



# ROADMAP TO CREDITS

From Memorandum of Understanding to Verified Credits,  
Delivered, Collected, and Distributed.

Thailand Plastic Credit Programme | Operational Roadmap  
Confidential | Version 1.0.0

- 01
- 02
- 03
- 04
- 05
- 06
- 07
- 08

# From First Contact to Recurring Revenue

This roadmap describes how a Thai recycling operator is taken from first contact through to the periodic distribution of net proceeds from verified Verra plastic credits. It is an operational document – it describes *what happens, in what order, and against what evidence*.

The journey is composed of **eight sequential stages** spanning a mobilisation horizon of roughly twelve to eighteen months, followed by a **perpetual annual operating cycle** that produces recurring credit issuance, buyer delivery, collection, and multi-party distribution.

Stage 5 – the operational heart – runs **six parallel sub-stages** covering Verra registration, monitoring mechanism, platform build, marker deployment, baseline monitoring, and first verification.

*"The roadmap is the contract between ambition and discipline. It makes the journey auditable before it is audited."*

**8**

Sequential stages from engagement to distribution

**6**

Parallel sub-stages within Stage 5 Implementation

**63**

Enumerated milestones across the full programme

**5**

Beneficiary classes in proceeds distribution

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01

# THE JOURNEY AT A GLANCE

*Eight stages, sixty-three milestones, one operational spine*

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# Stages Overview

Durations are ranges of working time. No fixed calendar dates. Actual dates anchor to operator kick-off.

#	STAGE	DURATION	MILESTONES
1	Memorandum of Understanding & Partnership Framing	3-5 weeks	5
2	Site Inspection & Technical Diligence	3-4 weeks	5
3	As-Is Process Documentation	4-6 weeks	6
4	Needs Analysis & Gap Assessment	4-6 weeks	6
<b>5</b>	<b>Implementation under Verra Monitoring (six parallel sub-stages)</b>	<b>~9-15 months</b>	<b>28</b>
5a	→ Verra Programme Registration	6-9 months	5
5b	→ Monitoring Mechanism Implementation	3-5 months	5
5c	→ Platform Build & Commissioning	3-5 months	5
5d	→ Marker System Deployment	2-4 months	4
5e	→ Baseline Establishment & First Monitoring Period	6-12 months	4
5f	→ VVB Verification & First Credit Issuance	2-4 months after 5e	5
6	Credit Delivery to Buyer	1-3 months from issuance	5
7	Money Collection & Reconciliation	30-60 days from delivery	4
8	Multi-Party Proceeds Distribution	15-30 days after collection	4
—	<b>Ongoing cycle (Stages 5e → 5f → 6 → 7 → 8 repeat annually)</b>	<b>Annual cadence</b>	<b>—</b>

Sixty-three milestones in total. Every milestone has its enumerated activities. Every stage has a gate.

# The Operational Spine

The eight-stage journey from engagement to recurring distribution. Stages 5e → 8 repeat annually.



Stages 1-4 and 5a-5d run once. Stages 5e → 5f → 6 → 7 → 8 repeat annually – the programme's long-run rhythm.

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02

# ENGAGEMENT & DILIGENCE

*Stages 1-4 · partnership, inspection, documentation, design*

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# Stage 1 – MoU & Partnership Framing

01

3-5 WEEKS

5 milestones · M1.1 → M1.5

A structured engagement that establishes mutual intent, protects exchanged information, and fixes the scope within which subsequent diligence and implementation will proceed.

**M1.1 Initial qualification call completed**

Operator introduction, capability overview from XD, processing footprint and volumes presentation, mutual fit assessment, and initial waste-stream scoping.

**M1.2 Non-disclosure agreement executed**

NDA drafted to mutual confidentiality standard, legal review by both parties, bilateral execution, and counterpart archival in the document vault.

**M1.3 Letter of intent / term sheet exchanged**

Commercial principles captured in high-level form, exclusivity window agreed, scope boundaries (sites, waste streams, timeframe) fixed, and responsibilities sketched.

**M1.4 MoU executed**

MoU drafted from the term sheet, operator internal review, legal sign-off both sides, formal execution of counterparts, exchange and archival.

**M1.5 Programme kick-off scheduled**

Kick-off meeting calendared, roles and points-of-contact assigned on both sides, Site Inspection calendar locked, and programme document vault provisioned.

# Stage 2 – Site Inspection & Technical Diligence

**02****3-4 WEEKS**

5 milestones · M2.1 → M2.5

A first-hand, on-site technical assessment of the operator's facilities, volumes, and current practices. Observation, measurement, and documentation – not yet implementation.

**M2.1 Inspection plan approved**

Scope defined, access protocols and safety plan agreed, equipment list confirmed, composition sampling plan drafted and signed off, inspection window scheduled with the operator's site lead.

**M2.2 Physical site walk-through completed**

Facility tour of intake, sorting, processing, storage, and output areas; staff interviews; equipment inventory; photographic record; observation of a full intake-to-output cycle where practical.

**M2.3 Volumetric data capture completed**

Weighbridge logs for the trailing 12-24 months, historical throughput and intake records, processing output records, loss and residue records, consistency cross-checks against operator ledgers.

**M2.4 Composition sampling executed**

Representative sampling at intake, mid-sort, and output per the approved plan; laboratory analysis; contamination assessment; plastic-type distribution analysis.

**M2.5 Site Inspection Report delivered**

Findings compiled into a structured report, volumetric baseline estimate produced, risk observations catalogued, operator sign-off captured, report archived in the programme vault.

# Stage 3 – As-Is Process Documentation

**03**

4-6 WEEKS

6 milestones · M3.1 → M3.6

Detailed documentation of the operator's current processes, data flows, and technology footprint – in enough depth to serve as the baseline for PWR gap assessment.

**M3.1 End-to-end process flow map drafted**

Full intake-to-output flow documented, handoff points between teams and shifts identified, timings captured for each major step, responsible roles annotated.

**M3.2 Chain-of-custody mapping completed**

Each custody event (receipt, weighing, sorting, staging, processing, dispatch) logged; gaps versus PWR requirements marked for remediation in Stage 4.

**M3.3 Data inventory compiled**

Existing systems catalogued (ERP, weighbridge software, manual logs, spreadsheets, QC systems); data sources inventoried at the field level; quality assessed per source.

**M3.4 Technology inventory compiled**

Physical assets catalogued – weighbridges, scales, sensors, conveyors, sorting equipment, CCTV; software catalogued with vendors and versions; network and third-party dependencies noted.

**M3.5 Baseline KPIs established**

Throughput per shift / day / month, composition by plastic type, stage-wise loss rates, end-to-end recovery rates, contamination and rework metrics.

**M3.6 As-Is documentation signed off**

Operator walk-through of all artefacts, corrections applied, joint sign-off, and formal handover as the baseline for Stage 4 gap analysis.

# Stage 4 – Needs Analysis & Gap Assessment

04

4-6 WEEKS

6 milestones · M4.1 → M4.6

Analytical stage that determines the delta between the operator's current state and the state required to issue Verra PWR-certified credits. The output is an implementation-ready plan.

- M4.1 PWR methodology fit assessed**  
 PWR Standard reviewed against observed activities; eligible end-of-life pathway determined; credit tier options scoped; methodology variant selected for recommendation.
- M4.2 MRV gap analysis completed**  
 As-is MRV compared against PWR requirements; data quality, sensor coverage, and audit-trail / retention gaps identified; remediation options scoped.
- M4.3 Chain-of-custody gap analysis completed**  
 Traceability gaps, handoff evidence gaps, and documentation gaps catalogued; remediation paths scoped for each gap with owner and effort estimate.
- M4.4 Additionality narrative drafted**  
 Business-as-usual baseline defined in rigorous form; additionality argument constructed and evidenced; evidence base catalogued and reviewed internally.
- M4.5 Implementation roadmap drafted**  
 Remediation activities prioritised against impact and effort; dependencies sequenced; responsibilities assigned; plan drafted for Stage 5 sub-stage kickoff.
- M4.6 Needs Analysis signed off**  
 Joint XD x Operator review; corrections captured; dual sign-off; formal handover into Stage 5 sub-stages with owners, dates, and evidence requirements locked.

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03

# IMPLEMENTATION UNDER VERRA

*Stage 5 · six parallel sub-stages · the operational core of mobilisation*

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# Stage 5 – Six Parallel Sub-stages

05

~9-15 MONTHS

28 milestones across six parallel sub-stages

Sub-stages 5a-5d run largely in parallel. 5e begins once 5b, 5c, and 5d are live and 5a has cleared registration. 5f depends on 5e closing.

## Verra Programme Registration

5a

6-9 months · 5 milestones

Project Description, VVB appointment, public stakeholder consultation, Verra technical review, registration on the Verra Registry.

## Monitoring Mechanism

5b

3-5 months · 5 milestones

MRV architecture, sensor fleet commissioning, data ingestion pipeline, data quality framework, MRV user acceptance sign-off.

## Platform Build

5c

3-5 months · 5 milestones

Architecture approval, core module deployment, Verra Registry integration, operator portal UAT, production go-live.

## Marker System Deployment

5d

2-4 months · 4 milestones

Hybrid physical + digital marker strategy, vendor selection, floor deployment, first tagged batch verified end-to-end.

## Baseline & First Monitoring

5e

6-12 months · 4 milestones

Baseline period completed and approved, first reporting period closed, monitoring data package assembled for VVB.

## Verification & First Issuance

5f

2-4 months · 5 milestones

VVB audit, corrective actions closure, monitoring report finalised, **first credits issued into the Verra Registry.**

# Stage 5a – Verra Programme Registration

**5a**

6-9 MONTHS · PARALLEL

5 milestones · M5a.1 → M5a.5

Formal path from Project Description through validation to listing on the Verra Registry under the operator's name.

- M5a.1 Project Description prepared**  
Methodology selection confirmed from Stage 4; programme boundaries documented in PD form; additionality substantiated per PWR Standard; PD drafted, internally reviewed, and pre-submission quality-checked.
- M5a.2 VVB appointed**  
Candidates shortlisted from Verra's approved list; proposals solicited and reviewed; engagement letter executed; audit scope and schedule agreed; kickoff call held.
- M5a.3 Public stakeholder consultation completed**  
Consultation launched per Verra requirements; comments collected from stakeholders; responses drafted and published; consultation report finalised and filed with Verra.
- M5a.4 Verra technical review cleared**  
PD submitted to Verra; technical queries addressed; findings resolved; validation opinion received from the appointed VVB; review cleared for registration.
- M5a.5 Programme registered with Verra**  
Registration ID issued; programme listed on the Verra Registry; operator formally recognised as the programme holder; registration record archived.

# Stage 5b – Monitoring Mechanism Implementation

## 5b

3-5 MONTHS · PARALLEL

5 milestones · M5b.1 → M5b.5

The MRV substrate – sensors, pipeline, validation, and audit interface – on which every credit is measured and every verification stands.

- M5b.1 MRV architecture approved**  
Sensor plan detailing coverage of all relevant data points; data pipeline from edge to data lake to analytics; dashboard specs for operator and VVB users; audit interface design; architecture review and sign-off by technical committee.
- M5b.2 Sensor fleet installed and commissioned**  
Weighbridge integration with ingestion pipeline; load cells on conveyors where relevant; composition sampling stations deployed; CCTV with computer-vision verification configured; sensor UAT against calibrated references.
- M5b.3 Data ingestion pipeline operational**  
Streaming ingestion of sensor telemetry to data lake; time-synchronisation across the sensor fleet; persistent storage configured; validation rules at ingest; reconciliation service deployed to production.
- M5b.4 Data quality framework live**  
Tolerance thresholds defined per data type; anomaly detection configured against baselines; alerting active for out-of-tolerance readings; manual override process documented and rehearsed with operations staff.
- M5b.5 MRV user acceptance signed off**  
End-to-end test from sensor through ingestion, storage, and dashboard; operator training delivered to all relevant site staff; UAT sign-off received; MRV declared go-live ready.

# Stage 5c – Platform Build & Commissioning

**5c**

3-5 MONTHS · PARALLEL

5 milestones · M5c.1 → M5c.5

The programme platform: operator portal, data warehouse, credit tracking ledger, distribution ledger, and Verra Registry integration – one system of record for every actor.

**M5c.1 Platform architecture approved**

Module decomposition (operator portal, data warehouse, credit tracking ledger, distribution ledger, reporting interfaces); data model finalised; integration points to MRV and Verra Registry specified; access control model agreed.

**M5c.2 Core modules deployed**

Operator portal deployed to staging; data warehouse populated with historical baseline; credit tracking ledger configured; distribution ledger configured; inter-module integration validated.

**M5c.3 Verra Registry integration tested**

Verra Registry API integration built and tested; transfer instruction flows validated; reconciliation service between internal ledger and registry state verified; dry-run transfers executed and reviewed.

**M5c.4 Operator portal UAT completed**

Operator walkthrough of the portal; feedback captured; corrections shipped and validated; final sign-off from operator on portal and ledger views.

**M5c.5 Platform go-live**

Production cutover executed; monitoring and alerting live across platform components; operational runbook active; support rota in place for incident handling.

# Stage 5d – Marker System Deployment

## 5d

2-4 MONTHS · PARALLEL

4 milestones · M5d.1 → M5d.4

A hybrid physical + digital traceability layer: tamper-evident bale tags, unique serial identifiers, optional tracer-based sorting for high-value streams, and cryptographic anchoring of custody events.

### M5d.1 Marker strategy approved

Physical versus digital marker trade-offs assessed; vendor options shortlisted for each marker class; hybrid physical + digital protocol drafted; committee review and approval; strategy committed to the implementation plan.

### M5d.2 Marker vendors selected and contracted

Tamper-evident tagging vendor evaluated and engaged; serialisation / unique-ID system selected and contracted; optional tracer-based sorting vendor engaged if within strategy. Commercial terms sit outside this roadmap.

### M5d.3 Marker system deployed on the floor

Tagging stations installed at intake; scanning stations at each subsequent handoff; staff trained on application and scanning protocols; initial calibration runs executed and reviewed.

### M5d.4 First tagged batch verified end-to-end

A representative batch tagged at intake; tracked through each operational handoff; retired at the processing output point; reconciled against weighbridge and MRV data; full audit pass recorded.

# Stage 5e – Baseline & First Monitoring Period

5e

6-12 MONTHS

4 milestones · M5e.1 → M5e.4

First operational period under full MRV. Depends on 5b, 5c, and 5d being live and 5a registration concluded. Output is the data package on which the first VVB verification will run.

**M5e.1 Baseline period completed**  
Continuous data capture at the defined quality level; monthly data reviews to confirm stability; deviation tracking against expected ranges; baseline data frozen at the end of the period.

**M5e.2 Baseline approved**  
Baseline package compiled from the period data; internal review against PWR baseline requirements; formal sign-off for use in additionality and issuance calculations; baseline locked in the ledger.

**M5e.3 First reporting period closed**  
Data lock at the end of the first reporting period; monitoring report drafted; data quality summary produced; variance notes prepared for any deviations from the expected operating envelope.

**M5e.4 Monitoring data package assembled for VVB**  
Data export prepared in VVB-consumable format; supporting evidence compiled (operational logs, chain-of-custody records, marker verification logs); package delivered to the VVB; VVB acknowledgment received.

# Stage 5f – VVB Verification & First Credit Issuance

**5f**

2-4 MONTHS AFTER 5E

5 milestones · M5f.1 → M5f.5

The gate stage – third-party audit, findings closure, and issuance of the first tranche of Verra-certified credits into the Registry under the operator's programme.

**M5f.1 VVB audit kick-off held**  
Kick-off meeting between operator, XD, and VVB; evidence request list issued by the VVB; audit plan agreed; timeline locked; audit scope confirmed.

**M5f.2 VVB site audit completed**  
Physical audit visit by the VVB to operator sites; sample verification against the data package; marker re-verification against a sampled batch; staff interviews; audit findings documented.

**M5f.3 Corrective actions closed**  
Findings list reviewed with the operator; responses and supporting evidence filed with the VVB; re-submission where required; closure sign-off from the VVB on all findings.

**M5f.4 Monitoring report finalised**  
Monitoring report updated to reflect VVB findings and closures; VVB verification statement attached; Verra submission package assembled to issuance standards.

**M5f.5 First credits issued into Verra Registry**  
Verra review of the issuance request; issuance request processed; registry entry confirmed under the operator's programme; operator notification; programme scale confirmed and logged.

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04

# DELIVERY, COLLECTION, & DISTRIBUTION

*Stages 6-8 · from registered credit to beneficiary pay-out*

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# Stage 6 – Credit Delivery to Buyer

**06**

1-3 MONTHS FROM ISSUANCE

5 milestones · M6.1 → M6.5

With credits sitting in the Verra Registry under the operator's programme, Stage 6 activates XD's buyer network, matches a qualified buyer, executes the SPA, and transfers the credits on the registry.

- M6.1 Buyer pipeline activated**  
 XD buyer network outreach with the programme brief; programme data package shared with qualified prospects; letter-of-intent solicitation; pipeline tracked through the platform.
- M6.2 Qualified buyer matched**  
 KYC performed on prospective buyers; ESG screening against programme criteria; volume and credit-tier fit assessed; final match reviewed with and approved by the operator.
- M6.3 Sale & Purchase Agreement executed**  
 SPA drafted; legal review by both parties; terms negotiated (commercial terms remain outside this roadmap); execution; counterpart exchange; filing in the platform document vault.
- M6.4 Registry transfer executed**  
 Transfer instruction filed with the Verra Registry; Verra processing awaited; confirmation of transfer to the buyer's registry account received; internal ledger updated.
- M6.5 Retirement recorded (if buyer retires immediately)**  
 Retirement instruction filed by the buyer or on the buyer's behalf; Verra retirement record confirmed; public retirement statement generated; buyer confirmation archived.

# Stage 7 – Money Collection & Reconciliation

**07****30-60 DAYS FROM DELIVERY**

4 milestones · M7.1 → M7.4

Stage 7 converts the delivered credit into cash in the programme treasury. Milestones are administrative but gate-critical: until Stage 7 is complete, no distribution occurs in Stage 8.

**M7.1 Invoice issued**  
Invoice generated per SPA terms from the platform; buyer billing contact confirmed; invoice transmitted through the agreed channel; receipt acknowledgment tracked.

**M7.2 Payment received**  
Receipt confirmation from the programme treasury bank; bank reconciliation against the invoice; holding account credited; FX settlement where applicable to the SPA currency.

**M7.3 Reconciliation to registry transfer completed**  
Delivered volumes cross-checked against invoiced volumes; payment amount cross-checked against invoiced amount; exceptions worked with the buyer where present; reconciliation sign-off captured.

**M7.4 Settlement pack published**  
Settlement confirmation pushed to the operator dashboard; commercial close-out log updated; audit trail finalised for the delivery-to-collection cycle; pack archived for future audit.

# Stage 8 – Five-Class Proceeds Distribution

**08**

15-30 DAYS AFTER COLLECTION

4 milestones · M8.1 → M8.4 · 5 beneficiary classes

This document describes the mechanics of distribution – who receives, through what instrument, against what record. Percentages and amounts live in the separate commercial document.

- M8.1**    **Distribution schedule prepared**  
 Net-of-collection calculation performed in the distribution ledger; five-class allocation applied per the agreed model; schedule drafted and reviewed.
- M8.2**    **Distributions executed**  
 Transfers to all five beneficiary classes; bank references captured; execution evidence archived.
- M8.3**    **Statements published**  
 Per-class distribution statements; operator-consolidated statement; dashboard updated to reflect the closed cycle; statements delivered to each class.
- M8.4**    **Reporting and audit trail closed**  
 Audit pack assembled; tax and compliance reporting filed per applicable jurisdiction; cycle closure recorded; ledger marked closed.

## THE FIVE BENEFICIARY CLASSES

- ① XD – Programme management retention**  
 Recognition of XD's programme management, platform, buyer network, and end-to-end delivery obligations.
- ② Operator – Primary operational share**  
 The operator as the asset holder and primary revenue recipient for the processed plastic at source.
- ③ Waste collectors / informal pickers**  
 Upstream collection network share – formalising and rewarding the collectors who feed the operator's intake.
- ④ Community / local fund**  
 Impact allocation for the host region – a standing fund aligned with operator location and community needs.
- ⑤ Host government / regulator**  
 Allocation per ASEAN EPR framework where applicable – formal recognition of the regulatory host jurisdiction.

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05

# THE ANNUAL CYCLE

*Stages 5e → 5f → 6 → 7 → 8 · the programme's long-run rhythm*

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# Steady-State: The Perpetual Cycle

Stages 1-4 and sub-stages 5a-5d are one-time. After the first full cycle, the following five stages repeat annually and constitute the programme's long-run operational rhythm.



**One-time scaffolding**

Stages 1-4 and sub-stages 5a, 5b, 5c, and 5d are performed once. They establish the partnership, the registration, and the operational substrate – the MRV, platform, and marker system – that every subsequent cycle depends on.

**Perpetual operating loop**

Each year, a new monitoring period (5e) feeds a new VVB verification (5f) that yields a new tranche of credits. Those credits flow through delivery (6), collection (7), and distribution (8) to the five beneficiary classes.

**Always-on substrate**

The monitoring mechanism, platform, and marker system run continuously throughout. Verra Registration (5a) is refreshed only on programme renewal or methodology update.

*"The first cycle proves the programme. Every cycle after pays the programme."*



# EIGHT STAGES. SIXTY-THREE MILESTONES. ONE OPERATIONAL SPINE.

This roadmap is the contract between ambition and discipline. Every milestone carries its activities. Every stage carries its gate. Every cycle carries its evidence. The programme is not a promise – it is a sequence that has been designed to be audited, from first contact to the periodic distribution of proceeds.

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XD × VERRA · THAILAND PLASTIC CREDIT PROGRAMME

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