

# Verification & Receipts Method

Before/after evidence pattern and what counts as “fixed.”

Define evidence once. Reuse it everywhere.

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## 1. Purpose

What this is

This method defines the **before/after evidence pattern** used to verify outcomes and decide whether an issue is **fixed**. It standardizes what counts as acceptable proof so teams can move from subjective interpretation to repeatable commissioning decisions.

## 2. Definitions

| Term                  | Meaning                                                                                             |
|-----------------------|-----------------------------------------------------------------------------------------------------|
| Receipt               | A documented evidence artifact supporting a specific claim (e.g., “Pocket P-03 removed”)            |
| Before/After pair     | Matched measurements under comparable operating conditions, collected with the same protocol        |
| Comparable conditions | Same (or explicitly controlled) cycle window(s): lights, irrigation, dehumidification, HVAC mode    |
| Pocket signature      | Repeatable spatial/temporal pattern (RH/Temp/VPD) that indicates localized risk                     |
| Fixed                 | The signature no longer appears (or is reduced below threshold) <b>and</b> the result is repeatable |

### 3. Evidence Pattern (Receipt Stack)

#### Core pattern

A verification claim is valid only when supported by the complete receipt stack:

1. **Before:** baseline evidence showing the signature.
2. **Change log:** what changed, when, where, settings, and intent.
3. **After:** evidence collected with the same protocol under comparable conditions.
4. **Delta proof:** explicit before/after comparisons showing the signature is removed or reduced.
5. **Repeatability:** confirmation across  $[N]$  cycles or runs that the result persists.

#### Anti-pattern

If the “after” looks better but conditions were not comparable, or the protocol changed, the result is **non-verifiable**. Treat it as an observation, not proof.

### 4. What Counts as “Fixed”

## 4.1 Pass conditions

| Condition                   | Pass requirement                                                                  |
|-----------------------------|-----------------------------------------------------------------------------------|
| C-01: Signature removal     | The pocket signature does not recur in the agreed trigger window(s)               |
| C-02: Threshold compliance  | Metrics are below defined thresholds <i>[RH / VPD / recovery time / variance]</i> |
| C-03: Comparable conditions | Before/after collected under comparable modes (or differences fully documented)   |
| C-04: Protocol consistency  | Same route, heights, sampling density, and sensor placement rules                 |
| C-05: Repeatability         | Result holds across <i>[N of M]</i> cycles/runs, not a single lucky window        |
| C-06: Traceability          | Every intervention relevant to the outcome is logged (no silent changes)          |

## 4.2 Fail conditions (not fixed)

- The pocket signature disappears once but returns on the next comparable cycle.
- The “after” data was collected in a different operating mode without explicit documentation.
- The protocol changed (route/height/density) between before and after.
- The change log is incomplete (cannot link outcomes to interventions).
- “Wall sensors improved” but canopy evidence still shows localized pockets.

## 5. Receipt Templates (Copy/Paste)

### 5.1 Receipt cover sheet

|                                |                                                                                                      |
|--------------------------------|------------------------------------------------------------------------------------------------------|
| <b>Claim (what changed):</b>   | <i>[e.g., Pocket P-03 eliminated during post-irrigation window]</i>                                  |
| <b>Location / Pocket ID:</b>   | <i>[Pocket ID + coordinates / zone]</i>                                                              |
| <b>Trigger window(s):</b>      | <i>[lights ramp / post-irrigation / dehu recovery / HVAC transition]</i>                             |
| <b>Thresholds used:</b>        | <i>[e.g., RH <math>\leq</math> X% for <math>\geq</math> Y min; recovery <math>\geq</math> Z min]</i> |
| <b>Before artifact(s):</b>     | <i>[Map IDs / plots / file refs]</i>                                                                 |
| <b>Intervention log entry:</b> | <i>[Change log ref + timestamp]</i>                                                                  |
| <b>After artifact(s):</b>      | <i>[Map IDs / plots / file refs]</i>                                                                 |
| <b>Delta proof:</b>            | <i>[Overlay/delta plot ref]</i>                                                                      |
| <b>Repeatability evidence:</b> | <i>[N of M cycles; variance report]</i>                                                              |
| <b>Reviewer / date:</b>        | <i>[Name / Date]</i>                                                                                 |

## 5.2 Intervention log line item (minimum fields)

| Field        | Required content                                               |
|--------------|----------------------------------------------------------------|
| Timestamp    | <i>[YYYY-MM-DD HH:MM]</i>                                      |
| What changed | <i>[equipment move / setpoint change / airflow adjustment]</i> |
| Where        | <i>[coordinates / zone / diagram ref]</i>                      |
| Settings     | <i>[fan speed / dehu stage / HVAC mode]</i>                    |
| Intent       | <i>[why this change should affect the signature]</i>           |
| Owner        | <i>[who made the change]</i>                                   |

## 6. Common Verification Modes

### 6.1 Mode mapping

| Mode                              | When to use                                          | Primary evidence                                  |
|-----------------------------------|------------------------------------------------------|---------------------------------------------------|
| V-01: Pocket removal              | When the goal is “pockets gone”                      | Before/after maps + delta proof + repeatability   |
| V-02: Recovery improvement        | When the goal is faster stabilization after events   | Cycle-aligned time series + recovery metric plots |
| V-03: Zone stability              | When the goal is uniformity across canopy zones      | Spatial variance + repeatability score            |
| V-04: Control strategy validation | When the goal is “setpoints work in the real canopy” | Before/after under comparable cycles + thresholds |

## 7. Minimum Evidence Bundle (Go/No-Go)

### Required for a go-live claim

At minimum, a “fixed” decision should ship with:

- Before map(s) + cycle overlays showing the signature
- Intervention change log (timestamped, complete)
- After map(s) + cycle overlays under comparable conditions
- Delta proof (explicit before/after comparison)
- Repeatability confirmation across  $[N]$  cycles/runs

## 8. Appendix (Optional)

8.1 Threshold worksheet (fill-in)

| Metric                    | Threshold    | Rationale / notes                        |
|---------------------------|--------------|------------------------------------------|
| Pocket RH threshold       | $[X\%]$      | $[risk\ tolerance\ /\ historical\ loss]$ |
| Pocket VPD threshold      | $[X]$        | $[plant\ stress\ tolerance]$             |
| Recovery time threshold   | $[Y\ min]$   | $[cycle\ constraints]$                   |
| Zone variance threshold   | $[Z]$        | $[uniformity\ requirement]$              |
| Repeatability requirement | $[N\ of\ M]$ | $[confidence\ requirement]$              |

8.2 Change log

| Version | Date             | Notes                                                                         |
|---------|------------------|-------------------------------------------------------------------------------|
| v1.0.0  | January 19, 2026 | Initial method template (aligned styling; watermark + header/footer metadata) |