Human Verifier Standard Operating Procedure

Orenna Verification Platform

Document Type	Operating Procedure (Human Verifier)
Applies To	Verifier Organizations (Assessor + Supervisor roles)
Last Updated	2025-12-30
Owner	Verification Ops Lead (Verifier Org)
Approval	Verifier Org Supervisor + Orenna Admin

This SOP describes how human verifiers perform third-party review of ecological benefit projects (VWBA 2.0, WQBA, and Accounting for Nature / Nature-based Solutions) using Orenna's evidence packs, verification engagements, findings, and attestations. It is aligned to the platform's roles, state machines, and security controls.

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0) Document Control

0.1 Change Management

• All changes to this SOP must be reviewed by a **VERIFIER_SUPERVISOR** and recorded in your internal QMS.

• When the platform SOP documents are versioned (e.g., VWBA method updates), update this SOP's references accordingly.

0.2 Definitions (Platform Terms)

Term	Definition
Verification Engagement	A review assignment linking a verifier org to one or more evidence packs and a project. Engagement states follow the platform state machine.
Evidence Pack	A structured, versioned evidence submission. Packs move through a pack-specific state machine.
Evidence Item	A checklist/data point within a pack (may have visibility controls).
Evidence Pack File	Uploaded artifact stored with cryptographic hash (typically IPFS storage).
Finding	A verifier-identified issue, discrepancy, or data request raised during review.
Attestation	A supervisor-signed digital statement that the verification scope was reviewed and findings resolved per requirements.
Methodology Scope	One or more of: VWBA 2.0, WQBA, Accounting for Nature.
Verification Tier	Tier 1 (literature), Tier 2 (modeled), Tier 3 (measured) – with increasing confidence ranges.

1) Roles, Responsibilities & Segregation of Duties

1.1 Verifier Org Roles

VERIFIER_ASSESSOR

- Executes evidence review, performs cross-checks, documents workpapers, and drafts findings.
- Does **not** sign final attestation.

VERIFIER_SUPERVISOR

- Performs QA review, confirms findings resolution, validates scope completeness, and signs attestation.
- Must have MFA enabled (platform requirement).

1.2 Required Separation (Minimum)

- Assessor and Supervisor should be different individuals when possible.
- If one-person verifier org: supervisor must document independent review steps (self-QA checklist, second-pass review) and disclose in internal audit notes.

1.3 RACI Summary

Activity	Assessor	Supervisor	Orenna Admin	Seller	Buyer
Accept/decline engagement	R	A	I	I	I
Plan review + evidence needs	R	A	I	C	C
Conduct review + create findings	R	A	I	C	I
Request revisions	R	A	I	R	I
QA approve + sign attestation	C	A/R	I	I	I
Close engagement	R	A	C	I	I

R = Responsible, A = Accountable, C = Consulted, I = Informed

2) Preconditions (Before Accepting Engagement)

2.1 Independence & Conflict-of-Interest (COI)

Assessor and Supervisor must:

- Identify any financial, personal, or advisory relationship with the seller/buyer that could bias judgment.
- Document COI screening outcome (pass/fail) in verifier workpapers.
- If COI exists: decline engagement or seek written mitigation approved by your QMS + Orenna Admin.

2.2 Competence & Capacity

- Confirm your team has subject-matter competence for the **methodology scope** (VWBA/WQBA/Nature) and any project-specific context (basin hydrology, restoration technique, monitoring approach).
- Confirm you can meet the due date and required communication cadence.

2.3 Platform Access Readiness

Ensure each team member:

- Can authenticate via Privy
- Has correct org role (VERIFIER_ASSESSOR or VERIFIER_SUPERVISOR)
- Supervisor MFA is enabled (required for attestation)

3) Engagement Lifecycle SOP (End-to-End)

3.1 Receive Invitation (Engagement: INVITED)

Objective: Decide whether to accept assignment and confirm scope.

Steps:

1. Go to **/app/verifications** (Verifier dashboard).
2. Open the engagement and review: project name + location/basin context, methodology scope (VWBA/WQBA/Nature), evidence packs included and their states, due date/notes from admin.
3. Perform preconditions checks (Section 2).
4. Click **Accept** → engagement transitions to ASSIGNED, or **Decline** → provide reason; notify admin.

Outputs: Acceptance recorded in audit log. Internal: COI screening record + competence confirmation.

3.2 Plan Review (Engagement: ASSIGNED)

Objective: Produce a documented review plan and identify sufficiency gaps early.

Steps:

1. Confirm scope boundaries: which evidence packs are in-scope, which methodologies and methods, what is the reporting period/vintage.
2. Create a **Review Plan** (template in Appendix A): key risks and focal points, required cross-check data sources, sampling strategy, internal QC steps and supervisor checkpoints.
3. Validate evidence readiness: evidence packs should be SUBMITTED or RESUBMITTED before formal review starts.
4. If pack is not ready: contact seller via finding or comment, optionally request admin to pause/reschedule.

3.3 Start Review (Engagement: IN_REVIEW, Pack: IN_REVIEW)

Objective: Begin formal assessment with traceable workpapers.

Steps:

1. Click **Start review** (or take first formal review action); engagement becomes IN_REVIEW.
2. For each in-scope evidence pack: verify pack metadata (methodology, vintage, units), transition pack to IN_REVIEW.
3. Create a **Workpaper Index** (internal) that maps: evidence items → checks performed → conclusions; files → hash verification → relevance; oracle pulls → station IDs/date ranges → results.

4) Evidence Handling SOP

4.1 Evidence Integrity and Chain-of-Custody

For every file used to support verification:

- Confirm file is attached to the correct pack/item.
- Confirm cryptographic hash matches the stored hash (platform stores file hashes; files are typically on IPFS).
- Record in workpapers: filename + upload timestamp + uploader, hash value, what claim it supports.

Red Flags

- *File replaced without revision trail*
- *Hash mismatch or missing hash*
- *Unexplained gaps in monitoring records*

4.2 Evidence Sufficiency Test (Triage)

Classify each critical claim as:

- **Sufficient:** meets methodology requirements with acceptable quality.
- **Conditionally sufficient:** requires clarifying info but likely resolvable.
- **Insufficient:** missing or unreliable; must be remediated.

4.3 Version Control Expectations

- Evidence Packs are versioned via the pack state machine (draft/submitted/revision/resubmitted/accepted/locked).
- Do not accept evidence presented outside the platform unless it is uploaded and hashed.

4.4 Use of Platform Comments vs Findings

- Use **comments** for minor clarifications or navigational questions.
- Use **findings** for anything that: affects eligibility, quantification, methodology compliance; requires a deliverable (new file/data); must be tracked to resolution.

5) Core Verification Principles (Methodology-Agnostic)

These checks are required across VWBA, WQBA, and Nature/NbS scope.

5.1 Additionality

- Verify the project activity is beyond regulatory/business-as-usual.
- Confirm baseline scenario is credible and documented.
- Confirm there is evidence that the intervention caused the outcome.

5.2 Conservativeness

- When uncertainty exists, ensure assumptions bias toward lower benefit claims.
- Check any uncertainty/confidence scoring is correctly applied and justified.

5.3 Leakage Prevention

- Confirm benefits are not simply displaced elsewhere.
- Validate system boundary: basin/catchment assumptions are stated and reasonable.

5.4 Baseline Validity

- Baseline period and data sources are documented and defensible.
- Baseline does not embed implausible counterfactuals.

5.5 Permanence (where applicable)

- Confirm legal/physical mechanisms for permanence are disclosed.
- Confirm the platform records permanence conditions if relevant.

6) VWBA 2.0 Verification Checks

6.1 Method Eligibility

- Confirm method ID is active and project site meets applicability criteria.
- Cross-check stated hydrologic basin and climate/aridity class.

6.2 Data Inputs

- Verify ET sources (e.g., OpenET) match accepted tiers.
- Validate precipitation and reference ET inputs for reasonableness.

- Check crop coefficients or land cover classes used.

6.3 Quantification

- Recalculate sample benefit claims where feasible.
- Confirm units, conversions, and rounding policy.
- Verify tier-to-confidence mapping applied correctly.

6.4 Monitoring

- Confirm monitoring schedule aligns with method requirements.
- Check for gaps or anomalies in sensor/satellite data.

7) WQBA & Nature Verification Checks

7.1 WQBA-Specific

- Confirm indicator selection matches the method and receiving water context.
- Validate lab QA/QC records and chain-of-custody for samples.
- Check load reduction calculations: flow × concentration × conversion.

7.2 Nature / NbS-Specific

- Verify condition assessment methodology (e.g., Accounting for Nature module).
- Confirm reference benchmark and scoring logic.
- Validate spatial extent (GIS/field survey reconciliation).

8) Finding Lifecycle

8.1 When to Raise a Finding

Raise a finding for any gap, discrepancy, or missing evidence that affects eligibility, quantification, or compliance.

8.2 Finding Severity Levels

Severity	Definition	Impact
INFO	Observation or suggestion, no remediation required	None
MINOR	Small gap, should be addressed but not blocking	Low
MAJOR	Material issue affecting quantification or compliance	Medium
CRITICAL	Integrity/fraud concern or project-blocking issue	High

8.3 Finding Structure

Each finding must include:

1. **Finding Type:** Issue or Data Request
2. **Severity:** INFO / MINOR / MAJOR / CRITICAL
3. **Requirement:** cite the SOP/method section
4. **Observed:** what you found (with timestamps/IDs)
5. **Request/Corrective Action:** what seller must do

6. **Acceptance Criteria:** what constitutes resolution
7. **Due date** (optional)
8. **References:** evidence item(s), file(s), oracle output IDs

8.4 Triggering Revisions (Pack State)

If the finding requires changes to pack contents:

- Request revision → Evidence Pack transitions to REVISION_REQUESTED.
- Seller updates and resubmits → pack becomes RESUBMITTED.
- Re-review only the impacted areas **plus** regression check (ensure fixes didn't break other items).

8.5 Handling Suspected Fraud

If fraud or deliberate misrepresentation is suspected:

- *Mark finding as CRITICAL*
- *Notify Orenna Admin via escalation channel*
- *Pause verification actions until admin guidance*
- *Preserve evidence and notes; avoid off-platform communications*

9) Use of Oracles and Cross-Validation

The platform integrates oracles (OpenET, USGS, NOAA) and supports cross-validation and proof generation.

9.1 When to Use Oracles

- Claims relying on ET, precipitation, temperature, streamflow, groundwater trends, or climate normalization.
- Sanity checks of project-supplied values.

9.2 Minimum Oracle Workpaper Requirements

Record:

- Oracle source (OpenET/USGS/NOAA)
- Station/region identifier
- Date range queried
- Any cross-validation result
- Conclusion: consistent / inconsistent / inconclusive

9.3 If Oracle Conflicts with Submitted Evidence

- Raise a **MAJOR** finding unless clearly explainable.
- Request explanation, raw data, and reconciliation notes.
- Confirm whether model calibration or measurement locations explain the difference.

10) Supervisor QA Review and Attestation

10.1 Transition to QA Review (Engagement: QA_REVIEW)

Supervisor initiates QA when:

- All packs have been reviewed
- All findings are **RESOLVED** (or documented exceptions approved by policy)
- Benefit quantification and tier/confidence are finalized

10.2 Supervisor QA Checklist (Minimum)

1. **Scope completeness:** all in-scope packs/methods covered
2. **Evidence integrity:** hashes verified for critical artifacts
3. **Findings quality:** clear requirements, acceptance criteria, resolution evidence

4. **Principles validation:** additionality, conservativeness, leakage, baseline, permanence addressed
5. **Tier/confidence** justified and documented
6. **Audit trail:** all key decisions logged, no private off-platform decisions

10.3 Attestation Signing (Engagement: ATTESTED)

Prerequisites:

- Supervisor MFA enabled and functioning
- All evidence packs required for issuance are ACCEPTED (and later LOCKED when appropriate)

Signing Steps:

1. Open engagement attestation page (**/app/verifications/[engagementId]/attestation**).
2. Review the attestation draft: scope and methodology version references, list of packs reviewed (IDs/versions), summary of key checks, statement that findings were resolved.
3. Confirm that attestation references correct evidence hashes (where shown).
4. Sign attestation (digital signature); verify it appears in engagement record.

11) Closing the Engagement and Post-Verification Steps

11.1 Close Engagement (Engagement: CLOSED)

After attestation:

- Supervisor or assessor closes engagement when no further actions remain.
- Ensure all deliverables are accessible in the platform: findings log + attestation.

11.2 Issuance Readiness (Informational)

Verification completion supports the platform's benefit creation workflow and issuance prerequisites (verified pack + attestation + allocation plan).

- Evidence packs may transition to **LOCKED** to become immutable for issuance.

11.3 Records Retention and Confidentiality

- Treat all project materials as confidential unless explicitly designated public.
- Store internal workpapers per your QMS retention policy.
- Do not export or store PII outside approved systems.

Appendix A: Templates

A1) Review Plan Template

```
Engagement ID: _______________
Project: _______________
Scope: VWBA / WQBA / Nature (list)
Packs in scope: _______________
Vintage/Period: _______________

Key risks & hypotheses
R1: _______________
R2: _______________

Evidence sufficiency expectations
Critical items: _______________
Optional items: _______________

Cross-check sources
Oracles: _______________
External datasets: _______________
Site visit evidence: _______________

Sampling approach
What is sampled vs 100% checked: _______________
Rationale: _______________

QC checkpoints
Assessor self-review: _______________
Supervisor interim review: _______________
Final QA review: _______________
```

A2) Finding Template

```
Finding Type: Issue / Data Request
Severity: INFO / MINOR / MAJOR / CRITICAL
Pack: _______________
Evidence Item(s): _______________
Files/References: _______________

Requirement
(quote or paraphrase the requirement and cite SOP/method section)

Observed
(what you saw, with timestamps/IDs)

Request / Corrective Action
(what the seller must do)

Acceptance Criteria
(what constitutes resolution)

Due Date (optional): _______________
```

A3) Resolution Note Template

```
Finding ID: _______________
Resolution evidence: _______________
Verifier conclusion: Resolved / Not resolved
Notes: _______________
Resolved by: _______________
Resolved at: _______________
```

Appendix B: Checklists

B1) Assessor Checklist (Minimum)

- ■ COI screening completed and documented
- ■ Review plan created and approved internally
- ■ Pack(s) are in SUBMITTED/RESUBMITTED
- ■ File hashes verified for critical artifacts
- ■ Core principles validated (additionality, conservativeness, leakage, baseline, permanence)
- ■ Tier and confidence documented with rationale
- ■ Findings raised for all gaps and tracked to resolution
- ■ Re-review performed after resubmissions (including regression checks)
- ■ Workpaper index complete

B2) Supervisor Checklist (Minimum)

- ■ MFA enabled
- ■ Scope completeness confirmed
- ■ All findings resolved (or documented exception)
- ■ Evidence packs ACCEPTED (and LOCKED when required)
- ■ Attestation reviewed for accuracy and signed
- ■ Engagement closed with audit trail intact

Appendix C: Escalation Matrix

Situation	Severity	Immediate Action	Notify
Hash mismatch / evidence integrity issue	CRITICAL	Pause review, preserve evidence	Orenna Admin + Verifier Supervisor
Material discrepancy affecting totals	MAJOR	Raise finding, request reconciliation	Seller + Supervisor
Missing critical monitoring records	MAJOR	Data request + revision requested	Seller
Suspected fraud / fabrication	CRITICAL	Escalate, do not attest	Orenna Admin
Minor formatting / completeness	MINOR	Comment or minor finding	Seller

End of Document

For questions or clarifications, contact your Verification Ops Lead or Orenna Admin.

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