, learning what it takes to optimize **decentralized mini-MRFs, henceforth referred to as TPS3Rs**. In this phase, we seek to scale our intervention to a regency-level in Badung Regency in Bali, no longer engaging only with TPS3Rs, but also with all players in the system, chiefly **mid sized-MRFs, henceforth referred to as TPSTs**, as well as waste banks and independent waste collectors. Our main aim is to expand access to waste management services from around 170,000 to all 600,000 people in Badung in the span of 3 years, reducing residual waste going into the landfill and the environment.

To create a system that goes beyond intervention just at the TPS3R level, we hypothesize an integrated system where we combine our current TPS3R optimization approach with connecting TPS3Rs and TPSTs to share the burden of processing organic waste.

**Purpose.** This request for proposal (RFP) is for consulting and engineering support to:

- Propose an optimized operating system, including macro-waste flows and quantities, across the regency (600k people) and pilot area, including collection and transportation equipment required. Key considerations include financial constraints\*, existing infrastructural conditions, short implementation time, and organizational hypothesis for an integrated system, which all will be disclosed below.
- Develop optimum waste flow, layout, and additional machinery needs for TPST(s) in the system to accommodate the integrated waste management system above.

As a result, we have divided the scope of work into two lots: 1) waste management ecosystem mapping & waste flow analysis and, 2) process optimization at the TPST level. We divided the scope of work in anticipation of different expertise needed per lot, however, the deliverables of one lot are interdependent of the deliverables of the other. For this RfP, applicants can choose whether to bid for either one of the two lots, or the both lots altogether. Joined applications as a consortium or partnership is welcome, as we expect a close coordination between the execution of the two scopes of work.

Please do note that allotment of one of these lots to a bidder does not indicate any commitment on our part to allot that bidder the other lot as well.

**Who may respond?** Independent or waste management firms or individual consultants that have expertise and experience in municipal solid waste treatment. Deep knowledge of organic waste treatment and MRF design from operational, financial, technical, and logistical perspectives is necessary. Experience working in waste management in Indonesia or similar systems is required.

\*see Annex 4.

# PROJECT OVERVIEW

**Project Background.** The first lot of this RfP seeks service providers who are able to verify whether this hypothesized integrated system is a cost-efficient solution in reducing the volume of waste going to the landfill and the environment, and if so, what will the integrated operational system look like? In order to do this, we expect consultants to create a waste flow analysis of the current system based on our existing data on: Badung's waste generation, diagnostic assessments of 18 out of 30 Badung TPS3Rs and 1 out of 2 Badung TPSTs, and other relevant information. We also expect that the waste flow and quantities analysis of the optimized system will lean heavily on the work on lot 2, where TPST optimization plans and subsequent capacity improvement will affect the macro flow of materials in Badung.

The second lot of this RfP seek service providers who are able to design short-term and long-term optimization plans for TPST Mengwitani, the largest existing TPST in Badung, in accordance with the optimized waste flow.

We are planning to develop a proof-of-concept of our integration approach with 6 pre-selected pilot TPS3Rs and 1 TPST. This is to ensure a smooth implementation and risk management strategies before we replicate this model to all TPS3Rs and TPSTs in Badung. Therefore, we layered both lots' scopes of work and deliverables by pilot- and regency-levels.

As the initial engagement occurs, it is possible that some (up to 3) TPS3Rs might opt out of the pilot. In this case, the pilot will commence with the remaining TPS3Rs.



## Data collection.

Key to the work of lot 1, and to some extent lot 2, is the waste flow and quantity analysis of Badung's current waste generated and management system. Given its potential breadth, we must clarify that we expect no further large-scale, intensive data collection to be conducted by this service provider. Outlined below is the range of collection activities and resulting data we have compiled for analysis.

*Secondary data* – We gathered secondary data mainly from national and regency level government agencies, partner organizations, and published reports. Primarily, these data points serve to paint a contextual picture of Badung's waste management ecosystem such as:

- Population size and demographic characteristics
- Number and types of MRFs
  - Basic TPS3R and TPST characteristics (location, ownership types, etc)
- Number and characteristics of waste management actors such as waste banks, independent waste collectors, and other non-profit organizations.
- Estimations of waste generation volumes and characteristics

Additionally, we cross reference waste generation estimations from Badung's environmental agency with waste characterization exercises in Denpasar City, where Rethinking Recycling's first cohort resides. We anticipate another Badung waste generation exercise and estimation to be published by a trusted partner organization in early March 2023 in order to triangulate this essential component of a waste flow analysis.

*Primary data* – One of our program's main objectives is optimizing MRF waste treatment capacities. In August 2022, we visited 18 out of 30 TPS3Rs and 1 out of 2 TPSTs in Badung to collect in-depth profiling of each MRF. Data was gathered by conducting interviews & area measurements on site for 2-4 hours for each MRFs. We focused mainly on:

- Estimate of incoming waste volume based on fleet daily traffic
- Landsize and layout
- Machinery, fleet, and utility availability
- Number of workers, and role allocation
- Operational cost
- Composting methods
- MRFs' condition photos & videos

**Integrated organics waste management.** Key to our learning in our first cohort of village-level interventions is that most TPS3Rs have insufficient capacities to compost most incoming organic waste despite optimization. Our hypothesis is that if the burden to compost is shared between TPS3Rs and TPSTs, Badung's waste management ecosystem will be able to divert significantly more waste from the landfill and minimize environmental leakages at a reasonable cost.

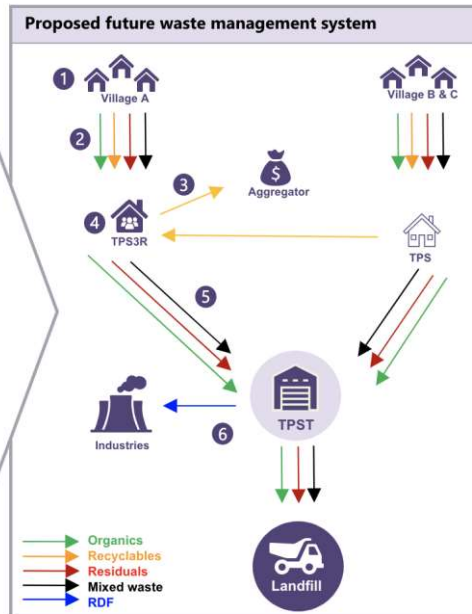
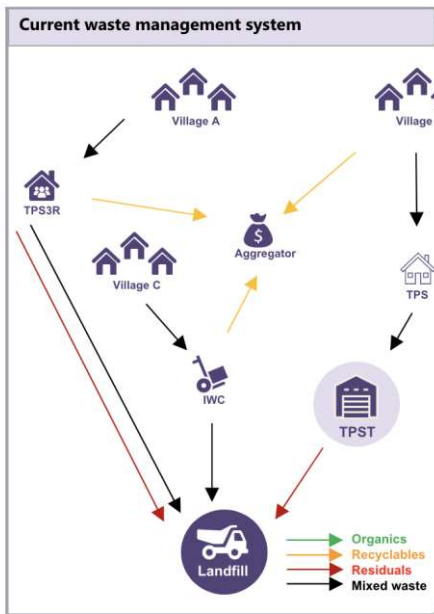
In practice, this approach will optimize TPS3Rs to be able to compost as much processable organics (determined at sorting), increase significantly recyclable sorting, hence reduce residual and unmanaged/unprocessed waste as possible on site. Then, the excess processable organics will be shredded and then sent to a TPST within 20-kilometer distance for composting.

*See Annex 3 for more details.*



RR's current thinking is to transform the operating model by enabling TPSTs to be an organics and residuals processing center and shifting TPS3Rs's focus to recyclables sorting and processing (1/2)

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How the integration model would work in practice:

1. Households will separate their waste into three streams: Recyclables, Organics and Residue
2. Drivers will collect separate waste from households, following a scheduled waste collection, in which different types of waste are collected on different days to help reinforce the importance of separation
3. All waste streams will be taken to the village recycling centre (TPS3R) where the recyclables will be sorted and then sold directly to priority off-takers, selected based on a combination of price and transparency on material traceability
4. Where space allows at TPS3Rs, organics will be shredded and composted on site, before selling to local buyers (e.g., farmers)
5. Organics that cannot be processed at TPS3Rs will be sent to a larger centralised regency facility (TPST) along with residue and any mixed waste
6. The TPST will process mixed waste into refuse derived fuel (RDF) and provide large-scale organic processing. RDF can be used as fuel in local industries and the processed organics can be sold or used as landfill cover

6

**TPS3R Optimization.** To optimize five TPS3Rs in our program's first cohort, we recently engaged an engineering consulting firm to specifically develop:

1. Plans for optimal material flow, equipment needs, and layout.
2. Optimal Standard Operating Procedures (SOPs) and workers activities.

We aim to use the learnings from this work to inform how we ought to optimize TPS3Rs in Badung given similar contexts and resource availability. However, we expect these optimization plans will need slight adjustments to the needs of an integrated system. Mainly, these adjustments will likely be reflected in less space dedicated to composting in lieu of being used to store shredded organics before being sent to a TPST.

The final report on TPS3R optimization recommendations is expected to be completed by the end of Q1 2023 at the latest.

# PROPOSAL INFORMATION

**Closing Submission Date.** Proposals must be submitted no later than February 3, 2023, 11:59 PM, Central Indonesia Time (GMT+8). Submissions will be evaluated with a rolling review process and Deltterra reserves the right to select the most appropriate candidate in a timely manner.

## **Expression of interest to bid and inquiries.**

Expression of interest to bid and all inquiries concerning this RFP should be emailed by Friday, January 27, 2023, 11:59 PM, Central Indonesia Time (GMT+8) to:

Laura Harjanto (Laura@deltterra.org) and Sathya Deva ([deva@deltterra.org](mailto:deva@deltterra.org)) (and cc [federico@deltterra.org](mailto:federico@deltterra.org) and [winny@deltterra.org](mailto:winny@deltterra.org))

stating clearly the Offeror's person-in-charge and email address.

We would send a response to the inquiries to all Offerors who has submitted their expression of interest by January 31, 2023, 11:59 PM, Central Indonesia Time (GMT+8). Therefore, in submitting a question, Offerors acknowledge that the question and answer will be shared with all other Offerors, without attribution.

## **Conditions of Proposal**

All costs incurred in the preparation of a proposal responding to this RFP will be the responsibility of the Offeror and will not be reimbursed by Deltterra.

The proposal should be addressed to:

Laura Harjanto  
laura@deltterra.org

Sathya Deva  
deva@deltterra.org

**Right to Reject.** Deltterra reserves the right to reject all proposals received in response to this RFP. A contract for the accepted proposal will be drafted based upon the factors described in this RFP.

**Notification of Award.** It is expected that a decision selecting the successful Firm will be made within three (3) weeks of the closing date for the receipt of proposals. Upon conclusion of final negotiations with the successful Firm, all Offerors submitting proposals in response to this Request for Proposal will be informed via email of the decision.

# SCOPE OF WORK 1

The Offeror selected will be responsible for providing the following services and complete the deliverables by August 18, 2023. Offerors are required to develop and submit a workplan to achieve this objective.

## DEVELOPING OPTIMIZED OPERATING SYSTEM

1. Map the flow of waste and quantities through Badung Regency's **existing** waste management system *with data provided from Delterra with no expectation of further data collection*. Analysis is expected to be done at two levels: regency-level and pilot-level (6 TPS3Rs).
2. Develop an **optimized regency-level operating system**, including processing capacities and waste flow analysis, with the goal of covering around *70% generated waste*, considering:
  - a. Current waste flow map of Badung (output of #1 above).
  - b. Our hypothesis of TPS3R and TPST organic processing integration (see Annex 3).
  - c. Existing land and infrastructure including TPS3R limitations (total area, worker, equipment & fleet).
  - d. Collection route and frequency, truck options, and quantity of trucks
3. Develop an **optimized pilot-level operational system**, including processing capacities and waste flow analysis, considering:
  - a. Current waste flow map of pilot villages
  - b. Our hypothesis of TPS3R and TPST organic processing integration (see Annex 3).
  - c. Existing land and infrastructure including TPS3R limitations (total area, worker, equipment & fleet).
  - d. Short timeline (3-4 months) for improvement.
  - e. Collection route and frequency, truck options, and quantity of trucks.
  - f. Estimation of capital and operational expenditures.

## ESTIMATING TOTAL COST OF TRANSFORMATION

4. Provide cost estimate of **cost for shredded organics and residues** transportation between TPS3R and TPST, and TPST to the landfill (TPA).
  - a. Required budget for buying new machines and equipment, should be submitted no later than July 2023 so that all equipment bought could be placed and implemented before end of the year.

## ADMINISTRATION AND REPORTING

6. Consultant will be expected to problem solve with our team and work hand in hand to find a set of solutions that work with the context of the Badung Regency. Hence, expect frequent communications and several working sessions to ensure recommendations align with Delterra's expectations.
7. Reporting Requirements (see further details on page 9)
  - a. Prepare reports of progress based on deliverables
  - b. Final report summarizing all findings
8. Other services as mutually agreed upon.

## SCOPE OF WORK 2

The Offeror selected will be responsible for providing the following services and complete the deliverables by June 30, 2023. Offerors are required to develop and submit a workplan to achieve this objective.

### TPST MENGWITANI OPTIMIZATION

1. Plan for optimizing processing capacity at TPST Mengwitani to accommodate for the **pilot-level** waste flow plan, focusing on organic processing, including:
  - a. Improvement implementation plan for a short timeline (2-3 months)
  - b. Optimum processing flow and procedure
  - c. Optimizing layout of available space, **without demolishing existing structures**
  - d. Machinery and equipment improvements
2. Plan for optimizing processing capacity at TPST Mengwitani to accommodate for the optimized **regency-level** waste flow plan that prioritizes organic processing, including:
  - a. Improvement implementation plan for ~1 year
  - b. Optimum processing flow and procedure
  - c. Optimizing layout of available space
  - d. Machinery and equipment improvements
  - e. Viable organic processing technology exploration and options based on contextual limitations such as capital, utility, space, and time availability.

### ESTIMATING TOTAL COST OF TRANSFORMATION

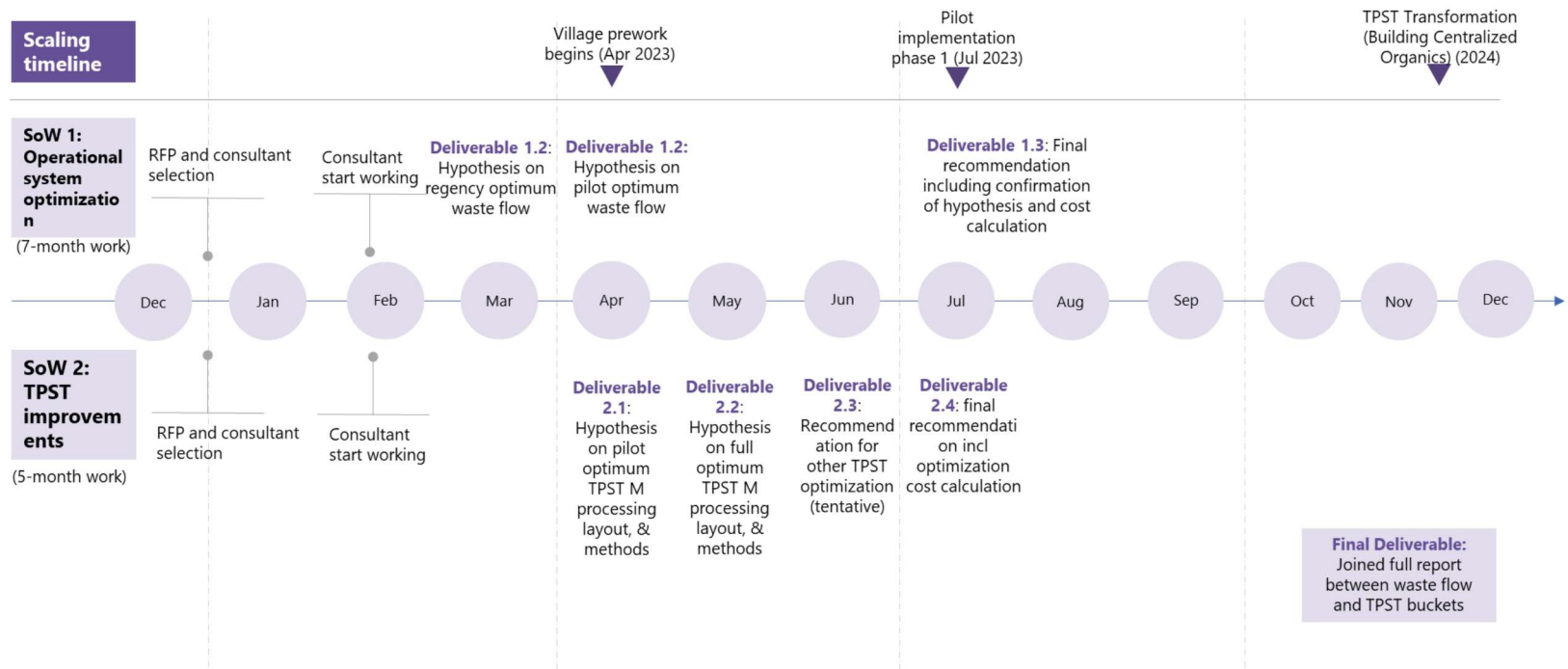
3. Provide cost estimate for:
  - a. Budget needed for pilot-level and regency-level improvement and implications for operational costs
  - b. Budget for site improvement, including additional infrastructure, machinery, and equipment. Full renovation of the existing infrastructure is not an option.
  - c. Budget for buying new machines and equipment, should be submitted no later than June 2023 so that all equipment bought could be placed and implemented before end of the year.

### ADMINISTRATION AND REPORTING

4. Consultant will be expected to problem solve with our team and work hand in hand to find a set of solutions that work with the existing land, infrastructure, and waste characterization of the Badung Regency. Hence, expect frequent communications and several working sessions to ensure recommendations align with Deltterra's expectations.
5. Reporting Requirements (see further details on page 10)
  - a. Prepare reports of progress based on deliverables
  - b. Final report summarizing all findings
6. Other services as mutually agreed upon, including potential TPSTs that might become available for optimization during the contract period



# DELIVERABLES TIMELINE



\*TPST M: TPST Mengwitani

# DELIVERABLES 1

The bidder will be required to submit the following deliverables, defining an appropriate timeline for each, considering the overarching objectives and timeline for the engagement, as stated in the "Scope of Work 1".

## DEVELOPING OPTIMIZED OPERATIONAL SYSTEM HYPOTHESIS

1. **Initial report** on early hypothesis of an optimized **regency-level** operational system (March 2023)
  - a. Includes waste flow analysis of existing waste management system in Badung
  - b. Early hypothesis on whether a TPS3R and TPST integrated operational system is a cost-efficient waste diversion solution for Badung. (See Annex 3)
  - c. Depending on item C, early hypothesis on waste flow and quantities that will enable an integrated system
  - d. Based on items A and C, TPS3R improvement recommendations include:
    - a. High-level optimal layout, processing flow & procedure requirements
    - b. Machinery and equipment requirements
    - c. Manpower requirements  
*(adjusted from existing recommendation for integration)*
  - e. Based on item C and D, logistical recommendations for material flow
    - a. Number and type of fleet
    - b. Collection route & frequency
  - f. High level cost estimation for items c and d.
2. **Second report** on optimized **pilot-level** operational system (April 2023)
  - a. Application of optimized operational system and waste flow hypothesis in Deliverable 1 to select pilot villages
  - b. TPS3R improvement recommendations given short timeline for implementation
    - a. Optimal layout, processing flow & procedure requirements for each MRF
    - b. Machinery and equipment requirements for each MRF
    - c. Manpower requirements for each MRF  
*(adjusted from existing recommendation for integration)*
  - c. Logistical plan for material flow
    - a. Number and type of fleet
    - b. Collection route & frequency
    - c. Cost estimation of operational expenditures

## FINAL WASTE FLOW RECOMMENDATION

3. **Final report** on optimized regency-level waste flow analysis (August 2023)
  - a. Based on SoW lot #2 recommendations, evaluate and adjust regency-level waste flow recommendation
  - b. Annexed basic confidence level analysis/expert view of TPS3R survey results
  - c. More detailed regency-level waste flow analysis
  - d. Re-evaluate logistical recommendation and identify key challenges if necessary
  - e. Detailed cost estimation for items b and c

## DELIVERABLES 2

The bidder will be required to submit the following deliverables, defining an appropriate timeline for each, considering the overarching objectives and timeline for the engagement, as stated in the "Scope of Work 2".

### TPST MENGWITANI OPTIMIZATION

1. **Initial recommendation** on optimizing processing capacity at TPST Mengwitani to accommodate for the optimized pilot-level waste flow recommendations, focusing on organic processing (April 2023), including:
  - a. Improvement implementation plan for a short implementation timeline (2-3 months)
  - b. Optimum processing flow and procedure
  - c. Optimized layout of available space without massive infrastructural changes
  - d. Tool and machinery improvements
2. **Final recommendation** on optimizing processing capacity at TPST Mengwitani to accommodate for the ideal waste flow plan in Badung regency that prioritizes organic processing (May 2023), including:
  - a. Improvement implementation plan for ~1 year implementation timeline
  - b. Optimum processing flow and procedure
  - c. Optimized layout of available space
  - d. Tool and machinery improvements
  - e. Viable organic processing technology exploration and options based on contextual limitations such as capital, utility, space, and time availability.

*(see Annex 5 for TPST Mengwitani existing conditions)*

### FINAL TPST OPTIMIZATION RECOMMENDATION

3. **Final report** including total cost calculation (July 2023), including:
  - a. Approximation financial budget needed for pilot-level and regency-level improvement and implications for operational costs
  - b. Provide budget calculation for the improvement of each site, including additional infrastructure, machinery, and equipment. Full renovation of the existing infrastructure is not an option.
  - c. Budget for buying new machines and equipment

# PROPOSAL INSTRUCTIONS

The proposal must be no more than 10 pages, 12 font Times New Roman, single spaced, 1" margins, with an additional appendices of up to a total of an additional 8 (as an example) pages can be included. Information that can be included in the appendices instead of the main body of the proposal are asterisked below.

1. General Information; please include a cover sheet with the following information:
  - a. Name of contractor/firm
  - b. Contact Person
  - c. Title
  - d. Mailing Address
  - e. Telephone Number
  - f. E-mail
  - g. Website
2. Organizational Overview & Qualifications
  - a. Describe the firm, professional history & scope of practice
  - b. Biographies of proposed team with resumes attached and work locations\*
  - c. Explain how the Firm is a good fit with our organization, detailing experience with other clients of a similar size and scope
3. Proposed Work Plan & Timeline; please provide the following descriptions:
  - a. Proposal to fulfill the Scope of Work and Deliverables noted above
  - b. Outline of key steps and persons responsible, including each assigned staff member's experience, and level of effort and supervision required
  - c. Your preferences and expectations, including communication response times, when working with clients
  - d. Specific expectations from Delterra as a client.
4. Project Management & Fees; please provide the following:
  - a. Process for managing project, including communications with Delterra
  - b. Measures & reports to be used to keep project on track & demonstrate fulfillment of expected deliverables\*
  - c. Proposed budget necessary to fulfill Scope of Work & Deliverables, including travel costs for site visits
  - d. Budget narrative, justification & methods of calculation, as well as hourly rates for the Firm's employees should additional services be requested outside of the scope of this proposal\*
    - a. Sample budget template
5. References; please provide the following references:
  - a. List of clients for whom contractor/Firm have provided similar contracted services
  - b. Contact information for three (3) specific professional references including non-profit clients, for whom the contractor/Firm has provided similar services.

# ADDITIONAL TERMS

## Reservation of Rights

During the evaluation process, Delterra reserves the right to request additional information or clarifications from offerors. The costs of developing proposals are entirely the responsibility of the vendor and shall not be charged in any manner to Delterra.

## Applicant Rights

Please note that all materials submitted in response to this RFP become the property of Delterra upon delivery and shall be appended to any formal documentation, which would further define or expand the contractual relationship between Delterra and the contracted vendor. Each applicant agrees that the contents of every other proposal submitted by other applicants with respect to this RFP are confidential and proprietary and waives any right to access such proposals during the RFP process. No submissions or supporting documentation will be returned to the submitting applicant.

## Expenses

Travel expenses and accommodation during the site visit, implementation supervision and assistance for offerors outside Bali, should be calculated separately based on the suitable number of visits and upon agreement.

# PROPOSAL EVALUATION

## Submission of Proposals.

Proposals shall be submitted via email to the previously listed email address no later than February 3, 2023.

## Evaluation Procedure and Criteria.

Delterra's Board of Directors, Project Leads, and appropriate staff will review proposals and make recommendations to the CEO for final approval. The Director of Operations and/or CEO may request a meeting with some qualified Offerors prior to final selection.

Proposals will be reviewed in accordance with the following criteria:

- Technical approach
  - **Proposed approach** to the scope of work
  - **Feasibility** / overall program management approach
- Management approach
  - Level of experience of the **individual(s)** identified to work on this matter
  - The Offeror's experience with **similar work**
  - **Response from references**
- Cost approach



# ANNEX 1

## Map of MRFs & other Waste Management Players in Badung

Badung is a regency in Bali with a population of around 600k, spanning from the most southernmost tip of Bali to the north, with a total area of 418.52 km<sup>2</sup>.

Through this vast area, we mapped the locations of key waste management centers such as TPS3Rs, TPSTs, Waste Banks (WBs) & Independent Waste Collectors (IWCs).

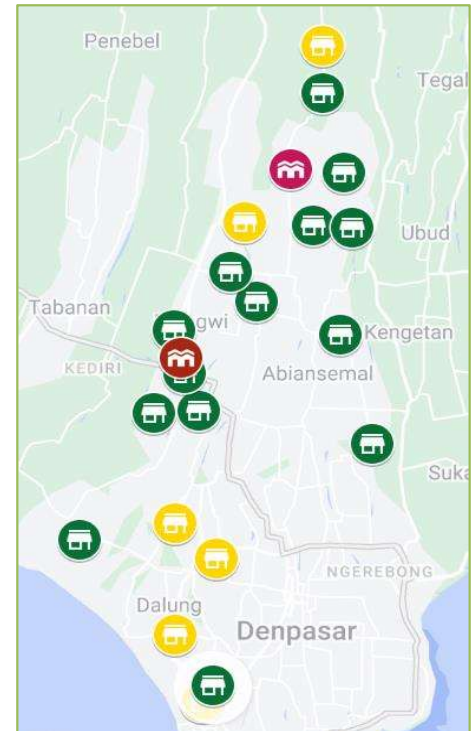
Waste Banks are community-based plastic collection and separation centers. At waste banks, customers (usually individuals/households) deposit plastics and receive monetary credit for the value of the plastics in return.

Independent Waste Collectors are largely waste collection for-profit entities whose main source of revenue depend on collection fees. They typically dump the collected waste at the landfill.

We paid close attention especially to the mapping of the TPS3Rs and TPSTs. Our hypothesis is that material transportation cost between a TPS3R and TPST will be one of the largest considerations in testing the cost efficiency of the integrated system we proposed. Therefore, distance matters.

Based on transportation of materials from TPS3R Padang Tegal to the Suwung landfill, we benchmarked 20 kilometers as the maximum distance between a TPS3R and TPST. On the map linked below, you will find TPS3Rs grouped based on their distance to a TPST. Additionally, these TPS3Rs are verified to be operational.

The link to the waste management players in Badung includes TPST, TPS3R, IWCs, Waste Bank: [Map of MRFs & other WM players in Badung Regency - Google My Maps](#)



Map of TPS3R within <20 km radius from TPST Mengwitani (Cluster Mengwi)



Map of TPS3R within <20 km radius from TPST Samtaku (Cluster Samtaku Jimbaran)

## ANNEX 1 (Cont.)

### What are on the Map?

No	Groups	Information
1	TPST Mengwitani Cluster 10km	Location of TPS3Rs around 10km of TPST Mengwitani
2	TPST Mengwitani Cluster 20 km - additions	Location of <b>additional</b> TPS3Rs around 20km of TPST Mengwitani
3	TPST SAMTAKU Cluster 10 km	Location of TPS3Rs around 10km of TPST Samtaku
4	Not Covered	Location of TPS3Rs which are located $\geq$ 20km from the TPST
5	TPST SAMTAKU Cluster 20km – additions	Location of <b>additional</b> TPS3Rs around 20km of TPST Samtaku
6	TPS3Rs	Location of TPS3Rs across whole Badung
7	IWCs	Location of Independent Waste Collectors (IWCs) across Badung
8	WBs	Location of Waste Bank (WBs) across Badung
9	TPSTs	Location of TPSTs across Badung
10	TPST Mengwitani Cluster Pilot	Location of the potential TPS3Rs for integration pilot and the location of landfill (TPA)

We will do the Pilot with TPST Mengwitani and TPS3Rs within 20km distance of the TPST. TPST Mengwitani is preferred as this is government-owned and has a dedicated area for composting. In the full regency roll-out, we are aiming to intervene all existing TPSTs and TPS3Rs to cover the whole Badung regency population.



TPST



Village-owned  
TPS3R



Private -  
TPS3R



TPA/  
Landfill

The link to the waste management players in Badung includes TPST, TPS3R, IWCs, Waste Bank: [Map of MRFs & other WM players in Badung Regency - Google My Maps](#)

# ANNEX 2

## MRFs List in Badung (TPS3Rs & TPST)

	MRF Name	Type	Owner	Total area (sqm)	Village population	Current coverage*	Site layout, photos, and videos
1	Sari Wangi Sedana – Mengwitani	TPS3R	Public	234	8025	62%	<a href="#">TPS3R Sari Wangi Sedana</a>
2	Mengwi	TPS3R	Public	1,500	8097	100%	<a href="#">TPS3R Mengwi</a>
3	Kapal	TPS3R	Private	1,190	12048	8%	<a href="#">TPS3R Kapal</a>
4	Kekeran	TPS3R	Public	400	3841	100%	<a href="#">TPS3R Kekeran</a>
5	Penarungan	TPS3R	Public	322	5115	7%	<a href="#">TPS3R Penarungan</a>
6	Bakti Pertiwi – Bindu	TPS3R	Public	386	800	100%	<a href="#">TPS3R Bakti Pertiwi</a>
7	Sedana Nadi – Jagapati	TPS3R	Public	1099	4038	100%	<a href="#">TPS3R Sedana Nadi</a>
8	Sumber Sari Nadi – Sobangan	TPS3R	Private	2000	4432	n.a.	<i>Not visited</i>
9	Lembu Tusan - Baha	TPS3R	Public	573	3953	100%	<a href="#">TPS3R Lembu Tusan</a>
10	Catu Kwero Sedana – Pecatu	TPS3R	Public	7940	8304	18%	<a href="#">TPS3R Catu Kwero Sedana</a>
11	Panca Lestari - Tanjung Benoa	TPS3R	Public	668	5225	23%	<a href="#">TPS3R Panca Lestari</a>
12	Tunjung Mas – Peminge	TPS3R	Public	794	2058	21%	<a href="#">TPS3R Tunjung Mas</a>
13	Jimbaran Lestari	TPS3R	Private	3000	53464	n.a.	<i>Not visited</i>
14	Kedonganan	TPS3R	Public	2329	7038	37%	<a href="#">TPS3R Kedonganan</a>
15	Punggul Hijau	TPS3R	Public	505	3294	100%	<a href="#">TPS3R Punggul Hijau</a>
16	Bongkasa	TPS3R	Public	502	6264	100%	<a href="#">TPS3R Bongkasa</a>
17	Kerta Bhuana Lestari – Pererenan	TPS3R	Public	982	3267	100%	<a href="#">TPS3R Kerta Bhuana Lestari</a>
18	Seminyak	TPS3R	Public	1589	1348	100%	<a href="#">TPS3R Seminyak</a>
19	Desa Taman	TPS3R	Public	607	6993	100%	<a href="#">TPS3R Taman</a>
20	Eco Bali Recycling	TPS3R	Private	250	11752	n.a.	<i>Not visited</i>
21	JS. Umas	TPS3R	Private	200	16464	n.a.	<i>Not visited</i>
22	Tambyak Lestari	TPS3R	Private	400	6460	n.a.	<i>Not visited</i>
23	CV Tangkas Karya Mandiri	TPS3R	Private	300	19488	n.a.	<i>Not visited</i>
24	Taman Sari Nadi - Kerobokan Kelod	TPS3R	Private	900	9836	n.a.	<i>Not visited</i>
25	Carangsari	TPS3R	Public	846	6011	19%	<a href="#">TPS3R Carangsari</a>
26	Getasan	TPS3R	Public	2495	2812	n.a.	<i>Not visited</i>
27	Pangsan	TPS3R	Public	1600	3600	n.a.	<i>Not visited</i>
28	Petang	TPS3R	Public	900	4696	n.a.	<i>Not visited</i>
29	Plaga	TPS3R	Public	800	7784	n.a.	<i>Not visited</i>
30	Belok/Sidan	TPS3R	Public	1500	6472	n.a.	<i>Not visited</i>
31	TPST Desa Sangeh (planned)	TPST	Public		-	-	<i>Not visited</i>
32	TPST Mengwitani	TPST	Public	16134	-	-	<a href="#">TPST Mengwitani</a>
33	TPST SAMTAKU Jimbaran	TPST	Private	5000	-	-	<i>Not visited</i>

\*Current coverage is the ratio of the current HHs served by the MRFs compared to total HHs at the village.

## ANNEX 2 (Cont.)

### List of legends on the TPS3Rs/TPSTs Layout

Given the layouts are written in Indonesia, below are the English version of some legends in the layouts for more clarity.

No	Bahasa Indonesia	English
1	Drop organik	Organic waste drop area
2	Pemrosesan organik	Organic waste processing area
3	Parkir armada	Fleet parking area
4	Pemilahan organik	Organic waste sorting area
5	Pemilahan daur ulang	Recyclable sorting area
6	Bak kompos	Composting boxes
7	Gudang daur ulang	Recyclable storage
8	Penyimpanan mesin	Machinaries storage area
9	Penyimpanan cacahan organik	Shredded organic storage
10	Pengayakan kompos	Compost sieving area
11	Drop residu	Residual waste drop area
12	Tumpukan pilahan	Sorted waste pile area
13	Gudang	Storage
14	Akses armada	Fleet access
15	Kosong	Empty area
16	Mati	Dead area – have no potential to use
17	Kantor	Office
18	Taman	Garden
19	Pelinggih	Small temple
20	Penumpukan hasil pembakaran	Pile of incinerating/burning leftover

# ANNEX 3

## Hypothesis for integrated composting

An integrated composting approach hinges on three things: 1) optimized composting at TPS3R, 2) shredding of excess processable organics at TPS3Rs and transportation of said material to a TPST within 20 km distance, 3) optimized composting at TPST.

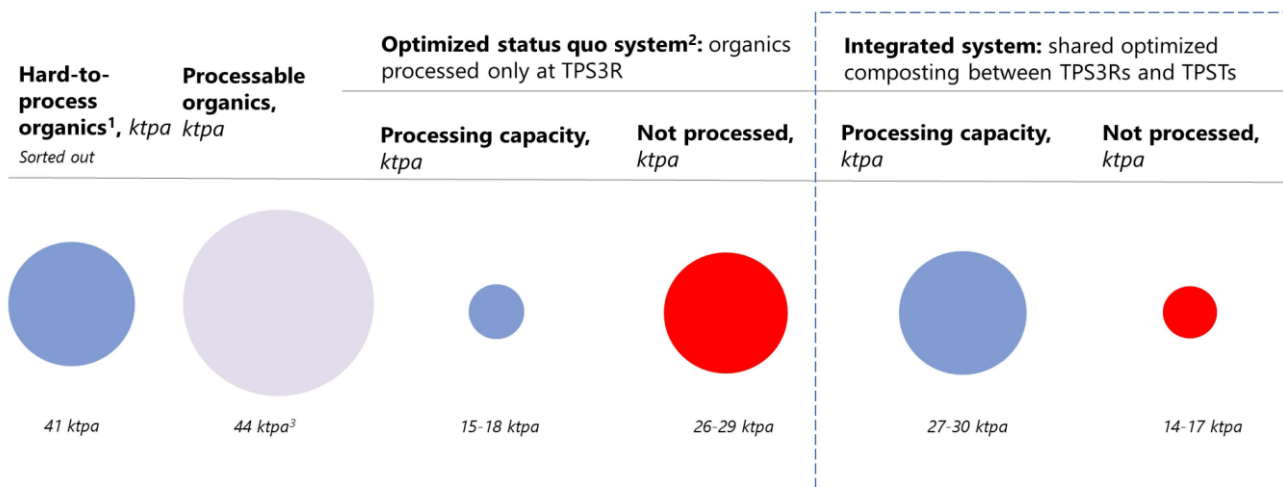
To optimize TPS3R composting, we propose 21-32% of total area is dedicated for composting activities, including shredding. We aim to build worker competency and implement standardized operating procedures to reduce composting. In order to store shredded material before transporting to TPST, 9-14% of TPS3R's total area should be dedicated for storage.

If this approach is implemented to all existing 30 TPS3Rs and 2 TPSTs (TPST Mengwitani & TPST SAMTAKU Jimbaran), we estimate the MRF ecosystem's organics processing capacity to increase by 17-22 times, reaching 72-75 ktpa organics processed. It must be noted that we estimate around 54-56 ktpa organics are still destined to head to the landfill, 14-15 ktpa of which are processable organics.

We also explored an approach where we simply optimize composting at TPS3Rs (status quo). We estimate that the MRF ecosystem's organics processing capacity will only reach 15-18 ktpa, with 26-29 ktpa processable organics heading to the landfill.

### Integration reduces processable organics heading to landfill and the environment

Calculated gap of processing capacities and excess organics between an integrated and non-integrated optimized approaches



1. Wood, coconut shells, contaminated organics – filtered out in the sorting stage  
 2. TPS3R area usage optimized following national standards



# ANNEX 4

## TPS3R & TPST Improvement Limitation

### TPST

- Estimate improvement budget up to ~1.572k USD for processing technology, machineries & equipment, infrastructure, & fleet (CAPEX)
- ~1 year period to deliver operational system improvement such as building infrastructure, and purchasing tech. for organic processing (regency-level)
- 2-3 months period to deliver short term operational improvement (pilot level)

### TPS3R

- Estimate improvement budget up to ~53k USD for CAPEX
- 2-3 months period to deliver operational system improvement (regency & pilot level)



# ANNEX 5

## TPST Mengwitani Current Conditions

### Incoming waste

TPST Mengwitani receives around 9-10 trucks (estimated ~30-33 tons) of mixed waste everyday from main roads and surrounding villages without access to a TPS3R.

Badung's environmental agency (DLHK) official claims that this incoming waste volume is standardized based on the maximum volume of waste that the TPST can process.

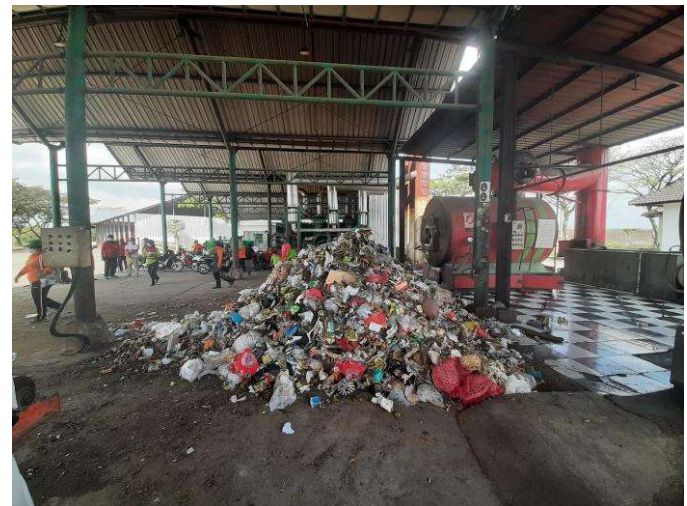
### Sorting methods

There is limited sorting done at the TPST, mostly skimming for high value recyclables. Workers are incentivized to do this as revenue from recyclables sales become an additional income for workers.

### Processing methods

While high value recyclables are stored and sold, organics are composted, and residual waste is burned. However, we noted during our visit that the composted material is mixed waste, as material sorting is still poorly done.

Additionally, within the same site complex, there will be an RDF site operated by a private entity. This could potentially redirect residual waste from being burnt to being processed in the RDF facility, although we are not yet sure to what capacity this facility will operate.



More pictures and videos of this site is available in [this folder](#).