

Payments & Settlement Constitution:

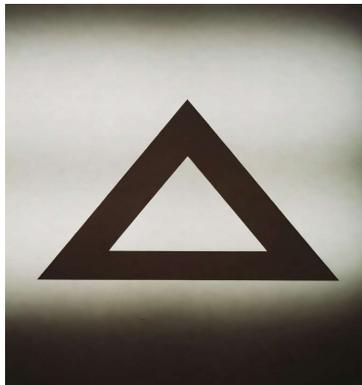
Stable-Value Rails, Tokenized Deposits, Wholesale Settlement, and Atomic DvP Finality

(Examiner-Ready Operating Model and Evidence Artifacts) (Non-Normative)

This submission offers a non-normative operating model for stable-value payment rails in tokenized markets, aligned with the FCCK Pilot Suite and U.S. institutional standards. It operationalizes atomic DvP settlement through evidence artifacts to minimize principal risk and supervisory friction while enabling controlled pilots

Submission to the U.S. Securities and Exchange Commission (SEC)

Date: March 06, 2026



“An examiner-ready blueprint for operationalizing tokenized deposits, stable-value rails, and atomic DvP settlement with evidence artifacts to mitigate risks in controlled U.S. pilots.”

Cover Letter

To: The U.S. Securities and Exchange Commission (SEC)

Date: March 06, 2026

Subject: Submission of the Payments & Settlement Constitution

Dear Securities and Exchange Commission,

I am submitting the Payments & Settlement Constitution for your consideration. This non-normative operating model addresses the cash-leg bottleneck in tokenized markets by providing examiner-ready artifacts for stable-value rails, tokenized deposits, wholesale settlement, and atomic DvP finality.

It tackles key challenges in institutional pilots, including:

- Principal and settlement risk mitigation through precondition gates, escrow models, and failure containment.
- Stable-value instrument classification via boundary tests and category-specific obligations (P1–P4).
- Intraday liquidity controls with gates, queues, and stress escalation playbooks.
- Evidence production standards, including Evidence Packs, immutable logs, and RACI matrices for supervisory efficiency.

As the fifth companion to the FCCK Pilot Suite (Baselines A–D), this framework promotes controlled deployment while preserving neutrality and reducing oversight friction.

I welcome the opportunity to explore how these tools can advance the SEC’s goals for secure, innovative markets.

Sincerely,

/s/ Daniel Bruno Corvelo Costa
Proponent & Lead Architect

Table of Contents

0. Executive Summary

1. Non-Normative Disclaimer & Scope Boundaries

2. Problem Statement: Why Payments & Settlement is the Bottleneck (Operational View)

3. Neutral Taxonomy: Cash-Leg Instruments and Settlement Rails

4. Settlement Architecture (Baseline-Aligned, Implementation-Agnostic)

5. Atomic DvP Core (The Settlement Engine)

6. Programmable Settlement Finality (Operational Finality Conditions, Not Legal Conclusions)

7. Liquidity, Funding, and Intraday Risk Controls (Operational)

8. Disclosure & Evidence Artifacts for Payments/Settlement (Baseline-Aligned)

9. Governance, RACI, and Accountability (Baseline-Aligned)

10. Offboarding, Unwind, and Legacy Compatibility (Reversibility Without Data Loss)

11. Examiner Readiness: Standard Checks Pack + Examiner Query Pack

12. Scale & Steady-State Operations (Baseline-Aligned)

13. Worked Examples (Paste-Ready)

Appendix A — Standardized Disclosure Schema for Cash-Leg Categories (Tables, Paste-Ready)

Appendix B — DvP Gate Checklist + Escrow State Model (Schema-Abstract)

Appendix C — Settlement Finality Conditions Checklist + Finality State Machine (Operational)

Appendix D — Evidence Pack Manifest Templates (Payments/Settlement Variants) + EP Delta Template

Appendix E — RACI + SLA/SLO Inserts (Paste-Ready)

Appendix F — Standard Checks Pack (Full List)

Appendix G — Examiner Query Pack (Expanded; Conceptual SQL / Pseudocode)

Appendix H — Stress Mode Playbooks: Liquidity Gates, Queues, and Unwind

Appendix I — Offboarding Proof Bundle and Legacy Transition Manifest

Appendix J — Glossary (Minimal; Baseline-First)

Appendix K — Netting vs Atomic Settlement Optimization Framework (Non-Normative)

Appendix L — Capital Efficiency & Intraday Liquidity Impact Analysis (Operational) (Non-Normative)

Payments & Settlement Constitution:

Stable-Value Rails, Tokenized Deposits, Wholesale Settlement, and Atomic DvP Finality

(Examiner-Ready Operating Model and Evidence Artifacts) (Non-Normative)

Document Status: Non-Normative Implementation Guidance

Companion to: FCCCK Pilot Suite (Baselines A–D)

Scope: U.S. Domestic Institutional Pilot — Controlled Deployment

Audience: Examiners, Compliance Officers, Governance Bodies, Settlement Operators

"This constitution operationalizes stable-value settlement rails and tokenized deposit patterns into an examiner-ready operating model. It defines atomic delivery-versus-payment (DvP) and programmable settlement finality as evidence-backed conditions, not legal conclusions. It does not prescribe policy outcomes or mandate technologies; it provides implementation artifacts intended to reduce supervisory friction and support controlled institutional pilots."

0. Executive Summary

0.1 What Problem This Document Addresses

Tokenized securities markets cannot achieve safe institutional deployment without a coherent operating model for the cash leg. Asset delivery mechanisms have advanced considerably through atomic settlement research, distributed ledger custody frameworks, and verifiable credential infrastructure. The cash leg — the settlement of payment obligations — remains the operational and supervisory bottleneck.

Four distinct risk categories drive this bottleneck:

Settlement risk and principal risk. When the asset leg and the cash leg are not synchronized, one counterparty may deliver without receiving. This principal risk is the primary operational hazard in any settlement system. Existing baseline frameworks (Baselines A and B) establish atomic DvP as a design objective. This constitution makes that objective operational: it defines the precondition gates, escrow state model, failure-mode containment, and evidence production necessary to demonstrate that DvP is working — not as an architectural claim, but as an auditable, evidence-backed condition.

Stable-value instrument ambiguity. Cash-leg instruments that incorporate yield features, affiliated rewards, or savings-like behaviors introduce disclosure, classification, and risk management complexity. Baseline D (Stable-Value Oversight Companion) establishes boundary test logic and

supervisory-safe design patterns for payment instruments and yield features. This constitution carries those patterns into the settlement context, extending boundary test discipline to the settlement rail itself and providing category-specific operator obligations.

Intraday liquidity stress and run-like dynamics. Payment rails used for institutional settlement are exposed to concentration risk, large-holder redemption dynamics, and intraday funding gaps. Without operational controls — liquidity gates, redemption queues, stress escalation ladders — settlement operators cannot demonstrate resilience to examiners or manage stress events in real time. This constitution translates the stress-mode concepts from Baseline D into settlement-specific playbooks.

Audit friction and examiner visibility gaps. Examiners reviewing settlement operations require consistent, standard artifacts: Evidence Packs (EPs), EP Deltas, immutable logs, chain-of-custody documentation, examiner query packs, and standard checks. Without these artifacts, examinations are slow, evidence is incomplete, and supervisory confidence is impaired. This constitution provides those artifacts for the payments and settlement domain, fully aligned with the evidence production standards established in Baselines B and C.

0.2 What This Document Is Not

This document is not:

- A claim of legal finality. All references to settlement finality in this document use the formulation "**operational finality conditions met**" — an evidence-backed operational state, not a legal conclusion. Legal finality determinations remain with competent legal authorities and applicable law.
- A universal identity framework. No MDU, universal ID, national ID, or centralized citizen PII architecture is proposed or implied. Identity controls reuse the federated credential and tiered-access model established in Baseline A (FCCK Pilot Proposal) and Baseline B (Operationalization Track).
- A platform mandate. No specific distributed ledger technology, chain, consensus mechanism, or proprietary messaging system is required. All controls are implementation-agnostic and conform to the standards-based, conformance-tested posture of Baseline B.
- A legal or regulatory determination. This document does not determine whether any specific instrument, feature, or arrangement is permitted, prohibited, or required under applicable law. Such determinations remain with appropriate regulatory authorities.
- A replacement for existing clearing and settlement infrastructure. This operating model is additive and operates within the phased deployment posture (Shadow → Limited Live → Expansion) established in Baseline A.

0.3 How This Document Integrates with the Baselines

This constitution is the fourth companion to the FCCK Pilot Suite:

Document	Role
Baseline A — FCCK Pilot Proposal & No-Action Request	Architecture: federated identity, tiered supervisory access, pilot structure

Document	Role
Baseline B — Operationalization Track (Dec 2025)	Governance: playbooks, reference profiles, conformance testing, RACI
Baseline C — Operational Assurance Artifacts Addendum (Jan 2026)	Execution: Evidence Pack templates, logging schemas, examiner query packs, RACI matrices
Baseline D — Stable-Value Oversight Companion (Feb 2026)	Boundary logic: payment vs. yield taxonomy, deposit stability controls, stress-mode patterns
This Document — Payments & Settlement Constitution	Settlement layer: DvP mechanics, finality conditions, liquidity gates, settlement-specific EPs and checks

The vocabulary, artifact structures, role taxonomy, tiered supervision model, purpose-limitation principles, time-to-live (TTL) constraints, recertification cadence, and material change governance established in Baselines A–D are **reused throughout this document without modification**. Where new constructs are introduced, they are explicitly labeled and justified as implied extensions of existing baseline concepts.

0.4 DvP and Finality as Evidence-Backed Guarantees

The central operational claim of this constitution is that **DvP and settlement finality can be demonstrated through evidence artifacts, not asserted through architectural descriptions**.

An Evidence Pack produced under this constitution contains:

- Pre-settlement gate completion records (escrow lock confirmations, authorization checks, funding availability attestations)
- Atomic settlement execution logs (asset-leg lock, cash-leg lock, simultaneous release, finality marker event)
- Finality state transitions with timestamps (pending → conditionally final → operationally final)
- Reconciliation checkpoint references
- Failure-mode and containment records (timeouts, unwinds, partial lock resolutions) where applicable

Examiners reviewing these artifacts can independently verify that DvP operated as intended — or identify where it did not and how the failure was contained. This shifts the supervisory posture from trust-in-architecture to verification-through-evidence.

1. Non-Normative Disclaimer & Scope Boundaries

1.1 Scope

This document provides operational guidance for:

- **Payments and settlement operating models** for tokenized institutional markets, specifically the cash-leg infrastructure supporting atomic delivery-versus-payment settlement

- **Stable-value instruments used in settlement contexts:** tokenized deposits, payment stable-value instruments, and wholesale settlement credits (Categories P1–P3 as defined in Section 3)
- **Yield features structurally separated from settlement rails** (Category P4 as defined in Section 3), including disclosure, boundary test discipline, and evidence requirements
- **Atomic DvP settlement mechanics:** precondition gates, escrow models, release conditions, failure modes, and evidence production
- **Programmable settlement finality:** operational finality conditions, finality state machines, finality proofs, and post-finality governance
- **Liquidity and intraday risk controls:** funding taxonomies, liquidity gates, redemption queues, concentration monitoring, and stress escalation
- **Governance and accountability:** RACI matrices, liability trigger catalogs, no-master-key implementation notes, and material change governance
- **Examiner readiness:** standard checks, examiner query packs, EP manifests specific to payments and settlement, and preservation bundle procedures

This document operates within the phased pilot posture established in Baseline A:

Phase	Label	Settlement Posture
Phase 1	Shadow Mode	DvP executed in parallel with legacy processes; no settlement finality claimed
Phase 2	Limited Live	DvP produces binding settlement outcomes within capped transaction limits
Phase 3	Expansion	Full operational scope subject to demonstrated control effectiveness and recertification

1.2 Out of Scope

The following topics are explicitly excluded from this document:

Excluded Topic	Reason
Monetary policy and central bank operations	Outside pilot scope; addressed by competent monetary authorities
Universal or national identity systems	Prohibited by baseline hard constraints; not relevant to settlement operations
Retail payment systems	Pilot is institutional-only (QIBs and Qualified Purchasers per Baseline B)
Political advocacy on competitive dynamics between banks and non-banks	Neutral implementation guidance only
Cross-border harmonization (Phase 1 scope)	Addressable in future conditional corridor work per Baseline B Appendix I
Legal finality determinations	Reserved for applicable law and competent legal authority
Macroprudential policy and systemic risk buffers	Outside pilot scope
Specific issuer, chain, platform, or proprietary messaging references	Implementation-agnostic by design

1.3 Baseline Anchors and Vocabulary Reuse

All core terminology in this document derives from and is consistent with Baselines A–D. The following table maps key concepts to their baseline sources:

Concept	Baseline Source	Usage in This Document
Evidence Pack (EP) and EP Delta	Baseline B (App. C); Baseline C (Sec. A.1)	Settlement-specific EP manifests and delta cadence
Immutable logs, chain-of-custody	Baseline B (App. B.3); Baseline C (Sec. A.2)	DvP execution logs, finality marker logs, gate activation logs
Tiered supervisory access (Tier 0/1/2)	Baseline A (Glossary); Baseline B (Sec. VIII.6)	Settlement surveillance, examiner query access, stress-mode escalation
Purpose limitation and TTL	Baseline B (Sec. VIII.6); Baseline D (Sec. 1.3)	Examiner access to settlement logs; post-access review
Preservation bundles	Baseline D (Sec. 1.3)	DvP dispute preservation; liquidity stress preservation
RACI matrices and liability triggers	Baseline B (Sec. IX); Baseline C (Sec. B)	DvP operations, finality change control, gate activation
Hold and release	Baseline B (Sec. V.5); Baseline C (Sec. A.4 EXM queries)	Escrow-leg holds; pre-settlement restriction controls
Recertification cadence and material change	Baseline B (Sec. VII.3); Baseline D (Sec. 4, Pattern C)	Finality logic governance; liquidity gate recertification
Conformance profiles (baseline / enhanced)	Baseline B (Sec. VI.1, App. B)	Settlement operator conformance tiers
Shadow → Limited Live → Expansion	Baseline A (Sec. 6.1); Baseline C (Implementation Roadmap)	Settlement phase-gate governance
Boundary tests (payment vs. yield)	Baseline D (Sec. 2.4)	Category determination for cash-leg instruments
Operator obligations by category	Baseline D (Sec. 2.5)	P1–P4 obligations in settlement context
No-master-key / distributed approvals	Baseline B (Sec. IX.4)	Finality logic change control; escrow release governance
Write-once storage	Baseline C (Glossary)	Settlement log integrity

Where this document introduces settlement-specific constructs (e.g., DvP Preconditions Gate, Operational Finality Conditions Checklist, Settlement Queue Unwind Playbook), those constructs are explicitly defined and positioned as implied operational extensions of existing baseline frameworks.

1.4 No-Master-Key Governance Statement

Consistent with the governance principles established in Baseline B (Section IX.4) and the distributed-control architecture of Baseline A, this constitution **does not propose and does not permit** any master key, administrative backdoor, or single-party override capability over settlement escrow, finality markers, or cash-leg release controls.

All controls requiring elevated authority — including DvP escrow release overrides, finality marker corrections, liquidity gate activations, and material change approvals — operate under **threshold/quorum approval structures** with:

- Minimum two authorized roles required for any privileged settlement action
- Immutable audit logging of all approval events (actor, timestamp, justification, outcome)
- Post-event review obligations for emergency actions
- Separation of duties enforced such that no single actor can both initiate and approve the same privileged action

These requirements apply in all operational modes (Shadow, Limited Live, Expansion) and cannot be suspended except through formal material change governance with supervisory notification.

2. Problem Statement: Why Payments & Settlement is the Bottleneck (Operational View)

Settlement risk is not a new problem. What is new is the combination of circumstances created by tokenized asset markets: the cash leg has not modernized at the same pace as the asset leg, creating a structural asymmetry that introduces exactly the principal risk that atomic settlement is designed to eliminate. This section translates the settlement bottleneck into concrete operational control objectives, grounded in the risk categories and operational frictions documented across Baselines A–D.

2.1 Principal Risk and Failed Settlement

Risk Description. Principal risk arises when one leg of a trade settles without the other. The delivering party transfers assets without receiving payment, or the paying party transfers funds without receiving assets. In legacy settlement systems, this risk is managed primarily by trusted central counterparties, netting arrangements, and settlement finality rules enforced by clearing agencies. In distributed ledger settlement environments — particularly in the absence of an atomic settlement mechanism — principal risk can re-emerge if the cash leg and asset leg are operationally decoupled.

Operational Manifestation. The following scenarios represent concrete operational failure modes, each documented as a liability trigger category in Baseline C (Section B.3):

Failure Mode	Operational Consequence	Control Gap
Asset leg settles; cash leg fails	Delivering party has no assets and no payment	No synchronized release condition
Cash leg settles; asset leg fails	Paying party has no assets despite payment	No asset-leg lock confirmation
Partial settlement (one side of a multi-leg trade)	Residual open exposure; audit trail break	No atomic all-or-nothing execution
Duplicate submission	Double settlement of one leg	No idempotency control on submission

Failure Mode	Operational Consequence	Control Gap
Timeout without proper unwind	Locked assets/cash without release path	No defined timeout and reversion protocol

Control Objectives Derived from This Risk:

1. **DvP Preconditions Gate** (Section 5.2): All eligibility, authorization, funding availability, and restriction checks must pass before any leg is locked. Gate completion is logged as a prerequisite event in the Evidence Pack.
2. **Escrow State Integrity** (Section 5.3): Both asset-leg lock and cash-leg lock must be confirmed and symmetrical before release conditions are evaluated. Asymmetric escrow states are treated as a hold condition, not a settlement condition.
3. **Atomic Release** (Section 5.3): Release of both legs occurs simultaneously under a single governance event. Neither leg can be released independently except through a formally documented unwind procedure with quorum approval.
4. **Failure Containment and Unwind** (Section 5.4): Defined timeout behaviors, partial-lock resolution procedures, and hold-only containment are mandatory. Unresolved escrow states trigger preservation bundle creation and examiner notification.
5. **Evidence Production** (Section 5.5): Every DvP cycle produces a minimum evidence set: precondition gate log, lock confirmation events, release event or unwind event, finality marker or failure code. These artifacts form the core of the settlement-specific Evidence Pack.

Translation to Examiner Questions. This control objective directly addresses the examiner inquiry: *"Can the operator demonstrate that no settlement occurred without both legs completing?"* The answer must be grounded in Evidence Pack artifacts — not in architectural descriptions.

2.2 Stable-Value Ambiguity (Payment Utility vs. Yield Feature Boundary)

Risk Description. Cash-leg instruments occupy a category boundary that is both operationally material and supervisory-sensitive. An instrument designed as a payment rail for settlement — a Category P1 or P2 instrument under the taxonomy established in Section 3 — may over time incorporate features (yield pass-through, affiliated rewards, savings-like holding incentives) that shift its regulatory character. Without rigorous operational discipline at this boundary, settlement operators may inadvertently operate yield programs under the guise of payment rails, creating disclosure gaps, concentration risks, and potential misclassification.

Baseline Grounding. Baseline D (Stable-Value Oversight Companion) establishes three instrument categories (Category 1: Payment-Only; Category 2: Yield Feature; Category 3: Third-Party/Affiliated Rewards) with formal boundary tests determining when a feature crosses from payment utility into yield or reward territory. This constitution adopts that taxonomy with settlement-specific extensions (Categories P1–P4, defined in Section 3) and applies boundary test discipline explicitly to instruments used as the cash leg in DvP settlement.

Operational Manifestation in Settlement Context. The following boundary ambiguities create specific risks in a settlement rail:

Ambiguity	Settlement-Specific Risk	Control Gap
Payment rail earns yield on prefunded balances, pass-through undisclosed	Holders effectively receiving yield through settlement mechanism without disclosure	No yield separation boundary enforcement
Settlement credit accrues affiliated rewards based on settlement volume	Reward program operationally commingled with settlement credit	No structural separation between settlement function and reward program
Wholesale settlement balances bear implicit return through netting timing	Timing benefit functions as undisclosed yield	No TTL or intraday neutralization control
Settlement operator changes yield methodology without material change governance	Disclosure is stale; examiner finds EP Delta gap	No recertification trigger on yield methodology change

Control Objectives Derived from This Risk:

1. **Boundary Test Discipline for Cash-Leg Instruments** (Section 3.5): Every instrument used as a cash leg in DvP settlement must be classified at onboarding and at each recertification cycle. Classification must be supported by a boundary test decision record in the Evidence Pack.
2. **Yield Separation Documentation** (Section 3.4 and 8.1): Any yield feature associated with a cash-leg instrument must be documented in a structurally separate disclosure schema and EP component, consistent with Baseline D Pattern B (Yield as a Separate Regulated Product).
3. **No Commingling Posture for Settlement Rails** (Section 4.2): Settlement operators must maintain documented separation between settlement credit functions and any yield program associated with the same instrument. Reserve attestations must confirm that settlement prefunding pools are not commingled with yield program funding sources.
4. **EP Delta Trigger on Boundary Events** (Section 8.3): Any feature introduction, modification, or reclassification that touches the payment-vs.-yield boundary must trigger an EP Delta submission and recertification review, consistent with the material change governance established in Baseline B.

Translation to Examiner Questions. This control objective directly addresses: *"Is the operator using the settlement rail to deliver undisclosed yield to participants?"* and *"Can the operator demonstrate that yield features are structurally separated from settlement credit functions?"*

2.3 Intraday Liquidity Stress and Run-Like Dynamics

Risk Description. Settlement rails used for institutional DvP transactions are exposed to intraday liquidity stress. Prefunded balances may be insufficient to cover settlement obligations if multiple large transactions arrive concurrently. Wholesale settlement credit lines may be drawn simultaneously by multiple counterparties. In yield-bearing settlement contexts, concentration in yield programs creates the additional run-like dynamic documented in Baseline D (Section 3.3): rapid exits from yield programs can create sudden demand for settlement liquidity that the underlying reserve pool cannot meet without liquidation.

Operational Manifestation. The following intraday stress scenarios represent concrete operational failure modes:

Stress Scenario	Settlement Impact	Evidence Required
Prefunding gap: settlement demand exceeds available balance	DvP precondition gate fails; transactions queue	Funding availability check logs; queue activation logs
Concentration exit: large holder redeems settlement credit simultaneously with settlement obligation	Liquidity gate activation without advance notice	Gate activation log; concentration monitoring log
Yield program run: rapid exit from yield component triggers redemption queue	Settlement credit availability reduced; DvP may fail for new transactions	Redemption velocity log; queue activation log; preservation bundle
Intraday credit line drawdown: multiple counterparties draw wholesale settlement credit simultaneously	Credit exhaustion; settlement queue backlog	Credit utilization log; queue depth metrics

Baseline Grounding. Baseline D (Sections 3.2, 3.3, 4) establishes operational controls for concentration risk, rapid redemption dynamics, and liquidity gate invocation. This constitution maps those controls directly onto the settlement context, extending them with settlement-specific triggers (DvP queue activation, escrow hold in lieu of gate), evidence requirements (settlement queue depth logs, intraday funding utilization logs), and examiner checks.

Control Objectives Derived from This Risk:

- Intraday Funding Availability Monitoring** (Section 7.1): Settlement operators must maintain real-time visibility of prefunding balances, credit line utilization, and settlement queue depth. Monitoring results are logged as operational metrics and included in the EP at defined cadences.
- Concentration Monitoring for Settlement Rails** (Section 7.3): The top-N holder and HHI (Herfindahl-Hirschman Index) metrics defined in Baseline D (Section 3.2) are applied to settlement credit and prefunded balances. Escalation thresholds are defined and logged.
- Liquidity Gate and Queue Activation Protocols** (Section 7.2): Pre-defined, documented procedures govern when a liquidity gate is activated, who may activate it, what quorum approval is required, and what evidence is produced. Gate activation is logged as a liability trigger event per the catalog in Baseline C (Section B.3).
- Stress Escalation Ladder** (Section 7.4): Four operating postures (Normal / Limited / Stress / Offboarding) are defined with documented entry and exit conditions, consistent with the phased deployment model of Baseline A and the pilot posture of Baseline B. Each posture transition is logged and triggers EP Delta submission.
- Preservation Bundle on Stress Events** (Section 7.5): Any liquidity gate activation or queue invocation triggers preservation bundle creation, consistent with the preservation bundle discipline of Baseline D. The bundle captures the stress event, gate activation log, queue depth at activation, communication records, and resolution timeline.

Translation to Examiner Questions. This control objective directly addresses: *"Does the operator have adequate liquidity controls to prevent settlement failures during periods of intraday stress?"* and *"If a gate was activated, can the operator produce complete evidence of the trigger, authorization, and resolution?"*

2.4 Operational Dispute Resolution, Error Correction, and Reversibility

Risk Description. Settlement transactions are designed to be final. Operational finality is a property that provides certainty to counterparties. However, operational errors (duplicate submissions, erroneous instruction inputs, oracle data failures, smart contract malfunction), compliance holds (sanctions screening matches, regulatory orders), and system malfunctions may require post-settlement action. Without defined, auditable procedures for dispute resolution, error correction, and reversibility, settlement operators face a dilemma: either settlement finality has no operational meaning, or correction is impossible even when correction is warranted.

Operational Manifestation. The following dispute and error categories require defined resolution procedures:

Error / Dispute Category	Required Resolution Path	Evidence Required
Duplicate submission (same instruction submitted twice)	Idempotency check; second submission rejected	Duplicate detection log; rejection record
Oracle data error (erroneous price/rate at settlement)	Oracle failure log; hold pending correction; unwind if warranted	Oracle check log; correction authorization; revised settlement log
Smart contract malfunction (unintended execution state)	Formal verification incident; ledger overlay or compensating transaction	Incident log; formal verification review; correction authorization chain
Sanctions screening match post-settlement	Hold on delivered assets; investigation and possible unwind	Hold placement log; investigation record; release or unwind log
Instruction input error (wrong counterparty, amount, instrument)	Pre-settlement: correction before gate lock; post-settlement: error correction playbook	Correction request; multi-party approval; correction execution log
Settlement break (reconciliation mismatch)	Open break register; resolution timeline; escalation if unresolved	Reconciliation log; break register; resolution record

Baseline Grounding. Baseline B (Section V.8, Redress and Error Correction Playbook) establishes the principle of contractual primacy — legal contracts govern ultimate rights and obligations while operational corrections address implementation errors. Baseline C (Section A.2, TX_REVERSED and SETTLEMENT_FAILED event types) establishes the logging taxonomy for settlement failure and reversal events. This constitution extends those frameworks with settlement-specific unwind playbooks and dispute resolution escalation paths.

Control Objectives Derived from This Risk:

1. **Pre-Settlement Correction Window** (Section 5.2): A defined window exists between instruction submission and DvP precondition gate lock during which corrections can be made without triggering formal error correction procedures. Corrections within this window are logged as instruction modifications, not reversals.

2. **Post-Settlement Correction Protocol** (Section 10.3): Corrections after operational finality require multi-party approval, documented legal authority (or contractual basis), and production of a correction authorization chain logged as a liability trigger event. Ledger overlays are used to preserve immutability while recording corrections.
3. **Open Breaks Register** (Section 10.2): Settlement reconciliation produces an open breaks register maintained in real-time. Breaks exceeding defined age thresholds trigger escalation, examiner notification, and preservation bundle creation. The offboarding proof bundle requires open breaks = 0 or an explicit, approved break list.
4. **Reversibility Without Data Loss** (Section 10): All unwind procedures are designed to preserve the complete audit trail. Reversing a settlement does not delete the original settlement event; it creates a reversal event linked to the original by correlation ID, consistent with the append-only log architecture of Baseline C.
5. **Contractual Primacy Documentation** (Section 10.1): Every material correction is accompanied by a legal authority reference — the contractual or regulatory basis for the correction — logged in the EP correction record. No correction proceeds without this documentation.

Translation to Examiner Questions. This control objective directly addresses: *"Can the operator demonstrate a complete, unbroken audit trail for every settlement, including corrections and unwinds?"* and *"Are correction procedures consistent with contractual rights and regulatory obligations?"*

2.5 Examiner Visibility vs. Minimization (Purpose Limitation and TTL)

Risk Description. Settlement systems generate high volumes of sensitive transaction data. Effective examiner access is essential for supervision and enforcement. At the same time, unrestricted access to settlement transaction data raises purpose limitation concerns: data collected for settlement operations must not be used for surveillance purposes beyond what is necessary for the regulatory function being exercised. This tension — between examiner visibility and data minimization — is one of the central design challenges of any supervisory framework for digital settlement.

Baseline Grounding. Baselines A and B establish the tiered supervisory access model (Tier 0: aggregate analytics; Tier 1: event-triggered access; Tier 2: emergency intervention with dual-control approval and mandatory post-event review). Baseline B (Section VIII.6) establishes purpose limitation and TTL principles. Baseline C (Section C) provides the tiered access request forms, purpose-limitation register, and post-access review workflow. This constitution applies those frameworks specifically to settlement data.

Operational Manifestation in Settlement Context. The following access scenarios illustrate the tension:

Access Scenario	Appropriate Tier	Control Required
Examiner reviewing aggregate	Tier 0	No individual transaction visibility; anonymized

Access Scenario	Appropriate Tier	Control Required
DvP pass rates, queue depths, gate activation frequencies		aggregate only
Examiner investigating specific settlement failure for a flagged trade	Tier 1	Event-triggered access; documented trigger; time-limited scope; logged access
Examiner requiring full counterparty identity for enforcement investigation	Tier 2	Dual-control approval; objective trigger criteria; immutable access log; post-event review; participant notification after investigation
Routine reporting of settlement metrics to supervisory authority	Tier 0	Standardized reporting template; no individual counterparty data
Examiner requesting preservation bundle for litigation hold	Tier 1 / Tier 2	Scope-limited; documented legal authority; chain-of-custody preserved

Control Objectives Derived from This Risk:

1. **Settlement Data Classification** (Section 8.2): All settlement log events are classified by supervisory tier at the time of logging. Tier classification determines default access controls and TTL for examiner access privileges.
2. **Purpose Limitation Register for Settlement Access** (Section 9.4): Every examiner access request to settlement data is recorded in a purpose-limitation register entry that specifies: the requesting authority, the regulatory purpose, the scope of data accessed, the TTL for the access privilege, and the post-access review obligation. This register is a mandatory component of the settlement-specific EP.
3. **TTL Enforcement for Settlement Examiner Access** (Section 11.1): Access privileges granted for Tier 1 or Tier 2 settlement investigations expire automatically at the end of the defined TTL. Renewal requires a new access request with updated justification. TTL expiration events are logged.
4. **Post-Access Review** (Section 9.4): All Tier 2 access events on settlement data require a post-access review report produced within a defined period after access termination. The review documents: what data was accessed, what findings were made, whether access scope was exceeded, and whether follow-up actions are required. This report is preserved in the EP.
5. **Separation of Operational and Supervisory Access Paths** (Section 4.4): Settlement operational participants (broker-dealers, settlement operators, custodians) and regulatory examiners access settlement data through distinct, separately logged access paths. Operational participants cannot observe supervisory access events; supervisory access events are logged in the supervisory access tier of the logging taxonomy (TIER1_EVENT_ACCESS, TIER2_ACCESS event types per Baseline C).

Translation to Examiner Questions. This control objective directly addresses: *"Does the operator maintain adequate access controls on settlement data to prevent scope creep or unauthorized surveillance?"* and *"Can the operator produce a complete record of all supervisory access to settlement data, including the purpose and findings of each access?"*

2.6 Multi-Intermediary Coordination and Liability Clarity

Risk Description. Institutional settlement involves multiple intermediaries: broker-dealers submitting instructions, qualified custodians holding assets and cash, settlement operators executing DvP, gateway operators routing messages, compliance attestation providers screening participants, and validators or consensus participants confirming finality. When settlement fails, a dispute arises, or a liability trigger event occurs, the absence of clear role-based accountability creates investigative paralysis: no single party can be held responsible, evidence is fragmented across systems, and remediation is delayed.

Operational Manifestation. The following multi-intermediary failure scenarios represent liability ambiguity:

Failure Scenario	Ambiguity Without Defined Roles	Required Control
DvP gate passes but cash leg fails due to custodian operational error	Who is accountable: settlement operator or custodian?	RACI with explicit accountability for funding verification
Finality marker issued but reconciliation shows open break	Who is accountable: validator or transfer agent?	RACI with explicit accountability for reconciliation checkpoint
Liquidity gate activated without required quorum	Who is accountable: gateway operator or compliance officer?	Gate activation RACI with multi-role quorum requirement
Hold placed on asset leg by custodian; cash leg proceeds	Cash transferred without delivery — principal risk realized	Hold-before-lock sequencing requirement; joint liability trigger
Evidence Pack incomplete due to logging gap at one intermediary	Examiner cannot reconstruct settlement chain	Chain-of-custody logging obligation at each intermediary

Baseline Grounding. Baseline B (Section V, Operating Model Playbooks) defines playbooks with explicit actors, responsibilities, escalation paths, and evidence requirements for each critical workflow. Baseline C (Section B, RACI Matrix and Liability Trigger Catalog) provides the RACI structure and liability trigger catalog. This constitution applies those frameworks to the settlement domain, extending them with settlement-specific roles (Settlement Operator function, DvP Escrow Controller function) and settlement-specific liability triggers (unauthorized escrow release, finality marker inconsistency, gate activation without quorum).

Control Objectives Derived from This Risk:

- 1. Settlement Role Taxonomy** (Section 9.1): All settlement roles are defined using baseline role taxonomy (broker-dealer, qualified custodian, gateway operator, compliance attestation provider, validator/consensus participant) with the addition of the **Settlement Operator** function as a coordination and accountability anchor for DvP execution. No new role types are created beyond those implied by baseline frameworks.
- 2. Settlement RACI Matrices** (Section 9.2): Paste-ready RACI matrices are provided for: DvP operations, finality logic change control, liquidity gate activation, hold/release decisions in settlement context, and examiner request handling. These matrices are mandatory components of the settlement-specific EP.

3. **Liability Trigger Catalog — Settlement Extensions** (Section 9.3): The baseline liability trigger catalog (Baseline C, Section B.3) is extended with settlement-specific triggers: unauthorized escrow release, cash-leg-without-asset-leg detection, finality marker inconsistency, gate activation without required approvals, and settlement break exceeding age threshold.
4. **Chain-of-Custody Obligations at Each Intermediary** (Section 4.4): Every intermediary in the settlement chain maintains its own log segment covering the events within its operational scope. Chain-of-custody documentation links these segments into a complete settlement-chain audit trail. The aggregate chain-of-custody record is assembled by the Settlement Operator and included in the EP.
5. **Contractual Liability Allocation Reference** (Section 9.3): The liability trigger catalog includes a reference field for the contractual or regulatory basis of each liability allocation. This field is populated at onboarding and reviewed at each recertification cycle. Settlement operators must ensure that RACI assignments are consistent with underlying contractual arrangements.

Translation to Examiner Questions. This control objective directly addresses: *"In the event of a settlement failure or liability trigger event, can the operator identify the accountable party, produce the relevant evidence, and demonstrate that RACI assignments were followed?"* and *"Is the complete settlement-chain audit trail accessible as a single, linked chain-of-custody record?"*

Summary: Problem-to-Control-Objective Mapping

The following table summarizes the mapping from operational risks to control objectives and evidence requirements established in this section. Each control objective is developed in the operational sections of this constitution that follow.

Risk Category	Primary Control Objective	Key Evidence Artifacts	Sections Addressing
Principal risk / failed settlement	DvP Preconditions Gate; atomic escrow; synchronized release	Gate completion log; escrow state log; finality marker event	5, 11, Appendix B
Stable-value ambiguity	Boundary test discipline; yield separation; EP Delta on boundary events	Boundary test record; yield separation attestation; EP Delta	3, 8, Appendix A
Intraday liquidity stress	Concentration monitoring; liquidity gates; stress escalation ladder	Funding availability log; gate activation log; preservation bundle	7, Appendix H
Dispute resolution / reversibility	Pre-settlement correction window; post-settlement protocol; open breaks register	Correction authorization chain; reversal log; break register	5.4, 10, Appendix I
Examiner visibility vs. minimization	Tiered access; purpose limitation register; TTL enforcement	Supervisory access log; purpose-limitation register; post-access review	8, 9, Appendix G

Risk Category	Primary Control Objective	Key Evidence Artifacts	Sections Addressing
Multi-intermediary liability clarity	Settlement RACI; settlement liability trigger catalog; chain-of-custody obligation	RACI attestation; liability trigger log; chain-of-custody assembly	9, Appendix E

3. Neutral Taxonomy: Cash-Leg Instruments and Settlement Rails

This section establishes the operational taxonomy for instruments used as the cash leg in DvP settlement. The taxonomy extends the three-category framework in Baseline D (Categories 1–3: Payment-Only, Yield Feature, Third-Party/Affiliated Rewards) with settlement-specific subcategories (P1–P4) that reflect the distinct operational contexts in which stable-value instruments participate in institutional settlement. No new tier system is created. The P1–P4 classification maps directly onto Baseline D's category logic and boundary test methodology.

The taxonomy is **implementation-agnostic**. It does not prescribe specific technologies, issuers, chains, or messaging protocols. Classification is determined by operational characteristics and disclosure posture, not by technical form.

3.1 Category P1: Payment/Settlement Stable-Value Instrument (No Yield)

Operational Definition. A digital instrument designed exclusively to serve as the cash leg in DvP settlement or bilateral payment transactions, maintaining a stable value relationship with a reference currency (typically 1:1) without providing yield, interest, rewards, or affiliated benefits to holders. The instrument has no savings-like features and no holding incentives.

Settlement-Specific Characteristics:

Characteristic	P1 Requirement
Value stability	1:1 peg to reference currency maintained through reserve backing or guaranteed convertibility
Yield provision	None. Reserve asset income, if any, is retained by the operator or applied to operational costs
Reward programs	None. No affiliated, third-party, or transactional rewards tied to holdings or settlement volumes
Holding incentives	None. No mechanism providing differential benefit based on duration or balance size
Redemption	Immediate or same-session redemption available; no lockup or notice period
Settlement role	Primary cash leg in DvP settlement; funding source for prefunded settlement balances
Disclosure	Clear statement: "This instrument maintains stable value and serves payment/settlement functions only. No yield, interest, or financial return is provided to holders."

Operator Obligations (P1):

Obligation	Requirement	Evidence Artifact
Reserve attestation	Periodic third-party or officer attestation of reserve adequacy, composition, and segregation	EP Component: Reserve attestation report
Redemption terms disclosure	Clear documentation of redemption process, timeline, and fees	EP Component: Redemption terms disclosure
No-yield attribution	No yield calculation, distribution log, or rate publication	EP Component: Negative attestation (no yield)
Concentration monitoring	Recommended: track large holders for settlement capacity planning	EP Component: Concentration metrics (operational)
Stress testing	Recommended: redemption surge scenarios tied to settlement queue triggers	EP Component: Stress scenario results
Boundary test record	Self-assessment at onboarding and each recertification confirming P1 classification	EP Component: Boundary test decision record

Examiner Focus Areas (P1). Reserve custody and segregation. Redemption reliability and processing times. Absence of undisclosed yield or reward mechanisms. Accuracy and completeness of "payment-only" disclosures. Concentration of settlement prefunding by large participants.

Relationship to Baseline D Category 1. P1 is the settlement-context instantiation of Baseline D Category 1 (Payment Stable-Value Instrument — No Yield). All Baseline D Category 1 requirements apply. The settlement-specific additions are: (a) the mandatory boundary test record at onboarding and recertification, (b) the concentration monitoring recommendation tied to settlement capacity planning, and (c) the negative yield attestation as a distinct EP component.

3.2 Category P2: Tokenized Deposit (Institutional, Redeemable; No Yield by Default)

Operational Definition. A digital representation of a demand deposit or other bank liability held at a regulated depository institution, used as the cash leg in institutional DvP settlement. The tokenized deposit represents a claim on the issuing institution; redemption converts the token back to the underlying deposit. No yield is distributed to token holders by default; any yield feature is structurally separated and classified as P4.

Settlement-Specific Characteristics:

Characteristic	P2 Requirement
Underlying asset	Deposit at regulated depository institution; not a synthetic construct
Value stability	Backed by the issuing institution's deposit obligation; value tracks underlying deposit 1:1
Yield by default	None. Any interest earned on underlying deposit is retained by issuing institution unless separately disclosed as P4
Redemption	Redeemable at issuing institution; redemption timeline consistent with underlying deposit terms
Settlement role	Cash leg in institutional DvP; may also serve as collateral in repo/collateral workflows
Regulatory	Issuing institution remains subject to applicable banking regulation; token layer

Characteristic	P2 Requirement
oversight	is additive
Disclosure	Clear statement of: (a) underlying deposit relationship, (b) redemption terms, (c) that no yield is distributed unless separately disclosed under P4

Operator Obligations (P2):

Obligation	Requirement	Evidence Artifact
Deposit backing attestation	Documentation of the depository institution relationship and deposit segregation	EP Component: Deposit relationship attestation
Redemption terms disclosure	Redemption timeline, minimum amounts, and any conditions	EP Component: Redemption terms
No-yield default statement	Explicit statement that yield on underlying deposit is not passed through by default	EP Component: Yield default disclosure
P4 separation (if yield introduced)	Any yield pass-through must be classified P4 and disclosed under a separate EP component	EP Component: P4 yield feature disclosure (if applicable)
Custodian chain documentation	Chain from token holder to underlying deposit, through all intermediaries	EP Component: Custodian chain map
Concentration monitoring	Required: institutional participants may hold large positions; monitor for settlement capacity	EP Component: Concentration metrics

Examiner Focus Areas (P2). Validity and enforceability of underlying deposit claim. Redemption reliability at the issuing institution. Custodian chain integrity and segregation. Absence of undisclosed yield pass-through. Consistency between token documentation and underlying deposit terms.

Relationship to Baseline D Category 1. P2 maps to Baseline D Category 1 with the specific sub-characterization of a deposit-backed instrument. The deposit relationship introduces regulatory considerations (banking oversight of the issuing institution) that P1 instruments backed by other reserve types do not carry. This operational distinction is material for examiner review of underlying asset quality.

3.3 Category P3: Wholesale Settlement Credit (Permissioned Settlement Balance / Omnibus Rail)

Operational Definition. A permissioned settlement balance or credit facility established within a controlled settlement network, denominated in reference currency units, used exclusively to effect settlement between network participants. P3 instruments are not freely transferable outside the settlement network; they are created for settlement purposes and extinguished or returned to the issuing settlement operator upon settlement completion or session close.

Settlement-Specific Characteristics:

Characteristic	P3 Requirement
Transferability	Limited to settlement network participants; not freely transferable outside the network

Characteristic	P3 Requirement
Value mechanism	Denominated in reference currency; settled against prefunded balances or credit lines
Duration	Intraday or session-scoped; not intended as a store of value
Yield provision	None. P3 instruments do not accrue yield or interest; any timing benefit from netting is operationally neutralized per Section 3.5 boundary test
Settlement role	Wholesale cash leg within an omnibus or multilateral settlement rail
Counterparty risk	Settlement operator holds the credit exposure; counterparty risk is to the settlement network, not to individual instrument holders
Disclosure	Network participation agreement and settlement rules document the nature and limitations of P3 balances

Operator Obligations (P3):

Obligation	Requirement	Evidence Artifact
Settlement rules documentation	Network rulebook defining permissioned use, creation, and extinguishment of P3 balances	EP Component: Settlement rulebook extract
Prefunding or credit line documentation	Documentation of funding mechanism (prefunded deposit, intraday credit, credit line)	EP Component: Funding arrangement attestation
Intraday balance monitoring	Real-time monitoring of P3 balance utilization; escalation if credit limits approached	EP Component: Intraday utilization logs
Session-close reconciliation	Zero-balance confirmation at session close; any open P3 balance triggers incident flag	EP Component: Session-close reconciliation log
No yield neutralization attestation	Attestation that timing benefits of netting do not constitute undisclosed yield	EP Component: Netting neutralization attestation
Concentration monitoring	Required: large network participants may dominate P3 credit utilization	EP Component: Concentration metrics

Examiner Focus Areas (P3). Settlement network governance and rulebook adequacy. Prefunding or credit line sufficiency. Intraday balance exposure and concentration. Session-close reconciliation completeness. Risk of P3 balances becoming a de facto external payment instrument through scope creep.

Relationship to Baseline D. P3 does not map cleanly to Baseline D's retail-oriented category framework. It is a settlement-infrastructure construct with no direct retail equivalent. The boundary test obligation (Section 3.5) governs the risk of P3 instruments acquiring characteristics (yield from netting timing, secondary transferability) that would require reclassification.

3.4 Category P4: Yield Feature / Yield Program (Structurally Separated from Payment Rail)

Operational Definition. Any mechanism that provides financial returns, interest, yield, or affiliated rewards to holders of P1, P2, or P3 instruments, structurally and operationally distinct from the underlying payment or settlement instrument. P4 is not a standalone settlement instrument; it is an

optional feature layer that must be separated from the settlement rail in all operational, disclosure, and evidence dimensions.

Settlement-Specific Characteristics:

Characteristic	P4 Requirement
Structural separation	P4 yield program is legally, operationally, and disclosurally distinct from the underlying P1/P2/P3 instrument
Opt-in architecture	Holders must affirmatively elect participation; default status is non-yielding settlement instrument
Yield source attribution	Explicit disclosure of yield origin (reserve asset income, lending income, fee rebates, subsidies)
Rate variability	Rates may fluctuate; current rate, historical range, and factors affecting variability disclosed
Settlement rail independence	Settlement functions (DvP, escrow, gate) operate independently of P4 yield program status; P4 suspension does not affect P1/P2/P3 settlement capability
Reserve segregation	P4 yield program funding is segregated from settlement reserve pools; no commingling
Disclosure	Separate disclosure schema from underlying settlement instrument; explicit yield-program risk labeling

Operator Obligations (P4):

Obligation	Requirement	Evidence Artifact
Yield source disclosure	High-level description of yield generation mechanism	EP Component: Yield source disclosure
Rate communication	Current rate, historical range, calculation methodology, variability factors	EP Component: Rate disclosure log
Opt-in/opt-out records	Timestamped records of holder elections	EP Component: Opt-in/opt-out log
Yield attribution logs	Immutable records of yield accruals, payout calculations, distribution events	EP Component: Yield attribution log
Structural separation attestation	Officer attestation that settlement rail and yield program are operationally separated	EP Component: Separation attestation
Concentration monitoring	Required: monitor yield program participation concentration for run-risk	EP Component: Concentration metrics (yield program)
Stress testing	Required: model run-like exit scenarios from yield program; test impact on settlement rail	EP Component: Stress test results
P4 material change governance	Any change to yield methodology, rate caps, lockup periods, or program structure triggers EP Delta and recertification	EP Component: Material change log

Examiner Focus Areas (P4). Structural and operational separation from settlement rail. Accuracy of yield source attribution. Concentration in yield program relative to total outstanding. Settlement rail continuity if P4 program is suspended or terminated. Compliance with Baseline D Pattern B (Yield as a Separate Regulated Product) requirements.

Relationship to Baseline D Category 2 and Pattern B. P4 is the settlement-context instantiation of Baseline D Category 2 (Yield Feature / Yield Program) and Pattern B (Yield as a Separate Regulated Product Posture). All Baseline D Category 2 and Pattern B requirements apply. The settlement-specific addition is the explicit requirement that P4 suspension does not affect DvP settlement capability, which must be documented and tested.

3.5 Boundary Tests Table (Payment vs. Yield Features; Settlement-Extended)

The following table extends the Baseline D boundary test framework (Section 2.4) to settlement-specific features and mechanics. Operators must run this boundary test at instrument onboarding and at each recertification cycle. Test results are recorded in a boundary test decision record filed in the EP.

Feature / Mechanism	P1/P2/P3 (Settlement-Only)	Boundary Indicator	Reclassification
Reserve asset income	Retained by operator; not distributed to holders or used to fund yield programs	Income distributed to holders or attributed to yield program	→ P4 (Yield Feature)
Settlement volume rebates	No rebates based on settlement volume or participant activity	Systematic rebates paid to participants based on settlement activity	→ P4 (Affiliated Reward / Yield Feature)
Prefunding balance interest	No interest on prefunded settlement balances	Interest accrues on prefunded balances held overnight or intraday	→ P4 (Yield Feature); may also implicate P3 netting neutralization
Netting timing benefit	Timing benefit operationally neutralized at session close; no net value transfer	Netting creates systematic timing benefit with net positive value transfer to participants	→ P4 (Yield Feature, requires disclosure)
Holding duration incentives	No differential settlement fee or benefit based on holding duration	Settlement fee discount or priority increases with holding duration	→ P4 (Yield Feature, holding incentive)
Affiliated entity benefits	No benefits from affiliated entities tied to settlement participation	Affiliated entity provides rebates, credits, or services tied to settlement volumes	→ P4 (Affiliated Reward)
Voluntary lockup for settlement credit	No lockup; P3 balances extinguished at session close	Participants offered enhanced credit terms in exchange for minimum holding duration	→ P4 (Yield Feature, creates savings-like behavior)
Settlement network reward points	No points, loyalty credits, or accrual tied to settlement participation	Points or credits accruing based on settlement activity, redeemable for cash or services	→ P4 (Reward Program)
Intraday overdraft / credit income	Credit exposure is to settlement network at cost;	Settlement operator distributes income from	→ P4 (Yield Feature)

Feature / Mechanism	P1/P2/P3 (Settlement-Only)	Boundary Indicator	Reclassification
	no income distribution	credit facility to participants	
Principal risk pass-through	Settlement credit is fully backed; no principal risk to holder	Yield program exposes holder to principal risk through investment of settlement reserves	→ P4 (Yield Feature) with enhanced risk disclosure

Governance Process for Boundary Determination (Settlement Context). The governance process follows Baseline D (Section 2.4) with the following settlement-specific additions:

1. **Initial Classification** at instrument onboarding. Operator self-assessment using the boundary test table above. Result documented in the EP boundary test decision record.
2. **Recertification Boundary Review** at each annual or event-triggered recertification cycle.
3. **Disclosure Trigger** on any affirmative boundary crossing. Any determination that a settlement feature has crossed into P4 territory triggers an EP Delta submission and updated disclosure schema.
4. **Supervisory Notification** for material reclassifications: any reclassification from P1/P2/P3 to P4 is treated as a material change requiring regulatory notification within 30 days.
5. **Settlement Rail Independence Test** as a mandatory P4 classification step: before any P4 feature is introduced, the operator must document and test that the underlying settlement rail (DvP, escrow, gate) operates independently of the P4 feature status.

3.6 Operator Obligations by Category (High-Level Table)

The following table summarizes operator obligations across all four categories. Detailed requirements for each obligation are developed in Sections 7, 8, and 9, and in Appendix A.

Obligation	P1 (Payment/Settlement)	P2 (Tokenized Deposit)	P3 (Wholesale Credit)	P4 (Yield Feature)
Reserve / backing attestation	Required: reserve adequacy and segregation	Required: deposit relationship and segregation	Required: prefunding or credit line documentation	Required: yield program reserve segregation from settlement pool
Yield/reward disclosure	Not applicable	Not applicable by default; required if P4 introduced	Not applicable; netting neutralization attestation required	Required: yield source, rates, variability, risks
Redemption terms	Required: process, timeline, fees	Required: deposit redemption terms and token-to-deposit conversion	Required: session-close extinguishment rules	Required: opt-out terms, lockup/notice periods if any
Risk labeling	Standard: payment instrument operational risks	Standard + deposit relationship risk	Standard + settlement network exposure risk	Enhanced: yield variability, principal risk, program

Obligation	P1 (Payment/Settlement)	P2 (Tokenized Deposit)	P3 (Wholesale Credit)	P4 (Yield Feature)
				termination risk
Boundary test record	Required at onboarding and each recertification	Required at onboarding and each recertification	Required at onboarding and each recertification	Not applicable (P4 is the yield category)
Concentration monitoring	Recommended	Required	Required	Required
Stress testing	Recommended	Recommended	Required (intraday capacity)	Required (run-like exit scenarios)
Immutable logging	Payment transactions, redemptions, reserve movements	Token issuance, redemption, deposit chain events	Settlement balance creation, utilization, extinguishment	Yield accruals, payouts, rate changes, opt-in/opt-out events
EP components	Reserve attestation; redemption log; boundary test record; negative yield attestation	Deposit attestation; custodian chain map; redemption log; boundary test record	Settlement rulebook; funding attestation; intraday utilization log; session-close reconciliation	Yield source disclosure; rate log; opt-in/out log; yield attribution log; separation attestation
EP Delta triggers	Material change to instrument design or redemption terms; boundary crossing	Material change to deposit relationship, custodian chain, or redemption terms; boundary crossing	Material change to network rules, funding arrangement, or session-close procedures; boundary crossing	Any change to yield methodology, rate caps, lockup periods, or program structure
Recertification cadence	Annual or upon material change	Annual or upon material change	Annual or upon material change	Annual or upon material change; more frequent if high concentration or yield program volatility
Supervisory reporting	Standard: reserve attestations, redemption metrics	Standard + deposit institution regulatory status	Enhanced: intraday utilization, credit concentration, session-close metrics	Enhanced: yield program metrics, concentration data, stress test results
Material change governance	Required: instrument design changes, redemption term changes	Required: deposit institution changes, custody arrangement changes	Required: rulebook changes, funding arrangement changes	Required: all yield-related changes; supervisory pre-approval for pilot-context P4 programs

4. Settlement Architecture (Baseline-Aligned, Implementation-Agnostic)

This section establishes the operational architecture for the payments and settlement layer: participant roles, dual-mode operating posture, message/event model, and evidence packaging. All architectural elements are grounded in the baseline frameworks and are implementation-agnostic — they describe functional requirements and evidence obligations, not specific technology choices.

4.1 Dual-Mode Operating Posture: Shadow → Limited Live → Expansion

The settlement architecture operates under the three-phase deployment posture established in Baseline A (Section 6.1) and operationalized in Baseline C (Implementation Roadmap). Each phase defines a distinct settlement posture, with explicit gate conditions governing transition between phases.

Phase 1: Shadow Mode

Settlement posture. All DvP logic executes in parallel with existing legacy settlement processes. No settlement finality is claimed from the pilot system. Transactions processed in shadow mode are reconciled against legacy settlement records. Discrepancies are flagged and investigated but do not displace the authoritative legacy record.

Purpose. Validate DvP gate logic, escrow state transitions, finality marker generation, and evidence production without operational risk. Identify integration gaps, timing issues, and evidence completeness deficiencies before live settlement begins.

Control	Shadow Mode Requirement
DvP execution	Full DvP logic executes; asset-leg and cash-leg locks simulated against production data
Finality marker	Generated and logged but labeled SHADOW_MODE: non-binding
Reconciliation	Shadow settlement records reconciled against legacy records daily; discrepancy log maintained
Evidence Pack	Full EP produced on shadow cycles; completeness validated by conformance assessment
Examiner access	Full Tier 0/1 access to shadow settlement data; Tier 2 not applicable in shadow mode
Gate conditions to advance	Zero critical discrepancies for 30 consecutive shadow settlement cycles; EP completeness score ≥ 95%; conformance certification achieved by all Phase 1 participants

Phase 2: Limited Live

Settlement posture. DvP produces binding settlement outcomes within defined transaction limits (see Baseline B Appendix J.2 for cap framework). Settlement finality conditions are operational and logged as OPERATIONALLY_FINAL where all conditions are met. Exceptions and failures are contained within the pilot cohort.

Purpose. Validate DvP operational finality under live conditions, with real asset and cash movements, within a controlled participant set and transaction cap. Generate operational data for examiner review and recertification.

Control	Limited Live Requirement
Transaction caps	Per Baseline B Appendix J.2: aggregate notional cap; individual transaction limits
DvP execution	Full atomic DvP; both legs live; finality conditions active
Finality marker	Operational finality markers issued; labeled OPERATIONALLY_FINAL_LIMITED_LIVE
Reconciliation	Real-time reconciliation against participant books; open breaks register active
Evidence Pack	Full EP produced at defined cadence; EP Deltas on all material events
Stress testing	Quarterly stress scenarios; results included in EP
Gate conditions to advance	Demonstrated control effectiveness (conformance pass rate $\geq 95\%$); zero unresolved critical incidents for 90 consecutive days; SLA compliance $\geq 95\%$; successful DR drill completion; pilot steering committee approval per Baseline B Appendix J.2.4

Phase 3: Expansion

Settlement posture. Full operational scope within approved participant and notional limits. Settlement architecture operates at steady state. Recertification cadence and material change governance are the primary controls for managing ongoing risk.

Control	Expansion Requirement
Transaction caps	Expanded per Baseline B Appendix J.2.4; notional cap unchanged during pilot period
DvP execution	Full atomic DvP; finality markers labeled OPERATIONALLY_FINAL
Reconciliation	Continuous; break resolution SLA active
Evidence Pack	Standard cadence; enhanced EP Deltas for any material events
Recertification	Annual or upon material change; settlement-specific controls reviewed
Cross-jurisdiction readiness	Evidence portability preparation per Baseline B Appendix I (conditional)

Phase Transition Evidence Requirements. Transition from Shadow to Limited Live, and from Limited Live to Expansion, requires production of a **Phase Transition Evidence Package** filed with the pilot steering committee and made available to supervisory staff. The package includes:

- Reconciliation performance summary (shadow period or limited live period)
- EP completeness scores across all participating intermediaries
- Conformance certification status for all participant types
- Incident summary and resolution log
- Open breaks register (must show zero unresolved critical breaks)
- Pilot steering committee approval resolution
- Regulatory notification record

4.2 Participants and Roles

Settlement operations under this constitution involve the following roles, defined using the baseline role taxonomy (Baseline B Section V; Baseline C Glossary) with settlement-specific accountability assignments.

Role	Settlement Function	Accountability Scope
Broker-Dealer	Submits settlement instructions on behalf of institutional counterparties; conducts pre-settlement eligibility checks; maintains participant onboarding records	Instruction accuracy; eligibility verification; pre-settlement compliance screening; hold-before-instruction obligation
Qualified Custodian (Asset Leg)	Holds tokenized assets on behalf of beneficial owners; confirms asset availability for DvP escrow; executes asset-leg lock and release	Asset custody integrity; asset-leg lock confirmation; segregation of delivered assets; post-settlement custody transfer
Qualified Custodian (Cash Leg)	Holds cash-leg instruments (P1/P2/P3) on behalf of participants; confirms funding availability for DvP precondition gate; executes cash-leg lock and release	Cash-leg funding confirmation; cash-leg lock integrity; settlement payment execution; post-settlement balance reconciliation
Settlement Operator	Coordinates DvP execution across asset and cash legs; manages escrow state machine; issues finality markers; maintains settlement queue; activates liquidity gates	DvP gate completion integrity; escrow state consistency; finality marker accuracy; settlement queue governance; gate activation authorization; chain-of-custody assembly for EP
Gateway Operator	Routes settlement instructions between participants; validates message schemas; enforces policy controls (participant eligibility, instrument eligibility, cap compliance); operates circuit breakers	Message integrity; policy enforcement at submission; cap monitoring; circuit breaker activation; gateway-level logging for EP
Compliance Attestation Provider	Executes automated compliance screening (sanctions, eligibility, concentration limits) at submission and at pre-settlement gate; generates attestation artifacts	Screening completeness; attestation accuracy; false positive investigation support; compliance screening log for EP
Validator / Consensus Participant	Confirms transaction validity through consensus mechanism (where applicable to technical architecture); endorses finality conditions	Consensus integrity; finality endorsement log; fault detection and reporting
Transfer Agent / Functional Equivalent	Maintains beneficial ownership registry for tokenized assets; processes post-settlement ownership transfers; manages credential lifecycle for settlement participants	Registry accuracy; post-settlement transfer processing; revocation list freshness for settlement eligibility checks
Independent	Conducts conformance certification,	Assessment independence;

Role	Settlement Function	Accountability Scope
Assessor	evidence pack validation, and periodic control assessments	conformance determination accuracy; assessment report completeness

Role Assignment Principles (Settlement-Specific). The following constraints apply to role assignments in the settlement context, consistent with baseline separation-of-duties requirements (Baseline B Section VI.2):

1. The Settlement Operator and any Qualified Custodian serving the same participant in the same settlement cycle must be distinct legal entities or operationally separated functions with independent logging and approval chains.
2. The Compliance Attestation Provider must be independent of the party whose instructions are being screened. Self-attestation is not permitted for compliance screening results used as DvP precondition gate inputs.
3. The Validator / Consensus Participant role must not be held by a party with a direct financial interest in the settlement outcome of the transaction being validated, except where conflict management procedures are documented and disclosed.
4. A single entity may fulfill multiple roles (e.g., a qualified custodian may also serve as settlement operator for its own settlement transactions) only where: (a) segregated operational units with independent logging are maintained, (b) the dual-role assignment is disclosed in the EP, and (c) the conformance assessment has reviewed and accepted the dual-role structure.

Settlement Operator Function — Additional Detail. The Settlement Operator is the coordination and accountability anchor for DvP execution. This function may be fulfilled by a clearing agency, a regulated intermediary operating a settlement service, or a distributed settlement infrastructure with a designated operator entity. In all cases, the Settlement Operator is the party responsible for:

- Assembling the chain-of-custody record across all intermediary log segments into the complete settlement-chain audit trail
- Maintaining the settlement queue and documenting queue management decisions
- Issuing finality markers (with multi-party endorsement where required)
- Activating liquidity gates (with quorum approval per Section 9.2 RACI)
- Producing the settlement-specific EP and EP Deltas
- Serving as the primary examination contact for settlement-layer supervisory inquiries

4.3 Message/Event Model (Schema-Abstract)

The following event model describes the lifecycle of a settlement instruction from submission to finality. The model is schema-abstract: it defines event types, required log fields, sequencing constraints, and evidence outputs without prescribing specific message formats, protocols, or technology choices. Implementors map this model onto their chosen technical infrastructure as part of conformance certification.

4.3.1 Settlement Lifecycle Event Sequence

[1] ORDER

└─ Instruction submitted by Broker-Dealer

- └ Event: TX_SUBMITTED
- └ Inputs: trade_id, instruction_id, asset_id, quantity, cash_amount, cash_instrument_category (P1/P2/P3), counterparties, settlement_date, submission_timestamp
- └ Gate: Duplicate detection (idempotency check on instruction_id)

[2] ALLOCATION

- └ Asset allocation confirmed by asset-leg Qualified Custodian
- └ Event: ASSET_ALLOCATION_CONFIRMED
- └ Inputs: instruction_id, asset_id, quantity_available, custodian_id, allocation_timestamp
- └ Gate: Asset availability \geq required quantity

[3] FUNDING

- └ Cash funding confirmed by cash-leg Qualified Custodian
- └ Event: CASH_FUNDING_CONFIRMED
- └ Inputs: instruction_id, cash_instrument_id, amount_available, custodian_id, funding_timestamp
- └ Gate: Cash availability \geq settlement amount

[4] COMPLIANCE SCREENING

- └ Automated compliance check by Compliance Attestation Provider
- └ Event: COMPLIANCE_SCREENING (SANCTIONS_CHECK, ELIGIBILITY_VERIFICATION, CONCENTRATION_LIMIT_CHECK per Baseline C taxonomy)
- └ Inputs: instruction_id, counterparty_credentials, instrument_id, screening_timestamp
- └ Gate: All checks pass (no open sanctions match; eligibility confirmed; concentration limit not exceeded)

[5] LOCK

- └ Escrow initiated by Settlement Operator
- └ Sub-events:
 - └ ASSET_LEG_LOCKED: asset_id, quantity, lock_timestamp, custodian_attestation_hash
 - └ CASH_LEG_LOCKED: cash_instrument_id, amount, lock_timestamp,

custodian_attestation_hash

- └ Gate: Both legs locked symmetrically within timeout window
- └ Failure path: If only one leg locks → ESCROW_ASYMMETRY_DETECTED
→ hold-only containment; timeout counter starts

[6] SETTLE

- └ Simultaneous release of both legs by Settlement Operator
- └ Event: DVP_SETTLEMENT_EXECUTED
- └ Inputs: instruction_id, asset_transfer_record, cash_transfer_record,
release_authorization (multi-party quorum reference),
settlement_timestamp
- └ Gate: Release condition satisfied (both legs locked; no open hold;
finality preconditions met)
- └ Failure path: If gate fails post-lock → SETTLEMENT_HOLD_ACTIVATED
→ escrow maintained; investigation triggered

[7] FINALIZE

- └ Finality marker issued by Settlement Operator
(with Validator endorsement where consensus required)
- └ Event: FINALITY_MARKER_ISSUED
- └ Inputs: instruction_id, finality_state (OPERATIONALLY_FINAL),
marker_timestamp, endorsement_signatures,
reconciliation_checkpoint_reference
- └ Post-event: Reconciliation update; EP evidence production triggered

4.3.2 Event Sequencing Constraints

The following sequencing constraints are mandatory. Any deviation is an operational exception requiring logging and investigation:

Constraint	Rule	Exception Path
FUNDING before LOCK	Cash-leg lock cannot proceed until CASH_FUNDING_CONFIRMED is logged	Gateway rejects lock attempt if funding confirmation is absent
ALLOCATION before LOCK	Asset-leg lock cannot proceed until ASSET_ALLOCATION_CONFIRMED is logged	Gateway rejects lock attempt if allocation confirmation is absent
COMPLIANCE before LOCK	Compliance screening must produce a passing result before either leg is locked	If compliance screening result is pending, instruction enters compliance queue (not escrow)

Constraint	Rule	Exception Path
SYMMETRIC LOCK before SETTLE	Both ASSET_LEG_LOCKED and CASH_LEG_LOCKED must be logged before SETTLE can proceed	If only one leg is locked after timeout, ESCROW_ASYMMETRY_DETECTED triggers containment
SETTLE before FINALIZE	DVP_SETTLEMENT_EXECUTE must be logged before FINALITY_MARKER_ISSUED	Finality markers on non-settled transactions are a critical error; triggers FINALITY_MARKER_INCONSISTENCY liability trigger
FINALITY_MARKER unique per instruction_id	One finality marker per instruction_id; duplicates trigger critical alert	Duplicate finality marker detection triggers DUPLICATE_FINALITY_MARKER liability trigger

4.3.3 Required Log Fields per Event (Settlement-Specific Extensions)

Each settlement lifecycle event must include all base fields specified in Baseline C (Section A.2, Required Event Fields), plus the following settlement-specific metadata fields:

Field	Type	Description
trade_id	string	External trade identifier (from upstream trade matching system)
instruction_id	string (UUID)	Unique settlement instruction identifier; idempotency key
dvp_session_id	string	Settlement session or batch identifier; links related events
asset_instrument_id	string	Tokenized asset identifier
cash_instrument_id	string	Cash-leg instrument identifier
cash_instrument_category	enum: P1/P2/P3/P4	Classification of cash-leg instrument per Section 3 taxonomy
asset_custodian_id	string	Qualified Custodian identifier for asset leg
cash_custodian_id	string	Qualified Custodian identifier for cash leg
settlement_operator_id	string	Settlement Operator identifier
phase_mode	enum: SHADOW/LIMITED_LIQUIDITY/EXPANSION	Operating phase at time of settlement
escrow_lock_hash	string (SHA-256)	Hash of escrow state at lock confirmation; integrity anchor
finality_state	enum	Current finality state (see Section 6.2 state machine)

Field	Type	Description
reconciliation_checkpoint_ref	string	Reference to reconciliation checkpoint record
hold_flag	boolean	Whether any hold is active on instruction or counterparty
queue_position	integer (nullable)	Position in settlement queue if queued; null if immediate

4.3.4 Event Correlation and Chain Integrity

All events in a single settlement lifecycle share the same `instruction_id` and `dvp_session_id`. The Baseline C hash-chaining mechanism (each event's `previous_event_hash` linking to the prior event) applies within each log stream. The Settlement Operator assembles the cross-stream correlation — linking asset-custodian logs, cash-custodian logs, compliance provider logs, and gateway logs — using `instruction_id` as the correlation key. The resulting correlated event chain is the primary audit artifact for examiner review of any individual settlement.

4.4 Immutable Logs, Chain-of-Custody, and Evidence Packaging (Baseline Artifacts)

Settlement operations produce evidence artifacts at multiple points in the lifecycle. This subsection describes the immutable log architecture, chain-of-custody assembly, and evidence packaging approach. All mechanisms extend and are fully consistent with Baseline C (Sections A.1–A.3) and Baseline B (Appendix B.3 Logging and Retention Baseline).

4.4.1 Immutable Log Architecture (Settlement Layer)

The following principles govern the settlement-layer immutable log implementation:

Write-once append-only storage. Settlement lifecycle events are written to append-only storage per the write-once storage requirement established in Baseline C (Glossary). No modification or deletion is permitted post-write. Corrections create new reversal or correction events; they do not overwrite original entries.

Hash chaining per log stream. Each intermediary maintains its own log stream with hash chaining (Baseline C, Section A.2 Integrity and Chain-of-Custody Mechanisms). The Settlement Operator maintains the master settlement log stream that anchors all cross-intermediary correlations.

Settlement-specific event types. The following settlement-specific event types extend the Baseline C logging taxonomy and are logged in the master settlement log stream:

Event Type	Category	Description
ASSET_ALLOCATION_CONFIRMED	Transaction	Asset availability confirmed by asset-leg custodian
CASH_FUNDING_CONFIRMED	Transaction	Cash availability confirmed by cash-leg custodian

Event Type	Category	Description
ASSET_LEG_LOCKED	Transaction	Asset escrow lock executed
CASH_LEG_LOCKED	Transaction	Cash escrow lock executed
ESCROW_ASYMMETRY_DETECTED	Transaction	One leg locked; other not locked within timeout window
DVP_SETTLEMENT_EXECUTED	Transaction	Simultaneous release of both legs
SETTLEMENT_HOLD_ACTIVATED	Hold / Release	Hold placed on escrow post-lock pending investigation
SETTLEMENT_QUEUE_ENTRY	Transaction	Instruction entered settlement queue
SETTLEMENT_QUEUE_EXIT	Transaction	Instruction exited queue (settled or withdrawn)
FINALITY_MARKER_ISSUED	Transaction	Operational finality marker issued
FINALITY_MARKER_CORRECTED	Transaction	Finality marker correction (multi-party authorized)
LIQUIDITY_GATE_ACTIVATED	Hold / Release	Liquidity gate invoked; new settlement submissions suspended/limited
LIQUIDITY_GATE_DEACTIVATED	Hold / Release	Liquidity gate lifted; normal operations resumed
SETTLEMENT_BREAK_FLAGGED	Compliance	Open reconciliation break flagged for investigation
SETTLEMENT_BREAK_RESOLVED	Compliance	Open break resolved; reconciliation updated
PHASE_TRANSITION_EXECUTED	Change Management	Operating phase transition (Shadow → Limited Live → Expansion)
DUPLICATE_INSTRUCTION_DETECTED	Compliance	Duplicate instruction detected by idempotency check; rejected

Retention classification for settlement events. Settlement lifecycle events are classified as TRANSACTION retention class (7-year minimum per Baseline C, Section A.2 Retention Requirements). Finality markers, escrow lock records, and reconciliation checkpoints are retained indefinitely as critical custody-chain evidence. Gate activation events and phase transition events are classified as CHANGE_MGMT retention class (7 years).

4.4.2 Cross-Intermediary Chain-of-Custody Assembly

The Settlement Operator is responsible for assembling the complete settlement-chain audit trail from distributed log segments. The assembly process produces the following chain-of-custody artifacts for each settlement instruction:

Step 1: Log segment collection. The Settlement Operator collects log segments from:

- Asset-leg Qualified Custodian log (covering ASSET_ALLOCATION_CONFIRMED through post-settlement custody transfer)
- Cash-leg Qualified Custodian log (covering CASH_FUNDING_CONFIRMED through post-settlement balance update)

- Compliance Attestation Provider log (covering COMPLIANCE_SCREENING and attestation events)
- Gateway Operator log (covering TX_SUBMITTED, policy enforcement events, circuit breaker events)
- Settlement Operator master log (covering all remaining lifecycle events)

Step 2: Correlation by instruction_id. Events across all log segments are correlated by `instruction_id`. The correlated event set is sorted by `timestamp` and validated for sequencing constraint compliance (Section 4.3.2).

Step 3: Chain-of-custody record generation. A chain-of-custody record is produced per instruction with the following fields:

`chain_of_custody_record:`

```

instruction_id:          [unique settlement instruction ID]
trade_id:               [upstream trade identifier]
dvp_session_id:        [settlement session]
phase_mode:            [SHADOW / LIMITED_LIVE / EXPANSION]
submitted_by:          [Broker-Dealer ID]
asset_custodian_id:    [asset-leg custodian]
cash_custodian_id:     [cash-leg custodian]
settlement_operator_id: [settlement operator]
events:
  - event_type, event_id, timestamp, actor_id, outcome, integrity_hash
  - [ordered list of all correlated lifecycle events]
sequencing_validation: [PASS / FAIL + deviation log if FAIL]
final_state:           [OPERATIONALLY_FINAL / UNWOUND / FAILED / PENDING]
finality_marker_ref:   [finality marker event_id if final]
reconciliation_ref:    [reconciliation checkpoint reference]
open_breaks:           [list of unresolved breaks, if any]
custody_chain_hash:    [SHA-256 of complete correlated event list]
assembly_timestamp:    [timestamp of chain-of-custody assembly]
assembler_id:          [Settlement Operator ID]
assembly_attestation:  [officer attestation of completeness]

```

Step 4: EP integration. Chain-of-custody records for all settlements within the EP period are packaged into the settlement-specific Evidence Pack component (`/05_Transaction_Logs/Settlement_Chain_Records_[Period].jsonl`), consistent with the EP folder structure established in Baseline C (Section A.1).

4.4.3 Settlement-Specific Evidence Pack Structure

The settlement-specific EP extends the standard EP folder structure defined in Baseline C (Section A.1) with the following additional components:

```
/Evidence_Pack_[Entity_Name]_[Period]_[Version]/
|
├─ /05_Transaction_Logs/           ← extended for settlement
|   ├─ Settlement_Chain_Records_[Period].jsonl
|   ├─ Settlement_Queue_Logs_[Period].jsonl
|   ├─ DvP_Gate_Completion_Logs_[Period].jsonl
|   ├─ Escrow_State_Logs_[Period].jsonl
|   ├─ Finality_Marker_Log_[Period].jsonl
|   ├─ Reconciliation_Checkpoints_[Period].jsonl
|   ├─ Open_Breaks_Register_[Period].json
|   └─ Log_Integrity_Proofs.json
|
├─ /12_Settlement_Controls/       ← settlement-specific new folder
|   ├─ DvP_Gate_Checklist_[Period].pdf
|   ├─ Escrow_State_Model_Reference.pdf
|   ├─ Finality_Conditions_Checklist_[Period].pdf
|   ├─ Liquidity_Gate_Activation_Records/
|   |   └─ GATE_[ID]_Documentation.pdf
|   ├─ Liquidity_Monitoring_Reports_[Period].pdf
|   ├─ Concentration_Metrics_[Period].pdf
|   ├─ Stress_Test_Results_[Period].pdf
|   ├─ Phase_Transition_Evidence/
|   |   └─ Phase_Transition_[Phase]_Package.pdf
|   └─ Settlement_RACI_Attestation_[Period].pdf
|
├─ /13_Cash_Leg_Instruments/      ← settlement-specific new folder
|   ├─ Cash_Instrument_Classification_Records/
|   |   └─ [InstrumentID]_Boundary_Test_Record.pdf
|   ├─ Reserve_Attestations/
|   |   └─ [InstrumentID]_Reserve_Attestation_[Period].pdf
|   ├─ P4_Yield_Program_Components/ ← present only if P4 instrument used
|   |   └─ Yield_Source_Disclosure.pdf
```

- | | |— Rate_Disclosure_Log_[Period].pdf
- | | |— Opt_In_Out_Log_[Period].jsonl
- | | |— Yield_Attribution_Log_[Period].jsonl
- | | |— Separation_Attestation_[Period].pdf
- | |— Netting_Neutralization_Attestation_[Period].pdf
- |
- └─ /14_Offboarding_and_Unwind/ ← populated at program end or incident
 - |— Final_Snapshot_Asset_Leg.pdf
 - |— Final_Snapshot_Cash_Leg.pdf
 - |— Open_Breaks_Final_Register.json
 - |— Chain_of_Custody_Transfer_Record.pdf
 - └─ Legacy_Transition_Evidence.pdf

EP Delta Cadence (Settlement-Specific). EP Deltas for settlement operations follow the baseline cadence (Baseline B Section 8.3) with the following additions:

Delta Trigger	Cadence	Delta Contents
Routine operational	Daily (limited live / expansion)	Settlement chain records, escrow state logs, finality markers, reconciliation checkpoints
Material event	Event-triggered (within 24 hours)	Specific event package: gate activation, phase transition, liability trigger, open break exceeding age threshold
Stress event	Immediate (within 2 hours of gate activation)	Gate activation record, queue snapshot, concentration metrics, communication records
Recertification	Annual or material change	Full EP update; all settlement controls reviewed and attested

4.4.4 Preservation Bundle Triggers (Settlement Context)

The following events trigger creation of a preservation bundle (per Baseline D definition, extended to settlement context):

Trigger Event	Preservation Bundle Contents
Liquidity gate activation	Gate activation log; queue state snapshot; concentration metrics at activation; funding availability data; communication records; resolution timeline
Unresolved escrow asymmetry (timeout exceeded)	ESCROW_ASYMMETRY_DETECTED event; lock attempt logs for both legs; timeout counter log; containment actions; investigation record
Finality marker inconsistency detected	FINALITY_MARKER_ISSUED event; SETTLEMENT_BREAK_FLAGGED event; reconciliation records; correction authorization chain
Regulatory hold on settlement instruction post-finality	Finality marker; hold placement log; investigation record; correction or unwind authorization

Trigger Event	Preservation Bundle Contents
Settlement break exceeding age threshold	Break detection log; investigation actions; escalation record; resolution outcome
Phase transition failure (gate conditions not met)	Phase transition evidence package; specific gate condition failures; remediation plan

Preservation bundles are stored separately from standard EP components with enhanced chain-of-custody documentation and indefinite retention, consistent with Baseline D (Section 1.3) and Baseline C (Section A.3).

5. Atomic DvP Core (The Settlement Engine)

5.1 Objective: Eliminate Principal Risk Operationally

The central operational purpose of the DvP engine is to eliminate principal risk — the risk that one counterparty delivers without receiving — through synchronized, atomic execution of the asset leg and the cash leg. This objective is stated architecturally in Baseline A (Glossary: Atomic Settlement; Section 3.5: Dual-Mode Settlement Rails) and is operationalized in this section through precondition gates, an escrow state model, failure-mode containment protocols, and an evidence production framework.

The DvP engine achieves its objective by enforcing three invariants across every settlement cycle:

Invariant 1 — No leg releases before the other is locked. The settlement release condition requires that both `ASSET_LEG_LOCKED` and `CASH_LEG_LOCKED` events are logged and confirmed before any release is initiated. An asymmetric escrow state — one leg locked, the other not — is a hold condition, not a release condition.

Invariant 2 — No release without gate completion. Release of escrow requires that all DvP Preconditions Gate checks (Section 5.2) have passed and their passing is documented in the gate completion log. Any single gate failure blocks settlement for the affected instruction; it does not affect other instructions in the queue.

Invariant 3 — No finality without settlement. A finality marker (Section 6) may only be issued after `DVP_SETTLEMENT_EXECUTED` is logged for the same `instruction_id`. Finality markers without a prior settlement execution event are a critical control failure and a liability trigger event (`FINALITY_MARKER_INCONSISTENCY`, Section 9.3).

These invariants are enforced at the Settlement Operator level. They are validated by the conformance test suite (Section 11, Check IDs SCP-007 through SCP-015) and are examined through the Examiner Query Pack (Section 11.3, Queries EQP-001 and EQP-002).

Non-Legal Framing. Operational elimination of principal risk means that the evidence artifacts demonstrate synchronized execution. It does not constitute a legal guarantee of settlement finality, a waiver of rights arising from fraud or error, or a representation regarding the legal enforceability of the underlying transaction. Legal finality determinations remain governed by applicable law, contractual arrangements, and the principle of contractual primacy established in Baseline B (Section V.8).

5.2 DvP Preconditions Gate

The DvP Preconditions Gate is the control checkpoint that must be fully satisfied before any escrow lock is initiated. The gate is a structured checklist of checks organized into four categories: eligibility and authorization, funding availability, restriction and hold, and disclosure version. Each check produces a PASS or FAIL outcome logged as part of the gate completion record.

Gate execution timing. The gate is evaluated once per instruction, immediately after ALLOCATION and FUNDING confirmation events are received and before LOCK is initiated. If any check produces FAIL, the instruction enters the compliance queue (not escrow) and a gate failure record is logged. The instruction remains in the compliance queue until either (a) the failing condition is resolved and the gate is re-evaluated, or (b) the instruction is withdrawn by the submitting Broker-Dealer, or (c) the queue age threshold is exceeded, triggering escalation.

Gate re-evaluation. A gate re-evaluation is treated as a new gate execution event with a new timestamp. Both the initial failure and the subsequent pass are preserved in the audit trail; the failure record is not overwritten.

5.2.1 Category 1: Eligibility and Authorization Checks

Check ID	Check Description	Pass Condition	Fail Action	Evidence Output
G-EA-01	Submitting Broker-Dealer is a conformance-certified pilot participant	Broker-Dealer ID found in active conformance registry with non-suspended certification	Block instruction; notify Broker-Dealer; log COMPLIANCE_ALERT	Conformance registry lookup result
G-EA-02	Both counterparties hold valid, non-revoked credentials for the settlement activity	Credential verification passes for both sides; no CREDENTIAL_REVOKE D or CREDENTIAL_SUSPENDED events in current period	Block instruction; flag for manual review; log CREDENTIAL event	CREDENTIAL_VERIFIED log entries for both counterparties
G-EA-03	Asset instrument is on the approved instrument registry	Instrument ID found in active instrument registry with no suspension flag	Block instruction; log COMPLIANCE_ALERT	Registry lookup result
G-EA-04	Cash-leg instrument category (P1/P2/P3) is consistent with settlement authorization	Instrument category matches the category authorized in counterparty onboarding documents	Block instruction; flag category mismatch; log COMPLIANCE_ALERT	Category verification record
G-EA-05	Transaction is within pilot notional caps (per Baseline B Appendix J.2)	Instruction notional value \leq per-transaction cap; cumulative session notional \leq session cap	Block instruction; log cap breach event	Cap utilization log at time of check
G-EA-06	Instruction has not been previously	No prior TX_SUBMITTED event	Reject duplicate; log DUPLICATE_INSTRUCT	Duplicate detection log entry

Check ID	Check Description	Pass Condition	Fail Action	Evidence Output
	submitted (idempotency check)	with the same instruction_id within the lookback window	ION_DETECTED	
G-EA-07	Multi-party authorization is complete for instructions above the high-value threshold	Dual authorization events (AUTH_BIOMETRIC + secondary AUTH per Baseline B Section VI.2) logged for instructions above threshold	Block instruction; return to submitter for secondary authorization	AUTH event references for both authorizers

5.2.2 Category 2: Funding Availability Checks

Check ID	Check Description	Pass Condition	Fail Action	Evidence Output
G-FA-01	Asset-leg custodian confirms asset quantity available for lock	ASSET_ALLOCATION_CONFIRMED event present with quantity_available ≥ instruction quantity	Enter funding queue; log funding gap; notify custodian	ASSET_ALLOCATION_CONFIRMED event reference
G-FA-02	Cash-leg custodian confirms cash amount available for lock	CASH_FUNDING_CONFIRMED event present with amount_available ≥ instruction cash amount	Enter funding queue; log funding gap; notify custodian	CASH_FUNDING_CONFIRMED event reference
G-FA-03	Liquidity gate is not active for the cash-leg instrument	No active LIQUIDITY_GATE_ACTIVATED event for the cash instrument ID in current session	Queue instruction per gate queue procedures (Section 7.2); log queue entry	Liquidity gate status check record
G-FA-04	P3 wholesale settlement credit line is not exhausted (if P3 instrument)	Credit utilization ≤ credit limit for the settlement session	Queue instruction; log SETTLEMENT_QUEUE_ENTRY with reason CREDIT_LIMIT_APPROACHED	Intraday utilization log at time of check
G-FA-05	Intraday funding stress threshold is not breached	Current settlement queue depth and aggregate pending funding ≤ stress threshold	If threshold breached, flag for Settlement Operator review before proceeding	Queue depth metric at time of check

5.2.3 Category 3: Restriction and Hold Checks

Check ID	Check Description	Pass Condition	Fail Action	Evidence Output
G-RH-01	No active hold on asset-leg position	No HOLD_PLACED event with scope matching asset position; or HOLD_RELEASED event is more recent than any HOLD_PLACED	Block instruction; log SETTLEMENT_HOLD_ACTIVATED; notify both counterparties	Hold status check record; most recent HOLD_PLACED / HOLD_RELEASED event references
G-RH-02	No active hold on cash-leg account	No HOLD_PLACED event with scope matching cash-leg account; or	Block instruction; log SETTLEMENT_HOLD_ACTIVATED	Hold status check record

Check ID	Check Description	Pass Condition	Fail Action	Evidence Output
		HOLD_RELEASED event is more recent		
G-RH-03	No active sanctions match on either counterparty	SANCTIONS_CHECK result = PASS for both counterparties at time of gate evaluation; no open COMPLIANCE_ALERT with type SANCTIONS_MATCH	Block instruction; log COMPLIANCE_ALERT; initiate hold/release playbook per Baseline B Section V.5	SANCTIONS_CHECK event reference; alert log if applicable
G-RH-04	Counterparties are not on the suspended participant list	No active suspension flag in the conformance registry for either counterparty	Block instruction; log COMPLIANCE_ALERT	Conformance registry suspension check result
G-RH-05	Concentration limit is not exceeded by this instruction	Post-settlement concentration metric for both counterparties remains within defined limits	Block instruction; log CONCENTRATION_LIMIT_CHECK with FAIL; notify compliance officer	Concentration calculation record at time of check
G-RH-06	No active circuit breaker on the gateway for the instrument or session	No active circuit breaker event from Gateway Operator for relevant instrument or session scope	Queue instruction; log SETTLEMENT_QUEUE_ENTRY with reason CIRCUIT_BREAKER_ACTIVE	Circuit breaker status record

5.2.4 Category 4: Disclosure Version Checks

Check ID	Check Description	Pass Condition	Fail Action	Evidence Output
G-DV-01	Cash-leg instrument disclosure version is current	Instrument disclosure version in use by both counterparties matches the current version in the disclosure registry	Flag for compliance review; do not block unless version delta is material	Disclosure version comparison record
G-DV-02	P4 yield feature disclosure is current (if P4 instrument involved)	If cash-leg instrument has an active P4 yield program, yield program disclosure version is current	Flag for compliance review; log EP Delta trigger if version is stale	P4 disclosure version check record
G-DV-03	Counterparty boundary test records are current for the cash-leg instrument	Both counterparties' boundary test decision records for the cash-leg instrument are within the recertification window	Flag for recertification review; log compliance alert if records are overdue	Boundary test record age check

5.2.5 Gate Completion Record

Upon completion of all gate checks — whether PASS or FAIL — the Settlement Operator logs a **Gate Completion Record** with the following structure:

gate_completion_record:

```

record_id:           [unique gate record ID]
instruction_id:      [settlement instruction ID]

```

```

evaluation_timestamp: [timestamp of gate evaluation]
evaluator_id:        [Settlement Operator system or role ID]
phase_mode:          [SHADOW / LIMITED_LIVE / EXPANSION]
overall_result:      [PASS / FAIL]
checks:
  - check_id:         [G-EA-01 through G-DV-03]
    result:           [PASS / FAIL / NOT_APPLICABLE]
    evidence_ref:     [event_id or record reference supporting result]
    failure_reason:   [populated if FAIL; null if PASS]
gate_completion_hash: [SHA-256 of gate record content; integrity anchor]
previous_event_hash: [hash of prior event in Settlement Operator log chain]

```

Gate Completion Records are stored in the DvP Gate Completion Logs component of the settlement-specific EP (/05_Transaction_Logs/DvP_Gate_Completion_Logs_[Period].jsonl) and are a primary target of the Standard Checks Pack (Check ID SCP-007: DvP Gate Completeness) and the Examiner Query Pack (Query EQP-001: DvP Lock/Release Trace).

5.3 DvP Escrow Model (Schema-Abstract)

The DvP escrow model describes the state machine governing asset-leg and cash-leg locks from instruction submission through settlement or unwind. The model is schema-abstract: it defines states, transitions, conditions, and evidence obligations without prescribing the technical mechanism (smart contract, custodian instruction hold, or other implementation).

5.3.1 Asset-Leg Lock

Purpose. The asset-leg lock places the delivery quantity of the tokenized asset in a restricted state such that the delivering party cannot transfer, pledge, or otherwise dispose of the locked quantity for the duration of the escrow period.

Lock initiation. Triggered by gate PASS outcome. Initiated by the Settlement Operator instruction to the asset-leg Qualified Custodian.

Lock confirmation. The asset-leg Qualified Custodian logs ASSET_LEG_LOCKED with the following fields:

```

asset_leg_lock:
  instruction_id:      [settlement instruction ID]
  asset_instrument_id: [tokenized asset identifier]
  quantity_locked:    [quantity placed in escrow]
  delivering_party_id: [beneficial owner or custodian account]
  lock_expiry_timestamp: [maximum lock duration; auto-unwind if exceeded]

```

lock_timestamp: [actual lock execution timestamp]
custodian_attestation: [Qualified Custodian officer or system attestation]
lock_hash: [SHA-256 of lock state; integrity anchor]

Lock duration and timeout. The lock carries a defined expiry timestamp. If the cash-leg lock confirmation (Section 5.3.2) is not received before the lock expiry:

- ESCROW_ASYMMETRY_DETECTED is logged
- The asset-leg lock is held (not released) pending investigation
- The timeout counter starts; if timeout is not resolved within the defined resolution window, ESCROW_TIMEOUT_ESCALATED is logged and the Settlement Operator initiates unwind procedures (Section 5.4)

Lock restrictions. While the asset-leg lock is active:

- The delivering party may not submit new instructions referencing the locked quantity
- The asset-leg Qualified Custodian must reject any transfer instruction for the locked quantity
- The G-RH-01 gate check will block any new instruction that references the locked position

5.3.2 Cash-Leg Lock

Purpose. The cash-leg lock places the settlement cash amount in a restricted state such that the paying party cannot withdraw, transfer, or otherwise dispose of the locked amount for the duration of the escrow period.

Lock initiation. Triggered by gate PASS outcome, concurrently with asset-leg lock initiation. Both lock initiation instructions are issued by the Settlement Operator as a coordinated pair; neither is issued without the other.

Lock confirmation. The cash-leg Qualified Custodian logs CASH_LEG_LOCKED with the following fields:

cash_leg_lock:

instruction_id: [settlement instruction ID]
cash_instrument_id: [cash-leg instrument identifier]
cash_instrument_category: [P1 / P2 / P3]
amount_locked: [cash amount placed in escrow]
paying_party_id: [beneficial owner or custodian account]
lock_expiry_timestamp: [maximum lock duration; auto-unwind if exceeded]
lock_timestamp: [actual lock execution timestamp]
custodian_attestation: [Qualified Custodian officer or system attestation]
lock_hash: [SHA-256 of lock state; integrity anchor]

Symmetric confirmation requirement. Before any release is initiated, the Settlement Operator must confirm that both ASSET_LEG_LOCKED and CASH_LEG_LOCKED events are logged for the same instruction_id, that their lock_timestamps are within the defined synchronization window, and that neither lock has exceeded its expiry timestamp. This confirmation is logged as an

ESCROW_SYMMETRY_CONFIRMED event — a prerequisite for the release condition evaluation.

5.3.3 Release Conditions

Release of both escrow legs occurs simultaneously upon satisfaction of all release conditions. The Settlement Operator evaluates release conditions and issues the release instruction only when all of the following are true:

Release Condition	Verification Method	Evidence Reference
RC-01 Both legs confirmed locked	ASSET_LEG_LOCKED and CASH_LEG_LOCKED both present for instruction_id	ESCROW_SYMMETRY_CONFIRMED event
RC-02 Lock timestamps within synchronization window	Difference between asset-leg and cash-leg lock timestamps \leq synchronization window (operator-configured; typically \leq 60 seconds)	Lock timestamp delta calculation in ESCROW_SYMMETRY_CONFIRMED
RC-03 Neither lock has expired	Current timestamp $<$ both lock_expiry_timestamps	Lock expiry check at time of release evaluation
RC-04 No active hold on either leg	G-RH-01 and G-RH-02 checks pass at time of release evaluation	Hold status re-check record
RC-05 No open compliance alert blocking release	No unresolved COMPLIANCE_ALERT with BLOCK_SETTLEMENT flag for instruction_id	Compliance alert status check
RC-06 Release authorization is quorum-approved	For instructions above the high-value threshold: minimum two authorized roles have endorsed release	Release authorization quorum record (multi-party approval chain)

Release execution. When all release conditions are satisfied, the Settlement Operator issues simultaneous release instructions to both custodians. DVP_SETTLEMENT_EXECUTED is logged by the Settlement Operator with the following fields:

dvp_settlement_executed:

```

instruction_id:           [settlement instruction ID]
trade_id:                [upstream trade identifier]
dvp_session_id:         [settlement session]
asset_transfer_reference: [asset-leg Qualified Custodian transfer record]
cash_transfer_reference: [cash-leg Qualified Custodian transfer record]
release_authorization_ref: [quorum approval record ID, if applicable]
release_conditions_checked: [list of RC-01 through RC-06 with PASS status]
settlement_timestamp:    [timestamp of simultaneous release execution]
settlement_operator_id:  [Settlement Operator ID]

```

phase_mode: [SHADOW / LIMITED_LIVE / EXPANSION]
 settlement_hash: [SHA-256 of settlement event content]
 previous_event_hash: [hash of prior event in log chain]

5.3.4 Failure and Timeout Behaviors

The following table describes the defined behaviors for escrow failure and timeout scenarios, with associated containment actions and evidence obligations:

Scenario	Trigger	Immediate Action	Containment	Evidence Produced
Asset-leg lock timeout	ASSET_LEG_LOCKED not received within lock initiation window after gate PASS	Log ESCROW_ASYMMETRY_DETECTED; start timeout counter	Hold cash-leg lock (do not release or re-submit); notify asset-leg custodian	ESCROW_ASYMMETRY_DETECTED event; timeout counter log
Cash-leg lock timeout	CASH_LEG_LOCKED not received within lock initiation window after gate PASS	Log ESCROW_ASYMMETRY_DETECTED; start timeout counter	Hold asset-leg lock; notify cash-leg custodian	ESCROW_ASYMMETRY_DETECTED event; timeout counter log
Symmetry window exceeded	Lock timestamps differ by more than the synchronization window	Log ESCROW_SYMMETRY_FAILED; treat as asymmetry	Hold both legs; initiate investigation; do not release	ESCROW_SYMMETRY_FAILED event; lock timestamp delta record
Lock expiry with no release	Current timestamp exceeds lock_expiry_timestamp without DVP_SETTLEMENT_EXECUTED	Log ESCROW_TIMEOUT_ESCALATED; escalate to Settlement Operator	Initiate unwind (Section 5.4); preserve both escrow state logs	ESCROW_TIMEOUT_ESCALATED event; preservation bundle triggered
Post-lock compliance hold	Active COMPLIANCE_ALERT with BLOCK_SETTLEMENT flag arises after both legs are locked	Log SETTLEMENT_HOLD_ACTIVATED; block release	Maintain both locks; initiate compliance investigation; notify both counterparties	SETTLEMENT_HOLD_ACTIVATED event; compliance alert reference; preservation bundle triggered
Release authorization failure	Quorum approval for high-value release cannot be obtained within authorization window	Log RELEASE_AUTHORIZATION_TIMEOUT; escalate to Settlement Operator	Maintain both locks; extend lock expiry if authorization is in progress; or unwind if unresolvable	RELEASE_AUTHORIZATION_TIMEOUT event
Technical failure during release	Settlement Operator release instruction fails to execute on one or both legs	Log DVP_RELEASE_PARTIAL if partial; log SETTLEMENT_FAILED if both fail	Initiate reconciliation; check actual custodian state; unwind if delivery without payment detected	DVP_RELEASE_PARTIAL or SETTLEMENT_FAILED event; custodian state verification record; preservation bundle triggered

Hold-only containment principle. In all failure and timeout scenarios, the default containment action is to maintain existing locks — not to release them. Release without full confirmation is the exact principal risk scenario the DvP engine is designed to prevent. Unilateral release of one leg while the other remains locked is prohibited absent a formally documented and quorum-approved unwind authorization.

5.4 DvP Failure Modes and Containment

This section provides the operational playbook for the most material DvP failure modes, extending the containment principles in Section 5.3.4 with response procedures, escalation paths, and evidence production requirements.

5.4.1 Partial Lock (One Leg Locked, Other Fails)

Definition. One escrow leg is confirmed locked; the other fails to lock within the defined synchronization window due to funding gap, custodian system failure, compliance hold on the failing leg, or instruction error.

Response sequence:

Step	Actor	Action	Evidence
1	Settlement Operator	Log ESCROW_ASYMMETRY_DETECTED; identify which leg failed	ESCROW_ASYMMETRY_DETECTED event
2	Settlement Operator	Notify both counterparties of partial lock status	Communication log entry
3	Settlement Operator	Investigate failing-leg cause (funding gap, custodian error, compliance hold)	Investigation record
4	Settlement Operator	If cause is resolvable within extension window: extend lock expiry; re-attempt failing leg	Lock expiry extension record
5	Settlement Operator	If cause is not resolvable within extension window: initiate unwind (Section 5.4.4)	UNWIND_INITIATED event
6	Qualified Custodian (locked leg)	Maintain existing lock until unwind authorization received	Lock maintenance log
7	Settlement Operator	Log resolution: either ESCROW_SYMMETRY_CONFIRMED (if successfully resolved) or UNWIND_COMPLETE	Resolution event

Preservation bundle trigger. If the partial lock is not resolved within 2x the lock expiry window, a preservation bundle is created covering: ESCROW_ASYMMETRY_DETECTED event, both custodian state logs, investigation record, and communication records.

5.4.2 Timeout (Lock Expiry Without Settlement)

Definition. Both legs are locked but DVP_SETTLEMENT_EXECUTED is not logged before the lock expiry timestamp, due to release authorization delay, post-lock compliance hold, or Settlement Operator system failure.

Response sequence:

Step	Actor	Action	Evidence
1	Settlement Operator	Log ESCROW_TIMEOUT_ESCALATED	ESCROW_TIMEOUT_ESCALATED event
2	Settlement Operator	Assess cause: authorization delay vs. system failure vs. compliance hold	Root cause log entry
3	Settlement Operator (authorization delay)	If quorum authorization is in progress: extend lock expiry with quorum approval for extension	Lock expiry extension authorization record
4	Settlement Operator (system failure)	If technical failure: restore system state; verify custodian lock status; re-attempt release	System recovery log; custodian state verification
5	Settlement Operator (compliance hold)	If compliance hold arises: maintain both locks; initiate compliance investigation per hold/release playbook	SETTLEMENT_HOLD_ACTIVATED event
6	Settlement Operator	If unresolvable within maximum extension window: initiate unwind	UNWIND_INITIATED event
7	Settlement Operator	Log UNWIND_COMPLETE with both legs released to original holders	UNWIND_COMPLETE event; preservation bundle

Maximum extension policy. Lock expiry may be extended a maximum of two times, each requiring quorum approval. After the second extension, if settlement has not been executed, unwind is mandatory. This policy prevents indefinite lock of counterparty assets.

5.4.3 Mismatch (Instruction vs. Escrow State)

Definition. A discrepancy is detected between the instruction terms (asset, quantity, cash amount, counterparties) and the actual escrow state reflected in the lock confirmation events. This may arise from instruction input error, oracle data error, or custodian system error.

Response sequence:

Step	Actor	Action	Evidence
1	Settlement Operator	Log ESCROW_MISMATCH_DETECTED with mismatch description	ESCROW_MISMATCH_DETECTED event
2	Settlement Operator	Block release; maintain both locks	Containment log entry
3	Broker-Dealer	Confirm instruction terms; identify source of mismatch	Instruction confirmation record

Step	Actor	Action	Evidence
4	Settlement Operator + Custodians	Verify actual escrow state in custodian systems	Custodian state verification records
5	Settlement Operator	If mismatch is in instruction: correction authorization required per Section 2.4 pre-settlement correction protocol	Correction authorization chain
6	Settlement Operator	If mismatch is in custodian system: custodian remediation required before re-attempt	Custodian remediation record
7	Settlement Operator	Re-evaluate gate after correction; re-initiate escrow if correction is authorized	New gate completion record

5.4.4 Duplicate Submission

Definition. An instruction with an instruction_id that matches a previously submitted instruction is received. This may arise from system retry logic, operator error, or a deliberate attempt to duplicate a settlement.

Response. Duplicate submission detection is a mandatory gate check (G-EA-06). The gateway logs DUPLICATE_INSTRUCTION_DETECTED and rejects the submission before it enters the gate evaluation. No escrow is initiated for the duplicate. The rejection event is logged and flagged for review if the duplicate appears within a short window of the original (which may indicate a retry attempt) versus a longer window (which may indicate an intentional duplicate).

The idempotency check lookback window is operator-configured (recommended: 24 hours for same-day; 7 days for cross-day). All duplicate detection events are included in the settlement EP and are a target of the Examiner Query Pack (Query EQP-004: Duplicate Submission Detection).

5.4.5 Post-Settlement Discovery (Delivery Without Payment Scenario Detection)

Definition. Reconciliation discovers that DVP_SETTLEMENT_EXECUTED was logged but one leg did not actually transfer in the underlying custodian system. This is the most critical DvP failure scenario — it represents realized principal risk.

Detection mechanism. Post-settlement reconciliation (Section 4.3.2, reconciliation checkpoint) compares settlement execution logs against actual custodian position records. Any discrepancy between logged settlement and actual position change is logged as SETTLEMENT_BREAK_FLAGGED with severity CRITICAL.

Response sequence:

Step	Actor	Action	Evidence
1	Settlement Operator	Log SETTLEMENT_BREAK_FLAGGED (severity: CRITICAL); create preservation bundle immediately	Preservation bundle; SETTLEMENT_BREAK_FLAGGED event
2	Settlement	Notify both counterparties; notify	Notification records; supervisory

Step	Actor	Action	Evidence
	Operator	supervisory authority within 2 hours per incident reporting protocol	notification log
3	Settlement Operator + Custodians	Determine actual position state in each custodian system	Custodian position verification records
4	Settlement Operator	If one leg did not transfer: initiate hold on the leg that did transfer; block disposal	SETTLEMENT_HOLD_ACTIVATED on completed leg
5	Settlement Operator + Legal Counsel	Assess correction path: compensating transaction; reversal; or remediation per contractual rights	Legal authority reference; correction authorization chain
6	Settlement Operator	Execute approved correction; log TX_REVERSED or compensating transaction with full authorization chain	TX_REVERSED event or compensating TX_SUBMITTED event; authorization records
7	Settlement Operator	Reconcile both custodian systems to post-correction state; log SETTLEMENT_BREAK_RESOLVED	SETTLEMENT_BREAK_RESOLVED event; updated reconciliation checkpoint
8	Settlement Operator	Produce incident report; update EP with full resolution documentation	Incident report; EP update

5.5 Evidence Outputs for DvP

The following table provides a comprehensive catalog of evidence artifacts produced by the DvP engine, organized by lifecycle stage. These artifacts are the primary content of the settlement-specific EP (/05_Transaction_Logs/ and /12_Settlement_Controls/) and are the targets of the Standard Checks Pack (Section 11.2) and Examiner Query Pack (Section 11.3).

Stage	Event / Artifact	Log Location	Retention Class	Examiner Relevance
Submission	TX_SUBMITTED event	Master settlement log	TRANSACTION (7 yr)	Instruction receipt confirmation; idempotency anchor
Submission	DUPLICATE_INSTRUCTION_DETECTED event (if applicable)	Master settlement log	TRANSACTION (7 yr)	Duplicate control evidence
Allocation	ASSET_ALLOCATION_CONFIRMED event	Asset-leg custodian log	TRANSACTION (7 yr)	Asset availability pre-lock confirmation
Funding	CASH_FUNDING_CONFIRMED event	Cash-leg custodian log	TRANSACTION (7 yr)	Cash availability pre-lock confirmation
Compliance	COMPLIANCE_SCREENING event (SANCTIONS_CHECK, ELIGIBILITY_VERIFICATION,	Compliance attestation provider log	TRANSACTION (7 yr)	Compliance gate evidence; sanctions screening completeness

Stage	Event / Artifact	Log Location	Retention Class	Examiner Relevance
	CONCENTRATION_LIMIT_CHECK)			
Gate	Gate Completion Record (PASS or FAIL)	DvP Gate Completion Log	TRANSACTION (7 yr)	Primary DvP gate completeness evidence
Gate (failure)	Gate failure record with check ID and failure reason	DvP Gate Completion Log	TRANSACTION (7 yr)	Gate failure investigation; compliance queue documentation
Lock	ASSET_LEG_LOCKED event with lock_hash	Asset-leg custodian log	TRANSACTION (7 yr)	Asset escrow integrity evidence
Lock	CASH_LEG_LOCKED event with lock_hash	Cash-leg custodian log	TRANSACTION (7 yr)	Cash escrow integrity evidence
Lock symmetry	ESCROW_SYMMETRY_CONFIRMED event	Master settlement log	TRANSACTION (7 yr)	Pre-release symmetry verification
Lock failure	ESCROW_ASYMMETRY_DETECTED event	Master settlement log	TRANSACTION (7 yr) + Preservation Bundle	Partial lock investigation evidence
Lock failure	ESCROW_TIMEOUT_ESCALATED event	Master settlement log	TRANSACTION (7 yr) + Preservation Bundle	Timeout escalation evidence
Settlement	DVP_SETTLEMENT_EXECUTED event with settlement_hash	Master settlement log	TRANSACTION (7 yr)	Primary settlement execution evidence
Settlement (failure)	DVP_RELEASE_PARTIAL or SETTLEMENT_FAILED event	Master settlement log	TRANSACTION (7 yr) + Preservation Bundle	Critical failure evidence
Hold (post-lock)	SETTLEMENT_HOLD_ACTIVATED event	Master settlement log	HOLD_RELEASE (Indefinite)	Post-lock hold evidence; principal risk containment
Unwind	UNWIND_INITIATED event, UNWIND_COMPLETE event	Master settlement log	TRANSACTION (7 yr) + Preservation Bundle	Unwind authorization and execution evidence
Reconciliation	Reconciliation checkpoint record	Reconciliation checkpoint log	TRANSACTION (7 yr)	Post-settlement position verification
Reconciliation break	SETTLEMENT_BREAK_FLAGGED event, SETTLEMENT_BREAK_RESOLVED event	Master settlement log	TRANSACTION (7 yr) + Preservation Bundle	Break investigation and resolution evidence
Chain-of-	Cross-intermediary chain-	Settlement EP	TRANSACTION	Complete settlement-

Stage	Event / Artifact	Log Location	Retention Class	Examiner Relevance
custody	of-custody assembly record	/05_Transaction_Logs/	(7 yr)	chain audit trail
Integrity	Log_Integrity_Proofs.json (per Baseline C)	Settlement EP /05_Transaction_Logs/	TRANSACTION (7 yr)	Hash chain integrity verification

Minimum evidence set per settled instruction. For any instruction reaching DVP_SETTLEMENT_EXECUTED, the minimum evidence set that must be present in the EP to satisfy the Standard Checks Pack and Examiner Query Pack requirements is:

1. TX_SUBMITTED event
2. ASSET_ALLOCATION_CONFIRMED event
3. CASH_FUNDING_CONFIRMED event
4. COMPLIANCE_SCREENING events (SANCTIONS_CHECK, ELIGIBILITY_VERIFICATION, CONCENTRATION_LIMIT_CHECK — all PASS)
5. Gate Completion Record (all checks PASS)
6. ASSET_LEG_LOCKED event
7. CASH_LEG_LOCKED event
8. ESCROW_SYMMETRY_CONFIRMED event
9. DVP_SETTLEMENT_EXECUTED event
10. Finality marker (FINALITY_MARKER_ISSUED — see Section 6)
11. Reconciliation checkpoint reference

Absence of any element from this minimum set is a check failure in Standard Check SCP-007 (DvP Gate Completeness) and SCP-008 (Escrow Lock Symmetry). Any absent element for a settled instruction must be explained and documented in the EP with an explicit deviation record.

6. Programmable Settlement Finality (Operational Finality Conditions, Not Legal Conclusions)

6.1 Define "Operational Finality Conditions Met" (Checklist)

Framing statement. "Operational finality conditions met" is an evidence-backed operational state that signifies all defined control conditions for a settlement have been satisfied and documented. It is not a legal conclusion, not a waiver of fraud or error remedies, and not a representation regarding the legal enforceability of the underlying transaction under applicable law. Legal finality determinations remain governed by applicable law, contractual arrangements, and the principle of contractual primacy (Baseline B, Section V.8).

The operational finality conditions checklist is the control gate that the Settlement Operator evaluates before issuing a finality marker. Every condition must be satisfied and its satisfaction must be documented by a referenced evidence artifact. The checklist is evaluated once per instruction after DVP_SETTLEMENT_EXECUTED is logged.

Operational Finality Conditions Checklist

Condition ID	Condition Description	Verification Method	Evidence Reference Required
OFC-01	DVP_SETTLEMENT_EXECUTED event is logged for this instruction_id	Lookup in master settlement log	DVP_SETTLEMENT_EXECUTE D event ID
OFC-02	Settlement execution timestamp is within the settlement session window	Timestamp comparison against session open/close parameters	Session window record
OFC-03	Asset-leg transfer is confirmed by the asset-leg Qualified Custodian	Post-execution custodian position confirmation received	Asset custodian transfer confirmation record
OFC-04	Cash-leg transfer is confirmed by the cash-leg Qualified Custodian	Post-execution custodian balance confirmation received	Cash custodian transfer confirmation record
OFC-05	Reconciliation checkpoint passes: no open break for this instruction_id	Reconciliation checkpoint record shows no open break	Reconciliation checkpoint record ID
OFC-06	No active hold or compliance alert that would reverse settlement	Hold status check at finality evaluation time: no SETTLEMENT_HOLD_ACTIVATED without corresponding HOLD_RELEASED for this instruction	Hold status check record
OFC-07	Finality marker has not been previously issued for this instruction_id	Duplicate finality marker check: no prior FINALITY_MARKER_ISSUED event for this instruction_id	Duplicate finality check log
OFC-08	Phase mode label is accurate and consistent with operating posture	Finality marker phase_mode field matches current authorized operating phase	Phase authorization record
OFC-09	Settlement hash is verifiable and consistent with logged events	SHA-256 of DVP_SETTLEMENT_EXECUTED event content matches settlement_hash field	Hash verification record
OFC-10	Validator endorsement is present (where consensus mechanism is applicable)	Validator / Consensus Participant endorsement signature logged; or N/A attestation if consensus mechanism not used	Validator endorsement record or N/A attestation

Checklist evaluation record. The Settlement Operator logs a **Finality Conditions Evaluation Record** capturing each condition ID, its evaluation result (PASS / FAIL / NOT_APPLICABLE), and the evidence reference. This record is the direct input to the finality marker issuance event. If any condition returns FAIL, the finality marker is not issued and the instruction enters the finality exception queue (Section 6.4).

6.2 Finality States (Operational State Machine)

The following state machine defines the permitted finality states and transitions for a settlement instruction. No transition may occur except through a logged, evidence-backed event. State transitions that are not permitted are blocking — the system must prevent them and log the attempted invalid transition as an anomaly.

6.2.1 State Definitions

State	Label	Description
S0	PENDING_SUBMISSION	Instruction received; TX_SUBMITTED logged; gate evaluation not yet started
S1	GATE_IN_PROGRESS	Gate evaluation in progress; allocation and funding confirmations being collected
S2	GATE_FAILED	One or more gate checks returned FAIL; instruction in compliance queue; not in escrow
S3	ESCROW_PARTIAL	One leg locked; other leg not yet locked; ESCROW_ASYMMETRY_DETECTED logged
S4	ESCROW_ACTIVE	Both legs locked; ESCROW_SYMMETRY_CONFIRMED logged; release conditions being evaluated
S5	SETTLEMENT_HOLD	Post-lock hold activated; both legs locked; release blocked pending investigation
S6	SETTLEMENT_EXECUTED	DVP_SETTLEMENT_EXECUTED logged; awaiting finality conditions evaluation
S7	CONDITIONALLY_FINAL	DVP_SETTLEMENT_EXECUTED logged; custodian confirmations received; OFC-01 through OFC-04 passed; OFC-05 through OFC-10 evaluation in progress
S8	OPERATIONALLY_FINAL	All OFC conditions passed; FINALITY_MARKER_ISSUED logged; normal post-settlement state
S9	FINALITY_EXCEPTION	One or more OFC conditions failed; instruction in finality exception queue; under investigation
S10	REVERSED_UNWOUND	Settlement reversed or unwound per authorized correction procedure; TX_REVERSED or UNWIND_COMPLETE logged
S11	WITHDRAWN	Instruction withdrawn before gate PASS; no escrow initiated; TX_CANCELLED logged

6.2.2 Permitted State Transitions

S0 —[gate evaluation started]—> S1

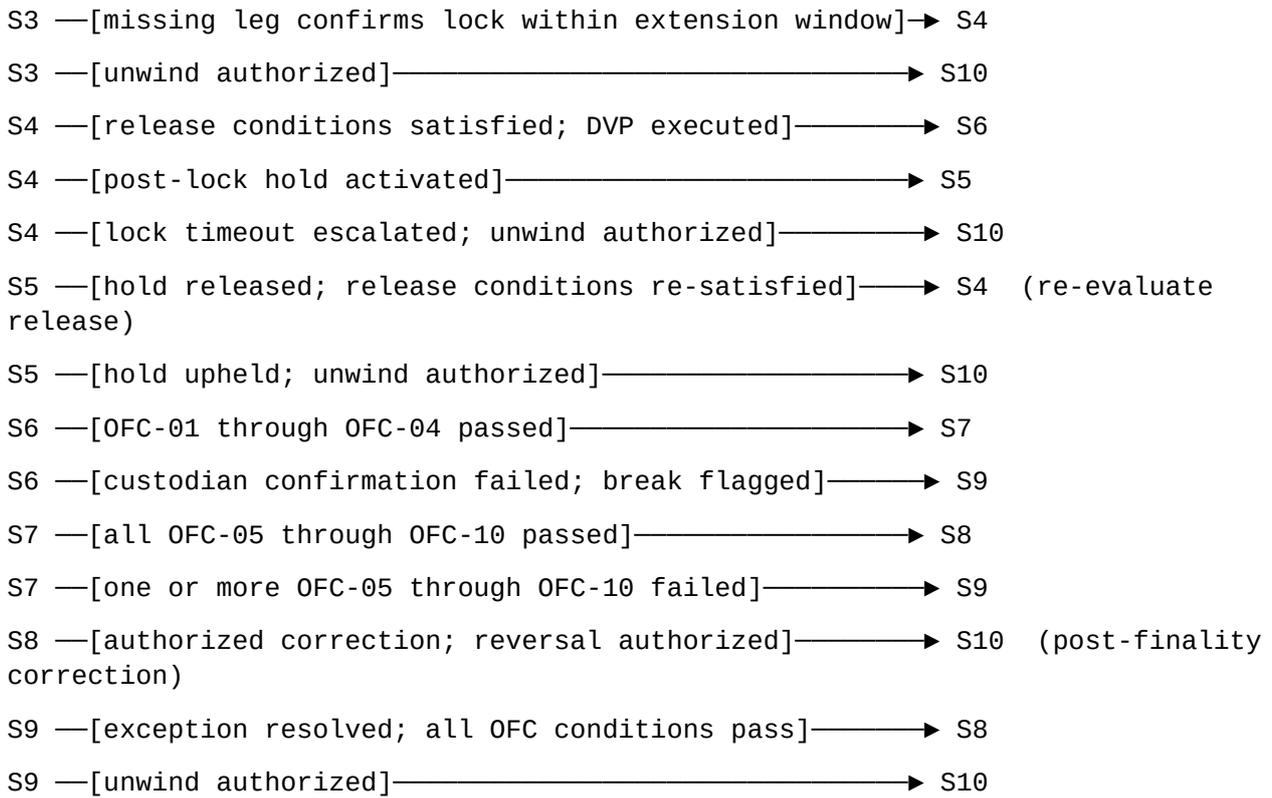
S1 —[all gate checks PASS]—> S4 (via lock initiation)

S1 —[one or more gate checks FAIL]—> S2

S1 —[partial lock occurs during gate processing]—> S3

S2 —[gate failure resolved; re-evaluation PASS]—> S4 (via lock initiation)

S2 —[instruction withdrawn]—> S11



Prohibited transitions (blocking). The following transitions are not permitted and must be prevented by the Settlement Operator system:

Prohibited Transition	Reason	Anomaly Log
S0/S1/S2/S3 → S8	Finality without completed escrow and settlement	INVALID_FINALITY_TRANSITION
S6 → S8 (without S7)	Finality without completing all OFC conditions	INVALID_FINALITY_TRANSITION
S8 → S4 (re-opening finalized escrow)	Cannot return to active escrow after finality	INVALID_STATE_REVERSION
Any state → S8 if FINALITY_MARKER_ISSUED already exists for instruction_id	Duplicate finality marker	DUPLICATE_FINALITY_MARKER
S10 → S8 (finality after unwind)	Cannot finalize a reversed/unwound settlement	INVALID_FINALITY_ON_UNWOUND

6.2.3 State Transition Log Requirements

Every state transition is logged as a distinct event in the master settlement log. The event type is drawn from the settlement event taxonomy (Section 4.4.1) supplemented by the following finality-specific event types:

Event Type	Triggered By	State Transition
FINALITY_CONDITIONS_EVALUATED	Settlement Operator; OFC checklist completion	S6 → S7 or S6 → S9
FINALITY_MARKER_ISSUED	Settlement Operator; all OFC conditions PASS	S7 → S8
FINALITY_EXCEPTION_OPENED	Settlement Operator; one or more OFC conditions FAIL	S7 → S9 or S6 → S9
FINALITY_EXCEPTION_RESOLVED	Settlement Operator; exception investigation complete	S9 → S8
FINALITY_MARKER_CORRECTED	Settlement Operator; authorized post-finality correction	S8 → S8 (corrected marker)
POST_FINALITY_REVERSAL_AUTHORIZED	Multi-party authorization + legal authority reference	S8 → S10
INVALID_FINALITY_TRANSITION	System detection of blocked transition attempt	Anomaly log; no state change
DUPLICATE_FINALITY_MARKER	System detection of duplicate marker attempt	Anomaly log; duplicate rejected

6.3 Finality Proofs and Artifacts

Finality proofs are the evidence artifacts that together demonstrate to an examiner that the operational finality conditions were satisfied for a given instruction. The finality proof set for each instruction is assembled by the Settlement Operator and stored in the settlement EP.

6.3.1 Finality Marker Event

The finality marker is the primary finality artifact. It is logged by the Settlement Operator upon completion of the OFC checklist (all conditions PASS) and carries the following fields:

finality_marker:

```

marker_id:                [unique finality marker ID; must be globally
unique]
instruction_id:            [settlement instruction ID; 1:1 relationship]
trade_id:                  [upstream trade identifier]
dvp_session_id:           [settlement session]
finality_state:           OPERATIONALLY_FINAL
phase_mode:                [SHADOW_MODE_NON_BINDING /
OPERATIONALLY_FINAL_LIMITED_LIVE
                            / OPERATIONALLY_FINAL]

```

ofc_checklist_ref: [Finality Conditions Evaluation Record ID]
 settlement_execution_ref: [DVP_SETTLEMENT_EXECUTED event ID]
 asset_custodian_confirmation: [Asset custodian post-execution confirmation record ID]
 cash_custodian_confirmation: [Cash custodian post-execution confirmation record ID]
 reconciliation_checkpoint_ref:[Reconciliation checkpoint record ID]
 validator_endorsement_ref: [Validator endorsement record ID; or N/A attestation ref]
 marker_timestamp: [ISO 8601 timestamp with millisecond precision]
 issuing_operator_id: [Settlement Operator ID]
 endorsement_signatures: [List of multi-party endorsement references, if applicable]
 marker_hash: [SHA-256 of finality marker content]
 previous_event_hash: [Hash of prior event in Settlement Operator log chain]

Uniqueness requirement. Each finality marker must have a globally unique `marker_id`. The Settlement Operator system must enforce a uniqueness constraint such that no two finality markers share the same `marker_id` or the same `instruction_id`. This uniqueness is validated by Standard Check SCP-014 (Finality Marker Integrity and Uniqueness).

Shadow mode labeling. In Shadow Mode (Phase 1), finality markers are issued with `phase_mode: SHADOW_MODE_NON_BINDING` to clearly distinguish them from operational finality markers. This label prevents any reliance on shadow-mode markers as evidence of settlement finality and ensures that examiners reviewing EP contents can immediately identify the operating phase at the time of issuance.

6.3.2 Quorum/Endorsement Evidence (Where Applicable)

Where the settlement architecture uses a Validator / Consensus Participant role (Baseline B Section II.1; Baseline A Section 3.3 Layer 3: Regulated Validator and Custody Mesh), finality markers carry endorsement signatures from the qualifying validators. The endorsement evidence includes:

Evidence Element	Description	Required Fields
Validator endorsement record	Log entry by each endorsing Validator confirming that the transaction was validated through the consensus mechanism	<code>validator_id</code> ; <code>instruction_id</code> ; <code>endorsement_timestamp</code> ; <code>endorsement_signature</code> ; <code>consensus_round_reference</code>
Quorum confirmation record	Settlement Operator confirmation that the endorsement threshold was met	<code>instruction_id</code> ; <code>required_endorsements</code> ; <code>received_endorsements</code> ; <code>threshold_met</code> : boolean; <code>quorum_confirmation_timestamp</code>
Consensus mechanism	Reference to the applicable conformance profile section	<code>conformance_profile_version</code> ; <code>consensus_mechanism_type</code>

Evidence Element	Description	Required Fields
reference	describing the consensus mechanism in use	

Where consensus mechanism is not used (e.g., bilateral settlement between two counterparties through a custodian pair), the finality marker carries an N/A attestation signed by the Settlement Operator confirming that no consensus mechanism applies and identifying the bilateral authorization structure used in its place.

6.3.3 Reconciliation Checkpoint References

Each finality marker references a reconciliation checkpoint record that confirms post-settlement position alignment between the settlement logs and the actual custodian position records. The reconciliation checkpoint is produced by the Settlement Operator through a structured comparison of:

- DVP_SETTLEMENT_EXECUTED event (what was logged as settled)
- Asset-leg Qualified Custodian position record (what the custodian holds post-settlement)
- Cash-leg Qualified Custodian balance record (what the custodian reflects post-settlement)

reconciliation_checkpoint:

```

checkpoint_id:           [unique checkpoint ID]
instruction_id:          [settlement instruction ID]
settlement_execution_ref: [DVP_SETTLEMENT_EXECUTED event ID]
asset_position_verified: boolean (post-settlement custodian position =
expected)
cash_balance_verified:  boolean (post-settlement custodian balance =
expected)
asset_delta:            [quantity difference if any; 0.00 if verified]
cash_delta:            [amount difference if any; 0.00 if verified]
open_break:            boolean (true if any delta ≠ 0)
break_severity:        [NONE / MINOR / MAJOR / CRITICAL; null if no
break]
checkpoint_timestamp:   [timestamp of reconciliation execution]
reconciler_id:         [Settlement Operator or reconciliation system ID]
checkpoint_hash:       [SHA-256 of checkpoint content]

```

A reconciliation checkpoint with `open_break: true` blocks the finality conditions evaluation at OFC-05 (no open break). The instruction enters S9 `FINALITY_EXCEPTION` and the break is added to the Open Breaks Register.

6.3.4 Complete Finality Proof Set per Instruction

The complete finality proof set assembled for each operationally finalized instruction consists of the following linked artifacts:

Finality Proof Set – Instruction [instruction_id]:

1. FINALITY_MARKER_ISSUED event ← marker_id (anchor)
 - └ references: OFC Checklist Record
 - └ OFC-01: DVP_SETTLEMENT_EXECUTED event
 - | └ references: ESCROW_SYMMETRY_CONFIRMED event
 - | | └ references: ASSET_LEG_LOCKED event
 - | | | └ references: CASH_LEG_LOCKED event
 - | └ references: Gate Completion Record (all PASS)
 - | | └ references: ASSET_ALLOCATION_CONFIRMED
 - | | └ references: CASH_FUNDING_CONFIRMED
 - | | └ references: COMPLIANCE_SCREENING events
 - | | └ references: Release Authorization Record (if applicable)
 - └ OFC-03: Asset Custodian Transfer Confirmation
 - └ OFC-04: Cash Custodian Transfer Confirmation
 - └ OFC-05: Reconciliation Checkpoint Record (open_break: false)
 - └ OFC-06: Hold Status Check Record (no active holds)
 - └ OFC-07: Duplicate Finality Check (no prior marker for instruction_id)
 - └ OFC-08: Phase Authorization Record
 - └ OFC-09: Hash Verification Record
 - └ OFC-10: Validator Endorsement Record (or N/A attestation)

This linked proof set is stored as a JSON document in the settlement EP (/05_Transaction_Logs/Finality_Marker_Log_[Period].jsonl) and is the primary artifact reviewed by Standard Check SCP-014 and Examiner Query EQP-003.

6.4 Finality Under Exceptions (Fraud, Error, System Malfunction — Redress Posture)

Principle. Operational finality is not absolute immunity from correction. Where fraud, material error, or system malfunction is documented and where the correction is authorized through the proper governance chain, post-finality correction is permitted. Correction does not delete or overwrite the original finality marker; it creates a correction event linked to the original marker by `instruction_id` and `marker_id`.

This section applies the redress and error correction posture established in Baseline B (Section V.8) to the post-finality settlement context.

6.4.1 Exception Categories and Response Postures

Exception Category	Definition	Initial Response	Correction Path
Fraud or unauthorized instruction	Settlement was executed based on a forged, unauthorized, or coerced instruction	Log SECURITY_INCIDENT; place SETTLEMENT_HOLD on delivered assets immediately; initiate incident response per Baseline B Section V.4	Multi-party authorization + legal authority reference required; contractual and legal framework governs ultimate rights
Material instruction error	Settlement executed on incorrect terms (wrong quantity, wrong counterparty, wrong instrument) due to input error	Log SETTLEMENT_BREAK_FLAGGED; initiate error investigation; notify counterparties	Pre-authorized correction protocol for operational errors; multi-party authorization; correction transaction or reversal per Section 5.4.5
Oracle data error	Settlement executed based on erroneous reference data (price, rate, conversion factor)	Log COMPLIANCE_ALERT with type ORACLE_DATA_ERROR; hold on affected instruments	Correction based on corrected oracle data; counterparty agreement or legal framework governs adjustment
System malfunction	Settlement executed in an unintended state due to smart contract error, custodian system failure, or Settlement Operator technical fault	Log INCIDENT_DETECTED; escalate to Change Control Board per Baseline B Section VII.3	Formal verification review; change control; correction transaction with full authorization chain
Regulatory intervention post-finality	Supervisory authority orders reversal or hold post-settlement	Log REGULATORY_NOTIFICATION; execute hold per hold/release playbook	Hold maintained until supervisory resolution; unwind or correction per regulatory instruction

6.4.2 Post-Finality Correction Authorization Chain

Post-finality corrections require the following authorization chain, documented in the EP as a correction authorization record:

Step	Requirement	Evidence
1	Documented exception category (from Section 6.4.1)	Exception classification record
2	Root cause determination	Root cause analysis document
3	Legal authority reference (contractual basis or regulatory instruction)	Legal authority citation
4	Impact assessment (counterparties affected, amounts involved, systemic implications)	Impact assessment document
5	Dual authorization (minimum two senior roles: Settlement Operator + Compliance Officer or Legal Counsel)	Dual authorization record with timestamps and digital signatures
6	Supervisory notification (for corrections above)	Supervisory notification log

Step	Requirement	Evidence
	materiality threshold)	
7	Correction execution record	TX_REVERSED or compensating TX_SUBMITTED event
8	Post-correction reconciliation confirmation	Reconciliation checkpoint record (post-correction)
9	Updated EP with full correction documentation	EP Delta submission

FINALITY_MARKER_CORRECTED event. Upon completion of an authorized post-finality correction, the Settlement Operator logs a FINALITY_MARKER_CORRECTED event with the following structure:

finality_marker_corrected:

```

correction_id:           [unique correction record ID]
original_marker_id:     [marker_id of the original FINALITY_MARKER_ISSUED]
instruction_id:         [settlement instruction ID]
correction_type:       [REVERSAL / PARTIAL_CORRECTION /
HOLD_POST_FINALITY]
exception_category:    [from Section 6.4.1 classification]
correction_authorization_ref: [dual authorization record ID]
legal_authority_ref:   [legal authority citation or regulatory
instruction reference]
corrected_finality_state: [REVERSED_UNWOUND / CORRECTED_FINAL / HOLD_ACTIVE]
correction_timestamp:  [ISO 8601 timestamp]
issuing_operator_id:   [Settlement Operator ID]
correction_hash:       [SHA-256 of correction event content]
previous_event_hash:   [hash of prior event in log chain]

```

The original FINALITY_MARKER_ISSUED event is not modified. The FINALITY_MARKER_CORRECTED event is linked to it by original_marker_id. Both events are preserved in the EP with indefinite retention classification.

6.4.3 Finality Exception Queue Management

Instructions in S9 FINALITY_EXCEPTION are tracked in the Finality Exception Queue, an operational register maintained by the Settlement Operator. The register contains:

Field	Description
instruction_id	Settlement instruction in exception state
exception_opened_timestamp	When exception state was entered
exception_category	Exception type (from Section 6.4.1)
failed_ofc_conditions	List of OFC condition IDs that returned FAIL
investigation_status	OPEN / IN_PROGRESS / RESOLVED
assigned_to	Role responsible for resolution

Field	Description
target_resolution_timestamp	Defined resolution deadline
escalation_flag	Whether exception has been escalated to senior management or supervisors
resolution_outcome	OPERATIONALLY_FINAL / REVERSED_UNWOUND (populated on resolution)

Age thresholds and escalation. Finality exceptions have defined age thresholds that trigger escalation:

- **24 hours:** Exception not resolved → escalate to Senior Compliance Officer; log in EP Delta
- **72 hours:** Exception not resolved → escalate to supervisory authority notification; preservation bundle created
- **7 days:** Exception not resolved → mandatory senior management review; Pilot Steering Committee notification

The Open Breaks Register (Section 10.2) and the Finality Exception Queue are reconciled at the end of each settlement session. Any instruction that appears in one but not the other is an integrity anomaly requiring immediate investigation.

6.5 Material Change Triggers for Finality Logic (Governance and Recertification)

Changes to the finality logic — including changes to the OFC checklist, state machine transitions, finality marker schema, validator endorsement requirements, or reconciliation checkpoint methodology — are subject to material change governance per Baseline B (Sections V.7, VII.3) and the Change Control Board procedures established in Baseline B (Section VIII.3).

The following events constitute material changes to finality logic requiring Change Control Board review and, for significant changes, Pilot Steering Committee approval and supervisory notification:

Change Category	Change Description	Governance Requirement
OFC condition modification	Adding, removing, or modifying any condition in the OFC checklist (Section 6.1)	Change Control Board approval; conformance recertification for all settlement participants; EP Delta with updated checklist
State machine transition change	Adding, removing, or modifying any permitted or prohibited state transition in the state machine (Section 6.2.2)	Change Control Board approval; formal verification review of state machine correctness; conformance recertification
Finality marker schema change	Modifying required fields, data types, or integrity mechanisms of the finality marker event	Change Control Board approval; backward compatibility assessment; participant notification with migration timeline
Validator endorsement threshold change	Changing the quorum threshold for validator endorsements on finality markers	Pilot Steering Committee approval; supervisory notification; conformance recertification for

Change Category	Change Description	Governance Requirement
		Validator participants
Reconciliation checkpoint methodology change	Changing the comparison logic, tolerance parameters, or break severity classification	Change Control Board approval; reconciliation re-baseline; EP Delta
Phase mode label change	Changing the label applied to finality markers (e.g., advancing from LIMITED_LIVE to EXPANSION)	Pilot Steering Committee approval; phase transition evidence package required (Section 4.1)
Exception category or correction protocol change	Adding new exception categories or modifying authorization requirements for post-finality corrections	Change Control Board approval; legal review; supervisory notification if authorization requirements are reduced
Finality exception queue age threshold change	Modifying escalation thresholds for finality exception queue age	Change Control Board approval; supervisory notification if thresholds are extended

Recertification obligation. Any material change to finality logic triggers recertification for all settlement participants and the Settlement Operator, consistent with the recertification cadence and procedures established in Baseline B (Section VII.3). Recertification confirms that the updated finality logic has been implemented correctly, that evidence production is consistent with the new logic, and that participants understand the updated procedures.

No-master-key constraint on finality logic. Consistent with Section 1.4, no single actor may unilaterally change finality logic, modify the OFC checklist, alter state machine transitions, or correct a finality marker. All such actions require the quorum-based authorization structure described in this section and the RACI governance established in Section 9.2.

Evidence of change. All material changes to finality logic produce the following EP artifacts:

- Change request record (Baseline B Section V.7 change management playbook)
- Impact assessment
- Approval record (Change Control Board minutes or Pilot Steering Committee resolution)
- Updated conformance certification for affected participants
- EP Delta covering the period of the change

7. Liquidity, Funding, and Intraday Risk Controls (Operational)

7.1 Funding Sources Taxonomy

Stable-value settlement rails depend on the reliable availability of cash-leg funding at the moment of DvP execution. This section establishes a neutral taxonomy of funding sources applicable across Category P1 through P3 instruments (see Section 3). Categorization is implementation-agnostic; operators select funding arrangements consistent with their institutional role, applicable regulatory requirements, and the conformance baseline.

Table 7.1-A — Funding Source Taxonomy

Source ID	Funding Type	Description	Eligible Categories	Key Controls
FS-01	Institutional Prefunding	Participant deposits cash-leg balance into a designated settlement account or omnibus rail prior to transaction submission. Funds are earmarked and segregated.	P1, P2, P3	Segregation confirmation; prefunding attestation log; daily balance reconciliation
FS-02	Intraday Credit Line	A permissioned credit facility extended by a settlement operator or sponsoring institution, collateralized and time-bounded. Draws must be closed by end-of-day or defined settlement window.	P1, P3	Collateral sufficiency check; drawdown log; end-of-day settlement confirmation; automatic expiry gate
FS-03	Repo / Collateral Recycling	Short-term secured borrowing using eligible instrument positions as collateral, generating intraday cash-leg availability.	P2, P3	Haircut schedule; collateral eligibility register; settlement-leg linkage log
FS-04	Wholesale Settlement Credit (Omnibus)	Pre-authorized credit balance held within a wholesale settlement rail (Category P3), cleared against participant accounts at defined intervals.	P3	Omnibus balance attestation; netting confirmation; end-of-cycle settlement evidence
FS-05	Intraday Liquidity Facility (ILF)	An operational buffer maintained by the settlement operator or gateway operator to bridge timing mismatches between funding receipt and DvP execution. Not a lending facility; expires at cycle close.	P1, P2, P3	ILF utilization log; timestamp of draw and return; operator authorization record

Operator Obligations — Funding Documentation:

- For each active funding source, operators must maintain a current **Funding Source Register** updated no less than daily, identifying source type, counterparty, authorized limit, collateral posted (if applicable), and current utilization.
- The Funding Source Register is a mandatory input to the Evidence Pack (EP) for liquidity controls (see Section 8.2).
- Any funding source modification (limit change, collateral substitution, termination) constitutes a material change event subject to governance notification and EP Delta generation (see Section 8.3).

7.2 Liquidity Gates and Redemption Queues

Liquidity gates and redemption queues are operational mechanisms that limit or sequence cash-leg outflows during periods of funding stress, elevated redemption demand, or abnormal settlement velocity. These mechanisms are adapted from the stable-value stress-mode concepts established in Baseline D and the hold/release runbook discipline of Baseline B.

7.2.1 Gate Types

Table 7.2-A — Liquidity Gate Taxonomy

Gate ID	Gate Type	Trigger Basis	Operational Effect	Authorization Required
LG-01	Soft Concentration Gate	Single-participant redemption or settlement request exceeds defined percentage of available pool (e.g., 10–25% threshold, operator-configured).	Submission queued; counterparty notified; processing resumes at next settlement cycle or upon authorization.	Compliance Officer acknowledgment; logged event
LG-02	Hard Settlement Gate	Aggregate outflow requests in a defined window exceed pool capacity or intraday credit limit.	All new DvP submissions suspended; queue formed; processing resumes in FIFO order as funding is replenished or credit restored.	Senior Operations + Compliance dual approval; supervisory notification if gate active > defined threshold (e.g., 2 hours)
LG-03	Redemption Queue Gate	Elevated redemption requests on Category P2 instruments exceed defined daily redemption cap.	Redemptions accepted into queue; processed in order as available funding permits; participants notified of queue position and estimated processing time.	Compliance Officer; participant notification log required
LG-04	Yield Separation Gate	Activity on Category P4 yield program creates funding demand that would impair Category P1/P2 settlement capacity.	Yield program disbursements suspended or deferred; settlement funding ring-fenced for DvP operations.	Settlement Operator; documented yield-separation rationale log
LG-05	Emergency Settlement Suspension	Systemic integrity risk, oracle failure, or smart-contract malfunction detected.	All DvP submissions suspended; existing locks held; incident response triggered per Section 5.4.	Incident Response Authority; immediate supervisory notification

7.2.2 Queue Architecture and Processing Discipline

When a gate is activated, pending submissions enter a **Settlement Queue** governed by the following operational rules:

1. **FIFO Default:** Submissions are processed in order of receipt timestamp, absent an operator-approved priority override supported by documented justification.
2. **Priority Override:** Time-sensitive institutional obligations (e.g., corporate action settlements, regulatory margin calls) may receive queue priority upon written authorization from the Settlement Operator and Compliance Officer, with full audit log.

3. **Queue Transparency:** Participants with submissions in queue receive real-time or near-real-time status notifications including queue position, estimated processing time, and gate activation reason (at appropriate level of detail consistent with TTL/purpose limitation discipline).
4. **Queue Expiry:** Submissions held in queue beyond a defined TTL (e.g., end-of-settlement-day, or operator-configured window) are returned to submitting participants with a logged rejection event, releasing all associated locks (see Section 5.3).
5. **Queue Evidence:** The full queue state — entries, timestamps, processing decisions, overrides, and expirations — is logged immutably and packaged as a queue manifest, which is a required component of the liquidity evidence bundle (see Section 7.5).

7.2.3 Gate Activation and Deactivation Discipline

Gate activation and deactivation events are high-signal operational moments requiring rigorous documentation:

- **Activation record** must capture: gate type, trigger metric and threshold value at activation, authorizing personnel (per RACI Table 9.2-C), timestamp, and initial affected-submission count.
- **Status update records** must be generated at defined intervals (e.g., every 30 minutes) while a gate is active, logging current queue depth, funding availability, and any escalation actions taken.
- **Deactivation record** must capture: deactivation trigger (funding restored, credit facility cleared, incident resolved), authorizing personnel, timestamp, queue depth at deactivation, and processing plan for queued submissions.
- All gate lifecycle records are preserved in immutable logs and included in the **Liquidity Gate Activation Log**, a named artifact within the EP structure (see Section 8.2).

7.3 Concentration Monitoring and Large-Holder Dynamics (Operational)

Concentration risk arises when a small number of participants hold disproportionate positions in a stable-value instrument or account for a disproportionate share of settlement flow. Under stress conditions, large-holder redemption or settlement activity can rapidly exhaust funding buffers and trigger gate activation. The following controls operationalize concentration monitoring as a continuous, evidence-producing process.

7.3.1 Concentration Metrics

Table 7.3-A — Operational Concentration Metrics

Metric ID	Metric Name	Calculation Basis	Monitoring Frequency	Threshold Type
CM-01	Top-N Holder Concentration	Combined holding of top 3, top 5, and top 10 participants as % of total outstanding supply per instrument.	Daily close; real-time flag on delta > defined % intraday	Operator-configured soft/hard thresholds
CM-02	Single-Participant	Settlement flow	Continuous	Soft alert at configurable %;

Metric ID	Metric Name	Calculation Basis	Monitoring Frequency	Threshold Type
	Settlement Share	attributable to single participant as % of total settlement activity in a given window (e.g., 1-hour, 1-day).	intraday	hard gate at configurable %
CM-03	Redemption Velocity Indicator	Rate of redemption requests per unit time, normalized against historical baseline.	Continuous; 15-minute rolling window	Deviation from baseline triggers escalation
CM-04	Funding Buffer Coverage Ratio	Available funding (prefunded + available credit) divided by aggregate pending DvP obligations.	Continuous; recalculated at each submission	Hard floor threshold (e.g., 110% coverage minimum)
CM-05	Yield Program Funding Demand	Cash demand attributable to Category P4 yield disbursements as % of total funding pool.	Daily; real-time flag during disbursement cycles	Soft alert; hard gate (LG-04) trigger

7.3.2 Large-Holder Early Warning Process

When CM-01 or CM-02 metrics breach soft thresholds, the following early warning sequence is activated:

1. **Internal Alert:** Settlement Operator and Compliance Officer receive automated notification with metric value, threshold, and affected participant identifier (internal use only; not disclosed to the market).
2. **Pre-emptive Liquidity Assessment:** Operations team assesses whether available funding buffers are sufficient to absorb a stress-scenario outflow from top-concentration participants (defined as simultaneous redemption or settlement requests equal to a configured % of top-N holdings).
3. **Contingency Preparation:** If assessment identifies a funding gap, contingency funding sources (FS-02, FS-03) are pre-positioned and the Incident Response Playbook is placed on standby.
4. **Evidence Production:** Concentration monitoring log entry is generated with metric values, threshold comparison, assessment outcome, and any pre-positioning actions taken. This entry feeds the daily EP Delta.

7.4 Stress Triggers and Escalation Ladder

The following escalation ladder maps operating posture to trigger conditions, operational constraints, and evidence requirements. This structure is aligned with the phased operational model (Shadow → Limited Live → Expansion) from Baseline B and the incident severity classification framework from Baseline C.

Table 7.4-A — Stress Trigger and Escalation Ladder

Level	Posture Label	Trigger Conditions	Operational Constraints	Evidence Requirements	Supervisory Notification
L0	Normal Operations	All metrics within configured thresholds; funding buffer \geq floor; no active gates.	Full DvP processing; no queue; standard EP Delta cadence.	Daily reconciliation log; standard EP Delta.	Routine quarterly reporting.
L1	Heightened Monitoring	One or more concentration metrics (CM-01 through CM-03) at soft threshold; or funding buffer between floor and secondary alert level.	Increased monitoring frequency (e.g., 15-minute metric refresh); contingency funding pre-positioned; Compliance Officer on active watch.	Hourly concentration log; contingency positioning record; updated EP Delta at end of day.	No immediate notification required; reflected in next periodic report.
L2	Limited Operations	LG-01 or LG-03 gate activated; or funding buffer at or below floor; or single concentration metric at hard threshold.	New submissions queued (LG-01 or LG-03 active); priority override protocol available with authorization; contingency funding drawdown authorized.	Gate activation log; queue manifest updated continuously; EP Delta generated at gate activation and deactivation.	Supervisory notification within defined SLA (e.g., 4 hours of gate activation).
L3	Stress Mode	LG-02 hard settlement gate activated; or multiple concurrent metric breaches; or funding buffer insufficient to cover queue.	All new DvP submissions suspended; existing locks maintained; queue frozen pending funding resolution; Incident Response on active engagement.	Full preservation bundle triggered (see Section 7.5); EP frozen at gate activation timestamp; queue state snapshot.	Immediate supervisory notification (e.g., within 2 hours); escalation to senior operations and legal.
L4	Offboarding / Unwind	LG-05 emergency suspension; or governance decision to cease operations; or participant default with systemic implication.	All processing halted; offboarding proof bundle initiated (see Section 10.2); unwind playbook activated.	Full offboarding proof bundle; chain-of-custody transfer record; final reconciliation snapshot.	Immediate supervisory notification; coordination per incident response governance.

Escalation Authority (Summary): Full RACI detail is provided in Section 9.2. At each level transition, a documented authorization record is required, capturing the authorizing personnel, trigger metric values, timestamp, and planned remediation or monitoring action.

7.5 Evidence Artifacts for Liquidity Controls

All liquidity control activities must produce evidence artifacts that are immutably logged, packaged into the EP structure, and available for examiner review on demand. The following table catalogs the mandatory evidence artifacts for this section.

Table 7.5-A — Liquidity Evidence Artifact Catalog

Artifact ID	Artifact Name	Content	Generation Trigger	Retention Tag	EP Component
LEA-01	Funding Source Register	Current active sources (FS-01 through FS-05), limits, utilization, collateral, counterparty.	Daily update; material change event.	7 years	EP-Core / Liquidity
LEA-02	Intraday Funding Utilization Log	Time-series log of funding drawdowns and repayments per source, per settlement cycle.	Continuous; end-of-day snapshot.	7 years	EP-Core / Liquidity
LEA-03	Concentration Monitoring Log	Metric values (CM-01 through CM-05) at each monitoring interval; threshold comparisons; alert events.	Per monitoring cycle; alert events on threshold breach.	7 years	EP-Core / Liquidity
LEA-04	Liquidity Gate Activation Log	Gate type, trigger metric value, authorization record, status updates, deactivation record.	On gate activation; periodic updates; on deactivation.	7 years	EP-Core / Liquidity
LEA-05	Queue Manifest	Full queue state: submissions, timestamps, positions, processing decisions, overrides, expirations, returns.	On queue formation; continuous update while queue active; final snapshot on queue closure.	7 years	EP-Core / Liquidity
LEA-06	Liquidity Preservation Bundle	Frozen snapshot of LEA-01 through LEA-05 plus DvP lock states and finality statuses at time of L3/L4 trigger.	On L3 or L4 escalation.	Indefinite (or until regulatory retention obligation expires)	Preservation Bundle
LEA-07	Stress Assessment Record	Pre-emptive assessment output: scenario tested, funding gap	On L1 trigger; on large-holder early warning activation.	7 years	EP-Delta

Artifact ID	Artifact Name	Content	Generation Trigger	Retention Tag	EP Component
		identified, contingency actions taken.			

Immutability and Chain-of-Custody Requirements:

Artifacts LEA-01 through LEA-07 must be stored in tamper-evident, append-only log infrastructure consistent with the Logging and Retention Baseline (Baseline B, Appendix B.3). Hash-chaining linking sequential events and periodic attestation of log integrity are required. Access to these artifacts must follow purpose-limitation and TTL discipline: examiner access is scoped to the investigation period and logged with a post-access review record.

8. Disclosure & Evidence Artifacts for Payments/Settlement (Baseline-Aligned)

8.1 Standardized Disclosure Schema for Cash-Leg Categories

Disclosures for stable-value payment and settlement instruments must be standardized, version-controlled, and linked to the Evidence Pack structure so that examiners can confirm the disclosure version in effect at any given point in time. The following schemas apply per instrument category defined in Section 3.

Design principles:

- Disclosure schema fields are non-prescriptive as to specific form or medium; they define required informational content.
- Each disclosure document carries a **disclosure version identifier** and a **validity period** (TTL). Expiry triggers recertification of the disclosure and generation of an EP Delta.
- Disclosure version mismatches between the operator record and the participant-acknowledged version constitute a control failure and must be flagged in standard checks (see Section 11.2, Check DC-01 through DC-04).

8.1.1 Category P1 — Payment/Settlement Stable-Value Instrument

Table 8.1-A — P1 Disclosure Schema

Field ID	Field Name	Required Content	Mandatory / Conditional
P1-D01	Instrument Description	Nature of the instrument; that it functions solely as a payment and settlement medium; no yield or return is offered or implied.	Mandatory
P1-D02	Redemption Terms	Conditions and process for redemption; any applicable redemption windows, minimum amounts, or notice requirements.	Mandatory
P1-D03	Settlement Finality Statement	Statement that settlement is operational finality (conditions-based); not a legal finality claim;	Mandatory

Field ID	Field Name	Required Content	Mandatory / Conditional
		operator's evidence-based finality conditions.	
P1-D04	Yield Separation Statement	Explicit statement that this instrument carries no yield feature; yield is structurally separated and offered, if at all, only through a distinct Category P4 program.	Mandatory
P1-D05	Restriction and Hold Notice	Disclosure that holds may be placed on positions consistent with regulatory requirements, court orders, or compliance investigations, per baseline hold/release discipline.	Mandatory
P1-D06	Funding and Liquidity Risk Statement	Disclosure of liquidity gate and queue mechanisms; that redemptions may be queued during stress conditions; description of L1–L4 posture in plain operational terms.	Mandatory
P1-D07	Operator Obligations Summary	High-level description of operator's disclosure, evidence, and monitoring obligations under this constitution.	Mandatory
P1-D08	Disclosure Version and TTL	Version identifier; effective date; expiry date or recertification trigger.	Mandatory
P1-D09	Examiner Access Statement	Statement that supervisory access to transaction data follows purpose-limitation and TTL discipline; tiered access model applies.	Mandatory

8.1.2 Category P2 — Tokenized Deposit (Institutional, Redeemable)

Table 8.1-B — P2 Disclosure Schema

Field ID	Field Name	Required Content	Mandatory / Conditional
P2-D01	Instrument Description	Nature as a tokenized representation of an institutional deposit; redeemable on defined terms; no yield by default.	Mandatory
P2-D02	Redemption Terms	Redemption process; applicable windows; notice requirements; applicable minimum redemption size.	Mandatory
P2-D03	Settlement Finality Statement	Same as P1-D03.	Mandatory
P2-D04	Yield Separation Statement	Same as P1-D04; explicit statement that any yield feature is offered solely through a structurally separate Category P4 program.	Mandatory
P2-D05	Deposit Institution Disclosure	Identity (by role description, not proprietary name) of the depository institution; applicable deposit protection arrangements, if any.	Mandatory
P2-D06	Restriction and Hold Notice	Same as P1-D05.	Mandatory
P2-D07	Funding and Liquidity Risk Statement	Same as P1-D06; adapted to redemption queue mechanics applicable to P2 instruments.	Mandatory
P2-D08	Revocation and	Disclosure that participant credentials governing	Mandatory

Field ID	Field Name	Required Content	Mandatory / Conditional
	Credential Controls	access to tokenized deposit positions are subject to revocation checking at transaction time; revoked credentials prevent transaction execution.	
P2-D09	Disclosure Version and TTL	Same as P1-D08.	Mandatory
P2-D10	Examiner Access Statement	Same as P1-D09.	Mandatory

8.1.3 Category P3 — Wholesale Settlement Credit (Permissioned Rail)

Table 8.1-C — P3 Disclosure Schema

Field ID	Field Name	Required Content	Mandatory / Conditional
P3-D01	Rail Description	Nature of the permissioned wholesale settlement balance; eligible participants; omnibus or bilateral structure.	Mandatory
P3-D02	Settlement Terms	Netting cycle, end-of-cycle settlement, participant obligations, and collateral requirements.	Mandatory
P3-D03	Credit Terms	Terms of any intraday credit facility (FS-02); collateral requirements; end-of-day closure obligation.	Conditional (if FS-02 used)
P3-D04	Settlement Finality Statement	Same as P1-D03.	Mandatory
P3-D05	Yield Separation Statement	Same as P1-D04.	Mandatory
P3-D06	Restriction and Hold Notice	Same as P1-D05.	Mandatory
P3-D07	Participant Default Provisions	Description of default isolation, loss mutualization (if any), and participant suspension procedures.	Mandatory
P3-D08	Funding and Liquidity Risk Statement	Same as P1-D06; adapted to wholesale rail mechanics.	Mandatory
P3-D09	Disclosure Version and TTL	Same as P1-D08.	Mandatory
P3-D10	Examiner Access Statement	Same as P1-D09.	Mandatory

8.1.4 Category P4 — Yield Feature / Yield Program

Table 8.1-D — P4 Disclosure Schema (Boundary-Critical)

Field ID	Field Name	Required Content	Mandatory / Conditional
P4-D01	Program Description	Nature of the yield program; that it is structurally and operationally separate from the	Mandatory

Field ID	Field Name	Required Content	Mandatory / Conditional
		payment rail; no commingling with P1, P2, or P3 settlement functionality.	
P4-D02	Yield Calculation and Payment Terms	Basis of yield calculation; payment schedule; applicable conditions or discretion.	Mandatory
P4-D03	Structural Separation Statement	Explicit statement of operational and financial separation from payment rail; cross-reference to boundary test result (Section 3.5).	Mandatory
P4-D04	Payment Rail Non-Dependency Statement	Statement that access to, and functioning of, the Category P1/P2/P3 settlement rail is not contingent on participation in or performance of the yield program.	Mandatory
P4-D05	Restriction and Suspension Notice	Disclosure that yield disbursements may be suspended (LG-04 gate) to protect settlement rail funding capacity.	Mandatory
P4-D06	Funding Demand Disclosure	Disclosure of yield program's demand on the shared funding pool; concentration of yield obligations as a liquidity risk factor.	Mandatory
P4-D07	Disclosure Version and TTL	Same as P1-D08.	Mandatory
P4-D08	Examiner Access Statement	Same as P1-D09.	Mandatory

8.1.5 Boundary Test Result — Disclosure Linkage

Where a boundary test (Section 3.5) has been performed to classify an instrument or feature into the P1–P4 taxonomy, the **Boundary Test Record** (a named artifact, see LEA mapping in Section 8.2) must be cross-referenced in the applicable disclosure document. The record documents: classification rationale, applied boundary criteria, determiner identity and date, and scheduled recertification date. Any reclassification constitutes a material change event.

8.2 Evidence Pack (EP) Mapping

The Evidence Pack is the primary examiner-facing artifact produced by this constitution. Each control domain maps to required EP artifacts. The table below provides the complete EP mapping for payments and settlement controls, following the Evidence Pack discipline established in Baselines B and C.

EP Architecture:

- **EP-Core:** Baseline artifacts produced continuously and updated per cadence. Available to examiners on demand.
- **EP-Delta:** Incremental artifact capturing changes since the last EP-Core snapshot. Generated per cadence band (Section 8.3).
- **Preservation Bundle:** Frozen, point-in-time artifact set generated on incident, dispute, L3/L4 escalation, or examiner request. Immutable after generation.

Table 8.2-A — EP Mapping: DvP Controls

Control Domain	Required EP Artifact	Artifact ID	EP Component	Retention Tag
DvP Preconditions Gate	Gate completion log per trade_id; pass/fail result per gate check; authorization records for override decisions.	DvP-EP-01	EP-Core	7 years
Escrow Lock (Asset-Leg)	Asset-leg lock record: asset identifier, lock timestamp, lock state, releasing condition, release or timeout event.	DvP-EP-02	EP-Core	7 years
Escrow Lock (Cash-Leg)	Cash-leg lock record: funding source, amount, lock timestamp, lock state, releasing condition, release or timeout event.	DvP-EP-03	EP-Core	7 years
Lock Symmetry Confirmation	Paired lock confirmation record linking DvP-EP-02 and DvP-EP-03 for each trade_id; confirms simultaneous lock states.	DvP-EP-04	EP-Core	7 years
Release Execution	Release event record: trade_id, release trigger, release timestamp, dual-authorization record if applicable.	DvP-EP-05	EP-Core	7 years
Timeout / Unwind	Timeout event record: trade_id, timeout trigger, unwind sequence log, lock release confirmation, participant notification record.	DvP-EP-06	EP-Core	7 years
DvP Failure / Mismatch	Failure record: trade_id, failure type (mismatch, duplicate, partial lock), containment action, resolution path.	DvP-EP-07	EP-Core	7 years
Boundary Test (P4 Separation)	Boundary Test Record: classification, criteria applied, determiner, date, recertification date.	DvP-EP-08	EP-Core	7 years; indefinite if reclassification occurred

Table 8.2-B — EP Mapping: Finality Controls

Control Domain	Required EP Artifact	Artifact ID	EP Component	Retention Tag
Finality Marker	Finality marker event record: trade_id, finality state achieved, timestamp, evidence inputs satisfied (checklist reference).	FIN-EP-01	EP-Core	7 years
Finality State Machine Log	Full state transition log per trade_id: pending → conditionally final → operationally final (or reversed/unwound).	FIN-EP-02	EP-Core	7 years

Control Domain	Required EP Artifact	Artifact ID	EP Component	Retention Tag
Quorum / Multi-Signature Evidence	Multi-party authorization record for finality confirmation where quorum approval applies.	FIN-EP-03	EP-Core	7 years
Reconciliation Checkpoint	Reconciliation record at each finality checkpoint: asset-leg balance, cash-leg balance, open breaks (must = 0 for finality).	FIN-EP-04	EP-Core	7 years
Finality Exception Record	Record of any finality marker issued that is subsequently contested, reversed, or placed under review; root-cause log.	FIN-EP-05	EP-Core	Indefinite
Material Change — Finality Logic	Change record for any modification to finality logic: prior state, new state, authorization, effective date, recertification reference.	FIN-EP-06	EP-Delta	7 years

Table 8.2-C — EP Mapping: Liquidity Gate Controls

Control Domain	Required EP Artifact	Artifact ID	EP Component	Retention Tag
Funding Source Register	LEA-01 (see Section 7.5).	LIQ-EP-01	EP-Core	7 years
Intraday Funding Utilization	LEA-02 (see Section 7.5).	LIQ-EP-02	EP-Core	7 years
Concentration Monitoring Log	LEA-03 (see Section 7.5).	LIQ-EP-03	EP-Core	7 years
Gate Activation / Deactivation	LEA-04 (see Section 7.5).	LIQ-EP-04	EP-Core	7 years
Queue Manifest	LEA-05 (see Section 7.5).	LIQ-EP-05	EP-Core	7 years
Liquidity Preservation Bundle	LEA-06 (see Section 7.5).	LIQ-EP-06	Preservation Bundle	Indefinite
Stress Assessment Record	LEA-07 (see Section 7.5).	LIQ-EP-07	EP-Delta	7 years

Table 8.2-D — EP Mapping: Disclosure and TTL Controls

Control Domain	Required EP Artifact	Artifact ID	EP Component	Retention Tag
Disclosure Version Register	Current disclosure version per instrument and category (P1–P4), with effective and expiry dates.	DISC-EP-01	EP-Core	7 years
Participant Acknowledgment Log	Record of each participant's acknowledgment of current disclosure version, with timestamp and version number.	DISC-EP-02	EP-Core	7 years

Control Domain	Required EP Artifact	Artifact ID	EP Component	Retention Tag
Disclosure Expiry Alert Record	Record of TTL expiry alerts generated, actions taken (recertification or update), and outcome.	DISC-EP-03	EP-Delta	7 years
Boundary Test Record	See DvP-EP-08 above.	DISC-EP-04	EP-Core	7 years (indefinite on reclassification)
TTL Enforcement Log (Examiner Access)	Log of examiner access events: purpose, scope, duration, post-access review record.	DISC-EP-05	EP-Core	7 years
Material Change Notification Record	Record of material change events affecting disclosures: change description, notification recipients, date, EP Delta reference.	DISC-EP-06	EP-Delta	7 years

8.3 EP Delta Cadence

EP Deltas capture the incremental changes to the EP-Core since the last snapshot. They are the primary mechanism by which examiners track control evolution between full evidence pack reviews. Delta cadence is operator-configured within the bands defined below, consistent with the EP Delta discipline from Baselines B and C.

Table 8.3-A — EP Delta Cadence Bands

Band	Cadence	Applicable Trigger Domains	Operator Configuration Permitted
Daily	End-of-business-day	DvP gate completions; finality marker events; intraday funding utilization; concentration log updates; disclosure TTL alerts; any L1 escalation events.	Interval within band: fixed at daily.
Weekly	End of each calendar week	Reconciliation checkpoint summaries; queue manifest summaries (if no active gate); boundary test status; funding source register changes.	Interval within band: operator may configure 5-day or 7-day; must be consistent.
Monthly	End of each calendar month	Full EP-Core refresh; material change notification summary; disclosure version register review; recertification status update.	Interval within band: calendar month; no variation permitted.
Event-Driven	On occurrence	Any material change event (see below); any L2–L4 escalation; any gate activation/deactivation; any finality exception; any boundary test reclassification; any examiner access event; any preservation bundle generation.	Not configurable; immediate generation required.

Material Change Events (Mandatory Event-Driven Delta):

A material change event requires an immediate EP Delta regardless of scheduled cadence. The following constitute material change events for payments and settlement controls:

1. Any modification to DvP gate logic, escrow model, or release conditions.
2. Any modification to finality state definitions or finality marker criteria.
3. Activation or deactivation of any liquidity gate (LG-01 through LG-05).
4. Any change to the Funding Source Register (new source, terminated source, limit change, collateral substitution).
5. Any reclassification of an instrument across the P1–P4 taxonomy.
6. Any disclosure document update or version increment.
7. Escalation to L3 or L4 operating posture.
8. Any finality exception event or finality marker reversal.
9. Any change to the RACI for liquidity gate authorization or finality confirmation.
10. Any change to TTL or purpose-limitation parameters for examiner access.

EP Delta Contents (Standard Template):

Each EP Delta package must contain:

Field	Content
Delta Reference ID	Unique identifier (format: EP-DELTA-[YYYYMMDD]-[sequence])
Delta Type	Scheduled (band) or Event-Driven
Prior EP Snapshot Reference	Reference to EP-Core or prior Delta to which this Delta applies
Change Summary	Narrative summary of changes captured in this Delta
Artifact List	Enumeration of artifacts updated, added, or flagged for expiry in this Delta
Material Change Flag	Yes / No; if Yes, identify triggering event
Authorizing Personnel	Identity and role of officer certifying Delta completeness and accuracy
Generation Timestamp	UTC timestamp of Delta generation
Hash	Integrity hash of Delta package contents

8.4 Preservation Bundles: Disputes and Incidents

A preservation bundle is a frozen, point-in-time snapshot of all EP artifacts relevant to a specific dispute, incident, or examiner investigation. Once generated, a preservation bundle is immutable: no artifact within the bundle may be modified, deleted, or overwritten. The bundle is retained indefinitely (or until regulatory retention obligations expire and disposition is authorized per governance procedures).

8.4.1 Triggers for Preservation Bundle Generation

A preservation bundle must be generated upon any of the following:

1. **L3 or L4 escalation** (Section 7.4).
2. **Examiner request** specifically referencing a trade, participant, time window, or incident.
3. **Formal dispute** initiated by a participant regarding a DvP execution, finality determination, or redemption queue treatment.
4. **Finality exception** where a finality marker is contested or reversed (FIN-EP-05).

5. **Incident declaration** under the incident response framework (Baseline C, Appendix A.3) where the incident implicates settlement integrity, funding availability, or escrow state.
6. **Offboarding initiation** (Section 10.1): a preservation bundle is required as part of the offboarding proof bundle.
7. **Yield separation boundary dispute**: any allegation or supervisory concern regarding commingling of P4 yield operations with P1–P3 settlement rails.

8.4.2 Preservation Bundle Contents (Standard Template)

Table 8.4-A — Preservation Bundle Contents

Item	Content	Source Artifacts
Cover Record	Bundle ID; trigger event; timestamp; authorizing personnel; scope definition (trade IDs, time window, participant IDs, instrument IDs as applicable).	Generated at bundle creation
DvP Execution Record Set	Full DvP-EP-01 through DvP-EP-07 records for all trades within scope.	EP-Core / DvP
Finality State Log	Full FIN-EP-01 through FIN-EP-05 records for all trades within scope.	EP-Core / Finality
Liquidity Snapshot	LEA-01 through LEA-05 as of bundle generation timestamp; funding utilization at time of incident or dispute.	EP-Core / Liquidity
Concentration Log Snapshot	CM-01 through CM-05 metric values for the 48-hour window preceding the trigger event.	EP-Core / Concentration
Gate Activation Records	LEA-04 records for any gate activations within 72-hour window of trigger event.	EP-Core / Gate
Queue Manifest Snapshot	LEA-05 queue state as of bundle generation timestamp and at trigger event timestamp.	EP-Core / Queue
Disclosure Version Record	DISC-EP-01 showing disclosure versions in effect at time of trigger event for all implicated instruments.	EP-Core / Disclosure
Participant Acknowledgment Records	DISC-EP-02 records confirming participant acknowledgment of disclosure versions in effect.	EP-Core / Disclosure
Examiner Access Log (if applicable)	DISC-EP-05 records for any supervisory access events within scope window.	EP-Core / TTL
Chain-of-Custody Transfer Record	If bundle is transferred to a third party (examiner, court, arbitrator): transfer record with recipient identity, purpose, scope, and timestamp.	Generated at transfer
Integrity Manifest	Hash of each artifact included in the bundle; overall bundle hash; attestation by generating officer.	Generated at bundle creation

8.4.3 Preservation Bundle Handling and Access Controls

- Access to a preservation bundle is restricted to: the generating operator's senior compliance and legal personnel; the examiner or regulatory authority for whose benefit the bundle was generated; and, in dispute contexts, the specific participant(s) whose positions are implicated (limited to records pertaining to their own activity, consistent with purpose-limitation discipline).

- Every access to a preservation bundle is logged as a **Bundle Access Event** (artifact: DISC-EP-05 extension), capturing: accessor identity and role, purpose of access, scope of records accessed, timestamp.
- Preservation bundles may not be modified. If additional records are identified after bundle generation that are relevant to the trigger event, a **Supplemental Bundle** is generated, referencing the original bundle ID, with the same immutability and access controls applying.
- Bundle disposition (destruction at end of retention period) requires documented authorization from the Compliance Officer and, where relevant, confirmation from the supervising regulatory authority that no pending investigation or proceeding requires continued retention.

8.5 Post-Access Review Discipline (TTL/Purpose Limitation Enforcement)

Consistent with the tiered supervisory access model from Baselines A and B and the purpose-limitation principles throughout this constitution, all examiner and supervisory access to EP artifacts is subject to post-access review.

Post-Access Review Requirements:

Requirement	Detail
Review Trigger	Any examiner or supervisory access event logged in DISC-EP-05.
Review Cadence	Completed within 5 business days of access event for Tier 1 access; within 2 business days for Tier 2 (emergency) access.
Review Scope	Confirm access was within authorized purpose and scope; confirm TTL was honored; confirm no over-collection of records occurred; confirm disposition of accessed records by examiner (if available).
Review Record	Named artifact: Post-Access Review Record (DISC-EP-05 supplement). Retained 7 years.
Escalation	If review identifies out-of-scope access or purpose violation: immediate notification to senior Compliance Officer and legal counsel; incident record generated; remediation documented.
Transparency	Participants are notified of supervisory access to records pertaining to their activity, consistent with applicable legal and investigative constraints, and in accordance with the non-surveillance posture established in Baseline B, Section VIII.6.

9. Governance, RACI, and Accountability (Baseline-Aligned)

9.1 Role Taxonomy

The role taxonomy below reuses baseline roles established in Baselines A, B, and C and extends them only where payments and settlement operations require it. No net-new tier system is introduced. Roles are defined functionally; a single individual or organizational unit may hold multiple roles provided that separation-of-duties requirements are satisfied and documented.

Table 9.1-A — Role Taxonomy

Role ID	Role Name	Functional Description	Scope
R-01	Settlement Operator	Operates the settlement infrastructure and DvP engine; manages queue and gate mechanics; oversees escrow state transitions.	DvP, gate, queue, finality
R-02	Compliance Officer	Reviews and approves hold placements, gate activations, boundary test records, disclosure version changes, and escalation actions. First-level accountability for purpose-limitation enforcement.	All control domains
R-03	Senior Compliance Officer	Second-level approval authority for material changes, high-threshold gate activations, finality exceptions, and preservation bundle generation. Appeals decisions reference this role.	Material change, L3/L4, finality exceptions
R-04	Operations Personnel	Executes technical implementations of gate activations, hold placements, queue management, and release actions under authorized instruction.	DvP, gate, hold/release, queue
R-05	Gateway Operator	Manages participant connectivity to the settlement rail; enforces schema validation, allowlisting, and circuit-breaker controls at the perimeter.	Participant access, message validation
R-06	Custodian	Maintains segregated asset-leg positions; confirms asset-leg lock and release; issues custody receipts and reconciliation confirmations.	Asset-leg, custody, reconciliation
R-07	Examiner / Supervisory Authority	External supervisory role; accesses EP artifacts under tiered access model; initiates examiner requests; receives supervisory notifications.	Read-only access (tiered); notification recipient
R-08	Incident Response Authority	Activates and manages incident response procedures; has authority to invoke LG-05 (Emergency Settlement Suspension) and L4 escalation; coordinates with R-07 on supervisory notification.	Incident response, L4 escalation
R-09	Legal Counsel	Reviews hold authority, release conditions, boundary test reclassifications, and offboarding legal obligations. Advises on contractual primacy and redress paths.	Hold/release, offboarding, disputes
R-10	Participant Representative	Institutional participant (broker-dealer, custodian, transfer agent) with authorized access to its own records; receives gate and queue notifications; initiates error and dispute reports.	Participant-scoped access
R-11	Change Control Authority	Reviews and approves modifications to DvP logic, finality conditions, gate thresholds, disclosure schemas, and RACI assignments. Composed of R-02, R-03, and R-01 at minimum.	Material change governance
R-12	Offboarding Coordinator	Manages orderly program end; assembles offboarding proof bundle; coordinates chain-of-	Offboarding, unwind, legacy transition

Role ID	Role Name	Functional Description	Scope
		custody transfer; interfaces with R-07 on wind-down reporting.	

Separation-of-Duties Requirements:

The following role combinations must not be held by the same individual for any single operational action:

Action	Required Separation
Gate activation (LG-02 and above)	R-01 (initiator) must be separate from R-02 (approver).
Hold placement	R-04 (implementer) must be separate from R-02 (approver).
Hold release	R-04 (implementer) must be separate from R-03 (approver).
Finality marker issuance	R-01 (issuer) must be separate from R-02 (confirmer).
Preservation bundle generation	R-04 (generator) must be separate from R-02 (authorizer).
Material change approval	R-11 (approval body) must include at least two roles; no single individual may constitute a quorum.
Offboarding initiation	R-12 (coordinator) must obtain dual authorization from R-03 and R-07 (notification).

9.2 RACI Matrices (Paste-Ready)

The following RACI matrices apply the standard convention: **R** = Responsible (performs the action); **A** = Accountable (owns the outcome; single A per action); **C** = Consulted (provides input before action); **I** = Informed (receives notification after action).

9.2.1 DvP Operations RACI

Table 9.2-A — DvP Operations

Action	R-01 Settlement Op.	R-02 Compliance	R-03 Sr. Compliance	R-04 Operations	R-05 Gateway Op.	R-06 Custodian	R-07 Examiner	R-08 IR Authority	R-10 Participant
DvP submission receipt and schema validation	R	—	—	—	R	—	—	—	I
DvP preconditions gate execution	R	C	—	—	—	C	—	—	—
Asset-leg lock initiation	A	—	—	R	—	R	—	—	I
Cash-leg lock initiation	A	—	—	R	—	—	—	—	I
Lock symmetry confirmation	R	C	—	R	—	R	—	—	—
DvP release execution (successful	A	C	—	R	—	R	—	—	I

Action	R-01 Settlement Op.	R-02 Compliance	R-03 Sr. Compliance	R-04 Operations	R-05 Gateway Op.	R-06 Custodian	R-07 Examiner	R-08 IR Authority	R-10 Participant
settlement)									
DvP timeout / unwind initiation	A	C	—	R	—	R	—	I	I
Failure containment (mismatch / duplicate)	A	R	—	R	C	C	—	C	I
Failure evidence packaging (DvP-EP-07)	R	A	—	R	—	—	—	—	—
Override of preconditions gate	C	A	R	R	—	C	—	—	—

9.2.2 Finality Logic Change Control RACI

Table 9.2-B — Finality Logic Change Control

Action	R-01 Settlement Op.	R-02 Compliance	R-03 Sr. Compliance	R-04 Operations	R-09 Legal	R-11 Change Control	R-07 Examiner
Change request submission (finality logic)	R	C	C	—	C	—	—
Impact assessment (finality state machine)	R	C	—	C	—	—	—
Compliance and legal review	—	R	A	—	R	—	—
Change Control Authority approval	C	C	C	—	C	A	—
Supervisory pre-notification (material change)	—	R	A	—	—	—	I
Implementation (finality logic update)	R	C	—	R	—	—	—
Post-implementation validation	R	A	C	R	—	C	—
EP Delta generation (FIN-EP-06)	R	A	—	R	—	—	I
Recertification scheduling	—	R	A	—	—	C	I

9.2.3 Liquidity Gate Activation RACI

Table 9.2-C — Liquidity Gate Activation and Deactivation

Action	R-01 Settlement Op.	R-02 Compliance	R-03 Sr. Compliance	R-04 Operations	R-08 IR Authority	R-07 Examiner	R-10 Participant
Soft gate (LG-01 / LG-03) initiation	R	A	—	R	—	—	I
Hard gate (LG-02) initiation	R	R	A	R	C	—	I

Action	R-01 Settlement Op.	R-02 Compliance	R-03 Sr. Compliance	R-04 Operations	R-08 IR Authority	R-07 Examiner	R-10 Participant
Emergency suspension (LG-05) initiation	C	C	C	R	A	—	I
Yield separation gate (LG-04) initiation	R	A	C	R	—	—	I
Queue formation and participant notification	R	C	—	A	—	—	I
Priority override authorization	C	R	A	R	—	—	I
Gate status update records (every 30 min.)	R	A	—	R	—	—	—
Supervisory notification (gate active > SLA)	—	R	A	—	—	I	—
Gate deactivation authorization	R	R	A	R	C	—	I
LEA-04 Activation Log generation	R	A	—	R	—	I	—

9.2.4 Hold/Release Decisions RACI

Table 9.2-D — Hold Placement and Release

Action	R-02 Compliance	R-03 Sr. Compliance	R-04 Operations	R-05 Gateway Op.	R-06 Custodian	R-07 Examiner	R-09 Legal	R-10 Participant
Hold request receipt and validation	R	—	—	—	—	—	C	—
Legal authority confirmation	C	C	—	—	—	—	A	—
Hold approval (standard)	A	C	—	—	—	—	—	—
Hold approval (above threshold)	C	A	—	—	—	—	R	—
Technical hold implementation (all layers)	C	—	A	R	R	—	—	—
Participant notification of hold	R	A	—	—	—	—	C	I
Supervisory notification of hold	—	A	—	—	—	I	—	—
Hold monitoring (periodic review)	A	C	R	—	—	—	C	—

Action	R-02 Compliance	R-03 Sr. Compliance	R-04 Operations	R-05 Gateway Op.	R-06 Custodian	R-07 Examiner	R-09 Legal	R-10 Participant
Release authorization documentation	C	A	—	—	—	—	R	—
Technical release execution (all layers)	C	—	A	R	R	—	—	—
Release verification testing	R	A	—	R	R	—	—	—
Participant notification of release	R	A	—	—	—	—	—	I

9.2.5 Examiner Request Handling RACI

Table 9.2-E — Examiner Request Handling

Action	R-02 Compliance	R-03 Sr. Compliance	R-04 Operations	R-07 Examiner	R-09 Legal	R-12 Offboarding (if applicable)
Examiner request receipt and logging	R	A	—	—	C	—
Scope and purpose confirmation	R	A	—	R	C	—
TTL / purpose-limitation review	A	C	—	—	C	—
Evidence gathering and EP compilation	C	—	R	—	—	—
Privilege review	C	C	—	—	A	—
Evidence submission (secure channel)	R	A	—	I	C	—
Submission receipt logging (DISC-EP-05)	R	A	R	—	—	—
Post-access review (within SLA)	A	C	—	—	—	—
Post-access review record generation	R	A	—	I	—	—
Participant notification (post-access, per TTL)	R	A	—	—	C	—

9.3 Liability Trigger Catalog (Operational)

The following catalog identifies operational conditions that constitute liability trigger events. Each trigger requires: an immediate operational response; an evidence record; escalation to the appropriate role (per RACI); and, where applicable, supervisory notification. The catalog is operational in nature; it does not make legal conclusions about liability allocation, which is governed by contractual instruments and applicable law.

Table 9.3-A — Liability Trigger Catalog

Trigger ID	Trigger Name	Trigger Condition	Immediate Response	Evidence Record Required	Supervisory Notification SLA
LT-01	Unauthorized Release	A hold is released without the authorization records required by RACI Table 9.2-D (missing dual approval, missing legal authority confirmation, or release implemented before authorization record is complete).	Immediate re-hold if position is still accessible; incident record generated; R-03 and R-09 notified; R-08 placed on standby.	Hold re-activation log; unauthorized release incident record; root-cause investigation report.	Within 2 hours.
LT-02	Settlement Without Gate	A DvP settlement completes for a trade where the DvP preconditions gate log (DvP-EP-01) does not show a passing result for all required checks; or where a gate override was applied without the authorization record required by Table 9.2-A.	Immediate settlement review; affected trade flagged; finality marker suspended pending investigation; R-03 and R-07 notified.	Settlement-without-gate incident record; DvP-EP-01 gap analysis; authorization audit.	Within 2 hours.
LT-03	Finality Marker Inconsistency	A finality marker event (FIN-EP-01) exists for a trade where the finality state machine log (FIN-EP-02) does not show a complete, unbroken state transition to "operationally final"; or where reconciliation checkpoint (FIN-EP-04) shows open breaks at finality.	Finality marker placed under review; affected positions flagged; R-01 and R-03 convene reconciliation review; examiner pre-notification if unresolved within defined window.	FIN-EP-05 finality exception record; reconciliation gap report; corrective action log.	Within 4 hours if unresolved; immediate if participant asset impact confirmed.
LT-04	Gate Activation Without Authorization	A liquidity gate (LG-01 through LG-05) is activated without the dual	Gate state reviewed; retroactive authorization sought or gate rescinded;	LEA-04 gap record; unauthorized activation incident report; retroactive or rescission	Immediate for LG-05; within 2 hours for LG-02; within 4 hours

Trigger ID	Trigger Name	Trigger Condition	Immediate Response	Evidence Record Required	Supervisory Notification SLA
		authorization required by RACI Table 9.2-C; or without the supervisory notification required where gate remains active beyond SLA.	R-03 and R-07 notified; EP Delta generated.	authorization record.	for LG-01, LG-03, LG-04.
LT-05	Escrow Asymmetry	Asset-leg lock (DvP-EP-02) and cash-leg lock (DvP-EP-03) are not symmetrical in state or timestamp beyond the defined tolerance window; one leg is released while the other remains locked without a corresponding unwind authorization.	Immediate lock state review; unaffected leg locked in hold-only containment pending resolution; R-01 and R-06 convene; R-03 notified.	Lock symmetry incident record; DvP-EP-04 mismatch analysis; corrective action log.	Within 2 hours.
LT-06	Disclosure Version Mismatch	A participant executes a transaction under a disclosure version that has expired (TTL elapsed) and has not been recertified; or the participant acknowledgment log (DISC-EP-02) does not contain an acknowledgment of the version in effect at transaction time.	Transaction flagged; participant notified; recertification initiated; R-02 reviews whether transaction proceeds or is held pending recertification.	DISC-EP-03 expiry alert record; DISC-EP-02 gap record; corrective recertification log.	Within 4 hours of detection.
LT-07	Yield Commingling	Evidence indicates that Category P4 yield program operations have drawn on funding allocated to Category P1, P2, or P3 settlement rails without a	Immediate yield program suspension; funding pool segregation review; R-02 and R-09 convene boundary test re-examination; DvP-EP-08 boundary test record	Commingling incident record; funding pool audit; revised boundary test record; corrective segregation log.	Within 2 hours.

Trigger ID	Trigger Name	Trigger Condition	Immediate Response	Evidence Record Required	Supervisory Notification SLA
		documented LG-04 gate authorization; or that yield disbursements were processed through the same escrow account used for DvP settlement.	updated.		
LT-08	Preservation Bundle Tampering	Any artifact within a generated preservation bundle is found to have been modified, deleted, or overwritten after bundle generation timestamp (detected via integrity manifest hash mismatch).	Immediate bundle access suspension; forensic investigation initiated; R-03 and R-09 notified; R-07 notified if bundle was generated in response to examiner request.	Hash mismatch incident record; forensic investigation report; chain-of-custody review.	Immediate; notify R-07 regardless of access context.
LT-09	Post-Access Review Failure	A post-access review (Section 8.5) identifies that examiner or supervisory access exceeded the authorized scope or purpose; or that the access event was not logged in DISC-EP-05 within the required window.	R-03 and R-09 notified; affected access event placed under remediation review; participant notification prepared (consistent with TTL and investigation constraints).	Post-access review exception record; remediation plan; participant notification log (if issued).	Within 2 hours of review completion.
LT-10	Material Change Without EP Delta	A material change event (Section 8.3) occurs but no corresponding event-driven EP Delta is generated within the required window; or the Delta is generated without the required authorizing officer certification.	EP Delta generated retroactively with gap notation; R-03 reviews whether the change should be rolled back pending proper documentation; R-07 notified of Delta gap.	Retroactive EP Delta; gap notation record; authorization remediation log.	Within 4 hours of detection.

9.4 No-Master-Key Implementation Notes

Consistent with the governance posture established throughout the baseline suite, this constitution does not permit any single role, individual, or system component to hold unilateral control over: the DvP release mechanism; the finality marker issuance; any gate activation at LG-02 or above; the generation or modification of a preservation bundle; or the offboarding proof bundle assembly.

The following implementation requirements operationalize this constraint:

Table 9.4-A — Distributed Control Implementation Requirements

Function	Minimum Approval Quorum	Audit Trail Requirement	Prohibition
DvP gate override	R-01 + R-03 (two distinct individuals)	Override authorization record with individual identities, timestamps, and stated justification; logged in DvP-EP-01.	No single-role override.
LG-02 hard gate activation	R-01 + R-02 (two distinct individuals)	Dual-approval record in LEA-04.	No single-role activation.
LG-05 emergency suspension	R-08 + R-03 (two distinct individuals; emergency may allow sequential rather than simultaneous, with second approval within defined window, e.g., 30 minutes)	Emergency activation log with timestamped sequential approvals; if second approval not received within window, suspension auto-reverts to LG-02 pending reactivation.	No single-role activation; auto-revert if quorum not completed.
Finality marker issuance	R-01 (issuer) + R-02 (confirmer) [distinct individuals]	Dual-role confirmation in FIN-EP-01.	No single-role marker issuance.
Hold release	R-03 (approver) + R-04 (implementer) [distinct individuals] + R-09 (legal review for above-threshold)	Multi-role authorization chain in hold release record.	No single-role release.
Preservation bundle generation	R-02 (authorizer) + R-04 (generator) [distinct individuals]	Dual-role generation record in bundle cover record.	No single-role generation.
Offboarding initiation	R-03 + R-12 (two distinct individuals) + R-07 notification	Offboarding authorization record; supervisory notification receipt.	No single-role initiation.
RACI modification	R-11 (minimum two members)	Change Control Authority meeting record with quorum documentation; EP Delta generated.	No single-individual RACI amendment.

Audit Trail Requirements — Distributed Controls:

Every distributed-control action must produce an audit trail entry that is: immutably logged at the moment of each approval (not retrospectively aggregated); individually timestamped for each approving role; hash-chained to prior log entries; and included in the relevant EP artifact for that control domain. The audit trail must permit reconstruction of the full approval sequence — who

approved, in what order, at what time, and on what stated basis — without reference to any external system.

10. Offboarding, Unwind, and Legacy Compatibility (Reversibility Without Data Loss)

10.1 Offboarding Triggers

Offboarding refers to the controlled cessation of settlement rail operations for a program, an instrument class, or a specific participant. It encompasses both planned program ends and unplanned exits arising from operational, governance, or supervisory events. Three trigger classes are defined.

Table 10.1-A — Offboarding Trigger Taxonomy

Trigger ID	Trigger Class	Trigger Conditions	Lead Role	Advance Notice Requirement
OB-T01	Planned Program End	Pilot term expires; governance decision to sunset instrument class; operator elects to discontinue program with appropriate notice.	R-12 Offboarding Coordinator	Defined minimum notice to participants (e.g., 90 days); supervisory notification per reporting obligations.
OB-T02	Incident-Driven Exit	L4 escalation (Section 7.4); systemic integrity failure; unresolvable escrow asymmetry or finality exception; cyber incident requiring full system rebuild.	R-08 IR Authority → R-12	Immediate activation; participant notification as soon as operationally safe to disclose; supervisory notification within 2 hours.
OB-T03	Governance Decision	Supervisory directive; regulatory action; material governance failure (e.g., repeated RACI violations, unresolved liability trigger events); participant consent withdrawal where threshold not met.	R-03 Sr. Compliance + R-07 (directive source)	Per supervisory directive timeline; R-12 activated upon directive receipt.

Regardless of trigger class, offboarding must follow the structured procedures in Sections 10.2 through 10.4. No participant assets may be returned, transferred, or written off without completion of the offboarding proof bundle (Section 10.2). No settlement rail infrastructure may be decommissioned until the legacy transition evidence (Section 10.4) is complete and confirmed.

10.2 Offboarding Proof Bundle (Template)

The offboarding proof bundle is the definitive evidence artifact proving that program cessation was conducted in an orderly manner, with no participant assets lost, no open settlement breaks

unresolved, and no chain-of-custody gap. It is a named preservation bundle and is therefore immutable once generated. It must be delivered to R-07 (Examiner / Supervisory Authority) upon completion.

10.2.1 Bundle Assembly Sequence

The offboarding proof bundle is assembled in the following sequence, with each step producing a named artifact that becomes part of the bundle:

Step	Action	Artifact Produced	Responsible Role
OB-S01	Trigger documentation: record offboarding trigger, authorization, and activation timestamp.	Offboarding Authorization Record	R-12 + R-03
OB-S02	Settlement rail suspension: activate LG-05 (or confirm L4 already active); log suspension state.	Rail Suspension Log	R-08 + R-01
OB-S03	Open position census: enumerate all participant positions, pending DvP submissions, active locks, and queued submissions as of suspension timestamp.	Open Position Census	R-04 + R-06
OB-S04	Open breaks resolution: for each identified open break, execute resolution (unwind, return to participant, or documented exception with R-09 legal review). Open breaks must reach zero or be explicitly listed with resolution path and timeline.	Open Breaks Register (zero-value or exception list)	R-01 + R-02 + R-09
OB-S05	Final reconciliation snapshot: asset-leg and cash-leg balances for all participants, confirmed as of suspension timestamp; reconciliation checkpoint record showing open breaks = 0.	Final Reconciliation Snapshot	R-01 + R-06
OB-S06	Chain-of-custody transfer: for each participant's residual position, document transfer to legacy custodian, participant-direct control, or successor arrangement.	Chain-of-Custody Transfer Record	R-06 + R-12
OB-S07	Disclosure TTL closeout: mark all active disclosure versions as superseded with offboarding date; generate final disclosure version register entry.	Final Disclosure Version Register	R-02
OB-S08	EP archive: compile and freeze full EP-Core, all EP Deltas, and all preservation bundles generated during program life; produce EP Archive Manifest.	EP Archive Manifest	R-04 + R-02
OB-S09	Participant notification: notify all participants of program cessation, final account statements, and chain-of-custody transfer confirmations.	Participant Notification Log	R-12 + R-02
OB-S10	Bundle integrity manifest: generate hash of all bundle artifacts; obtain authorizing signatures from R-03 and R-12; deliver bundle to R-07.	Offboarding Proof Bundle Integrity Manifest	R-12 + R-03 → R-07

10.2.2 Offboarding Proof Bundle Contents (Paste-Ready Template)

OFFBOARDING PROOF BUNDLE – COVER RECORD

Bundle ID: [OB-BUNDLE-YYYYMMDD]-{program_id}]
Trigger Class: [OB-T01 / OB-T02 / OB-T03]
Trigger Authorization: [Reference to Offboarding Authorization Record]
Program / Rail: [Instrument class, pilot phase, or rail identifier]
Suspension Timestamp: [UTC]
Bundle Generation Timestamp: [UTC]
Generating Officer: [R-12 identity and role]
Authorizing Officer: [R-03 identity and role]

--- ARTIFACTS INCLUDED ---

1. Offboarding Authorization Record [OB-S01]
2. Rail Suspension Log [OB-S02]
3. Open Position Census [OB-S03]
 - As-of Timestamp: [UTC]
 - Participant Count: [N]
 - Total Asset-Leg Positions: [aggregate]
 - Total Cash-Leg Balances: [aggregate]
 - Pending DvP Submissions: [count]
 - Active Locks: [count]
 - Queued Submissions: [count]
4. Open Breaks Register [OB-S04]
 - Open Breaks at Suspension: [N]
 - Breaks Resolved: [N]
 - Breaks Remaining (exception list): [0 / list with resolution path]
 - R-09 Legal Review Reference: [if exception list non-zero]
5. Final Reconciliation Snapshot [OB-S05]
 - Asset-Leg Balance (all participants): [confirmed aggregate]
 - Cash-Leg Balance (all participants): [confirmed aggregate]
 - Reconciliation Result: BALANCED / EXCEPTION [detail]
 - Open Breaks at Snapshot: 0 [or exception reference]

- 6. Chain-of-Custody Transfer Record [OB-S06]
 - Transfer Type: [Legacy Custodian / Participant-Direct / Successor]
 - Participants Transferred: [N]
 - Transfer Completion Timestamp: [UTC]
 - Custodian Acknowledgments: [reference to signed receipts]

- 7. Final Disclosure Version Register [OB-S07]
 - All versions marked superseded as of: [offboarding date]

- 8. EP Archive Manifest [OB-S08]
 - EP-Core Snapshots: [count, date range]
 - EP Deltas: [count, date range]
 - Preservation Bundles: [count, trigger references]
 - Archive Location: [immutable storage reference]
 - Archive Integrity Hash: [hash]

- 9. Participant Notification Log [OB-S09]
 - Notifications Sent: [N]
 - Delivery Confirmations: [N]
 - Undelivered (exception list): [0 / list with follow-up]

--- INTEGRITY MANIFEST ---

Artifact Hash List:

[Artifact 1 hash] ... [Artifact N hash]

Bundle Hash (root): [root hash of all artifact hashes]

Authorizing Signatures:

R-12: [identity, role, timestamp]

R-03: [identity, role, timestamp]

Delivered to R-07: [delivery method, timestamp, receipt reference]

10.3 Unwind Playbooks (Schema-Abstract)

Unwind playbooks define the operational sequences for reversing or closing out specific settlement structures without data loss. Each playbook applies to a specific unwind scenario; multiple

playbooks may be invoked concurrently in a complex offboarding. All unwind actions are logged in real-time to the immutable audit trail and generate EP Delta entries.

10.3.1 Partial DvP Unwind

Applicability: A DvP trade has been submitted and one or both legs are locked, but settlement has not been completed (finality marker not yet issued). Unwind is required due to: participant default; LG-05 activation; trade cancellation authorized by R-02 and R-09; or expiry of queue TTL.

Table 10.3-A — Partial DvP Unwind Sequence

Step	Action	Responsible Role	Evidence Artifact
PDU-01	Identify trade_id(s) subject to unwind; confirm current lock states for asset-leg (DvP-EP-02) and cash-leg (DvP-EP-03).	R-01 + R-04	Unwind initiation record (trade_id list, lock states)
PDU-02	Obtain unwind authorization: R-02 approval for standard unwind; R-03 + R-09 approval if unwind arises from participant default or legal hold conflict.	R-02 / R-03 + R-09	Unwind authorization record
PDU-03	Release asset-leg lock: return asset-leg position to pre-lock state; confirm with R-06 (Custodian).	R-04 + R-06	Asset-leg release log (DvP-EP-02 update)
PDU-04	Release cash-leg lock: return cash-leg funding to originating participant account or funding source; confirm with funding source (FS-01 through FS-05 as applicable).	R-04 + R-01	Cash-leg release log (DvP-EP-03 update)
PDU-05	Symmetry confirmation: confirm both legs returned to pre-lock state; DvP-EP-04 lock symmetry record updated to "unwound" state.	R-01 + R-06	Updated DvP-EP-04 with unwind state
PDU-06	Participant notification: notify both counterparties of unwind, with trade_id, reason, and confirmation of lock releases.	R-04	Participant notification log
PDU-07	Finality marker negation: confirm no finality marker was issued for unwound trade; if a marker was issued in error, generate FIN-EP-05 finality exception record and initiate LT-03 liability trigger response.	R-01 + R-02	FIN-EP-05 (if applicable); unwind completion log
PDU-08	EP Delta generation: generate event-driven EP Delta capturing PDU-01 through PDU-07 artifacts.	R-04 + R-02	EP Delta

Containment Requirement: During PDU-01 through PDU-05, no new DvP submissions for the affected participant(s) or instrument(s) may be processed until lock releases are confirmed. Gateway Operator (R-05) applies submission block at perimeter.

10.3.2 Liquidity Gate Unwind

Applicability: A liquidity gate (LG-01 through LG-04) has been activated and queued submissions must be processed in an orderly sequence upon gate deactivation; or an LG-05 emergency suspension must be wound down after resolution of the triggering incident.

Table 10.3-B — Liquidity Gate Unwind Sequence

Step	Action	Responsible Role	Evidence Artifact
LGU-01	Confirm gate deactivation trigger (funding restored, credit cleared, incident resolved); obtain deactivation authorization per RACI Table 9.2-C.	R-01 + R-02 / R-03	Deactivation authorization record
LGU-02	Queue state assessment: review current queue manifest (LEA-05); identify submissions by: FIFO order, TTL status (expired vs. valid), and priority override flags.	R-01 + R-04	Updated queue manifest
LGU-03	Expired submission returns: for any submission whose TTL has elapsed during gate activation, return to submitting participant with rejection event log.	R-04	Rejection event log per submission; participant notification
LGU-04	Funding adequacy confirmation: confirm available funding (LEA-01 updated) is sufficient to process remaining valid queue entries without triggering re-activation of gate.	R-01 + R-02	Funding adequacy confirmation record
LGU-05	Ordered processing: process valid queue entries in FIFO order (or priority-override order where authorized); each processed entry follows standard DvP execution sequence (PDU flow).	R-01 + R-04	DvP execution records per trade_id; queue manifest updated per entry
LGU-06	Queue closure: confirm queue fully drained (all entries processed, returned, or expired); queue manifest final state recorded.	R-01	Queue closure record (LEA-05 final snapshot)
LGU-07	Concentration re-check: post-drain, re-evaluate CM-01 through CM-04 metrics; confirm return to L0 posture is supported by metric values.	R-01 + R-02	Concentration monitoring log update (LEA-03)
LGU-08	Supervisory deactivation notification: notify R-07 of gate deactivation, queue processing outcome, and current operating posture.	R-02	Supervisory notification record
LGU-09	EP Delta generation: generate event-driven EP Delta capturing LGU-01 through LGU-08 artifacts.	R-04 + R-02	EP Delta

10.3.3 Settlement Queue Unwind

Applicability: Applied specifically to scenarios where a settlement queue must be wound down without resuming normal processing — i.e., in conjunction with offboarding (OB-T01 through OB-T03), where the queue cannot be drained through normal DvP execution because the rail is ceasing operations.

Table 10.3-C — Settlement Queue Unwind (Offboarding Context)

Step	Action	Responsible Role	Evidence Artifact
SQU-01	Queue freeze: rail suspension (OB-S02) freezes queue; no new entries accepted; existing entries preserved in LEA-05 final state.	R-08 + R-01	Rail suspension log; LEA-05 frozen snapshot
SQU-02	Participant notification of queue freeze: each	R-12 + R-04	Participant notification

Step	Action	Responsible Role	Evidence Artifact
	participant with a queued submission notified of freeze, current queue position, and offboarding status.		log per submission
SQU-03	Queued submission return: all queued submissions returned to submitting participants; per-submission return record generated; locks (if any) released per PDU-03 through PDU-05 sequence.	R-04 + R-01	Return log per submission; updated LEA-05
SQU-04	Final queue state confirmation: queue manifest (LEA-05) updated to reflect all entries returned; queue depth = 0 confirmed.	R-01 + R-02	LEA-05 final state (queue depth = 0)
SQU-05	Queue manifest included in offboarding proof bundle: LEA-05 final snapshot ingested as part of OB-S03 (Open Position Census).	R-12	OB-S03 reference

10.4 Legacy Transition Evidence (What Proves No Data Loss)

Legacy transition evidence comprises the artifacts that collectively demonstrate that, following program cessation, no participant data, asset position, or settlement record has been lost, corrupted, or rendered inaccessible. This evidence set is a prerequisite for decommissioning any settlement rail infrastructure component.

10.4.1 Legacy Transition Evidence Set

Table 10.4-A — Legacy Transition Evidence Catalog

Evidence ID	Artifact Name	Content	Proves	Retention
LTE-01	Final Reconciliation Snapshot (cross-reference OB-S05)	Asset-leg and cash-leg balances for all participants; reconciliation result = BALANCED; open breaks = 0.	No position lost or unaccounted for at time of cessation.	Indefinite
LTE-02	Chain-of-Custody Transfer Record (cross-reference OB-S06)	Per-participant record of transfer: sending arrangement, receiving arrangement, transfer method, custodian acknowledgment, timestamp.	Each participant's residual position was transferred without interruption of custody.	Indefinite
LTE-03	EP Archive Manifest (cross-reference OB-S08)	Enumeration of all EP-Core snapshots, EP Deltas, and preservation bundles from program inception to cessation; integrity hashes for each; storage location reference.	The complete evidence record is preserved, accessible, and tamper-evidenced.	Indefinite
LTE-04	Immutable Log Archive Confirmation	Attestation from the log infrastructure operator that all immutable logs from	No log records were deleted or lost during infrastructure	Indefinite

Evidence ID	Artifact Name	Content	Proves	Retention
		program inception to cessation have been transferred to long-term archive storage; archive integrity hash.	decommissioning.	
LTE-05	Open Breaks Register — Zero Confirmation (cross-reference OB-S04)	Final state of Open Breaks Register showing zero open breaks or, if exceptions remain, explicit enumeration with documented resolution path and legal review reference.	All settlement breaks were resolved or explicitly accounted for prior to cessation.	Indefinite
LTE-06	Participant Final Account Statements	Per-participant statement of final positions, transfers, and unwind outcomes as of cessation date; participant acknowledgment receipt.	Each participant received a complete and accurate accounting of their position at program end.	7 years minimum
LTE-07	Decommissioning Authorization Record	Authorization by R-03, R-12, and R-07 (notification) to proceed with infrastructure decommissioning; confirmation that LTE-01 through LTE-06 are complete.	Decommissioning was authorized only after legacy transition evidence was confirmed complete.	Indefinite
LTE-08	Post-Decommissioning Access Confirmation	Attestation that archived EP artifacts, immutable logs, and preservation bundles remain accessible to R-07 and R-02 post-decommissioning; access test results.	Decommissioning did not impair regulatory access to historical records.	7 years (renewed on examiner request)

10.4.2 Decommissioning Gate — Required Conditions

Infrastructure decommissioning may not commence until all of the following conditions are confirmed and documented in the Decommissioning Authorization Record (LTE-07):

Condition ID	Condition	Confirmed By
DC-G01	Final Reconciliation Snapshot (LTE-01) shows BALANCED result with zero open breaks.	R-01 + R-06
DC-G02	Chain-of-Custody Transfer Record (LTE-02) is complete for 100% of participant positions.	R-06 + R-12
DC-G03	EP Archive Manifest (LTE-03) is complete and archive integrity hashes verified.	R-04 + R-02
DC-G04	Immutable Log Archive Confirmation (LTE-04) received from log infrastructure operator.	R-04

Condition ID	Condition	Confirmed By
DC-G05	Open Breaks Register (LTE-05) shows zero open breaks or all exceptions have documented resolution paths with R-09 legal review.	R-02 + R-09
DC-G06	Participant Final Account Statements (LTE-06) issued and delivery confirmations received for all participants.	R-12
DC-G07	R-07 (Examiner / Supervisory Authority) has been notified of decommissioning intent and has not issued an objection within the defined notice window (e.g., 30 days).	R-12 → R-07
DC-G08	Post-Decommissioning Access Confirmation (LTE-08) protocol tested and confirmed functional in archive environment before production decommissioning proceeds.	R-04 + R-02

Decommissioning Authorization Record — Template:

DECOMMISSIONING AUTHORIZATION RECORD

Program / Rail: [Identifier]
Offboarding Bundle ID: [OB-BUNDLE-YYYYMMDD]-{program_id}]
Decommissioning Type: [Infrastructure / Participant-level / Full program]

GATE CONFIRMATION:

DC-G01 – Final Reconciliation BALANCED: [CONFIRMED] Date: [UTC] By: [R-01 + R-06]
DC-G02 – Chain-of-Custody Complete: [CONFIRMED] Date: [UTC] By: [R-06 + R-12]
DC-G03 – EP Archive Manifest Verified: [CONFIRMED] Date: [UTC] By: [R-04 + R-02]
DC-G04 – Log Archive Confirmed: [CONFIRMED] Date: [UTC] By: [R-04]
DC-G05 – Open Breaks = 0 (or exceptions): [CONFIRMED] Date: [UTC] By: [R-02 + R-09]
DC-G06 – Participant Statements Delivered: [CONFIRMED] Date: [UTC] By: [R-12]
DC-G07 – Supervisory Notice Window Elapsed: [CONFIRMED] Date: [UTC] Objection: None / [detail]
DC-G08 – Archive Access Test Passed: [CONFIRMED] Date: [UTC] By: [R-04 + R-02]

AUTHORIZATION:

R-03 (Sr. Compliance): [identity, signature, timestamp]

R-12 (Offboarding Coord.): [identity, signature, timestamp]

R-07 Notification Receipt: [method, timestamp, receipt reference]

Authorized Decommissioning Start Date: [UTC]

10.4.3 Residual Access and Long-Term Retention

Following infrastructure decommissioning, the following obligations persist:

Obligation	Duration	Responsible Role
EP archive access for examiner requests	7 years minimum from program cessation date; indefinite for preservation bundles	R-02 (designated successor if R-01 decommissioned)
Immutable log access for supervisory inquiries	7 years minimum; indefinite for incidents involving unresolved liability triggers	R-02
Participant dispute and redress access	Until all disputes are resolved and applicable statutes of limitation have run; minimum 7 years	R-09 + R-02
Offboarding proof bundle and LTE set	Indefinite	R-02 / designated archive custodian
Post-access review records	7 years from each access event	R-02

Archive Custodian Designation: Where the Settlement Operator (R-01) is decommissioned, a designated archive custodian must be named in the Decommissioning Authorization Record to fulfill ongoing access obligations. The archive custodian is bound by the same TTL, purpose-limitation, and post-access review requirements as R-02 for the duration of the retention period.

11 — Examiner Readiness: Standard Checks Pack + Examiner Query Pack

11.1 Control Objectives → Required Artifacts (Master Mapping Table)

The table below maps each control objective to the evidence artifacts required to satisfy it and to the standard checks (Section 11.2) and examiner queries (Section 11.3) that operationalize examiner review. This table is the entry point for any examination of the settlement rail.

Table 11.1-A — Control Objective to Artifact and Check Mapping

Obj. ID	Control Objective	Required EP Artifacts	Standard Checks	Examiner Queries
CO-01	DvP gate completeness: every settled trade passed all preconditions before execution.	DvP-EP-01, DvP-EP-04	DV-01, DV-02, DV-03	Q-DV-01, Q-DV-02
CO-02	Escrow lock symmetry: asset-leg and cash-leg locks are created and released atomically per trade.	DvP-EP-02, DvP-EP-03, DvP-EP-04	DV-04, DV-05, DV-06	Q-DV-03, Q-DV-04
CO-03	Timeout and unwind correctness: timed-	DvP-EP-06, DvP-	DV-07,	Q-DV-05

Obj. ID	Control Objective	Required EP Artifacts	Standard Checks	Examiner Queries
	out trades are unwound cleanly with zero residual lock.	EP-07	DV-08	
CO-04	Finality marker integrity: every finality marker is unique, traceable, and supported by a complete state-machine log.	FIN-EP-01, FIN-EP-02, FIN-EP-03, FIN-EP-04	FN-01, FN-02, FN-03, FN-04	Q-FN-01, Q-FN-02
CO-05	Settlement completeness: no trade is in a state of "settled without payment" or "payment without delivery."	DvP-EP-02, DvP-EP-03, DvP-EP-05, FIN-EP-02	DV-09, DV-10	Q-DV-06, Q-DV-07
CO-06	Liquidity gate activation discipline: every gate activation carries dual authorization and supervisory notification within SLA.	LEA-04, LEA-05	LQ-01, LQ-02, LQ-03, LQ-04	Q-LQ-01, Q-LQ-02
CO-07	Queue integrity: the settlement queue is FIFO-ordered, TTL-enforced, and produces a complete manifest.	LEA-05	LQ-05, LQ-06, LQ-07	Q-LQ-03, Q-LQ-04
CO-08	Concentration and run-like dynamics: concentration metrics are monitored continuously; large-holder early-warning is evidenced.	LEA-03, LEA-07	LQ-08, LQ-09, LQ-10	Q-LQ-05, Q-LQ-06
CO-09	Yield separation boundary compliance: no P4 yield-program activity commingles with P1–P3 settlement rails.	DvP-EP-08, DISC-EP-04, LQ (LEA-04 LG-04 records)	YS-01, YS-02, YS-03	Q-YS-01, Q-YS-02
CO-10	TTL and purpose-limitation enforcement: examiner access to EP artifacts is scoped, time-bounded, and post-access reviewed.	DISC-EP-05	DC-01, DC-02, DC-03	Q-DC-01
CO-11	Preservation bundle completeness: every triggered preservation bundle contains all required artifacts and passes integrity check.	All preservation bundle artifacts per Table 8.4-A	PB-01, PB-02, PB-03	Q-PB-01
CO-12	Disclosure version currency: all participants operate under a non-expired disclosure version; acknowledgment logs are current.	DISC-EP-01, DISC-EP-02, DISC-EP-03	DC-04, DC-05, DC-06	Q-DC-02
CO-13	RACI and separation-of-duties compliance: dual-authorization and separation-of-duties requirements are satisfied for every sensitive action.	All authorization records per Section 9.2	GOV-01 through GOV-06	Q-GOV-01, Q-GOV-02
CO-14	Liability trigger response: each liability trigger event is detected, responded to, and documented within required SLAs.	All LT-series incident records per Section 9.3	GOV-07 through GOV-10	Q-GOV-03
CO-15	Offboarding completeness: program cessation produces a complete proof bundle and satisfies all decommissioning	OB-series artifacts, LTE-01 through LTE-08	OB-01 through OB-06	Q-OB-01 through Q-OB-03

Obj. ID	Control Objective	Required EP Artifacts	Standard Checks	Examiner Queries
	gate conditions.			

11.2 Standard Checks Pack

Each check follows the standard format: **ID | Objective | Pass Condition | Fail Condition | Evidence Inputs | Frequency | Escalation Trigger | Retention Tag.**

Checks are organized by domain. The full pack contains 42 checks across seven domains.

Domain DV — DvP Gate, Escrow, and Settlement Integrity (Checks DV-01 through DV-10)

DV-01 — DvP Gate Completeness: All Required Checks Present

Field	Content
Objective	Confirm that for every settled trade, the DvP preconditions gate log (DvP-EP-01) records a passing result for every required gate check (eligibility, funding, restriction, disclosure version).
Pass Condition	100% of settled trades in the review period have a complete DvP-EP-01 record with no missing gate-check fields and a final gate result of PASS.
Fail Condition	Any settled trade whose DvP-EP-01 record is absent, incomplete, or records a FAIL on any gate check without a documented authorized override.
Evidence Inputs	DvP-EP-01 (gate log); DvP-EP-05 (release log, to confirm settlement occurred); authorization override records (if applicable).
Frequency	Daily (automated); examiner spot-check on demand.
Escalation Trigger	Any fail: immediate LT-02 liability trigger; R-03 and R-07 notification within 2 hours.
Retention Tag	7 years.

DV-02 — DvP Gate Override Authorization Completeness

Field	Content
Objective	Confirm that every gate override applied during the review period is supported by a complete dual-authorization record (R-01 + R-03, per Section 9.4).
Pass Condition	All override records contain: authorizing individuals (distinct roles), timestamp, stated justification, and hash-chain linkage to DvP-EP-01 entry.
Fail Condition	Any override record missing one or more required fields; any override authorized by a single individual; any override where authorizing individuals share the same role.
Evidence Inputs	DvP-EP-01 override records; role registry (to confirm distinct-role requirement).
Frequency	Weekly; examiner on demand.
Escalation Trigger	Any fail: LT-02; R-03 notified; Change Control Authority (R-11) reviews gate logic.

Field	Content
Retention Tag	7 years.

DV-03 — DvP Gate Precondition Coverage (Funding Availability Check)

Field	Content
Objective	Confirm that the funding availability check (DvP precondition sub-check) was executed and passed for every settled trade, referencing a valid and current Funding Source Register entry (LEA-01).
Pass Condition	Every settled trade DvP-EP-01 record links to a LEA-01 entry that was current (not expired or superseded) at the time of gate execution; funding check result = PASS.
Fail Condition	Any settled trade where the funding check references a stale or missing LEA-01 entry; or where the check result is absent.
Evidence Inputs	DvP-EP-01; LEA-01 (Funding Source Register with effective timestamps).
Frequency	Daily (automated).
Escalation Trigger	Any fail: R-01 and R-02 convene funding audit; LEA-01 updated; EP Delta generated.
Retention Tag	7 years.

DV-04 — Asset-Leg Lock Integrity

Field	Content
Objective	Confirm that every DvP trade in the review period has an asset-leg lock record (DvP-EP-02) with valid lock state, lock timestamp, and releasing condition.
Pass Condition	100% of DvP trades have a DvP-EP-02 record; lock state is one of: LOCKED, RELEASED, UNWOUND, EXPIRED — with no null or undefined states; releasing condition is populated.
Fail Condition	Any DvP trade without a DvP-EP-02 record; any record with null lock state; any record where lock timestamp post-dates release timestamp.
Evidence Inputs	DvP-EP-02; DvP-EP-05 (release log) for cross-reference.
Frequency	Daily (automated).
Escalation Trigger	Any null state or timestamp inversion: LT-05 (escrow asymmetry); R-01 and R-06 convene immediately.
Retention Tag	7 years.

DV-05 — Cash-Leg Lock Integrity

Field	Content
Objective	Confirm that every DvP trade in the review period has a cash-leg lock record (DvP-EP-03) with valid lock state, funding source reference, amount, and releasing condition.
Pass Condition	100% of DvP trades have a DvP-EP-03 record; all required fields populated; lock state valid (same enumeration as DV-04); funding source reference matches a current LEA-01 entry at lock time.

Field	Content
Fail Condition	Any DvP trade without a DvP-EP-03 record; any null field; any funding source reference that cannot be matched to LEA-01.
Evidence Inputs	DvP-EP-03; LEA-01.
Frequency	Daily (automated).
Escalation Trigger	Any fail: LT-05; R-01 and R-02 notified.
Retention Tag	7 years.

DV-06 — Escrow Lock Symmetry (Asset-Leg vs. Cash-Leg)

Field	Content
Objective	Confirm that for every DvP trade, the asset-leg lock and cash-leg lock are symmetric: created within the defined tolerance window; in the same lock state at any point in time; and released or unwound in the same event sequence.
Pass Condition	For every trade_id: (a) lock timestamps for DvP-EP-02 and DvP-EP-03 differ by no more than the defined tolerance (operator-configured, e.g., ≤ 500 ms for atomic execution); (b) state transitions are co-incident; (c) release or unwind events appear in both records within the defined window.
Fail Condition	Any trade_id where asset-leg and cash-leg lock timestamps exceed tolerance; any trade_id where one leg is RELEASED and the other is LOCKED without a corresponding authorized asymmetric-hold record; any trade_id where release events appear in one leg only.
Evidence Inputs	DvP-EP-02; DvP-EP-03; DvP-EP-04 (lock symmetry confirmation).
Frequency	Per-settlement-cycle (continuous); daily summary check.
Escalation Trigger	Any asymmetry outside tolerance: LT-05 immediate; R-01 and R-06 convene; R-03 notified.
Retention Tag	7 years.

DV-07 — Timeout Event Completeness

Field	Content
Objective	Confirm that every trade that reached the queue TTL expiry without settlement has a timeout event record (DvP-EP-06) and that all associated locks were released upon timeout.
Pass Condition	Every timed-out trade has a DvP-EP-06 record with: timeout trigger type, timestamp, unwind sequence log reference, lock release confirmation for both legs, and participant notification record.
Fail Condition	Any timed-out trade without a DvP-EP-06 record; any record missing lock release confirmation; any record where participant notification is absent.
Evidence Inputs	DvP-EP-06; DvP-EP-02 and DvP-EP-03 (confirm EXPIRED state); LEA-05 (queue manifest, for TTL reference).
Frequency	Daily (automated).

Field	Content
Escalation Trigger	Any fail: R-01 and R-04 review; if residual lock detected, LT-05 triggered.
Retention Tag	7 years.

DV-08 — Unwind Correctness: Zero Residual Lock

Field	Content
Objective	Confirm that every trade subject to a partial DvP unwind (Section 10.3.1) shows zero residual lock on both legs after unwind completion (PDU-05 confirmed).
Pass Condition	For every unwound trade_id: DvP-EP-02 and DvP-EP-03 both show state = UNWOUND; DvP-EP-04 symmetry record shows "unwound" state; no open lock entry exists for the trade_id in the current lock state index.
Fail Condition	Any unwound trade_id with a residual LOCKED state on either leg; any trade_id in the unwind log (PDU-01 through PDU-08) that does not appear in DvP-EP-04 with an UNWOUND state.
Evidence Inputs	DvP-EP-02; DvP-EP-03; DvP-EP-04; Unwind initiation record (PDU-01); Unwind authorization record (PDU-02).
Frequency	Per-unwind event; weekly aggregate check.
Escalation Trigger	Any residual lock: LT-05 immediate; R-01 and R-06 convene; R-03 notified.
Retention Tag	7 years.

DV-09 — Settled-Without-Payment Detection

Field	Content
Objective	Confirm that no trade exists in a state where the asset-leg shows RELEASED (delivery completed) but the cash-leg shows any state other than RELEASED.
Pass Condition	Zero trades in review period where DvP-EP-02 state = RELEASED and DvP-EP-03 state ≠ RELEASED (excluding authorized asymmetric-hold records with documented justification).
Fail Condition	Any trade_id where asset delivered but cash not confirmed released; any such trade without an authorized asymmetric-hold record signed by R-03 and R-09.
Evidence Inputs	DvP-EP-02; DvP-EP-03; DvP-EP-04; FIN-EP-02 (state machine log, to confirm finality state).
Frequency	Continuous (automated alert); daily summary.
Escalation Trigger	Any detection: LT-02 immediate; R-01, R-03, R-07 notified within 2 hours; preservation bundle triggered.
Retention Tag	7 years; indefinite for any identified instance.

DV-10 — Payment-Without-Delivery Detection

Field	Content
Objective	Confirm that no trade exists in a state where the cash-leg shows RELEASED (payment completed) but the asset-leg shows any state other than RELEASED.

Field	Content
Pass Condition	Zero trades where DvP-EP-03 state = RELEASED and DvP-EP-02 state ≠ RELEASED (excluding authorized asymmetric-hold records).
Fail Condition	Any trade_id where payment released but delivery not confirmed; any such trade without an authorized asymmetric-hold record.
Evidence Inputs	DvP-EP-02; DvP-EP-03; DvP-EP-04; FIN-EP-02.
Frequency	Continuous (automated alert); daily summary.
Escalation Trigger	Same as DV-09.
Retention Tag	7 years; indefinite for any identified instance.

Domain FN — Finality Marker Integrity (Checks FN-01 through FN-04)

FN-01 — Finality Marker Uniqueness

Field	Content
Objective	Confirm that every finality marker event (FIN-EP-01) is unique per trade_id; no trade_id carries more than one active finality marker at any point in time.
Pass Condition	The finality marker index contains exactly one marker per trade_id; no duplicate trade_id entries with status = ACTIVE.
Fail Condition	Any trade_id with two or more active finality markers; any trade_id where a superseded marker was not recorded in FIN-EP-05 (exception record) upon replacement.
Evidence Inputs	FIN-EP-01 (full marker index); FIN-EP-05 (exception records).
Frequency	Daily (automated deduplication check).
Escalation Trigger	Any duplicate: LT-03 immediate; R-01 and R-03 convene reconciliation.
Retention Tag	7 years.

FN-02 — Finality State Machine Completeness

Field	Content
Objective	Confirm that every trade with an active finality marker has a complete, unbroken state-machine log (FIN-EP-02) showing all required state transitions from PENDING to OPERATIONALLY FINAL (or REVERSED/UNWOUND, with corresponding FIN-EP-05 record).
Pass Condition	Every finality-marked trade_id has a FIN-EP-02 log with: at least one entry per required state; monotonically increasing timestamps; no gap between consecutive states exceeding the defined transition window (operator-configured).
Fail Condition	Any trade_id with a missing state; any timestamp gap exceeding defined window; any finality state achieved without a prior CONDITIONALLY FINAL state (unless a documented accelerated-finality exception exists).
Evidence Inputs	FIN-EP-02; FIN-EP-01 (marker reference).

Field	Content
Frequency	Per-finality event; daily batch validation.
Escalation Trigger	Any gap or missing state: LT-03; R-01 and R-02 convene; R-07 notified if gap > 24 hours unresolved.
Retention Tag	7 years.

FN-03 — Reconciliation Checkpoint at Finality

Field	Content
Objective	Confirm that every trade reaching OPERATIONALLY FINAL state has a reconciliation checkpoint record (FIN-EP-04) showing open breaks = 0 at the time of finality confirmation.
Pass Condition	Every finality-marked trade_id has a FIN-EP-04 record timestamped within the defined window before or concurrent with the OPERATIONALLY FINAL state entry in FIN-EP-02; open breaks field = 0.
Fail Condition	Any finality-marked trade without a FIN-EP-04 record; any FIN-EP-04 record showing open breaks > 0 at finality; any FIN-EP-04 record timestamped after the OPERATIONALLY FINAL state entry.
Evidence Inputs	FIN-EP-04; FIN-EP-02 (for timestamp cross-reference).
Frequency	Per-finality event; daily batch check.
Escalation Trigger	Any fail: LT-03; R-01 and R-06 convene reconciliation; R-03 notified.
Retention Tag	7 years.

FN-04 — Finality Exception Record Completeness

Field	Content
Objective	Confirm that every finality exception event — contested marker, reversed marker, or marker under review — has a complete FIN-EP-05 record with root cause, corrective action, and resolution status.
Pass Condition	Every FIN-EP-05 record has all required fields populated; resolution status is either RESOLVED (with resolution timestamp and method) or OPEN (with estimated resolution date and current responsible role). No FIN-EP-05 record has been open for longer than the defined maximum review window (operator-configured).
Fail Condition	Any finality exception event without a FIN-EP-05 record; any FIN-EP-05 record open beyond the maximum review window without a documented extension authorization from R-03 and R-07.
Evidence Inputs	FIN-EP-05; FIN-EP-01 (for marker reference); FIN-EP-02 (for state context).
Frequency	Weekly; examiner on demand.
Escalation Trigger	Any open record beyond maximum window: LT-03 escalation; immediate R-07 notification.
Retention Tag	Indefinite.

Domain LQ — Liquidity Gate, Queue, and Concentration (Checks LQ-01 through LQ-10)

LQ-01 — Gate Activation Dual-Authorization Completeness

Field	Content
Objective	Confirm that every gate activation in the review period has a dual-authorization record consistent with RACI Table 9.2-C, with distinct individuals per role.
Pass Condition	Every LEA-04 gate activation record has two authorizing entries from distinct role holders; role assignments verified against current role registry.
Fail Condition	Any gate activation with a single authorizer; any activation where the two authorizers share the same role; any activation record missing identity or timestamp fields.
Evidence Inputs	LEA-04 (gate activation log); role registry.
Frequency	Per-activation event; weekly aggregate.
Escalation Trigger	Any fail: LT-04 immediate; R-03 and R-07 notified.
Retention Tag	7 years.

LQ-02 — Gate Activation Supervisory Notification Within SLA

Field	Content
Objective	Confirm that for every LG-02, LG-04, or LG-05 gate activation, a supervisory notification was delivered to R-07 within the SLA defined in Table 7.4-A.
Pass Condition	Every qualifying gate activation has a supervisory notification record timestamped within: 4 hours for LG-02; 4 hours for LG-04; 2 hours for LG-05.
Fail Condition	Any qualifying activation where the notification record is absent; any notification timestamped after the applicable SLA window.
Evidence Inputs	LEA-04 (activation timestamp); supervisory notification record (from RACI Table 9.2-C, R-02 → R-07).
Frequency	Per-activation event; weekly aggregate.
Escalation Trigger	Any SLA breach: LT-04 escalation; R-03 notified; retroactive notification issued and logged.
Retention Tag	7 years.

LQ-03 — Gate Status Update Records (30-Minute Cadence While Active)

Field	Content
Objective	Confirm that while any gate is active, status update records appear in LEA-04 at intervals not exceeding the defined cadence (30 minutes, per Section 7.2.3).
Pass Condition	For every active gate period, the gap between consecutive LEA-04 status update entries does not exceed 30 minutes; each update contains current queue depth, funding availability, and escalation-actions-taken field.
Fail	Any gap between updates exceeding 30 minutes during an active gate period; any

Field	Content
Condition	update record missing required fields.
Evidence Inputs	LEA-04 (status update entries, sorted by timestamp).
Frequency	Real-time automated monitoring; daily summary.
Escalation Trigger	Any gap > 45 minutes: alert to R-01 and R-02; retroactive update generated with gap notation.
Retention Tag	7 years.

LQ-04 — Gate Deactivation Authorization and EP Delta

Field	Content
Objective	Confirm that every gate deactivation event has a deactivation authorization record (per RACI Table 9.2-C) and that an event-driven EP Delta was generated at deactivation.
Pass Condition	Every LEA-04 deactivation entry has: deactivation trigger documented; dual-authorization record (R-01 + R-02/R-03 per gate type); timestamp; EP Delta reference ID generated within the defined window post-deactivation (e.g., ≤ 1 hour).
Fail Condition	Any deactivation without a dual-authorization record; any deactivation without a corresponding EP Delta reference.
Evidence Inputs	LEA-04 (deactivation entries); EP Delta index.
Frequency	Per-deactivation event; weekly aggregate.
Escalation Trigger	Any fail: R-03 notified; retroactive EP Delta generated with gap notation.
Retention Tag	7 years.

LQ-05 — Queue FIFO Ordering Integrity

Field	Content
Objective	Confirm that the settlement queue (LEA-05) processes submissions in FIFO order by receipt timestamp, absent a documented priority override.
Pass Condition	For every queue drain event, the sequence of processed submissions matches ascending receipt-timestamp order; any out-of-order processing is matched 1-to-1 with a priority override authorization record (dual-authorized, per RACI Table 9.2-C).
Fail Condition	Any out-of-order processing without a corresponding priority override record; any priority override record lacking dual authorization.
Evidence Inputs	LEA-05 (queue manifest with receipt timestamps and processing sequence); priority override authorization records.
Frequency	Per-queue-drain event; weekly.
Escalation Trigger	Any unexcused ordering violation: R-01 and R-02 review; if repeated, LT-04 pattern escalation.
Retention	7 years.

Field	Content
Tag	

LQ-06 — Queue TTL Enforcement

Field	Content
Objective	Confirm that every submission that exceeded the queue TTL was returned to the submitting participant with a logged rejection event, and that no submission was processed after TTL expiry.
Pass Condition	Every LEA-05 entry with status = EXPIRED has a corresponding rejection event log and participant notification record; no submission timestamped as PROCESSED has a processing timestamp after its TTL expiry timestamp.
Fail Condition	Any expired submission processed after TTL expiry; any expired submission without a rejection event log or participant notification.
Evidence Inputs	LEA-05 (queue manifest with TTL and processing timestamps); rejection event log; participant notification log.
Frequency	Per-queue event; daily automated check.
Escalation Trigger	Any TTL violation: immediate R-01 review; if post-TTL processing confirmed, LT-02 liability trigger.
Retention Tag	7 years.

LQ-07 — Queue Manifest Final-State Completeness

Field	Content
Objective	Confirm that every queue lifecycle (formation through closure) produces a final-state LEA-05 snapshot with queue depth = 0 or a documented exception list for any non-zero residuals.
Pass Condition	Every queue-closure record in LEA-05 shows queue depth = 0; if depth > 0 at closure, an exception list is attached with submission IDs, status, and resolution path.
Fail Condition	Any queue closure record without a final-state snapshot; any final-state snapshot showing depth > 0 without an exception list; any exception list item without a documented resolution path.
Evidence Inputs	LEA-05 (closure records).
Frequency	Per-queue-closure; weekly aggregate.
Escalation Trigger	Any non-zero depth without exception list: R-01 and R-02 immediate review.
Retention Tag	7 years.

LQ-08 — Concentration Metric Monitoring Completeness

Field	Content
Objective	Confirm that concentration metrics CM-01 through CM-05 (Section 7.3) were computed and logged at the required monitoring frequency throughout the review period, with no gaps exceeding the defined interval.

Field	Content
Pass Condition	LEA-03 contains entries for all five metrics at every required monitoring interval; no gap in the time series exceeds the defined interval (e.g., 15-minute rolling for CM-03; daily for CM-01 and CM-02); all threshold comparisons are recorded.
Fail Condition	Any metric absent from a required interval; any gap exceeding the defined interval without a documented system-outage explanation; any threshold breach not recorded as an alert event.
Evidence Inputs	LEA-03 (concentration monitoring log).
Frequency	Daily automated completeness check.
Escalation Trigger	Any gap > 2× defined interval: R-01 and R-02 notified; retroactive metric estimation not permitted; gap noted in EP Delta.
Retention Tag	7 years.

LQ-09 — Large-Holder Early-Warning Process Evidence

Field	Content
Objective	Confirm that every soft-threshold breach of CM-01 or CM-02 triggered the large-holder early-warning sequence (Section 7.3.2) and produced a documented stress assessment record (LEA-07).
Pass Condition	Every LEA-03 alert event corresponding to a soft-threshold breach on CM-01 or CM-02 has a corresponding LEA-07 record with: scenario tested, funding gap result, and contingency actions taken (or "no gap identified" with supporting metric values).
Fail Condition	Any CM-01 or CM-02 soft-threshold breach without a corresponding LEA-07 record; any LEA-07 record missing required fields.
Evidence Inputs	LEA-03 (alert events); LEA-07 (stress assessment records).
Frequency	Per-alert event; weekly aggregate.
Escalation Trigger	Any missing LEA-07: R-02 notified; retroactive assessment conducted and noted as late in LEA-07 record.
Retention Tag	7 years.

LQ-10 — Funding Buffer Coverage Ratio Continuous Monitoring

Field	Content
Objective	Confirm that CM-04 (Funding Buffer Coverage Ratio) remained at or above the defined floor throughout the review period; any breach triggered the appropriate escalation response.
Pass Condition	LEA-03 shows CM-04 \geq floor at every monitoring interval; any interval where CM-04 < floor has a corresponding LEA-04 or LEA-07 entry documenting the escalation response within the defined reaction window.
Fail Condition	Any interval where CM-04 < floor without a documented escalation response; any interval where CM-04 was not computed.
Evidence Inputs	LEA-03 (CM-04 time series); LEA-04 (gate activation records, for cross-reference if gate was triggered); LEA-07 (stress assessment).

Field	Content
Frequency	Daily automated; continuous alert.
Escalation Trigger	Any floor breach without documented response: LT-04; R-01 and R-02 immediate review.
Retention Tag	7 years.

Domain YS — Yield Separation Boundary Compliance (Checks YS-01 through YS-03)

YS-01 — Boundary Test Record Currency

Field	Content
Objective	Confirm that every instrument currently active on the settlement rail has a current, non-expired Boundary Test Record (DvP-EP-08 / DISC-EP-04) classifying it within the P1–P4 taxonomy.
Pass Condition	Every active instrument has a DvP-EP-08 record with: classification (P1/P2/P3/P4); classification date; scheduled recertification date that has not elapsed; determiner identity and role.
Fail Condition	Any active instrument without a DvP-EP-08 record; any record whose recertification date has elapsed without a renewal or reclassification record; any record whose determiner is not a currently authorized role.
Evidence Inputs	DvP-EP-08 (boundary test records); active instrument registry; role registry.
Frequency	Weekly; examiner on demand.
Escalation Trigger	Any expired record: DC alert; R-02 initiates recertification within 5 business days.
Retention Tag	7 years; indefinite on reclassification.

YS-02 — P4 Yield Disbursement Funding Isolation

Field	Content
Objective	Confirm that all P4 yield disbursements during the review period were funded exclusively from a funding pool designated for the yield program, with no draw on the funding pool serving P1–P3 settlement rails (absent a documented LG-04 gate authorization).
Pass Condition	The LEA-02 (intraday funding utilization log) shows no funding draw tagged to P4 yield disbursements against a P1/P2/P3 funding source; any cross-source draw has a corresponding LG-04 activation record in LEA-04 with dual authorization.
Fail Condition	Any P4 disbursement draw against a P1/P2/P3 funding source without a corresponding authorized LG-04 record; any LG-04 record that is missing dual authorization.
Evidence Inputs	LEA-02 (funding utilization, tagged by category); LEA-04 (LG-04 records); DvP-EP-08 (instrument classification for cross-reference).
Frequency	Daily automated; weekly summary.

Field	Content
Escalation Trigger	Any unauthorized cross-draw: LT-07 (yield commingling); R-02 and R-09 convene immediately; R-07 notified within 2 hours.
Retention Tag	7 years.

YS-03 — P4 Disclosure Structural Separation Statement Currency

Field	Content
Objective	Confirm that every active P4 yield program has a current, non-expired disclosure document containing the mandatory structural separation statement (P4-D03) and payment-rail non-dependency statement (P4-D04).
Pass Condition	Every P4 program has a DISC-EP-01 entry with disclosure version referencing a document containing P4-D03 and P4-D04; document TTL has not elapsed; participant acknowledgment records (DISC-EP-02) are current for all enrolled participants.
Fail Condition	Any P4 program without a current disclosure version; any disclosure missing P4-D03 or P4-D04; any participant without a current acknowledgment record.
Evidence Inputs	DISC-EP-01 (disclosure version register); DISC-EP-02 (participant acknowledgment log); active P4 program registry.
Frequency	Weekly; examiner on demand.
Escalation Trigger	Any expired disclosure: LT-06; R-02 initiates recertification; participant notified.
Retention Tag	7 years.

Domain DC — Disclosure, TTL, and Post-Access Review (Checks DC-01 through DC-06)

DC-01 — Examiner Access Logging Completeness (TTL Enforcement)

Field	Content
Objective	Confirm that every examiner or supervisory access to any EP artifact during the review period is recorded in DISC-EP-05 within the required logging window.
Pass Condition	DISC-EP-05 contains an entry for every access event; each entry has: accessor identity and role, purpose, scope of records accessed, timestamp, and access duration. No access event is unlogged.
Fail Condition	Any access event not reflected in DISC-EP-05; any DISC-EP-05 entry missing required fields; any entry where scope description is absent or exceeds the authorized purpose documented in the access request.
Evidence Inputs	DISC-EP-05; access request records (from examiner request handling, RACI Table 9.2-E).
Frequency	Per-access event; weekly aggregate.
Escalation Trigger	Any unlogged access: LT-09 immediate; R-03 and R-09 convene; preservation bundle triggered for affected artifacts.
Retention Tag	7 years.

DC-02 — Post-Access Review Completion Within SLA

Field	Content
Objective	Confirm that every access event logged in DISC-EP-05 has a completed post-access review record within the SLA defined in Section 8.5 (5 business days for Tier 1; 2 business days for Tier 2).
Pass Condition	Every DISC-EP-05 entry has a corresponding Post-Access Review Record timestamped within the applicable SLA; review records confirm: access within scope, TTL honored, no over-collection.
Fail Condition	Any DISC-EP-05 entry without a corresponding review record; any review record completed after the applicable SLA; any review record that identifies an out-of-scope access without a corresponding LT-09 incident record.
Evidence Inputs	DISC-EP-05 (access events); Post-Access Review Records.
Frequency	Weekly automated check.
Escalation Trigger	Any SLA breach: R-03 notified; retroactive review conducted with gap notation; if out-of-scope access confirmed, LT-09 triggered.
Retention Tag	7 years.

DC-03 — Participant Access Notification Completeness (Post-Access)

Field	Content
Objective	Confirm that participants were notified of supervisory access to records pertaining to their activity within the TTL established in the applicable access request, consistent with investigation constraints (Section 8.5).
Pass Condition	For every access event where investigation constraints do not prohibit notification, a participant notification record exists and is timestamped within the defined notification window post-review-completion.
Fail Condition	Any access event where notification was due (no investigation constraint applied) but no participant notification record exists; any notification record issued beyond the defined window without a documented investigation-constraint exception authorized by R-09.
Evidence Inputs	DISC-EP-05; Post-Access Review Records; participant notification log.
Frequency	Weekly.
Escalation Trigger	Any missing notification: R-02 and R-09 review; retroactive notification issued with delay notation.
Retention Tag	7 years.

DC-04 — Disclosure Version Register Currency

Field	Content
Objective	Confirm that the Disclosure Version Register (DISC-EP-01) contains a current, non-expired version entry for every active instrument in every active category (P1–P4).

Field	Content
Pass Condition	DISC-EP-01 contains one active entry per instrument per category; TTL has not elapsed for any entry; superseded versions are marked as such with supersession date.
Fail Condition	Any active instrument/category pair without a DISC-EP-01 entry; any entry with elapsed TTL and no recertification or update record; any entry marked as both ACTIVE and SUPERSEDED.
Evidence Inputs	DISC-EP-01; active instrument registry.
Frequency	Weekly automated; examiner on demand.
Escalation Trigger	Any elapsed TTL without recertification: LT-06; R-02 initiates update within 5 business days.
Retention Tag	7 years.

DC-05 — Participant Disclosure Acknowledgment Currency

Field	Content
Objective	Confirm that every active participant has a current acknowledgment record in DISC-EP-02 for the disclosure version in effect for each instrument they hold or transact.
Pass Condition	For every active participant–instrument pair, DISC-EP-02 contains an acknowledgment record referencing the current disclosure version (per DISC-EP-01) with timestamp not preceding the current version's effective date.
Fail Condition	Any participant–instrument pair without a DISC-EP-02 record; any record referencing a superseded disclosure version without a re-acknowledgment record for the current version; any record predating the current version's effective date.
Evidence Inputs	DISC-EP-02; DISC-EP-01 (for current version and effective date cross-reference).
Frequency	Weekly automated; per-transaction check at DvP gate (DV-03 cross-reference).
Escalation Trigger	Any stale or missing acknowledgment: LT-06; R-02 notifies participant; transactions held pending re-acknowledgment per DV-03 gate check.
Retention Tag	7 years.

DC-06 — Material Change EP Delta Completeness

Field	Content
Objective	Confirm that every material change event (per Section 8.3 trigger list) has a corresponding event-driven EP Delta generated within the required window (≤ 1 hour of trigger).
Pass Condition	For every logged material change event in the review period, an EP Delta exists with generation timestamp within 1 hour of the trigger event; each Delta contains the authorizing officer certification and required artifact list.
Fail Condition	Any material change event without a corresponding EP Delta; any EP Delta generated beyond the 1-hour window without a documented system-outage justification; any EP Delta missing the authorizing officer certification.
Evidence Inputs	Material change event log; EP Delta index (with generation timestamps).

Field	Content
Frequency	Daily automated; examiner on demand.
Escalation Trigger	Any missing or late Delta: LT-10; R-03 notified; retroactive Delta generated with gap notation.
Retention Tag	7 years.

Domain PB — Preservation Bundle Completeness (Checks PB-01 through PB-03)

PB-01 — Preservation Bundle Trigger Coverage

Field	Content
Objective	Confirm that every event qualifying as a preservation bundle trigger (per Section 8.4.1) resulted in a preservation bundle being generated.
Pass Condition	Every qualifying trigger event in the review period has a corresponding preservation bundle entry in the bundle index, with bundle generation timestamp within the defined window of the trigger event.
Fail Condition	Any qualifying trigger event without a preservation bundle; any bundle generated beyond the defined window without a documented justification authorized by R-03.
Evidence Inputs	Trigger event log (L3/L4 records, finality exceptions, examiner requests, incident declarations, dispute records, offboarding initiations, boundary dispute records); preservation bundle index.
Frequency	Per-trigger event; weekly aggregate.
Escalation Trigger	Any missing bundle: R-03 and R-09 immediate review; retroactive bundle generated as Supplemental Bundle (Section 8.4.3) with gap notation.
Retention Tag	Indefinite.

PB-02 — Preservation Bundle Integrity Manifest Verification

Field	Content
Objective	Confirm that the integrity manifest of every preservation bundle passes hash verification (all artifact hashes match re-computed hashes of current archive copies).
Pass Condition	For every preservation bundle in the archive, hash verification of all artifacts in the integrity manifest returns MATCH; bundle root hash matches re-computed root.
Fail Condition	Any artifact hash mismatch; any bundle root hash mismatch; any bundle whose integrity manifest is absent or does not contain all required artifacts per Table 8.4-A.
Evidence Inputs	Preservation bundle integrity manifests; archive copies of bundle artifacts.
Frequency	Monthly automated verification; on-demand examiner request.
Escalation Trigger	Any hash mismatch: LT-08 immediate; R-03, R-09, and R-07 notified; forensic investigation initiated.
Retention Tag	Indefinite.

PB-03 — Preservation Bundle Access Control Audit

Field	Content
Objective	Confirm that every access to a preservation bundle was logged as a Bundle Access Event and was within the authorized scope for the accessor (per Section 8.4.3).
Pass Condition	Every Bundle Access Event record contains: accessor identity and role, purpose, scope of artifacts accessed, timestamp. Every accessor falls within the authorized categories for the specific bundle (generating operator personnel, examiner for whom bundle was generated, or specifically authorized participant).
Fail Condition	Any bundle access without a Bundle Access Event record; any accessor not in an authorized category without a documented R-03-authorized exception; any access where artifacts accessed exceed the documented scope.
Evidence Inputs	Bundle Access Event records (DISC-EP-05 extension); bundle authorization records.
Frequency	Monthly; examiner on demand.
Escalation Trigger	Any unauthorized access: LT-08 immediate; forensic investigation.
Retention Tag	Indefinite.

Domain GOV — Governance, RACI, and Liability Triggers (Checks GOV-01 through GOV-10)

GOV-01 — Separation-of-Duties Compliance: DvP Override

Field	Content
Objective	Confirm that every DvP gate override in the review period was authorized by R-01 and R-03 as distinct individuals (no same-individual dual authorization).
Pass Condition	All override records show two distinct individuals with distinct roles (R-01 and R-03); role registry confirms both individuals were actively assigned to those roles at the time of authorization.
Fail Condition	Any override authorized by a single individual; any override where both authorizers hold the same role; any override where role registry does not confirm active role assignment at authorization time.
Evidence Inputs	DvP-EP-01 (override authorization records); role registry.
Frequency	Weekly.
Escalation Trigger	Any fail: LT-02; R-11 (Change Control Authority) reviews; disciplinary process per governance procedures.
Retention Tag	7 years.

GOV-02 — Separation-of-Duties Compliance: Hold Release

Field	Content
Objective	Confirm that every hold release in the review period was authorized by R-03 (approver) and implemented by R-04 (implementer) as distinct individuals, with

Field	Content
	R-09 legal review for above-threshold releases.
Pass Condition	All hold release records show R-03 and R-04 as distinct individuals; above-threshold releases additionally show an R-09 legal review record.
Fail Condition	Any release where approver and implementer are the same individual; any above-threshold release without R-09 review; any release record missing role identification.
Evidence Inputs	Hold release authorization records; role registry.
Frequency	Weekly.
Escalation Trigger	Any fail: LT-01; R-03 and R-09 immediate review; R-07 notified.
Retention Tag	7 years.

GOV-03 — RACI Assignment Currency

Field	Content
Objective	Confirm that the role registry and RACI matrices are current: all active roles are assigned to named individuals; no role is vacant; any RACI modification in the review period has a Change Control Authority record.
Pass Condition	Role registry shows a named individual for every role R-01 through R-12; no role has been vacant for longer than the defined maximum vacancy window (e.g., 5 business days); every RACI modification in the review period has a documented R-11 approval record and an EP Delta.
Fail Condition	Any role vacancy beyond the defined window; any RACI modification without an R-11 record; any R-11 record without quorum documentation (minimum two members).
Evidence Inputs	Role registry; R-11 meeting records; EP Delta index (for RACI change Deltas).
Frequency	Monthly; on any role change event.
Escalation Trigger	Any vacancy beyond window: R-03 notified; interim assignment documented within 24 hours.
Retention Tag	7 years.

GOV-04 — No-Master-Key Control: Finality Marker Issuance

Field	Content
Objective	Confirm that every finality marker issuance (FIN-EP-01) is supported by a dual-role confirmation record (R-01 issuer + R-02 confirmer, distinct individuals).
Pass Condition	All FIN-EP-01 records show two distinct individuals with distinct roles; no marker is recorded without the dual-role confirmation field populated.
Fail Condition	Any marker with a single-role confirmation; any marker where issuer and confirmer are the same individual; any marker missing the confirmation field.
Evidence Inputs	FIN-EP-01 (dual-role confirmation field); role registry.

Field	Content
Frequency	Daily (automated check per marker issuance).
Escalation Trigger	Any fail: LT-03 immediate; R-03 and R-07 notified.
Retention Tag	7 years.

GOV-05 — No-Master-Key Control: LG-05 Emergency Suspension

Field	Content
Objective	Confirm that every LG-05 emergency suspension activation has a dual-authorization record (R-08 + R-03, sequential within defined window) or documents an auto-revert if the second authorization was not received within the window.
Pass Condition	Every LG-05 activation record shows either: (a) R-08 and R-03 authorizations with the second authorization timestamped within the defined window (e.g., 30 minutes of first); or (b) an auto-revert record confirming reversion to LG-02 posture when the second authorization was not received within the window.
Fail Condition	Any LG-05 activation with a single authorization remaining active beyond the defined window without reversion; any activation record missing the R-08 or R-03 identity fields.
Evidence Inputs	LEA-04 (LG-05 activation records); auto-revert logs.
Frequency	Per-activation event; weekly aggregate.
Escalation Trigger	Any single-authorization activation beyond window: LT-04 immediate; R-03 and R-07 notified.
Retention Tag	7 years.

GOV-06 — Recertification Completion on Material Change

Field	Content
Objective	Confirm that every material change event (per Section 8.3) that requires recertification (per Section 12.3) has a completed recertification record within the defined window.
Pass Condition	Every material change event in the review period that triggered a recertification requirement has a completed recertification record dated within the defined window (e.g., 30 days for standard; 5 business days for urgent); record shows recertifying officer identity and role.
Fail Condition	Any material change event requiring recertification without a completed recertification record within the defined window; any recertification record missing officer identity or role.
Evidence Inputs	Material change event log; recertification records; EP Delta (for change reference).
Frequency	Monthly; per material change event.
Escalation Trigger	Any overdue recertification: R-03 notified; operations suspended for affected control domain pending completion if risk assessment warrants.
Retention Tag	7 years.

GOV-07 — Liability Trigger Response Within SLA

Field	Content
Objective	Confirm that every detected liability trigger event (LT-01 through LT-10, Section 9.3) received the required immediate operational response and supervisory notification within the applicable SLA.
Pass Condition	Every liability trigger event record has: immediate response action documented; supervisory notification timestamp within the SLA defined in Table 9.3-A; root-cause investigation initiated within 24 hours.
Fail Condition	Any liability trigger event without a documented immediate response; any notification beyond the SLA without a documented emergency justification; any event without an investigation record.
Evidence Inputs	LT-series incident records; supervisory notification records; investigation reports.
Frequency	Weekly aggregate; per-event on detection.
Escalation Trigger	Any SLA breach: R-03 immediate review; escalation to R-07 regardless of original notification status.
Retention Tag	7 years; indefinite for unresolved events.

GOV-08 — Liability Trigger Investigation Closure

Field	Content
Objective	Confirm that every liability trigger investigation has a closure record with root-cause determination, corrective action implemented, and recurrence-prevention documentation.
Pass Condition	Every LT-series incident record has a closure record showing: root cause (must be one of defined categories or documented as "novel" with full analysis); corrective action implemented (with implementation timestamp); recurrence-prevention measure (control enhancement, playbook update, or training record).
Fail Condition	Any investigation open beyond the defined maximum window without a documented extension authorized by R-03 and R-07; any closure record missing root-cause or corrective-action fields.
Evidence Inputs	LT-series incident records; investigation reports; corrective action logs; playbook or control update records.
Frequency	Monthly; per-closure event.
Escalation Trigger	Any overdue investigation: R-03 and R-07 joint review.
Retention Tag	7 years; indefinite for LT-08 (tampering) and LT-02 (settlement-without-gate).

GOV-09 — Supervisory Notification Accuracy

Field	Content
Objective	Confirm that all supervisory notifications delivered to R-07 during the review period were accurate, complete, and not materially misleading at the time of delivery.
Pass	A sample of supervisory notification records (minimum 10% or all if < 20 in period)

Field	Content
Condition	is compared to the underlying event records; no material discrepancy in timing, scope, or factual content is identified.
Fail Condition	Any notification where stated timing differs from event record by > defined tolerance; any notification omitting material facts documented in the event record at the time of notification; any notification delivered to an incorrect recipient.
Evidence Inputs	Supervisory notification records; underlying event records (gate activation logs, incident records, finality exception records as applicable).
Frequency	Quarterly sample review; examiner on demand.
Escalation Trigger	Any material inaccuracy: R-03 and R-09 immediate review; corrective notification issued; R-11 reviews notification procedures.
Retention Tag	7 years.

GOV-10 — Offboarding Proof Bundle Completeness (If Offboarding Occurred)

Field	Content
Objective	If an offboarding event occurred in the review period, confirm that the offboarding proof bundle (Section 10.2) contains all required artifacts (OB-S01 through OB-S10), passes integrity manifest verification, and was delivered to R-07.
Pass Condition	Offboarding proof bundle integrity manifest hash verification: MATCH for all artifacts; all ten OB-S steps have corresponding artifacts; R-07 delivery receipt recorded; decommissioning gate conditions DC-G01 through DC-G08 all confirmed.
Fail Condition	Any missing artifact from OB-S01 through OB-S10; any hash mismatch; any decommissioning gate condition not confirmed; no R-07 delivery receipt.
Evidence Inputs	Offboarding proof bundle integrity manifest; OB-series artifacts; decommissioning authorization record.
Frequency	Per-offboarding event; one-time post-event.
Escalation Trigger	Any fail: LT-08 (if tampering) or LT-10 (if documentation gap); decommissioning halted pending resolution.
Retention Tag	Indefinite.

11.3 Examiner Query Pack (Conceptual SQL / Pseudocode)

All queries are expressed in implementation-agnostic pseudocode. Operators must implement functionally equivalent queries against their immutable log and EP artifact stores. Field names follow the naming conventions established in Sections 7, 8, 9, and 10. All queries assume read-only access scoped to the examiner's authorized purpose and TTL window (DISC-EP-05 access must be logged before query execution).

Q-DV-01 — DvP Gate Completeness Scan

-- Returns all settled trades missing a complete gate log or with a FAIL gate result.

SELECT

```

t.trade_id,
t.settlement_timestamp,
g.gate_result,
g.missing_checks,      -- null if all checks present
g.override_flag,
g.override_auth_count  -- must be 2 for authorized override
FROM settlements t
LEFT JOIN dvp_gate_log g ON t.trade_id = g.trade_id
WHERE
    g.trade_id IS NULL          -- no gate log at all
    OR g.gate_result = 'FAIL'  -- failed gate, check for
override
    OR (g.override_flag = TRUE
        AND g.override_auth_count < 2)  -- override without dual auth
    OR g.missing_checks IS NOT NULL    -- incomplete gate record
ORDER BY t.settlement_timestamp DESC;

```

Examiner interpretation: Any non-empty result set is a CO-01 / LT-02 indicator requiring investigation. Cross-reference override records with the role registry for separation-of-duties verification.

Q-DV-02 — Gate Override Audit Trail

-- Returns all gate overrides with authorizer roles and timestamps for SOD verification.

```

SELECT
    g.trade_id,
    g.gate_execution_timestamp,
    g.override_justification,
    a1.authorizer_id AS auth_1_id,
    a1.authorizer_role AS auth_1_role,
    a1.auth_timestamp AS auth_1_time,
    a2.authorizer_id AS auth_2_id,
    a2.authorizer_role AS auth_2_role,
    a2.auth_timestamp AS auth_2_time,
    CASE
        WHEN a1.authorizer_id = a2.authorizer_id THEN 'SOD_VIOLATION'
        WHEN a1.authorizer_role = a2.authorizer_role THEN 'ROLE_OVERLAP'
    
```

```

        ELSE 'COMPLIANT'
    END AS sod_status
FROM dvp_gate_log g
JOIN gate_override_auth a1 ON g.trade_id = a1.trade_id AND a1.seq = 1
JOIN gate_override_auth a2 ON g.trade_id = a2.trade_id AND a2.seq = 2
WHERE g.override_flag = TRUE
ORDER BY g.gate_execution_timestamp DESC;

```

Q-DV-03 — Escrow Lock Symmetry Check

-- Detects asymmetric lock states between asset-leg and cash-leg per trade.

```

SELECT
    al.trade_id,
    al.lock_state      AS asset_leg_state,
    al.lock_timestamp AS asset_lock_ts,
    al.release_timestamp AS asset_release_ts,
    cl.lock_state      AS cash_leg_state,
    cl.lock_timestamp AS cash_lock_ts,
    cl.release_timestamp AS cash_release_ts,
    ABS(EPOCH(al.lock_timestamp) - EPOCH(cl.lock_timestamp))
        AS lock_timestamp_delta_ms,
    CASE
        WHEN al.lock_state != cl.lock_state THEN 'ASYMMETRIC_STATE'
        WHEN ABS(EPOCH(al.lock_timestamp) - EPOCH(cl.lock_timestamp))
            > :tolerance_ms THEN 'TIMESTAMP_TOLERANCE_BREACH'
        ELSE 'SYMMETRIC'
    END AS symmetry_status
FROM dvp_asset_leg_locks al
JOIN dvp_cash_leg_locks cl ON al.trade_id = cl.trade_id
WHERE symmetry_status != 'SYMMETRIC'
ORDER BY al.lock_timestamp DESC;

```

Parameter: `:tolerance_ms` = operator-configured atomic-execution tolerance (e.g., 500 ms).

Q-DV-04 — Settled-Without-Payment and Payment-Without-Delivery Detection

-- C0-05 / LT-05: detects principal-risk residual states.

```

SELECT

```

```

al.trade_id,
al.lock_state AS asset_leg_state,
cl.lock_state AS cash_leg_state,
fm.finality_state,
CASE
    WHEN al.lock_state = 'RELEASED' AND cl.lock_state != 'RELEASED'
        THEN 'SETTLED_WITHOUT_PAYMENT'
    WHEN cl.lock_state = 'RELEASED' AND al.lock_state != 'RELEASED'
        THEN 'PAYMENT_WITHOUT_DELIVERY'
    ELSE 'OK'
END AS risk_flag
FROM dvp_asset_leg_locks al
JOIN dvp_cash_leg_locks cl ON al.trade_id = cl.trade_id
LEFT JOIN finality_markers fm ON al.trade_id = fm.trade_id
WHERE risk_flag != 'OK'
    AND NOT EXISTS (
        -- exclude authorized asymmetric
        holds
        SELECT 1 FROM asymmetric_hold_auth ah
        WHERE ah.trade_id = al.trade_id
            AND ah.auth_role_1 = 'R-03'
            AND ah.auth_role_2 = 'R-09'
    )
ORDER BY al.trade_id;

```

Q-DV-05 — Timeout and Unwind Residual Lock Detection

-- Confirms that timed-out and unwound trades carry zero residual locks.

```

SELECT
    t.trade_id,
    t.event_type,          -- 'TIMEOUT' or 'UNWIND'
    t.event_timestamp,
    al.lock_state AS asset_leg_current_state,
    cl.lock_state AS cash_leg_current_state,
    CASE
        WHEN al.lock_state NOT IN ('EXPIRED', 'UNWOUND') THEN
'RESIDUAL_ASSET_LOCK'

```

```

        WHEN cl.lock_state NOT IN ('EXPIRED', 'UNWOUND') THEN
'RESIDUAL_CASH_LOCK'
        ELSE 'CLEAN'
    END AS residual_status
FROM dvp_timeout_unwind_log t
JOIN dvp_asset_leg_locks al ON t.trade_id = al.trade_id
JOIN dvp_cash_leg_locks cl ON t.trade_id = cl.trade_id
WHERE residual_status != 'CLEAN'
ORDER BY t.event_timestamp DESC;

```

Q-FN-01 — Finality Marker Integrity and Uniqueness

-- Detects duplicate markers, missing state-machine logs, and open-break finality.

```

SELECT
    fm.trade_id,
    COUNT(fm.marker_id)                AS marker_count,
    sm.state_at_final,
    sm.open_breaks_at_final,
    sm.state_machine_complete_flag,
    CASE
        WHEN COUNT(fm.marker_id) > 1                THEN 'DUPLICATE_MARKER'
        WHEN sm.trade_id IS NULL                      THEN 'MISSING_STATE_MACHINE'
        WHEN sm.open_breaks_at_final > 0             THEN 'OPEN_BREAKS_AT_FINALITY'
        WHEN sm.state_machine_complete_flag = FALSE  THEN 'INCOMPLETE_STATE_MACHINE'
    ELSE 'COMPLIANT'
    END AS integrity_flag
FROM finality_markers fm
LEFT JOIN finality_state_machine_log sm ON fm.trade_id = sm.trade_id
    AND sm.state_at_final = 'OPERATIONALLY_FINAL'
GROUP BY fm.trade_id, sm.state_at_final, sm.open_breaks_at_final,
    sm.state_machine_complete_flag, sm.trade_id
HAVING integrity_flag != 'COMPLIANT'
ORDER BY fm.trade_id;

```

Q-FN-02 — Finality Status Distribution and Anomaly Scan

-- Provides distribution of finality states; flags anomalies (stale PENDING, reversed without exception record).

```
SELECT
    fm.finality_state,
    COUNT(*)                AS trade_count,
    MIN(fm.state_timestamp) AS earliest,
    MAX(fm.state_timestamp) AS latest,
    SUM(CASE WHEN fm.finality_state = 'PENDING'
           AND EPOCH(NOW()) - EPOCH(fm.state_timestamp) > :stale_threshold_s
           THEN 1 ELSE 0 END) AS stale_pending_count,
    SUM(CASE WHEN fm.finality_state IN ('REVERSED', 'UNWOUND')
           AND NOT EXISTS (
               SELECT 1 FROM finality_exceptions fe
               WHERE fe.trade_id = fm.trade_id
           )
           THEN 1 ELSE 0 END) AS reversed_without_exception_count
FROM finality_state_machine_log fm
WHERE fm.state_timestamp BETWEEN :period_start AND :period_end
GROUP BY fm.finality_state
ORDER BY fm.finality_state;
```

Parameter: :stale_threshold_s = operator-configured pending-state staleness threshold (e.g., 86400 s = 24 hours).

Q-LQ-01 — Queue Integrity and Gate Activation Event Timeline

-- Returns the full timeline of gate activations, queue formations, updates, and deactivations.

```
SELECT
    g.event_id,
    g.event_type,           -- ACTIVATION, STATUS_UPDATE, DEACTIVATION
    g.gate_type,           -- LG-01 through LG-05
    g.event_timestamp,
    g.queue_depth_at_event,
    g.funding_availability_at_event,
    g.auth_count,
```

```

g.supervisory_notification_timestamp,
EPOCH(g.supervisory_notification_timestamp)
  - EPOCH(g.event_timestamp) AS notification_lag_s,
CASE
  WHEN g.auth_count < 2
    AND g.gate_type IN ('LG-02','LG-04','LG-05')
    THEN 'AUTH_DEFICIT'
  WHEN g.event_type = 'STATUS_UPDATE'
    AND g.seconds_since_prior_update > 1800
    THEN 'CADENCE_BREACH'
  WHEN notification_lag_s > :notification_sla_s
    THEN 'NOTIFICATION_SLA_BREACH'
  ELSE 'COMPLIANT'
END AS compliance_flag
FROM gate_lifecycle_log g
WHERE g.event_timestamp BETWEEN :period_start AND :period_end
ORDER BY g.event_timestamp ASC;

```

Q-LQ-02 — Gate Activation Without Authorization Anomaly

-- Isolates gate activations lacking required dual authorization records.

```

SELECT
  g.gate_id,
  g.gate_type,
  g.activation_timestamp,
  g.auth_record_count,
  g.auth_role_1,
  g.auth_role_2,
CASE
  WHEN g.auth_record_count < 2
    THEN 'SINGLE_AUTH'
  WHEN g.auth_role_1 = g.auth_role_2
    THEN 'ROLE_OVERLAP'
  WHEN g.auth_id_1 = g.auth_id_2
    THEN 'SAME_INDIVIDUAL'
  ELSE 'COMPLIANT'
END AS auth_flag
FROM gate_activations g
WHERE auth_flag != 'COMPLIANT'

```

```
ORDER BY g.activation_timestamp DESC;
```

Q-LQ-03 — Settlement Queue FIFO Ordering and TTL Compliance

-- Detects out-of-order queue processing and expired submissions processed after TTL.

```
SELECT
    q.queue_id,
    q.submission_id,
    q.receipt_timestamp,
    q.processing_timestamp,
    q.queue_position_at_receipt,
    q.actual_processing_sequence,
    q.ttl_expiry_timestamp,
    q.status,          -- PROCESSED, EXPIRED, RETURNED, OVERRIDE
CASE
    WHEN q.actual_processing_sequence < q.queue_position_at_receipt
        AND q.override_auth_flag = FALSE
        THEN 'UNEXCUSED_FIFO_VIOLATION'
    WHEN q.status = 'PROCESSED'
        AND q.processing_timestamp > q.ttl_expiry_timestamp
        THEN 'POST_TTL_PROCESSING'
    WHEN q.status = 'EXPIRED'
        AND q.participant_notification_flag = FALSE
        THEN 'MISSING_EXPIRY_NOTIFICATION'
    ELSE 'COMPLIANT'
END AS queue_flag
FROM queue_manifest q
WHERE queue_flag != 'COMPLIANT'
ORDER BY q.receipt_timestamp ASC;
```

Q-LQ-04 — Queue Depth and Gate Duration Analysis

-- Summarizes gate active periods, peak queue depths, and processing outcomes.

```
SELECT
    g.gate_id,
    g.gate_type,
```

```

g.activation_timestamp,
g.deactivation_timestamp,
EPOCH(g.deactivation_timestamp) - EPOCH(g.activation_timestamp)
                                AS gate_duration_s,
MAX(q.queue_depth_at_event)      AS peak_queue_depth,
SUM(CASE WHEN q.status = 'PROCESSED' THEN 1 ELSE 0 END) AS processed_count,
SUM(CASE WHEN q.status = 'EXPIRED'   THEN 1 ELSE 0 END) AS expired_count,
SUM(CASE WHEN q.status = 'RETURNED'  THEN 1 ELSE 0 END) AS returned_count
FROM gate_lifecycle_log g
LEFT JOIN queue_manifest q ON q.gate_id = g.gate_id
WHERE g.event_type IN ('ACTIVATION','DEACTIVATION')
GROUP BY g.gate_id, g.gate_type, g.activation_timestamp,
g.deactivation_timestamp
ORDER BY g.activation_timestamp DESC;

```

Q-LQ-05 — Concentration and Run-Like Dynamics Indicators

-- Detects periods where concentration metrics breached thresholds, flagging run-like dynamics.

```

SELECT
    c.metric_id,          -- CM-01 through CM-05
    c.measurement_timestamp,
    c.metric_value,
    c.soft_threshold,
    c.hard_threshold,
    c.alert_generated_flag,
    CASE
        WHEN c.metric_value >= c.hard_threshold THEN 'HARD_BREACH'
        WHEN c.metric_value >= c.soft_threshold THEN 'SOFT_BREACH'
        ELSE 'NORMAL'
    END AS threshold_status,
    ea.stress_assessment_id, -- LEA-07 reference; null if missing
    CASE
        WHEN threshold_status IN ('SOFT_BREACH','HARD_BREACH')
            AND ea.stress_assessment_id IS NULL
            THEN 'MISSING_STRESS_ASSESSMENT'
        ELSE 'DOCUMENTED'
    END

```

```

        END AS documentation_flag
FROM concentration_monitoring_log c
LEFT JOIN stress_assessments ea
    ON c.measurement_timestamp BETWEEN ea.assessment_window_start
        AND ea.assessment_window_end
    AND ea.triggered_metric = c.metric_id
WHERE threshold_status != 'NORMAL'
    OR documentation_flag = 'MISSING_STRESS_ASSESSMENT'
ORDER BY c.measurement_timestamp DESC;

```

Q-LQ-06 — Funding Buffer Coverage Ratio Time Series

-- Returns CM-04 time series with floor breach indicators and escalation response verification.

```

SELECT
    c.measurement_timestamp,
    c.metric_value          AS coverage_ratio,
    c.floor_threshold,
    CASE
        WHEN c.metric_value < c.floor_threshold THEN 'FLOOR_BREACH'
        ELSE 'ABOVE_FLOOR'
    END AS floor_status,
    g.gate_type             AS escalation_gate_triggered,
    g.activation_timestamp AS gate_activation_ts,
    EPOCH(g.activation_timestamp) - EPOCH(c.measurement_timestamp)
        AS reaction_lag_s
FROM concentration_monitoring_log c
LEFT JOIN gate_activations g
    ON g.activation_timestamp BETWEEN c.measurement_timestamp
        AND DATEADD('minute', :reaction_window_m,
            c.measurement_timestamp)
    AND g.gate_type IN ('LG-01', 'LG-02', 'LG-03', 'LG-04', 'LG-05')
WHERE c.metric_id = 'CM-04'
    AND (floor_status = 'FLOOR_BREACH'
        OR g.gate_type IS NOT NULL)
ORDER BY c.measurement_timestamp ASC;

```

Q-YS-01 — Yield Separation Funding Isolation Audit

-- Detects P4 disbursement draws against P1/P2/P3 funding sources.

```
SELECT
    f.transaction_id,
    f.funding_source_id,
    f.funding_category,    -- P1, P2, P3, or P4
    f.draw_amount,
    f.draw_timestamp,
    f.purpose_tag,          -- tagged at draw time: SETTLEMENT or
YIELD_DISBURSEMENT
    lg.gate_id            AS lg04_authorization, -- null if no LG-04 gate
CASE
    WHEN f.purpose_tag = 'YIELD_DISBURSEMENT'
        AND f.funding_category IN ('P1','P2','P3')
        AND lg.gate_id IS NULL
        THEN 'UNAUTHORIZED_COMMINGLING'
    WHEN f.purpose_tag = 'YIELD_DISBURSEMENT'
        AND f.funding_category IN ('P1','P2','P3')
        AND lg.gate_id IS NOT NULL
        THEN 'AUTHORIZED_CROSS_DRAW'
    ELSE 'COMPLIANT'
END AS commingling_flag
FROM funding_utilization_log f
LEFT JOIN gate_activations lg
    ON lg.gate_type = 'LG-04'
    AND lg.activation_timestamp <= f.draw_timestamp
    AND (lg.deactivation_timestamp IS NULL
        OR lg.deactivation_timestamp >= f.draw_timestamp)
WHERE commingling_flag != 'COMPLIANT'
ORDER BY f.draw_timestamp DESC;
```

Q-YS-02 — Boundary Test Record Expiry Scan

-- Identifies instruments with expired or missing boundary test records.

```
SELECT
```

```

i.instrument_id,
i.instrument_category,      -- P1, P2, P3, P4
bt.boundary_test_id,
bt.classification_date,
bt.recertification_due_date,
bt.determiner_role,
CASE
    WHEN bt.boundary_test_id IS NULL          THEN 'NO_RECORD'
    WHEN bt.recertification_due_date < NOW()  THEN 'EXPIRED'
    WHEN bt.recertification_due_date < DATEADD('day', 30, NOW())
                                                THEN 'EXPIRING_SOON'
    ELSE 'CURRENT'
END AS record_status
FROM active_instruments i
LEFT JOIN boundary_test_records bt ON i.instrument_id = bt.instrument_id
    AND bt.record_status = 'ACTIVE'
WHERE record_status != 'CURRENT'
ORDER BY bt.recertification_due_date ASC;

```

Q-DC-01 — TTL / Purpose-Limitation Access Audit

-- Returns all examiner access events with TTL compliance and post-access review status.

```

SELECT
    a.access_event_id,
    a.accessor_id,
    a.accessor_role,
    a.access_purpose,
    a.authorized_scope,
    a.artifacts_accessed,
    a.access_timestamp,
    a.access_duration_s,
    a.ttl_window_end,
    par.review_timestamp,
    par.review_outcome,      -- IN_SCOPE, OUT_OF_SCOPE, OVER_COLLECTION
    EPOCH(par.review_timestamp) - EPOCH(a.access_timestamp)

```

```

                AS review_lag_s,
CASE
    WHEN par.review_timestamp IS NULL           THEN 'REVIEW_MISSING'
    WHEN par.review_outcome != 'IN_SCOPE'      THEN 'SCOPE_VIOLATION'
    WHEN a.access_timestamp > a.ttl_window_end
                                                THEN 'TTL_EXPIRED_AT_ACCESS'

    WHEN review_lag_s > :tier1_sla_s
         AND a.access_tier = 'TIER_1'          THEN 'REVIEW_SLA_BREACH'
    WHEN review_lag_s > :tier2_sla_s
         AND a.access_tier = 'TIER_2'          THEN 'REVIEW_SLA_BREACH'
    ELSE 'COMPLIANT'
END AS ttl_compliance_flag
FROM examiner_access_log a
LEFT JOIN post_access_reviews par ON a.access_event_id = par.access_event_id
WHERE a.access_timestamp BETWEEN :period_start AND :period_end
      AND ttl_compliance_flag != 'COMPLIANT'
ORDER BY a.access_timestamp DESC;

Parameters: :tier1_sla_s = 432000 s (5 business days); :tier2_sla_s = 172800 s (2
business days).

```

Q-DC-02 — Disclosure Version and Acknowledgment Currency Check

-- Returns participants with stale or missing disclosure acknowledgments.

```

SELECT
    p.participant_id,
    i.instrument_id,
    i.instrument_category,
    dv.current_version_id,
    dv.version_effective_date,
    dv.ttl_expiry_date,
    pa.acknowledged_version_id,
    pa.acknowledgment_timestamp,
CASE
    WHEN pa.participant_id IS NULL             THEN 'NO_ACKNOWLEDGMENT'
    WHEN pa.acknowledged_version_id
         != dv.current_version_id              THEN 'STALE_VERSION'

```

```

        WHEN dv.ttl_expiry_date < NOW()                THEN 'DISCLOSURE_EXPIRED'
        ELSE 'CURRENT'
    END AS acknowledgment_status
FROM active_participants p
CROSS JOIN active_instruments i
LEFT JOIN disclosure_version_register dv
    ON dv.instrument_id = i.instrument_id
    AND dv.record_status = 'ACTIVE'
LEFT JOIN participant_acknowledgments pa
    ON pa.participant_id = p.participant_id
    AND pa.instrument_id = i.instrument_id
WHERE acknowledgment_status != 'CURRENT'
ORDER BY p.participant_id, i.instrument_id;

```

Q-GOV-01 — Separation-of-Duties Compliance Scan

```

-- Detects all sensitive actions where the same individual performed two
-- roles that must be held by distinct individuals (per Section 9.4).

```

```

SELECT
    ar.action_id,
    ar.action_type,          -- e.g., DVP_OVERRIDE, HOLD_RELEASE, MARKER_ISSUANCE
    ar.action_timestamp,
    ar.role_1_actor_id,
    ar.role_1_type,
    ar.role_2_actor_id,
    ar.role_2_type,
    CASE
        WHEN ar.role_1_actor_id = ar.role_2_actor_id THEN 'SAME_INDIVIDUAL'
        WHEN ar.role_1_type = ar.role_2_type           THEN 'SAME_ROLE_TYPE'
        ELSE 'COMPLIANT'
    END AS sod_flag
FROM authorization_records ar
WHERE sod_flag != 'COMPLIANT'
    AND ar.action_timestamp BETWEEN :period_start AND :period_end
ORDER BY ar.action_timestamp DESC;

```

Q-GOV-02 — Liability Trigger Event Detection and SLA Monitoring

-- Returns all liability trigger events, response records, and SLA compliance.

```
SELECT
    lt.event_id,
    lt.trigger_type,          -- LT-01 through LT-10
    lt.detection_timestamp,
    lt.immediate_response_timestamp,
    lt.supervisory_notification_timestamp,
    lt.investigation_open_timestamp,
    lt.closure_timestamp,
    :sla_map[lt.trigger_type] AS notification_sla_s,
    EPOCH(lt.supervisory_notification_timestamp)
      - EPOCH(lt.detection_timestamp) AS notification_lag_s,
CASE
    WHEN lt.immediate_response_timestamp IS NULL
        THEN 'NO_IMMEDIATE_RESPONSE'
    WHEN notification_lag_s > :sla_map[lt.trigger_type]
        THEN 'NOTIFICATION_SLA_BREACH'
    WHEN lt.closure_timestamp IS NULL
        AND EPOCH(NOW()) - EPOCH(lt.detection_timestamp)
        > :max_investigation_s
        THEN 'INVESTIGATION_OVERDUE'
    ELSE 'COMPLIANT'
END AS sla_status
FROM liability_trigger_events lt
WHERE lt.detection_timestamp BETWEEN :period_start AND :period_end
ORDER BY lt.detection_timestamp DESC;
```

Parameter: :sla_map = associative map of trigger type to notification SLA seconds, per Table 9.3-A.

Q-GOV-03 — Supervisory Notification Accuracy Sample

-- Cross-references supervisory notification content against underlying event records

-- for a sampled set of notifications in the review period.

```
SELECT
```

```

n.notification_id,
n.notification_timestamp,
n.stated_event_type,
n.stated_event_timestamp,
n.stated_scope,
e.actual_event_type,
e.actual_event_timestamp,
e.actual_scope,
ABS(EPOCH(n.stated_event_timestamp)
    - EPOCH(e.actual_event_timestamp)) AS timestamp_delta_s,
CASE
    WHEN n.stated_event_type != e.actual_event_type
        THEN 'EVENT_TYPE_MISMATCH'
    WHEN timestamp_delta_s > :ts_tolerance_s
        THEN 'TIMESTAMP_INACCURACY'
    WHEN n.stated_scope != e.actual_scope
        THEN 'SCOPE_MISMATCH'
    ELSE 'ACCURATE'
END AS accuracy_flag
FROM supervisory_notifications n
JOIN underlying_event_records e ON n.event_reference_id = e.event_id
WHERE n.notification_timestamp BETWEEN :period_start AND :period_end
    AND n.notification_id IN (
        -- 10% sample or all if < 20
        SELECT notification_id
        FROM supervisory_notifications
        WHERE notification_timestamp BETWEEN :period_start AND :period_end
        ORDER BY RANDOM()
        LIMIT GREATEST(
            CEIL(0.1 * COUNT(*) OVER()),
            20
        )
    )
HAVING accuracy_flag != 'ACCURATE'
ORDER BY n.notification_timestamp DESC;

```

Q-OB-01 — Offboarding Proof Bundle Completeness Check

-- Verifies that all required OB-S01 through OB-S10 artifacts exist in the
-- offboarding proof bundle and that the final reconciliation is balanced.

```
SELECT
    ob.bundle_id,
    ob.trigger_class,
    ob.bundle_generation_timestamp,
    ob.open_breaks_at_final,
    ob.participant_count,
    ob.chain_of_custody_complete_flag,
    ob.ep_archive_hash_verified_flag,
    ob.supervisory_delivery_timestamp,
    (SELECT COUNT(*) FROM bundle_artifacts ba
     WHERE ba.bundle_id = ob.bundle_id) AS artifact_count,
CASE
    WHEN artifact_count < 10 THEN 'INCOMPLETE_ARTIFACTS'
    WHEN ob.open_breaks_at_final > 0
         AND ob.exception_list_attached_flag = FALSE
         THEN 'UNRESOLVED_BREAKS'
    WHEN ob.chain_of_custody_complete_flag = FALSE
         THEN 'COC_INCOMPLETE'
    WHEN ob.ep_archive_hash_verified_flag = FALSE
         THEN 'ARCHIVE_HASH_FAIL'
    WHEN ob.supervisory_delivery_timestamp IS NULL
         THEN 'NO_SUPERVISORY_DELIVERY'
    ELSE 'COMPLETE'
END AS bundle_status
FROM offboarding_proof_bundles ob
WHERE ob.bundle_generation_timestamp BETWEEN :period_start AND :period_end
ORDER BY ob.bundle_generation_timestamp DESC;
```

Q-OB-02 — Decommissioning Gate Condition Verification

-- Confirms all eight decommissioning gate conditions were confirmed before
-- any infrastructure decommissioning proceeded.

```
SELECT
```

```

d.decommission_record_id,
d.authorized_decommission_start,
d.dc_g01_confirmed, d.dc_g01_confirmed_by, d.dc_g01_confirmed_at,
d.dc_g02_confirmed, d.dc_g02_confirmed_by, d.dc_g02_confirmed_at,
d.dc_g03_confirmed, d.dc_g03_confirmed_by, d.dc_g03_confirmed_at,
d.dc_g04_confirmed, d.dc_g04_confirmed_by, d.dc_g04_confirmed_at,
d.dc_g05_confirmed, d.dc_g05_confirmed_by, d.dc_g05_confirmed_at,
d.dc_g06_confirmed, d.dc_g06_confirmed_by, d.dc_g06_confirmed_at,
d.dc_g07_confirmed, d.dc_g07_confirmed_by, d.dc_g07_confirmed_at,
d.dc_g08_confirmed, d.dc_g08_confirmed_by, d.dc_g08_confirmed_at,
CASE
    WHEN NOT (d.dc_g01_confirmed AND d.dc_g02_confirmed
              AND d.dc_g03_confirmed AND d.dc_g04_confirmed
              AND d.dc_g05_confirmed AND d.dc_g06_confirmed
              AND d.dc_g07_confirmed AND d.dc_g08_confirmed)
              THEN 'INCOMPLETE_GATES'
    ELSE 'ALL_GATES_CONFIRMED'
END AS gate_status
FROM decommissioning_authorization_records d
ORDER BY d.authorized_decommission_start DESC;

```

Q-OB-03 — Post-Decommissioning Archive Access Verification

```

-- Confirms that post-decommissioning archive access remains functional
-- by checking the most recent archive access test results.

```

```

SELECT
    at.test_id,
    at.test_timestamp,
    at.artifact_types_tested,
    at.access_success_flag,
    at.access_latency_ms,
    at.tested_by_role,
CASE
    WHEN at.access_success_flag = FALSE      THEN 'ACCESS_FAILURE'
    WHEN at.access_latency_ms > :max_latency_ms
              THEN 'LATENCY_THRESHOLD_BREACH'

```

```

WHEN EPOCH(NOW()) - EPOCH(at.test_timestamp)
    > :max_test_age_s
    THEN 'TEST_OVERDUE'
ELSE 'ACCESSIBLE'
END AS archive_status
FROM archive_access_tests at
ORDER BY at.test_timestamp DESC
LIMIT 10;

```

12. Scale & Steady-State Operations (Baseline-Aligned)

12.1 Operating Metrics and Reporting Template

Steady-state operations require continuous production of operating metrics and their integration into the EP structure. The metrics framework below reuses the reporting posture established in Baselines B and C (Appendix F — Metrics and Reporting Template) and extends it for payments and settlement control domains.

12.1.1 Metric Categories

Table 12.1-A — Operating Metric Categories

Category	Metric Domain	Primary Audience	Cadence
M-DV	DvP execution quality	Settlement Operator, Compliance, Examiner	Daily, with monthly trend
M-FN	Finality integrity	Settlement Operator, Compliance, Examiner	Daily, with monthly trend
M-LQ	Liquidity and gate performance	Settlement Operator, Compliance, Examiner	Daily intraday; weekly summary
M-YS	Yield separation compliance	Compliance, Examiner	Weekly
M-DC	Disclosure and TTL compliance	Compliance	Weekly
M-GOV	Governance and RACI health	Compliance, Change Control Authority	Monthly
M-OB	Offboarding and unwind readiness	Compliance, Examiner	Quarterly; per-event

12.1.2 Standard Operating Metrics (Paste-Ready Reporting Template)

Table 12.1-B — Standard Metrics Definition

Metric ID	Metric Name	Calculation	Target	Alert Threshold	Source Artifact
M-DV-01	DvP Settlement Success Rate	Settled trades / total submitted trades (excluding gate-	≥ 99.5%	< 98%	DvP-EP-01, DvP-EP-05

Metric ID	Metric Name	Calculation	Target	Alert Threshold	Source Artifact
		returned) × 100			
M-DV-02	Gate Override Rate	Overrides / total gate executions × 100	< 0.5%	≥ 1%	DvP-EP-01 (override flag)
M-DV-03	Escrow Symmetry Rate	Symmetric lock pairs / total lock pairs × 100	100%	< 100% (any instance)	DvP-EP-04
M-DV-04	Timeout Rate	Timed-out submissions / total submitted × 100	< 2%	≥ 5%	DvP-EP-06
M-DV-05	Post-Timeout Residual Lock Rate	Timed-out trades with residual lock / total timed-out × 100	0%	Any instance > 0	DvP-EP-06, DvP-EP-02, DvP-EP-03
M-FN-01	Finality Marker Uniqueness Rate	Unique markers / total markers × 100	100%	Any duplicate	FIN-EP-01
M-FN-02	State Machine Completeness Rate	Trades with complete FIN-EP-02 logs / total finality-marked × 100	100%	< 100% (any instance)	FIN-EP-02
M-FN-03	Open-Break-at-Finality Rate	Trades with open breaks at finality / total finality-marked × 100	0%	Any instance > 0	FIN-EP-04
M-FN-04	Finality Exception Rate	FIN-EP-05 records / total finality-marked × 100	< 0.1%	≥ 0.5%	FIN-EP-05
M-LQ-01	Gate Activation Frequency	Count of gate activations per operating day (rolling 30-day average)	Operator-set baseline	2× baseline	LEA-04
M-LQ-02	Average Gate Duration	Mean gate active duration per activation (minutes)	Operator-set baseline	2× baseline	LEA-04
M-LQ-03	Peak Queue Depth	Maximum queue depth recorded per gate activation	Operator-set baseline	2× baseline	LEA-05
M-LQ-04	Queue TTL Expiry Rate	Expired submissions / total queued submissions × 100	< 5%	≥ 15%	LEA-05
M-LQ-05	Funding Buffer Floor	Count of CM-04	0	≥ 2 in 30	LEA-03

Metric ID	Metric Name	Calculation	Target	Alert Threshold	Source Artifact
	Breach Frequency	floor breaches per 30-day period		days	
M-LQ-06	Concentration Soft-Threshold Breach Rate	Count of CM-01 or CM-02 soft-threshold breaches per 30-day period	Operator-set baseline	3× baseline	LEA-03
M-YS-01	Boundary Test Record Currency Rate	Current boundary test records / total active instruments × 100	100%	< 100%	DvP-EP-08
M-YS-02	Unauthorized Commingling Instances	Count of LT-07 events per quarter	0	Any instance	Commingling incident log
M-DC-01	Disclosure TTL Currency Rate	Current disclosure versions / active instrument–category pairs × 100	100%	< 100%	DISC-EP-01
M-DC-02	Participant Acknowledgment Currency Rate	Current acknowledgments / active participant–instrument pairs × 100	100%	< 100%	DISC-EP-02
M-DC-03	Post-Access Review SLA Compliance Rate	Reviews completed within SLA / total access events × 100	100%	< 100%	Post-Access Review Records
M-GOV-01	Liability Trigger Notification SLA Compliance Rate	Notifications within SLA / total LT events × 100	100%	< 100%	LT-series incident records
M-GOV-02	RACI Vacancy Rate	Vacant roles / total defined roles × 100	0%	Any vacancy > 5 business days	Role registry
M-GOV-03	Material Change EP Delta Timeliness Rate	Deltas within 1-hour window / total material change events × 100	100%	< 100%	EP Delta index
M-GOV-04	Recertification On-Time Completion Rate	On-time completions / due recertifications × 100	100%	< 95%	Recertification records

12.1.3 Quarterly Reporting Package (Paste-Ready Template)

QUARTERLY OPERATING REPORT – PAYMENTS & SETTLEMENT CONSTITUTION

Reporting Period: [Q{N} YYYY: {start_date} through {end_date}]

Operator: [Settlement Operator identity / role]
Prepared By: [R-02 Compliance Officer identity]
Authorized By: [R-03 Senior Compliance Officer identity]
Submitted To: [R-07 Supervisory Authority]
Report Generation TS: [UTC timestamp]

=== SECTION 1: EXECUTIVE SUMMARY ===

Operating Posture Range: [L0 / L1 / L2 reached during period]
Gate Activations: [Count by type: LG-01 through LG-05]
Liability Trigger Events: [Count by type LT-01 through LT-10; 0 if none]
Preservation Bundles Generated: [Count; trigger types]
Material Changes: [Count; EP Delta references]
Recertifications Completed: [Count; any overdue with explanation]

=== SECTION 2: DvP EXECUTION METRICS (M-DV-01 through M-DV-05) ===

[Table: Metric ID | Value | Target | Status (ON TARGET / ALERT)]

=== SECTION 3: FINALITY INTEGRITY METRICS (M-FN-01 through M-FN-04) ===

[Table: Metric ID | Value | Target | Status]

=== SECTION 4: LIQUIDITY AND GATE METRICS (M-LQ-01 through M-LQ-06) ===

[Table: Metric ID | Value | Target | Status]

Gate Activation Narratives: [Brief narrative per activation: trigger, duration, resolution]

=== SECTION 5: YIELD SEPARATION METRICS (M-YS-01 through M-YS-02) ===

[Table: Metric ID | Value | Target | Status]

=== SECTION 6: DISCLOSURE AND TTL METRICS (M-DC-01 through M-DC-03) ===

[Table: Metric ID | Value | Target | Status]

=== SECTION 7: GOVERNANCE METRICS (M-GOV-01 through M-GOV-04) ===

[Table: Metric ID | Value | Target | Status]

=== SECTION 8: INCIDENT AND LIABILITY TRIGGER SUMMARY ===

[Table per LT event: Event ID | Trigger Type | Detection TS | Response TS | Notification TS | Notification SLA Met | Closure Status]

=== SECTION 9: STANDARD CHECKS SUMMARY ===

[Table: Check ID | Pass Count | Fail Count | Fail Details | Remediation Status]

=== SECTION 10: OPEN ITEMS AND REMEDIATION TRACKING ===

[Table: Item ID | Type | Detection Date | Due Date | Responsible Role | Status]

=== SECTION 11: UPCOMING RECERTIFICATIONS AND MATERIAL CHANGES ===

[Table: Item | Due Date | Responsible Role | Pre-Action Required]

=== INTEGRITY ATTESTATION ===

"All metrics and narratives in this report accurately reflect the underlying EP artifacts and immutable logs for the reporting period. No material fact has been omitted. Evidence artifacts supporting all metrics are available for examiner review on request."

Compliance Officer: [identity, role, timestamp]

Sr. Compliance Officer: [identity, role, timestamp]

12.2 Continuous Control Monitoring Cadence and Storage

Continuous control monitoring is the ongoing, automated process of evaluating control effectiveness between examiner reviews. It produces the evidence that populates EP Deltas and feeds the quarterly reporting package. Monitoring results are themselves evidence artifacts subject to immutable logging and retention requirements.

12.2.1 Monitoring Cadence by Domain

Table 12.2-A — Continuous Control Monitoring Cadence

Domain	Monitoring Interval	Automated Alert Threshold	Evidence Artifact	Storage Requirement
DvP Gate (CO-01, CO-02)	Per-trade (real-time)	Any gate failure or asymmetry	DvP-EP-01, DvP-EP-04 update	Immutable append-only log; hash-chained
Finality Integrity (CO-04, CO-05)	Per-finality event (real-time)	Any duplicate marker, open break at finality	FIN-EP-01, FIN-EP-04 update	Immutable append-only log
Liquidity Metrics	CM-01, CM-02: daily	Per threshold	LEA-03 time	Time-series store; daily

Domain	Monitoring Interval	Automated Alert Threshold	Evidence Artifact	Storage Requirement
(CO-06, CO-07, CO-08)	close + intraday at 15-min intervals; CM-03: 15-min rolling; CM-04: continuous; CM-05: daily	definition (Table 7.3-A)	series	snapshot exported to EP-Core
Gate Lifecycle (CO-06)	Per-event (real-time)	Any cadence breach (LQ-03 check)	LEA-04	Immutable append-only log
Queue State (CO-07)	Per-submission event	FIFO violation, TTL breach	LEA-05	Immutable append-only log
Yield Separation (CO-09)	Per P4 disbursement event	Any cross-category draw without LG-04	LEA-02 (tagged)	Immutable append-only log
Disclosure TTL (CO-10, CO-12)	Daily scan of DISC-EP-01	Any TTL within 14 days of expiry; any elapsed TTL	DISC-EP-01 expiry scan log	Daily snapshot; alert events logged
Post-Access Review (CO-10)	Per-access event + daily SLA check	Any review overdue per SLA	Post-Access Review Records	Immutable log
RACI Currency (CO-13)	Weekly	Any role vacancy; any RACI modification without R-11 record	Role registry audit log	Weekly snapshot
Liability Triggers (CO-14)	Real-time event monitoring	Any LT-series trigger condition detected	LT-series incident records	Immutable log; immediate alert

12.2.2 Monitoring Infrastructure Requirements

- Append-Only Log Store:** All real-time monitoring events must be written to an append-only, hash-chained log store. Write operations are one-way; no modification or deletion is permitted. The log store must support: concurrent writes from multiple monitoring processes; per-event cryptographic hash computation; periodic attestation of hash-chain integrity (minimum daily).
- Time-Series Store for Metrics:** Liquidity and concentration metrics require a time-series store capable of: sub-minute write latency; efficient range queries by metric_id and timestamp; export of daily snapshots to the EP-Core store in standard format.
- Alert Routing:** All automated alerts generated by threshold breaches or control failures must be routed to the applicable role (per RACI) within the defined SLA. Alert routing is itself logged: each alert has a dispatch record (timestamp, recipient role, delivery confirmation) stored in the monitoring infrastructure log.
- Storage Segregation:** Monitoring infrastructure logs must be stored separately from the settlement execution infrastructure to prevent a single system failure from destroying both operational records and monitoring evidence. Geographic separation consistent with the disaster recovery specifications in Baseline B (Appendix J.5) applies.

5. **Monitoring Results as EP Inputs:** At each EP Delta cadence point (Section 8.3), the monitoring infrastructure must export a monitoring summary artifact to the EP-Core store. This artifact lists: metrics computed in the period, alert events, check pass/fail counts, and any anomalies detected. The monitoring summary artifact is part of the standard EP and is available to examiners.

12.3 Recertification Cadence and Material Change Criteria

12.3.1 Recertification Cadence

Recertification is the periodic re-confirmation that controls are operating as designed, that role assignments are current, and that disclosure documents are accurate. The table below defines the standard recertification cadence for payments and settlement controls.

Table 12.3-A — Recertification Cadence

Control Domain	Recertification Type	Standard Cadence	Triggering Material Change (Accelerated)	Responsible Role	Output Artifact
DvP Gate Logic	Full review of gate check definitions, override authorization requirements, and pass/fail criteria.	Quarterly	Any modification to gate logic; any LT-02 event.	R-11 + R-02	DvP gate recertification record; EP Delta
Finality Conditions	Review of finality state definitions, transition rules, quorum requirements, and exception criteria.	Quarterly	Any modification to finality logic (FIN-EP-06 trigger); any LT-03 event.	R-11 + R-02	Finality recertification record; EP Delta
Liquidity Gate Thresholds	Review of gate trigger thresholds, queue TTL, concentration metric floors, and escalation ladder postures.	Semi-annually	Any gate threshold change; two or more LG-02/LG-05 activations in a 60-day period.	R-01 + R-02 + R-03	Liquidity gate recertification record; EP Delta
Funding Source Register	Confirmation that all active funding sources (LEA-01) remain eligible, authorized, and within defined limits.	Monthly	Any new funding source; any limit change; any collateral substitution.	R-01 + R-02	LEA-01 update; EP Delta
Disclosure Documents (P1–P4)	Review of all disclosure schema fields; TTL renewal or document update.	Per TTL (operator-configured; maximum 12	Any change to instrument terms, boundary test reclassification, or	R-02	Updated disclosure version; DISC-EP-01 update; EP Delta

Control Domain	Recertification Type	Standard Cadence	Triggering Material Change (Accelerated)	Responsible Role	Output Artifact
		months)	yield separation structure.		
Role Registry and RACI	Confirmation that all roles R-01 through R-12 are assigned; RACI matrices are current and reflect operational practice.	Quarterly	Any role change; any RACI modification; any separation-of-duties violation identified.	R-11 + R-03	Role registry audit record; EP Delta
Boundary Test Records (P1–P4)	Re-examination of classification criteria for all active instruments.	Annually (or per individual record TTL, whichever is sooner)	Any change to instrument economics, yield feature addition/removal, or regulatory guidance affecting classification.	R-02 + R-09	Updated DvP-EP-08 / DISC-EP-04; EP Delta
Standard Checks Pack	Review of check definitions, thresholds, frequencies, and escalation triggers for continued fitness.	Annually	Any material control failure revealing a check gap; any new control domain added.	R-11 + R-02	Standard checks recertification record
Examiner Query Pack	Review of query logic for continued accuracy against current schema and artifact naming.	Annually; or on any schema change.	Any log schema update; any EP artifact naming change.	R-01 + R-04 + R-02	Query pack recertification record

12.3.2 Material Change Criteria (Payments and Settlement Specific)

The following criteria define a material change for the purposes of accelerated recertification, event-driven EP Delta generation, and supervisory notification. This list supplements the general material change trigger list in Section 8.3.

Table 12.3-B — Payments and Settlement Material Change Criteria

Criteria ID	Change Description	Accelerated Recertification Domains	Supervisory Notification Required
MC-PS-01	Any modification to DvP gate check definitions, precondition list, or gate pass/fail logic.	DvP Gate Logic; Standard Checks Pack	Yes — within EP Delta
MC-PS-02	Any change to escrow lock/release mechanics, including atomic execution tolerance window.	DvP Gate Logic; Finality Conditions	Yes
MC-PS-03	Any change to finality state definitions, transition rules, or	Finality Conditions	Yes — within 24 hours

Criteria ID	Change Description	Accelerated Recertification Domains	Supervisory Notification Required
	quorum requirements.		
MC-PS-04	Any change to liquidity gate trigger thresholds or queue TTL values.	Liquidity Gate Thresholds	Yes — within EP Delta
MC-PS-05	Addition, termination, or limit change of any funding source in LEA-01.	Funding Source Register	Yes if limit change exceeds 20% of prior limit
MC-PS-06	Any reclassification of an instrument across the P1–P4 taxonomy.	Boundary Test Records; Disclosure Documents	Yes — within 24 hours
MC-PS-07	Addition of a new instrument to the settlement rail.	Boundary Test Records; Disclosure Documents	Yes — before first DvP execution
MC-PS-08	Any change to the yield separation structure (P4 program launch, modification, or termination).	Boundary Test Records; Disclosure Documents; Liquidity Gate Thresholds (LG-04 trigger)	Yes — within 24 hours
MC-PS-09	Any change to concentration metric thresholds (CM-01 through CM-05).	Liquidity Gate Thresholds	Yes — within EP Delta
MC-PS-10	Any change to the escalation ladder posture definitions (L0 through L4 trigger conditions).	Liquidity Gate Thresholds; Standard Checks Pack	Yes — within 24 hours
MC-PS-11	Any RACI modification affecting authorization requirements for DvP, finality, gate, hold/release, or offboarding actions.	Role Registry and RACI	Yes
MC-PS-12	Any change to the EP Delta cadence bands or material change trigger list.	Standard Checks Pack	Yes
MC-PS-13	Any change to post-access review SLA, TTL parameters, or purpose-limitation scope definitions.	Disclosure Documents	Yes
MC-PS-14	Any change to the offboarding proof bundle required contents or decommissioning gate conditions.	Standard Checks Pack	Yes
MC-PS-15	Any liability trigger event of type LT-01, LT-02, LT-05, LT-07, or LT-08 (highest-severity triggers).	Per applicable domain above	Yes — immediately (per Table 9.3-A SLAs)

12.3.3 Recertification Governance Process

When a recertification is due (standard cadence or material-change-triggered), the following process applies:

1. **Initiation:** R-02 issues a recertification notice identifying the domain, trigger, and scheduled completion date.
2. **Review:** The responsible role(s) per Table 12.3-A conduct the review, comparing current operational practice to the documented control design.

3. **Discrepancy Resolution:** Any discrepancy between practice and design is documented as a finding; a remediation plan with a defined completion date is attached to the recertification record.
4. **Sign-Off:** The recertifying officer(s) certify that the control domain is operating as designed (or, if findings exist, that a remediation plan is in place and within the defined completion window).
5. **EP Delta:** An event-driven EP Delta is generated capturing the recertification record and any findings.
6. **Supervisory Notification:** Where required per Table 12.3-B, the EP Delta is transmitted to R-07 with a notification cover record.

Recertifications with open findings must be tracked in the quarterly reporting package (Section 12.1.3, Section 10: Open Items) until closure. Any recertification finding that is not remediated within the defined completion window escalates to R-03 and R-07.

12.4 Cross-Jurisdiction Readiness (Optional): Evidence Portability Without Harmonization

This section is optional and non-normative for domestic-only pilots. It applies where the operator contemplates future cross-jurisdictional participation under the Corridor Pack framework established in Baseline B (Appendix I). No regulatory conclusions are made; this section provides evidence-portability guidance only.

12.4.1 Evidence Portability Principles

Cross-jurisdiction readiness does not require harmonization of legal frameworks, settlement finality laws, or regulatory classification systems. It requires that the EP structure produced by this constitution is portable: examiners and regulatory authorities in a corridor jurisdiction can read, interpret, and verify the evidence artifacts without requiring access to the domestic operator's internal systems.

Evidence portability is achieved through three design properties:

1. **Schema Standardization:** All EP artifacts follow field definitions and naming conventions established in this constitution. No artifact contains proprietary or operator-specific field names that would require a separate data dictionary to interpret.
2. **Self-Describing Integrity:** Every EP artifact carries its own integrity hash and, where applicable, a reference to the prior artifact in its hash chain. An examiner with access only to the artifact set (not the live log infrastructure) can verify that the artifact is unmodified and correctly sequenced.
3. **Disclosure Self-Containment:** The disclosure version register (DISC-EP-01) and boundary test records (DvP-EP-08) provide sufficient context for an examiner to understand the instrument classification, the applicable disclosure in effect at any transaction time, and the yield separation structure — without reference to the domestic regulatory framework.

12.4.2 Corridor-Readiness Evidence Checklist

Operators wishing to demonstrate corridor readiness should confirm the following before initiating any corridor equivalence mapping process (per Baseline B, Appendix I.3):

Table 12.4-A — Corridor Readiness Evidence Checklist

Item	Requirement	Evidence Artifact	Status
CR-01	All EP artifacts use documented, stable field schemas with a published data dictionary version.	EP Archive Manifest (LTE-03) + data dictionary version record	<input type="checkbox"/> Confirmed
CR-02	All EP artifact integrity hashes have been independently verified within the past 30 days.	PB-02 check results; LTE-04 log archive confirmation	<input type="checkbox"/> Confirmed
CR-03	The disclosure version register (DISC-EP-01) is current for all active instruments and has no elapsed TTL entries.	DISC-EP-01 + DC-04 check results	<input type="checkbox"/> Confirmed
CR-04	All boundary test records (DvP-EP-08) are current and include a plain-language classification rationale sufficient for a non-domestic examiner to understand the P1–P4 determination.	DvP-EP-08; YS-01 check results	<input type="checkbox"/> Confirmed
CR-05	The Standard Checks Pack (Section 11.2) has been executed for the most recent quarter with no open critical findings.	Standard checks summary (quarterly report Section 9)	<input type="checkbox"/> Confirmed
CR-06	The Examiner Query Pack (Section 11.3) is functional against the current log and EP artifact store, confirmed by a test run within the past 90 days.	Query pack test results record	<input type="checkbox"/> Confirmed
CR-07	The Liquidity Preservation Bundle mechanism (LEA-06) has been tested in a drill scenario within the past 12 months, with results documented.	Drill scenario record; LEA-06 test artifact	<input type="checkbox"/> Confirmed
CR-08	The Offboarding Proof Bundle template (Section 10.2.2) has been reviewed and confirmed operable for the current instrument set within the past 12 months.	Offboarding readiness review record	<input type="checkbox"/> Confirmed
CR-09	The role registry (R-01 through R-12) includes a designated archive custodian function with post-program retention obligations documented (Section 10.4.3).	Role registry; archive custodian designation record	<input type="checkbox"/> Confirmed
CR-10	Post-access review records (DISC-EP-05 supplement) are available in a format that can be shared with a corridor regulatory authority consistent with the information-sharing provisions of a bilateral MoU, without requiring access to domestic systems.	DISC-EP-05 export format specification	<input type="checkbox"/> Confirmed

12.4.3 Evidence Export Protocol

For the purpose of corridor examinations or joint supervisory reviews, EP artifacts may be exported to corridor regulatory authorities under the following protocol:

1. **Export Authorization:** Export requires dual authorization from R-03 and R-07 (domestic supervisory authority), with a documented scope (artifact set, time window, corridor recipient).
2. **Integrity Preservation:** Exported artifacts are accompanied by their integrity manifests and hash-chain references. The exporting operator provides a signed attestation that the exported set is complete and unmodified.
3. **Purpose Limitation:** Export is limited to the scope authorized; no additional artifacts may be included without a new authorization record.
4. **Export Event Log:** Each export is logged as a Bundle Access Event (DISC-EP-05 extension) with the corridor authority as recipient; domestic participant notification follows Section 8.5 principles.
5. **Recipient Controls:** The export authorization record includes a statement of the recipient authority's obligations regarding use, retention, and onward transfer, consistent with the bilateral MoU template provisions (Baseline B, Appendix I.2.1, Template A, Clause 4).

13. Worked Examples (Paste-Ready)

Each worked example is presented as a timeline table: Actor | Action | Evidence Produced. All names, identifiers, and values are illustrative and fictional. All timestamps are UTC. Evidence artifact IDs follow the naming conventions established in Sections 7 through 12.

13.1 Worked Example 1 — Simple DvP Trade (Shadow Mode) with Evidence Pack Outputs

13.1.1 Scenario Context

Operating Posture: Shadow mode (no live participant asset exposure; all positions are simulated against mirrored live market data). **Instrument:** Category P2 — Tokenized Deposit, institutional, 90-day term. **Participants:** Participant A (buyer, institutional) and Participant B (seller, institutional). **Trade:** Participant A acquires tokenized deposit units valued at [notional amount redacted for illustrative neutrality] from Participant B. **Settlement Cycle:** T+0 (same-day DvP execution in shadow mode). **Purpose:** Validate DvP gate logic, escrow lock symmetry, finality marker issuance, and EP artifact production under controlled shadow conditions before Limited Live phase.

13.1.2 Timeline Table

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
1	T+00:00:00	Participant A	Submits DvP purchase order via gateway. Order includes: trade_id = TRD-EX1-001; instrument category = P2; disclosure version = DV-P2-003 (current).	DvP submission receipt logged.	DvP-EP-01 (initial entry)

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
2	T+00:00:01	Gateway Operator (R-05)	Schema validation executed. Order passes: field completeness, allowlisted instrument, participant eligibility check. Order forwarded to settlement engine.	Schema validation record appended to DvP-EP-01.	DvP-EP-01 (schema pass)
3	T+00:00:02	Settlement Operator (R-01)	DvP Preconditions Gate executed. Checks run: (a) eligibility/authorization — PASS; (b) funding availability — PASS (LEA-01 confirms FS-01 prefunded balance sufficient); (c) restriction/hold — PASS (no active holds on Participant A or instrument); (d) disclosure version — PASS (DV-P2-003 acknowledged in DISC-EP-02, TTL current). Gate result: PASS.	Gate completion log with four sub-checks, each PASS. No override flag.	DvP-EP-01 (gate PASS)
4	T+00:00:03	Settlement Operator (R-01)	Asset-leg lock initiated. Participant B's tokenized deposit units placed in escrow. Lock state: LOCKED. Releasing condition: cash-leg RELEASED.	Asset-leg lock record created. Lock timestamp: T+00:00:03.012.	DvP-EP-02
5	T+00:00:03	Settlement Operator (R-01)	Cash-leg lock initiated. Participant A's prefunded settlement balance (FS-01) earmarked. Lock state: LOCKED. Releasing condition: asset-leg RELEASED.	Cash-leg lock record created. Lock timestamp: T+00:00:03.089. Lock timestamp delta vs. asset-leg: 77 ms (within 500 ms tolerance).	DvP-EP-03
6	T+00:00:03	Settlement Operator (R-01)	Lock symmetry confirmation executed. Asset-leg and cash-leg both in LOCKED state. Timestamp delta: 77 ms — within tolerance. Symmetry status: SYMMETRIC.	Lock symmetry confirmation record.	DvP-EP-04
7	T+00:00:04	Settlement Engine	Release conditions evaluated. Both legs confirmed LOCKED; no restriction events; no gate	Release event record: trade_id = TRD-EX1-001; release trigger = CONDITIONS_MET;	DvP-EP-05

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
			activation; no finality exceptions pending. Release authorized. Asset-leg and cash-leg released simultaneously.	release timestamp: T+00:00:04.201. Both DvP-EP-02 and DvP-EP-03 updated to RELEASED.	
8	T+00:00:04	Settlement Operator (R-01)	Post-release reconciliation checkpoint executed. Asset-leg balance confirmed transferred to Participant A custody account. Cash-leg balance confirmed transferred to Participant B settlement account. Open breaks: 0.	Reconciliation checkpoint record. Open breaks = 0.	FIN-EP-04
9	T+00:00:05	Settlement Operator (R-01)	Finality state machine progressed: PENDING → CONDITIONALLY_FINAL (reconciliation checkpoint passed).	State machine log entry: state = CONDITIONALLY_FINAL; timestamp: T+00:00:05.003.	FIN-EP-02 (entry 1)
10	T+00:00:07	Settlement Operator (R-01) [R-01 issuance role] + Compliance Officer (R-02) [R-02 confirmation role]	Finality marker issued. R-01 issues marker; R-02 confirms. Dual-role confirmation recorded with distinct individual IDs. Finality state: OPERATIONALLY_FINAL.	Finality marker event record. Dual-role confirmation: R-01-ID = SO-001; R-02-ID = CO-002 (distinct individuals).	FIN-EP-01
11	T+00:00:07	Settlement Engine	Finality state machine progressed: CONDITIONALLY_FINAL → OPERATIONALLY_FINAL. State machine complete flag: TRUE. Open breaks at finality: 0.	State machine log entry: state = OPERATIONALLY_FINAL; complete flag = TRUE.	FIN-EP-02 (entry 2)
12	T+00:00:08	Custodian (R-06)	Custody confirmation issued to Participant A: tokenized deposit units deposited to segregated custody account. Custody receipt generated.	Custody receipt; Custodian reconciliation confirmation.	DvP-EP-02 (custodian confirmation field)
13	T+00:00:08	Operations Personnel (R-04)	Participant A and Participant B notified of settlement completion. Notification	Participant notification log entries (2).	DvP-EP-05 (notification field)

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
			records generated.		
14	End of Day	Operations Personnel (R-04)	Daily EP Delta generated. Captures: DvP-EP-01 through DvP-EP-05 entries for TRD-EX1-001; FIN-EP-01, FIN-EP-02, FIN-EP-04 entries; LEA-01 (no change); DISC-EP-01 (no change); concentration monitoring log (CM-01 through CM-05 — no threshold breach). Delta type: Scheduled (Daily).	EP Delta record. Material change flag: NO. Authorizing officer: CO-002 (R-02).	EP-DELTA-[date]-001
15	End of Quarter	Compliance Officer (R-02)	Quarterly operating report compiled. Section 2 (M-DV-01): DvP Settlement Success Rate = 100% for shadow-mode period. Section 3 (M-FN-01): Finality Marker Uniqueness Rate = 100%. No gate activations. No liability trigger events. Standard checks: DV-01 through DV-10 — all PASS.	Quarterly Operating Report (Section 12.1.3 template).	QR-EX1-Q[N]-[YYYY]

13.1.3 Evidence Pack Output Summary for TRD-EX1-001

Artifact ID	Artifact Name	State at Cycle End	Examiner Query Cross-Reference
DvP-EP-01	Gate log	Gate PASS; no override	Q-DV-01, Q-DV-02
DvP-EP-02	Asset-leg lock record	RELEASED	Q-DV-03, Q-DV-04
DvP-EP-03	Cash-leg lock record	RELEASED	Q-DV-03, Q-DV-04
DvP-EP-04	Lock symmetry confirmation	SYMMETRIC; RELEASED	Q-DV-03
DvP-EP-05	Release event record	CONDITIONS_MET; participant notifications sent	Q-DV-04
FIN-EP-01	Finality marker	OPERATIONALLY_FINAL; dual-role confirmed	Q-FN-01
FIN-EP-02	State machine log	Complete; PENDING → CONDITIONALLY_FINAL → OPERATIONALLY_FINAL	Q-FN-01, Q-FN-02
FIN-EP-04	Reconciliation checkpoint	Open breaks = 0	Q-FN-01

Artifact ID	Artifact Name	State at Cycle End	Examiner Query Cross-Reference
DISC-EP-02	Participant acknowledgment	DV-P2-003 acknowledged; TTL current	Q-DC-02

Control Objective Satisfaction (Shadow Mode): CO-01 ✓ CO-02 ✓ CO-03 (N/A — no timeout) ✓ CO-04 ✓ CO-05 ✓ CO-10 ✓ CO-12 ✓

13.2 Worked Example 2 — Liquidity Stress Event → Queue + Gate → Examiner Request → Preservation Bundle

13.2.1 Scenario Context

Operating Posture: Limited Live (live institutional participants; positions real). **Trigger:** Elevated intraday redemption volume on Category P2 instruments causes CM-04 (Funding Buffer Coverage Ratio) to approach and then breach the defined floor. A large participant (Participant C) submits a settlement request representing 18% of the total available pool at the time of submission — breaching the LG-01 soft concentration gate threshold (operator-configured at 15%). **Escalation Path:** L0 → L1 → L2 (LG-01 + LG-02 sequential activation) → L3 (funding floor breach) → Resolution → L0 restoration. **Examiner Involvement:** R-07 is notified at L2 activation (per SLA) and subsequently requests a formal examiner review of the gate activation and queue processing records.

13.2.2 Timeline Table

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
1	Day 1 — 08:00	Settlement Engine	Daily concentration metrics computed at market open. CM-01: top-3 holder concentration = 41% (soft threshold: 40%). Alert generated. L1 posture activated.	LEA-03 alert event (CM-01 soft breach, 41%). L1 activation notation.	LEA-03 (alert entry)
2	Day 1 — 08:05	Settlement Operator (R-01)	L1 heightened monitoring posture confirmed. Contingency funding (FS-02 intraday credit line) pre-positioned. Stress assessment initiated.	LEA-07 stress assessment record initiated. Contingency pre-positioning record logged.	LEA-07 (initiated)
3	Day 1 — 09:14	Settlement Engine	CM-04 (Funding Buffer Coverage Ratio) computed at 112% — above floor (110%), but within L1 watch range. 15-minute metric refresh active.	LEA-03 CM-04 entry: 112%. No gate trigger.	LEA-03
4	Day 1 —	Participant C	Submits settlement request	DvP submission	DvP-EP-01 (initial

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
	10:30		(DvP buy) representing 18% of available pool — exceeds LG-01 soft concentration gate threshold (15%).	receipt logged (TRD-EX2-C01). LG-01 threshold breach flag raised.	entry, flagged)
5	Day 1 — 10:30	Settlement Operator (R-01)	LG-01 soft gate activated. Participant C submission queued. Participant C notified: submission queued; processing at next cycle or upon authorization.	LEA-04 LG-01 activation record: auth-1 = R-01-SO-001 (initiator); auth-2 = R-02-CO-002 (approver). Queue formed. LEA-05 queue manifest: TRD-EX2-C01, queue position 1, receipt timestamp 10:30:14.	LEA-04 (LG-01 activation); LEA-05 (queue entry)
6	Day 1 — 10:32	Operations Personnel (R-04)	Participant C notified of queue placement and expected processing window.	Participant notification log (LG-01 queue entry notification).	LEA-05 (notification field)
7	Day 1 — 10:45	Settlement Engine	Two additional settlement requests submitted by Participants D and E. Aggregate outflow window analysis: requests from C, D, E combined = 31% of available pool — breaching LG-02 hard gate threshold (30%). CM-04 drops to 108% (below floor of 110%).	LEA-03 CM-04 entry: 108% — FLOOR_BREACH . LG-02 trigger condition met.	LEA-03 (floor breach alert)
8	Day 1 — 10:47	Settlement Operator (R-01) + Compliance Officer (R-02)	LG-02 hard settlement gate activated. R-01 and R-02 provide dual authorization (distinct individuals). All new DvP submissions suspended. Participants D and E submissions added to queue. LG-01 escalated to LG-02 in LEA-04.	LEA-04 LG-02 activation record: auth-1 = R-01-SO-001; auth-2 = R-02-CO-002. Queue manifest updated: positions 2 (TRD-EX2-D01) and 3 (TRD-EX2-E01) added. L2 posture activated.	LEA-04 (LG-02 activation); LEA-05 (queue positions 2–3)
9	Day 1 — 10:50	Compliance Officer (R-02)	Supervisory notification (R-07) dispatched. Content: LG-02 active; trigger metric (CM-04 = 108%, floor = 110%); queue depth = 3;	Supervisory notification record. Notification lag from activation: 3 minutes (within 4-	Supervisory notification log

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
			contingency funding being deployed; estimated resolution within 90 minutes.	hour SLA).	
10	Day 1 — 11:00	Settlement Operator (R-01)	LEA-04 status update (30-minute cadence). Queue depth: 3. CM-04: 109% (contingency FS-02 partially deployed). Escalation actions: FS-02 drawdown authorized by R-01 and R-02.	LEA-04 status update entry: 11:00 UTC; queue = 3; CM-04 = 109%.	LEA-04 (status update 1)
11	Day 1 — 11:22	Settlement Engine	FS-02 intraday credit drawdown complete. CM-04 recomputed: 116% — above floor. LG-02 deactivation conditions met: funding restored; no additional large-holder requests pending.	LEA-03 CM-04 entry: 116% — ABOVE_FLOOR. LEA-02 drawdown record: FS-02 draw amount, draw timestamp, authorization reference.	LEA-03; LEA-02
12	Day 1 — 11:25	Settlement Operator (R-01) + Compliance Officer (R-02)	LG-02 deactivation authorized. Deactivation record created: deactivation trigger = FUNDING_RESTORED; dual authorization (R-01 + R-02, same individuals as activation, distinct roles confirmed). Queue processing authorized in FIFO order.	LEA-04 deactivation record: deactivation trigger, auth-1, auth-2, timestamp. Event-driven EP Delta triggered.	LEA-04 (deactivation); EP-DELTA-[date]-002
13	Day 1 — 11:26	Settlement Engine	Queue drained in FIFO order. TRD-EX2-C01 processed first (DvP execution per Section 5 flow); TRD-EX2-D01 second; TRD-EX2-E01 third. Each trade follows standard DvP sequence. All three settle successfully.	DvP-EP-01 through DvP-EP-05 and FIN-EP-01 through FIN-EP-04 for each of the three trades. LEA-05 queue manifest updated: all entries status = PROCESSED. Queue closure record: depth = 0.	Per-trade DvP artifacts; LEA-05 (closure, depth = 0)
14	Day 1 — 11:30	Compliance Officer (R-02)	LEA-07 stress assessment completed. Scenario tested: simultaneous LH redemption at 18% of pool + aggregate threshold breach. Funding gap at peak: 2% below floor. Contingency FS-02 covered	LEA-07 stress assessment record completed. Recertification recommendation noted.	LEA-07 (completed)

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
			gap. Conclusion: existing buffers adequate with FS-02 pre-position; recommend reviewing LG-01 threshold sensitivity in next recertification.		
15	Day 1 — 11:32	Compliance Officer (R-02)	Supervisory deactivation notification dispatched to R-07: gate deactivated; queue fully drained; current CM-04 = 116%; operating posture returned to L0.	Supervisory notification record (deactivation).	Supervisory notification log
16	Day 2 — 09:00	Examiner / Supervisory Authority (R-07)	Formal examiner access request submitted. Scope: gate lifecycle records (LEA-04), queue manifest (LEA-05), concentration logs (LEA-03), stress assessment (LEA-07), and DvP execution records for TRD-EX2-C01, TRD-EX2-D01, TRD-EX2-E01. Purpose: verify gate activation discipline and queue processing integrity. TTL: 10 business days from access date.	Examiner access request record.	DISC-EP-05 (access request)
17	Day 2 — 09:15	Compliance Officer (R-02)	Examiner request scope and purpose confirmed. TTL window noted. Privilege review: no privileged materials in requested scope. Evidence compilation authorized.	TTL/purpose confirmation record.	DISC-EP-05 (confirmation)
18	Day 2 — 10:00	Operations Personnel (R-04)	Evidence pack compiled: LEA-03 (concentration time series for Day 1 window); LEA-04 (full gate lifecycle: activation, status updates, deactivation); LEA-05 (queue manifest: three entries, FIFO sequence, processing records); LEA-07 (stress assessment); DvP-EP-01 through DvP-EP-05 and FIN-EP-01 through FIN-EP-04 for all three trades.	Evidence pack submitted to R-07 via secure channel. Submission receipt logged.	DISC-EP-05 (submission receipt)
19	Day 2 —	Compliance	Preservation bundle triggered:	Preservation bundle	Preservation Bundle:

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
	10:05	Officer (R-02)	examiner request scope + L2/L3 escalation event qualifies per Section 8.4.1 triggers (gate activation + examiner request). Bundle generated: all artifacts from steps 1–15 frozen; integrity manifest computed; bundle hash generated.	cover record. Integrity manifest: 14 artifacts, bundle hash computed.	PB-EX2-[date]-001
20	Day 2 — 10:10	Senior Compliance Officer (R-03)	Preservation bundle authorized. R-04 (generator) and R-02 (authorizer) recorded as distinct individuals. Bundle delivered to R-07 alongside evidence pack.	Preservation bundle authorization record. Bundle Access Event logged (R-07 as recipient).	PB-EX2-[date]-001 (authorization); DISC-EP-05 (Bundle Access Event)
21	Day 7	Compliance Officer (R-02)	Post-access review completed (within 5-business-day Tier 1 SLA). Review outcome: access within scope; TTL honored; no over-collection. Participant C, D, E notified of supervisory access (investigation constraint: none applicable).	Post-Access Review Record. Participant notification records (3).	Post-Access Review Record; DISC-EP-05 (review field)
22	End of Week	Operations Personnel (R-04)	Weekly EP Delta generated. Captures: all LEA, DvP-EP, FIN-EP, DISC-EP updates from Days 1–2; preservation bundle reference; stress assessment completion; recertification recommendation for LQ threshold review. Material change flag: YES (LG-02 activation and deactivation).	EP Delta. Material change flag: YES. Authorizing officer: R-03.	EP-DELTA-[date]-003

13.2.3 Standard Checks Satisfied (Example 2)

Check ID	Result	Notes
LQ-01	PASS	LG-01 and LG-02 activations both carry dual authorization, distinct individuals.
LQ-02	PASS	Supervisory notification at LG-02: lag = 3 minutes; SLA = 4 hours.
LQ-03	PASS	One status update at 11:00 — gate active from 10:47 to 11:25 (38 min); one update within 30-minute cadence, gate resolved before second update due.
LQ-04	PASS	Deactivation record complete; EP Delta generated within 1 hour of deactivation.
LQ-05	PASS	Queue processed TRD-EX2-C01 (pos. 1), TRD-EX2-D01 (pos. 2), TRD-EX2-E01

Check ID	Result	Notes
		(pos. 3) in FIFO order; no priority overrides.
LQ-07	PASS	Queue closure record: depth = 0; no exception list required.
LQ-10	PASS	CM-04 floor breach at 108% triggered LG-02 within 2 minutes; response documented.
LQ-09	PASS	CM-01 soft breach at 41% triggered LEA-07 stress assessment (initiated at 08:05, completed at 11:30).
DC-01	PASS	Examiner access logged in DISC-EP-05 at access request time.
DC-02	PASS	Post-access review completed Day 7 (5 business days from Day 2 access).
PB-01	PASS	Preservation bundle generated within same day as examiner request + L2 trigger.
PB-02	PASS	Integrity manifest hash verification: all 14 artifacts MATCH.

13.3 Worked Example 3 — Yield Feature Boundary Test: Payment Rail + Separate Yield Program (No Commingling)

13.3.1 Scenario Context

Instrument Landscape: The Settlement Operator has been running a Category P2 Tokenized Deposit rail for six months. A request is received from an issuing institution to add a yield feature to the same instrument class — offering enrolled participants an accrual on balances held overnight in the tokenized deposit. **Governance Question:** Does the addition of a yield accrual feature reclassify the instrument from Category P2 to Category P4, or does it remain P2 with a structurally separate P4 program running alongside? **Process:** Boundary test initiated per Section 3.5 and Section 8.1.5. Evidence trail documented from request through classification, structural separation design, disclosure update, and operational go-live.

13.3.2 Timeline Table

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
1	Week 1 — Day 1	Issuing Institution	Formal proposal submitted to Settlement Operator and Compliance Officer (R-02): add overnight yield accrual to existing P2 tokenized deposit instrument (instrument ID: INST-P2-007). Proposed structure: accrual calculated daily on overnight balance; disbursed weekly; funded from issuer's yield reserve account (separate from settlement funding pool).	Proposal record logged. Boundary test initiation record created.	Boundary test initiation record (DvP-EP-08 draft)
2	Week 1 — Day 2	Compliance Officer (R-02) + Legal Counsel	Boundary test criteria applied (Section 3.5). Analysis questions: (a) Is yield payment contingent on use of the	Boundary test analysis worksheet initiated. Four criteria documented.	DvP-EP-08 (analysis draft)

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
		(R-09)	settlement rail? (b) Does the yield reserve share any account with the P2 settlement funding pool (FS-01 through FS-05)? (c) Does the yield feature alter the redemption terms of the P2 instrument? (d) Can participants access the settlement rail without enrolling in the yield program?	Preliminary determination: P2 classification MAINTAINABLE if structural separation conditions are satisfied.	
3	Week 1 — Day 3	Settlement Operator (R-01) + Operations Personnel (R-04)	Structural separation design review. Design requirements for P4 yield program operating alongside P2 rail: (a) Separate funding account for yield reserve — no overlap with LEA-01 funding sources (FS-01 through FS-05); (b) Yield disbursement processing must use a distinct operational workflow, not the DvP escrow mechanism; (c) LG-04 gate (yield separation gate) must be configured to suspend yield disbursements if yield demand would impair P1–P3 settlement capacity; (d) Enrollment in yield program is voluntary and independent of P2 settlement access. Design confirmed feasible.	Design confirmation record. LG-04 configuration specification. Yield reserve account designation (separate from LEA-01 sources).	Design confirmation record; LG-04 configuration spec
4	Week 1 — Day 5	Compliance Officer (R-02) + Legal Counsel (R-09)	Boundary test criteria re-evaluated against confirmed design: (a) Yield NOT contingent on rail use — SEPARATION CONFIRMED; (b) Yield reserve account SEPARATE from FS-01 through FS-05 — SEPARATION CONFIRMED; (c) P2 redemption terms UNCHANGED — SEPARATION CONFIRMED; (d) Rail access independent of yield enrollment — SEPARATION CONFIRMED. Classification determination:	Boundary test completion record. Classification: P2 maintained; P4 program designated separately. Determiner: R-02 (primary) + R-09 (review). Recertification date: 12 months.	DvP-EP-08 (completed, INST-P2-007); new DvP-EP-08 (PROG-P4-001)

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
			INST-P2-007 remains Category P2; yield accrual feature constitutes a new, separate Category P4 program (PROG-P4-001). No reclassification of P2 instrument.		
5	Week 2 — Day 1	Compliance Officer (R-02)	P4 disclosure document drafted (per Section 8.1.4 schema fields P4-D01 through P4-D08). Key fields: P4-D01 (program description — separate from P2 rail); P4-D03 (structural separation statement — cross-references DvP-EP-08 boundary test record); P4-D04 (payment rail non-dependency — explicit statement). Disclosure version: DV-P4-PROG-001-v1.0. TTL: 12 months.	P4 disclosure document version DV-P4-PROG-001-v1.0 drafted.	DISC-EP-01 (P4 entry, pending)
6	Week 2 — Day 2	Change Control Authority (R-11)	Material change review: addition of new P4 program constitutes MC-PS-08 (yield separation structure change). Change Control Authority approval obtained (R-01, R-02, R-03 — three members, quorum of two minimum met). Supervisory notification prepared.	R-11 approval record (quorum: 3 members). Material change event log entry.	R-11 approval record
7	Week 2 — Day 2	Compliance Officer (R-02)	Supervisory notification dispatched to R-07: new P4 yield program PROG-P4-001 to launch alongside existing P2 rail INST-P2-007; boundary test confirms structural separation; disclosure DV-P4-PROG-001-v1.0 in review. EP Delta generated.	Supervisory notification record (MC-PS-08, within 24-hour SLA). Event-driven EP Delta.	Supervisory notification log; EP-DELTA-[date]-004
8	Week 2 — Day 3	Operations Personnel (R-04)	LG-04 yield separation gate configured and tested in sandbox. Test scenario: yield disbursement demand at 8% of pool — below LG-04 trigger. Second test: yield demand at 12% of pool — LG-04	LG-04 configuration test record. Sandbox test results (2 scenarios: BELOW_TRIGGER and TRIGGER_ACTIVE).	LG-04 test record

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
			activates, disbursements suspended, P2 settlement processing unaffected. Test results: PASS both scenarios.		
9	Week 2 — Day 4	Settlement Operator (R-01)	LEA-01 (Funding Source Register) reviewed: yield reserve account confirmed absent from FS-01 through FS-05 entries. LEA-02 tagging configured: all P4 disbursement draws tagged as purpose_tag = YIELD_DISBURSEMENT at draw time (enabling Q-YS-01 query detection).	LEA-01 review confirmation. LEA-02 tagging configuration record.	LEA-01 (no change — confirmation); LEA-02 (tagging config)
10	Week 2 — Day 5	Compliance Officer (R-02)	Participant enrollment process opened for P4 yield program. Enrolled participants receive disclosure DV-P4-PROG-001-v1.0 and must acknowledge. First 12 participants acknowledge within the day. DISC-EP-02 entries created for each enrollment.	12 participant acknowledgment records in DISC-EP-02 referencing DV-P4-PROG-001-v1.0.	DISC-EP-02 (12 entries)
11	Week 2 — Day 5	Compliance Officer (R-02)	P4 disclosure version DV-P4-PROG-001-v1.0 published to DISC-EP-01. Effective date: Day 5. TTL expiry: +12 months.	DISC-EP-01 entry: PROG-P4-001; version DV-P4-PROG-001-v1.0; effective date; TTL expiry.	DISC-EP-01 (P4 entry, active)
12	Week 3 — Day 1 (Go-Live)	Settlement Engine	First yield accrual cycle runs. Overnight balances for 12 enrolled participants calculated. Accrual amounts computed from yield reserve account. No P2 DvP processing active at accrual computation time (accrual computed outside settlement window). LEA-02 logs yield reserve draw tagged YIELD_DISBURSEMENT. CM-05 (Yield Program Funding Demand): 3.2% of total pool — below LG-04 trigger.	LEA-02 draw record (YIELD_DISBURSEMENT tag; funding_category = P4). LEA-03 CM-05 entry: 3.2%. No LG-04 trigger.	LEA-02; LEA-03
13	Week 3 — Day 1	Operations Personnel	YS-01 check executed against new P4 boundary test record.	Standard checks YS-01, YS-02, YS-03	Standard checks log

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
		(R-04)	Result: CURRENT. YS-02 check executed against LEA-02 draw records: no P4 draw against P1/P2/P3 sources. YS-03 check: P4 disclosure current; all enrolled participant acknowledgments reference DV-P4-PROG-001-v1.0. All three YS checks: PASS.	execution records.	
14	Week 3 — Day 2	Compliance Officer (R-02)	Event-driven EP Delta generated: captures DvP-EP-08 (P4 boundary test), DISC-EP-01 (P4 entry), DISC-EP-02 (12 acknowledgments), LEA-02 (first yield draw), LEA-03 (CM-05), LG-04 configuration test record, R-11 approval record. Material change flag: YES (MC-PS-08).	EP Delta. Material change flag: YES. Authorizing officer: R-03.	EP-DELTA-[date]-005

13.3.3 Boundary Test Record — Paste-Ready Output (DvP-EP-08 for INST-P2-007)

BOUNDARY TEST RECORD – DvP-EP-08

Instrument ID: INST-P2-007

Instrument Name: [P2 Tokenized Deposit – 90-day institutional]

Boundary Test ID: BT-EX3-001

Classification: CATEGORY P2 – maintained (no reclassification)

Associated P4 Program: PROG-P4-001 (structurally separate)

Criteria Applied (Section 3.5):

- (a) Yield contingent on rail use? NO – SEPARATION CONFIRMED
- (b) Yield reserve overlaps settlement pool? NO – SEPARATION CONFIRMED
- (c) P2 redemption terms altered? NO – SEPARATION CONFIRMED
- (d) Rail access independent of P4 enrollment? YES – SEPARATION CONFIRMED

Determination: P2 classification MAINTAINED

P4 Program: Designated separately as PROG-P4-001

Plain-Language Rationale: The yield accrual feature operates on balances

after settlement, using a reserve account that has no operational connection to the settlement funding pool. Participants can use the P2 settlement rail without enrolling in or being affected by the P4 program. The P2 redemption process is unchanged.

Determiner (Primary): R-02-CO-002 (Compliance Officer)
 Determiner (Review): R-09-LC-003 (Legal Counsel)
 Classification Date: [date]
 Recertification Date: [date + 12 months]
 Supersedes: N/A (new record)

Cross-Reference:

P4 Program Boundary Test Record: BT-EX3-002 (PROG-P4-001)
 P4 Disclosure Version: DV-P4-PROG-001-v1.0
 LG-04 Configuration Record: [reference]
 Material Change Event: MC-PS-08; EP-DELTA-[date]-004

13.3.4 Standard Checks Satisfied (Example 3)

Check ID	Result	Notes
YS-01	PASS	Boundary test records for INST-P2-007 and PROG-P4-001 both current; recertification dates set.
YS-02	PASS	LEA-02 Day 1 draw: purpose_tag = YIELD_DISBURSEMENT; funding_category = P4. No cross-category draw.
YS-03	PASS	P4 disclosure DV-P4-PROG-001-v1.0 current; 12/12 enrolled participants acknowledged.
DC-04	PASS	DISC-EP-01 updated with P4 entry; TTL 12 months.
DC-06	PASS	Event-driven EP Delta generated within 1 hour of MC-PS-08 trigger (notification dispatched same day as R-11 approval).
GOV-03	PASS	R-11 approval record documents quorum (3 members).
GOV-06	PASS	No recertification overdue; P4 recertification date set at go-live.

13.4 Worked Example 4 — Offboarding: Controlled Program End → Final Snapshots → Legacy Transition Proof Bundle

13.4.1 Scenario Context

Trigger: OB-T01 — Planned Program End. The 18-month pilot term is complete. Governance decision (Pilot Steering Committee, per Baseline B, Section VIII.2) to conclude the domestic pilot. No participant defaults; no incidents. All participants have been notified 90 days in advance per the OB-T01 notice requirement. **Scope:** Three active instruments (INST-P1-001, INST-P2-007, and

PROG-P4-001) with positions across 14 participants. No active DvP submissions at the time of suspension. One queued submission (TRD-OB-001) submitted 4 hours before suspension — still in queue. **Offboarding Coordinator:** R-12 designated 60 days before program end. **Goal:** Produce a complete offboarding proof bundle (Section 10.2) and satisfy all eight decommissioning gate conditions (Section 10.4.2) before initiating infrastructure wind-down.

13.4.2 Timeline Table

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
1	T-90 days	Compliance Officer (R-02)	Participant notification issued: pilot program concluding in 90 days; final settlement date; timeline for position wind-down; custodian transfer instructions. All 14 participants notified. Delivery confirmations received from 14/14 participants.	Participant notification log (14 entries, 14 delivery confirmations).	Participant notification log (pre-offboarding)
2	T-60 days	Offboarding Coordinator (R-12)	Designated and role registry updated. Offboarding plan drafted: assembly sequence (OB-S01 through OB-S10); responsibilities assigned; target dates for each step. R-11 review and R-03 approval of plan obtained.	Offboarding plan record. R-11 review record. R-03 approval. Role registry updated (R-12 active).	Offboarding plan; role registry update
3	T-30 days	Operations Personnel (R-04)	EP-Core full refresh completed. EP Archive Manifest (LTE-03) pre-population begins: all EP-Core snapshots from pilot inception indexed; all EP Deltas indexed (count: 47 Deltas across 18 months); all preservation bundles indexed (count: 3 bundles). Archive integrity hashes pre-computed for all indexed items.	EP Archive Manifest draft (LTE-03 draft). 47 Delta references; 3 bundle references. All hashes computed.	LTE-03 (draft)
4	T-7 days	Settlement Operator (R-01)	No new instrument issuances permitted (moratorium enforced). Existing positions frozen to wind-down-eligible states: no new DvP submissions	Moratorium record. Gateway Operator (R-05) notified to reject new non-closing submissions.	Moratorium record

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
			accepted except for position-closing trades.		
5	T-0 — 09:00	Senior Compliance Officer (R-03) + Offboarding Coordinator (R-12)	Offboarding initiation authorized. Dual authorization (R-03 + R-12, distinct individuals). Offboarding Authorization Record created (OB-S01).	Offboarding Authorization Record (OB-S01): trigger class = OB-T01; authorization identities; timestamp.	OB-S01
6	T-0 — 09:01	Incident Response Authority (R-08) + Settlement Operator (R-01)	LG-05 Emergency Settlement Suspension activated to freeze the rail. Dual authorization: R-08 (first, 09:01:03) + R-03 (second, 09:01:41 — within 30-minute window). All DvP submissions suspended. Rail suspension log created (OB-S02).	Rail Suspension Log (OB-S02): suspension timestamp = 09:01:03; LG-05 auth-1 = R-08; auth-2 = R-03; reason = PLANNED_PROGRAM_END. LEA-04 LG-05 activation record.	OB-S02; LEA-04
7	T-0 — 09:05	Operations Personnel (R-04) + Custodian (R-06)	Open Position Census executed (OB-S03). Full enumeration as of 09:01:03 (suspension timestamp): 14 participants; 3 instruments. Positions: INST-P1-001 (6 participants; total units enumerated); INST-P2-007 (11 participants; total units enumerated); PROG-P4-001 accruals pending (12 enrolled; accrual balances enumerated). Pending DvP submissions: 1 (TRD-OB-001 — in queue, submitted 4 hours before suspension). Active locks: 0 (no DvP mid-execution at suspension time). Active gates: LG-05 (just activated).	Open Position Census (OB-S03): participant count = 14; pending submissions = 1; active locks = 0.	OB-S03
8	T-0 — 09:10	Operations Personnel (R-04)	Settlement Queue Unwind executed for TRD-OB-001 (per Section 10.3.3, SQU-01 through SQU-05). Submission returned to submitting participant (Participant F). LEA-05 queue manifest frozen:	Queue closure record: depth = 0. LEA-05 frozen snapshot. Rejection event log (TRD-OB-001). Participant F notification.	LEA-05 (frozen); SQU return log

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
			TRD-OB-001 status = RETURNED. Queue depth at closure: 0. Participant F notified of return.		
9	T-0 — 09:30	Compliance Officer (R-02) + Legal Counsel (R-09)	Open Breaks Resolution (OB-S04). Breaks identified from census: 0 open settlement breaks. PROG-P4-001 accrual balances pending disbursement: treated as open items requiring resolution. Legal Counsel (R-09) confirms accruals are contractual obligations payable from yield reserve account — not settlement rail obligations. Resolution path: P4 yield reserve executes final disbursement outside DvP rail per contractual terms. Documented in exception handling note. Open Breaks Register: 0 pure settlement breaks; 1 exception item (P4 accruals, resolution path documented, R-09 review attached).	Open Breaks Register (OB-S04): pure settlement breaks = 0; exception item = 1 (P4 accruals with documented resolution path and R-09 legal review).	OB-S04
10	T-0 — 10:00	Issuing Institution (P4 yield program)	Final P4 yield accrual disbursement executed from yield reserve account to 12 enrolled participants (outside DvP rail, per contractual terms documented in OB-S04 resolution path). Disbursement confirmation receipts received from custodian for all 12.	P4 accrual disbursement confirmation records (12).	P4 disbursement confirmation log
11	T-0 — 10:30	Settlement Operator (R-01) + Custodian (R-06)	Final Reconciliation Snapshot executed (OB-S05). Asset-leg balances: all positions confirmed transferred to custodian segregated accounts (INST-P1-001 and INST-P2-007). Cash-leg balances: FS-01	Final Reconciliation Snapshot (OB-S05): asset-leg balance = CONFIRMED; cash-leg balance = CONFIRMED; P4 accruals = DISBURSED; open breaks = 0; reconciliation result =	OB-S05

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
			prefunding returned to participant accounts; FS-02 intraday credit fully repaid (confirmed with credit facility counterparty). PROG-P4-001 accruals: disbursed (per step 10 confirmation). Open breaks: 0. Reconciliation result: BALANCED.	BALANCED.	
12	T-0 — 11:00	Custodian (R-06) + Offboarding Coordinator (R-12)	Chain-of-Custody Transfer (OB-S06). Each participant's residual position transferred: INST-P1-001 holders — positions returned to participant-held accounts (direct custody transfer); INST-P2-007 holders — positions redeemed at par by issuing institution and cash proceeds wired to participant accounts (confirmed); PROG-P4-001 participants — accrual disbursement already completed (step 10). Chain-of-Custody Transfer Record assembled: 14 participant entries; transfer type per participant; custodian acknowledgment receipts attached. Transfer completion timestamp: 11:00 UTC.	Chain-of-Custody Transfer Record (OB-S06): 14 entries; all transfer types documented; custodian acknowledgment receipts attached. Chain-of-custody complete flag: TRUE.	OB-S06
13	T-0 — 11:15	Compliance Officer (R-02)	Final Disclosure Version Register closure (OB-S07). All active disclosure versions (DV-P1-001-v2.1, DV-P2-007-v3.0, DV-P4-PROG-001-v1.0) marked SUPERSEDED with offboarding date T-0. DISC-EP-01 final entry created for each.	Final Disclosure Version Register (OB-S07): 3 versions superseded; offboarding date applied.	OB-S07
14	T-0 — 12:00	Operations Personnel	EP Archive Manifest finalized (OB-S08). Final	EP Archive Manifest (OB-S08) finalized: 18	OB-S08; LTE-03 (final); LTE-04

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
		(R-04) + Compliance Officer (R-02)	refresh: all artifacts captured through T-0 11:15. Total EP-Core snapshots: 18 (monthly for 18 months). Total EP Deltas: 49 (2 additional Deltas generated on offboarding day). Total preservation bundles: 3. Archive integrity hashes verified for all 70 items. Archive transferred to long-term immutable store. Log Archive Confirmation received from log infrastructure operator (LTE-04).	snapshots, 49 Deltas, 3 bundles; all hashes verified. LTE-04 log archive confirmation received.	
15	T-0 — 13:00	Offboarding Coordinator (R-12) + Compliance Officer (R-02)	Participant Final Notifications (OB-S09). All 14 participants notified: program ended; final account statements attached; chain-of-custody transfer confirmed; EP archive available for participant access requests per retention obligations. Delivery confirmations received: 14/14.	Participant Final Notification log (OB-S09): 14 entries; 14 delivery confirmations.	OB-S09
16	T-0 — 14:00	Offboarding Coordinator (R-12) + Senior Compliance Officer (R-03)	Offboarding Proof Bundle assembled (OB-S10). All 9 artifact sets (OB-S01 through OB-S09) compiled. Integrity manifest computed: 9 primary artifact sets + supporting records; bundle root hash generated. Authorizing signatures: R-12 (identity: OC-012) and R-03 (identity: SC-003). Bundle delivered to R-07 via secure channel. R-07 delivery receipt logged.	Offboarding Proof Bundle cover record. Integrity manifest with root hash. Authorization signatures (2). R-07 delivery receipt.	OB-BUNDLE-[date]-PILOT-001
17	T+30 days	Compliance Officer (R-02) + Legal Counsel (R-09) +	Decommissioning Gate Conditions verified (Section 10.4.2). All 8 conditions (DC-G01 through DC-G08)	Decommissioning Authorization Record: all 8 gate conditions confirmed; 3 authorizing officers	LTE-07 (Decommissioning Authorization Record)

Step	Timestamp (UTC)	Actor	Action	Evidence Produced	Artifact ID
		Operations Personnel (R-04)	confirmed: reconciliation BALANCED; CoC complete; EP archive hashes verified; log archive confirmed; open breaks = 0; participant statements delivered; supervisory 30-day notice window elapsed (R-07 issued no objection); post-decommissioning archive access test PASSED (R-04 tested EP archive retrieval for 3 sample artifacts — all accessible within latency threshold).	(R-03, R-12, R-09 for exception-item sign-off); R-07 non-objection confirmation.	
18	T+30 days + 1	Operations Personnel (R-04)	Infrastructure decommissioning authorized. Settlement rail infrastructure wind-down initiated. Archive custodian designated (role: R-02 successor designation) to fulfill 7-year residual access obligations. Post-Decommissioning Access Confirmation generated.	Post-Decommissioning Access Confirmation (LTE-08): archive accessible; access latency within threshold; custodian designated.	LTE-08

13.4.3 Legacy Transition Evidence Set Summary (Example 4)

LTE ID	Artifact Name	Status	Verified By
LTE-01	Final Reconciliation Snapshot (OB-S05)	BALANCED; open breaks = 0	R-01 + R-06
LTE-02	Chain-of-Custody Transfer Record (OB-S06)	14/14 participants; CoC complete flag = TRUE	R-06 + R-12
LTE-03	EP Archive Manifest (OB-S08)	18 snapshots, 49 Deltas, 3 bundles; all hashes verified	R-04 + R-02
LTE-04	Log Archive Confirmation	Received from log infrastructure operator	R-04
LTE-05	Open Breaks Register (OB-S04)	0 pure settlement breaks; 1 exception item with documented resolution path	R-02 + R-09
LTE-06	Participant Final Account Statements (OB-S09)	14/14 delivered and confirmed	R-12
LTE-07	Decommissioning Authorization Record	All 8 gate conditions confirmed	R-03 + R-12 + R-07
LTE-08	Post-Decommissioning Access Confirmation	Archive accessible; custodian designated	R-04 + R-02

Decommissioning Gate Status (All 8 Conditions):

Gate	Condition	Status
DC-G01	Final Reconciliation BALANCED; open breaks = 0	✓ CONFIRMED
DC-G02	Chain-of-Custody Transfer complete (100% of participants)	✓ CONFIRMED
DC-G03	EP Archive Manifest complete; hashes verified	✓ CONFIRMED
DC-G04	Log Archive Confirmation received	✓ CONFIRMED
DC-G05	Open Breaks Register: 0 pure breaks; exception item with documented path	✓ CONFIRMED
DC-G06	Participant Final Statements: 14/14 delivered	✓ CONFIRMED
DC-G07	R-07 30-day notice window elapsed; no objection received	✓ CONFIRMED
DC-G08	Archive access test passed; archive custodian designated	✓ CONFIRMED

Standard Checks Satisfied (Example 4):

Check ID	Result	Notes
GOV-10	PASS	All 10 OB-S artifacts present; integrity manifest hash verified; R-07 delivery receipt logged.
PB-01	PASS	No new preservation bundle trigger during offboarding — LG-05 activation for planned program end is documented as offboarding context (not a separate incident trigger).
DV-08	PASS	One queued submission (TRD-OB-001) returned via SQU flow; residual lock = 0 confirmed.
LQ-05	PASS	Queue contained single entry; returned without processing; FIFO not applicable (single-entry queue).
LQ-07	PASS	Queue closure record: depth = 0 after SQU-04.

Operational Context & Governance Inheritance "This submission operates strictly within the security architecture established in the 'Custody & Segregation Proof Kit' (v.Release). It inherits, by reference, the Genesis Configuration Parameters and Cryptographic Network Identity (Chain_ID) defined in the 'Provenance & Anchoring' section of that control framework. No new initialization vectors are introduced herein.

Appendix A — Standardized Disclosure Schema for Cash-Leg Categories (Tables, Paste-Ready)

A.1 Purpose and Application

This appendix provides the complete, paste-ready standardized disclosure schemas for all four cash-leg instrument categories (P1 through P4) defined in Section 3. These schemas are the operational reference for drafting and recertifying disclosure documents. Section 8.1 introduces the schemas; this appendix provides the extended field-level specifications, completion guidance, and example language for each mandatory and conditional field.

How to use this appendix:

1. For each instrument or program to be onboarded, select the applicable schema (A.2 through A.5).

2. Complete all Mandatory fields. Complete Conditional fields if the applicable condition is met.
3. Assign a disclosure version identifier and TTL.
4. Submit the completed disclosure to the Compliance Officer (R-02) for review.
5. Upon R-02 approval, publish to DISC-EP-01 and collect participant acknowledgments per DISC-EP-02.
6. Cross-reference the Boundary Test Record (DvP-EP-08) in field [Category]-D-BT.
7. Generate an event-driven EP Delta (Section 8.3) on first publication and on any subsequent update.

General Drafting Requirements (All Categories):

- All fields must be completed in plain, non-technical language accessible to institutional participants without specialist knowledge.
- No field may contain promotional, advocacy, or investment-advisory language.
- All finality references must use "operational finality conditions met" language; no legal finality claims.
- All yield-related fields must be structurally separated from payment/settlement fields; commingling language in disclosure drafts is a control failure (LT-07 precursor).
- The Boundary Test Record cross-reference field ([Category]-D-BT) is mandatory for all categories to enable examiner tracing from disclosure to classification evidence.

A.2 Category P1 — Payment/Settlement Stable-Value Instrument

Full Disclosure Schema (Paste-Ready)

```
=====
DISCLOSURE DOCUMENT – CATEGORY P1
Payment/Settlement Stable-Value Instrument
=====
```

DOCUMENT METADATA

```
Disclosure Version ID:      [DV-P1-{instrument_id}-v{N.N}]
Instrument ID:              [INST-P1-{identifier}]
Effective Date:            [YYYY-MM-DD]
TTL Expiry Date:          [YYYY-MM-DD] (maximum 12 months from Effective
Date)
Supersedes Version:       [prior version ID, or "N/A – initial version"]
Boundary Test Record Ref: [DVP-EP-08 record ID for this instrument]
Prepared By (Role):       [R-02 Compliance Officer – identity]
Approved By (Role):       [R-03 Senior Compliance Officer – identity]
```

Approval Timestamp: [UTC]

=====

FIELD P1-D01 – INSTRUMENT DESCRIPTION [MANDATORY]

=====

Purpose of Field: Describe the instrument's nature and function.
Completion Guidance: State clearly that the instrument is a payment and settlement medium only. Avoid any language suggesting investment value, yield, or return.

[DRAFT LANGUAGE – ADAPT AS APPROPRIATE]

This instrument is a stable-value instrument designed and operated exclusively as a payment and settlement medium within the [program name] settlement rail. It is not an investment product and does not offer or imply any yield, return, interest accrual, or appreciation. Its sole function is to facilitate the cash-leg of delivery-versus-payment (DvP) settlement transactions among authorized institutional participants.

=====

FIELD P1-D02 – REDEMPTION TERMS [MANDATORY]

=====

Purpose of Field: Define how and when participants can redeem the instrument for its underlying value.
Completion Guidance: State redemption process, any applicable windows, minimum amounts, notice requirements, and redemption currency.

[DRAFT LANGUAGE – ADAPT AS APPROPRIATE]

Redemption of this instrument is available to authorized participants on [redemption window: e.g., any business day / designated redemption windows as published]. Redemption requests must be submitted to [Settlement Operator] in accordance with the operational procedures published in the participant handbook. Minimum redemption amount: [amount or "no minimum"]. Redemptions will be processed in the currency in which the instrument is denominated. No redemption fee

applies. Redemption processing is subject to the availability of funding and the liquidity gate and queue mechanisms described in Field P1-D06 below.

=====
FIELD P1-D03 – SETTLEMENT FINALITY STATEMENT [MANDATORY]
=====

Purpose of Field: Define the nature of settlement finality.
Completion Guidance: Use "operational finality conditions met" language only. No legal finality claims.

[DRAFT LANGUAGE – ADAPT AS APPROPRIATE]

Settlement using this instrument is characterized by "operational finality conditions met" when all of the following evidence-backed conditions have been satisfied: (a) the DvP preconditions gate has returned a passing result for all required checks; (b) the asset-leg and cash-leg escrow locks have been confirmed as symmetric and simultaneously released; (c) the reconciliation checkpoint confirms zero open breaks; and (d) a finality marker has been issued with dual-role confirmation. This statement describes an operational condition supported by documented evidence artifacts. It does not constitute a legal determination of finality or irrevocability under any applicable law. Legal rights and obligations are governed by the contractual instruments entered into by participants.

=====
FIELD P1-D04 – YIELD SEPARATION STATEMENT [MANDATORY]
=====

Purpose of Field: Explicitly state that this instrument carries no yield feature.
Completion Guidance: Must be unambiguous. If a related yield program exists (Category P4), reference it and state that it is structurally separate.

[DRAFT LANGUAGE – ADAPT AS APPROPRIATE]

This instrument carries no yield, interest, accrual, or return feature of any kind. Any yield program that may operate alongside this settlement rail is a structurally separate Category P4 program, operated through distinct accounts, workflows, and disclosures, and is in no way embedded in or contingent upon this instrument. Participants who hold this instrument and do not enroll in any separate yield program receive no return. The absence of a yield feature is a permanent structural characteristic of this instrument, not a temporary condition.

=====
FIELD P1-D05 – RESTRICTION AND HOLD NOTICE [MANDATORY]
=====

Purpose of Field: Disclose the possibility and mechanics of holds.
Completion Guidance: Reference the hold/release framework. Do not describe specific current hold events.

[DRAFT LANGUAGE – ADAPT AS APPROPRIATE]

Positions held in this instrument may be subject to temporary transfer restrictions (holds) in accordance with applicable regulatory requirements, court orders, law enforcement requests, or compliance investigations. Holds are placed and released in accordance with the documented hold/release procedures of the settlement rail, which require multi-party authorization and produce auditable evidence records. Participants subject to a hold will be notified in accordance with those procedures, subject to applicable legal constraints. A hold does not constitute a forfeiture or loss of position; the instrument continues to exist during the hold period.

=====
FIELD P1-D06 – FUNDING AND LIQUIDITY RISK STATEMENT [MANDATORY]
=====

Purpose of Field: Disclose liquidity gate and queue mechanics; describe stress-condition impact on redemption.

Completion Guidance: Describe gate types at a functional level.
Do not reveal specific threshold values (operator-configured).

[DRAFT LANGUAGE – ADAPT AS APPROPRIATE]

The settlement rail operating this instrument maintains liquidity gate and queue mechanisms designed to protect the integrity of settlement operations during periods of elevated redemption demand or funding stress. Under normal operating conditions (Level 0), redemption and settlement requests are processed without queue or delay. Under heightened monitoring conditions (Level 1), contingency funding is pre-positioned and processing continues normally. Under limited operations conditions (Level 2), new settlement submissions may be queued and processed in order as funding capacity permits; participants will be notified of queue status. Under stress conditions (Level 3), settlement submission may be temporarily suspended while the operator restores funding capacity. Participants with queued submissions will be notified of gate status and expected resolution. Submissions held beyond their defined time-to-live will be returned to the submitting participant. The operator does not guarantee processing within any specific time window during gate-active periods.

=====
FIELD P1-D07 – OPERATOR OBLIGATIONS SUMMARY [MANDATORY]
=====

Purpose of Field: Describe the operator's disclosure, evidence, and monitoring obligations.
Completion Guidance: High-level; reference the constitution-level operating model.

[DRAFT LANGUAGE – ADAPT AS APPROPRIATE]

The Settlement Operator maintains a documented operating model governing this instrument. The operator's obligations include: maintaining standardized evidence artifacts (including DvP gate logs, escrow lock records, finality state machine logs, and

liquidity monitoring logs) available for supervisory examination; producing evidence pack deltas on a defined cadence and on material changes; notifying the supervisory authority of material operational events within defined timeframes; maintaining a boundary test record classifying this instrument within the applicable category; and conducting periodic recertification of controls and disclosures. Examiner access to these artifacts follows a purpose-limited, time-bounded access model with post-access review.

=====
FIELD P1-D08 – DISCLOSURE VERSION AND TTL [MANDATORY]
=====

Purpose of Field: Machine-readable version and expiry metadata.

Disclosure Version ID: [DV-P1-{instrument_id}-v{N.N}]

Version Effective Date: [YYYY-MM-DD]

TTL Expiry Date: [YYYY-MM-DD]

Recertification Trigger: This disclosure expires on the TTL Expiry Date above. It will also be updated upon any material change to the instrument terms, operating model, or applicable classification. Participants will be notified of updates and must re-acknowledge the new version.

=====
FIELD P1-D09 – EXAMINER ACCESS STATEMENT [MANDATORY]
=====

Purpose of Field: Describe the supervisory access model for participant data.

Completion Guidance: Reference tiered access and purpose limitation.

[DRAFT LANGUAGE – ADAPT AS APPROPRIATE]

Supervisory access to transaction records and evidence artifacts relating to this instrument operates under a tiered access model. Routine aggregate monitoring (Tier 0) does not involve access to

individual transaction data or participant identity. Event-triggered supervisory access (Tier 1) is scoped to specific investigations, time-bounded, and logged. Emergency access (Tier 2) requires objective trigger conditions and dual-control approval. All supervisory access events are logged and subject to post-access review. Participants receive notification of supervisory access to records pertaining to their activity, subject to applicable legal and investigative constraints.

=====
END OF P1 DISCLOSURE SCHEMA
=====

A.3 Category P2 — Tokenized Deposit (Institutional, Redeemable)

Full Disclosure Schema (Paste-Ready)

=====
DISCLOSURE DOCUMENT – CATEGORY P2
Tokenized Deposit – Institutional, Redeemable
=====

DOCUMENT METADATA

Disclosure Version ID: [DV-P2-`{instrument_id}`-v`{N.N}`]
Instrument ID: [INST-P2-`{identifier}`]
Effective Date: [YYYY-MM-DD]
TTL Expiry Date: [YYYY-MM-DD]
Supersedes Version: [prior version ID, or "N/A"]
Boundary Test Record Ref: [DVP-EP-08 record ID]
Depository Institution Ref: [Role description – e.g., "qualifying depository institution as designated in Instrument Spec Annex 1"]
Prepared By (Role): [R-02]
Approved By (Role): [R-03]
Approval Timestamp: [UTC]

=====

FIELD P2-D01 – INSTRUMENT DESCRIPTION [MANDATORY]

=====

[DRAFT LANGUAGE]

This instrument is a tokenized representation of an institutional deposit maintained at [qualifying depository institution – see Depository Institution Ref above]. Each unit of this instrument corresponds to a defined claim on the underlying deposit balance. The instrument is redeemable on the terms described in Field P2-D02. It is designed for use as the cash-leg of delivery-versus-payment (DvP) settlement transactions among authorized institutional participants. No yield or interest accrual is offered through this instrument by default; any yield feature is available solely through a structurally separate Category P4 program (see Field P2-D04).

=====

FIELD P2-D02 – REDEMPTION TERMS [MANDATORY]

=====

[DRAFT LANGUAGE]

Redemption of this instrument is available to authorized participants on [redemption window]. Redemption requires submission of a redemption request to [Settlement Operator] in accordance with applicable operational procedures. Minimum redemption: [amount or "no minimum"]. Redemptions are denominated in [currency]. Redemption proceeds will be delivered to the participant's designated account within [timeline] of the processing date, subject to the liquidity gate and queue conditions described in Field P2-D07. Redemption requests submitted during gate-active periods will be queued and processed in order as funding capacity permits.

=====

FIELD P2-D03 – SETTLEMENT FINALITY STATEMENT [MANDATORY]

=====

[Same as P1-D03 – adapt instrument reference]

[DRAFT LANGUAGE – identical in substance to P1-D03; replace "this instrument" references with "tokenized deposit settlement"]

as appropriate]

=====

FIELD P2-D04 – YIELD SEPARATION STATEMENT [MANDATORY]

=====

[DRAFT LANGUAGE]

This instrument does not offer or accrue yield, interest, or any form of return by default. Any yield program associated with this instrument class is a structurally separate Category P4 program, operated through a dedicated yield reserve account with no operational overlap with the settlement funding pool serving this instrument. Enrollment in any such yield program is voluntary and is governed by a separate disclosure document. Non-enrollment does not affect a participant's access to or use of this tokenized deposit instrument for settlement purposes.

=====

FIELD P2-D05 – DEPOSIT INSTITUTION DISCLOSURE [MANDATORY]

=====

Purpose of Field: Identify the depository institution role and applicable deposit protection, without naming proprietary entities.
Completion Guidance: Use role descriptions. Do not make legal conclusions about deposit protection coverage.

[DRAFT LANGUAGE]

The underlying deposit represented by this instrument is held at a qualifying depository institution designated in the instrument specification. The applicable deposit protection arrangements, if any, are described in the instrument specification annex and are subject to the terms and limits of the applicable regulatory regime. The Settlement Operator makes no representation as to the sufficiency of deposit protection for any particular participant's position. Participants should review the instrument specification annex for details of the depository arrangement.

=====
FIELD P2-D06 – RESTRICTION AND HOLD NOTICE [MANDATORY]

=====
[Same in substance as P1-D05 – adapt references to "tokenized deposit positions" as appropriate]

=====
FIELD P2-D07 – FUNDING AND LIQUIDITY RISK STATEMENT [MANDATORY]

=====
[Same in substance as P1-D06 – adapt "redemption" references to include the P2-specific redemption queue mechanics per LG-03 as well as LG-02]

=====
FIELD P2-D08 – REVOCATION AND CREDENTIAL CONTROLS [MANDATORY]

=====
Purpose of Field: Disclose credential-based access controls and the effect of credential revocation on transaction execution.

[DRAFT LANGUAGE]

Access to this instrument and the ability to execute transactions involving it are controlled through verifiable credentials issued to authorized participants. These credentials are subject to revocation. At the time of each transaction submission, the Settlement Operator verifies that the submitting participant's credential is current and has not been revoked. A revoked credential will prevent transaction execution until the credential is renewed or reinstated. Participants are responsible for maintaining their credentials in good standing and should notify the Settlement Operator promptly of any suspected credential compromise. Revocation checking occurs at transaction time; cached revocation information is not relied upon beyond defined freshness thresholds.

=====

FIELD P2-D09 – DISCLOSURE VERSION AND TTL [MANDATORY]

=====

[Same structure as P1-D08 – adapt version ID prefix to DV-P2]

=====

FIELD P2-D10 – EXAMINER ACCESS STATEMENT [MANDATORY]

=====

[Same in substance as P1-D09]

=====

END OF P2 DISCLOSURE SCHEMA

=====

A.4 Category P3 — Wholesale Settlement Credit (Permissioned Rail)

Full Disclosure Schema (Paste-Ready)

=====

DISCLOSURE DOCUMENT – CATEGORY P3

Wholesale Settlement Credit – Permissioned Settlement Rail

=====

DOCUMENT METADATA

Disclosure Version ID: [DV-P3-`{rail_id}`-v`{N.N}`]

Rail / Program ID: [RAIL-P3-`{identifier}`]

Effective Date: [YYYY-MM-DD]

TTL Expiry Date: [YYYY-MM-DD]

Supersedes Version: [prior version ID, or "N/A"]

Boundary Test Record Ref: [DVP-EP-08 record ID]

Prepared By (Role): [R-02]

Approved By (Role): [R-03]

Approval Timestamp: [UTC]

=====

FIELD P3-D01 – RAIL DESCRIPTION [MANDATORY]

=====

[DRAFT LANGUAGE]

This disclosure describes the wholesale settlement credit rail [RAIL-P3-`{identifier}`], a permissioned settlement balance arrangement available to authorized institutional participants. The rail provides a multilateral settlement mechanism in which participant credit balances are maintained and netted against settlement obligations at defined intervals. The rail is not a deposit product, is not insured, and does not offer yield or return. It is designed exclusively to facilitate the efficient settlement of delivery-versus-payment transactions among eligible participants. Participation is limited to institutions that have been credentialed and certified under the applicable conformance framework.

=====
FIELD P3-D02 – SETTLEMENT TERMS [MANDATORY]

[DRAFT LANGUAGE]

Settlement obligations on this rail are netted and settled at [netting cycle – e.g., end of each business day / intraday at defined intervals]. Participants must maintain sufficient prefunded balances or authorized intraday credit (see Field P3-D03) to meet their net settlement obligations at each cycle. Obligations not met by the end of the defined settlement window may trigger the participant default procedures described in Field P3-D07. Collateral requirements, if applicable, are specified in the participant agreement and instrument specification annex.

=====
FIELD P3-D03 – CREDIT TERMS [CONDITIONAL – if FS-02 applies]

=====
Completion Guidance: Include this field only if an intraday credit facility (FS-02) is available to participants on this rail.

[DRAFT LANGUAGE]

An intraday credit facility is available to eligible participants on this rail, subject to collateral posting requirements and the terms of the participant credit agreement. Intraday credit draws must be fully repaid by the end of the defined settlement window. Draws that are not repaid within the settlement window may trigger the default procedures described in Field P3-D07. The credit facility does not constitute a loan beyond the settlement day. Interest or fees, if applicable, are described in the participant credit agreement.

=====
FIELD P3-D04 – SETTLEMENT FINALITY STATEMENT [MANDATORY]

=====
[Same in substance as P1-D03 – adapt to wholesale rail context: replace "escrow lock" references with "netting confirmation and cycle-end settlement confirmation" as appropriate]

=====
FIELD P3-D05 – YIELD SEPARATION STATEMENT [MANDATORY]

[DRAFT LANGUAGE]
This rail provides no yield, interest, or return on settlement balances. Any participation in a yield program is governed by a structurally separate Category P4 disclosure. Settlement balances held on this rail do not earn any return by virtue of being held here.

=====
FIELD P3-D06 – RESTRICTION AND HOLD NOTICE [MANDATORY]

=====
[Same in substance as P1-D05 – adapt to "participant balances on the wholesale settlement rail"]

FIELD P3-D07 – PARTICIPANT DEFAULT PROVISIONS [MANDATORY]

=====

Purpose of Field: Describe default isolation and loss mutualization mechanics if a participant fails to meet settlement obligations.

[DRAFT LANGUAGE]

If a participant fails to meet its net settlement obligation at the end of a settlement cycle, the following procedures apply:

- (a) the defaulting participant's settlement balance is isolated from the balances of other participants;
- (b) the Settlement Operator will notify other affected participants and the supervisory authority (R-07) within the timeframe specified in the incident response framework;
- (c) the defaulting participant's future submissions are suspended pending resolution;
- (d) any loss mutualization arrangements applicable to this rail are described in the participant agreement.

The Settlement Operator will document all default events as liability trigger events under the applicable procedures.

=====

FIELD P3-D08 – FUNDING AND LIQUIDITY RISK STATEMENT [MANDATORY]

=====

[Same in substance as P1-D06 – adapt to wholesale rail context; reference end-of-cycle settlement obligations and the impact of LG-02 gate activation on netting cycle completion]

=====

FIELD P3-D09 – DISCLOSURE VERSION AND TTL [MANDATORY]

=====

[Same structure as P1-D08 – adapt version ID prefix to DV-P3]

=====

FIELD P3-D10 – EXAMINER ACCESS STATEMENT [MANDATORY]

=====

[Same in substance as P1-D09]

=====
END OF P3 DISCLOSURE SCHEMA
=====

A.5 Category P4 — Yield Feature / Yield Program

Full Disclosure Schema (Paste-Ready)

=====
DISCLOSURE DOCUMENT – CATEGORY P4

Yield Feature / Yield Program

(Structurally Separate from Payment Rail)

=====
DOCUMENT METADATA

Disclosure Version ID: [DV-P4-`{program_id}`-v`{N.N}`]
Program ID: [PROG-P4-`{identifier}`]
Associated P1/P2/P3 Rail: [Instrument or rail ID – for cross-ref
to boundary test record only; no operational dependency]
Effective Date: [YYYY-MM-DD]
TTL Expiry Date: [YYYY-MM-DD]
Supersedes Version: [prior version ID, or "N/A"]
Boundary Test Record Ref: [DvP-EP-08 record ID for this program]
Prepared By (Role): [R-02]
Approved By (Role): [R-03]
Approval Timestamp: [UTC]

WARNING – BOUNDARY CRITICALITY:

This document governs a Category P4 yield program. Drafters must ensure that P4-D03 (Structural Separation Statement) and P4-D04 (Payment Rail Non-Dependency Statement) are complete and unambiguous. Any language suggesting that this program is part of, embedded in, or required for access to the associated payment rail constitutes a commingling control failure (LT-07 precursor) and must be escalated to R-09 Legal Counsel before publication.

=====

FIELD P4-D01 – PROGRAM DESCRIPTION [MANDATORY]

=====

[DRAFT LANGUAGE]

This document describes the [program name] yield program [PROG-P4-`{identifier}`], a voluntary program available to eligible participants who hold qualifying positions in [associated instrument – identified by role, not by embedding this program into the instrument's settlement function]. This program offers a yield accrual on enrolled balances, calculated and disbursed in accordance with the terms in Field P4-D02. This program is structurally and operationally separate from the settlement rail associated with the qualifying instrument. Enrollment is voluntary. Non-enrollment does not affect a participant's access to or use of the settlement rail.

=====

FIELD P4-D02 – YIELD CALCULATION AND PAYMENT TERMS [MANDATORY]

=====

[DRAFT LANGUAGE]

Yield accrues on enrolled overnight balances at [rate description – e.g., "a rate determined by the yield program administrator, as published in the yield rate schedule maintained in the participant portal"]. Accrual is calculated [frequency – e.g., daily on the end-of-business-day enrolled balance]. Yield is disbursed to enrolled participants [disbursement schedule – e.g., weekly on each Friday, or on the next business day following any Friday that is not a business day]. Disbursements are made from the yield reserve account [described in Field P4-D06] to the participant's designated settlement account. The yield rate is subject to change; participants will be notified of rate changes in accordance with the notification procedures in the participant handbook. The yield program administrator makes no guarantee of any minimum yield rate.

=====

FIELD P4-D03 – STRUCTURAL SEPARATION STATEMENT [MANDATORY]

=====

Purpose of Field: Provide unambiguous documentation of operational and financial separation from the payment rail.

Completion Guidance: Cross-reference the Boundary Test Record.

This field is boundary-critical; see document-level WARNING above.

[DRAFT LANGUAGE]

This yield program is structurally and operationally separate from the settlement rail with which the qualifying instrument is associated. Separation is established and evidenced as follows:

(a) Funding: yield disbursements are funded exclusively from a dedicated yield reserve account that has no operational overlap with any settlement funding pool (FS-01 through FS-05) serving the associated settlement rail. (b) Workflow: yield accrual computation and disbursement processing operate through a distinct workflow that does not use the DVP escrow mechanism. (c)

Governance: the yield program is subject to a dedicated boundary test record ([Boundary Test Record Ref above]) classifying it as Category P4 and confirming separation from the associated Category P1/P2/P3 instrument. (d) Funding Protection: if yield disbursement demand would impair settlement rail funding capacity, yield disbursements may be temporarily suspended (see Field P4-D05) without affecting settlement rail operations.

=====

FIELD P4-D04 – PAYMENT RAIL NON-DEPENDENCY STATEMENT [MANDATORY]

=====

Purpose of Field: Confirm that the settlement rail functions independently of this program. This field is boundary-critical.

[DRAFT LANGUAGE]

Access to, and functioning of, the settlement rail associated

with the qualifying instrument is not contingent upon participation in or performance of this yield program. A participant who is not enrolled in this yield program has full and unrestricted access to the settlement rail for DvP transaction purposes. Similarly, a participant who is enrolled in this program but whose enrollment is suspended or terminated retains full settlement rail access. No settlement rail function – including submission processing, escrow lock, DvP execution, finality marker issuance, or redemption – is conditioned on yield program participation or performance.

=====
FIELD P4-D05 – RESTRICTION AND SUSPENSION NOTICE [MANDATORY]
=====

[DRAFT LANGUAGE]

Yield disbursements under this program may be temporarily suspended if the Settlement Operator determines that yield disbursement demand would impair the funding capacity of the associated settlement rail. Such suspensions are governed by the LG-04 yield separation gate mechanism described in the operating model. Suspended disbursements will be processed upon restoration of adequate funding separation. Participants will be notified of any disbursement suspension and expected resumption timeline. A disbursement suspension does not affect the accrual calculation or the participant's entitlement to accrued yield; it affects only the timing of cash disbursement.

=====
FIELD P4-D06 – FUNDING DEMAND DISCLOSURE [MANDATORY]
=====

[DRAFT LANGUAGE]

The yield reserve account funding this program is maintained separately from the settlement funding pool. The yield program administrator is responsible for maintaining adequate reserves in the yield reserve account to meet disbursement obligations

on a timely basis. The Settlement Operator monitors the yield program's demand on the overall funding environment through concentration metric CM-05 (yield program funding demand as a percentage of total funding pool). If CM-05 approaches or breaches defined thresholds, the LG-04 gate mechanism (Field P4-D05) may be activated. Participants acknowledge that yield disbursement is subject to the funding adequacy of the yield reserve account and the LG-04 gate discipline.

```
=====
FIELD P4-D07 – DISCLOSURE VERSION AND TTL                [MANDATORY]
=====
```

[Same structure as P1-D08 – adapt version ID prefix to DV-P4]

```
=====
FIELD P4-D08 – EXAMINER ACCESS STATEMENT                [MANDATORY]
=====
```

[Same in substance as P1-D09 – note that examiner access to yield program records follows the same tiered, purpose-limited model and is subject to the same post-access review discipline]

```
=====
END OF P4 DISCLOSURE SCHEMA
=====
```

A.6 Disclosure Version Register Entry Template (DISC-EP-01 Row, Paste-Ready)

The following template provides the standard row format for the Disclosure Version Register (DISC-EP-01). One row per instrument/program per category per active version.

DISC-EP-01 ROW TEMPLATE

Field	Value
Instrument/Prog ID	[INST-P{N}-{id} or PROG-P4-{id}]
Category	[P1 / P2 / P3 / P4]

| Version ID	| [DV-P{N}-{id}-v{N.N}]	|
| Record Status	| [ACTIVE / SUPERSEDED]	|
| Effective Date	| [YYYY-MM-DD]	|
| TTL Expiry Date	| [YYYY-MM-DD]	|
| Days to Expiry	| [Computed field – for monitoring / DC-04]	|
| Supersedes	| [Prior version ID or "N/A"]	|
| Boundary Test Ref	| [DVP-EP-08 record ID]	|
| Prepared By	| [R-02 identity]	|
| Approved By	| [R-03 identity]	|
| Approval TS (UTC)	| [timestamp]	|
| Supersession Date	| [YYYY-MM-DD if SUPERSEDED; blank if ACTIVE]	|
| EP Delta Ref	| [EP Delta generated on this version's publish]	|

A.7 Participant Acknowledgment Record Template (DISC-EP-02 Row, Paste-Ready)

The following template provides the standard row format for participant acknowledgment records (DISC-EP-02). One row per participant per instrument/program per disclosure version acknowledged.

DISC-EP-02 ROW TEMPLATE

| Field	| Value	|
-----	-----	
| Acknowledgment ID	| [ACK-{participant_id}-{instrument_id}-{date}]	|
| Participant ID	| [Participant identifier]	|
| Instrument/Prog ID	| [INST-P{N}-{id} or PROG-P4-{id}]	|
| Category	| [P1 / P2 / P3 / P4]	|
| Acknowledged Version	| [DV-P{N}-{id}-v{N.N}]	|
| Acknowledgment TS (UTC)	| [timestamp]	|
| Acknowledgment Method	| [Electronic / Portal / Signed Document]	|
| Current Flag	| [YES / NO – NO if a newer version exists	|
|	| and this acknowledgment has not been	|
|	| superseded by a re-acknowledgment]	|
| Re-Acknowledgment Due	| [YYYY-MM-DD – TTL expiry date of the	|
|	| acknowledged version]	|
| Superseded By Ack ID	| [Later acknowledgment ID, if re-acked;	|

A.8 Disclosure Expiry Alert Record Template (DISC-EP-03 Entry, Paste-Ready)

Generated automatically when a disclosure version is within 14 days of TTL expiry (DC-04 monitoring trigger) or has elapsed without recertification.

DISC-EP-03 ENTRY TEMPLATE

Alert ID: [ALERT-DISC-{instrument_id}-{YYYYMMDD}]
Alert Type: [EXPIRY_WARNING (14 days) / EXPIRED]
Instrument/Prog ID: [identifier]
Category: [P1 / P2 / P3 / P4]
Expiring Version: [DV-P{N}-{id}-v{N.N}]
TTL Expiry Date: [YYYY-MM-DD]
Alert Generation TS: [UTC]
Routed To: [R-02 Compliance Officer identity]
Action Required By: [TTL expiry date]
Action Type: [VERSION_UPDATE / RECERTIFICATION_RENEWAL]
Status: [OPEN / RESOLVED]
Resolution TS: [UTC – when new version published or
recertification completed]
New Version ID: [DV-P{N}-{id}-v{N+1} if updated; same
version ID if recertified without change]
EP Delta Ref: [Delta generated on resolution]

Appendix B — DvP Gate Checklist + Escrow State Model (Schema-Abstract)

B.1 Purpose and Scope

This appendix provides paste-ready operational artifacts for implementing and examining the Atomic DvP core described in Section 5 of the Constitution. It contains:

- **B.2** — DvP Preconditions Gate Checklist (full, examiner-ready)
- **B.3** — Escrow State Model (schema-abstract, implementation-agnostic)
- **B.4** — Escrow Transition Rules and Failure Containment Logic
- **B.5** — Evidence Outputs Specification per DvP phase
- **B.6** — DvP Gate RACI Summary

All artifacts are grounded in baseline vocabulary (Evidence Packs, EP Deltas, immutable logs, chain-of-custody, hold/release logic, preservation bundles, tiered access controls, purpose limitation, TTL) consistent with Baselines A–D. No legal conclusions are drawn. "Finality" is treated as an operational property evidenced by artifact completeness, not as a legal determination.

B.2 DvP Preconditions Gate Checklist

The DvP Preconditions Gate is a mandatory multi-dimensional check executed **before** any asset-leg or cash-leg lock is initiated. Each gate item must resolve to **PASS** or produce an explicit **FAIL** record with a containment action. No partial lock may proceed if any gate item remains in **PENDING** or **FAIL** state.

Gate execution results are logged immutably as a **DvP Gate Evidence Record (DGER)** and appended to the applicable Evidence Pack (EP).

B.2.1 Gate Group 1 — Eligibility and Authorization Prechecks

Gate ID	Check Description	Pass Condition	Fail Action	Evidence Artifact
G1-001	Asset-leg participant holds valid, non-revoked credential for the instrument category	Credential present, signature valid, revocation status = ACTIVE, TTL not expired	Reject submission; log DGER with credential_status = REVOKED or EXPIRED	Credential verification record + timestamp
G1-002	Cash-leg participant holds valid, non-revoked credential for the settlement rail category	Same as G1-001	Same as G1-001	Credential verification record + timestamp
G1-003	Both participants confirmed as eligible institutional participants per conformance profile	Eligibility attestation on file; recertification not expired	Hold submission; route to compliance queue; log DGER with eligibility_gap flag	Eligibility attestation record + recert date
G1-004	Transaction authorization chain complete (multi-party approval where applicable)	Required approval quorum met; all authorization signatures present and verified	Block lock initiation; escalate to RACI "Authorization Owner"; log DGER	Authorization chain log + quorum signature bundle
G1-005	Instrument is listed on the operator's eligible instrument register for this settlement rail	Instrument identifier present in current eligible register; register TTL valid	Reject; log DGER with instrument_ineligible flag	Eligible instrument register snapshot + query timestamp
G1-006	Transaction size is within defined operational limits (per-transaction and	Transaction notional \leq per-transaction cap; participant aggregate \leq daily/period cap	Reject or escalate to limit override queue; log DGER with limit_breach flag	Limit check log with cap values and participant aggregate at time of check

Gate ID	Check Description	Pass Condition	Fail Action	Evidence Artifact
	aggregate caps)			
G1-007	Counterparty is not on the operator's prohibited counterparty list	Screening result = CLEAR; no match on prohibited list	Hold submission; route to compliance hold queue; log DGER with screening_flag	Sanctions/prohibition screening record + result timestamp
G1-008	No active regulatory hold or restriction order applies to either participant or the instrument	Hold registry query returns NONE for both participants and instrument	Block lock; preserve existing holds; log DGER with hold_present flag	Hold registry query result + preserving log entry

B.2.2 Gate Group 2 — Funding Availability Checks

Gate ID	Check Description	Pass Condition	Fail Action	Evidence Artifact
G2-001	Cash-leg funding source confirmed available at or above transaction notional + fee reserve	Available balance \geq (notional + fee_reserve); balance query timestamp \leq gate_staleness_TTL	Reject; log DGER with insufficient_funds flag; do not lock asset-leg	Funding availability query result + timestamp
G2-002	Cash-leg instrument category confirmed (P1/P2/P3 per taxonomy; P4 yield feature structurally separated)	Instrument category tag present in cash-leg metadata; P4 flag absent from settlement rail metadata	Reject if P4 flag present on settlement rail; log DGER with yield_commingling_flag	Cash-leg category check log
G2-003	Intraday liquidity gate is not active for this settlement rail at time of submission	Liquidity gate status = OPEN for relevant rail; gate registry query timestamp fresh	Queue transaction in settlement queue; do not fail; log DGER with gate_queued flag and queue_position	Liquidity gate status query result + queue entry record
G2-004	Cash-leg amount matches asset-leg consideration within defined tolerance threshold		cash_notional - asset_consideration	\leq tolerance_bps \times notional
G2-005	Cash-leg settlement balance has not been double-committed to another pending DvP lock	No other active lock references same cash-leg balance segment	Reject duplicate; log DGER with double_commitment_flag	Lock registry query result showing no conflicting locks

B.2.3 Gate Group 3 — Restriction and Hold Checks

Gate ID	Check Description	Pass Condition	Fail Action	Evidence Artifact
G3-001	Asset-leg instrument has no	Restriction registry query returns NONE for	Block lock; log DGER with restriction_present	Restriction registry query result +

Gate ID	Check Description	Pass Condition	Fail Action	Evidence Artifact
	transfer restriction (regulatory, contractual, or operational)	instrument at transaction time	flag; route to compliance queue	timestamp
G3-002	Cash-leg balance segment has no hold, freeze, or encumbrance	Hold registry query returns NONE for cash-leg segment	Block lock; preserve hold; log DGER with cash_hold_present flag	Hold registry query result + hold_id reference if present
G3-003	Asset-leg balance segment has no hold, freeze, or encumbrance	Hold registry query returns NONE for asset-leg segment	Block lock; preserve hold; log DGER with asset_hold_present flag	Hold registry query result + hold_id reference if present
G3-004	No concentration limit breach would result from completing this transaction	Post-transaction concentration calculation \leq operator-defined concentration limit for participant and instrument category	Queue or reject per operator policy; log DGER with concentration_flag	Pre-transaction concentration calculation record
G3-005	No run-dynamic threshold breach is active on the settlement rail	Run-risk indicator for rail = NORMAL; stress mode not active	Queue transaction; do not fail; log DGER with stress_mode_queued flag	Rail stress status query result + indicator value

B.2.4 Gate Group 4 — Disclosure Version Checks

Gate ID	Check Description	Pass Condition	Fail Action	Evidence Artifact
G4-001	Participants have acknowledged the current disclosure version for the instrument	Disclosure acknowledgment record present; version_id matches current version; acknowledgment TTL not expired	Block lock; trigger disclosure re-acknowledgment workflow; log DGER with disclosure_stale flag	Disclosure acknowledgment record + version_id + timestamp
G4-002	Settlement rail disclosure (redemption terms, restriction disclosures, yield separation statement) acknowledged by cash-leg participant	Acknowledgment record present for current rail disclosure version	Block lock; trigger re-acknowledgment; log DGER	Rail disclosure acknowledgment record
G4-003	No material change notice is pending unacknowledged for the instrument	Material change registry query returns NONE or ACKNOWLEDGED	Block lock until acknowledgment received; log DGER with pending_material_change	Material change registry query result

Gate ID	Check Description	Pass Condition	Fail Action	Evidence Artifact
	or rail	for both participants	flag	

B.2.5 Gate Execution Summary Record (DGER Template)

```
DvP_Gate_Evidence_Record {
  dger_id:          [unique identifier, immutable]
  trade_id:        [trade reference]
  gate_execution_ts: [ISO-8601 timestamp, millisecond precision]
  asset_leg_participant:[participant identifier]
  cash_leg_participant: [participant identifier]
  instrument_id:    [instrument identifier]
  cash_instrument_cat: [P1 | P2 | P3]
  gate_results: [
    { gate_id, status: PASS|FAIL|QUEUED, detail, evidence_ref }
    ...
  ]
  overall_gate_status: [ALL_PASS | FAIL | QUEUED]
  containment_action:  [NONE | REJECT | HOLD | QUEUE | ESCALATE]
  operator_id:        [settlement operator identifier]
  log_hash:           [hash of this record]
  prev_log_hash:      [hash of prior log entry – chain-of-custody]
}
```

Examiner note: The DGER is an immutable artifact. Any post-hoc correction must be recorded as a compensating log entry referencing the original DGER, not an overwrite.

B.3 Escrow State Model (Schema-Abstract)

The escrow model describes the states through which both the **asset-leg** and **cash-leg** of a DvP transaction travel, from pre-lock through to release (settlement) or reversion (failure/timeout). The model is implementation-agnostic: it applies whether the underlying mechanism is a smart contract, an off-chain escrow ledger entry, or a traditional hold on an omnibus account.

B.3.1 Escrow State Definitions

State ID	State Name	Description	Permitted Next States
ES-00	UNALLOCATED	Balance or instrument exists in participant's account; no lock pending	ES-01 (on gate pass)
ES-01	LOCK_PENDING	Gate ALL_PASS	ES-02 (confirmation received),

State ID	State Name	Description	Permitted Next States
		confirmed; lock instruction issued; awaiting confirmation from custody/settlement layer	ES-FF (timeout or rejection)
ES-02	LOCKED	Asset-leg OR cash-leg confirmed locked by custody/settlement layer; hold applied; transfer blocked	ES-03 (both legs locked — ready for release), ES-04 (partial lock — counterparty timeout), ES-FF (system failure)
ES-03	DUAL_LOCKED	Both asset-leg AND cash-leg confirmed locked; DvP release conditions can now be evaluated	ES-05 (release conditions met), ES-04 (mismatch detected), ES-FF (timeout)
ES-04	HOLD_ONLY_CONTAINMENT	One leg locked, counterparty leg failed to lock within timeout window; locked leg held pending resolution	ES-05 (resolution: both legs re-confirmed), ES-06 (resolution: revert locked leg)
ES-05	RELEASE_INITIATED	Release conditions verified; simultaneous release instruction issued to both legs	ES-07 (both releases confirmed — SETTLED), ES-FF (partial release failure)
ES-06	REVERSION_INITIATED	Unwind decision made (timeout, mismatch, error, or governance trigger); reversion instruction issued	ES-08 (reversion confirmed), ES-FF (reversion failure)
ES-07	SETTLED	Both legs released to counterparties; DvP complete; finality conditions checkable	Terminal (no further state transitions; finality assessment begins)
ES-08	REVERTED	All locks unwound; balances restored to pre-lock state; DGER updated with reversion record	Terminal
ES-FF	FAULT	Unrecoverable state transition failure; requires operator intervention; preservation bundle triggered	Operator intervention required; transitions to ES-06 or ES-08 after manual resolution

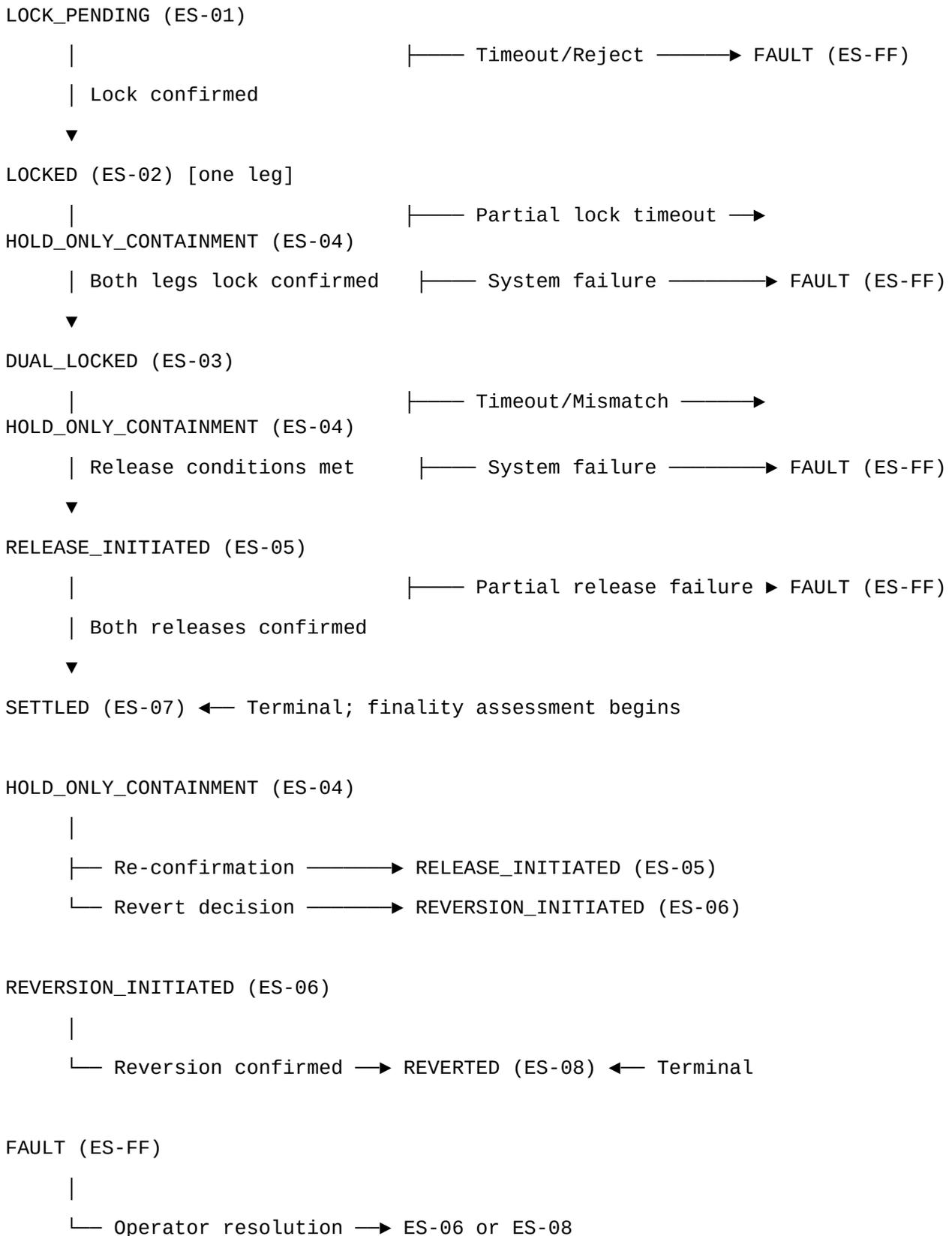
B.3.2 Escrow State Diagram (Textual Representation)

UNALLOCATED (ES-00)

|

| Gate ALL_PASS

▼



B.3.3 Escrow Record Schema (Schema-Abstract)

The following schema is abstract and implementation-agnostic. Field types indicate data class, not platform-specific encoding.

```

Escrow_Record {
  escrow_id:          [unique identifier – generated at ES-01 creation]
  trade_id:           [links to originating trade and DGER]
  created_ts:         [ISO-8601 timestamp at ES-01 entry]
  current_state:      [ES-00 through ES-FF; see state table]
  state_history: [
    { state_id, entered_ts, exited_ts, transition_trigger, operator_id, log_hash
  }
  ...
]
asset_leg: {
  participant_id:     [asset-leg participant]
  instrument_id:      [instrument identifier]
  quantity:           [numeric, instrument units]
  custody_ref:        [reference to custody system hold record]
  lock_confirmed_ts: [timestamp of ES-02 entry for this leg]
  release_confirmed_ts: [timestamp of release confirmation]
  reversion_confirmed_ts: [timestamp of reversion confirmation, if applicable]
  hold_log_ref:       [immutable log reference to hold event]
}
cash_leg: {
  participant_id:     [cash-leg participant]
  instrument_category: [P1 | P2 | P3]
  amount:             [numeric, settlement currency units]
  currency:           [ISO 4217 currency code]
  funding_source_ref: [reference to funding availability check record]
  lock_confirmed_ts: [timestamp of ES-02 entry for this leg]
  release_confirmed_ts: [timestamp of release confirmation]
  reversion_confirmed_ts: [timestamp of reversion confirmation, if applicable]
  hold_log_ref:       [immutable log reference to hold event]
}
release_conditions: {
  asset_leg_locked:   [boolean]
  cash_leg_locked:    [boolean]
  amount_match_verified:[boolean]
}

```

```

no_intervening_hold: [boolean]
timeout_not_expired: [boolean]
all_conditions_met: [boolean – computed; not operator-editable]
}
timeout_config: {
  lock_timeout_seconds: [operator-configured; default reference: 300s]
  dual_lock_timeout_seconds: [operator-configured; default reference: 600s]
  release_timeout_seconds: [operator-configured; default reference: 120s]
}
failure_record: {
  fault_code: [enumerated fault codes; see B.3.4]
  fault_ts: [timestamp of ES-FF entry]
  operator_action: [description of intervention taken]
  resolution_ts: [timestamp of resolution]
  resolution_state: [ES-06 or ES-08]
}
preservation_triggered: [boolean – true if preservation bundle auto-generated]
preservation_bundle_ref: [reference to preservation bundle, if triggered]
ep_ref: [reference to Evidence Pack entry for this escrow
record]
log_hash: [hash of this record at last state transition]
prev_log_hash: [hash of prior escrow log entry – chain-of-custody]
}

```

B.3.4 Fault Code Enumeration

Fault Code	Description	Default Resolution Path
LOCK_TIMEOUT_ASSET	Asset-leg lock confirmation not received within lock_timeout_seconds	Route to ES-04; release cash-leg if locked
LOCK_TIMEOUT_CASH	Cash-leg lock confirmation not received within lock_timeout_seconds	Route to ES-04; release asset-leg if locked
DUAL_LOCK_TIMEOUT	Both legs locked but release initiation not completed within dual_lock_timeout_seconds	Route to ES-04; await operator decision
RELEASE_PARTIAL	One leg release confirmed; counterparty release failed within release_timeout_seconds	Route to ES-FF; immediate operator escalation; preservation bundle triggered

Fault Code	Description	Default Resolution Path
AMOUNT_MISMATCH_POST_LOCK	Post-lock reconciliation detects amount discrepancy exceeding tolerance	Route to ES-04; hold-only containment; operator and compliance escalation
DUPLICATE_SUBMISSION	Duplicate escrow_id or trade_id detected after lock already in progress	Reject duplicate; log; no state change on existing record
INTERVENING_HOLD	Regulatory or compliance hold applied to a participant after lock initiated	Route to ES-04; hold-only containment; route to compliance queue
CUSTODY_LAYER_REJECTION	Custody or settlement layer rejected lock or release instruction	Route to ES-FF; operator escalation; preservation bundle triggered
SYSTEM_FAULT_UNCLASSIFIED	Unclassified system error; cannot determine partial state	Route to ES-FF; operator escalation; preservation bundle triggered; incident trigger

B.4 Escrow Transition Rules and Failure Containment Logic

B.4.1 Core Transition Rules

1. **Atomicity Invariant.** A transaction may only reach ES-07 (SETTLED) if and only if both the asset-leg and the cash-leg release confirmations are logged within the same atomic operation or within the `release_timeout_seconds` window with both confirmations present. Any state where one leg is released and the other is not released constitutes ES-FF (FAULT).
2. **No Partial Settlement.** There is no valid settled state for one leg only. Partial settlement is a fault condition requiring immediate operator intervention and preservation bundle generation.
3. **Hold Supremacy.** A hold applied to either leg at any state (including ES-03 DUAL_LOCKED) overrides the `release_conditions` check. The `no_intervening_hold` release condition must be re-evaluated at the moment of release initiation, not only at gate execution.
4. **Timeout Cascade.** Timeouts at ES-01 or ES-02 for one leg automatically initiate reversion of any already-locked leg (ES-04 → ES-06 → ES-08). The settlement operator must not hold one leg locked indefinitely awaiting the other.
5. **Immutable State History.** Every state transition appends a new entry to `state_history`. No entries may be deleted or overwritten. Post-resolution corrections are recorded as separate compensating log entries.
6. **Preservation Bundle Trigger.** The following conditions auto-trigger a preservation bundle: entry into ES-FF; RELEASE_PARTIAL fault; INTERVENING_HOLD fault after dual lock; any operator manual intervention; and any escrow record that is not resolved (ES-07 or ES-08) within operator-defined maximum resolution window.

B.4.2 Hold-Only Containment Protocol (ES-04)

When a transaction enters ES-04, the following protocol governs behavior:

Step	Action	Actor (RACI)	Evidence Produced
1	Log ES-04 entry with fault_code, locked leg details, and timestamp	Settlement Operator (Responsible)	Escrow state log entry
2	Notify both participants of hold-only containment status, fault code, and expected resolution window	Settlement Operator (Responsible); Compliance (Informed)	Participant notification log
3	Query hold registry to confirm no intervening regulatory hold was applied	Compliance Officer (Responsible)	Hold registry query result
4	Attempt counterparty lock re-confirmation within operator-configured retry window	Settlement Operator (Responsible)	Retry attempt log with outcome
5	If re-confirmation succeeds → transition to ES-05; if re-confirmation fails → escalate to governance decision: SETTLE (ES-05) or REVERT (ES-06)	Settlement Operator + Compliance (Accountable)	Decision record with authorization signatures
6	If REVERT decision: initiate reversion for locked leg(s); log ES-06 entry	Settlement Operator (Responsible)	Reversion initiation log
7	Confirm reversion of all locked balances; log ES-08 entry	Settlement Operator (Responsible)	Reversion confirmation log; EP update

B.5 Evidence Outputs Specification per DvP Phase

The following table maps each DvP phase to the evidence artifacts that must be produced, logged, and available for examiner review.

DvP Phase	Required Evidence Artifact	Retention Tag	EP / EP-Delta Mapping
Gate Execution	DvP Gate Evidence Record (DGER) — full gate results, timestamps, containment action	Transaction-level; 7-year minimum	EP: DvP Controls → Required Artifacts
Asset-Leg Lock	Escrow Record ES-02 state entry (asset leg); custody system hold confirmation reference	Transaction-level; 7-year minimum	EP: DvP Controls
Cash-Leg Lock	Escrow Record ES-02 state entry (cash leg); funding availability check reference	Transaction-level; 7-year minimum	EP: DvP Controls
Dual Lock Confirmation	Escrow Record ES-03 state entry; release_conditions evaluated = true log	Transaction-level; 7-year minimum	EP: DvP Controls
Release Initiation	Escrow Record ES-05 state entry; release instruction log with operator_id	Transaction-level; 7-year minimum	EP: DvP Controls
Settlement Completion	Escrow Record ES-07 state entry; both release confirmation timestamps; EP Delta event	Transaction-level; 7-year minimum	EP + EP-Delta: Settlement Finality Controls

DvP Phase	Required Evidence Artifact	Retention Tag	EP / EP-Delta Mapping
Reversion	Escrow Record ES-06 and ES-08 state entries; reversion confirmation for both legs; notification logs	Transaction-level; 7-year minimum	EP: DvP Controls; Incident trigger if fault-driven
Fault / ES-FF	Fault record; preservation bundle; operator escalation log; incident trigger record	Indefinite (until regulatory retention expires)	EP: Incidents; Preservation Bundle
Hold-Only Containment	ES-04 state entry; hold registry query; participant notifications; resolution decision record	Transaction-level + incident-level; 7-year minimum	EP: DvP Controls; Compliance Queue
Examiner Request	Evidence Pack export covering all above for queried trade_id(s); chain-of-custody manifest	Per examination; 7-year minimum for EP	EP: Examiner Artifacts

B.6 DvP Gate and Escrow RACI Summary

Function	Settlement Operator	Compliance Officer	Custodian / Funding Agent	Examiner	Governance / Steering
Execute DvP Gate checks (G1-G4)	R	C	C (G2 funding checks)	—	—
Approve gate override (if applicable)	—	A/R	—	—	—
Initiate asset-leg lock	R	I	C	—	—
Initiate cash-leg lock	R	I	C	—	—
Confirm dual lock (ES-03)	R	I	C	—	—
Evaluate release conditions	R	C	—	—	—
Initiate release	R	A	C	—	—
Hold-only containment decision (ES-04)	R	A	I	—	—
Reversion decision	R	A	C	—	—
Fault escalation and preservation bundle	R	A	I	—	I
Examiner evidence production	R	A	C	I	—
Material change to DvP logic (gate thresholds, timeouts)	—	C	—	—	A/R

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

Appendix C — Settlement Finality Conditions Checklist + Finality State Machine (Operational)

C.1 Purpose and Scope

This appendix provides the operational finality framework referenced in Section 6 of the Constitution. It defines:

- **C.2** — "Operational Finality Conditions Met" checklist (all conditions must be satisfied; no legal conclusion is made)
- **C.3** — Finality State Machine (states, transitions, triggers)
- **C.4** — Finality Proof Artifacts (what is logged, preserved, and produced for examiners)
- **C.5** — Finality Under Exceptions (fraud, error, system malfunction — redress posture)
- **C.6** — Material Change Triggers for Finality Logic

Definitional constraint: Throughout this appendix, "operational finality" means that the defined set of evidence-backed conditions has been verified and logged. It does not constitute a legal or contractual conclusion about irrevocability. Legal rights and obligations are governed by the underlying agreements and applicable law. The settlement operator's role is to produce evidence artifacts that support — but do not replace — the legal analysis that examiners or counsel may perform.

C.2 "Operational Finality Conditions Met" Checklist

Operational finality is assessed after the Escrow Record reaches ES-07 (SETTLED). Each condition below must resolve to **VERIFIED** and be logged in the **Finality Evidence Record (FER)**. If any condition resolves to **NOT MET** or **INDETERMINATE**, the settlement is classified as **CONDITIONALLY_FINAL** with a pending review flag, not **OPERATIONALLY_FINAL**.

C.2.1 Condition Group F1 — Settlement Completion Conditions

Condition ID	Condition Description	Verification Method	Pass Criterion	Evidence Artifact
F1-001	Asset-leg delivery confirmed: instrument quantity transferred from seller to buyer custody	Custody system release confirmation log + Escrow Record ES-07 asset_leg.release_confirmed_ts present	release_confirmed_ts ≠ null; custody confirmation reference logged	Custody transfer confirmation record
F1-002	Cash-leg payment confirmed: payment amount transferred from buyer to seller	Funding layer release confirmation log + Escrow Record ES-07 cash_leg.release_confirmed_ts present	release_confirmed_ts ≠ null; funding layer confirmation reference logged	Payment release confirmation record
F1-003	Both leg confirmations received within the release_timeout_seconds	Timestamp delta:	asset_release_ts - cash_release_ts	≤ release_timeout_seconds

Condition ID	Condition Description	Verification Method	Pass Criterion	Evidence Artifact
	window			
F1-004	No reversion instruction was issued after release initiation	Escrow state_history contains no ES-06 entry after ES-05 entry	ES-06 absent after ES-05 in state_history	Escrow state_history extract
F1-005	Released amounts match locked amounts (no unauthorized modification during escrow)	Asset quantity at release = quantity at lock; cash amount at release = amount at lock	Zero delta or delta within defined reconciliation tolerance	Amount reconciliation record; computed hash of lock values vs. release values

C.2.2 Condition Group F2 — Integrity and Chain-of-Custody Conditions

Condition ID	Condition Description	Verification Method	Pass Criterion	Evidence Artifact
F2-001	Escrow Record hash chain is unbroken from ES-01 creation through ES-07	Hash verification: each log_hash in state_history is computable from prior state + prev_log_hash	All hashes verify; no gaps in state_history sequence numbers	Hash verification log
F2-002	DGER (DvP Gate Evidence Record) is present and all gate items show PASS or QUEUED-then-PASS	DGER query by trade_id; overall_gate_status = ALL_PASS	overall_gate_status = ALL_PASS; all gate_results entries resolved	DGER reference in FER
F2-003	Immutable log entry exists for every state transition in the Escrow Record	Log count in state_history = expected state transitions; no gaps	Count matches; sequence unbroken	Immutable log completeness check
F2-004	Finality marker event logged by settlement operator with operator_id and signing credential	Finality marker event present in immutable log with operator_id, credential reference, and timestamp	Marker event present; credential valid at time of marker	Finality marker event log entry
F2-005	No duplicate settlement records exist for the same trade_id	Trade_id registry query returns exactly one ES-07 entry	Count = 1	Trade_id uniqueness check log

C.2.3 Condition Group F3 — Compliance and Authorization Conditions

Condition ID	Condition Description	Verification Method	Pass Criterion	Evidence Artifact
F3-001	No regulatory hold was applied to either participant or the instrument between gate execution and settlement confirmation	Hold registry query for period [gate_execution_ts, release_confirmed_ts] returns NONE for both participants and instrument	No holds applied during window	Hold registry time-ranged query result
F3-002	Disclosure	Disclosure	TTL not expired at	Disclosure TTL check

Condition ID	Condition Description	Verification Method	Pass Criterion	Evidence Artifact
	acknowledgments remained valid (not expired, not revoked) throughout the settlement lifecycle	acknowledgment TTL check at time of release: acknowledgment still active	release_confirmed_ts	record
F3-003	Authorization chain was not revoked or challenged between gate execution and settlement	Authorization record query confirms no revocation event between gate_execution_ts and release_confirmed_ts	No revocation events in window	Authorization revocation query result
F3-004	No concentration limit breach resulted from the completed settlement	Post-settlement concentration recalculation \leq concentration limit	No breach	Post-settlement concentration record
F3-005	Yield separation boundary was not breached during settlement (P4 instrument not present on settlement rail)	Cash-leg instrument_category \in {P1, P2, P3}; no P4 tag in settlement layer metadata at any state	P4 absent throughout lifecycle	Cash-leg category audit through all states

C.2.4 Condition Group F4 — Reconciliation Conditions

Condition ID	Condition Description	Verification Method	Pass Criterion	Evidence Artifact
F4-001	Post-settlement position reconciliation completed: buyer's position increased by delivered quantity	Position registry query for buyer at settlement_date + reconciliation_window shows delta = delivered quantity	Delta matches exactly	Post-settlement position reconciliation record
F4-002	Post-settlement position reconciliation completed: seller's position decreased by delivered quantity	Position registry query for seller at settlement_date + reconciliation_window shows delta = -delivered quantity	Delta matches exactly (negative)	Post-settlement position reconciliation record
F4-003	Post-settlement cash reconciliation completed: buyer's cash balance decreased by payment amount	Cash balance query for buyer shows delta = -payment_amount (net of fees)	Delta matches within tolerance	Cash reconciliation record
F4-004	Post-settlement cash reconciliation completed: seller's cash balance increased by payment amount	Cash balance query for seller shows delta = +payment_amount (net of fees)	Delta matches within tolerance	Cash reconciliation record
F4-005	Reconciliation	Reconciliation	Reference	FER

Condition ID	Condition Description	Verification Method	Pass Criterion	Evidence Artifact
	checkpoint reference logged and linked to the Finality Evidence Record	checkpoint record present; reconciliation_checkpoint_ref populated in FER	present and resolvable	reconciliation_checkpoint_ref field

C.2.5 Finality Evidence Record (FER) Template

```

Finality_Evidence_Record {
  fer_id: [unique identifier]
  trade_id: [links to Escrow Record and DGER]
  escrow_id: [links to Escrow Record]
  dger_id: [links to DvP Gate Evidence Record]
  finality_assessed_ts: [ISO-8601 timestamp of finality assessment
execution]
  finality_state: [PENDING | CONDITIONALLY_FINAL | OPERATIONALLY_FINAL
| REVERSED | INDETERMINATE]
  conditions_evaluated: [
    { condition_id, status: VERIFIED|NOT_MET|INDETERMINATE, evidence_ref,
evaluated_ts }
    ...
  ]
  all_conditions_verified: [boolean – computed; not operator-editable]
  pending_conditions: [
    { condition_id, reason, expected_resolution_ts }
  ]
  finality_marker_event_ref:[reference to immutable finality marker log entry]
  reconciliation_checkpoint_ref: [reference to post-settlement reconciliation
record]
  exceptions_noted: [
    { exception_type, description, redress_status, redress_ref }
  ]
  ep_ref: [reference to Evidence Pack entry]
  ep_delta_ref: [reference to EP Delta event, if applicable]
  operator_id: [settlement operator]
  log_hash: [hash of this record]
  prev_log_hash: [hash of prior log entry – chain-of-custody]
}

```

C.3 Finality State Machine

C.3.1 Finality State Definitions

State ID	State Name	Description	Permitted Next States
FS-00	PENDING	Escrow ES-07 reached; finality conditions assessment not yet initiated or in progress	FS-01, FS-04
FS-01	CONDITIONALLY_FINAL	All F1 (settlement completion) conditions verified; one or more F2/F3/F4 conditions INDETERMINATE or in short resolution window	FS-02 (all conditions resolve VERIFIED), FS-03 (exception identified), FS-04 (reversion triggered)
FS-02	OPERATIONALLY_FINAL	All conditions in groups F1–F4 verified; finality marker event logged; reconciliation checkpoint complete	FS-03 (post-finality exception — limited window), FS-04 (post-finality reversion — exceptional)
FS-03	EXCEPTION_UNDER_REVIEW	Post-settlement exception identified (fraud signal, error correction request, system malfunction evidence); finality assessment suspended pending review	FS-02 (exception resolved; conditions re-verified), FS-04 (reversion approved), FS-05 (indeterminate — escalate)
FS-04	REVERSED_OR_UNWOUND	Reversion or unwind completed per redress posture (see C.5); positions and balances restored; reversal record logged	Terminal
FS-05	INDETERMINATE	Conditions cannot be fully verified or falsified due to system fault, incomplete logs, or disputed facts; requires operator and compliance escalation; preservation bundle triggered	FS-02 (after resolution), FS-04 (after resolution), or remains until governance decision

C.3.2 Finality State Diagram (Textual Representation)

[ES-07 SETTLED]

|

▼

PENDING (FS-00)

|

| F1 conditions verified

▼

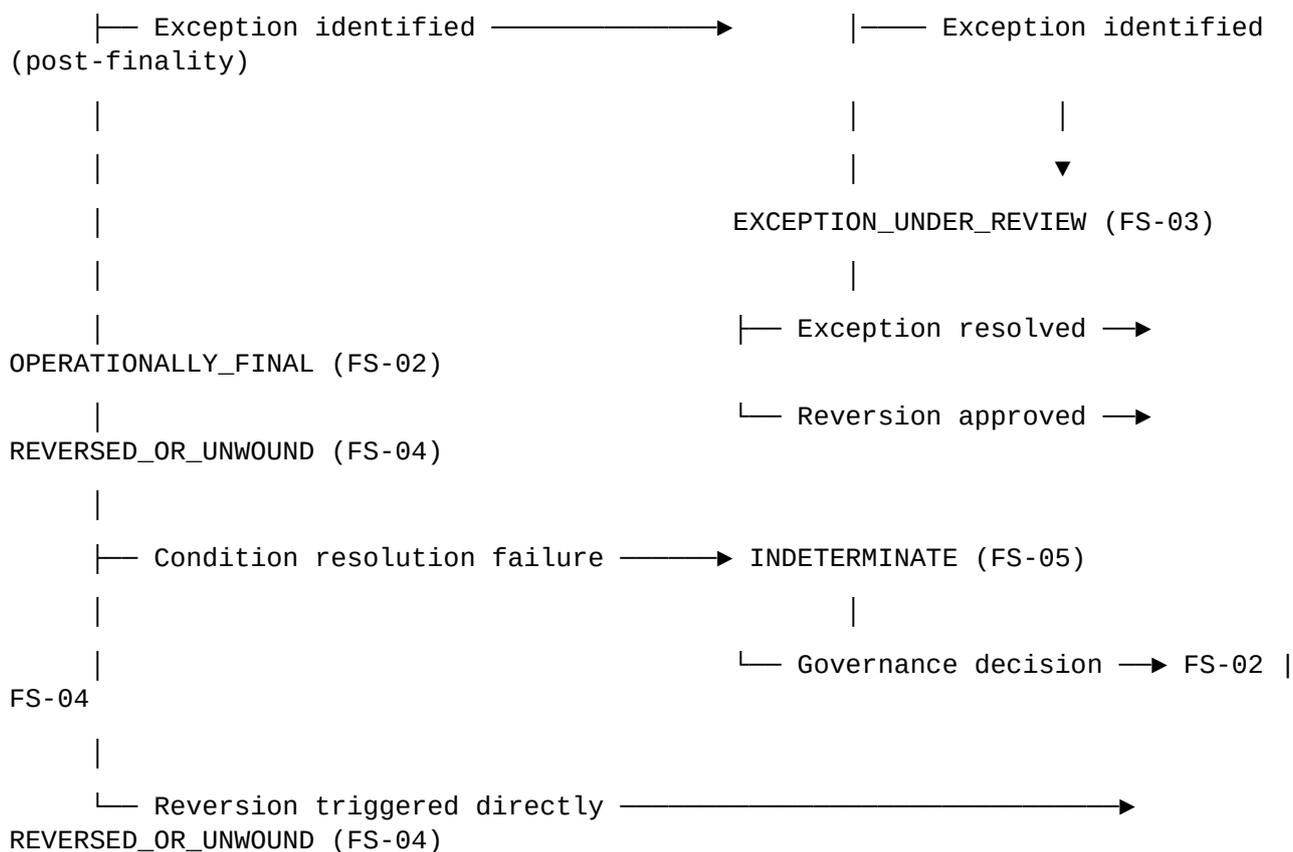
CONDITIONALLY_FINAL (FS-01)

|

| — All F1-F4 verified —————> OPERATIONALLY_FINAL (FS-02)

|

|



C.3.3 Finality State Transition Triggers

Transition	Trigger Event	Required Authorization	Evidence Produced
FS-00 → FS-01	F1 conditions all VERIFIED; FER partially populated	Settlement Operator (automated)	FER with F1 conditions marked VERIFIED
FS-01 → FS-02	All F1–F4 conditions VERIFIED; finality marker event logged	Settlement Operator (automated) + Compliance Officer (review)	FER fully populated; finality marker event; EP Delta event
FS-01 → FS-03	Exception signal detected (fraud indicator, error correction request, system anomaly)	Compliance Officer or Settlement Operator	Exception record; FER exception_noted entry; incident trigger
FS-02 → FS-03	Post-finality exception signal within defined post-finality review window	Compliance Officer (escalated) + Governance approval	Exception record; amended FER; incident trigger
FS-03 → FS-02	Exception resolved: root cause identified; conditions re-verified; no reversion required	Compliance Officer (Accountable) + Settlement Operator (Responsible)	Exception resolution record; FER updated
FS-03 → FS-04	Reversion approved: exception requires unwinding of settlement	Governance / Steering (Accountable) + Compliance Officer +	Reversion authorization record; reversion execution log; FER final state updated

Transition	Trigger Event	Required Authorization	Evidence Produced
		legal review	
FS-05 → FS-02/FS-04	Governance decision after indeterminate resolution	Governance / Steering (Accountable)	Governance decision record; FER updated
Any → FS-04	Reversion or unwind: fraud confirmed, mandatory regulatory order, or system integrity failure	As per redress posture (Section C.5)	Reversion record; EP preservation bundle

C.4 Finality Proof Artifacts

The following artifacts constitute the operational finality proof bundle associated with a given trade_id. This bundle is produced at FS-02 (OPERATIONALLY_FINAL) and must be available for examiner review on demand.

Artifact	Description	Source System	Retention
Finality Evidence Record (FER)	Full FER with all conditions, states, timestamps, and references	Settlement layer	7-year minimum
DvP Gate Evidence Record (DGER)	Full gate results for the trade_id	Settlement layer	7-year minimum
Escrow Record (full state_history)	Complete state_history from ES-01 through ES-07	Escrow/custody layer	7-year minimum
Asset-leg custody release confirmation	Custody system confirmation of instrument transfer	Custody layer	7-year minimum
Cash-leg payment release confirmation	Funding layer confirmation of payment transfer	Funding/payment layer	7-year minimum
Post-settlement reconciliation record	Position and cash reconciliation checkpoints (F4 conditions)	Reconciliation layer	7-year minimum
Finality marker event log entry	Immutable log entry with operator_id, credential reference, and timestamp	Immutable log	7-year minimum
Hash chain verification log	Log proving unbroken hash chain from DGER through FER	Audit/logging layer	7-year minimum
Disclosure acknowledgment records	Acknowledgment records for both participants, current at time of settlement	Disclosure layer	7-year minimum
Authorization chain log	Multi-party authorization records for the transaction	Authorization layer	7-year minimum
Hold registry negative query results	Query results confirming no intervening holds during settlement lifecycle	Hold registry	7-year minimum

C.4.1 Finality Proof Bundle Manifest Template

```
Finality_Proof_Bundle_Manifest {
    bundle_id:          [unique identifier]
    trade_id:           [trade reference]
```

```

fer_id: [Finality Evidence Record reference]
generated_ts: [ISO-8601 timestamp]
generated_by: [settlement_operator_id]
finality_state_at_generation: [FS-02 expected; note if otherwise]
artifacts: [
  { artifact_type, artifact_ref, source_system, hash, hash_algorithm }
  ...
]
chain_of_custody_verified: [boolean]
examiner_ready: [boolean – true if all artifacts present and hashes
verified]
retention_expiry_ts: [earliest retention expiry across all artifacts]
ep_ref: [Evidence Pack reference]
log_hash: [hash of this manifest]
}

```

C.5 Finality Under Exceptions: Redress Posture (Baseline-Aligned)

This section defines the operational posture for addressing post-settlement exceptions. It is aligned with the Hold/Release and Redress frameworks in Baselines B and C. No reversion is automatic or self-executing; each requires documented authorization.

C.5.1 Exception Categories and Response Posture

Exception Category	Definition	Default Posture	Reversion Eligible?	Required Authorization
Operational Error	System malfunction, data corruption, or procedural deviation that caused an unintended outcome	Investigate; if correctable via compensating transaction, prefer over reversion	Yes, within defined correction window	Compliance Officer + Settlement Operator
Instruction Error	Participant submitted incorrect parameters (wrong quantity, wrong instrument, wrong counterparty)	Investigate; participant bears responsibility per agreements; correcting transaction preferred	Only with bilateral participant agreement + legal review	Both participants + Compliance Officer + legal review
Fraud Signal	Post-settlement evidence of unauthorized instruction, identity compromise, or transaction	Immediate hold on proceeds (where possible); investigation; escalation to compliance and	Yes, subject to legal and regulatory authority	Compliance Officer (escalated) + Governance + regulatory coordination

Exception Category	Definition	Default Posture	Reversion Eligible?	Required Authorization
	manipulation	supervisory authorities		
System Integrity Failure	Hash chain break, log tampering evidence, or custody system integrity failure detected post-settlement	Immediate preservation bundle; incident trigger; operator escalation; supervisory notification	Conditional — subject to investigation outcome	Governance / Steering + regulatory coordination
Mandatory Regulatory Order	Supervisory authority issues binding order requiring reversion or unwind	Compliance with order within defined timelines; evidence of order preserved	Yes — mandatory	Regulatory order is the authorization; Compliance Officer executes

C.5.2 Reversion Decision and Execution Steps

When reversion is authorized, the following steps apply regardless of exception category:

Step	Action	Actor (RACI)	Evidence Produced
1	Document reversion authorization basis (exception type, authorization record, regulatory order if applicable)	Compliance Officer (Responsible)	Reversion authorization record
2	Assess feasibility: can both legs be unwound (e.g., proceeds not yet further transferred)?	Settlement Operator + Compliance (Responsible)	Feasibility assessment record
3	If full reversion feasible: initiate simultaneous reversion of both legs	Settlement Operator (Responsible)	Reversion initiation log
4	If partial reversion only (one leg not unwindable): escalate to governance; document compensating mechanism	Governance (Accountable)	Governance decision record; compensating mechanism description
5	Confirm reversion: asset-leg quantity returned to seller; cash-leg amount returned to buyer	Settlement Operator (Responsible)	Reversion confirmation log; reconciliation record
6	Update FER finality_state to REVERSED_OR_UNWOUND; log final state	Settlement Operator (Responsible)	FER final state entry
7	Notify both participants and supervisory authorities	Compliance Officer (Responsible)	Notification records
8	Generate post-reversion preservation bundle	Settlement Operator (Responsible)	Preservation bundle
9	Post-incident review	Compliance Officer + Governance (Responsible)	Post-incident review record; lessons learned entry

C.5.3 Post-Finality Review Window

Operators must define and disclose a **post-finality review window** — the period after FS-02 is reached during which an exception report can initiate transition to FS-03

(EXCEPTION_UNDER_REVIEW). Beyond this window, reversion becomes exceptional and requires elevated authorization.

Parameter	Default Reference Value	Operator Configuration
Post-finality review window	T + 2 business days from FS-02 timestamp	Operator-configurable; must be disclosed in settlement rail disclosure (Appendix A)
Elevated authorization threshold for post-window reversion	Governance / Steering + regulatory coordination	Not reducible below dual-authorization requirement

C.6 Material Change Triggers for Finality Logic

Any change to the finality conditions, state machine transitions, timeout parameters, or redress posture constitutes a **material change** requiring the following governance and recertification process:

Change Type	Trigger Criteria	Required Process	Evidence Produced
Addition or removal of a finality condition (F1–F4)	Any change to the checklist in Section C.2	Governance / Steering approval; participant notification (minimum 30 days advance); EP Delta event	Governance decision record; amended finality conditions document; EP Delta
Change to timeout parameters (lock_timeout, dual_lock_timeout, release_timeout)	Any numeric change	Change Control Board approval; participant notification (minimum 14 days advance)	Change Control Board record; updated configuration manifest
Change to post-finality review window	Any numeric change	Compliance Officer + Governance approval; updated settlement rail disclosure; participant notification	Updated disclosure version; acknowledgment workflow triggered
Change to reversion authorization requirements	Any change to required authorization levels	Governance / Steering approval; regulatory notification where applicable	Governance decision record; regulatory notification record
Change to finality state machine transitions or states	Any structural change	Governance / Steering approval; formal verification re-run (if smart contract implements state machine); participant notification	Governance decision record; updated state machine specification; formal verification report if applicable
Change to EP or EP-Delta mapping for finality artifacts	Any change to artifact requirements	Change Control Board approval	Change Control Board record; updated EP manifest template

C.6.1 Material Change Evidence Record Template

```
Material_Change_Evidence_Record {
```

```

change_id:          [unique identifier]
change_type:        [from taxonomy in C.6 table]
description:        [plain-language description of change]
prior_value:        [prior configuration or condition text]
new_value:          [new configuration or condition text]
justification:      [operational, risk, or compliance rationale]
authorization_level: [CCB | Compliance | Governance – per C.6 table]
authorizing_actors: [
  { actor_id, role, authorization_ts }
]
participant_notification_ts: [timestamp notifications sent]
effective_ts:       [timestamp change takes effect]
regulatory_notification_ts: [timestamp of regulatory notification, if
required]
formal_verification_ref:[reference to formal verification report, if
applicable]
ep_delta_event_ref: [reference to EP Delta event recording this change]
log_hash:           [hash of this record]
prev_log_hash:      [hash of prior material change record – chain-of-
custody]
}

```

C.7 Finality RACI Summary

Function	Settlement Operator	Compliance Officer	Governance / Steering	Examiner
Execute finality conditions assessment (F1–F4)	R	C	—	—
Issue finality marker event	R	A	—	—
Classify finality state (FS-00 through FS-05)	R	C	—	—
Exception signal triage (FS-03 initiation)	R	A	I	—
Exception resolution decision	R	A	C	—
Reversion authorization (within window)	C	A/R	I	—
Reversion authorization (post-window or elevated)	C	C	A/R	—
Preservation bundle generation	R	A	I	—
FER production for examiner review	R	A	—	I
Finality proof bundle assembly	R	A	—	I
Material change authorization (CCB	C	C	A/R	—

Function	Settlement Operator	Compliance Officer	Governance / Steering	Examiner
level)				
Material change authorization (Governance level)	I	C	A/R	—

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

C.8 Examiner Quick-Reference: Finality State Lookup

The following is a condensed reference for examiners assessing settlement finality for a given trade_id.

Step 1 — Locate FER: Query by trade_id. Confirm FER exists. Confirm finality_state field.

Step 2 — Verify FS-02 conditions: If finality_state = OPERATIONALLY_FINAL, confirm all conditions in conditions_evaluated show status = VERIFIED.

Step 3 — Check for exceptions: Confirm exceptions_noted list is empty or that all listed exceptions show redress_status = RESOLVED.

Step 4 — Verify finality marker: Confirm finality_marker_event_ref resolves to an immutable log entry with a valid operator credential reference.

Step 5 — Verify hash chain: Confirm F2-001 through F2-005 all show VERIFIED. Request hash verification log if any are INDETERMINATE.

Step 6 — Check reconciliation: Confirm F4-001 through F4-005 all show VERIFIED. Request reconciliation records if any are INDETERMINATE.

Step 7 — Check for post-finality state transitions: If finality_state ≠ OPERATIONALLY_FINAL, request state_history and exception records. Any FS-03, FS-04, or FS-05 state requires the additional artifacts specified in Section C.4 plus the incident record.

If finality_state = REVERSED_OR_UNWOUND: Request reversion authorization record, reversion execution log, and post-reversion preservation bundle. Confirm both legs were reverted. Confirm participant and supervisory notifications were made.

Appendix D — Evidence Pack Manifest Templates (Payments/Settlement Variants) + EP Delta Template

D.1 Purpose and Scope

This appendix provides paste-ready Evidence Pack (EP) manifest templates and EP Delta templates for the payments and settlement operating model. It contains:

- **D.2** — Evidence Pack Structure and Taxonomy (baseline-aligned)
- **D.3** — EP Manifest Template: DvP Controls Variant
- **D.4** — EP Manifest Template: Settlement Finality Controls Variant
- **D.5** — EP Manifest Template: Liquidity Gates and Redemption Queue Controls Variant

- **D.6** — EP Manifest Template: Yield Separation Boundary Controls Variant
- **D.7** — EP Manifest Template: Examiner Request Variant (on-demand, scoped)
- **D.8** — EP Delta Template (all variants)
- **D.9** — EP Cadence, Retention, and Access Control (baseline-aligned)
- **D.10** — Preservation Bundle Template (disputes and incidents)
- **D.11** — EP Completeness Checklist (examiner-facing)

All templates reuse baseline vocabulary: Evidence Packs, EP Deltas, immutable logs, chain-of-custody, preservation bundles, tiered supervision, purpose limitation, TTL, RACI, hold/release, conformance profiles, recert cadence, material change. No legal conclusions are drawn. Examiners should treat EP contents as operational evidence supporting — not replacing — independent regulatory analysis.

D.2 Evidence Pack Structure and Taxonomy

D.2.1 EP Hierarchy

Each Evidence Pack is a structured, versioned collection of artifacts organized by control domain. The hierarchy is:

Evidence_Pack (EP)

- ├─ EP Header (metadata, operator identity, period, version)
- ├─ EP Sections (one per control domain – see D.2.2)
 - | ── Section Header
 - | ── Artifact List (each artifact: type, ref, hash, source, retention tag)
 - | ── Section Completeness Attestation
- ├─ EP Cross-Reference Index (trade_id, escrow_id, fer_id, hold_id cross-references)
- ├─ EP Deltas (incremental updates since last full EP – see D.8)
- └─ EP Manifest (top-level manifest linking all sections – see D.3–D.7)

D.2.2 Control Domain Taxonomy (Payments/Settlement Variants)

Domain Code	Domain Name	Primary Appendix Reference
EP-DVP	DvP Gate and Escrow Controls	Appendix B
EP-FIN	Settlement Finality Controls	Appendix C
EP-LIQ	Liquidity Gates and Redemption Queue Controls	Section 7 of Constitution
EP-YLD	Yield Separation Boundary Controls	Section 3 of Constitution
EP-DSC	Disclosure and Acknowledgment Controls	Section 8 of Constitution
EP-GOV	Governance, RACI, and Material Change Controls	Section 9 of Constitution
EP-OFF	Offboarding and Unwind Controls	Section 10 of Constitution
EP-INC	Incident and Exception Controls	Cross-cutting
EP-REC	Reconciliation and Break Management	Section 4 of Constitution

Domain Code	Domain Name	Primary Appendix Reference
EP-ACC	Examiner Access and Purpose Limitation Controls	Tiered access framework

D.2.3 EP Naming Convention

EP_{operator_id}_{variant_code}_{period_start}_{period_end}_{version}

Examples:

EP_OPR001_DVP_20260101_20260331_v1.0

EP_OPR001_FIN_20260101_20260331_v1.0

EP_OPR001_EXAM_20260301_20260301_v1.0 ← Examiner request, point-in-time

D.2.4 EP Header Schema (All Variants)

EP_Header {

ep_id: [unique identifier – generated at EP creation]

ep_variant: [DVP | FIN | LIQ | YLD | EXAM | FULL | PRESERVATION]

operator_id: [settlement operator identifier]

operator_credential_ref: [operator's conformance credential reference]

period_start: [ISO-8601 date – inclusive]

period_end: [ISO-8601 date – inclusive]

generated_ts: [ISO-8601 timestamp of EP generation]

generated_by: [operator_id or system identifier]

ep_version: [semantic version: major.minor]

prior_ep_ref: [reference to prior EP of same variant, if exists]

ep_delta_refs: [
 { delta_id, delta_ts, change_description }
 ...
]

pilot_phase: [SHADOW | LIMITED_LIVE | EXPANSION]

total_artifact_count: [integer – computed]

total_section_count: [integer – computed]

all_sections_complete: [boolean – computed; false if any section has pending artifacts]

attestation: {

 attesting_officer_id: [compliance officer or designated senior officer]

 attestation_ts: [ISO-8601 timestamp]

 attestation_statement: "I attest that the artifacts in this Evidence Pack are accurate, complete to the best of operational

knowledge,

and have been produced in accordance with the settlement operator's conformance profile. This attestation does not constitute a legal conclusion."

```

    attestation_signature_ref: [reference to digital signature or authorization record]
  }
  log_hash: [hash of this EP Header record]
  prev_log_hash: [hash of prior log entry – chain-of-custody]
}

```

D.3 EP Manifest Template: DvP Controls Variant (EP - DvP)

D.3.1 Purpose

The DvP Controls EP documents all artifacts related to the execution, monitoring, and exception handling of the Atomic DvP gate and escrow lifecycle for the reporting period. It is produced at minimum on the cadence defined in D.9 and on demand in response to examiner requests.

D.3.2 Required Sections and Artifacts

Section DvP-1 — Gate Execution Records

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
DvP-1.001	DvP Gate Evidence Records (DGER) — full population	All DGERs generated in period; indexed by trade_id	Settlement layer immutable log	7-year	Required
DvP-1.002	Gate FAIL and QUEUED summary report	Summary of all non-ALL_PASS gate outcomes; count by gate group and gate_id; containment actions taken	Settlement layer	7-year	Required
DvP-1.003	Gate override records	Any gate item manually overridden; authorization records; compliance approvals	Compliance log	7-year	Conditional — required if any override occurred
DvP-1.004	Eligible instrument register snapshots	Snapshots of eligible instrument register at start and end of period; any mid-period updates	Registry layer	7-year	Required
DvP-1.005	Concentration limit check logs	All concentration pre-checks executed; any G3-004 flags raised	Risk monitoring layer	7-year	Required

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
DvP-1.006	Sanctions and prohibition screening records	All screening records for period; any flags raised and resolution	Compliance screening layer	7-year	Required

Section DvP-1 Completeness Attestation:

```

Section_Completeness_Record {
  section_id:      "DvP-1"
  ep_id:          [parent EP reference]
  artifacts_present: [count of artifacts included]
  artifacts_required: [count per this template]
  conditional_artifacts_triggered: [list of conditional artifact IDs included]
  gaps_noted: [
    { artifact_id, gap_reason, expected_resolution_ts }
  ]
  section_complete: [boolean]
  attesting_officer_id: [officer ID]
  attestation_ts: [timestamp]
}

```

Section DvP-2 — Escrow Lifecycle Records

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
DvP-2.001	Escrow Records — full state_history	All Escrow Records generated in period; full state_history for each; indexed by escrow_id and trade_id	Escrow/custody layer	7-year	Required
DvP-2.002	Escrow state distribution report	Count of escrow records by terminal state (ES-07, ES-08, ES-FF pending resolution); period totals	Settlement layer	7-year	Required
DvP-2.003	ES-FF fault records	All Escrow Records that entered ES-FF in period; fault codes; operator resolution records	Settlement layer	7-year	Required (zero-count acceptable if none occurred)
DvP-2.004	Hold-only containment records (ES-04)	All ES-04 entries; resolution decisions; authorization records	Settlement + compliance layer	7-year	Required (zero-count acceptable if none occurred)
DvP-2.005	Partial lock timeout records	All LOCK_TIMEOUT_ASSET and LOCK_TIMEOUT_CASH fault events	Settlement layer	7-year	Required (zero-count acceptable)

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
DvP-2.006	Duplicate submission rejection records	All DUPLICATE_SUBMISSION fault events	Settlement layer	7-year	Required (zero-count acceptable)
DvP-2.007	Hash chain verification logs	Verification logs confirming unbroken hash chain for all Escrow Records in period	Audit/logging layer	7-year	Required

Section DvP-3 — Settlement Completion Records

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
DvP-3.001	Settlement confirmation records — asset leg	All custody release confirmations for the period; indexed by trade_id	Custody layer	7-year	Required
DvP-3.002	Settlement confirmation records — cash leg	All payment release confirmations for the period; indexed by trade_id	Funding/payment layer	7-year	Required
DvP-3.003	Settlement-without-payment detection log	Query results confirming no asset-leg releases occurred without corresponding cash-leg release	Settlement reconciliation layer	7-year	Required
DvP-3.004	Payment-without-delivery detection log	Query results confirming no cash-leg releases occurred without corresponding asset-leg release	Settlement reconciliation layer	7-year	Required
DvP-3.005	Amount mismatch records	All AMOUNT_MISMATCH_POST_LOCK events; investigation and resolution records	Settlement + compliance layer	7-year	Required (zero-count acceptable)
DvP-3.006	Intervening hold records (post-lock)	All INTERVENING_HOLD fault events; compliance queue routing records	Settlement + compliance layer	7-year	Required (zero-count acceptable)

Section DvP-4 — Preservation Bundles (Period)

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
DvP-4.001	Preservation bundle manifest index	Index of all preservation bundles generated in period; linked to triggering events	Settlement layer	Indefinite	Required (zero-count acceptable)
DvP-4.002	Preservation bundle contents (per bundle)	Full artifact set for each preservation bundle; see D.10 for	All source systems	Indefinite	Conditional — required if any preservation bundles generated

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
		template			

D.4 EP Manifest Template: Settlement Finality Controls Variant (EP - FIN)

D.4.1 Purpose

The Settlement Finality Controls EP documents all artifacts related to the operational finality assessment lifecycle, exception handling, and reversion records for the reporting period.

D.4.2 Required Sections and Artifacts

Section FIN-1 — Finality Evidence Records

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
FIN-1.001	Finality Evidence Records (FER) — full population	All FERs generated in period; indexed by trade_id and fer_id	Settlement layer	7-year	Required
FIN-1.002	Finality state distribution report	Count of FERs by finality_state at period end; any INDETERMINATE or pending states flagged	Settlement layer	7-year	Required
FIN-1.003	CONDITIONALLY_FINAL pending resolution log	All FERs that remained in FS-01 beyond defined resolution window; escalation records	Settlement + compliance layer	7-year	Required (zero-count acceptable)
FIN-1.004	Finality marker event log — full population	All finality marker events for period; operator_id, credential reference, timestamp for each	Immutable log	7-year	Required
FIN-1.005	Finality marker uniqueness check	Query confirming each trade_id has exactly one finality marker event	Audit layer	7-year	Required

Section FIN-2 — Exception and Reversion Records

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
FIN-2.001	FS-03 exception records	All instances where finality transitioned to EXCEPTION_UNDER_REVIEW;	Compliance + settlement layer	7-year	Required (zero-count acceptable)

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
		exception category; resolution			
FIN-2.002	FS-04 reversion authorization records	All reversion authorization records; authorization basis; authorizing actors; timestamps	Compliance + governance layer	7-year	Required (zero-count acceptable)
FIN-2.003	Reversion execution logs	Step-by-step reversion execution logs for all FS-04 instances; both-leg confirmation records	Settlement + custody + payment layer	7-year	Conditional — required if any reversions occurred
FIN-2.004	FS-05 indeterminate escalation records	All INDETERMINATE state entries; escalation path; governance decision records	Governance layer	7-year	Required (zero-count acceptable)
FIN-2.005	Post-finality review window disclosures	Operator's published post-finality review window value; any changes in period	Disclosure layer	7-year	Required

Section FIN-3 — Reconciliation and Integrity

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
FIN-3.001	Post-settlement reconciliation records — asset leg	All F4-001 and F4-002 condition verification records for period	Reconciliation layer	7-year	Required
FIN-3.002	Post-settlement reconciliation records — cash leg	All F4-003 and F4-004 condition verification records for period	Reconciliation layer	7-year	Required
FIN-3.003	Reconciliation break log	All reconciliation breaks identified; investigation status; resolution records	Reconciliation + compliance layer	7-year	Required (zero-count acceptable)
FIN-3.004	Hash chain integrity verification — FER population	Verification confirming unbroken hash chains across all FERs for period	Audit layer	7-year	Required
FIN-3.005	Finality proof bundles index	Index of all finality proof bundles generated in period; linked to fer_id	Settlement layer	7-year	Required

Section FIN-4 — Material Change Records (Finality Logic)

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
FIN-4.001	Material change	All Material Change	Governance +	7-year	Required (zero-count

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
	evidence records — finality logic	Evidence Records (Section C.6) for finality conditions, state machine, or timeout parameters changed in period	change control layer		acceptable)
FIN-4.002	Recertification records triggered by material changes	Any recertification events triggered by finality logic changes	Conformance layer	7-year	Conditional — required if any material changes occurred
FIN-4.003	Participant notifications for finality logic changes	All notifications sent to participants for finality logic changes in period	Communication log	7-year	Conditional — required if any material changes occurred

D.5 EP Manifest Template: Liquidity Gates and Redemption Queue Controls Variant (EP - LIQ)

D.5.1 Purpose

The Liquidity Gates EP documents all artifacts related to the activation, monitoring, and deactivation of liquidity gates and settlement queues, including stress trigger events and concentration monitoring for the reporting period.

D.5.2 Required Sections and Artifacts

Section LIQ-1 — Gate Status and Activation Records

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
LIQ-1.001	Liquidity gate status log — full period	Time-series log of gate status (OPEN / RESTRICTED / CLOSED) per settlement rail; timestamps and triggering values	Liquidity monitoring layer	7-year	Required
LIQ-1.002	Gate activation event records	All gate activation events; triggering indicator values; authorization records; notifications sent	Liquidity monitoring + compliance layer	7-year	Required (zero-count acceptable if no activations)
LIQ-1.003	Gate deactivation event records	All gate deactivation events; deactivation authorization; post-deactivation monitoring period log	Liquidity monitoring + compliance layer	7-year	Required (zero-count acceptable if no activations)
LIQ-1.004	Gate activation	Dual-authorization records	Compliance +	7-year	Conditional —

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
	authorization records	for each gate activation; authorizing actor IDs and timestamps	governance layer		required if any activations occurred
LIQ-1.005	Examiner notification records for gate activations	Records of supervisory notifications made upon gate activation	Compliance communication log	7-year	Conditional — required if any activations occurred

Section LIQ-2 — Settlement Queue Records

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
LIQ-2.001	Settlement queue entries log	All transactions queued during gate-active periods; queue_position, queued_ts, dequeued_ts, outcome	Settlement layer	7-year	Required (zero-count acceptable if no queuing occurred)
LIQ-2.002	Queue integrity checks	Verification that queue order was maintained and no transactions were skipped or reordered without authorization	Settlement layer	7-year	Required
LIQ-2.003	Queue abandonment and expiry records	Transactions that were queued but expired or were withdrawn; participant notifications	Settlement + compliance layer	7-year	Conditional — required if any queue expirations occurred
LIQ-2.004	Queue unwind records	Post-gate-deactivation queue processing records; order of execution; settlement confirmations	Settlement layer	7-year	Conditional — required if any gate activations occurred

Section LIQ-3 — Stress Indicators and Concentration Monitoring

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
LIQ-3.001	Stress indicator time-series log	Daily values of run-risk indicator, redemption velocity, large-holder concentration metric, and intraday liquidity ratio for each settlement rail	Risk monitoring layer	7-year	Required
LIQ-3.002	Stress threshold breach records	All instances where any stress indicator crossed a defined threshold; escalation actions taken	Risk monitoring + compliance layer	7-year	Required (zero-count acceptable)
LIQ-3.003	Large-holder dynamics records	Monitoring records for participants exceeding concentration thresholds;	Risk monitoring layer	7-year	Required

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
		notification and monitoring actions			
LIQ-3.004	Intraday liquidity position snapshots	Hourly or operator-configured frequency snapshots of available intraday liquidity per rail	Liquidity monitoring layer	7-year	Required
LIQ-3.005	Redemption velocity monitoring records	Records of redemption request volumes vs. capacity; any spike detection events	Liquidity monitoring layer	7-year	Required

Section LIQ-4 — Stress Mode Escalation Records

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
LIQ-4.001	Operating posture classification log	Time-series record of operating posture (NORMAL / LIMITED / STRESS / OFFBOARDING) per rail	Operator governance layer	7-year	Required
LIQ-4.002	Posture escalation authorization records	Authorization records for any posture change above NORMAL; authorizing actors; escalation triggers	Compliance + governance layer	7-year	Conditional — required if any posture escalations occurred
LIQ-4.003	Supervisory notifications for stress mode	All supervisory notifications made upon stress mode activation	Compliance communication log	7-year	Conditional — required if any stress mode activations occurred
LIQ-4.004	Stress mode exit records	Evidence of conditions satisfied for exit from STRESS or LIMITED posture; return-to-NORMAL authorization	Compliance + governance layer	7-year	Conditional — required if any posture escalations occurred

D.6 EP Manifest Template: Yield Separation Boundary Controls Variant (EP - YLD)

D.6.1 Purpose

The Yield Separation Boundary Controls EP documents all artifacts demonstrating that the payment rail (P1, P2, P3 categories) and yield features (P4 category) remained structurally separated throughout the reporting period, and that no yield feature was commingled with the settlement rail.

D.6.2 Required Sections and Artifacts

Section YLD-1 — Instrument Category Classification Records

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
YLD-1.001	Instrument category registry — full period	Current registry of all instruments active on settlement rails; category tags (P1/P2/P3/P4) and last review dates	Registry layer	7-year	Required
YLD-1.002	Category assignment records	All category assignments and re-classifications made in period; authorization records	Registry + compliance layer	7-year	Required
YLD-1.003	Boundary test records	All formal boundary tests executed in period per Section 3.5 of Constitution (payment vs. yield features)	Compliance layer	7-year	Required
YLD-1.004	P4 instrument register	Register of all P4 (yield feature) instruments; confirmation that none appear in settlement rail metadata	Registry layer	7-year	Required

Section YLD-2 — Separation Compliance Records

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
YLD-2.001	Settlement rail metadata audit	Audit log confirming no P4 category tag appeared in settlement rail metadata for any transaction in period; query results	Settlement layer audit	7-year	Required
YLD-2.002	Yield commingling detection log	All yield_commingling_flag events raised in DvP gate G2-002; investigation and resolution records	Settlement + compliance layer	7-year	Required (zero-count acceptable)
YLD-2.003	P4 structural separation evidence	Documentation demonstrating yield program is operated on separate rails, separate accounts, or separate contractual arrangements from settlement rail	Compliance + legal layer	7-year	Required
YLD-2.004	Disclosure records — yield separation statements	All participant disclosures for the period that include yield separation statements; acknowledgment records	Disclosure layer	7-year	Required
YLD-2.005	Operator obligation compliance records by	Records demonstrating operator discharged category-specific obligations (disclosure, evidence,	Compliance layer	7-year	Required

Artifact ID	Artifact Type	Description	Source System	Retention Tag	Required / Conditional
	category	monitoring) per Section 3.6 of Constitution			

D.7 EP Manifest Template: Examiner Request Variant (EP - EXAM)

D.7.1 Purpose

The Examiner Request EP is produced on-demand in response to a specific examiner inquiry or examination request. It is scoped to the trade_id(s), time period, and control domains specified in the request. It incorporates artifacts from all relevant domain EPs plus any additional artifacts specific to the requested scope.

D.7.2 Examiner Request Record

Before assembling an EP-EXAM, the settlement operator must produce and log an Examiner Request Record:

```
Examiner_Request_Record {
  request_id:           [unique identifier]
  requesting_authority: [examiner / regulatory authority identifier]
  request_received_ts:  [ISO-8601 timestamp]
  request_scope: {
    trade_ids:          [list, or "ALL" for period]
    period_start:       [ISO-8601 date]
    period_end:         [ISO-8601 date]
    control_domains:    [list of EP domain codes, or "ALL"]
    specific_artifacts: [list of specific artifact types requested, if
specified]
  }
  access_tier:          [TIER_1_ROUTINE | TIER_2_ELEVATED – per tiered access
framework]
  access_purpose:         [documented purpose per purpose limitation principle]
  access_ttl:           [ISO-8601 datetime – access expiry per TTL framework]
  authorization_records: [
    { authorizing_actor_id, role, authorization_ts }
  ]
  ep_exam_id:          [reference to produced EP-EXAM]
  production_due_ts:    [ISO-8601 datetime – SLA deadline; see Appendix E]
  produced_ts:         [ISO-8601 datetime – actual production]
```

```

    post_access_review_due_ts: [ISO-8601 datetime – per TTL/post-access review
framework]
    post_access_review_completed: [boolean]
    log_hash:                    [hash of this record]
    prev_log_hash:                [chain-of-custody reference]
}

```

D.7.3 EP-EXAM Required Contents

Section	Contents	Source
EXAM-0	Examiner Request Record	Operator compliance log
EXAM-1	EP Header (EP-EXAM variant) with scoped period and control domains	Operator
EXAM-2	All DvP Gate Evidence Records (DGERs) for requested trade_ids	DvP domain EP
EXAM-3	All Escrow Records (full state_history) for requested trade_ids	DvP domain EP
EXAM-4	All Finality Evidence Records (FERs) for requested trade_ids	FIN domain EP
EXAM-5	All finality proof bundle artifacts for requested trade_ids	FIN domain EP
EXAM-6	All hold/release records touching requested trade_ids or participants	Compliance layer
EXAM-7	All liquidity gate and queue records touching requested period	LIQ domain EP
EXAM-8	Reconciliation records for requested trade_ids	REC domain EP
EXAM-9	Preservation bundles (if any) for requested trade_ids	Preservation layer
EXAM-10	Chain-of-custody manifest (see D.7.4)	Operator audit layer
EXAM-11	TTL and purpose limitation compliance record for this access event	Access control log

D.7.4 Chain-of-Custody Manifest (EP-EXAM)

```

Chain_of_Custody_Manifest {
    manifest_id:                [unique identifier]
    ep_exam_id:                 [parent EP-EXAM reference]
    request_id:                 [Examiner Request Record reference]
    generated_ts:                [ISO-8601 timestamp]
    artifacts: [
        {
            artifact_id:         [artifact identifier within EP-EXAM]
            artifact_type:       [type description]
            source_system:       [originating system]
            extracted_ts:        [ISO-8601 timestamp of extraction]
            hash:                 [SHA-256 or operator-specified hash]
            hash_algorithm:      [algorithm identifier]
        }
    ]
}

```

```

    tamper_check:      [PASSED | FAILED | NOT_APPLICABLE]
    original_log_ref:  [reference to original immutable log entry]
  }
  ...
]
total_artifact_count: [integer]
all_tamper_checks_passed: [boolean]
examiner_delivery_method:[SECURE_PORTAL | ENCRYPTED_TRANSFER | OTHER –
specify]
delivery_ts:          [ISO-8601 timestamp of delivery to examiner]
delivery_confirmation_ref: [delivery receipt reference]
log_hash:             [hash of this manifest]
}

```

D.8 EP Delta Template

D.8.1 Purpose and Trigger Conditions

An EP Delta is an incremental update to an existing EP, documenting changes to the control environment, new artifact availability, or corrections since the last full EP or prior Delta. EP Deltas do not replace full EPs; they supplement them.

EP Delta trigger conditions:

Trigger	Delta Type	Urgency
Material change to DvP logic, finality conditions, or liquidity gate thresholds	MATERIAL_CHANGE	Within 2 business days of change effective date
Preservation bundle generated (incident or dispute)	PRESERVATION_EVENT	Within 1 business day of bundle generation
Finality state of a prior trade_id changes (e.g., FS-02 → FS-03 post-finality exception)	FINALITY_STATE_UPDATE	Within 1 business day of state change
Hold placement or release touching a previously-reported trade_id	HOLD_EVENT	Within 1 business day of hold/release event
Reconciliation break identified and corrected post-EP production	RECONCILIATION_CORRECTION	Within 2 business days of correction
Examiner post-access review completed	ACCESS_REVIEW_COMPLETION	Within 2 business days of review completion
Operating posture change (NORMAL → LIMITED/STRESS/OFFBOARDING)	POSTURE_CHANGE	Within 1 business day of posture change

Trigger	Delta Type	Urgency
Recertification event or conformance status change	CONFORMANCE_UPDATE	Within 5 business days
Routine daily or weekly incremental update (operator-configured)	ROUTINE_INCREMENT	Per operator-configured cadence

D.8.2 EP Delta Schema

```

EP_Delta {
  delta_id:                [unique identifier – format: DELTA_{ep_id}
_{sequence_number}]
  parent_ep_id:            [reference to full EP this delta supplements]
  prior_delta_id:         [reference to prior delta in chain, or null if first
delta]
  delta_type:              [from trigger taxonomy in D.8.1]
  delta_ts:                [ISO-8601 timestamp of delta generation]
  generated_by:           [operator_id or system identifier]
  period_covered: {
    start:                 [ISO-8601 date – may be point-in-time for event-driven
deltas]
    end:                   [ISO-8601 date]
  }
  change_summary:         [plain-language description of what changed and why]
  triggering_event_ref:   [reference to triggering event record, if applicable]
  new_artifacts: [
    {
      artifact_id:         [new artifact identifier]
      artifact_type:       [type description]
      ep_section:          [target EP section this artifact belongs to]
      source_system:       [originating system]
      extracted_ts:        [ISO-8601 timestamp]
      hash:                [artifact hash]
      hash_algorithm:      [algorithm identifier]
      artifact_ref:        [reference to artifact in source system]
      retention_tag:       [retention classification]
    }
    ...
  ]
}

```

```

amended_artifacts: [
  {
    original_artifact_id: [artifact ID in parent EP or prior delta]
    amendment_reason: [plain-language reason – correction, update,
supplementation]
    new_artifact_id: [replacement artifact identifier]
    artifact_ref: [reference to amended artifact]
    hash: [new artifact hash]
  }
  ...
]
retracted_artifacts: [
  {
    original_artifact_id: [artifact ID being retracted]
    retraction_reason: [plain-language reason – error, superseded]
    replacement_artifact_id: [reference to replacement, if applicable]
  }
  ...
]
cumulative_ep_completeness: {
  all_required_sections_complete: [boolean – accounting for parent EP + all
prior deltas + this delta]
  pending_items: [
    { section_id, artifact_id, reason, expected_resolution_ts }
  ]
}
attestation: {
  attesting_officer_id: [compliance officer or designated officer]
  attestation_ts: [ISO-8601 timestamp]
  attestation_statement: "I attest that the artifacts in this EP Delta are
accurate
and complete to the best of operational knowledge."
  attestation_signature_ref: [digital signature or authorization record
reference]
}
log_hash: [hash of this EP Delta record]

```

```

prev_log_hash:      [hash of prior log entry – chain-of-custody]
}

```

D.8.3 EP Delta Cadence — Operator-Configured Bands

Operators configure EP Delta cadence within the following bands. The cadence election must be disclosed in the operator's conformance profile and cannot be reduced below the minimum band without governance approval and participant notification.

Control Domain	Minimum Delta Cadence	Standard Cadence (Reference)	Maximum Delta Cadence	Notes
EP - DVP	Daily (business days)	Daily	Weekly	More frequent for high-volume periods
EP - FIN	Daily (business days)	Daily	Weekly	Tied to DvP cadence
EP - LIQ	Daily (business days)	Daily	Daily	Liquidity risk requires daily minimum
EP - YLD	Weekly	Weekly	Monthly	Boundary conditions change less frequently
EP - DSC	Weekly	Weekly	Monthly	
EP - GOV	Monthly	Monthly	Quarterly	
EP - INC	Event-driven	Event-driven	—	No maximum; generate on incident
EP - REC	Daily (business days)	Daily	Weekly	
EP - ACC	Event-driven	Event-driven	—	Generate on each access event

Note: Event-driven deltas (PRESERVATION_EVENT, FINALITY_STATE_UPDATE, HOLD_EVENT, POSTURE_CHANGE) are always generated regardless of routine cadence configuration. Routine cadence governs ROUTINE_INCREMENT deltas only.

D.9 EP Cadence, Retention, and Access Control

D.9.1 Full EP Production Cadence

EP Variant	Full EP Cadence	Trigger for Out-of-Cycle EP	Notes
EP - DVP	Monthly	Examiner request; material incident; pilot phase transition	
EP - FIN	Monthly	Examiner request; material incident; pilot phase transition	
EP - LIQ	Monthly	Examiner request; stress mode activation; posture escalation	
EP - YLD	Quarterly	Examiner request; boundary test failure; material change to instrument taxonomy	
EP - EXAM	On-demand	Examiner request triggers production per SLA in Appendix E	
EP - FULL	Semi-annually	Examiner request; pilot phase transition; recertification	Comprehensive EP covering all domains

D.9.2 Retention Schedule

Artifact Class	Minimum Retention	Maximum Retention Reference	Notes
DvP Gate Evidence Records (DGER)	7 years from trade_date	No maximum specified	
Escrow Records	7 years from trade_date	No maximum specified	
Finality Evidence Records (FER)	7 years from trade_date	No maximum specified	
Finality Proof Bundles	7 years from trade_date	No maximum specified	
Preservation Bundles	Indefinite (until regulatory retention expires)	—	Never destroy without explicit governance approval
Examiner Request Records	7 years from request_date	Indefinite recommended	
EP Deltas	7 years from delta_ts	No maximum specified	
Full EPs	7 years from period_end	No maximum specified	
Immutable log entries (all types)	7 years	No maximum specified	
Material Change Evidence Records	7 years from change_effective_ts	No maximum specified	
Hold/Release records	7 years from hold_placement_ts	No maximum specified	
Liquidity gate activation records	7 years from activation_ts	No maximum specified	

D.9.3 EP Access Control and Purpose Limitation

Access to EPs is governed by the tiered supervisory access framework. The following controls apply:

Access Level	Permitted Actors	Purpose Limitation	TTL	Post-Access Review
Tier 0 — Automated aggregate monitoring	Operator automated systems; supervisor automated monitoring feeds	Systemic risk monitoring; aggregate statistics only; no individual trade_id visibility	Continuous; no individual artifact access	Not applicable
Tier 1 — Routine examiner / compliance access	Compliance officers; designated examiners with documented authorization	Routine examination; specific investigation with documented justification	Per Examiner Request Record TTL field	Required within 30 days of TTL expiry
Tier 2 — Elevated	Senior supervisory	Imminent threat to	Minimum;	Required within 10

Access Level	Permitted Actors	Purpose Limitation	TTL	Post-Access Review
access (incident / enforcement)	personnel with dual-authorization; documented extraordinary justification	market integrity; active enforcement action	defined in Examiner Request Record	business days of TTL expiry
Operator internal	Settlement operator designated personnel	Operational management; EP production; audit support	Ongoing per role	Annual role review

D.10 Preservation Bundle Template

D.10.1 Preservation Bundle Trigger Conditions

A preservation bundle is generated automatically (or by compliance officer instruction) upon any of the following:

Trigger Code	Description	Auto-Generate?
PB-FAULT	Escrow Record enters ES-FF (FAULT)	Yes — automated
PB-REVERSION	Finality state transitions to FS-04 (REVERSED_OR_UNWOUND)	Yes — automated
PB-EXCEPTION	Finality state transitions to FS-03 (EXCEPTION_UNDER_REVIEW) with fraud or system integrity fault code	Yes — automated
PB-HOLD_DISPUTE	Hold placement or release is disputed by a participant	Compliance officer instruction
PB-INCIDENT	Incident with severity CRITICAL or HIGH is declared	Yes — automated on incident declaration
PB-EXAMINER	Examiner requests preservation of specific records	Compliance officer instruction
PB-OFFBOARD	Offboarding trigger activated for a participant or the pilot	Compliance officer instruction

D.10.2 Preservation Bundle Schema

```

Preservation_Bundle {
  bundle_id:                [unique identifier – format: PB_{trigger_code}_{ts}
_{operator_id}]
  trigger_code:             [from trigger taxonomy above]
  triggering_event_ref:     [reference to triggering event record]
  generated_ts:             [ISO-8601 timestamp]
  generated_by:             [operator_id or system identifier – auto-generated
bundles noted]
  scope: {
    trade_ids:              [list of trade_ids in scope, or "OPERATOR_WIDE"]
    escrow_ids:             [list of escrow_ids in scope]
  }
}

```

```

    participant_ids:      [list of participant_ids in scope]
    period_start:        [ISO-8601 date]
    period_end:          [ISO-8601 date]
}
frozen_artifacts: [
  {
    artifact_id:         [identifier]
    artifact_type:       [type description]
    source_system:       [originating system]
    frozen_ts:           [ISO-8601 timestamp of freeze – point at which
artifact was immutably captured]
    hash:                [artifact hash at time of freeze]
    hash_algorithm:      [algorithm identifier]
    original_log_ref:    [reference to original immutable log entry]
    retrieval_ref:       [reference for retrieval from preservation storage]
    tamper_check_at_freeze: [PASSED | FAILED]
  }
  ...
]
open_breaks_at_generation: [
  { break_type, description, trade_id_ref, status: OPEN | RESOLVED }
]
open_breaks_count:       [integer – must equal 0 for OFFBOARDING bundles;
explicit list otherwise]
chain_of_custody_verified: [boolean – hash chain verified across all frozen
artifacts]
immutability_confirmed: [boolean – all artifacts written to write-once /
append-only storage]
bundle_hash:             [hash of complete bundle manifest]
compliance_officer_id:  [compliance officer who authorized or reviewed bundle]
review_ts:               [ISO-8601 timestamp of compliance officer review]
retention_class:         [INDEFINITE – all preservation bundles]
supervisory_notification_required: [boolean – true for PB-INCIDENT, PB-FAULT
if material]
supervisory_notification_ts: [ISO-8601 timestamp of notification, if
applicable]
log_hash:                [hash of this record]

```

```

prev_log_hash:          [chain-of-custody reference]
}

```

D.10.3 Preservation Bundle Required Artifact Checklist

For each preservation bundle, the following artifact categories must be frozen at a minimum:

#	Artifact Category	Required for Trigger Codes	Notes
1	All DGERs for in-scope trade_ids	All	
2	All Escrow Records (full state_history) for in-scope trade_ids	All	
3	All FERs for in-scope trade_ids	All	
4	All immutable log entries for in-scope trade_ids (full range)	All	
5	Hash chain verification log at time of bundle generation	All	
6	All hold/release records for in-scope participants (period)	All	
7	Participant notification records	All	
8	Incident record (if PB-INCIDENT)	PB-INCIDENT	
9	Fault record from Escrow Record (if PB-FAULT)	PB-FAULT	
10	Reversion authorization and execution records (if PB-REVERSION)	PB-REVERSION	
11	Exception record and investigation log (if PB-EXCEPTION)	PB-EXCEPTION	
12	Final position and cash snapshots for in-scope participants	PB-OFFBOARD	Open breaks = 0 required
13	Chain-of-custody transfer record (if PB-OFFBOARD)	PB-OFFBOARD	

D.11 EP Completeness Checklist (Examiner-Facing)

This checklist is provided for examiner use when reviewing an EP or EP-EXAM submission. Each item should be verified before accepting the EP as complete.

Check #	Item	Pass Criterion	If Fail
EC-001	EP Header is present with all required fields populated	All mandatory EP_Header fields non-null	Request supplementation
EC-002	EP version matches stated period	period_start and period_end consistent with EP naming	Clarify with operator
EC-003	Attestation is present with officer signature reference	attestation block fully populated; attestation_signature_ref resolvable	Request re-attestation
EC-004	All required sections for the EP variant are present	Section count = required count for stated variant	Request missing sections

Check #	Item	Pass Criterion	If Fail
EC-005	Each section has a Section Completeness Record	All sections include attestation block	Request missing records
EC-006	No section has unresolved gaps	All gaps_noted items either resolved or have expected_resolution_ts in the future	Monitor resolution; escalate if past-due
EC-007	All DGERs are present for stated period	DvP-1.001 artifact count matches trade volume for period (cross-check against settlement confirmation count)	Request gap explanation
EC-008	Settlement-without-payment and payment-without-delivery detection logs are present and show zero occurrences or documented explanations	DvP-3.003 and DvP-3.004 present; results documented	Escalate if positive findings unexplained
EC-009	All FERs show OPERATIONALLY_FINAL or documented exceptions	FIN-1.002 report reviewed; any non-FS-02 states have supporting records	Request exception records
EC-010	Finality marker events match FER count	FIN-1.004 and FIN-1.005 consistent with FIN-1.001 FER count	Request reconciliation
EC-011	Reconciliation completeness confirmed	FIN-3.001 through FIN-3.004 present; break log reviewed	Request break resolution records if open breaks present
EC-012	Hash chain integrity confirmed for all immutable logs	FIN-3.004 and DvP-2.007 both show all chains verified	Escalate immediately if any hash chain failure
EC-013	No unexplained yield commingling flags	YLD-2.002 reviewed; zero-count or fully documented	Escalate if positive findings unexplained
EC-014	EP Deltas are present and chained correctly	All EP Deltas for the period are referenced in EP Header ep_delta_refs; delta chain is unbroken	Request missing deltas
EC-015	All preservation bundles are indexed	DvP-4.001 / FIN-3.005 bundle index present; bundles accessible	Request missing bundles
EC-016	Examiner Request Record is present (EP-EXAM only)	EXAM-0 section populated; TTL and purpose documented	Request before reviewing EP-EXAM contents
EC-017	Chain-of-custody manifest is present and all tamper checks passed (EP-EXAM only)	EXAM-10 all_tamper_checks_passed = true	Escalate any failed tamper checks
EC-018	Post-access review record is present for prior access events within TTL window	EP-ACC delta present for prior access events; review_completed = true	Request overdue reviews

Appendix E — RACI + SLA/SLO Inserts (Paste-Ready)

E.1 Purpose and Scope

This appendix provides paste-ready RACI matrices and SLA/SLO reference tables for the key operational functions of the Payments & Settlement Constitution. It contains:

- E.2 — RACI: DvP Operations (end-to-end)
- E.3 — RACI: Finality Logic Change Control
- E.4 — RACI: Liquidity Gate Activation and Deactivation
- E.5 — RACI: Hold and Release Decisions
- E.6 — RACI: Examiner Request Handling
- E.7 — RACI: EP and EP-Delta Production
- E.8 — RACI: Incident Response (payments/settlement)
- E.9 — RACI: Offboarding and Unwind
- E.10 — SLA/SLO Reference Tables (all functions)
- E.11 — SLA/SLO Breach Escalation Ladder
- E.12 — Role Taxonomy Reference (baseline-aligned)

Legend for all RACI tables:

- **R** = Responsible — executes the task
- **A** = Accountable — owns the outcome; signs off
- **C** = Consulted — provides input before action; two-way communication
- **I** = Informed — notified after action; one-way communication
- **—** = Not involved

E.2 RACI: DvP Operations (End-to-End)

Function / Task	Settlement Operator	Compliance Officer	Custodian / Funding Agent	Gateway Operator	Participants (Asset-Leg / Cash-Leg)	Pilot Steering / Governance	Examiner
Pre-Trade							
Maintain eligible instrument register	R	A	—	—	—	I	—
Maintain prohibited counterparty list	R	A	—	—	—	I	—
Maintain participant eligibility registry	R	A	C	—	I	—	—
Maintain concentration limit configuration	R	A	—	—	—	C	—
Gate Execution							
Execute DvP Gate checks G1–G4	R	C	C (G2 only)	C	—	—	—
Resolve gate FAIL or QUEUED items	R	A	C	—	I	—	—

Function / Task	Settlement Operator	Compliance Officer	Custodian / Funding Agent	Gateway Operator	Participants (Asset-Leg / Cash-Leg)	Pilot Steering / Governance	Examiner
Override gate item (if applicable)	—	A/R	—	—	—	—	—
Log DGER to immutable log	R	I	—	—	—	—	—
Lock Phase							
Initiate asset-leg lock instruction	R	I	C	—	I	—	—
Confirm asset-leg lock (custody layer)	C	—	R	—	I	—	—
Initiate cash-leg lock instruction	R	I	C	—	I	—	—
Confirm cash-leg lock (funding layer)	C	—	R	—	I	—	—
Confirm dual lock (ES-03)	R	I	C	—	I	—	—
Release Phase							
Evaluate release conditions	R	C	—	—	—	—	—
Initiate simultaneous release instruction	R	A	C	—	I	—	—
Confirm asset-leg release (custody layer)	C	—	R	—	I	—	—
Confirm cash-leg release (funding layer)	C	—	R	—	I	—	—
Log ES-07 SETTLED state entry	R	I	—	—	—	—	—
Failure and Containment							
Detect and classify fault (ES-FF)	R	I	I	—	I	—	—
Initiate hold-only containment (ES-04)	R	A	C	—	I	—	—
Reversion decision (ES-04 → ES-06)	C	A	C	—	I	—	—
Execute reversion (both legs)	R	A	R	—	I	—	—
Generate preservation bundle	R	A	—	—	—	I	—
Escalate to governance (material fault)	R	A	—	—	—	R	—

Function / Task	Settlement Operator	Compliance Officer	Custodian / Funding Agent	Gateway Operator	Participants (Asset-Leg / Cash-Leg)	Pilot Steering / Governance	Examiner
Evidence and Reporting							
Produce DvP domain EP and EP Deltas	R	A	C	—	—	—	I
Respond to examiner DvP request	R	A	C	—	—	—	R

E.3 RACI: Finality Logic Change Control

Function / Task	Settlement Operator	Compliance Officer	Change Control Board (CCB)	Governance / Steering	Participants	Examiner / Regulator
Identify need for finality logic change	R	C	C	—	C	—
Submit formal change request	R	C	R	—	—	—
CCB technical review and risk assessment	C	C	R	—	—	—
Compliance review of regulatory implications	—	R	C	—	—	—
Formal verification re-run (if smart contract)	R	C	A	—	—	—
Approve change (CCB-level)	—	C	A/R	I	—	—
Approve change (Governance-level, if material)	—	C	C	A/R	—	I
Issue participant notification (\geq notice period)	R	A	—	I	I	I
Issue regulatory notification (if required)	—	A/R	—	A	—	R
Implement change in production	R	C	C	—	—	—
Update finality conditions documentation	R	A	C	—	—	—
Produce Material Change Evidence Record	R	A	C	I	—	—
Generate EP Delta (MATERIAL_CHANGE type)	R	A	—	I	—	I
Trigger recertification (if required)	—	A/R	C	—	R (affected participants)	—
Post-change monitoring review	R	A	C	I	—	—

E.4 RACI: Liquidity Gate Activation and Deactivation

Function / Task	Settlement Operator	Compliance Officer	Risk Officer	Governance / Steering	Participants	Supervisory Authority
Monitoring						
Monitor stress indicators (continuous)	R	I	C	—	—	—
Monitor redemption velocity (continuous)	R	I	C	—	—	—
Monitor large-holder concentration (continuous)	R	C	A	—	—	—
Monitor intraday liquidity position (hourly)	R	I	C	—	—	—
Gate Activation						
Detect threshold breach triggering gate review	R	I	C	—	—	—
Assess gate activation necessity	R	C	A	—	—	—
Dual-authorize gate activation	—	A	A	—	—	—
Execute gate activation (technical)	R	I	—	—	—	—
Log gate activation event (immutable)	R	I	—	—	—	—
Notify participants of gate activation	R	A	—	I	I	—
Notify supervisory authority of gate activation	—	A/R	—	A	—	R
Route new transactions to queue	R	I	—	—	I	—
Queue Management						
Maintain queue integrity during gate-active period	R	C	—	—	—	—
Monitor queue depth and aging	R	C	C	—	—	—
Escalate if queue exceeds max depth or age	R	A	C	I	—	I
Gate Deactivation						
Assess conditions for gate deactivation	R	C	A	—	—	—
Dual-authorize gate deactivation	—	A	A	—	—	—
Execute gate deactivation (technical)	R	I	—	—	—	—
Process queued	R	C	—	—	I	—

Function / Task	Settlement Operator	Compliance Officer	Risk Officer	Governance / Steering	Participants	Supervisory Authority
transactions post-deactivation						
Log gate deactivation event (immutable)	R	I	—	—	—	—
Notify participants of gate deactivation	R	A	—	I	I	—
Notify supervisory authority of deactivation	—	A/R	—	A	—	R
Posture Escalation						
Declare LIMITED posture	C	A	A	—	I	I
Declare STRESS posture	C	A	C	A	I	I
Declare OFFBOARDING posture	—	C	C	A/R	I	R
Generate LIQ domain EP Delta (posture change)	R	A	—	I	—	I

E.5 RACI: Hold and Release Decisions

Function / Task	Settlement Operator	Compliance Officer	Senior Compliance Officer	Legal Counsel	Custodian	Supervisory Authority	Participant
Hold Placement							
Receive hold request (regulatory, legal, internal)	R	A	I	I	—	—	—
Validate legal authority and documentation	—	R	A	C	—	—	—
Assess hold scope (participants, instruments, balances)	—	R	A	C	C	—	—
Dual-authorize hold placement	—	R	R	—	—	—	—
Legal review (holds > defined threshold)	—	C	C	A/R	—	—	—
Execute technical hold (all system layers)	R	I	—	—	C	—	—
Verify hold effectiveness (test)	R	A	—	—	C	—	—
Segregate held assets (if applicable)	R	A	—	—	R	—	—
Log hold placement event (immutable)	R	I	—	—	—	—	—
Notify participant (within notice period)	R	A	—	C	—	—	I

Function / Task	Settlement Operator	Compliance Officer	Senior Compliance Officer	Legal Counsel	Custodian	Supervisory Authority	Participant
per SLA)							
Notify supervisory authority (if required)	—	A/R	—	C	—	R	—
Hold Monitoring							
Periodic hold status review	—	R	A	—	C	—	—
Escalate holds approaching expiry without resolution	—	R	A	C	—	I	—
Escalate holds > 60 days to senior management	—	C	A/R	C	—	I	—
Hold Release							
Receive release documentation / clearance	R	A	—	—	—	—	—
Validate clearance sufficiency	—	R	A	C	—	—	—
Dual-authorize hold release	—	R	R	—	—	—	—
Execute technical release (all system layers)	R	I	—	—	C	—	—
Verify release effectiveness (test transaction)	R	A	—	—	C	—	—
Log release event (immutable)	R	I	—	—	—	—	—
Notify participant of release	R	A	—	—	—	—	I
Compile hold lifecycle documentation for EP	R	A	—	—	—	—	—
Enhanced post-release monitoring (30 days)	R	A	—	—	—	—	—

E.6 RACI: Examiner Request Handling

Function / Task	Settlement Operator	Compliance Officer	Senior Compliance Officer	Legal Counsel	Technology / Systems	Examiner
Receive examiner request or examination notice	R	A	I	I	—	R
Log Examiner Request Record	R	A	—	—	—	—

Function / Task	Settlement Operator	Compliance Officer	Senior Compliance Officer	Legal Counsel	Technology / Systems	Examiner
Assess request scope and access tier	—	R	A	C	—	—
Validate access authorization (tier, purpose, TTL)	—	R	A	—	—	—
Privilege review (attorney-client, trade secret)	—	C	C	A/R	—	—
Extract and compile evidence artifacts	R	C	—	—	R	—
Execute chain-of-custody manifest	R	A	—	—	C	—
Tamper-check all artifacts before delivery	R	A	—	—	C	—
Produce EP-EXAM package	R	A	—	—	C	—
Deliver EP-EXAM via secure channel	R	A	—	—	—	I
Log delivery and obtain delivery confirmation	R	A	—	—	—	—
Respond to follow-up examiner requests	R	A	C	C	C	R
Conduct post-access review (within TTL + 30 days)	R	A	C	—	—	—
Generate EP Delta (ACCESS_REVIEW_COMPLETION)	R	A	—	—	—	—
Escalate scope disputes to governance	—	A	C	C	—	—

E.7 RACI: EP and EP-Delta Production

Function / Task	Settlement Operator	Compliance Officer	Technology / Systems	Change Control Board	Governance / Steering	Examiner
Configure EP cadence per conformance profile	R	A	C	C	I	—
Execute automated artifact extraction	R	I	R	—	—	—
Execute hash chain verification for EP	R	I	R	—	—	—
Assemble EP sections	R	C	R	—	—	—
Compliance officer review of EP completeness	—	A/R	—	—	—	—
Officer attestation and signature	—	A/R	—	—	—	—
Log EP to immutable log	R	I	R	—	—	—
Detect EP Delta trigger event	R	I	R	—	—	—
Generate EP Delta	R	C	R	—	—	—
Officer attestation on EP Delta	—	A/R	—	—	—	—

Function / Task	Settlement Operator	Compliance Officer	Technology / Systems	Change Control Board	Governance / Steering	Examiner
Log EP Delta to immutable log and link to parent EP	R	I	R	—	—	—
Notify examiner of material EP Delta (if required)	R	A	—	—	—	I
Annual EP completeness review	R	A	C	C	I	—
Respond to EP gap identified in examination	R	A	C	—	—	C

E.8 RACI: Incident Response (Payments/Settlement)

Function / Task	Settlement Operator	Compliance Officer	Risk Officer	Technology / Security	Governance / Steering	Supervisory Authority	Participants
Detection and Triage							
Detect incident (automated or manual)	R	I	I	R	—	—	—
Initial triage and severity classification	R	C	C	R	—	—	—
Escalate CRITICAL incident to senior leadership	R	A	—	—	I	—	—
Containment							
Execute immediate containment actions	R	A	—	R	—	—	—
Apply hold to affected participants/instruments	R	A	—	—	—	—	I
Preserve forensic evidence	R	A	—	R	—	—	—
Generate preservation bundle	R	A	—	C	I	—	—
Notification							
Notify CRITICAL incident (within 2 hours)	—	A/R	—	—	I	R	—
Notify HIGH incident (within 8 hours)	—	A/R	—	—	I	R	—
Notify MEDIUM incident (within 24 hours)	—	A/R	—	—	I	R	—
Notify affected	R	A	—	—	—	—	I

Function / Task	Settlement Operator	Compliance Officer	Risk Officer	Technology / Security	Governance / Steering	Supervisory Authority	Participants
participants							
Investigation							
Conduct root cause analysis	R	C	C	R	—	—	—
Review affected transaction records	R	A	—	C	—	—	—
Engage external specialists (if needed)	R	A	—	C	C	—	—
Remediation							
Develop remediation plan	R	A	C	R	—	—	—
Implement technical fixes	R	C	—	R	—	—	—
Validate remediation effectiveness	R	A	C	R	—	—	—
Restore services post-validation	R	A	—	R	I	I	I
Post-Incident							
Produce post-incident review report	R	A	C	C	I	—	—
Update playbooks and EP templates (lessons learned)	R	A	C	C	A	—	—
Generate EP Delta (incident record)	R	A	—	—	—	—	—
Follow-up with supervisory authority on resolution	—	A/R	—	—	I	R	—

E.9 RACI: Offboarding and Unwind

Function / Task	Settlement Operator	Compliance Officer	Custodian	Participants	Governance / Steering	Supervisory Authority
Identify offboarding trigger	R	A	I	I	I	—
Declare OFFBOARDING posture	—	C	—	—	A/R	I
Notify participants of offboarding	R	A	—	I	I	I
Notify supervisory authority of offboarding	—	A/R	—	—	A	R
Halt new transaction submissions	R	A	—	I	—	—
Process all pending queue	R	A	C	I	—	—

Function / Task	Settlement Operator	Compliance Officer	Custodian	Participants	Governance / Steering	Supervisory Authority
items to completion						
Resolve all open DvP escrow records (ES-07 or ES-08)	R	A	R	—	—	—
Resolve all open finality exceptions (FS-03, FS-05)	R	A	C	—	C	—
Release all non-disputed holds	—	A/R	C	—	—	—
Transfer custody of assets to successor/participant	—	C	R	I	—	—
Produce final position snapshots (asset and cash)	R	A	R	—	—	—
Confirm open breaks = 0 (or explicit list)	R	A	C	—	—	—
Generate offboarding preservation bundle (PB-OFFBOARD)	R	A	C	—	I	I
Execute chain-of-custody transfer record	R	A	R	—	—	—
Produce legacy transition evidence manifest	R	A	C	—	I	I
Archive all EPs and EP Deltas for retention period	R	A	—	—	—	—
Final governance sign-off on offboarding completion	—	C	—	—	A/R	I
Post-offboarding data retention monitoring	R	A	—	—	—	I

E.10 SLA/SLO Reference Tables

E.10.1 DvP Operations SLAs

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-DvP-001	Gate execution completion time	≤ 30 seconds from submission to DGER generation	P99 latency measured daily	> 60 seconds at P99	Settlement Operator + Compliance Officer notification
SLA-DvP-002	Lock confirmation (single leg)	≤ 120 seconds from lock instruction to custody/funding	P99 latency measured daily	> 300 seconds at P99	Compliance Officer notification; fault investigation

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
		layer confirmation			
SLA-DvP-003	Dual lock confirmation	≤ 300 seconds from second lock instruction to ES-03 entry	P99 latency measured daily	> 600 seconds at P99	Compliance Officer notification
SLA-DvP-004	Release execution (both legs)	≤ 60 seconds from release initiation to ES-07 entry	P99 latency measured daily	> 120 seconds at P99	Immediate escalation; fault investigation
SLA-DvP-005	ES-04 hold-only containment resolution	≤ 4 business hours from ES-04 entry to resolution (ES-05 or ES-06 decision)	Mean time to resolution; measured per event	> 8 business hours	Governance notification
SLA-DvP-006	ES-FF fault operator response	≤ 1 business hour from ES-FF entry to operator engagement	Measured per event	> 2 business hours	Senior management notification
SLA-DvP-007	ES-FF fault resolution	≤ 1 business day from ES-FF entry to ES-07 or ES-08 terminal state	Measured per event	> 2 business days	Governance notification; supervisory notification if material
SLA-DvP-008	DGER availability for examiner query	≤ 5 minutes from query submission	P99 query response time	> 15 minutes	Technology escalation
SLA-DvP-009	Preservation bundle generation	≤ 30 minutes from trigger event	Measured per event	> 1 business hour	Immediate escalation

E.10.2 Settlement Finality SLAs

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-FIN-001	Finality conditions assessment (FS-00 → FS-01 or FS-02)	≤ 60 minutes from ES-07 entry	P99 latency measured daily	> 2 hours	Compliance Officer notification
SLA-FIN-002	Full operational finality confirmation (FS-02)	≤ 4 business hours from ES-07 entry (all F1–F4 conditions)	P95 time-to-FS-02; measured daily	> 8 business hours	Compliance Officer + Risk Officer notification
SLA-FIN-003	FS-03 exception triage	≤ 2 business hours from exception signal detection	Measured per event	> 4 business hours	Senior Compliance Officer notification
SLA-FIN-004	FS-03 exception resolution	≤ 5 business days from FS-03 entry	Measured per event	> 10 business days	Governance notification; supervisory notification

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-FIN-005	Reversion authorization decision (FS-04)	≤ 1 business day from reversion recommendation	Measured per event	> 2 business days	Governance escalation
SLA-FIN-006	Reversion execution completion	≤ 2 business days from reversion authorization	Measured per event	> 5 business days	Governance notification; supervisory notification
SLA-FIN-007	Post-settlement reconciliation completion (F4 conditions)	≤ 4 business hours from ES-07 entry	P95 latency; measured daily	> 8 business hours	Risk Officer notification
SLA-FIN-008	FER availability for examiner query	≤ 5 minutes from query submission	P99 query response time	> 15 minutes	Technology escalation

E.10.3 Liquidity Gate and Queue SLAs

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-LIQ-001	Stress indicator monitoring refresh rate	≤ 5 minutes between indicator recalculations	Continuous; measured daily	> 15-minute gap	Technology + Risk Officer notification
SLA-LIQ-002	Gate activation decision time (from threshold breach detection)	≤ 30 minutes from breach detection to dual-authorization decision	Measured per event	> 1 hour	Governance notification
SLA-LIQ-003	Gate activation execution (technical)	≤ 5 minutes from dual-authorization to gate active status	Measured per event	> 15 minutes	Technology escalation; manual controls activated
SLA-LIQ-004	Participant notification of gate activation	≤ 15 minutes from gate active status	Measured per event	> 30 minutes	Compliance Officer escalation
SLA-LIQ-005	Supervisory notification of gate activation	≤ 1 business hour from gate active status	Measured per event	> 2 business hours	Senior Compliance Officer escalation
SLA-LIQ-006	Queue depth review during gate-active period	At least every 30 minutes	Continuous; measured per gate event	No review for > 1 hour	Compliance Officer notification
SLA-LIQ-007	Gate deactivation execution (from dual-authorization)	≤ 5 minutes from dual-authorization to gate OPEN status	Measured per event	> 15 minutes	Technology escalation
SLA-LIQ-008	Post-deactivation queue processing	All queued transactions processed within 2 business hours of deactivation	Measured per gate event	> 4 business hours	Compliance Officer + Settlement Operator escalation

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-LIQ-009	Posture escalation supervisory notification	≤ 1 business hour from posture escalation above NORMAL	Measured per event	> 2 business hours	Governance escalation

E.10.4 Hold and Release SLAs

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-HLD-001	Hold request initial validation	≤ 2 business hours from receipt	Measured per event	> 4 business hours	Senior Compliance Officer notification
SLA-HLD-002	Hold placement (from dual-authorization)	≤ 30 minutes from dual-authorization to hold active (all system layers)	Measured per event	> 1 business hour	Technology escalation; manual controls activated
SLA-HLD-003	Participant notification of hold	≤ 24 hours from hold placement	Measured per event	> 48 hours	Compliance Officer escalation
SLA-HLD-004	Supervisory notification of hold (if required)	≤ 2 business days from hold placement	Measured per event	> 3 business days	Senior Compliance Officer escalation
SLA-HLD-005	Periodic hold review	At least every 30 days for active holds	Continuous monitoring; measured per hold	No review for > 45 days	Senior Compliance Officer notification; mandatory escalation
SLA-HLD-006	60-day senior management review	≤ 5 business days from 60-day mark	Measured per hold exceeding 60 days	Review not completed	Governance escalation
SLA-HLD-007	Release validation (from receipt of clearance documentation)	≤ 5 business days for standard; ≤ 2 business days for court-ordered releases	Measured per event	> stated targets	Legal Counsel escalation
SLA-HLD-008	Release execution (from dual-authorization)	≤ 30 minutes from dual-authorization to hold fully lifted (all system layers)	Measured per event	> 1 business hour	Technology escalation
SLA-HLD-009	Participant notification of release	≤ 2 business hours from hold fully lifted	Measured per event	> 4 business hours	Compliance Officer escalation

E.10.5 Examiner Request Handling SLAs

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-EXM-001	Examiner Request Record logged	≤ 1 business hour from receipt of request	Measured per request	> 2 business hours	Senior Compliance Officer notification
SLA-EXM-002	Initial response / acknowledgment to examiner	≤ 1 business day from receipt of request	Measured per request	> 2 business days	Senior Compliance Officer + Governance notification
SLA-EXM-003	Standard EP-EXAM production and delivery (Tier 1 routine)	≤ 5 business days from receipt of request	Measured per request	> 10 business days	Governance notification
SLA-EXM-004	Expedited EP-EXAM production and delivery (Tier 2 elevated)	≤ 2 business days from authorization of access	Measured per request	> 3 business days	Governance + supervisory authority notification
SLA-EXM-005	Response to follow-up examiner questions	≤ 3 business days from receipt	Measured per request	> 5 business days	Senior Compliance Officer notification
SLA-EXM-006	Post-access review completion (Tier 1)	≤ 30 days from TTL expiry	Measured per access event	> 45 days	Compliance Officer escalation; EP Delta overdue
SLA-EXM-007	Post-access review completion (Tier 2)	≤ 10 business days from TTL expiry	Measured per access event	> 15 business days	Governance escalation; supervisory notification
SLA-EXM-008	Chain-of-custody manifest delivery with EP-EXAM	Simultaneous with EP-EXAM delivery	Per request	Any delivery without manifest	Compliance Officer notification; EP-EXAM recalled

E.10.6 EP and EP-Delta Production SLAs

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-EP-001	Routine EP Delta generation (daily cadence domains)	By end of next business day	Measured per domain per day	> 2 business days late	Technology + Compliance Officer notification
SLA-EP-002	Event-driven EP Delta generation (PRESERVATION_EVENT, HOLD_EVENT)	≤ 1 business day from triggering event	Measured per event	> 2 business days	Compliance Officer escalation
SLA-EP-003	Event-driven EP Delta generation	≤ 2 business	Measured per	> 5	Compliance Officer

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
	(MATERIAL_CHANGE, POSTURE_CHANGE)	days from change effective date	event	business days	escalation
SLA-EP-004	Full EP production (monthly cadence domains)	Within 10 business days of period end	Measured per domain per month	> 15 business days	Governance notification
SLA-EP-005	Officer attestation on full EP	≤ 3 business days from EP assembly completion	Measured per EP	> 5 business days	Senior Compliance Officer escalation
SLA-EP-006	Preservation bundle EP Delta generation	≤ 1 business day from preservation bundle generation	Measured per event	> 2 business days	Compliance Officer escalation
SLA-EP-007	EP completeness self-assessment (annual)	Completed within 20 business days of fiscal year end	Annual; measured per operator	> 30 business days	Governance notification

E.10.7 Incident Response SLAs

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-INC-001	CRITICAL incident detection-to-triage	≤ 15 minutes from detection	Measured per incident	> 30 minutes	Immediate senior management escalation
SLA-INC-002	HIGH incident detection-to-triage	≤ 30 minutes from detection	Measured per incident	> 1 hour	Senior management escalation
SLA-INC-003	CRITICAL incident containment	≤ 2 hours from detection	Measured per incident	> 4 hours	Governance + supervisory authority immediate notification
SLA-INC-004	HIGH incident containment	≤ 4 hours from detection	Measured per incident	> 8 hours	Governance notification
SLA-INC-005	CRITICAL supervisory notification	≤ 2 hours from detection	Measured per incident	> 2 hours	Automatic escalation to Governance
SLA-INC-006	HIGH supervisory notification	≤ 8 hours from detection	Measured per incident	> 8 hours	Governance escalation
SLA-INC-007	MEDIUM supervisory notification	≤ 24 hours from detection	Measured per incident	> 24 hours	Compliance Officer escalation
SLA-INC-008	CRITICAL incident	≤ 5 business	Measured per	> 10	Governance + supervisory

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
	full resolution	days from detection	incident	business days	authority update
SLA-INC-009	Post-incident review completion (CRITICAL)	≤ 10 business days from resolution	Measured per incident	> 15 business days	Governance notification
SLA-INC-010	Post-incident review completion (HIGH)	≤ 20 business days from resolution	Measured per incident	> 30 business days	Compliance Officer escalation
SLA-INC-011	Preservation bundle generation at incident declaration	≤ 30 minutes from CRITICAL/HIGH incident declaration	Measured per incident	> 1 business hour	Immediate escalation

E.10.8 Offboarding and Unwind SLAs

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-OFF-001	Participant notification of offboarding trigger	≤ 2 business days from trigger declaration	Measured per event	> 5 business days	Governance escalation
SLA-OFF-002	Supervisory notification of offboarding trigger	≤ 1 business day from trigger declaration	Measured per event	> 2 business days	Governance escalation
SLA-OFF-003	Halt of new transaction submissions	≤ 4 business hours from OFFBOARDING posture declaration	Measured per event	> 8 business hours	Immediate Governance escalation
SLA-OFF-004	Resolution of all pending queue items	≤ 3 business days from transaction halt	Measured per offboarding	> 5 business days	Governance + supervisory authority notification
SLA-OFF-005	Resolution of all open DvP escrow records	≤ 5 business days from transaction halt	Measured per offboarding	> 10 business days	Governance notification
SLA-OFF-006	Final position snapshots production	≤ 2 business days from all escrow records resolved	Measured per offboarding	> 5 business days	Governance escalation
SLA-OFF-007	Open breaks confirmation (= 0 or explicit list)	≤ 1 business day from final position snapshots	Measured per offboarding	> 2 business days	Governance escalation
SLA-OFF-008	Offboarding preservation bundle generation	≤ 3 business days from open breaks = 0 confirmation	Measured per offboarding	> 5 business days	Governance escalation

SLA ID	Function	SLA Target	SLO Measurement Basis	Breach Threshold	Escalation Trigger
SLA-OFF-009	Chain-of-custody transfer record completion	≤ 2 business days from preservation bundle generation	Measured per offboarding	> 5 business days	Governance escalation
SLA-OFF-010	Final governance sign-off on offboarding completion	≤ 5 business days from legacy transition evidence completion	Measured per offboarding	> 10 business days	Supervisory authority notification

E.11 SLA/SLO Breach Escalation Ladder

When an SLA breach threshold is crossed, the following escalation ladder applies. Each level activates if the breach is not resolved within the stated timeframe.

Level	Breach Condition	Escalation Target	Escalation Action	Evidence Required
Level 1	SLA breach threshold crossed	Compliance Officer + Settlement Operator	Internal alert; investigation initiated; remediation plan within 1 business day	Breach detection log; initial assessment record
Level 2	Breach not resolved within 2× SLA target	Senior Compliance Officer + Risk Officer	Formal breach record; remediation plan with milestones; enhanced monitoring	Breach record; remediation plan
Level 3	Breach not resolved within 5× SLA target, OR any CRITICAL-class SLA breach at level 2	Governance / Steering	Governance notification; potential operational restriction; supervisory notification consideration	Governance notification record; escalation justification
Level 4	Governance escalation not resolved, OR systemic SLA breach pattern (≥ 3 distinct SLAs in breach simultaneously)	Supervisory Authority	Regulatory notification; potential pilot posture escalation; regulatory guidance sought	Supervisory notification record; systemic breach analysis
Level 5	Supervisory notification not acted on within 5 business days, OR imminent investor harm risk	Pilot offboarding trigger assessment	Governance convenes emergency session; offboarding posture considered; participant protection actions	Emergency session minutes; protection action log

E.11.1 SLA Breach Record Template

```
SLA_Breach_Record {
    breach_id:           [unique identifier]
    sla_id:              [breached SLA from tables above]
    function:           [plain-language description of the function]
    sla_target:         [stated SLA target]
```

```

breach_detected_ts:    [ISO-8601 timestamp]
actual_performance:   [measured value at breach detection]
breach_threshold:     [stated breach threshold]
escalation_level:     [1 | 2 | 3 | 4 | 5 – current level]
escalation_history: [
  { level, escalated_ts, escalation_target, action_taken }
]
root_cause:           [plain-language description]
remediation_plan:     [description of corrective actions and milestones]
remediation_owner:   [actor_id]
resolved_ts:         [ISO-8601 timestamp – null if unresolved]
resolution_description: [plain-language description of resolution]
ep_delta_ref:        [reference to EP Delta recording this breach, if
applicable]
log_hash:            [hash of this record]
prev_log_hash:       [chain-of-custody reference]
}

```

E.12 Role Taxonomy Reference (Baseline-Aligned)

The following role taxonomy is used consistently across all RACI matrices in this appendix. Roles are defined functionally; a single individual or team may hold multiple roles depending on operator size and structure, subject to segregation of duties requirements noted.

Role Name	Functional Description	Segregation of Duties Constraints
Settlement Operator	The entity operating the settlement rail and DvP engine; responsible for day-to-day operational execution of gates, locks, releases, logging, and EP production	Must not also serve as Compliance Officer for dual-authorization purposes
Compliance Officer	Senior compliance function responsible for regulatory oversight, hold/release authorization, examiner liaison, and EP attestation	Must be independent of Settlement Operator for dual-authorization and hold release decisions
Senior Compliance Officer	Escalation authority for compliance decisions; second-level authorization for material holds and releases; governance liaison	Must be organizationally senior to Compliance Officer
Risk Officer	Responsible for stress indicator monitoring, concentration limit oversight, liquidity gate trigger assessment, and risk escalation	Provides independent risk assessment; not responsible for operational execution
Legal Counsel	Provides legal review for hold authority,	Advisory only; not operationally

Role Name	Functional Description	Segregation of Duties Constraints
	reversion decisions, and examiner scope disputes	responsible for execution
Custodian / Funding Agent	The custody layer (for asset-leg locks and releases) and/or funding layer (for cash-leg locks and releases); confirms lock and release events	Must be institutionally separate from Settlement Operator where required by custody rule alignment objectives
Gateway Operator	Operator of the message/event gateway connecting participants to the settlement rail; not a party to individual transactions	Consulted on message schema validation; not authorized to modify transaction parameters
Change Control Board (CCB)	Technical governance body responsible for reviewing, approving, and managing changes to operational playbooks, conformance profiles, and finality logic	Must include at least one member independent of the Settlement Operator
Governance / Steering	Pilot Steering Committee or equivalent governance body; provides strategic direction, approves material changes, and oversees escalated issues	Includes regulatory observer(s) in non-voting capacity per baseline governance framework
Supervisory Authority	Regulatory examiner(s) or supervisory personnel with authority over the pilot; receives notifications and conducts examinations	Not operationally involved except through Examiner Request process
Examiner	Individual examiner conducting a specific examination or review; operates within the EP-EXAM and Examiner Request framework	Access governed strictly by TTL, purpose limitation, and tiered access controls
Participants (Asset-Leg / Cash-Leg)	Regulated institutional participants submitting transactions; primarily informed of operational events rather than operationally responsible	Subject to eligibility, disclosure acknowledgment, and conformance requirements
Technology / Systems	Systems and technology personnel responsible for infrastructure, logging, EP generation automation, and technical incident response	Consulted on feasibility; not authorized to modify compliance decisions or EP content

E.12.1 Minimum Segregation of Duties Requirements

The following segregation of duties requirements are mandatory and may not be waived without Governance approval and documented compensating controls:

Requirement	Minimum Segregation	Notes
DvP gate override authorization	Compliance Officer must authorize; Settlement Operator must not self-authorize	Override must be dual-authorized where override is of a FAIL gate item
Hold placement dual-authorization	Compliance Officer + Senior Compliance Officer; neither may be the same individual as the requestor	Legal counsel review also required for holds > defined threshold
Hold release dual-authorization	Same requirement as hold placement	Must not be waived even for short-duration or obviously erroneous holds

Requirement	Minimum Segregation	Notes
Finality reversion authorization (post-window)	Governance approval required; Compliance Officer and Settlement Operator alone are insufficient	Regulatory coordination may also be required
Liquidity gate activation dual-authorization	Compliance Officer + Risk Officer; neither may be the Settlement Operator alone	
EP officer attestation	Compliance Officer or designated senior officer must be independent of EP artifact extraction and assembly	Attesting officer must review, not merely sign
Examiner access authorization (Tier 2)	Senior supervisory officer + independent compliance reviewer; dual-control required	
Offboarding posture declaration	Governance / Steering required; Settlement Operator and Compliance Officer alone are insufficient	

Appendix F — Standard Checks Pack (Full List)

F.1 Purpose and Structure

The Standard Checks Pack provides a complete, paste-ready set of operational control checks for the payments and settlement operating model. Each check is designed to be executed by the settlement operator's compliance, risk, or operations function — or by an examiner reviewing operator evidence — and produces a deterministic PASS, FAIL, or FLAG result that feeds directly into the Evidence Pack (EP) and EP-Delta cycle.

Check record structure: Every check produces a **Check Execution Record (CER)** containing the fields defined in F.1.1. CERs are appended to the operator's immutable log and referenced in the applicable EP section.

Scope: 42 checks are defined across 7 control groups. Each check maps to one or more EP domain codes (see Appendix D, Section D.2.2).

F.1.1 Check Execution Record (CER) Schema

```

Check_Execution_Record {
    cer_id:                [unique identifier – format: CER_{check_id}
_{execution_ts}]
    check_id:              [check identifier from this appendix]
    check_group:           [control group code: G-DVP | G-FIN | G-LIQ | G-YLD |
G-TTL | G-PRV | G-REC]
    execution_ts:         [ISO-8601 timestamp of check execution]
    executed_by:          [operator_id or system identifier – automated checks
noted]

```

```

period_covered: {
  start:          [ISO-8601 date]
  end:            [ISO-8601 date]
}
result:          [PASS | FAIL | FLAG | NOT_APPLICABLE]
result_detail:   [plain-language description of finding]
evidence_inputs_used: [
  { artifact_type, artifact_ref, source_system }
  ...
]
exceptions_noted: [
  { exception_id, description, trade_id_ref, escalation_required: boolean }
]
escalation_triggered: [boolean]
escalation_target:  [actor_id or role – if escalation_triggered = true]
escalation_ts:      [ISO-8601 timestamp of escalation, if applicable]
ep_ref:             [reference to EP section where this CER is filed]
ep_delta_ref:       [reference to EP Delta if this check triggered a
delta]
retention_tag:      [7-year | INDEFINITE | per operator retention
schedule]
log_hash:           [hash of this CER]
prev_log_hash:      [hash of prior log entry – chain-of-custody]
}

```

F.1.2 Check Frequency Codes

Code	Meaning
DAILY	Every business day; automated where noted
WEEKLY	Every calendar week
MONTHLY	Every calendar month
QUARTERLY	Every calendar quarter
EVENT	Each time the specified triggering event occurs
ON_DEMAND	Executed upon examiner request or ad hoc compliance review
CONTINUOUS	Real-time or near-real-time automated monitoring

F.1.3 Result Definitions

Result	Meaning
PASS	Check condition fully satisfied; no exceptions
FAIL	Check condition not satisfied; mandatory escalation required
FLAG	Check condition partially satisfied or anomaly detected; investigation required before escalation determination
NOT_APPLICABLE	Check condition does not apply for the period or scope (must be documented with reason)

F.2 Control Group G-DVP: DvP Gate and Escrow Controls

CHECK DVP-001 — DvP Gate Completeness

Field	Value
Check ID	DVP-001
Control Group	G-DVP
Objective	Confirm that a DvP Gate Evidence Record (DGER) exists for every trade submitted for settlement in the period; no trade reached ES-02 (LOCKED) without a preceding DGER with overall_gate_status = ALL_PASS
Pass Condition	COUNT(DGERs with overall_gate_status = ALL_PASS) = COUNT(trades reaching ES-02 or beyond); zero trades in escrow state ES-02 or higher with missing or non-ALL_PASS DGER
Fail Condition	Any trade in ES-02 or higher state has no corresponding DGER, or DGER overall_gate_status ≠ ALL_PASS without an authorized gate override record
Flag Condition	Any gate override record exists; requires compliance officer review
Evidence Inputs	DGER population (DvP-1.001); Escrow Record population (DvP-2.001); gate override records (DvP-1.003)
Frequency	DAILY (automated); MONTHLY full-population reconciliation
Escalation Trigger	Any FAIL; any FLAG without compliance officer sign-off within 1 business day
Escalation Target	Compliance Officer → Senior Compliance Officer if unresolved within 2 business days
Retention Tag	7-year
EP Domain	EP-DvP

CHECK DVP-002 — Escrow Lock Symmetry (Asset-Leg vs. Cash-Leg)

Field	Value
Check ID	DVP-002
Control Group	G-DVP
Objective	Confirm that every trade reaching ES-03 (DUAL_LOCKED) has both asset-leg and

Field	Value
	cash-leg lock confirmation timestamps present; no asymmetric lock state exists beyond the lock_timeout_seconds window
Pass Condition	For all Escrow Records that passed through ES-03: asset_leg.lock_confirmed_ts ≠ null AND cash_leg.lock_confirmed_ts ≠ null;
Fail Condition	Any Escrow Record shows ES-03 state with one or both lock_confirmed_ts null; or timestamp delta exceeds lock_timeout_seconds without a corresponding fault record
Flag Condition	Any trade where timestamp delta is > 50% of lock_timeout_seconds (indicating near-timeout); warrants monitoring
Evidence Inputs	Escrow Records — full state_history (DvP-2.001); fault records (DvP-2.003)
Frequency	DAILY (automated)
Escalation Trigger	Any FAIL → immediate Compliance Officer + Technology escalation; preservation bundle review
Escalation Target	Compliance Officer; Technology if lock confirmation layer anomaly suspected
Retention Tag	7-year
EP Domain	EP-DvP

CHECK DVP-003 — Timeout and Unwind Correctness

Field	Value
Check ID	DVP-003
Control Group	G-DVP
Objective	Confirm that every trade that experienced a lock timeout (fault codes LOCK_TIMEOUT_ASSET, LOCK_TIMEOUT_CASH, DUAL_LOCK_TIMEOUT) was correctly routed to ES-04 (HOLD_ONLY_CONTAINMENT) and subsequently resolved to ES-07 (SETTLED) or ES-08 (REVERTED); no timed-out trade remains in an unresolved intermediate state beyond the operator-defined maximum resolution window
Pass Condition	All timeout fault events have a subsequent ES-04 state entry; all ES-04 entries resolve to ES-07 or ES-08 within the operator-configured maximum resolution window; zero trades stuck in ES-04 beyond the window
Fail Condition	Any timeout fault event with no subsequent ES-04 entry; any ES-04 entry unresolved beyond the maximum resolution window
Flag Condition	Any ES-04 entry approaching 75% of the maximum resolution window without resolution decision logged
Evidence Inputs	Fault records (DvP-2.003); hold-only containment records (DvP-2.004); Escrow Records state_history (DvP-2.001)
Frequency	DAILY (automated); MONTHLY trend analysis
Escalation Trigger	Any FAIL → Compliance Officer + Governance notification; any FLAG → Compliance Officer notification
Escalation Target	Compliance Officer; Governance if resolution window exceeded

Field	Value
Retention Tag	7-year
EP Domain	EP-DvP

CHECK DVP-004 — No Settled-Without-Payment Instances

Field	Value
Check ID	DVP-004
Control Group	G-DVP
Objective	Confirm that no trade reached ES-07 (SETTLED) with asset-leg release confirmed but cash-leg release absent or unconfirmed; principal risk elimination verification
Pass Condition	For all ES-07 Escrow Records: cash_leg.release_confirmed_ts ≠ null AND asset_leg.release_confirmed_ts ≠ null; detection log (DvP-3.003) shows zero settled-without-payment instances
Fail Condition	Any ES-07 record with asset_leg.release_confirmed_ts present and cash_leg.release_confirmed_ts null or post-release-timeout; or detection log (DvP-3.003) shows any positive result
Flag Condition	Any ES-07 record where release timestamp delta exceeds 10 seconds (warrants review for atomicity assurance)
Evidence Inputs	Escrow Records (DvP-2.001); settlement confirmation records — both legs (DvP-3.001, DvP-3.002); settled-without-payment detection log (DvP-3.003)
Frequency	DAILY (automated); EVENT on any ES-07 state entry
Escalation Trigger	Any FAIL → immediate escalation to Governance + Supervisory Authority; preservation bundle auto-generated
Escalation Target	Governance; Supervisory Authority
Retention Tag	7-year; INDEFINITE if FAIL instance confirmed
EP Domain	EP-DvP

CHECK DVP-005 — No Payment-Without-Delivery Instances

Field	Value
Check ID	DVP-005
Control Group	G-DVP
Objective	Confirm that no trade reached ES-07 (SETTLED) with cash-leg release confirmed but asset-leg release absent or unconfirmed
Pass Condition	For all ES-07 Escrow Records: asset_leg.release_confirmed_ts ≠ null; detection log (DvP-3.004) shows zero payment-without-delivery instances
Fail Condition	Any ES-07 record with cash_leg.release_confirmed_ts present and asset_leg.release_confirmed_ts null; or detection log (DvP-3.004) shows any positive result
Flag	Same as DVP-004 FLAG condition

Field	Value
Condition	
Evidence Inputs	Escrow Records (DvP-2.001); settlement confirmation records (DvP-3.001, DvP-3.002); payment-without-delivery detection log (DvP-3.004)
Frequency	DAILY (automated); EVENT on any ES-07 state entry
Escalation Trigger	Any FAIL → same as DVP-004
Escalation Target	Governance; Supervisory Authority
Retention Tag	7-year; INDEFINITE if FAIL instance confirmed
EP Domain	EP-DvP

CHECK DVP-006 — Duplicate Submission Detection

Field	Value
Check ID	DVP-006
Control Group	G-DVP
Objective	Confirm that the trade_id registry contains no duplicate entries that both progressed beyond ES-01 (LOCK_PENDING); confirm all duplicate submission fault events were correctly rejected without advancing the escrow state
Pass Condition	Trade_id registry: each trade_id appears exactly once in ES-02 or higher states; all DUPLICATE_SUBMISSION fault events have no corresponding ES-02 entry for the duplicate
Fail Condition	Any trade_id appears in ES-02 or higher state more than once; or any DUPLICATE_SUBMISSION fault event has a concurrent ES-02 entry for the same trade_id
Flag Condition	Elevated duplicate submission attempt rate (> operator-defined threshold per period) indicating possible operational issue or adversarial probing
Evidence Inputs	Duplicate submission rejection records (DvP-2.006); Escrow Records (DvP-2.001); trade_id uniqueness check (FIN-1.005)
Frequency	DAILY (automated)
Escalation Trigger	Any FAIL → immediate Compliance Officer + Technology escalation; incident trigger assessment
Escalation Target	Compliance Officer; Technology; incident if adversarial pattern suspected
Retention Tag	7-year
EP Domain	EP-DvP

CHECK DVP-007 — Escrow Hash Chain Integrity

Field	Value
Check ID	DVP-007
Control Group	G-DVP

Field	Value
Objective	Confirm that the hash chain linking all Escrow Record state_history entries is unbroken for all Escrow Records in the period; no tamper evidence detected
Pass Condition	For every Escrow Record: each state_history entry's prev_log_hash equals the computed hash of the immediately prior entry; hash verification log (DvP-2.007) shows all chains verified with zero failures
Fail Condition	Any hash chain break detected; any prev_log_hash mismatch; tamper evidence detected on any Escrow Record
Flag Condition	Any hash computation taking longer than operator-defined timeout (may indicate infrastructure issue)
Evidence Inputs	Escrow Records — full state_history (DvP-2.001); hash chain verification logs (DvP-2.007)
Frequency	DAILY (automated); EVENT on any Escrow Record state transition
Escalation Trigger	Any FAIL → immediate Governance + Supervisory Authority + Technology escalation; CRITICAL incident declaration; preservation bundle auto-generated
Escalation Target	Governance; Supervisory Authority; Technology
Retention Tag	7-year
EP Domain	EP-DvP

CHECK DVP-008 — Amount Match Verification

Field	Value
Check ID	DVP-008
Control Group	G-DVP
Objective	Confirm that for all settled trades the released asset quantity equals the locked asset quantity, and the released cash amount equals the locked cash amount, within the defined reconciliation tolerance
Pass Condition	For all ES-07 Escrow Records:
Fail Condition	Any amount delta exceeds tolerance; any AMOUNT_MISMATCH_POST_LOCK fault event not fully investigated and resolved
Flag Condition	Any amount delta > 0 even within tolerance (warrants documentation)
Evidence Inputs	Amount mismatch records (DvP-3.005); Escrow Records (DvP-2.001)
Frequency	DAILY (automated)
Escalation Trigger	Any FAIL → Compliance Officer + Governance escalation; incident trigger if pattern detected
Escalation Target	Compliance Officer; Governance
Retention Tag	7-year
EP Domain	EP-DvP

F.3 Control Group G-FIN: Settlement Finality Controls

CHECK FIN-001 — Finality Marker Integrity

Field	Value
Check ID	FIN-001
Control Group	G-FIN
Objective	Confirm that every trade reaching ES-07 (SETTLED) has a corresponding finality marker event in the immutable log, that each marker is cryptographically signed by the settlement operator's current conformance credential, and that no marker references a revoked or expired credential
Pass Condition	COUNT(finality marker events) = COUNT(ES-07 Escrow Records); every marker has operator_id, valid credential reference, and timestamp; no marker references a credential with revoked or expired status at time of issuance
Fail Condition	Any ES-07 record without a corresponding finality marker; any marker with missing operator_id or invalid credential reference; any marker issued under a revoked credential
Flag Condition	Any marker issued within 60 seconds of credential expiry (warrants credential lifecycle review)
Evidence Inputs	Finality marker event log (FIN-1.004); finality marker uniqueness check (FIN-1.005); FER population (FIN-1.001); operator conformance credential records
Frequency	DAILY (automated); EVENT on each ES-07 state entry
Escalation Trigger	Any FAIL → Compliance Officer + Governance escalation; incident trigger; preservation bundle review
Escalation Target	Compliance Officer; Governance
Retention Tag	7-year
EP Domain	EP-FIN

CHECK FIN-002 — Finality Marker Uniqueness

Field	Value
Check ID	FIN-002
Control Group	G-FIN
Objective	Confirm that each trade_id has exactly one finality marker event in the immutable log; no trade has duplicate finality markers, which could indicate replay or system duplication error
Pass Condition	For every trade_id in ES-07 state: COUNT(finality marker events for trade_id) = 1 exactly
Fail Condition	Any trade_id with COUNT(finality marker events) > 1 or = 0 (ES-07 without marker is covered by FIN-001; duplicate marker is the specific concern here)
Flag Condition	Any trade_id with a finality marker timestamp more than 1 hour after ES-07 entry timestamp (delayed marker issuance)

Field	Value
Evidence Inputs	Finality marker uniqueness check (FIN-1.005); finality marker event log (FIN-1.004)
Frequency	DAILY (automated)
Escalation Trigger	Any FAIL → Compliance Officer + Technology escalation; duplicate marker treated as potential system integrity issue
Escalation Target	Compliance Officer; Technology
Retention Tag	7-year
EP Domain	EP-FIN

CHECK FIN-003 — Operational Finality Condition Completeness

Field	Value
Check ID	FIN-003
Control Group	G-FIN
Objective	Confirm that all FERs for trades settled in the period have reached FS-02 (OPERATIONALLY_FINAL) within the defined SLA window (SLA-FIN-002: ≤ 4 business hours from ES-07); confirm no FERs remain in FS-00 or FS-01 beyond the SLA window
Pass Condition	All FERs for ES-07 trades in the period show finality_state = OPERATIONALLY_FINAL; time from ES-07 entry to FS-02 ≤ 4 business hours at P95; no FERs in FS-00 or FS-01 beyond the SLA window
Fail Condition	Any FER remaining in FS-00 or FS-01 beyond SLA-FIN-002 breach threshold (8 business hours)
Flag Condition	Any FER approaching but not yet breaching SLA-FIN-002 (between 4 and 8 business hours in FS-00/FS-01)
Evidence Inputs	FER population (FIN-1.001); finality state distribution report (FIN-1.002); CONDITIONALLY_FINAL pending log (FIN-1.003)
Frequency	DAILY (automated)
Escalation Trigger	Any FAIL → Compliance Officer + Risk Officer notification
Escalation Target	Compliance Officer
Retention Tag	7-year
EP Domain	EP-FIN

CHECK FIN-004 — Post-Settlement Reconciliation Completeness

Field	Value
Check ID	FIN-004
Control Group	G-FIN
Objective	Confirm that F4 reconciliation conditions (F4-001 through F4-005) are verified for

Field	Value
	all trades that reached FS-02 in the period; confirm all reconciliation breaks are either resolved or on an active investigation track
Pass Condition	All F4 conditions VERIFIED for all FS-02 FERs; reconciliation break log (FIN-3.003) shows zero open breaks older than operator-defined resolution window
Fail Condition	Any FS-02 FER with one or more F4 conditions showing NOT_MET or INDETERMINATE; any open reconciliation break older than resolution window without active investigation record
Flag Condition	Any reconciliation break open for > 50% of the resolution window
Evidence Inputs	Post-settlement reconciliation records (FIN-3.001, FIN-3.002); reconciliation break log (FIN-3.003); FER population (FIN-1.001)
Frequency	DAILY (automated)
Escalation Trigger	Any FAIL → Compliance Officer + Risk Officer escalation; preservation bundle if break involves material amount
Escalation Target	Compliance Officer; Risk Officer
Retention Tag	7-year
EP Domain	EP-FIN

CHECK FIN-005 — FER Hash Chain Integrity

Field	Value
Check ID	FIN-005
Control Group	G-FIN
Objective	Confirm that the hash chain across all FERs in the period is unbroken; no tamper evidence detected on any FER
Pass Condition	Hash chain verification (FIN-3.004) shows all FER hash chains verified; zero prev_log_hash mismatches
Fail Condition	Any hash chain break or tamper evidence on any FER
Flag Condition	Any hash verification computation anomaly (e.g., unexpected latency)
Evidence Inputs	Hash chain integrity verification (FIN-3.004); FER population (FIN-1.001)
Frequency	DAILY (automated)
Escalation Trigger	Any FAIL → CRITICAL incident declaration; immediate Governance + Supervisory Authority escalation
Escalation Target	Governance; Supervisory Authority; Technology
Retention Tag	7-year
EP Domain	EP-FIN

CHECK FIN-006 — Post-Finality Exception Discipline

Field	Value
Check ID	FIN-006

Field	Value
Control Group	G-FIN
Objective	Confirm that all FS-03 (EXCEPTION_UNDER_REVIEW) transitions were authorized by at least a Compliance Officer, are being actively resolved within SLA-FIN-003/FIN-004 targets, and that no FS-03 state has been open beyond the SLA breach threshold (10 business days) without Governance escalation
Pass Condition	All FS-03 entries have Compliance Officer authorization record; all open FS-03 entries are within SLA-FIN-004 target; any entry beyond SLA-FIN-004 breach threshold has documented Governance escalation
Fail Condition	Any FS-03 entry without authorization record; any FS-03 entry beyond breach threshold (10 business days) without Governance escalation record
Flag Condition	Any FS-03 entry past 50% of SLA-FIN-004 target without resolution timeline documented
Evidence Inputs	FS-03 exception records (FIN-2.001); FER population (FIN-1.001)
Frequency	DAILY (automated monitoring of open FS-03 entries)
Escalation Trigger	Any FAIL → Governance + Supervisory Authority notification
Escalation Target	Governance
Retention Tag	7-year
EP Domain	EP-FIN

CHECK FIN-007 — Reversion Authorization Completeness

Field	Value
Check ID	FIN-007
Control Group	G-FIN
Objective	Confirm that every FS-04 (REVERSED_OR_UNWOUND) transition has a complete reversion authorization record containing all required authorizing actors per the applicable authorization level (within-window or post-window)
Pass Condition	All FS-04 FERs have a reversion authorization record (FIN-2.002); within-window reversions have Compliance Officer + Senior Compliance Officer authorization; post-window reversions have Governance authorization; all authorization timestamps precede reversion execution timestamps
Fail Condition	Any FS-04 FER without reversion authorization record; any FS-04 with insufficient authorization level; any reversion executed before authorization timestamp
Flag Condition	Any reversion where authorization-to-execution time was < 30 minutes (verify no procedural shortcut)
Evidence Inputs	FS-04 reversion authorization records (FIN-2.002); reversion execution logs (FIN-2.003); FER population (FIN-1.001)
Frequency	EVENT (each FS-04 transition); MONTHLY full-population review
Escalation	Any FAIL → Governance + Supervisory Authority immediate escalation

Field	Value
Trigger	
Escalation Target	Governance; Supervisory Authority
Retention Tag	7-year; INDEFINITE for any FAIL instance
EP Domain	EP-FIN

F.4 Control Group G-LIQ: Liquidity Gate Activation Discipline

CHECK LIQ-001 — Gate Activation Dual-Authorization Compliance

Field	Value
Check ID	LIQ-001
Control Group	G-LIQ
Objective	Confirm that every liquidity gate activation event has a dual-authorization record signed by both a Compliance Officer and a Risk Officer, and that authorization timestamps precede the technical gate activation timestamp
Pass Condition	All gate activation events (LIQ-1.002) have gate activation authorization records (LIQ-1.004) with two distinct authorizing actors; authorization timestamps precede gate_active_ts for all events
Fail Condition	Any gate activation without dual-authorization record; any single-actor authorization; any activation timestamp preceding authorization timestamp
Flag Condition	Any gate activation where authorization-to-execution time was > 30 minutes (may indicate delayed technical execution)
Evidence Inputs	Gate activation event records (LIQ-1.002); gate activation authorization records (LIQ-1.004)
Frequency	EVENT (each gate activation); MONTHLY full-period review
Escalation Trigger	Any FAIL → Governance + Supervisory Authority immediate notification
Escalation Target	Governance; Supervisory Authority
Retention Tag	7-year
EP Domain	EP-LIQ

CHECK LIQ-002 — Queue Integrity During Gate-Active Period

Field	Value
Check ID	LIQ-002
Control Group	G-LIQ
Objective	Confirm that settlement queue entries during gate-active periods were processed in correct queue order (FIFO or operator-defined order) without unauthorized skipping,

Field	Value
	reordering, or deletion; confirm queue integrity checks (LIQ-2.002) show no violations
Pass Condition	Queue integrity checks show zero unauthorized reorderings; every transaction queued during a gate-active period has a queue entry record (LIQ-2.001) with sequential queue_position values; no gaps in queue_position sequence
Fail Condition	Any queue position gap not explained by authorized withdrawal or expiry; any reordering without authorization record; any transaction processed out of defined order without documented exception
Flag Condition	Any transaction with queue_position > operator-defined maximum depth (indicating queue stress)
Evidence Inputs	Settlement queue entries log (LIQ-2.001); queue integrity checks (LIQ-2.002); queue abandonment records (LIQ-2.003)
Frequency	DAILY; EVENT during gate-active periods (real-time monitoring)
Escalation Trigger	Any FAIL → Compliance Officer + Risk Officer escalation; incident trigger if pattern detected
Escalation Target	Compliance Officer; Risk Officer
Retention Tag	7-year
EP Domain	EP-LIQ

CHECK LIQ-003 — Stress Indicator Monitoring Continuity

Field	Value
Check ID	LIQ-003
Control Group	G-LIQ
Objective	Confirm that stress indicator monitoring was continuous throughout the period; no monitoring gap exceeded the SLA-LIQ-001 threshold (15-minute maximum gap between recalculations); confirm stress indicator time-series log (LIQ-3.001) is complete
Pass Condition	Stress indicator time-series log (LIQ-3.001) shows no monitoring gap > 15 minutes for any indicator on any settlement rail; all required indicators present (run-risk indicator, redemption velocity, large-holder concentration, intraday liquidity ratio)
Fail Condition	Any monitoring gap > 15 minutes; any required indicator missing from time-series log for any period
Flag Condition	Any monitoring gap between 5 and 15 minutes (within SLA but warrants investigation)
Evidence Inputs	Stress indicator time-series log (LIQ-3.001); Technology system availability records
Frequency	DAILY (automated gap detection); MONTHLY full continuity review
Escalation Trigger	Any FAIL → Technology + Risk Officer escalation; SLA breach record (SLA-LIQ-001)
Escalation Target	Technology; Risk Officer

Field	Value
Retention Tag	7-year
EP Domain	EP-LIQ

CHECK LIQ-004 — Supervisory Notification Timeliness for Gate Activations

Field	Value
Check ID	LIQ-004
Control Group	G-LIQ
Objective	Confirm that for every gate activation event, the required supervisory authority notification was sent within the SLA-LIQ-005 target (1 business hour from gate active status)
Pass Condition	All gate activation events have a corresponding examiner notification record (LIQ-1.005); notification_ts – gate_active_ts ≤ 1 business hour for all events
Fail Condition	Any gate activation event without a notification record; any notification_ts – gate_active_ts > 2 business hours (SLA breach threshold)
Flag Condition	Any notification_ts – gate_active_ts between 1 and 2 business hours
Evidence Inputs	Examiner notification records for gate activations (LIQ-1.005); gate activation event records (LIQ-1.002)
Frequency	EVENT (each gate activation); MONTHLY full-period review
Escalation Trigger	Any FAIL → SLA breach record (SLA-LIQ-005); Senior Compliance Officer escalation
Escalation Target	Senior Compliance Officer
Retention Tag	7-year
EP Domain	EP-LIQ

CHECK LIQ-005 — Operating Posture Classification Continuity

Field	Value
Check ID	LIQ-005
Control Group	G-LIQ
Objective	Confirm that the operating posture classification log (LIQ-4.001) is complete and continuous for the period; every posture change above NORMAL has a documented authorization record; no STRESS or OFFBOARDING posture was declared without Governance or required dual-authorization
Pass Condition	Operating posture log covers full period with no gaps; all posture escalation authorizations (LIQ-4.002) are present; Governance authorization present for all STRESS and OFFBOARDING declarations
Fail Condition	Any posture change without authorization record; any STRESS or OFFBOARDING declaration without Governance authorization
Flag	Any NORMAL → LIMITED posture change without Compliance Officer + Risk

Field	Value
Condition	Officer dual-authorization
Evidence Inputs	Operating posture classification log (LIQ-4.001); posture escalation authorization records (LIQ-4.002); supervisory notifications (LIQ-4.003)
Frequency	MONTHLY; EVENT on each posture change
Escalation Trigger	Any FAIL → Governance + Supervisory Authority notification
Escalation Target	Governance; Supervisory Authority
Retention Tag	7-year
EP Domain	EP-LIQ

F.5 Control Group G-YLD: Yield Separation Boundary Compliance

CHECK YLD-001 — Settlement Rail P4-Free Confirmation

Field	Value
Check ID	YLD-001
Control Group	G-YLD
Objective	Confirm that no P4 (yield feature) category tag appeared in settlement rail metadata for any transaction in the period; yield features remain structurally separated from the payment/settlement rail at all times
Pass Condition	Settlement rail metadata audit (YLD-2.001) shows zero P4 tag appearances across all transaction records in the period; yield commingling detection log (YLD-2.002) shows zero yield_commingling_flag events
Fail Condition	Any P4 tag detected in settlement rail metadata; any yield_commingling_flag event unresolved or uninvestigated
Flag Condition	Any yield_commingling_flag event (even if subsequently resolved as false positive) — requires compliance officer documented review
Evidence Inputs	Settlement rail metadata audit (YLD-2.001); yield commingling detection log (YLD-2.002); P4 instrument register (YLD-1.004)
Frequency	DAILY (automated); QUARTERLY full structural separation review
Escalation Trigger	Any FAIL → Compliance Officer + Governance immediate escalation; participant notification; supervisory notification
Escalation Target	Compliance Officer; Governance
Retention Tag	7-year
EP Domain	EP-YLD

CHECK YLD-002 — Boundary Test Execution Completeness

Field	Value
Check ID	YLD-002
Control Group	G-YLD
Objective	Confirm that formal boundary tests (Section 3.5 of the Constitution) were executed for all instruments active on settlement rails during the period, within the required recertification cadence; confirm all test results are documented in the EP
Pass Condition	Boundary test records (YLD-1.003) present for all active instruments; no active instrument without a boundary test result dated within the operator-defined recertification window
Fail Condition	Any active instrument with no boundary test result within the recertification window
Flag Condition	Any active instrument approaching recertification window expiry (within 30 days) without a scheduled test
Evidence Inputs	Boundary test records (YLD-1.003); instrument category registry (YLD-1.001)
Frequency	MONTHLY (check for approaching expirations); QUARTERLY full review
Escalation Trigger	Any FAIL → Compliance Officer escalation; instrument may be temporarily suspended from settlement rail pending test completion
Escalation Target	Compliance Officer
Retention Tag	7-year
EP Domain	EP-YLD

CHECK YLD-003 — P4 Structural Separation Evidence Currency

Field	Value
Check ID	YLD-003
Control Group	G-YLD
Objective	Confirm that the P4 structural separation evidence (YLD-2.003) is current, covers all active P4 instruments, and demonstrates that yield programs are operated on separate rails, accounts, or contractual arrangements from the settlement rail
Pass Condition	P4 structural separation evidence present for all P4 instruments; evidence dated within the operator-defined review cycle; no P4 instrument shares an account, rail identifier, or escrow mechanism with a settlement rail instrument
Fail Condition	Any P4 instrument without current structural separation evidence; any evidence showing shared infrastructure between P4 and settlement rail
Flag Condition	Any P4 structural separation evidence approaching review cycle expiry
Evidence Inputs	P4 structural separation evidence (YLD-2.003); P4 instrument register (YLD-1.004); instrument category registry (YLD-1.001)
Frequency	QUARTERLY

Field	Value
Escalation Trigger	Any FAIL → Compliance Officer + Governance escalation; participant disclosure review triggered
Escalation Target	Compliance Officer; Governance
Retention Tag	7-year
EP Domain	EP-YLD

F.6 Control Group G-TTL: TTL and Purpose Limitation Enforcement

CHECK TTL-001 — Examiner Access TTL Compliance

Field	Value
Check ID	TTL-001
Control Group	G-TTL
Objective	Confirm that all examiner access events are bounded by the TTL specified in the corresponding Examiner Request Record; no access persisted beyond the access_ttl timestamp; access was not extended without a new authorization record
Pass Condition	For all Examiner Request Records in the period: actual access was terminated at or before access_ttl; no access event log entries post-date access_ttl without a new authorization record referencing an extended or new Examiner Request Record
Fail Condition	Any access event log entry post-dating access_ttl without new authorization; any access that was not formally terminated
Flag Condition	Any access approaching access_ttl within 24 hours without a documented renewal decision or termination plan
Evidence Inputs	Examiner Request Records (EP-ACC); access event logs (immutable log — access tier events); post-access review records
Frequency	DAILY (automated TTL expiry monitoring); EVENT on each access TTL boundary
Escalation Trigger	Any FAIL → Senior Compliance Officer + Governance immediate escalation; potential supervisory notification
Escalation Target	Senior Compliance Officer; Governance
Retention Tag	7-year
EP Domain	EP-ACC

CHECK TTL-002 — Post-Access Review Completion Timeliness

Field	Value
Check ID	TTL-002
Control Group	G-TTL
Objective	Confirm that post-access reviews were completed within the required SLA for all

Field	Value
	examiner access events: Tier 1 ≤ 30 days from TTL expiry (SLA-EXM-006); Tier 2 ≤ 10 business days from TTL expiry (SLA-EXM-007)
Pass Condition	All Examiner Request Records with access_ttl in the review window show post_access_review_completed = true; review completion timestamp within SLA target
Fail Condition	Any Examiner Request Record with post_access_review_completed = false beyond SLA breach threshold
Flag Condition	Any post-access review approaching SLA target without completion
Evidence Inputs	Examiner Request Records (EP-ACC); EP Delta records of type ACCESS_REVIEW_COMPLETION
Frequency	DAILY (automated SLA monitoring)
Escalation Trigger	Any FAIL → Compliance Officer escalation; EP Delta marked overdue
Escalation Target	Compliance Officer
Retention Tag	7-year
EP Domain	EP-ACC

CHECK TTL-003 — Purpose Limitation Scope Adherence

Field	Value
Check ID	TTL-003
Control Group	G-TTL
Objective	Confirm that access to EP artifacts was limited to the scope and purpose documented in each Examiner Request Record; no artifacts outside the documented scope were accessed; access_purpose field is populated for all access events
Pass Condition	Access event logs show all accessed artifact_refs are within the scope defined in the corresponding Examiner Request Record; access_purpose is populated for all Examiner Request Records; no access_purpose = null entries
Fail Condition	Any accessed artifact outside documented scope; any Examiner Request Record with null access_purpose
Flag Condition	Any access event where accessed artifact count significantly exceeds estimated scope (may indicate scope creep requiring documented justification)
Evidence Inputs	Examiner Request Records (EP-ACC); access event logs; EP-EXAM chain-of-custody manifests
Frequency	EVENT (each access event); MONTHLY full-period review
Escalation Trigger	Any FAIL → Senior Compliance Officer + Governance escalation; potential supervisory notification for out-of-scope access
Escalation Target	Senior Compliance Officer; Governance
Retention Tag	7-year

Field	Value
EP Domain	EP-ACC

CHECK TTL-004 — Tier 2 Access Dual-Authorization Verification

Field	Value
Check ID	TTL-004
Control Group	G-TTL
Objective	Confirm that every Tier 2 (elevated) access event has a dual-authorization record in the immutable log from a senior supervisory officer and an independent compliance reviewer; no Tier 2 access was granted without both authorizations
Pass Condition	All Examiner Request Records with access_tier = TIER_2_ELEVATED have authorization_records with exactly two distinct authorizing actors in required roles; both authorization_ts precede first access event timestamp
Fail Condition	Any Tier 2 access event with fewer than two authorizing actors; any Tier 2 access where authorization is from the same actor twice; any access event predating both authorization timestamps
Flag Condition	Any Tier 2 access where authorization-to-first-access time was < 15 minutes (verify no procedural bypass)
Evidence Inputs	Examiner Request Records (EP-ACC); access authorization records; access event logs (immutable log)
Frequency	EVENT (each Tier 2 access event); QUARTERLY full-period review
Escalation Trigger	Any FAIL → Governance + Supervisory Authority immediate escalation; CRITICAL incident consideration
Escalation Target	Governance; Supervisory Authority
Retention Tag	7-year; INDEFINITE for any FAIL instance
EP Domain	EP-ACC

F.7 Control Group G-PRV: Preservation Bundle Completeness

CHECK PRV-001 — Preservation Bundle Trigger Coverage

Field	Value
Check ID	PRV-001
Control Group	G-PRV
Objective	Confirm that a preservation bundle was generated for every qualifying trigger event in the period; no ES-FF fault, FS-04 reversion, FS-03 fraud/system-integrity exception, or CRITICAL/HIGH incident occurred without a corresponding preservation bundle
Pass Condition	Preservation bundle manifest index (DvP-4.001 / FIN-3.005) accounts for every qualifying trigger event; COUNT(preservation bundles) ≥ COUNT(qualifying trigger events) for the period

Field	Value
Fail Condition	Any qualifying trigger event without a corresponding preservation bundle
Flag Condition	Any preservation bundle generated after SLA-DvP-009 breach threshold (1 business hour from trigger)
Evidence Inputs	Preservation bundle manifest index (DvP-4.001); fault records (DvP-2.003); FS-03 exception records (FIN-2.001); FS-04 reversion records (FIN-2.002); incident records (EP-INC)
Frequency	DAILY (automated trigger-to-bundle matching); MONTHLY full-period reconciliation
Escalation Trigger	Any FAIL → immediate Compliance Officer + Governance escalation; SLA breach record
Escalation Target	Compliance Officer; Governance
Retention Tag	INDEFINITE (all preservation bundles)
EP Domain	EP-DvP; EP-FIN; EP-INC

CHECK PRV-002 — Preservation Bundle Immutability and Tamper Verification

Field	Value
Check ID	PRV-002
Control Group	G-PRV
Objective	Confirm that all preservation bundles in storage have bundle_hash values that still verify correctly against their contents; no tampering with preserved artifacts since bundle generation; all artifacts in preservation bundles are stored in write-once or append-only storage
Pass Condition	Recomputed hash of each preservation bundle manifest matches the stored bundle_hash; all tamper_check_at_freeze values = PASSED; storage audit confirms write-once or append-only compliance
Fail Condition	Any bundle_hash mismatch; any tamper_check_at_freeze = FAILED; any artifact stored in modifiable storage
Flag Condition	Any bundle where hash verification computation time exceeded expected threshold (may indicate storage degradation)
Evidence Inputs	Preservation bundle manifests (DvP-4.002); storage audit records; hash verification logs
Frequency	MONTHLY (automated re-verification of all bundles); EVENT on any storage migration
Escalation Trigger	Any FAIL → CRITICAL incident declaration; Governance + Supervisory Authority immediate escalation
Escalation Target	Governance; Supervisory Authority; Technology
Retention Tag	INDEFINITE
EP Domain	EP-DvP; EP-FIN

CHECK PRV-003 — Offboarding Bundle Open-Breaks Confirmation

Field	Value
Check ID	PRV-003
Control Group	G-PRV
Objective	Confirm that all PB-OFFBOARD preservation bundles record open_breaks_count = 0 at the time of generation; any non-zero break count must be accompanied by an explicit break list and a documented remediation plan
Pass Condition	All PB-OFFBOARD bundles have open_breaks_count = 0; or, if open_breaks_count > 0, each open break has a description, trade_id_ref, and remediation status in the open_breaks list
Fail Condition	Any PB-OFFBOARD bundle with open_breaks_count > 0 and no corresponding break documentation
Flag Condition	Any PB-OFFBOARD bundle with open_breaks_count > 0 even if documented (warrants Governance attention)
Evidence Inputs	Preservation bundle manifests (offboarding type); final position snapshots; reconciliation records
Frequency	EVENT (each offboarding trigger)
Escalation Trigger	Any FAIL → Governance escalation; offboarding process paused pending break resolution
Escalation Target	Governance
Retention Tag	INDEFINITE
EP Domain	EP-OFF

F.8 Control Group G-REC: Reconciliation and Break Management

CHECK REC-001 — Daily Settlement Reconciliation Completeness

Field	Value
Check ID	REC-001
Control Group	G-REC
Objective	Confirm that end-of-day reconciliation was completed for every business day in the period; position and cash balances reconcile between the settlement layer, custody layer, and funding layer; no unreconciled difference exceeds the operator-defined tolerance
Pass Condition	Reconciliation records present for every business day; all position and cash deltas within tolerance; any delta exceeding tolerance has a documented break investigation open within 1 business hour
Fail Condition	Any business day without a reconciliation record; any unreconciled difference exceeding tolerance without an open investigation record
Flag	Any reconciliation difference > 0 but within tolerance (document for trend)

Field	Value
Condition	monitoring)
Evidence Inputs	Post-settlement reconciliation records (FIN-3.001, FIN-3.002); reconciliation break log (FIN-3.003); settlement confirmation records (DvP-3.001, DvP-3.002)
Frequency	DAILY (automated)
Escalation Trigger	Any FAIL → Compliance Officer + Risk Officer escalation; preservation bundle if break amount is material
Escalation Target	Compliance Officer; Risk Officer
Retention Tag	7-year
EP Domain	EP-REC

CHECK REC-002 — EP and EP-Delta Chain Completeness

Field	Value
Check ID	REC-002
Control Group	G-REC
Objective	Confirm that the EP and EP-Delta chain for the period is complete and unbroken; every EP Delta correctly references its parent EP; the cumulative EP (parent + all deltas) has all_required_sections_complete = true for all domains; no orphaned deltas exist
Pass Condition	All EP Deltas in the period correctly chain to their parent EP via parent_ep_id and prior_delta_id; no orphaned deltas; cumulative EP completeness field = true for all domains; all required attestations present
Fail Condition	Any EP Delta with invalid parent_ep_id or prior_delta_id reference; any domain EP with all_required_sections_complete = false beyond the defined grace period; any orphaned EP Delta
Flag Condition	Any domain EP approaching monthly production deadline without draft completion
Evidence Inputs	EP Headers and EP Delta records (all domain EPs); immutable EP production log
Frequency	WEEKLY; MONTHLY full-chain review
Escalation Trigger	Any FAIL → Compliance Officer escalation; Technology if chain break is system-generated
Escalation Target	Compliance Officer
Retention Tag	7-year
EP Domain	Cross-domain

CHECK REC-003 — Material Change Record Completeness

Field	Value
Check ID	REC-003

Field	Value
Control Group	G-REC
Objective	Confirm that a Material Change Evidence Record was produced for every material change to DvP logic, finality conditions, liquidity gate thresholds, reversion authorization requirements, or finality state machine transitions implemented in the period
Pass Condition	All Material Change Evidence Records (FIN-4.001) account for all change control board and governance decisions involving the specified change categories; every material change record references a corresponding EP Delta of type MATERIAL_CHANGE
Fail Condition	Any implemented material change without a corresponding Material Change Evidence Record; any Material Change Evidence Record without a linked EP Delta
Flag Condition	Any Material Change Evidence Record without a participant notification record where notification was required
Evidence Inputs	Material change evidence records (FIN-4.001); EP Delta records of type MATERIAL_CHANGE; change control board minutes; participant notification records (FIN-4.003)
Frequency	MONTHLY
Escalation Trigger	Any FAIL → Compliance Officer + Governance escalation
Escalation Target	Compliance Officer; Governance
Retention Tag	7-year
EP Domain	EP-GOV

Appendix G — Examiner Query Pack (Expanded; Conceptual SQL / Pseudocode)

G.1 Purpose and Structure

The Examiner Query Pack provides a library of conceptual queries that examiners and compliance personnel can adapt to their operating environment. Queries are written in a combination of structured pseudocode and conceptual SQL-style syntax; they are **not** tied to any specific database platform, ledger technology, or query engine.

Schema assumptions: Queries assume the following logical tables derived from the artifact schemas in Appendices B, C, and D. Operators may map these to their actual data models.

Logical Table	Contents
dger	DvP Gate Evidence Records — one row per gate execution
gate_results	Gate result rows — many rows per dger_id (one per gate item)
escrow	Escrow Records — one row per escrow lifecycle
escrow_states	State history rows — many rows per escrow_id

Logical Table	Contents
fer	Finality Evidence Records — one row per trade finality lifecycle
fer_conditions	Condition evaluation rows — many rows per fer_id
finality_markers	Finality marker events — one row per marker
recon	Reconciliation records — one row per trade leg per reconciliation
liq_gate_events	Liquidity gate activation and deactivation events
liq_queue	Settlement queue entries during gate-active periods
stress_indicators	Time-series stress indicator values
hold_events	Hold placement and release events
examiner_access	Examiner Request Records and access events
ep_deltas	EP Delta records
preservation_bundles	Preservation bundle manifests
instruments	Instrument category registry
participants	Participant registry with eligibility and credential data
posture_log	Operating posture classification time-series

Query result interpretation: Results are evidence artifacts, not legal conclusions. A positive result in a detection query requires investigation; it does not by itself establish a violation.

G.2 Query Group 1 — DvP Lock/Release Trace

QUERY DVP-Q001 — Full DvP Lifecycle Trace by trade_id

Purpose: Reconstruct the complete DvP lifecycle for a specific trade, from gate execution through final settlement or reversion. Provides the examiner with a single-trade audit trail.

```
-- QUERY DVP-Q001: Full DvP Lifecycle Trace
```

```
-- Input parameter: :target_trade_id
```

```
SELECT
    'GATE_EXECUTION'           AS lifecycle_stage,
    d.dger_id                  AS record_id,
    d.gate_execution_ts        AS event_ts,
    d.overall_gate_status      AS status,
    d.containment_action       AS action_taken,
    d.asset_leg_participant    AS asset_participant,
    d.cash_leg_participant     AS cash_participant,
    d.cash_instrument_cat      AS cash_category,
    NULL                       AS escrow_state,
    NULL                       AS finality_state,
    d.log_hash                 AS record_hash
```

```
FROM dger d
WHERE d.trade_id = :target_trade_id
```

```
UNION ALL
```

```
SELECT
  'ESCROW_STATE_' || es.state_id      AS lifecycle_stage,
  e.escrow_id                        AS record_id,
  es.entered_ts                      AS event_ts,
  es.state_id                        AS status,
  es.transition_trigger              AS action_taken,
  e.asset_leg_participant            AS asset_participant,
  e.cash_leg_participant              AS cash_participant,
  e.cash_instrument_cat              AS cash_category,
  es.state_id                        AS escrow_state,
  NULL                               AS finality_state,
  es.log_hash                        AS record_hash
```

```
FROM escrow e
  JOIN escrow_states es ON e.escrow_id = es.escrow_id
WHERE e.trade_id = :target_trade_id
```

```
UNION ALL
```

```
SELECT
  'FINALITY_ASSESSMENT'              AS lifecycle_stage,
  f.fer_id                          AS record_id,
  f.finality_assessed_ts             AS event_ts,
  f.finality_state                   AS status,
  CASE
    WHEN f.all_conditions_verified THEN 'ALL_CONDITIONS_VERIFIED'
    ELSE 'PENDING_CONDITIONS: ' || f.pending_conditions_count
  END                                AS action_taken,
  NULL                               AS asset_participant,
  NULL                               AS cash_participant,
  NULL                               AS cash_category,
```

```

NULL                                AS escrow_state,
f.finality_state                     AS finality_state,
f.log_hash                           AS record_hash
FROM fer f
WHERE f.trade_id = :target_trade_id

```

```
ORDER BY event_ts ASC;
```

Expected result: Ordered timeline of all lifecycle stages for the trade. A clean trade shows:
GATE_EXECUTION (ALL_PASS) → ESCROW_STATE_ES-01 → ES-02 (asset) → ES-02 (cash)
→ ES-03 → ES-05 → ES-07 → FINALITY_ASSESSMENT (OPERATIONALLY_FINAL).

Red flags: Any gap in the state sequence; any ES-FF entry; any finality_state ≠
OPERATIONALLY_FINAL without a documented exception record.

QUERY DVP-Q002 — Gate Failure and Override Summary by Period

Purpose: Identify all trades where gate items failed or were overridden; assess whether
containment actions were appropriate and consistently applied.

```
-- QUERY DVP-Q002: Gate Failure and Override Summary
```

```
-- Input parameters: :period_start, :period_end
```

```

SELECT
  d.dger_id,
  d.trade_id,
  d.gate_execution_ts,
  d.overall_gate_status,
  d.containment_action,
  COUNT(gr.gate_id)
    FILTER (WHERE gr.status = 'FAIL') AS fail_count,
  COUNT(gr.gate_id)
    FILTER (WHERE gr.status = 'QUEUED') AS queued_count,
  STRING_AGG(
    gr.gate_id || ':' || gr.status, ', '
    ORDER BY gr.gate_id
  )
    FILTER (WHERE gr.status IN ('FAIL','QUEUED'))
    AS failed_or_queued_gates,

```

```

EXISTS (
    SELECT 1 FROM gate_results go
    WHERE go.dger_id = d.dger_id
        AND go.detail LIKE '%OVERRIDE%'
)
        AS override_present
FROM dger d
    JOIN gate_results gr ON d.dger_id = gr.dger_id
WHERE d.gate_execution_ts BETWEEN :period_start AND :period_end
    AND (
        d.overall_gate_status != 'ALL_PASS'
    OR EXISTS (
        SELECT 1 FROM gate_results go
        WHERE go.dger_id = d.dger_id
            AND go.detail LIKE '%OVERRIDE%'
        )
    )
)
GROUP BY
    d.dger_id, d.trade_id, d.gate_execution_ts,
    d.overall_gate_status, d.containment_action
ORDER BY d.gate_execution_ts DESC;

```

Expected result: Zero rows indicates all gates passed with no overrides. Any rows require review. Overrides require compliance officer authorization records to be present.

QUERY DVP-Q003 — Escrow State Dwell Time Analysis

Purpose: Identify trades that spent unusually long durations in intermediate escrow states (ES-01, ES-02, ES-03, ES-04), which may indicate timeout management failures or unresolved containment situations.

```

-- QUERY DVP-Q003: Escrow State Dwell Time Analysis
-- Input parameters: :period_start, :period_end, :dwell_threshold_seconds

```

```

WITH state_durations AS (
    SELECT
        e.escrow_id,
        e.trade_id,
        es.state_id,

```

```

es.entered_ts,
LEAD(es.entered_ts) OVER (
  PARTITION BY e.escrow_id
  ORDER BY es.entered_ts
)
                                AS exited_ts,
EXTRACT(EPOCH FROM (
  COALESCE(
    LEAD(es.entered_ts) OVER (
      PARTITION BY e.escrow_id ORDER BY es.entered_ts
    ),
    CURRENT_TIMESTAMP
  ) - es.entered_ts
))
                                AS dwell_seconds
FROM escrow e
  JOIN escrow_states es ON e.escrow_id = es.escrow_id
WHERE es.entered_ts BETWEEN :period_start AND :period_end
  AND es.state_id IN ('ES-01','ES-02','ES-03','ES-04','ES-FF')
)
SELECT
sd.escrow_id,
sd.trade_id,
sd.state_id,
sd.entered_ts,
sd.exited_ts,
sd.dwell_seconds,
CASE
  WHEN sd.state_id = 'ES-FF'
                                THEN 'FAULT – REVIEW REQUIRED'
  WHEN sd.state_id = 'ES-04'
    AND sd.dwell_seconds > 28800
                                THEN 'HOLD_CONTAINMENT_SLA_BREACH'
  WHEN sd.dwell_seconds > :dwell_threshold_seconds
                                THEN 'EXCESSIVE_DWELL'
  ELSE 'WITHIN_THRESHOLD'
END
                                AS assessment
FROM state_durations sd
WHERE sd.dwell_seconds > :dwell_threshold_seconds

```

```
OR sd.state_id = 'ES-FF'  
ORDER BY sd.dwell_seconds DESC;
```

Expected result: All rows with assessment = 'WITHIN_THRESHOLD' are informational. Any 'FAULT', 'HOLD_CONTAINMENT_SLA_BREACH', or 'EXCESSIVE_DWELL' rows require investigation. Cross-reference with fault records (DvP-2.003) and hold-only containment records (DvP-2.004).

G.3 Query Group 2 — Settled-Without-Payment and Payment-Without-Delivery Detection

QUERY SWP-Q001 — Settled-Without-Payment Detection

Purpose: Identify any Escrow Record that reached ES-07 (SETTLED) without a confirmed cash-leg release, indicating a potential principal risk event.

```
-- QUERY SWP-Q001: Settled-Without-Payment Detection  
-- Input parameters: :period_start, :period_end
```

```
SELECT  
  e.escrow_id,  
  e.trade_id,  
  e.asset_leg_participant,  
  e.cash_leg_participant,  
  e.asset_leg_instrument_id,  
  e.cash_leg_amount,  
  e.cash_leg_currency,  
  settled_state.entered_ts          AS settlement_ts,  
  e.asset_leg_release_confirmed_ts,  
  e.cash_leg_release_confirmed_ts,  
CASE  
  WHEN e.cash_leg_release_confirmed_ts IS NULL  
    THEN 'CASH_LEG_RELEASE_ABSENT'  
  WHEN e.cash_leg_release_confirmed_ts  
    > e.asset_leg_release_confirmed_ts  
    + INTERVAL '120 seconds'  
    THEN 'CASH_RELEASE_SEVERELY_DELAYED'  
  WHEN e.cash_leg_release_confirmed_ts  
    > e.asset_leg_release_confirmed_ts
```

```

        + INTERVAL '10 seconds'
    THEN 'CASH_RELEASE_DELAYED_FLAG'
    ELSE 'SYMMETRIC'
END
        AS detection_result
FROM escrow e
    JOIN escrow_states settled_state
        ON e.escrow_id = settled_state.escrow_id
        AND settled_state.state_id = 'ES-07'
WHERE settled_state.entered_ts BETWEEN :period_start AND :period_end
    AND (
        e.cash_leg_release_confirmed_ts IS NULL
        OR e.cash_leg_release_confirmed_ts
            > e.asset_leg_release_confirmed_ts + INTERVAL '10 seconds'
    )
ORDER BY settled_state.entered_ts DESC;

```

Expected result: Zero rows with detection_result IN ('CASH_LEG_RELEASE_ABSENT', 'CASH_RELEASE_SEVERELY_DELAYED'). Any such rows constitute a FAIL condition for CHECK DVP-004 and require immediate escalation. 'CASH_RELEASE_DELAYED_FLAG' rows require investigation and documentation.

QUERY SWP-Q002 — Payment-Without-Delivery Detection

Purpose: Symmetric complement to SWP-Q001; identifies any Escrow Record where the cash leg released without a confirmed asset-leg delivery.

```

-- QUERY SWP-Q002: Payment-Without-Delivery Detection
-- Input parameters: :period_start, :period_end

```

```

SELECT
    e.escrow_id,
    e.trade_id,
    e.asset_leg_participant,
    e.cash_leg_participant,
    e.asset_leg_instrument_id,
    e.asset_leg_quantity,
    e.cash_leg_amount,
    settled_state.entered_ts           AS settlement_ts,
    e.asset_leg_release_confirmed_ts,

```

```

e.cash_leg_release_confirmed_ts,
CASE
  WHEN e.asset_leg_release_confirmed_ts IS NULL
    THEN 'ASSET_LEG_RELEASE_ABSENT'
  WHEN e.asset_leg_release_confirmed_ts
    > e.cash_leg_release_confirmed_ts
    + INTERVAL '120 seconds'
    THEN 'ASSET_RELEASE_SEVERELY_DELAYED'
  WHEN e.asset_leg_release_confirmed_ts
    > e.cash_leg_release_confirmed_ts
    + INTERVAL '10 seconds'
    THEN 'ASSET_RELEASE_DELAYED_FLAG'
  ELSE 'SYMMETRIC'
END AS detection_result
FROM escrow e
JOIN escrow_states settled_state
  ON e.escrow_id = settled_state.escrow_id
  AND settled_state.state_id = 'ES-07'
WHERE settled_state.entered_ts BETWEEN :period_start AND :period_end
  AND (
    e.asset_leg_release_confirmed_ts IS NULL
    OR e.asset_leg_release_confirmed_ts
      > e.cash_leg_release_confirmed_ts + INTERVAL '10 seconds'
  )
ORDER BY settled_state.entered_ts DESC;

```

Expected result: Same interpretation as SWP-Q001. Zero ABSENT or SEVERELY_DELAYED rows required.

QUERY SWP-Q003 — Asymmetric Release Population Summary

Purpose: Provide a period-level summary of release symmetry, suitable for inclusion in examiner reports and EP documentation.

```

-- QUERY SWP-Q003: Asymmetric Release Population Summary
-- Input parameters: :period_start, :period_end

```

```

SELECT

```

```

COUNT(*)                                AS total_settled_trades,
COUNT(*) FILTER (
  WHERE e.asset_leg_release_confirmed_ts IS NOT NULL
        AND e.cash_leg_release_confirmed_ts IS NOT NULL
        AND ABS(EXTRACT(EPOCH FROM (
          e.asset_leg_release_confirmed_ts -
          e.cash_leg_release_confirmed_ts
        ))) <= 10
)                                           AS symmetric_releases,
COUNT(*) FILTER (
  WHERE e.asset_leg_release_confirmed_ts IS NULL
        AND e.cash_leg_release_confirmed_ts IS NOT NULL
)                                           AS payment_without_delivery_count,
COUNT(*) FILTER (
  WHERE e.cash_leg_release_confirmed_ts IS NULL
        AND e.asset_leg_release_confirmed_ts IS NOT NULL
)                                           AS delivery_without_payment_count,
COUNT(*) FILTER (
  WHERE ABS(EXTRACT(EPOCH FROM (
    e.asset_leg_release_confirmed_ts -
    e.cash_leg_release_confirmed_ts
  ))) BETWEEN 10 AND 120
)                                           AS delayed_but_present_count,
ROUND(
  100.0 * COUNT(*) FILTER (
    WHERE e.asset_leg_release_confirmed_ts IS NOT NULL
          AND e.cash_leg_release_confirmed_ts IS NOT NULL
          AND ABS(EXTRACT(EPOCH FROM (
            e.asset_leg_release_confirmed_ts -
            e.cash_leg_release_confirmed_ts
          ))) <= 10
    ) / NULLIF(COUNT(*), 0), 2
)                                           AS pct_symmetric
FROM escrow e
JOIN escrow_states es

```

```

    ON e.escrow_id = es.escrow_id
    AND es.state_id = 'ES-07'
WHERE es.entered_ts BETWEEN :period_start AND :period_end;

```

Expected result: payment_without_delivery_count = 0 AND delivery_without_payment_count = 0. pct_symmetric should approach 100.0%. Any non-zero counts in the two critical columns are FAIL conditions.

G.4 Query Group 3 — Finality Status Distribution and Anomalies

QUERY FIN-Q001 — Finality State Distribution Report

Purpose: Provide a period-level distribution of finality states across all FERs, suitable for the FIN-1.002 EP artifact and examiner summary reporting.

```

-- QUERY FIN-Q001: Finality State Distribution
-- Input parameters: :period_start, :period_end

```

```

SELECT
    f.finality_state,
    COUNT(*)                AS fer_count,
    MIN(f.finality_assessed_ts) AS earliest_assessment,
    MAX(f.finality_assessed_ts) AS latest_assessment,
    AVG(EXTRACT(EPOCH FROM (
        f.finality_assessed_ts - es07.entered_ts
    ))) / 3600.0)           AS avg_hours_es07_to_assessment,
    MAX(EXTRACT(EPOCH FROM (
        f.finality_assessed_ts - es07.entered_ts
    ))) / 3600.0)           AS max_hours_es07_to_assessment,
    COUNT(*) FILTER (
        WHERE f.exceptions_count > 0
    )                        AS fer_with_exceptions
FROM fer f
    LEFT JOIN escrow_states es07
        ON f.trade_id = es07.trade_id
        AND es07.state_id = 'ES-07'
WHERE f.finality_assessed_ts BETWEEN :period_start AND :period_end
GROUP BY f.finality_state

```

```
ORDER BY fer_count DESC;
```

Expected result: The dominant row should be finality_state = 'OPERATIONALLY_FINAL'. Rows for CONDITIONALLY_FINAL, INDETERMINATE, or EXCEPTION_UNDER_REVIEW require investigation. Rows for REVERSED_OR_UNWOUND require reversion authorization review.

QUERY FIN-Q002 — Finality Condition Failure Frequency Analysis

Purpose: Identify which finality conditions (F1–F4 groups) are failing most frequently, to detect systemic control weaknesses.

```
-- QUERY FIN-Q002: Finality Condition Failure Frequency
```

```
-- Input parameters: :period_start, :period_end
```

```
SELECT
  fc.condition_id,
  LEFT(fc.condition_id, 2)           AS condition_group,
  COUNT(*)                          AS total_evaluations,
  COUNT(*) FILTER (
    WHERE fc.status = 'VERIFIED'
  )                                  AS verified_count,
  COUNT(*) FILTER (
    WHERE fc.status = 'NOT_MET'
  )                                  AS not_met_count,
  COUNT(*) FILTER (
    WHERE fc.status = 'INDETERMINATE'
  )                                  AS indeterminate_count,
  ROUND(
    100.0 * COUNT(*) FILTER (
      WHERE fc.status = 'NOT_MET'
    ) / NULLIF(COUNT(*), 0), 2
  )                                  AS not_met_rate_pct
FROM fer f
  JOIN fer_conditions fc ON f.fer_id = fc.fer_id
WHERE f.finality_assessed_ts BETWEEN :period_start AND :period_end
GROUP BY fc.condition_id
HAVING COUNT(*) FILTER (
  WHERE fc.status IN ('NOT_MET', 'INDETERMINATE')
```

```
) > 0
```

```
ORDER BY not_met_count DESC, indeterminate_count DESC;
```

Expected result: Zero rows indicates all conditions verified for all FERs in period. Any rows showing not_met_count > 0 for F1 conditions (F1-001 through F1-005) are high-severity findings. F2-F4 failures should be investigated against source system records.

QUERY FIN-Q003 — Stale CONDITIONALLY_FINAL FER Detection

Purpose: Identify FERs that have remained in FS-01 (CONDITIONALLY_FINAL) beyond the SLA-FIN-002 breach threshold, indicating a control gap in the finality assessment process.

```
-- QUERY FIN-Q003: Stale CONDITIONALLY_FINAL FER Detection
```

```
-- Input parameters: :sla_breach_threshold_hours (default: 8)
```

```
SELECT
  f.fer_id,
  f.trade_id,
  f.finality_assessed_ts,
  f.finality_state,
  EXTRACT(EPOCH FROM (
    CURRENT_TIMESTAMP - f.finality_assessed_ts
  )) / 3600.0 AS hours_in_current_state,
  f.pending_conditions_summary,
  CASE
    WHEN EXTRACT(EPOCH FROM (
      CURRENT_TIMESTAMP - f.finality_assessed_ts
    )) / 3600.0
      > :sla_breach_threshold_hours
    THEN 'SLA_BREACH'
    WHEN EXTRACT(EPOCH FROM (
      CURRENT_TIMESTAMP - f.finality_assessed_ts
    )) / 3600.0
      > :sla_breach_threshold_hours * 0.5
    THEN 'SLA_AT_RISK'
    ELSE 'WITHIN_SLA'
  END AS sla_status
FROM fer f
```

```
WHERE f.finality_state IN ('PENDING', 'CONDITIONALLY_FINAL')
ORDER BY f.finality_assessed_ts ASC;
```

Expected result: Zero rows in production means all trades have progressed to FS-02 or beyond. SLA_BREACH rows trigger CHECK FIN-003 FAIL. SLA_AT_RISK rows trigger CHECK FIN-003 FLAG.

G.5 Query Group 4 — Queue Integrity and Gate Activation Events

QUERY LIQ-Q001 — Gate Activation and Deactivation Timeline

Purpose: Reconstruct the complete timeline of liquidity gate activations and deactivations for all settlement rails in the period, including durations and transaction volumes affected.

```
-- QUERY LIQ-Q001: Gate Activation and Deactivation Timeline
-- Input parameters: :period_start, :period_end
```

```
WITH gate_pairs AS (
  SELECT
    a.gate_event_id           AS activation_id,
    a.rail_id,
    a.gate_active_ts         AS activated_ts,
    a.triggering_indicator,
    a.triggering_value,
    a.dual_auth_actor_1,
    a.dual_auth_actor_2,
    d.gate_event_id           AS deactivation_id,
    d.gate_deactive_ts       AS deactivated_ts,
    EXTRACT(EPOCH FROM (
      COALESCE(d.gate_deactive_ts, CURRENT_TIMESTAMP)
      - a.gate_active_ts
    )) / 3600.0              AS duration_hours
  FROM liq_gate_events a
  LEFT JOIN liq_gate_events d
    ON a.rail_id = d.rail_id
   AND d.event_type = 'DEACTIVATION'
   AND d.gate_deactive_ts
      = (
```

```

        SELECT MIN(d2.gate_deactive_ts)
        FROM liq_gate_events d2
        WHERE d2.rail_id = a.rail_id
            AND d2.event_type = 'DEACTIVATION'
            AND d2.gate_deactive_ts > a.gate_active_ts
    )
WHERE a.event_type = 'ACTIVATION'
    AND a.gate_active_ts BETWEEN :period_start AND :period_end
)
SELECT
    gp.*,
    COUNT(lq.queue_entry_id)                AS transactions_queued,
    SUM(lq.transaction_notional)            AS total_notional_queued,
    COUNT(lq.queue_entry_id) FILTER (
        WHERE lq.outcome = 'SETTLED'
    )                                        AS transactions_settled_from_queue,
    COUNT(lq.queue_entry_id) FILTER (
        WHERE lq.outcome = 'EXPIRED'
    )                                        AS transactions_expired_in_queue
FROM gate_pairs gp
    LEFT JOIN liq_queue lq
        ON gp.rail_id = lq.rail_id
    AND lq.queued_ts BETWEEN gp.activated_ts
        AND COALESCE(gp.deactivated_ts, CURRENT_TIMESTAMP)
GROUP BY
    gp.activation_id, gp.rail_id, gp.activated_ts,
    gp.triggering_indicator, gp.triggering_value,
    gp.dual_auth_actor_1, gp.dual_auth_actor_2,
    gp.deactivation_id, gp.deactivated_ts, gp.duration_hours
ORDER BY gp.activated_ts ASC;

```

Expected result: Each row represents one gate activation event with its duration, triggering context, authorization actors, and impact on queued transactions. Examiners should verify `dual_auth_actor_1` \neq `dual_auth_actor_2` and both actors are in required roles per the RACI in Appendix E.4.

QUERY LIQ-Q002 — Queue Integrity Verification (Ordering and Completeness)

Purpose: Detect any queue ordering violations (non-sequential processing) or missing queue entries during gate-active periods.

```
-- QUERY LIQ-Q002: Queue Integrity Verification
-- Input parameters: :gate_event_id (from LIQ-Q001 results)

WITH queue_sequence AS (
  SELECT
    lq.queue_entry_id,
    lq.trade_id,
    lq.rail_id,
    lq.queue_position,
    lq.queued_ts,
    lq.dequeued_ts,
    lq.outcome,
    LAG(lq.queue_position) OVER (
      PARTITION BY lq.rail_id
      ORDER BY lq.queue_position
    ) AS prior_position,
    lq.queue_position
    - LAG(lq.queue_position) OVER (
      PARTITION BY lq.rail_id
      ORDER BY lq.queue_position
    ) AS position_delta
  FROM liq_queue lq
  WHERE lq.gate_event_ref = :gate_event_id
)
SELECT
  qs.*,
  CASE
    WHEN qs.prior_position IS NULL THEN 'FIRST_ENTRY'
    WHEN qs.position_delta = 1 THEN 'SEQUENTIAL'
    WHEN qs.position_delta > 1 THEN 'GAP_DETECTED_DELTA_' ||
      qs.position_delta::text
    WHEN qs.position_delta < 1 THEN 'REORDER_DETECTED'
```

```

        ELSE 'UNKNOWN'
    END
    AS sequence_check,
CASE
    WHEN qs.dequeued_ts IS NULL
        AND qs.outcome IS NULL
        THEN 'STUCK_IN_QUEUE'
    WHEN qs.outcome = 'EXPIRED'
        THEN 'EXPIRED'
    WHEN qs.outcome = 'SETTLED'
        THEN 'SETTLED'
    WHEN qs.outcome = 'WITHDRAWN'
        THEN 'WITHDRAWN'
    ELSE qs.outcome
END
    AS queue_outcome
FROM queue_sequence qs
WHERE qs.position_delta IS NULL
    OR qs.position_delta != 1
    OR qs.outcome IN ('STUCK_IN_QUEUE', 'EXPIRED')
ORDER BY qs.queue_position ASC;

```

Expected result: Zero GAP_DETECTED or REORDER_DETECTED rows (these are FAIL conditions for CHECK LIQ-002). EXPIRED rows require documentation as abandonment records (LIQ-2.003). STUCK_IN_QUEUE rows require immediate investigation.

QUERY LIQ-Q003 — Stress Indicator Monitoring Gap Detection

Purpose: Identify periods where stress indicator monitoring was interrupted, exceeding the SLA-LIQ-001 maximum gap threshold of 15 minutes.

```

-- QUERY LIQ-Q003: Stress Indicator Monitoring Gap Detection
-- Input parameters: :period_start, :period_end,
--                   :max_gap_seconds (default: 900 = 15 minutes)

```

```

WITH indicator_gaps AS (
    SELECT
        si.rail_id,
        si.indicator_type,
        si.measured_ts,
        LEAD(si.measured_ts) OVER (
            PARTITION BY si.rail_id, si.indicator_type
            ORDER BY si.measured_ts
        )
        AS next_measured_ts,

```

```

EXTRACT(EPOCH FROM (
    LEAD(si.measured_ts) OVER (
        PARTITION BY si.rail_id, si.indicator_type
        ORDER BY si.measured_ts
    ) - si.measured_ts
))          AS gap_seconds
FROM stress_indicators si
WHERE si.measured_ts BETWEEN :period_start AND :period_end
)
SELECT
    ig.rail_id,
    ig.indicator_type,
    ig.measured_ts          AS gap_start_ts,
    ig.next_measured_ts    AS gap_end_ts,
    ig.gap_seconds,
CASE
    WHEN ig.gap_seconds > :max_gap_seconds * 4
        THEN 'CRITICAL_GAP'
    WHEN ig.gap_seconds > :max_gap_seconds
        THEN 'SLA_BREACH'
    WHEN ig.gap_seconds > :max_gap_seconds * 0.5
        THEN 'SLA_AT_RISK'
    ELSE 'WITHIN_THRESHOLD'
END          AS gap_severity
FROM indicator_gaps ig
WHERE ig.gap_seconds > :max_gap_seconds * 0.5
ORDER BY ig.gap_seconds DESC;

```

Expected result: Zero SLA_BREACH or CRITICAL_GAP rows. Any positive results trigger CHECK LIQ-003 FAIL and SLA breach record (SLA-LIQ-001). Cross-reference with Technology system availability records to determine root cause.

G.6 Query Group 5 — Concentration and Run-Like Dynamics Indicators

QUERY CON-Q001 — Large-Holder Concentration Monitoring

Purpose: Identify participants whose holdings in any single instrument exceed the operator-defined concentration limit threshold, as a run-risk indicator.

```
-- QUERY CON-Q001: Large-Holder Concentration Monitoring
-- Input parameters: :as_of_date, :concentration_threshold_pct
```

```
WITH instrument_totals AS (
  SELECT
    instrument_id,
    SUM(quantity) AS total_outstanding
  FROM position_registry
  WHERE position_date = :as_of_date
  GROUP BY instrument_id
),
participant_holdings AS (
  SELECT
    pr.participant_id,
    pr.instrument_id,
    pr.quantity,
    it.total_outstanding,
    ROUND(
      100.0 * pr.quantity / NULLIF(it.total_outstanding, 0),
      4
    ) AS holding_pct
  FROM position_registry pr
  JOIN instrument_totals it
    ON pr.instrument_id = it.instrument_id
  WHERE pr.position_date = :as_of_date
)
SELECT
  ph.participant_id,
  ph.instrument_id,
  i.instrument_category,
  ph.quantity,
  ph.total_outstanding,
```

```

ph.holding_pct,
CASE
  WHEN ph.holding_pct >= :concentration_threshold_pct * 1.5
    THEN 'CRITICAL_CONCENTRATION'
  WHEN ph.holding_pct >= :concentration_threshold_pct
    THEN 'THRESHOLD_BREACH'
  WHEN ph.holding_pct >= :concentration_threshold_pct * 0.8
    THEN 'APPROACHING_THRESHOLD'
  ELSE 'WITHIN_LIMITS'
END
AS concentration_status
FROM participant_holdings ph
  JOIN instruments i ON ph.instrument_id = i.instrument_id
WHERE ph.holding_pct >= :concentration_threshold_pct * 0.8
ORDER BY ph.holding_pct DESC;

```

Expected result: Zero CRITICAL_CONCENTRATION or THRESHOLD_BREACH rows. APPROACHING_THRESHOLD rows should be monitored and documented in LIQ-3.003. Cross-reference with stress_indicators table for correlated run-risk indicator elevation.

QUERY CON-Q002 — Redemption Velocity Spike Detection

Purpose: Detect periods where redemption request velocity significantly exceeded the rolling average, a potential early indicator of run-like dynamics.

```

-- QUERY CON-Q002: Redemption Velocity Spike Detection
-- Input parameters: :period_start, :period_end,
--                   :spike_multiplier (default: 3.0 = 3x rolling average)

```

```

WITH daily_redemptions AS (
  SELECT
    DATE_TRUNC('day', h.hold_placement_ts)
    AS redemption_date,
    h.rail_id,
    COUNT(*)
    AS daily_request_count,
    SUM(h.affected_amount)
    AS daily_request_amount
  FROM hold_events h
  WHERE h.hold_type = 'REDEMPTION_REQUEST'
    AND h.hold_placement_ts BETWEEN :period_start AND :period_end

```

```

GROUP BY DATE_TRUNC('day', h.hold_placement_ts), h.rail_id
),
rolling_stats AS (
SELECT
  dr.redemption_date,
  dr.rail_id,
  dr.daily_request_count,
  dr.daily_request_amount,
  AVG(dr.daily_request_count) OVER (
    PARTITION BY dr.rail_id
    ORDER BY dr.redemption_date
    ROWS BETWEEN 6 PRECEDING AND 1 PRECEDING
  )
    AS rolling_7d_avg_count,
  AVG(dr.daily_request_amount) OVER (
    PARTITION BY dr.rail_id
    ORDER BY dr.redemption_date
    ROWS BETWEEN 6 PRECEDING AND 1 PRECEDING
  )
    AS rolling_7d_avg_amount
FROM daily_redemptions dr
)
SELECT
  rs.*,
  ROUND(
    rs.daily_request_count
    / NULLIF(rs.rolling_7d_avg_count, 0),
    2
  )
    AS count_vs_rolling_avg,
  ROUND(
    rs.daily_request_amount
    / NULLIF(rs.rolling_7d_avg_amount, 0),
    2
  )
    AS amount_vs_rolling_avg,
CASE
  WHEN rs.daily_request_count
    / NULLIF(rs.rolling_7d_avg_count, 0)

```

```

        >= :spike_multiplier * 2
    THEN 'CRITICAL_SPIKE'
WHEN rs.daily_request_count
    / NULLIF(rs.rolling_7d_avg_count, 0)
    >= :spike_multiplier
    THEN 'SPIKE_DETECTED'
WHEN rs.daily_request_count
    / NULLIF(rs.rolling_7d_avg_count, 0)
    >= :spike_multiplier * 0.7
    THEN 'ELEVATED_VELOCITY'
ELSE 'NORMAL'
END
AS velocity_assessment
FROM rolling_stats rs
WHERE rs.daily_request_count
    / NULLIF(rs.rolling_7d_avg_count, 0) >= :spike_multiplier * 0.7
ORDER BY rs.redemption_date ASC, rs.rail_id;

```

Expected result: CRITICAL_SPIKE or SPIKE_DETECTED rows should correlate with documented gate activations (LIQ-1.002) and stress indicator threshold breach records (LIQ-3.002). Any CRITICAL_SPIKE without a corresponding gate activation or supervisory notification is a CHECK LIQ-001 or LIQ-004 FAIL.

QUERY CON-Q003 — Intraday Liquidity Position Stress Trajectory

Purpose: Identify settlement rails where intraday liquidity ratios declined below defined thresholds or showed sustained stress trajectories during the period.

```

-- QUERY CON-Q003: Intraday Liquidity Stress Trajectory
-- Input parameters: :period_start, :period_end,
--                   :stress_threshold_pct (default: 25)

```

```

WITH hourly_liquidity AS (
    SELECT
        si.rail_id,
        si.measured_ts,
        si.indicator_value           AS liquidity_ratio_pct,
        AVG(si.indicator_value) OVER (
            PARTITION BY si.rail_id
            ORDER BY si.measured_ts

```

```

        ROWS BETWEEN 23 PRECEDING AND CURRENT ROW
    )
        AS rolling_24h_avg,
    MIN(si.indicator_value) OVER (
        PARTITION BY si.rail_id
        ORDER BY si.measured_ts
        ROWS BETWEEN 23 PRECEDING AND CURRENT ROW
    )
        AS rolling_24h_min
FROM stress_indicators si
WHERE si.indicator_type = 'INTRADAY_LIQUIDITY_RATIO'
    AND si.measured_ts BETWEEN :period_start AND :period_end
)
SELECT
    hl.rail_id,
    hl.measured_ts,
    hl.liquidity_ratio_pct,
    hl.rolling_24h_avg,
    hl.rolling_24h_min,
    CASE
        WHEN hl.liquidity_ratio_pct < :stress_threshold_pct / 2.0
            THEN 'CRITICAL_LOW'
        WHEN hl.liquidity_ratio_pct < :stress_threshold_pct
            THEN 'STRESS_THRESHOLD_BREACH'
        WHEN hl.liquidity_ratio_pct < :stress_threshold_pct * 1.5
            THEN 'APPROACHING_THRESHOLD'
        ELSE 'ADEQUATE'
    END
        AS liquidity_status,
    CASE
        WHEN hl.rolling_24h_avg < :stress_threshold_pct * 1.2
            AND hl.rolling_24h_min < :stress_threshold_pct
            THEN 'SUSTAINED_STRESS_PATTERN'
        ELSE 'NO_SUSTAINED_PATTERN'
    END
        AS trajectory_assessment
FROM hourly_liquidity hl
WHERE hl.liquidity_ratio_pct < :stress_threshold_pct * 1.5
ORDER BY hl.rail_id, hl.measured_ts ASC;

```

Expected result: CRITICAL_LOW rows should have triggered gate activations and supervisory notifications. SUSTAINED_STRESS_PATTERN rows require review of whether posture escalation to LIMITED or STRESS was appropriate.

G.7 Query Group 6 — TTL/Purpose Access Audit and Post-Access Review Completeness

QUERY ACC-Q001 — Examiner Access Event Audit Log

Purpose: Produce a complete log of all examiner access events in the period, with access tier, purpose, TTL, and post-access review status, for access control compliance review.

-- QUERY ACC-Q001: Examiner Access Event Audit Log

-- Input parameters: :period_start, :period_end

```
SELECT
    ea.request_id,
    ea.requesting_authority,
    ea.request_received_ts,
    ea.access_tier,
    ea.access_purpose,
    ea.access_ttl,
    ea.production_due_ts,
    ea.produced_ts,
    EXTRACT(EPOCH FROM (
        ea.produced_ts - ea.request_received_ts
    )) / 3600.0 AS production_hours,
    CASE
        WHEN ea.access_tier = 'TIER_2_ELEVATED'
            AND (
                SELECT COUNT(*)
                FROM examiner_access_auth eaa
                WHERE eaa.request_id = ea.request_id
            ) < 2
            THEN 'DUAL_AUTH_MISSING'
        WHEN ea.access_tier = 'TIER_2_ELEVATED'
            AND (
```

```

        SELECT COUNT(DISTINCT eaa.authorizing_actor_id)
        FROM examiner_access_auth eaa
        WHERE eaa.request_id = ea.request_id
    ) < 2
    THEN 'SAME_ACTOR_DUAL_AUTH'
    ELSE 'AUTH_COMPLIANT'
END
        AS authorization_check,
ea.post_access_review_due_ts,
ea.post_access_review_completed,
CASE
    WHEN ea.post_access_review_completed = FALSE
        AND CURRENT_TIMESTAMP > ea.post_access_review_due_ts
    THEN 'OVERDUE'
    WHEN ea.post_access_review_completed = FALSE
        AND CURRENT_TIMESTAMP > ea.post_access_review_due_ts
        - INTERVAL '5 days'
    THEN 'DUE_SOON'
    WHEN ea.post_access_review_completed = TRUE
    THEN 'COMPLETED'
    ELSE 'PENDING_NOT_DUE'
END
        AS review_status
FROM examiner_access ea
WHERE ea.request_received_ts BETWEEN :period_start AND :period_end
ORDER BY ea.request_received_ts DESC;

```

Expected result: All rows should show authorization_check = 'AUTH_COMPLIANT' and review_status ∈ ('COMPLETED', 'PENDING_NOT_DUE'). Any DUAL_AUTH_MISSING, SAME_ACTOR_DUAL_AUTH, or OVERDUE rows trigger Checks TTL-002 and TTL-004 findings.

QUERY ACC-Q002 — TTL Expiry Compliance Verification

Purpose: Detect any examiner access that persisted beyond the TTL specified in the Examiner Request Record; identify unauthorized or unmonitored post-TTL access.

-- QUERY ACC-Q002: TTL Expiry Compliance Verification

-- Input parameters: :period_start, :period_end

WITH access_events AS (

```

SELECT
    ae.request_id,
    ae.access_event_ts,
    er.access_ttl,
    er.access_tier,
    er.requesting_authority,
    er.access_purpose,
CASE
    WHEN ae.access_event_ts > er.access_ttl
        THEN EXTRACT(EPOCH FROM (
            ae.access_event_ts - er.access_ttl
        )) / 3600.0
    ELSE NULL
END AS hours_past_ttl,
EXISTS (
    SELECT 1
    FROM examiner_access er2
    WHERE er2.request_id != ae.request_id
        AND er2.requesting_authority = er.requesting_authority
        AND er2.request_received_ts > er.access_ttl
        AND er2.request_received_ts <= ae.access_event_ts
    ) AS renewed_access_exists
FROM examiner_access_events ae
JOIN examiner_access er
    ON ae.request_id = er.request_id
WHERE ae.access_event_ts BETWEEN :period_start AND :period_end
)
SELECT
    ae2.request_id,
    ae2.requesting_authority,
    ae2.access_tier,
    ae2.access_purpose,
    ae2.access_ttl,
    ae2.access_event_ts,
    ae2.hours_past_ttl,

```

```

ae2.renewed_access_exists,
CASE
  WHEN ae2.hours_past_ttl IS NOT NULL
    AND NOT ae2.renewed_access_exists
    THEN 'TTL_BREACH_NO_RENEWAL'
  WHEN ae2.hours_past_ttl IS NOT NULL
    AND ae2.renewed_access_exists
    THEN 'POST_TTL_WITH_RENEWAL_PRESENT'
  ELSE 'WITHIN_TTL'
END
AS ttl_compliance_status
FROM access_events ae2
WHERE ae2.hours_past_ttl IS NOT NULL
ORDER BY ae2.hours_past_ttl DESC;

```

Expected result: Zero TTL_BREACH_NO_RENEWAL rows. These are FAIL conditions for CHECK TTL-001. POST_TTL_WITH_RENEWAL_PRESENT rows are informational and should be cross-referenced with the renewal authorization record.

QUERY ACC-Q003 — Purpose Limitation Scope Violation Detection

Purpose: Identify examiner access events where artifacts accessed were outside the documented scope in the Examiner Request Record.

-- QUERY ACC-Q003: Purpose Limitation Scope Violation Detection

-- Input parameters: :period_start, :period_end

```

WITH requested_scope AS (
  SELECT
    er.request_id,
    er.requesting_authority,
    er.access_purpose,
    UNNEST(er.requested_trade_ids) AS requested_trade_id,
    er.requested_period_start,
    er.requested_period_end,
    er.requested_control_domains
  FROM examiner_access er
  WHERE er.request_received_ts BETWEEN :period_start AND :period_end
),

```

```

accessed_artifacts AS (
  SELECT
    eae.request_id,
    eae.artifact_ref,
    eae.artifact_trade_id_ref,
    eae.artifact_period_date,
    eae.artifact_control_domain,
    eae.access_event_ts
  FROM examiner_access_events eae
  WHERE eae.access_event_ts BETWEEN :period_start AND :period_end
)
SELECT
  aa.request_id,
  aa.artifact_ref,
  aa.artifact_trade_id_ref,
  aa.artifact_period_date,
  aa.artifact_control_domain,
  aa.access_event_ts,
CASE
  WHEN aa.artifact_trade_id_ref IS NOT NULL
    AND NOT EXISTS (
      SELECT 1 FROM requested_scope rs
      WHERE rs.request_id = aa.request_id
        AND rs.requested_trade_id = aa.artifact_trade_id_ref
    )
    AND NOT EXISTS (
      SELECT 1 FROM examiner_access er2
      WHERE er2.request_id = aa.request_id
        AND er2.requested_trade_ids @> ARRAY['ALL']
    )
  THEN 'OUT_OF_SCOPE_TRADE_ID'
  WHEN aa.artifact_control_domain IS NOT NULL
    AND NOT EXISTS (
      SELECT 1 FROM examiner_access er3
      WHERE er3.request_id = aa.request_id

```

```

        AND (
            er3.requested_control_domains @>
                ARRAY[aa.artifact_control_domain]
            OR er3.requested_control_domains @> ARRAY['ALL']
        )
    )
    THEN 'OUT_OF_SCOPE_DOMAIN'
    ELSE 'WITHIN_SCOPE'
END                                AS scope_check
FROM accessed_artifacts aa
WHERE -- Only return potential violations
    aa.artifact_trade_id_ref IS NOT NULL
    OR aa.artifact_control_domain IS NOT NULL
HAVING
    (
        aa.artifact_trade_id_ref IS NOT NULL
        -- scope violation logic applied via CASE above
    )
ORDER BY aa.access_event_ts DESC;

```

Expected result: Zero OUT_OF_SCOPE_TRADE_ID or OUT_OF_SCOPE_DOMAIN rows. These are FAIL conditions for CHECK TTL-003 and require immediate escalation to Senior Compliance Officer and Governance.

G.8 Query Group 7 — Yield Separation Boundary and Hold/Release Integrity

QUERY YLD-Q001 — P4 Tag Settlement Rail Scan

Purpose: Scan all settlement rail transaction metadata in the period for any appearance of P4 category tags; provides the underlying data for the YLD-2.001 EP artifact.

```

-- QUERY YLD-Q001: P4 Tag Settlement Rail Scan
-- Input parameters: :period_start, :period_end

```

```

SELECT
    d.dger_id,
    d.trade_id,
    d.gate_execution_ts,

```

```

d.cash_instrument_cat,
d.cash_leg_participant,
d.asset_leg_participant,
CASE
  WHEN d.cash_instrument_cat = 'P4'
    THEN 'P4_ON_SETTLEMENT_RAIL'
  WHEN d.cash_instrument_cat IS NULL
    THEN 'CATEGORY_MISSING'
  WHEN d.cash_instrument_cat NOT IN ('P1','P2','P3','P4')
    THEN 'INVALID_CATEGORY_CODE'
  ELSE 'COMPLIANT'
END
          AS boundary_check
FROM dger d
WHERE d.gate_execution_ts BETWEEN :period_start AND :period_end
  AND (
    d.cash_instrument_cat = 'P4'
    OR d.cash_instrument_cat IS NULL
    OR d.cash_instrument_cat NOT IN ('P1','P2','P3','P4')
  )
ORDER BY d.gate_execution_ts DESC;

```

Expected result: Zero rows (zero non-compliant entries). Any P4_ON_SETTLEMENT_RAIL rows are FAIL conditions for CHECK YLD-001 and require immediate escalation.

QUERY HLD-Q001 — Hold Placement and Release Authorization Completeness

Purpose: Verify that every hold placement has the required dual-authorization record and every hold release has the required clearance documentation and dual-authorization record.

-- QUERY HLD-Q001: Hold Authorization Completeness

-- Input parameters: :period_start, :period_end

```

SELECT
  he.hold_id,
  he.event_type,
  he.hold_placement_ts,
  he.release_ts,
  he.hold_type,

```

```

he.affected_participant_id,
he.affected_amount,
-- Authorization count check
(
  SELECT COUNT(DISTINCT hea.authorizing_actor_id)
  FROM hold_event_auth hea
  WHERE hea.hold_id = he.hold_id
    AND hea.auth_type = he.event_type
)
                                AS distinct_authorizing_actors,
-- Timestamp ordering check
(
  SELECT MIN(hea.authorization_ts)
  FROM hold_event_auth hea
  WHERE hea.hold_id = he.hold_id
    AND hea.auth_type = he.event_type
)
                                AS earliest_auth_ts,
CASE
  WHEN he.event_type = 'PLACEMENT' THEN he.hold_placement_ts
  WHEN he.event_type = 'RELEASE'   THEN he.release_ts
END
                                AS execution_ts,
CASE
  WHEN (
    SELECT COUNT(DISTINCT hea.authorizing_actor_id)
    FROM hold_event_auth hea
    WHERE hea.hold_id = he.hold_id
      AND hea.auth_type = he.event_type
  ) < 2
  THEN 'INSUFFICIENT_AUTHORIZATION'
  WHEN (
    SELECT MIN(hea.authorization_ts)
    FROM hold_event_auth hea
    WHERE hea.hold_id = he.hold_id
      AND hea.auth_type = he.event_type
  ) > CASE
    WHEN he.event_type = 'PLACEMENT' THEN he.hold_placement_ts

```

```

        WHEN he.event_type = 'RELEASE' THEN he.release_ts
    END
    THEN 'AUTH_AFTER_EXECUTION'
    ELSE 'AUTHORIZATION_COMPLIANT'
END AS auth_check
FROM hold_events he
WHERE he.hold_placement_ts BETWEEN :period_start AND :period_end
    OR he.release_ts BETWEEN :period_start AND :period_end
HAVING
    (
        SELECT COUNT(DISTINCT hea.authorizing_actor_id)
        FROM hold_event_auth hea
        WHERE hea.hold_id = he.hold_id
    ) < 2
    OR (
        SELECT MIN(hea.authorization_ts)
        FROM hold_event_auth hea
        WHERE hea.hold_id = he.hold_id
    ) > COALESCE(he.release_ts, he.hold_placement_ts)
ORDER BY he.hold_placement_ts DESC;

```

Expected result: Zero rows. Any INSUFFICIENT_AUTHORIZATION or AUTH_AFTER_EXECUTION rows are FAIL conditions for the hold/release controls and require immediate escalation to Governance.

G.9 Query Group 8 — Cross-Cutting: Preservation Bundle Coverage and EP-Delta Chain Audit

QUERY PRS-Q001 — Preservation Bundle Trigger-to-Bundle Coverage Gap

Purpose: Identify any qualifying trigger event (ES-FF fault, FS-04 reversion, CRITICAL/HIGH incident) that does not have a corresponding preservation bundle within the SLA-DvP-009 window.

```

-- QUERY PRS-Q001: Preservation Bundle Coverage Gap Detection
-- Input parameters: :period_start, :period_end,
--                   :sla_minutes (default: 60)

```

```

WITH qualifying_triggers AS (

```

```

-- ES-FF fault events
SELECT
    es.escrow_id                AS event_id,
    'ES_FF_FAULT'              AS trigger_type,
    es.entered_ts              AS trigger_ts,
    e.trade_id                 AS trade_ref
FROM escrow_states es
    JOIN escrow e ON es.escrow_id = e.escrow_id
WHERE es.state_id = 'ES-FF'
    AND es.entered_ts BETWEEN :period_start AND :period_end

UNION ALL

-- FS-04 reversion events
SELECT
    f.fer_id                   AS event_id,
    'FS_04_REVERSION'        AS trigger_type,
    fc.entered_ts             AS trigger_ts,
    f.trade_id                AS trade_ref
FROM fer f
    JOIN fer_state_history fc
        ON f.fer_id = fc.fer_id
        AND fc.state_id = 'FS-04'
WHERE fc.entered_ts BETWEEN :period_start AND :period_end

UNION ALL

-- CRITICAL and HIGH incidents
SELECT
    i.incident_id             AS event_id,
    'INCIDENT_' || i.severity AS trigger_type,
    i.declared_ts            AS trigger_ts,
    NULL                      AS trade_ref
FROM incidents i
WHERE i.severity IN ('CRITICAL','HIGH')

```

```

        AND i.declared_ts BETWEEN :period_start AND :period_end
    )
SELECT
    qt.event_id,
    qt.trigger_type,
    qt.trigger_ts,
    qt.trade_ref,
    pb.bundle_id,
    pb.generated_ts,
    EXTRACT(EPOCH FROM (
        pb.generated_ts - qt.trigger_ts
    )) / 60.0                                AS minutes_to_bundle,
    CASE
        WHEN pb.bundle_id IS NULL
            THEN 'NO_BUNDLE_GENERATED'
        WHEN EXTRACT(EPOCH FROM (
            pb.generated_ts - qt.trigger_ts
        )) / 60.0 > :sla_minutes
            THEN 'BUNDLE_GENERATED_LATE'
        ELSE 'BUNDLE_ON_TIME'
    END                                        AS coverage_status
FROM qualifying_triggers qt
    LEFT JOIN preservation_bundles pb
        ON pb.triggering_event_ref = qt.event_id
ORDER BY qt.trigger_ts ASC;

```

Expected result: Zero NO_BUNDLE_GENERATED rows (FAIL for CHECK PRV-001). Zero BUNDLE_GENERATED_LATE rows exceeding SLA-DvP-009 (FLAG condition). All qualifying trigger events should have on-time bundles.

QUERY EP-Q001 — EP-Delta Chain Completeness and Orphan Detection

Purpose: Verify that the EP-Delta chain for each domain is complete, correctly chained, and free of orphaned deltas (deltas referencing non-existent parent EPs or prior deltas).

```

-- QUERY EP-Q001: EP-Delta Chain Completeness Audit
-- Input parameters: :period_start, :period_end

```

```

WITH delta_chain AS (
  SELECT
    epd.delta_id,
    epd.parent_ep_id,
    epd.prior_delta_id,
    epd.delta_type,
    epd.delta_ts,
    epd.cumulative_all_sections_complete,
    -- Check parent EP exists
  EXISTS (
    SELECT 1 FROM evidence_packs ep
    WHERE ep.ep_id = epd.parent_ep_id
  )
    AS parent_ep_exists,
    -- Check prior delta exists (if not first delta)
  CASE
    WHEN epd.prior_delta_id IS NULL
      THEN TRUE
    ELSE EXISTS (
      SELECT 1 FROM ep_deltas pd
      WHERE pd.delta_id = epd.prior_delta_id
    )
  END
    AS prior_delta_exists,
    -- Check no gaps in prior_delta chain
  CASE
    WHEN epd.prior_delta_id IS NULL
      THEN 'FIRST_DELTA'
    WHEN EXISTS (
      SELECT 1 FROM ep_deltas pd
      WHERE pd.delta_id = epd.prior_delta_id
        AND pd.parent_ep_id = epd.parent_ep_id
    )
      THEN 'CHAIN_INTACT'
    ELSE 'CHAIN_BREAK'
  END
    AS chain_status
  FROM ep_deltas epd

```

```

WHERE epd.delta_ts BETWEEN :period_start AND :period_end
)
SELECT
  dc.*,
  CASE
    WHEN NOT dc.parent_ep_exists      THEN 'ORPHANED_DELTA_NO_PARENT'
    WHEN NOT dc.prior_delta_exists    THEN 'ORPHANED_DELTA_NO_PRIOR'
    WHEN dc.chain_status = 'CHAIN_BREAK'
                                     THEN 'CHAIN_BREAK_DETECTED'
    WHEN NOT dc.cumulative_all_sections_complete
                                     THEN 'INCOMPLETE_EP_AFTER_DELTA'
    ELSE 'CHAIN_COMPLIANT'
  END
  AS audit_result
FROM delta_chain dc
WHERE NOT dc.parent_ep_exists
  OR NOT dc.prior_delta_exists
  OR dc.chain_status = 'CHAIN_BREAK'
  OR NOT dc.cumulative_all_sections_complete
ORDER BY dc.delta_ts ASC;

```

Expected result: Zero ORPHANED_DELTA_NO_PARENT, ORPHANED_DELTA_NO_PRIOR, or CHAIN_BREAK_DETECTED rows. INCOMPLETE_EP_AFTER_DELTA rows require investigation to determine whether pending sections have documented expected_resolution_ts values.

G.10 Query Execution Notes for Examiners

G.10.1 General Guidance

1. **All queries are conceptual.** Field names, table structures, and join logic must be mapped to the operator's actual data model before execution. Operators must provide schema documentation enabling this mapping as part of any EP-EXAM production.
2. **Period parameters.** Queries accept :period_start and :period_end as ISO-8601 datetime inputs. For point-in-time checks (e.g., DVP-Q002), set both parameters to the same date.
3. **No query result is self-conclusive.** A positive detection result (non-empty result set in detection queries) initiates an investigation; it does not establish a violation. Results must be cross-referenced with authorization records, compliance queue entries, and incident records before conclusions are drawn.

4. **Hash verification queries** (DVP-007, FIN-005) require the operator's hash verification infrastructure to be accessible. Hash values in the logical schema represent the output of the operator's defined hash algorithm (SHA-256 minimum); the examiner should confirm the algorithm specification before executing or interpreting hash-related checks.
5. **Null handling.** Several queries use NULLIF and COALESCE to handle null timestamps in unresolved records. Null values in `release_confirmed_ts` fields should always be treated as potential exceptions pending investigation, not as acceptable data states.

G.10.2 Recommended Query Execution Sequence

For a standard examination covering a quarterly period, the following sequence is recommended:

Step	Queries	Purpose
1	DVP-Q002	Assess gate failure landscape before diving into individual trades
2	SWP-Q003	Population-level settlement symmetry; identify scope for SWP-Q001/Q002
3	SWP-Q001, SWP-Q002	Detailed asymmetric release investigation for any non-zero SWP-Q003 counts
4	FIN-Q001	Finality state distribution; scope FS-03/FS-04/FS-05 investigation
5	FIN-Q002	Finality condition failure patterns; prioritize F1-group failures
6	FIN-Q003	Stale finality FERs; SLA compliance check
7	DVP-Q001	Trade-level lifecycle trace for any trades flagged in steps 2–6
8	LIQ-Q001	Gate activation timeline; verify authorization discipline
9	LIQ-Q002	Queue integrity for any activation periods in LIQ-Q001
10	CON-Q001, CON-Q002	Concentration and run-dynamics indicators
11	YLD-Q001	Yield separation scan; zero-tolerance check
12	HLD-Q001	Hold authorization completeness
13	ACC-Q001, ACC-Q002, ACC-Q003	Access audit; TTL and purpose limitation compliance
14	PRS-Q001	Preservation bundle coverage; trigger-to-bundle gap detection
15	EP-Q001	EP-Delta chain integrity

G.10.3 Examiner Query Pack Version Control

This query pack is maintained under change control per Section C.6 of the Constitution (Material Change Triggers for Finality Logic) and the equivalent governance framework for operational controls. Any modification to query logic, added queries, or removal of queries constitutes a material change requiring a Change Control Board record and an EP Delta of type MATERIAL_CHANGE. The current version, effective date, and change history are recorded in the operator's change management log.

Appendix H — Stress Mode Playbooks: Liquidity Gates, Queues, and Unwind

Classification: Operational Playbook — Paste-Ready

Baseline Anchors: Baseline C (FCCK Pilot Operational Assurance Artifacts Addendum, 20260113); Baseline D (FCCK Companion Stable-Value Oversight, 20260217); Baseline B (Operationalization Track, Dec 2025)

Disclaimer: This appendix is non-normative operational guidance. It does not make legal conclusions, does not claim legal finality, and does not supersede applicable regulatory obligations. All references to "finality" mean "operational finality conditions met" as defined in the body of this constitution.

H.1 Purpose and Scope

This appendix provides paste-ready stress mode playbooks for three interconnected operational scenarios that may arise in stable-value settlement rails and tokenized deposit environments:

1. **Liquidity Gate Activation** — triggered when redemption pressure, funding shortfalls, or concentration thresholds breach defined operational limits.
2. **Settlement Queue Management** — triggered when DvP settlement volume, sequencing conflicts, or funding unavailability requires ordered queuing and prioritization.
3. **Controlled Unwind** — triggered when a partial DvP position, liquidity gate, or settlement queue must be safely dissolved without data loss, open breaks, or unresolved obligations.

Each playbook specifies: trigger conditions, actors and RACI, step-by-step procedures, evidence outputs, escalation ladder, and exit criteria. All procedures align with the baseline phased posture (Normal → Limited → Stress → Offboarding) established in Baseline D and the hold/release and incident response frameworks in Baseline B.

H.2 Operational Stress Posture Reference

All three playbooks operate against the following four-state posture matrix, which must be declared and logged as a system-level state variable:

Posture State	Definition	Settlement Operations	Redemption Operations	Examiner Notification
NORMAL	All funding, liquidity, and concentration metrics within defined thresholds	Full DvP permitted	Full redemptions permitted	Routine reporting cadence
LIMITED	One or more secondary metrics breaching soft threshold; primary metrics within bounds	DvP permitted with enhanced gate checks	Redemptions subject to queue review	Notify within 24 hours of LIMITED declaration
STRESS	Primary funding or concentration metric breaching hard threshold; or two or more secondary metrics simultaneously breached	New DvP submissions suspended; in-flight DvP held in	Redemptions suspended pending gate review; queued	Notify within 2 hours of STRESS declaration

Posture State	Definition	Settlement Operations	Redemption Operations	Examiner Notification
		queue	FIFO	
OFFBOARDING	Controlled wind-down initiated (planned or regulatory direction)	No new submissions; existing queue processed to zero or transferred	Controlled redemption schedule per offboarding plan	Immediate notification; continuous updates per Appendix I

State transition authority: Posture state changes require dual approval (Settlement Operator + Compliance Officer), are immutably logged with timestamp and approver identities, and generate an EP Delta (Evidence Pack Delta) tagged STRESS_STATE_CHANGE.

H.3 Playbook H-1: Liquidity Gate Activation and Management

H.3.1 Trigger Conditions

A Liquidity Gate activation event is triggered when **any one** of the following hard-threshold conditions is detected by the continuous monitoring layer:

Trigger ID	Metric	Hard Threshold	Soft Threshold (Warning)	Data Source
LG-T01	Aggregate redemption requests as % of outstanding stable-value instrument balance (rolling 24-hour window)	≥ 15%	≥ 8%	Reconciliation ledger + custodian position report
LG-T02	Single-holder concentration as % of outstanding balance	≥ 25%	≥ 15%	Position registry
LG-T03	Intraday funding shortfall: cash-leg available vs. queued settlement obligations	Available < 90% of queued obligations	Available < 95%	Funding availability monitor
LG-T04	Redemption queue depth: number of pending redemption requests	≥ 50 concurrent requests	≥ 25 concurrent requests	Redemption queue log
LG-T05	Counterparty funding source failure: one or more primary funding sources unavailable	Any primary source unavailable > 30 min	Any primary source degraded	Funding source health monitor

Soft threshold breach → posture transitions to LIMITED; enhanced monitoring activated; no gate imposed.

Hard threshold breach → posture transitions to STRESS; Liquidity Gate activated per H.3.2.

H.3.2 Step-by-Step Liquidity Gate Activation

Phase 1 — Detection and Declaration (Target: ≤ 15 minutes from trigger event)

Step	Actor	Action	Evidence Output
LG-A01	Monitoring System	Automated detection of hard threshold breach; generate ALERT_LG_[TriggerID]_[Timestamp] event to compliance queue	Immutable alert log entry; EP tag: LG_ALERT
LG-A02	Settlement Operator (on-call)	Acknowledge alert within 10 minutes; validate that trigger is not a data error or monitoring system fault	Acknowledgment log entry; validation note
LG-A03	Settlement Operator	If validated, prepare dual-approval gate activation request: identify trigger ID, current metric value, threshold exceeded, proposed gate scope	Gate Activation Request form (template H.3.5)
LG-A04	Compliance Officer	Review and co-approve gate activation request; confirm gate scope is proportionate to trigger condition	Approval signature; co-approval log entry
LG-A05	Settlement Operator + Compliance Officer	Execute posture state transition: NORMAL/LIMITED → STRESS; immutably log state change with both approver identities and timestamp	State transition log; EP Delta: STRESS_STATE_CHANGE
LG-A06	Settlement Operator	Activate Liquidity Gate: suspend acceptance of new redemption requests at submission interface; apply hold-only mode to in-flight redemptions not yet in settlement	Gate active log; hold application confirmations
LG-A07	Compliance Officer	Issue supervisory notification within 2 hours per baseline notification SLA	Notification record with timestamp; recipient confirmation

Phase 2 — Queue Stabilization (Target: ≤ 60 minutes from gate activation)

Step	Actor	Action	Evidence Output
LG-B01	Settlement Operator	Generate queue snapshot: full inventory of pending redemptions (amount, participant ID, timestamp, DvP lock status)	Queue Snapshot manifest (template H.3.6); EP tag: LG_QUEUE_SNAPSHOT
LG-B02	Settlement Operator	Classify queued items: (a) DvP-locked — asset leg already locked, cash leg unavailable; (b) Pre-lock — submission received, not yet locked; (c) Timeout-approaching — within 30 minutes of lock timeout	Classification log; three-category manifest
LG-B03	Compliance Officer	Review concentration: identify any single participant with > 20% of queued redemption value; flag for enhanced review	Concentration review note; flagged items list
LG-B04	Settlement	Apply sequenced processing posture:	Processing sequence log; escalation

Step	Actor	Action	Evidence Output
	Operator	DvP-locked items processed first (in timestamp order); pre-lock items held; timeout-approaching items escalated to Governance Officer for hold-extension or release decision	records
LG-B05	Governance Officer	For timeout-approaching DvP items: decide hold-extend (up to operator-configured maximum) or controlled release (return to pre-lock state, notify participant)	Hold extension log OR controlled release log
LG-B06	Settlement Operator	Update queue status display; provide participant-facing queue position and estimated processing timeline (redacted to remove third-party information)	Queue status log; participant notifications

Phase 3 — Gate Management and Review (Continuous while gate is active)

Step	Actor	Action	Cadence	Evidence Output
LG-C01	Monitoring System	Re-evaluate all trigger metrics against thresholds	Every 15 minutes	Metric log entries
LG-C02	Settlement Operator	Review metric trend: improving, stable, or deteriorating	Every 30 minutes	Trend assessment log
LG-C03	Compliance Officer	If gate has been active ≥ 4 hours: mandatory senior escalation; brief Governance Officer; update supervisory notification	At 4-hour mark, then every 4 hours	Escalation log; updated notification
LG-C04	Governance Officer	If gate active ≥ 8 hours: assess whether offboarding posture is warranted; document decision and rationale	At 8-hour mark	Governance decision log
LG-C05	Settlement Operator	Maintain running EP Delta log of all gate management actions	Continuous	Running EP Delta: LG_MANAGEMENT

Phase 4 — Gate Deactivation (Triggered when all hard-threshold metrics return to \leq soft-threshold levels for a sustained period of ≥ 30 consecutive minutes)

Step	Actor	Action	Evidence Output
LG-D01	Monitoring System	Automated detection of sustained metric recovery; generate ALERT_LG_RECOVERY_[Timestamp]	Recovery alert log entry
LG-D02	Settlement Operator	Validate recovery is sustained (not momentary); review funding source health	Validation note
LG-D03	Settlement Operator + Compliance Officer	Dual-approve gate deactivation; execute posture state transition: STRESS \rightarrow LIMITED or NORMAL per current metric levels	Deactivation approval log; state transition log; EP Delta: STRESS_STATE_CHANGE
LG-D04	Settlement	Resume acceptance of redemption	Resume log; queue drain

Step	Actor	Action	Evidence Output
	Operator	submissions in controlled manner: process queued items first before accepting new submissions	confirmation
LG-D05	Compliance Officer	Issue supervisory notification of gate deactivation within 2 hours; include gate duration, number of redemptions processed during gate, open breaks (if any)	Closure notification with timestamp
LG-D06	Settlement Operator	Generate post-gate Evidence Pack: full record of gate lifecycle from trigger to deactivation	EP: LG_LIFECYCLE_[GateID]

H.3.3 Escalation Ladder

Duration	Escalation Level	Action Required
0–2 hours	Settlement Operator + Compliance Officer	Gate managed per standard procedure; supervisory notification issued
2–4 hours	+ Governance Officer briefed	Governance Officer receives status summary; no decision required unless posture change warranted
4–8 hours	Governance Officer active oversight	Mandatory senior review; updated supervisory notification; offboarding assessment begins
> 8 hours	+ Senior Management escalation	Senior Management formally notified; decision on offboarding posture required; enhanced supervisory coordination
Gate not resolved within 24 hours	Regulatory escalation	Formal written update to examiner; offboarding posture presumed unless explicitly reversed with documented rationale

H.3.4 Evidence Outputs for Liquidity Gate Events

Evidence Item	Tag	Content	Retention
Gate Activation Request form	LG_GATE_REQUEST	Trigger ID, metric value, threshold, scope, requestor, co-approver, timestamp	7 years
Gate Activation Log	LG_GATE_ACTIVE	State transition record, approver identities, timestamp, trigger reference	7 years
Queue Snapshot manifest	LG_QUEUE_SNAPSHOT	Full inventory at gate activation: amounts, classification, DvP lock status	7 years
Running EP Delta	LG_MANAGEMENT	All gate management actions in chronological order	7 years
Post-gate EP	LG_LIFECYCLE_[Gate ID]	Full gate lifecycle record; open breaks list; participant notifications	Indefinite (material event)
Supervisory	LG_NOTIFY	Notification content, timestamp,	7 years

Evidence Item	Tag	Content	Retention
notifications		recipient, delivery confirmation	

H.3.5 Gate Activation Request Template (Paste-Ready)

LIQUIDITY GATE ACTIVATION REQUEST

Gate Request ID: LG-REQ-[YYYYMMDD]-[NNN]

Timestamp (UTC):

Requesting Actor: [Settlement Operator Name / Role]

TRIGGER

Trigger ID: [LG-T01 / LG-T02 / LG-T03 / LG-T04 / LG-T05]

Trigger Description:

Current Metric Value:

Hard Threshold Value:

Data Source Reference:

Monitoring Alert Reference:

PROPOSED GATE SCOPE

Redemption suspension: [YES / NO]

New DvP submission suspension: [YES / NO]

In-flight DvP hold-only mode: [YES / NO]

Participant notification: [YES / NO – if YES, draft attached]

Other scope items:

PROPORTIONALITY ASSESSMENT

Brief rationale that gate scope is proportionate to trigger condition:

CO-APPROVAL (Compliance Officer)

Name:

Timestamp (UTC):

Signature / Digital Attestation Reference:

STATE TRANSITION

From: [NORMAL / LIMITED]

To: STRESS

Effective timestamp (UTC):

H.3.6 Queue Snapshot Manifest Template (Paste-Ready)

LIQUIDITY GATE – QUEUE SNAPSHOT MANIFEST

Gate ID: LG-[YYYYMMDD]-[NNN]

Snapshot Timestamp (UTC):

Generated By: [Settlement Operator Name]

SUMMARY

Total items in queue:

Total queued redemption value (notional):

Category A – DvP-Locked items: [count] / [value]

Category B – Pre-Lock items: [count] / [value]

Category C – Timeout-Approaching items (≤ 30 min): [count] / [value]

CATEGORY A – DvP-LOCKED ITEMS (asset leg locked, cash leg unavailable)

Item ID	Participant Ref	Amount	Lock Timestamp	Lock Timeout	Status
----- ----- ----- ----- ----- -----					
...

CATEGORY B – PRE-LOCK ITEMS (submission received, not yet locked)

Item ID	Participant Ref	Amount	Submission Timestamp	Status
----- ----- ----- ----- -----				
...

CATEGORY C – TIMEOUT-APPROACHING ITEMS

Item ID	Participant Ref	Amount	Lock Timestamp	Minutes to Timeout	Escalation Required
----- ----- ----- ----- ----- -----					
| ...	| ...	| ...	| ...	| ...	| YES

CONCENTRATION FLAGS (items flagged per LG-B03)

Participant Ref	% of Total Queue Value	Flag Reason
----- ----- -----		

| ... | ... | ... |

ATTESTATION

Prepared by (Settlement Operator): _____ Timestamp (UTC): _____

Reviewed by (Compliance Officer): _____ Timestamp (UTC): _____

Manifest Hash (SHA-256): _____

H.4 Playbook H-2: Settlement Queue Management

H.4.1 Purpose

This playbook governs the ordered management of DvP settlement submissions when normal straight-through processing is unavailable or suspended. A settlement queue may be activated independently of a Liquidity Gate (e.g., due to sequencing conflicts, system maintenance, or intraday funding constraints) or in conjunction with a Liquidity Gate event.

H.4.2 Queue Activation Triggers

Trigger ID	Condition	Queue Type Activated
SQ-T01	Posture state transition to STRESS (Liquidity Gate)	Redemption queue + DvP queue
SQ-T02	Scheduled maintenance window affecting settlement layer	DvP queue only
SQ-T03	Sequencing conflict: two or more DvP submissions referencing the same asset-leg token	DvP conflict queue
SQ-T04	Intraday funding window not yet open (e.g., pre-market); submissions received outside settlement hours	DvP time-gate queue
SQ-T05	Governance decision to impose orderly processing during large-lot settlement	Priority queue

H.4.3 Queue Processing Principles

The following prioritization order governs queue processing in all queue types unless an alternate Governance Officer-approved ordering is documented and logged:

1. **Timeout-critical DvP items** — items within 30 minutes of lock timeout, processed in timestamp order.
2. **DvP-locked items** — asset leg already locked; cash leg now available; processed in timestamp order.
3. **Priority-flagged items** — items flagged by Governance Officer with documented rationale; processed per flag priority.
4. **Pre-lock standard items** — processed in timestamp order (FIFO).
5. **Redemption queue items** — processed after DvP queue is cleared or stabilized.

Any deviation from this order requires documented Governance Officer approval and is logged as an EP Delta tagged SQ_ORDER_EXCEPTION.

H.4.4 Step-by-Step Queue Management

Step	Actor	Action	Evidence Output
SQ-A01	Settlement Operator	Activate queue per trigger; log queue ID, trigger reference, activation timestamp	Queue activation log; EP tag: SQ_ACTIVE
SQ-A02	Settlement Operator	Ingest all in-flight and pending submissions; assign queue position per prioritization order	Queue position assignment log
SQ-A03	Settlement Operator	Generate initial Queue Status Report (template H.4.6)	Queue Status Report: SQ_STATUS_[QueueID]
SQ-A04	Settlement Operator	For conflict-queue items (SQ-T03): identify conflicting submissions; notify affected participants; place conflicting items in HOLD_CONFLICT state pending resolution	Conflict hold log; participant notifications
SQ-A05	Compliance Officer	For conflict-queue items: review hold authority; confirm hold is proportionate and documented with legal authority basis	Conflict hold approval log
SQ-A06	Settlement Operator	Process queue items in prioritization order; for each item processed: log DvP execution or rejection with reason	Per-item processing log; EP Delta: SQ_PROCESSING
SQ-A07	Settlement Operator	Update queue position and estimated processing time every 30 minutes while queue is active	Updated Queue Status Report: cadence log
SQ-A08	Settlement Operator	For items approaching lock timeout: escalate to Governance Officer per H.3.2 Phase 2 Step LG-B05	Escalation log
SQ-A09	Settlement Operator	On queue drain (zero items remaining) or queue suspension: generate Queue Closure Report	Queue Closure Report: SQ_CLOSURE_[QueueID]
SQ-A10	Compliance Officer	Review Queue Closure Report; confirm open breaks = 0 or document any residual items	Closure review sign-off; open breaks log

H.4.5 Queue Integrity Checks (Automated, Run at Each Queue Processing Cycle)

Check ID	Description	Pass Condition	Fail Action
SQ-CHK-01	Every item in queue has a unique submission ID	No duplicates detected	Suspend duplicate; log SQ_DUPLICATE_ALERT; notify Settlement Operator
SQ-CHK-02	Every DvP-locked item has a matching asset-leg lock record	1:1 lock-record match confirmed	Place item in HOLD_MISMATCH; escalate
SQ-CHK-03	No item has been in queue beyond operator-configured maximum hold duration	All items within TTL	Generate SQ_TTL_BREACH alert; escalate to Governance Officer
SQ-CHK-04	Queue position ordering matches declared prioritization order	Positions consistent with rules	Reorder queue; log reorder event with justification
SQ-CHK-05	All HOLD_CONFLICT items	Every conflict	Flag missing authority; escalate to

Check ID	Description	Pass Condition	Fail Action
	have a documented hold authority reference	hold has a hold authority ID	Compliance Officer

H.4.6 Queue Status Report Template (Paste-Ready)

SETTLEMENT QUEUE STATUS REPORT

Queue ID: SQ-[YYYYMMDD]-[NNN]

Report Timestamp (UTC):

Reporting Cycle: [Initial / Update NNN / Closure]

Prepared By: [Settlement Operator Name]

QUEUE STATE

Activation Trigger: [SQ-T01 / SQ-T02 / SQ-T03 / SQ-T04 / SQ-T05]

Queue Type(s) Active: [DVP / Redemption / Conflict / Time-gate / Priority]

Current Posture State: [NORMAL / LIMITED / STRESS / OFFBOARDING]

QUEUE INVENTORY

Position	Item ID	Category	Amount (Notional)	Submission Timestamp	DvP Lock Status	Estimated Processing	Status
| 1	| ...	| ...	| ...	| ...	| ...	| ...	| ...
...

INTEGRITY CHECK RESULTS (current cycle)

SQ-CHK-01 (Duplicate IDs): [PASS / FAIL – details]

SQ-CHK-02 (Lock record match): [PASS / FAIL – details]

SQ-CHK-03 (TTL compliance): [PASS / FAIL – details]

SQ-CHK-04 (Position ordering): [PASS / FAIL – details]

SQ-CHK-05 (Conflict hold authority): [PASS / PASS-N/A / FAIL – details]

OPEN ITEMS REQUIRING ESCALATION

[List any items requiring Governance Officer attention]

ATTESTATION

Prepared by (Settlement Operator): _____ Timestamp (UTC): _____

Hash of this report (SHA-256): _____

H.5 Playbook H-3: Controlled Unwind

H.5.1 Purpose

A controlled unwind is the deliberate dissolution of an operational state — a partial DvP position, an active liquidity gate, or a settlement queue — in a manner that preserves all evidence, resolves all obligations (or documents unresolvable residuals), and produces a verifiable "open breaks = 0" attestation or an explicit enumerated list of documented residuals. Unwind is distinct from offboarding: unwind restores a specific operational state to a prior baseline; offboarding winds down the entire program (see Appendix I).

H.5.2 Unwind Type Matrix

Unwind Type	Trigger	Target End State
Partial DvP Unwind (H.5.3)	DvP timeout; mismatch detected; asset-leg lock without cash-leg; governance decision	Asset-leg lock released; cash-leg hold released; both legs returned to pre-lock state; participants notified; EP produced
Liquidity Gate Unwind (H.5.4)	Gate deactivation criteria met; governance decision to deactivate gate early; Offboarding decision	Gate deactivated; all queued redemptions processed, transferred, or explicitly documented as residual; posture returned to NORMAL or OFFBOARDING
Settlement Queue Unwind (H.5.5)	Queue drain complete; posture state change; governance decision	All items processed, returned, or explicitly documented; queue closed; Queue Closure Report issued

H.5.3 Partial DvP Unwind Procedure

Applicable to: DvP items in states: LOCK_TIMEOUT, LOCK_MISMATCH, LOCK_NO_CASHLEG, GOVERNANCE_UNWIND.

Step	Actor	Action	Evidence Output
DU-01	Settlement Operator	Identify item(s) subject to unwind; record unwind trigger (timeout, mismatch, governance decision)	Unwind initiation log; EP tag: DU_INITIATE
DU-02	Settlement Operator	Verify current lock state for each leg: confirm asset-leg lock record and cash-leg lock/hold record	Lock state verification log
DU-03	Compliance Officer	Confirm unwind authority: for governance-decision unwinds, dual approval required; for timeout/mismatch unwinds, single Settlement Operator action with Compliance Officer notification within 30 minutes	Authority log
DU-04	Settlement Operator	Execute asset-leg release: send release instruction to asset-leg lock contract/module; confirm release acknowledgment	Asset-leg release log with confirmation
DU-05	Settlement Operator	Execute cash-leg release: remove cash-leg hold; confirm funds returned to originating	Cash-leg release log with confirmation

Step	Actor	Action	Evidence Output
		account	
DU-06	Settlement Operator	Run reconciliation check: confirm asset-leg quantity returned to pre-lock position; confirm cash-leg balance restored to pre-lock level	Reconciliation confirmation log
DU-07	Settlement Operator	If reconciliation check fails: do NOT proceed; escalate immediately to Governance Officer and Compliance Officer; place item in HOLD_UNWIND_FAIL state	Escalation log; HOLD_UNWIND_FAIL record
DU-08	Settlement Operator	Notify affected participants: asset-leg and cash-leg participants both notified of unwind and reason	Participant notification log
DU-09	Settlement Operator + Compliance Officer	Generate DvP Unwind EP for each unwound item	EP: DU_RECORD_[ItemID]; retained 7 years
DU-10	Compliance Officer	Aggregate unwind events in daily Unwind Summary; include in EP Delta batch	EP Delta: DU_DAILY_SUMMARY

Reconciliation Check Criteria (Step DU-06):

- Asset-leg: token balance in originating account = pre-lock balance \pm zero tolerance.
- Cash-leg: account balance = pre-lock balance (plus any accrued settlement fees where applicable, per disclosed terms).
- Timestamp delta between lock and release logged and within operator-configured maximum lock duration.

H.5.4 Liquidity Gate Unwind Procedure

This procedure is executed at gate deactivation (planned or triggered) to confirm that no obligations remain in an unresolved state.

Step	Actor	Action	Evidence Output
GU-01	Settlement Operator	At gate deactivation decision: take final queue snapshot (identical format to H.3.6)	Final Queue Snapshot: LG_FINAL_SNAPSHOT_[GateID]
GU-02	Settlement Operator	Process all remaining queued items in prioritization order; for each item: execute DvP or execute partial DvP unwind per H.5.3 as applicable	Per-item processing/unwind logs
GU-03	Settlement Operator	For items that cannot be processed (participant-unavailable, funding permanently unavailable): place in RESIDUAL state with documented reason	Residual items log
GU-04	Compliance Officer	Review RESIDUAL items: confirm each has a documented reason and participant has been notified	Residual review sign-off

Step	Actor	Action	Evidence Output
GU-05	Settlement Operator	Perform final reconciliation: asset-leg positions vs. custodian position report; cash-leg balances vs. funding source report	Reconciliation report: LG_RECON_[GateID]
GU-06	Settlement Operator + Compliance Officer	Attest: Open Breaks = 0 OR provide enumerated list of documented residuals	Open Breaks Attestation (template H.5.6)
GU-07	Settlement Operator	Generate Gate Lifecycle EP: aggregation of all gate and unwind evidence items	EP: LG_LIFECYCLE_[GateID]; retained indefinitely
GU-08	Compliance Officer	Issue gate closure supervisory notification; attach Open Breaks Attestation	Closure notification with EP reference

H.5.5 Settlement Queue Unwind Procedure

This procedure closes a settlement queue and confirms all items are in a terminal state.

Step	Actor	Action	Evidence Output
QU-01	Settlement Operator	At queue closure decision: confirm no new items will enter queue (submission interface suspended or maintenance mode confirmed)	Queue closure lock log
QU-02	Settlement Operator	Process all remaining queue items per prioritization order; apply DvP unwind per H.5.3 as needed	Per-item processing logs
QU-03	Settlement Operator	For conflict-queue items still in HOLD_CONFLICT: attempt resolution; if resolution not possible, escalate to Governance Officer for disposition decision	Conflict resolution log or escalation
QU-04	Governance Officer	Decide disposition for unresolvable conflict-queue items: return to participants OR transfer to residual registry	Governance disposition log
QU-05	Settlement Operator	Run final queue integrity checks (all SQ-CHK-01 through SQ-CHK-05)	Integrity check log: SQ_FINAL_CHECKS_[Queue ID]
QU-06	Settlement Operator + Compliance Officer	Confirm queue depth = 0 or produce residual items list	Queue zero-balance confirmation or residual list
QU-07	Settlement Operator	Generate Queue Closure Report (see H.4.6 template, Closure cycle)	Queue Closure Report: SQ_CLOSURE_[QueueID]
QU-08	Compliance Officer	Sign Queue Closure Report; retain as part of EP	Signed closure report

H.5.6 Open Breaks Attestation Template (Paste-Ready)

OPEN BREAKS ATTESTATION

Attestation ID: OBA-[YYYYMMDD]-[NNN]

Related Event: [Gate ID / Queue ID / DvP Unwind batch ID]

Attestation Timestamp (UTC):

ATTESTATION STATEMENT

[SELECT ONE]

OPEN BREAKS = ZERO

All DvP obligations, redemption obligations, and queue items arising from the above-referenced event have been fully processed, unwound, or transferred as of the attestation timestamp. No unresolved obligations remain.

RESIDUAL ITEMS DOCUMENTED

The following items remain unresolved as of the attestation timestamp. Each item is documented with a reason code and participant notification confirmation. This does not represent a suppression of obligation; these items are carried forward to the residual registry for resolution.

RESIDUAL ITEMS LIST (if applicable)

Item ID	Amount (Notional)	Reason Code	Participant Notified (Y/N)	Notification Timestamp
---------	-------------------	-------------	----------------------------	------------------------

----- ----- ----- ----- -----

| ...	| ...	| [TIMEOUT / MISMATCH / FUNDING_UNAVAIL / PARTICIPANT_UNAVAIL / OTHER]	| ...	| ...
-----	-----	--	-----	-----

REASON CODES

TIMEOUT – DvP lock expired; automatic unwind executed; re-submission required.

MISMATCH – Asset-leg and cash-leg records did not reconcile; manual review required.

FUNDING_UNAVAIL – Cash-leg funding source permanently unavailable for this settlement cycle.

PARTICIPANT_UNAVAIL – Participant could not be reached for release confirmation within TTL.

OTHER – See narrative below.

Narrative (if OTHER):

RECONCILIATION REFERENCES

Asset-leg reconciliation report reference:

Cash-leg reconciliation report reference:

Discrepancies (if any):

ATTESTORS

Settlement Operator: _____ Role: _____ Timestamp (UTC): _____

Compliance Officer: _____ Role: _____ Timestamp (UTC): _____

Governance Officer (required if residuals > 0): _____ Timestamp (UTC): _____

Document Hash (SHA-256): _____

Chain reference (previous EP hash): _____

H.6 Evidence Pack Mapping for Stress Mode Events

Control Objective	Required EP Artifacts	Frequency	Examiner Relevance
Liquidity gate activation was properly authorized	Gate Activation Request + dual-approval log	Per event	Primary — confirms no unilateral gate action
Gate scope was proportionate	Gate Activation Request (proportionality section)	Per event	Primary
Queue was managed in defined priority order	Queue Status Reports + SQ-CHK logs	Per cycle (30 min)	Secondary
DvP unwinds were symmetric (both legs released)	DvP Unwind EP (DU-09) + Reconciliation log	Per unwind event	Primary
No obligations remain unresolved at gate closure	Open Breaks Attestation	Per gate lifecycle	Primary
Supervisory notifications met SLA	Notification records with timestamps	Per notification	Primary
All stress-mode state changes were dual-approved	State transition logs	Per transition	Primary
Residual items are documented with reason codes	Residual items list (in Open Breaks Attestation)	Per event (if residuals)	Primary

Appendix I — Offboarding Proof Bundle and Legacy Transition Manifest

Classification: Operational Template — Paste-Ready

Baseline Anchors: Baseline B (Operationalization Track, Dec 2025 — Sections V.2, V.4, V.5); Baseline C (FCCK Pilot Operational Assurance Artifacts Addendum); Baseline D (Companion Stable-Value Oversight)

Disclaimer: This appendix is non-normative. It defines operational procedures and evidence templates for controlled program offboarding. It does not prescribe legal outcomes, does not claim legal finality of any offboarded position, and does not supersede applicable regulatory or contractual obligations.

I.1 Purpose and Scope

This appendix provides the complete operational framework for controlled program offboarding: the process by which a stable-value settlement rail, tokenized deposit program, or wholesale settlement pilot is brought to an orderly end with no data loss, no unresolved obligations, and a verifiable chain-of-custody record of all material artifacts.

Offboarding is distinct from:

- **Unwind** (Appendix H.5): dissolution of a specific operational state within a running program.
- **Suspension:** temporary halt to operations pending resolution of a specific condition; program infrastructure remains intact.

Offboarding represents the final operational state. After offboarding is complete, no new settlement activity occurs under the program; all records are transferred to designated legacy archives; and the program's evidence bundle is sealed, hashed, and delivered to designated custodians including examiners as applicable.

I.2 Offboarding Trigger Taxonomy

Trigger Type	Trigger ID	Description	Notice Period	Authorization Required
Planned end — pilot conclusion	OB-T01	Pilot program reaches defined end date per program governance documentation	Minimum 60 days advance notice to all participants and supervisory authorities	Governance Officer + Compliance Officer + Supervisory Authority acknowledgment
Governance decision — voluntary	OB-T02	Pilot Steering Committee votes to conclude program prior to scheduled end date	Minimum 30 days advance notice	Steering Committee vote + Supervisory Authority notification
Regulatory direction	OB-T03	Supervisory authority directs program cessation	Per regulatory direction timeline	Immediate acknowledgment; compliance with direction

Trigger Type	Trigger ID	Description	Notice Period	Authorization Required
				timeline
Material incident — involuntary	OB-T04	Unresolved material incident or control failure; Governance Officer determines offboarding is required	Emergency: 24-hour activation; participant notification immediate	Governance Officer + Compliance Officer; supervisory authority notified within 2 hours
Participant attrition — no quorum	OB-T05	Insufficient participant count to sustain orderly operations (below program-defined minimum)	30 days from falling below minimum	Governance Officer decision; supervisory notification

I.3 Offboarding Phases Overview

Phase 0: Declaration & Notice

↓

Phase 1: Position Freeze & Final Snapshot

↓

Phase 2: Obligation Resolution & Queue Drain

↓

Phase 3: Final Reconciliation & Open Breaks Certification

↓

Phase 4: Evidence Bundle Assembly & Sealing

↓

Phase 5: Chain-of-Custody Transfer & Legacy Archive

↓

Phase 6: Program Closure Attestation

Each phase must be completed and attested before the next phase begins. No phase may be skipped. If a phase cannot be completed (e.g., due to unresolvable residuals), that phase is documented as an exception; the exception is logged, escalated, and carried forward into the legacy manifest as an open item requiring post-closure resolution.

I.4 Phase 0: Declaration and Notice

I.4.1 Offboarding Declaration

Step	Actor	Action	Evidence Output
OB0-01	Governance Officer	Issue Offboarding Declaration document (template I.4.3) identifying trigger type, effective date, and scope	Declaration document: OB_DECLARATION_[ProgramID]

Step	Actor	Action	Evidence Output
OB0-02	Compliance Officer	Co-sign Declaration; confirm regulatory notification obligations	Co-signed Declaration
OB0-03	Compliance Officer	Issue supervisory notification per trigger type notice requirements; attach Declaration	Supervisory notification: OB_NOTIFY_[ProgramID]
OB0-04	Settlement Operator	Transition posture state to OFFBOARDING; log state change with Declaration reference	State transition log; EP Delta: STRESS_STATE_CHANGE
OB0-05	Settlement Operator	Issue participant notification: announce offboarding, timeline, required actions, contact points	Participant notification log
OB0-06	Settlement Operator	Immediately suspend acceptance of new settlement submissions; apply OFFBOARDING hold to submission interface	Interface suspension log

I.4.2 Participant Communication Requirements

The participant notification (OB0-05) must include at minimum:

- Program ID and offboarding trigger type (without disclosing confidential investigation details if OB-T03/OB-T04).
- Effective offboarding date.
- Deadline by which participants must submit any pending settlement requests for processing (the "submission cutoff date").
- Deadline by which participants must confirm their legacy archive preferences (delivery format, designated recipient).
- Redemption processing schedule and expected timeline.
- Contact information for offboarding coordination queries.
- Reference to applicable contractual provisions governing program termination.

I.4.3 Offboarding Declaration Template (Paste-Ready)

OFFBOARDING DECLARATION

Program ID: [Program identifier]

Declaration ID: OB-DECL-[YYYYMMDD]-[NNN]

Declaration Timestamp (UTC):

Effective Offboarding Date:

TRIGGER

Trigger Type: [OB-T01 / OB-T02 / OB-T03 / OB-T04 / OB-T05]

Trigger Description (public-safe narrative):

Regulatory Authority Direction (if OB-T03): [Reference / N/A]

Incident Reference (if OB-T04): [Incident ID / N/A]

SCOPE

Program scope subject to offboarding:

Instruments affected:

Participant count affected:

Outstanding notional (as of declaration date):

TIMELINE

Submission cutoff date:

Obligation resolution target date:

Final reconciliation target date:

Evidence bundle sealing target date:

Legacy archive transfer target date:

Program closure attestation target date:

NOTICE OBLIGATIONS

Supervisory notification issued: [YES / NO] Timestamp (UTC):

Participant notification issued: [YES / NO] Timestamp (UTC):

Regulatory acknowledgment received: [YES / NO / PENDING] Reference:

AUTHORIZATION

Governance Officer: _____ Timestamp (UTC): _____

Compliance Officer: _____ Timestamp (UTC): _____

Supervisory Authority (acknowledgment, if OB-T01/OB-T02): _____ Date:

Document Hash (SHA-256): _____

I.5 Phase 1: Position Freeze and Final Snapshot

I.5.1 Purpose

A Position Freeze captures the authoritative state of all positions, obligations, locks, holds, and balances at the declaration moment and at the submission cutoff date. These snapshots become the reference baselines against which all subsequent reconciliation is performed.

I.5.2 Snapshot Procedure

Step	Actor	Action	Evidence Output
OB1-01	Settlement Operator	At declaration timestamp: generate Declaration Snapshot (asset-leg positions, cash-leg balances, active locks, active holds, open queue items)	Declaration Snapshot: OB_SNAP_DECL_[ProgramID]
OB1-02	Settlement Operator	At submission cutoff date: generate Cutoff Snapshot (same fields as Declaration Snapshot; reflects all activity between declaration and cutoff)	Cutoff Snapshot: OB_SNAP_CUTOFF_[ProgramID]
OB1-03	Compliance Officer	Compare Declaration Snapshot to Cutoff Snapshot; identify all activity that occurred in the interim; confirm no unauthorized activity	Snapshot comparison log
OB1-04	Settlement Operator	Freeze all positions: apply OFFBOARDING_HOLD to all remaining asset-leg and cash-leg positions; no further changes permitted without Governance Officer approval	Position freeze log
OB1-05	Settlement Operator	Request position confirmation from all custodians and counterparties: confirm their position records match the Cutoff Snapshot	Custodian confirmation log; discrepancy list (if any)
OB1-06	Compliance Officer	Review discrepancies (if any); determine whether discrepancies require Phase 2 resolution steps	Discrepancy review note

I.5.3 Snapshot Schema (Minimum Fields)

Asset-Leg Snapshot Record:

Field	Description
asset_id	Unique instrument identifier
token_id	Token-level identifier (if applicable)
holder_ref	Participant reference (anonymized for third-party disclosure)
quantity	Current holding quantity
lock_status	LOCKED / UNLOCKED / HELD
lock_reference	DvP lock ID (if locked)
hold_reference	Hold ID (if held)
as_of_timestamp	UTC timestamp of snapshot
custodian_confirmation_ref	Reference to custodian confirmation

Cash-Leg Snapshot Record:

Field	Description
account_ref	Participant account reference
instrument_category	P1 / P2 / P3 / P4 (per Section 3 taxonomy)
balance	Current balance
reserved_amount	Amount reserved for pending settlement
hold_amount	Amount subject to compliance hold

Field	Description
lock_amount	Amount locked in DvP escrow
available_balance	Balance - reserved - hold - locked
as_of_timestamp	UTC timestamp of snapshot
funding_source_ref	Reference to funding source confirmation

I.6 Phase 2: Obligation Resolution and Queue Drain

I.6.1 Purpose

Phase 2 resolves all remaining DvP obligations, redemptions, and queued items. The goal is to reach a state where all active obligations are in a terminal state (SETTLED, UNWOUND, or DOCUMENTED_RESIDUAL) before proceeding to final reconciliation.

I.6.2 Resolution Priority Order

1. **DvP-locked items with funding available** — execute settlement; produce settlement confirmation.
2. **DvP-locked items without funding available** — execute DvP unwind per H.5.3; document as resolved.
3. **Pending redemptions** — process per funded balance; queue drain per H.5.4.
4. **Compliance-hold items** — seek resolution per hold authority; if resolution not achievable before closure target date, document as residual with detailed hold authority reference.
5. **Timeout-approaching items** — process or unwind; no items may be left in LOCK state at phase close.

I.6.3 Phase 2 Steps

Step	Actor	Action	Evidence Output
OB2-01	Settlement Operator	Generate Phase 2 Work List: all items from Cutoff Snapshot requiring resolution; assign resolution type per priority order	Phase 2 Work List: OB_P2_WORKLIST_[ProgramID]
OB2-02	Settlement Operator	Process each item per assigned resolution type; log outcome per item	Per-item outcome log
OB2-03	Settlement Operator	For compliance-hold items: notify hold authority; request release determination or documented extension; if extension beyond closure date not granted, escalate to Governance Officer	Hold resolution log
OB2-04	Governance Officer	Disposition decision for hold items not releasable before closure: Transfer to designated legacy hold custodian OR Document as residual with authority reference	Governance disposition log
OB2-05	Settlement Operator	For each resolved item: produce resolution record (settlement confirmation, unwind EP, or residual documentation)	Resolution records
OB2-06	Compliance	Daily review of Phase 2 progress; identify	Daily progress review log

Step	Actor	Action	Evidence Output
	Officer	bottlenecks; escalate to Governance Officer if progress is behind target timeline	
OB2-07	Settlement Operator	At end of Phase 2: generate Phase 2 Completion Report	Phase 2 Completion Report: OB_P2_COMPLETE_[ProgramID]

I.6.4 Phase 2 Completion Report Template (Paste-Ready)

PHASE 2 COMPLETION REPORT – OBLIGATION RESOLUTION

Program ID: [Program identifier]

Report ID: OB-P2-[YYYYMMDD]

Report Timestamp (UTC):

Prepared By: [Settlement Operator Name]

RESOLUTION SUMMARY

Total items on Phase 2 Work List:

- Settled (DvP executed):
- Unwound (DvP unwind per H.5.3):
- Redeemed (redemption processed):
- Residual – compliance hold (transferred to legacy hold custodian):
- Residual – other (documented):
- UNRESOLVED (escalation required):

RESIDUAL ITEMS (if any)

| Item ID | Amount | Reason | Disposition | Authority Reference | Legacy Custodian (if transferred) |

|-----|-----|-----|-----|-----|-----|

| ... | ... | ... | ... | ... | ... |

UNRESOLVED ITEMS (if any – escalation required before Phase 3)

| Item ID | Amount | Reason Unresolved | Escalation Target | Escalation Timestamp |

|-----|-----|-----|-----|-----|

| ... | ... | ... | ... | ... |

PHASE 2 GATE CONDITION

- Phase 2 gate PASSED: zero unresolved items; all residuals documented.
- Phase 2 gate HELD: [count] unresolved items; escalation pending.

ATTESTATION

Settlement Operator: _____ Timestamp (UTC): _____

Compliance Officer: _____ Timestamp (UTC): _____

Governance Officer: _____ Timestamp (UTC): _____

Document Hash (SHA-256): _____

I.7 Phase 3: Final Reconciliation and Open Breaks Certification

I.7.1 Purpose

Phase 3 performs a definitive reconciliation of all asset-leg and cash-leg positions against external reference sources (custodian records, counterparty confirmations, transfer agent registry) and produces the program's Open Breaks Certification.

I.7.2 Reconciliation Steps

Step	Actor	Action	Evidence Output
OB3-01	Settlement Operator	Request final position confirmations from all custodians, counterparties, and transfer agents: "as of" the Phase 2 completion timestamp	Confirmation requests log
OB3-02	Settlement Operator	Receive and log all confirmations; flag any non-responses within 2 business days	Confirmation receipt log; non-response escalation
OB3-03	Settlement Operator	Perform reconciliation: compare program records (asset-leg + cash-leg) to each external confirmation; document any discrepancies	Reconciliation workbook: OB_RECON_[ProgramID]
OB3-04	Compliance Officer	Review reconciliation workbook; classify each discrepancy: timing difference / data entry error / genuine break	Discrepancy classification log
OB3-05	Settlement Operator	Resolve timing differences and data entry errors; re-confirm with external source	Resolution log
OB3-06	Governance Officer	Disposition of genuine breaks: resolve via compensating transaction if within program authority, OR document as open break with full narrative	Genuine break disposition log

Step	Actor	Action	Evidence Output
OB3-07	Settlement Operator + Compliance Officer + Governance Officer	Execute Open Breaks Attestation (using template H.5.6) for the full program	Program-level Open Breaks Attestation: OB_OPENBREAKS_[Program ID]
OB3-08	Compliance Officer	Transmit Program-level Open Breaks Attestation to supervisory authority	Transmission log

I.8 Phase 4: Evidence Bundle Assembly and Sealing

I.8.1 Purpose

The Evidence Bundle is the complete, immutable collection of all program artifacts. Once assembled and sealed (cryptographic hash computed over the full manifest), no artifact may be added, removed, or modified. Any subsequent additions constitute a separate Addendum Bundle with its own manifest and hash.

I.8.2 Bundle Assembly Steps

Step	Actor	Action	Evidence Output
OB4-01	Settlement Operator	Generate Master Artifact Index: complete list of all EP artifacts, EP Deltas, snapshots, reconciliation records, attestations, and governance documents produced throughout program lifetime	Master Artifact Index: OB_INDEX_[ProgramID]
OB4-02	Settlement Operator	Verify integrity of each artifact: recompute hash; compare to logged hash at time of creation	Integrity verification log
OB4-03	Settlement Operator	Identify and document any integrity failures: if hash mismatch detected, log as OB_INTEGRITY_FAIL_[ArtifactID]; escalate immediately	Integrity failure log (if applicable)
OB4-04	Compliance Officer	Review Master Artifact Index for completeness: confirm all required EP types are present	Completeness review sign-off
OB4-05	Settlement Operator	Produce Bundle Manifest (template I.8.4)	Bundle Manifest: OB_MANIFEST_[ProgramID]
OB4-06	Settlement Operator	Compute Bundle Seal Hash: SHA-256 hash of the concatenated sorted artifact hashes (canonical order: artifact creation timestamp ascending)	Bundle Seal Hash: logged in Bundle Manifest
OB4-07	Governance Officer + Compliance Officer + Settlement Operator	Three-party co-attestation of Bundle Manifest and Seal Hash	Co-attestation record
OB4-08	Compliance Officer	Transmit Bundle Manifest and Seal Hash to	Transmission log

Step	Actor	Action	Evidence Output
		supervisory authority	

I.8.3 Required Evidence Bundle Contents

The following artifact categories **must** be present in the bundle. Absence of any category requires documented justification approved by the Governance Officer.

Category	Required Artifacts	Tag Prefix
Program governance	Offboarding Declaration; Pilot charter / governance docs; All Steering Committee decisions material to offboarding	OB_
Snapshots	Declaration Snapshot; Cutoff Snapshot	OB_SNAP_
Phase 2 resolution	Phase 2 Work List; per-item outcome logs; Phase 2 Completion Report	OB_P2_
Reconciliation	Reconciliation workbook; external confirmations; discrepancy logs; genuine break dispositions	OB_RECON_
Open Breaks Attestation	Program-level Open Breaks Attestation	OB_OPENBREAKS_
DvP lifecycle	All DvP gate logs; DvP lock/release records; DvP unwind EPs	DU_
Liquidity gate lifecycle	All Gate Activation / Management / Closure EPs	LG_
Queue lifecycle	All Queue Status Reports; Queue Closure Reports	SQ_
Hold / release	All hold placement logs; release authorization logs; compliance-hold resolution records	(baseline hold/release tags)
Finality markers	All operational finality condition records; finality marker events	(baseline finality tags)
Supervisory notifications	All notifications issued throughout program lifetime	OB_NOTIFY_
Participant communications	All material participant notifications	(participant notification logs)
Immutable logs	Full immutable log archive (all event types; complete hash chain)	(system log archive)
EP Deltas	All EP Delta batches throughout program lifetime	EP_DELTA_
Recertification records	All conformance recertification artifacts	(conformance tags)
Incident records	All incident reports; post-incident reviews; remediation evidence	(incident tags)
Change management records	All CCB-approved changes; crypto-agility records	(change management tags)

I.8.4 Bundle Manifest Template (Paste-Ready)

OFFBOARDING EVIDENCE BUNDLE MANIFEST

Program ID: [Program identifier]

Manifest ID: OB-MANIFEST-[YYYYMMDD]

Manifest Creation Timestamp (UTC):

Bundle Covers Period: [Program start date] → [Phase 3 completion timestamp (UTC)]

ARTIFACT INVENTORY

Seq	Artifact ID	Tag	Description	Creation Timestamp (UTC)	SHA-256 Hash	Integrity Verified (Y/N)
001

[Repeat for all artifacts]

COMPLETENESS ATTESTATION

All required artifact categories per I.8.3 are present: [YES / NO]

If NO – missing categories and justification:

Category	Justification	Governance Officer Approval Reference
...

INTEGRITY SUMMARY

Total artifacts:

Artifacts with integrity verified (hash match):

Artifacts with integrity failure: [count – must be zero for sealed bundle; if > 0, addendum required]

BUNDLE SEAL

Canonical ordering: artifact creation timestamp ascending

Bundle Seal Hash (SHA-256 of concatenated sorted artifact hashes):

Seal Computation Timestamp (UTC):

THREE-PARTY CO-ATTESTATION

Settlement Operator: _____ Timestamp (UTC): _____

Compliance Officer: _____ Timestamp (UTC): _____

Governance Officer: _____ Timestamp (UTC): _____

SUPERVISORY TRANSMISSION

Transmitted to supervisory authority: [YES / NO]

Transmission timestamp (UTC):

Transmission reference:

I.9 Phase 5: Chain-of-Custody Transfer and Legacy Archive

I.9.1 Purpose

Phase 5 transfers the sealed Evidence Bundle and all associated records to the designated legacy archive custodian(s), ensuring that the chain of custody is unbroken and the records remain accessible for the full retention period.

I.9.2 Transfer Steps

Step	Actor	Action	Evidence Output
OB5-01	Settlement Operator	Identify designated legacy archive custodian(s) per program governance documentation	Custodian designation record
OB5-02	Settlement Operator	Prepare Transfer Package: sealed Evidence Bundle (including Bundle Manifest and Seal Hash) + Legacy Transition Manifest (template I.9.4)	Transfer Package: OB_TRANSFER_[ProgramID]
OB5-03	Settlement Operator	Execute transfer via designated secure channel; obtain delivery confirmation from legacy archive custodian	Transfer delivery confirmation
OB5-04	Legacy Archive Custodian	Verify Bundle Seal Hash: recompute hash over received artifacts; confirm match to Bundle Manifest	Custodian integrity verification record
OB5-05	Legacy Archive Custodian	Acknowledge receipt in writing: confirm bundle received, seal hash verified, records accepted into retention system	Custodian receipt acknowledgment
OB5-06	Compliance Officer	Transmit custodian acknowledgment to supervisory authority; confirm retention schedule	Transmission log
OB5-07	Settlement Operator	Log transfer completion; include custodian acknowledgment reference in program closure records	Transfer completion log

I.9.3 Retention Schedule

Artifact Category	Minimum Retention Period	Authority
Transaction logs (all types)	7 years from transaction date	Baseline B (Logging and Retention Baseline)
Key generation ceremony logs	7 years from key generation date	Baseline B
Incident records and post-incident reviews	7 years from incident closure date	Baseline B
Hold and release records	7 years from hold release date	Baseline B
Open Breaks Attestation	10 years (extended; material program record)	Governance decision

Artifact Category	Minimum Retention Period	Authority
Bundle Manifest and Seal Hash	10 years (extended; program integrity anchor)	Governance decision
Supervisory notifications	7 years	Baseline B
Genuine break dispositions	10 years (extended; potential legal relevance)	Governance decision
All other EP and EP Delta artifacts	7 years	Baseline B

All retention periods run from the **later of** the artifact creation date or the program closure attestation date.

I.9.4 Legacy Transition Manifest Template (Paste-Ready)

LEGACY TRANSITION MANIFEST

Program ID: [Program identifier]

Manifest ID: OB-LEGACY-[YYYYMMDD]

Manifest Creation Timestamp (UTC):

Program Closure Attestation Date: [to be inserted at Phase 6]

PROGRAM SUMMARY

Program name / description:

Program start date:

Program end date (Phase 3 completion):

Offboarding trigger type: [OB-T01 through OB-T05]

Total transactions processed over program lifetime:

Total notional value settled over program lifetime:

Total DvP unwind events:

Total liquidity gate events:

Total incident events:

LEGACY ARCHIVE CUSTODIAN

Entity name:

Regulatory status / registration:

Contact (role, not personal name):

Archive system reference:

Acceptance timestamp (UTC):

BUNDLE SEAL REFERENCE

Bundle Manifest ID:

Bundle Seal Hash (SHA-256):

Seal Computation Timestamp (UTC):

Custodian Integrity Verification Timestamp (UTC):

Custodian Integrity Verification Result: [MATCH / FAIL]

RETENTION SCHEDULE CONFIRMATION

Artifact Category	Retention Period	Archive System Tag
Transaction logs	7 years	...
Key ceremony logs	7 years	...
Incident records	7 years	...
Hold/release records	7 years	...
Open Breaks Attestation	10 years	...
Bundle Manifest + Seal Hash	10 years	...
Supervisory notifications	7 years	...
Genuine break dispositions	10 years	...
All other EP / EP Delta	7 years	...

OPEN ITEMS AT TRANSFER (residual obligations transferred to legacy management)

Item ID	Original Amount	Reason	Current Status	Responsible Party for Resolution	Target Resolution Date
...
...

SUPERVISORY ACCESS POST-CLOSURE

Records remain accessible to supervisory authorities per:

- Tiered access model (Tier 1 / Tier 2) as defined in baseline framework
- Access requests routed to: [Legacy Archive Custodian contact]
- Purpose limitation and TTL disciplines remain in force post-closure
- Post-access review obligations remain in force post-closure

LEGACY DATA PROOF (NO DATA LOSS ATTESTATION)

I/We attest that:

- (a) All artifacts listed in Bundle Manifest ID [____] have been transferred to the legacy archive custodian.
- (b) The Bundle Seal Hash has been verified by the legacy archive custodian.
- (c) No artifacts were deleted, modified, or withheld during the transfer process.
- (d) Retention schedules as specified are in force.
- (e) Open items as listed above have been identified, documented, and transferred to the responsible party for post-closure resolution.

Governance Officer: _____ Timestamp (UTC): _____

Compliance Officer: _____ Timestamp (UTC): _____

Legacy Archive Custodian (authorized representative): _____ Timestamp (UTC): _____

Supervisory Authority acknowledgment (if obtained): _____ Date: _____

Document Hash (SHA-256): _____

I.10 Phase 6: Program Closure Attestation

I.10.1 Purpose

The Program Closure Attestation is the final, authoritative record confirming that all offboarding phases have been completed, no unresolved obligations remain (or all residuals are documented and transferred), and the program is formally closed.

I.10.2 Closure Attestation Template (Paste-Ready)

PROGRAM CLOSURE ATTESTATION

Program ID: [Program identifier]

Attestation ID: OB-CLOSE-[YYYYMMDD]

Attestation Timestamp (UTC):

PHASE COMPLETION RECORD

Phase	Description	Completion Timestamp (UTC)	Completion Reference
0	Declaration & Notice	OB-DECL-[...]	
1	Position Freeze & Final Snapshot	OB_SNAP_CUTOFF_[...]	
2	Obligation Resolution & Queue Drain	OB-P2-[...]	
3	Final Reconciliation & Open Breaks Certification	OB_OPENBREAKS_[...]	
4	Evidence Bundle Assembly & Sealing	OB-MANIFEST-[...]	

CLOSURE STATEMENTS

- All DvP obligations are in a terminal state (SETTLED or UNWOUND).
- All redemption obligations are in a terminal state (PROCESSED or DOCUMENTED_RESIDUAL).
- All compliance holds have been resolved or transferred to legacy management with documented authority.
- Open breaks = ZERO or all residuals are enumerated in Legacy Transition Manifest.
- Evidence Bundle sealed, hash verified, and transferred to legacy archive custodian.
- Retention schedules in force.
- Supervisory access to archived records remains available per tiered access model.
- No new settlement activity will occur under this program identifier after this attestation date.

EXCEPTIONS (if any closure statement cannot be checked)

Statement	Exception Description	Responsible Party	Resolution Target Date
-----	-----	-----	-----
...

SUPERVISORY NOTIFICATION

Final closure notification transmitted to supervisory authority: [YES / NO]

Transmission timestamp (UTC):

Reference:

THREE-PARTY ATTESTATION

Governance Officer: _____ Timestamp (UTC): _____

Compliance Officer: _____ Timestamp (UTC): _____

Settlement Operator: _____ Timestamp (UTC): _____

Document Hash (SHA-256): _____

Chain reference (Legacy Transition Manifest hash): _____

Appendix J — Glossary (Minimal; Baseline-First)

Scope and Usage Note: This glossary defines terms as used in this constitution. Definitions prioritize the meaning established in the four baseline documents (Baselines A–D). Where a term appears in baseline documents, the definition below reflects baseline usage. Terms not present in baselines but necessary for this constitution are marked **[Constitution-defined]**. This glossary is non-normative; it does not create legal definitions or supersede applicable regulatory definitions.

Term	Definition	Baseline Source
Atomic DvP (Delivery versus Payment)	A settlement mechanism in which the asset leg (tokenized instrument delivery) and the cash leg (payment transfer) execute simultaneously and interdependently, such that neither can complete without the other completing, eliminating principal risk at the settlement layer.	Baseline A; Baseline B
Asset-Leg Lock	A technical state in which a tokenized instrument position is reserved for a specific pending DvP transaction and cannot be transferred, pledged, or otherwise disposed of until the DvP is either executed or unwound.	[Constitution-defined]
Cash-Leg Lock	A technical state in which a stable-value balance or tokenized deposit amount is held in escrow for a specific pending DvP transaction and cannot be redeployed until the DvP is either executed or unwound.	[Constitution-defined]
Category P1 — Payment/Settlement Stable-Value Instrument	A stable-value instrument whose primary function is transactional (payment and settlement); no yield feature attached; subject to purpose limitation ensuring cash-leg-only usage within the settlement rail.	Baseline D; [Constitution taxonomy]
Category P2 — Tokenized Deposit	An institutional, redeemable deposit represented as a token on a settlement rail; no yield feature by default; governed by applicable custody and banking regulation; redeemable at par per disclosed terms.	Baseline D; [Constitution taxonomy]
Category P3 — Wholesale Settlement Credit	A permissioned settlement balance or omnibus rail credit used by authorized settlement operators to facilitate multilateral netting or pre-funded settlement; not a retail instrument; not yield-bearing.	[Constitution taxonomy]
Category P4 — Yield Feature / Yield Program	Any arrangement that attributes returns, interest, or yield to a holder of a stable-value instrument; structurally separated from the payment rail; subject to boundary test discipline to prevent commingling with P1/P2/P3 functions.	Baseline D
Chain-of-Custody	The documented, unbroken sequence of possession, transfer, and control events for an	Baseline B; Baseline C

Term	Definition	Baseline Source
	artifact, record, or instrument, providing a verifiable record of who held, transferred, or accessed the item and when.	
Compliance Officer	The designated role responsible for reviewing and approving compliance-sensitive actions (hold placement, release, gate activation, offboarding declarations) and for ensuring regulatory notification obligations are met. Distinct from Settlement Operator and Governance Officer; separation of duties required.	Baseline B
Conformance Profile	A minimum auditable baseline specifying the operational capabilities, security postures, and control frameworks required for a participant or technology provider to achieve conformance certification.	Baseline B
DvP Escrow Model	The schema-abstract operational model governing how asset-leg and cash-leg values are held, locked, and released during a DvP transaction, including timeout behaviors and failure mode handling.	[Constitution-defined; grounded in Baseline A]
DvP Gate	The set of precondition checks that must all pass before a DvP transaction is permitted to proceed to the lock phase; includes eligibility, authorization, funding availability, restriction, and disclosure version checks.	[Constitution-defined; grounded in Baseline A]
DvP Preconditions Gate	See DvP Gate.	—
EP (Evidence Pack)	A standardized collection of documentation, logs, and artifacts prepared by an intermediary or operator to demonstrate compliance with operational requirements; designed to facilitate regulatory examinations and audit reviews.	Baseline B; Baseline C
EP Delta	An incremental update to an Evidence Pack capturing changes or additions since the prior EP or EP Delta; maintains a continuous, time-stamped evidence chain between full EP issuances.	Baseline C
Examiner Query Pack	A set of pseudocode or conceptual SQL queries designed to enable examiners to interrogate program logs and records for compliance verification, anomaly detection, and investigation support.	[Constitution-defined; grounded in Baseline B]
Finality — Operational Finality Conditions Met	The state in which a specific, defined checklist of operational conditions has been satisfied for a given settlement event, establishing that the event is complete from an operational standpoint. This constitution does not claim	[Constitution-defined; grounded in Baseline A]

Term	Definition	Baseline Source
	legal finality; "operational finality conditions met" is an evidence-backed operational determination only.	
Finality Marker Event	An immutable log entry produced when all operational finality conditions for a specific DvP transaction have been satisfied; uniqueness is enforced (one finality marker per trade ID).	[Constitution-defined]
Formal Verification	The use of mathematical methods to prove that a smart contract or critical system component satisfies specified properties across all possible states; required for critical contracts governing asset locking, supervisory access, or compliance enforcement.	Baseline B
Funding Source	An institutional-grade source of cash-leg liquidity used to fund DvP settlement obligations; includes pre-funded balances, intraday credit facilities, and interbank settlement accounts; must be confirmed as available before DvP gate clears.	[Constitution-defined]
Governance Officer	The designated role with authority to make escalated decisions during stress mode, offboarding, and material change events; may correspond to a senior program governance function; distinct from Compliance Officer and Settlement Operator.	[Constitution-defined]
Hold / Release	An operational mechanism allowing temporary restriction of asset transfers or payment flows in response to regulatory requirements, compliance investigations, or dispute resolution, followed by restoration upon appropriate authorization.	Baseline B
Hold-Only Mode	An operational posture applied to in-flight transactions during liquidity gate or stress mode activation: no new locks or settlements are executed; existing positions are held in their current state pending resolution or unwind.	[Constitution-defined]
Immutable Log	A log record stored in a tamper-evident, append-only format using cryptographic hash chaining or equivalent mechanisms, ensuring that no record can be modified or deleted without detectable evidence of tampering.	Baseline B; Baseline C
Intraday Liquidity	Cash-leg funding availability that arises and is consumed within a single business day settlement cycle; distinct from overnight or term funding; a key input to DvP gate checks and liquidity gate triggers.	[Constitution-defined; grounded in Baseline D]
Legacy Transition Manifest	The paste-ready template produced during offboarding Phase 5 documenting the complete	[Constitution-defined]

Term	Definition	Baseline Source
	transfer of the Evidence Bundle to the legacy archive custodian, including retention schedules, open items, and a no-data-loss attestation.	
Liquidity Gate	A control mechanism activated when predefined liquidity, concentration, or redemption pressure thresholds are breached; suspends new redemption submissions and applies hold-only mode to pending settlements until the triggering condition is resolved.	Baseline D; [Constitution-defined operational detail]
Material Change	A modification to program governance, settlement logic, finality conditions, liquidity gate thresholds, or other operationally significant parameters that requires formal change control review, documentation, and recertification as applicable.	Baseline B
Offboarding	The controlled, phase-based process of bringing a settlement program to an orderly end with no data loss, no unresolved obligations (or fully documented residuals), and a sealed Evidence Bundle transferred to a legacy archive custodian. Distinct from suspension (temporary halt) and unwind (dissolution of a specific operational state).	[Constitution-defined; grounded in Baseline B]
Open Breaks Attestation	A paste-ready attestation document produced at the close of a liquidity gate, queue drain, or offboarding phase, attesting that all obligations are in a terminal state (settled, unwound, or fully documented as residual).	[Constitution-defined]
Operational Finality	See Finality — Operational Finality Conditions Met.	—
Posture State	One of four declared operational states (NORMAL / LIMITED / STRESS / OFFBOARDING) governing which settlement and redemption activities are permitted; transitions require dual approval and produce an EP Delta.	[Constitution-defined; grounded in Baseline D]
Preservation Bundle	A complete, immutable collection of all artifacts related to a specific incident, dispute, or material event, frozen at the time of the triggering event to support investigation, litigation, or examination.	Baseline C
Principal Risk	The risk that one leg of a settlement transaction (asset or cash) is delivered while the other leg fails, leaving the delivering party exposed to the full value of the delivered asset. Atomic DvP is designed to operationally eliminate principal risk.	Baseline A

Term	Definition	Baseline Source
Purpose Limitation	The discipline of restricting access to, or use of, data and records to the specific purpose for which access was granted; access beyond original purpose requires new authorization; a core principle of tiered supervisory access.	Baseline B
RACI	Responsible / Accountable / Consulted / Informed — the role accountability matrix used to define who performs, approves, is consulted on, and is notified of each operational action.	Baseline B
Recertification Cadence	The defined schedule on which participant conformance is re-validated; required annually at minimum and upon material system changes; a trigger for updated EP submissions.	Baseline B
Reconciliation Checkpoint	A scheduled or event-triggered comparison of program records (asset-leg and cash-leg positions) against external reference sources (custodian records, counterparty confirmations, transfer agent registry) to identify and resolve discrepancies.	[Constitution-defined]
Redemption Queue	An ordered list of pending redemption requests that have been received but cannot be immediately processed due to a liquidity gate or funding constraint; managed per FIFO within prioritization tiers.	[Constitution-defined]
Residual Item	An obligation or position that cannot be resolved before a gate closure, queue drain, or offboarding phase completes; documented with a reason code, notified to the participant, and carried forward to the residual registry or legacy archive.	[Constitution-defined]
Run-Like Dynamics	Patterns of aggregate redemption or withdrawal pressure that, if not controlled, could destabilize a stable-value instrument program; the operational analogy to a bank run; addressed by liquidity gate thresholds and concentration monitoring.	Baseline D
Settlement Operator	The designated operational role responsible for executing settlement submissions, managing DvP gates, activating and managing queues and liquidity gates, and generating required evidence artifacts; subject to separation-of-duties controls with Compliance Officer and Governance Officer.	[Constitution-defined]
Settlement Queue	An ordered list of DvP settlement submissions that cannot be processed immediately in straight-through mode; activated by defined triggers; managed per prioritization order.	[Constitution-defined]

Term	Definition	Baseline Source
Stable-Value Instrument	A broad, neutral category encompassing instruments whose value is designed to be stable relative to a reference unit (e.g., a fiat currency), used in this constitution to describe cash-leg instruments in the P1–P4 taxonomy without implying regulatory classification.	Baseline D
Standard Checks Pack	The defined set of operational compliance checks run against program logs and records on a recurring basis; each check has a defined ID, pass/fail criterion, evidence inputs, frequency, escalation trigger, and retention tag.	[Constitution-defined; grounded in Baseline B]
Tiered Supervisory Access	A multi-level oversight model segregating supervisory access into Tier 0 (automated aggregate monitoring), Tier 1 (routine event-triggered access), and Tier 2 (emergency intervention with strict due process safeguards), as established in the FCCK baseline architecture.	Baseline A; Baseline B
Time-to-Live (TTL)	The maximum duration for which a specific access grant, lock, hold, or data retention authorization remains valid; expiry triggers automatic deactivation or escalation review; enforced as an operational control.	Baseline B
Tokenized Deposit	See Category P2.	—
Unwind	The deliberate dissolution of a specific operational state — a partial DvP position, an active liquidity gate queue, or a settlement queue — returning all legs to a prior baseline state with full evidence documentation. Distinct from offboarding.	[Constitution-defined]
Yield Separation	The architectural and operational discipline ensuring that yield features (Category P4) are maintained in a structurally separate arrangement from payment rail instruments (P1/P2/P3), with no commingling of balances, mechanics, or disclosures.	Baseline D

Appendix K — Netting vs Atomic Settlement Optimization Framework (Non-Normative)

Classification: Operational Optimization Framework — Paste-Ready

Baseline Anchors: Baseline A (FCCK Pilot Proposal and No-Action Request); Baseline B (Operationalization Track, Dec 2025); Baseline C (FCCK Pilot Operational Assurance Artifacts Addendum, 20260113); Baseline D (FCCK Companion Stable-Value Oversight, 20260217)

Parent Document: Payments & Settlement Constitution: Stable-Value Rails, Tokenized Deposits,

K0. Non-Normative Note: What This Appendix Does / Does Not Do

This appendix provides operational optimization patterns for Settlement Operators, Governance Officers, and examiners evaluating the selection between atomic gross DvP settlement and netting-based settlement (bilateral or multilateral) within the stable-value settlement rail operating model established in this constitution.

This appendix does:

- Define operational terms for gross and net settlement modes.
- Provide a decision matrix for selecting settlement mode based on scenario-specific control objectives.
- Define evidence requirements that apply equally to both modes, ensuring auditability is preserved regardless of mode selection.
- Provide paste-ready templates and examiner query inserts that are mode-aware.
- Define hybrid patterns combining both modes with explicit guardrails and failure-mode handling.

This appendix does not:

- Make legal conclusions. No statement herein constitutes legal finality, legal netting enforceability, or a regulatory determination.
- Advocate for netting or atomic DvP as superior. Both are treated as operational tools with distinct control tradeoff profiles.
- Endorse or reference specific central counterparties, central securities depositories, messaging networks, or platforms.
- Create fixed operational mandates. All thresholds, window sizes, batch caps, and cycle frequencies are expressed as configurable bands to be set by the operator within program governance parameters and subject to recertification cadence.
- Supersede the DvP discipline established in the body of this constitution. Netting does not eliminate DvP requirements; it reorganizes them at the net settlement execution step.

Positioning within the constitution: The body of this constitution (Sections 5–6) establishes atomic DvP as the baseline settlement discipline. This appendix establishes the conditions under which netting is a permissible operational variant, and the additional controls required when netting is elected.

K1. Definitions (Operational)

K1.1 Atomic Gross DvP

A settlement mode in which each individual trade is settled independently and simultaneously across both legs — asset delivery and cash payment — in a single, indivisible operation. Neither leg completes unless both complete. Each settlement event produces its own operational finality

marker. There is no aggregation of obligations across trades; each trade's principal risk exposure is resolved at the individual trade level.

Control profile: Maximum principal risk mitigation per trade; maximum intraday liquidity demand; lowest batch complexity.

K1.2 Bilateral Netting

A settlement mode in which two counterparties aggregate their mutual obligations over a defined netting window, computing a single net position per instrument (or per currency) that one party owes the other. The gross set of individual trade obligations is replaced by a single net obligation per bilateral pair per netting cycle. The net obligation is then settled via DvP at cycle close.

Control profile: Reduced bilateral liquidity demand; principal risk deferred to net settlement execution; netting computation and input set integrity become critical evidence requirements.

K1.3 Multilateral Netting

A settlement mode in which three or more counterparties' mutual obligations are aggregated across the full participant set in a single netting cycle, typically facilitated by a central settlement operator or designated netting function. Each participant's net position across all counterparties is computed; each participant settles a single net obligation (pay-in or receive) per instrument per cycle. Individual bilateral obligations are extinguished and replaced by obligations to/from the central netting function.

Control profile: Maximum liquidity compression; highest concentration of systemic risk at the netting computation and net settlement execution step; most complex evidence and audit requirements.

K1.4 Netting Cycle and Netting Window

Netting Cycle: A discrete operational period during which trade submissions are collected, aggregated, net positions computed, funding confirmed, and net DvP settlement executed. A single cycle produces one set of net obligations. Cycle states are defined in K4.1.

Netting Window: The configurable time interval during which trade submissions are accepted into a given netting cycle. No submission may be included in a cycle after the window closes without a documented exception approved by the Compliance Officer and logged as an EP Delta tagged NW_LATE_INCLUSION. The operator-configurable window length, cycle frequency, and late-inclusion policy are material parameters subject to governance documentation and recertification cadence.

Configurable bands (examples; not mandates):

Parameter	Illustrative Minimum	Illustrative Maximum	Governance Constraint
Netting window length	30 minutes	4 hours	Must be documented; changes require CCB review

Parameter	Illustrative Minimum	Illustrative Maximum	Governance Constraint
Cycles per business day	1	8	Must align with funding source availability windows
Late-inclusion tolerance	0 minutes (zero tolerance)	15 minutes with dual approval	Late inclusions logged; examiner-visible
Minimum participant count for multilateral netting	3	Operator-defined	Below minimum: revert to bilateral or atomic

K1.5 Operational Finality Conditions Under Each Mode

Per the body of this constitution, "finality" is an operational determination only — "operational finality conditions met" — not a legal conclusion.

Finality Dimension	Atomic Gross DvP	Bilateral Netting	Multilateral Netting
Finality unit	Individual trade	Net position per bilateral pair per cycle	Net position per participant per cycle
Finality trigger	Both legs confirmed settled simultaneously	Net DvP leg confirmed settled; cycle computation manifest verified	All net positions settled; cycle computation manifest and participant set verified
Finality evidence	Lock event + release event + finality marker per trade	Netting input set manifest + computation manifest + net DvP finality marker per cycle	Netting input set manifest + computation manifest + all net DvP finality markers + cycle reconciliation checkpoint
Reversibility	Unwind only per DvP Unwind procedure (Appendix H.5.3)	Cycle reversal: exceptional only; requires Governance Officer approval; all net positions re-opened to gross state	Same as bilateral; additionally requires re-opening all participant net positions
Finality marker uniqueness	One marker per trade_id	One marker per netting_cycle_id + net_position_id	One marker per netting_cycle_id + participant_id
Principal risk exposure window	Milliseconds to seconds (lock to release)	Duration of netting window + net settlement execution time	Duration of netting window + net settlement execution time

K2. Why Netting Exists vs Why Atomic DvP Exists (Control Objectives)

Objective	Netting Benefit	Atomic DvP Benefit	Operational Risk Tradeoff	Required Evidence Outputs
Eliminate principal risk	Reduces gross exposure; does not eliminate per-cycle principal risk at net settlement	Eliminates principal risk at the individual trade level; each trade self-contained	Netting defers principal risk to end-of-cycle net settlement; if net settlement fails, all included trades reopen	Lock/release symmetry records (atomic); netting computation manifest + net DvP execution record (netting)
Reduce intraday	High: multilateral	Low: each trade	Netting creates	Funding sufficiency

Objective	Netting Benefit	Atomic DvP Benefit	Operational Risk Tradeoff	Required Evidence Outputs
liquidity demand	netting can reduce gross funding requirements by configurable compression ratios	requires full gross funding	liquidity concentration at end-of-cycle; failure of a large net position has amplified impact vs individual trade failure	check at net settlement time (netting); per-trade funding availability check (atomic)
Operational throughput	High-frequency flows handled in batches; submission interface not bottlenecked by per-trade settlement latency	Optimal for low-frequency high-value trades; each trade independently processed	Netting latency: trades not final until cycle closes and net DvP settles	Queue depth logs (both modes); cycle completion timing records (netting)
Concentration risk control	Netting can mask concentration: multiple trades with a single counterparty compressed into one net position	Each trade independently visible; concentration patterns observable at trade level	Netting compression may delay detection of concentration accumulation	Concentration monitoring per participant per cycle (netting); per-trade concentration check (atomic)
Intraday stress resilience	Netting windows can be tightened during STRESS posture; reduces new obligation accumulation	Atomic DvP can be suspended per-trade with fine granularity	Tighter netting windows reduce compression benefit; stress mode reduces netting advantage	Posture state log; netting window parameter log; liquidity gate trigger records
Evidence reproducibility	Net position must be reproducibly derivable from the input set; examiner must be able to re-derive net positions from logged inputs	Each trade's evidence is self-contained; no computation re-derivation required	Netting computation integrity is a distinct attack/error surface; computation manifest is critical	Netting input set manifest + computation manifest (netting); per-trade EP (atomic)
Operational finality clarity	Finality occurs once per cycle; operationally simpler finality determination	Finality occurs per trade; more granular but higher event volume	Netting cycles can accumulate systemic risk if cycle fails; atomic failures are isolated	Finality markers (both); cycle-level vs trade-level granularity
Examiner visibility	Batch-level visibility; examiners must drill into input set for trade-level reconstruction	Trade-level visibility directly from logs	Netting requires additional query layers for trade-level reconstruction	Examiner query pack (K8.2 inserts); input set manifest indexed by trade_id

Objective	Netting Benefit	Atomic DvP Benefit	Operational Risk Tradeoff	Required Evidence Outputs
Reversibility and error correction	Cycle-level unwind impacts all included trades; error correction complex	Trade-level unwind; minimal collateral impact on other trades	Netting error correction requires re-computing net positions for all affected participants	DvP unwind records (Appendix H.5.3); netting cycle reversal records (K4.3)
Cross-jurisdiction alignment	Netting windows must align with operational hours across jurisdictions; misalignment creates late-inclusion risk	Atomic DvP is time-agnostic; executes on submission	Window misalignment can cause trades to miss a netting cycle; queued for next cycle	Netting window parameter log; cross-jurisdiction timing records

K3. Decision Matrix: When to Use Netting vs Atomic Settlement

Usage note: This matrix expresses operational preferences and guardrails, not mandates. The operator documents the elected settlement mode per participant type, instrument category, and operational scenario in the program governance documentation; elections are subject to recertification cadence and material change governance.

Scenario / Constraint	Prefer Atomic DvP	Prefer Netting	Guardrails When Netting Elected	Evidence Requirements	Examiner Questions Answered
High-frequency, low-value flows (many trades per participant per day; individual trade notional below operator-configured low-value threshold)	If any individual trade exceeds concentration threshold OR if participant funding buffer is thin	✓ Multilateral or bilateral netting preferred; compression reduces liquidity demand and throughput congestion	Netting window ≤ operator-configured maximum; late-inclusion policy documented; concentration check per cycle	Netting cycle manifest; computation manifest; funding sufficiency check at net settlement	Are all trades in the cycle accounted for? Is net position reproducible from inputs?
High-value, low-frequency flows (individual trade notional above operator-configured high-value threshold; infrequent per participant)	✓ Atomic DvP preferred; principal risk at individual trade level is significant; netting deferral is disproportionate to benefit	Only if cross-jurisdiction timing constraints make atomic DvP operationally infeasible in the settlement window	If netting elected for high-value: require Governance Officer approval per cycle; enhanced monitoring; EP tagged HV_NETTING_EXCEPTION	Per-trade lock/release records; finality markers; Governance Officer approval log	Was Governance Officer approval obtained? Was principal risk exposure duration documented?
Liquidity-constrained participants (participant's available	If only one or two trades are pending: atomic settlement of available trades,	✓ Netting preferred to compress gross funding requirement to net obligation	Funding sufficiency must be confirmed at net settlement	Funding availability check log at net settlement	Was funding available at net settlement? Did a funding shortfall

Scenario / Constraint	Prefer Atomic DvP	Prefer Netting	Guardrails When Netting Elected	Evidence Requirements	Examiner Questions Answered
cash-leg balance insufficient for gross settlement of all open obligations)	queue remainder		time, not at trade submission time; if net position cannot be funded, cycle fails for that participant per K4.3	execution; participant-level funding shortfall record	cause cycle failure?
STRESS posture / run-like dynamics	✓ Atomic DvP for any new submissions accepted during STRESS (selective); new submissions suspended if Liquidity Gate active	Netting windows tightened to operator-configured minimum; cycle frequency increased to reduce open exposure accumulation	Netting window tightening is a material parameter change; must be logged as EP Delta STRESS_STAT E_CHANGE; posture state variable updated	Posture state log; netting window parameter change log; liquidity gate trigger records; cycle manifest	When were netting windows tightened? Was the change dual-approved? Were all open exposures captured?
Cross-jurisdiction window constraints (settlement instructions arriving from a jurisdiction whose operational hours do not align with the domestic netting window)	If the trade cannot be included in a netting cycle before its contractual settlement date: atomic DvP at earliest opportunity	✓ If cross-jurisdiction instructions arrive within an open netting window: include in current cycle	No trade may be force-included in a closed netting window; late-inclusion exception policy applies	Cross-jurisdiction timing log; netting window open/close timestamps; late-inclusion exception records	Was the trade included in the correct cycle? Was any late-inclusion exception properly documented?
Operational outage / partial settlement risk (one or more participants in a multilateral cycle become unavailable before net settlement execution)	✓ For the unavailable participant's net position: atomic unwind per H.5.3; remaining cycle processes as bilateral netting between available participants if feasible	Continue cycle with reduced participant set only if operator governance documentation explicitly permits partial-cycle processing; dual approval required	Partial cycle processing is a material exception; logged as EP Delta NW_PARTIAL_CYCLE; unavailable participant's trades returned to gross state and queued for next cycle or atomic settlement	Partial cycle exception log; returned-trades queue record; availability incident record	Were returned trades queued or settled atomically? Was the partial cycle exception documented?
Concentration risk / large-holder dynamics (single	✓ Extract the large-holder trade(s) from the netting set; settle	Only if concentration threshold is	Concentration check is a mandatory	Concentration check log per cycle;	Did the cycle proceed with a concentration

Scenario / Constraint	Prefer Atomic DvP	Prefer Netting	Guardrails When Netting Elected	Evidence Requirements	Examiner Questions Answered
participant's net position would represent \geq operator-configured concentration threshold of total cycle notional)	atomically; proceed with netting for remaining participants	breached due to timing and splitting trades is operationally infeasible; requires Compliance Officer approval	precondition gate for every netting cycle (K4.2); breach triggers escalation per concentration monitoring procedure	Compliance Officer approval for threshold-breach exception; large-holder extraction record	above threshold? If so, was Compliance Officer approval documented?
Instrument category mismatch (trades in P1/P2/P3/P4 categories being included in the same netting cycle)	P4 (yield feature) trades must never be netted with P1/P2/P3 (yield separation boundary)	Netting permitted within P1/P2/P3 categories separately; cross-category netting requires explicit Compliance Officer approval and EP tag YIELD_BOUNDARY_NETTING_EXCEPTION	Yield separation boundary discipline (Section 3 of constitution) applies at the netting input gate; netting cycle must be category-homogeneous by default	Category homogeneity check log per cycle; yield boundary exception record if applicable	Were any P4 instruments included in a P1/P2/P3 netting cycle without approval?
Post-incident / investigation hold (one or more trades subject to compliance hold or investigation)	✓ Held trades must be excluded from netting cycles; settled atomically upon hold release per H.5.3	Not applicable; held trades are ineligible for netting set inclusion by definition	Hold status check is a mandatory precondition gate for netting cycle input validation (K4.2); held trades automatically excluded	Hold status check log; exclusion record per held trade; netting input set manifest showing excluded items	Were any held trades inadvertently included in a netting cycle?

K4. Netting Operating Model (Bilateral and Multilateral) — Evidence-First

K4.1 Netting Cycle States (Schema-Abstract)

State 1: COLLECT

- | Window open; trade submissions accepted into pending input set.
- | Each submission logged with: `submission_id`, `trade_id`, `submitter_ref`, `instrument_category`, `notional`, `counterparty_ref`, `submission_timestamp`.
- |

State 2: VALIDATE

- | Window closes (operator-configured cutoff time).
- | Preconditions gates applied per K4.2.

| Invalid / excluded items removed from input set; exclusion reason logged.
| Validated input set sealed: hash computed over ordered submission_id list.
| → Output: Netting Input Set Manifest (template K9.1)

|

State 3: COMPUTE NET

| Net positions computed from validated input set.
| For each participant (bilateral: per counterparty pair; multilateral: across all pairs):
| $net_position = \Sigma(buy_notional) - \Sigma(sell_notional)$ per instrument per cycle.
| Computation method is reproducible: same validated input set → same net positions.
| → Output: Netting Computation Summary (template K9.2)

|

State 4: FUND

| Each participant with $net_position > 0$ (net payer) confirms funding availability.
| Funding check: $available_cash_leg_balance \geq net_position + operator\text{-}configured\ buffer$.
| If any net payer fails funding check: apply K4.3 failure mode procedures.
| Funding confirmations logged with timestamp and funding_source_ref.

|

State 5: DvP SETTLE

| Net positions settled via DvP discipline (body of constitution, Section 5):
| Asset-leg lock applied per net receive position.
| Cash-leg lock applied per net pay position.
| Simultaneous release: DvP atomic execution at net settlement level.
| Each net DvP execution produces: lock event + release event + finality marker.
| → Output: Net Settlement Finality Proof Bundle (checklist K9.3)

|

State 6: FINALIZE

| Cycle reconciliation checkpoint:
| All net positions confirmed settled (or documented as failed/residual).
| Input set trades mapped to cycle outcome (settled, failed, returned-to-gross).
| Cycle EP assembled and sealed.
| Finality marker issued at cycle level: netting_cycle_finality_marker.

- | → Output: Netting Cycle Manifest (template K9.1) updated to FINALIZED state.
- | → EP Delta issued: NC_FINALIZED_[CycleID]

K4.2 Preconditions Gates for Netting Cycle

All gates must pass before transition from VALIDATE to COMPUTE NET state. Gate failures stop the cycle for the affected submission(s); the cycle proceeds with the remaining validated set. If the validated set falls below operator-configured minimum participant count, the entire cycle is cancelled and all submissions returned to atomic queue.

Gate ID	Gate Name	Check Logic	Pass Condition	Fail Action	Evidence Output
NG-G01	Eligibility / Authorization	Each submitter has a valid, non-revoked credential; participant status = ACTIVE	All submitters confirmed eligible	Exclude submission; log NG_G01_FAIL_[submission_id]; notify participant	Eligibility check log per submission
NG-G02	Hold Status	No trade in input set is subject to a compliance hold (hold_status = NONE)	All submissions hold-free	Exclude held submission; log NG_G02_HOLD_EXCLUDE_[submission_id]; hold record cross-referenced	Hold exclusion log
NG-G03	Instrument Category Homogeneity	All submissions in cycle share the same instrument category (P1/P2/P3); no P4 without exception approval	Category set = {single category} OR documented exception	Exclude cross-category submission OR flag for Compliance Officer exception approval	Category check log; exception record if applicable
NG-G04	Netting Window Compliance	Submission timestamp ≤ window_close_timestamp	All submissions within window	Exclude late submission; late-inclusion exception process per K1.4 if applicable	Window compliance log; late-inclusion exception record
NG-G05	Concentration Pre-Check	Single participant's gross contributions do not exceed operator-configured concentration pre-check threshold	Gross contribution < threshold OR Compliance Officer approval obtained	Escalate to Compliance Officer; hold submission pending approval or extraction decision	Concentration pre-check log; Compliance Officer approval record
NG-G06	Disclosure Version Check	All submissions reference the current effective disclosure version (no stale disclosure references)	Disclosure version match confirmed	Exclude submission; notify submitter to resubmit with current disclosure version	Disclosure version check log
NG-G07	Duplicate Submission Check	No two submissions share the same trade_id in the input set	No duplicate trade_ids	Exclude later-timestamped duplicate; log NG_G07_DUPLICAT	Duplicate exclusion log

Gate ID	Gate Name	Check Logic	Pass Condition	Fail Action	Evidence Output
				E_[trade_id]	

K4.3 Failure Modes

Failure Mode	Description	Trigger	Containment Action	Evidence Output
Partial participation — funding failure	One or more net payers cannot confirm funding at FUND state	Net payer available_balance < net_position + buffer	Return failing participant's submissions to gross state; re-compute net positions for remaining participants (new computation manifest required); if remaining set < minimum, cancel cycle entirely	Funding failure log; revised computation manifest; returned-trades queue record; EP Delta NC_PARTIAL_FUND_FAIL
Late break	A trade is reported as invalid or disputed after the netting window closed but before DvP settlement	Compliance alert or participant dispute filed during FUND or DvP SETTLE state	Pause cycle; apply hold to disputed submission; re-compute net positions excluding disputed item; Compliance Officer approval required to proceed	Dispute record; hold log; revised computation manifest; Compliance Officer approval log
Netting drift	Computed net positions deviate from expected range due to a data error or computation anomaly	Net position for a participant deviates > operator-configured anomaly threshold vs prior cycle baseline	Pause COMPUTE NET → FUND transition; escalate to Settlement Operator + Compliance Officer for review; do not proceed until root cause identified	Anomaly alert log; root cause investigation record; revised or cancelled cycle decision log
Queue congestion	Volume of submissions for a cycle exceeds operator-configured maximum batch size	Submission count or aggregate notional > batch cap	Split into two sequential cycles; overflow submissions queued for next cycle; no trade split across cycles	Queue congestion log; cycle split record; overflow queue manifest
Incomplete finalization — open net positions	One or more net positions remain unsettled at end of DvP SETTLE state	DvP timeout or lock mismatch for a net position	Apply DvP Unwind per Appendix H.5.3 for unsettled net position; remaining cycle positions proceed to FINALIZE; unsettled positions documented as residuals in Open Breaks Attestation	DvP unwind record; residual documentation; EP: NC_OPEN_POSITION_[CycleID]
Cycle cancellation	Full cycle cancelled before reaching DvP SETTLE state	Validated set falls below minimum;	Return all submissions to gross state; queue for atomic DvP or next	Cycle cancellation log; returned-trades manifest; participant notifications; EP

Failure Mode	Description	Trigger	Containment Action	Evidence Output
		catastrophic data error; governance decision	netting cycle; notify all participants; log cancellation reason	Delta NC_CANCELLED_[Cycle ID]

K4.4 Evidence Outputs for Netting Cycles

Evidence Item	Tag	Content	Retention
Netting Input Set Manifest (sealed)	NC_INPUT_[CycleID]	All validated submissions with attributes; exclusion list; input set hash	7 years
Netting Computation Summary	NC_COMPUTE_[CycleID]	Net positions per participant/pair; computation method reference; input set hash reference; approvals chain	7 years
Funding Confirmation Log	NC_FUND_[CycleID]	Per net payer: confirmed balance, net position, buffer, confirmation timestamp, funding_source_ref	7 years
Net DvP Lock Event Log	NC_LOCK_[CycleID]	Per net position: lock_id, asset_leg details, cash_leg details, lock_timestamp	7 years
Net DvP Release Event Log	NC_RELEASE_[CycleID]	Per net position: release_id, lock_id reference, release_timestamp, release_reason	7 years
Net Settlement Finality Marker	NC_FINAL_MARKER_[CycleID]	Cycle_id, finality_timestamp, net_positions_count, all net_position_finality_marker_ids, cycle_input_set_hash	Indefinite (material event)
Cycle Reconciliation Checkpoint	NC_RECON_[CycleID]	Trade-level mapping: input trade_id → net_position_id → outcome (SETTLED / FAILED / RETURNED)	7 years
EP Delta (cycle lifecycle)	NC_DELTA_[CycleID]	Running EP Delta of all state transitions and material events in cycle	7 years

K5. Atomic (Gross) DvP Operating Model — Evidence-First

K5.1 DvP Escrow Lock Symmetry Requirements

For each atomic DvP transaction, the following symmetry properties must hold. Asymmetry at any point is an immediate escalation trigger.

Property	Asset Leg	Cash Leg	Symmetry Check
Lock initiation	Asset-leg lock applied; lock_id issued; token quantity reserved	Cash-leg lock applied (escrow); lock_id issued; balance reserved	Both locks must carry the same trade_id reference; timestamp difference < operator-configured tolerance (e.g., < 500ms)
Lock confirmation	Asset-leg lock confirmation received from asset registry	Cash-leg lock confirmation received from funding source	Both confirmations must be received before DvP execution proceeds
Release trigger	Asset-leg released to	Cash-leg released to	Release events are co-dependent; neither

Property	Asset Leg	Cash Leg	Symmetry Check
	buyer upon simultaneous cash-leg confirmation	seller upon simultaneous asset-leg confirmation	may fire without the other
Timeout behavior	If cash-leg not confirmed within lock_timeout: asset-leg lock released; token returned to seller	If asset-leg not confirmed within lock_timeout: cash-leg lock released; funds returned to buyer	Both legs must be released; partial release (one leg released, one held) is a LOCK_MISMATCH failure requiring immediate escalation
Evidence symmetry	Lock event log; release event log; finality marker	Lock event log; release event log; finality marker	Examiner check: for every asset-leg lock_id there must be a corresponding cash-leg lock_id referencing the same trade_id

K5.2 Timeouts and Unwind Rules (Operational)

Parameter	Description	Configurable Band	Governance Constraint
Lock timeout	Maximum duration an asset-leg or cash-leg lock may be held before automatic unwind is triggered	Operator-configured; illustrative range: 15 minutes – 4 hours	Must be documented; changes require CCB review and EP Delta
Confirmation timeout	Maximum time to wait for lock confirmation from asset registry or funding source before treating as failed	Operator-configured; illustrative range: 30 seconds – 5 minutes	Shorter than lock timeout; must leave sufficient buffer for retry before lock timeout fires
Retry limit	Maximum number of confirmation retries before escalating to Settlement Operator	Operator-configured; illustrative range: 1 – 3 retries	Retry log must be immutable; each retry timestamped
Unwind trigger	Lock timeout expiry; LOCK_MISMATCH detection; explicit governance decision	Not configurable — unwind is mandatory on trigger	Unwind procedure per Appendix H.5.3; no discretion to delay once triggered
Post-unwind hold	Hold period applied to a trade after unwind before re-submission is permitted	Operator-configured; illustrative range: 0 – 60 minutes	Prevents rapid re-submission loops; logged as operational hold

K5.3 Evidence Outputs for Atomic DvP

Evidence Item	Tag	Content	Retention
Asset-leg lock event	DVP_LOCK_ASSET_[trade_id]	lock_id, trade_id, asset_id, quantity, holder_ref, lock_timestamp, lock_timeout	7 years
Cash-leg lock event	DVP_LOCK_CASH_[trade_id]	lock_id, trade_id, instrument_category, amount, account_ref, lock_timestamp, lock_timeout	7 years
Lock confirmation events (both legs)	DVP_CONFIRM_[trade_id]	asset_lock_confirmation + cash_lock_confirmation; both timestamps; delta < tolerance check result	7 years
Release event (both)	DVP_RELEASE_[trade_id]	asset_release_id, cash_release_id, trade_id,	7 years

Evidence Item	Tag	Content	Retention
legs, simultaneous)	_id]	release_timestamp, release_reason: SETTLED	
Timeout event (if triggered)	DVP_TIMEOUT_[trade_id]	lock_id(s), timeout_timestamp, legs_released: [ASSET / CASH / BOTH]	7 years
Operational finality marker	DVP_FINAL_MARKER_[trade_id]	trade_id, finality_timestamp, asset_lock_ref, cash_lock_ref, release_ref; uniqueness enforced	Indefinite
Unwind record (if triggered)	DVP_UNWIND_[trade_id]	Unwind procedure reference (H.5.3); both legs confirmed released; reconciliation result	7 years
Anomaly preservation hook	DVP_ANOMALY_[trade_id]	Generated on any LOCK_MISMATCH, retry-limit breach, or unexpected state transition; triggers preservation bundle creation	Indefinite (material event)

Anomaly preservation hook trigger conditions:

An DVP_ANOMALY event and associated preservation bundle are generated whenever:

- Asset-leg and cash-leg lock_ids reference different trade_ids for the same submission.
- A lock release fires for one leg without a corresponding release for the other leg.
- A finality marker is generated for a trade_id that already has a finality marker (duplicate finality attempt).
- Retry limit is reached without confirmation on either leg.
- Any hash-chain break is detected in the lock/release event sequence for a trade.

K6. Hybrid Patterns (Optimization Without Losing Controls)

K6.1 Pattern 1: Intraday Netting with End-Cycle Atomic DvP

Attribute	Detail
Objective	Compress intraday liquidity demand through netting while preserving atomic DvP discipline at net settlement execution.
Applicability	Programs with high-frequency institutional participant flows; sufficient cycle depth to generate meaningful compression; participants with intraday funding flexibility.
Steps	(1) Trade submissions collected in netting window (COLLECT state). (2) Preconditions gates applied; input set sealed. (3) Net positions computed per K4.1 COMPUTE NET. (4) Funding confirmed for each net payer. (5) Net positions settled via atomic DvP: each net position treated as a single DvP trade; asset-leg lock and cash-leg lock applied simultaneously; released on confirmation. (6) Cycle finalized; netting_cycle_finality_marker issued; individual trade outcomes mapped.
Guardrails	(a) Netting window must close before net DvP settlement begins; no trade added post-window. (b) Atomic DvP discipline (Section 5) applies at net settlement step without exception. (c) Concentration check required at COMPUTE NET step; if any net position > concentration threshold, extract and settle atomically as an individual trade. (d) If net DvP execution fails for a net position, apply DvP Unwind (H.5.3); do not net-settle partial positions.

Attribute	Detail
Evidence Outputs	Netting Cycle Manifest (K9.1); Netting Computation Summary (K9.2); Net Settlement Finality Proof Bundle (K9.3); individual trade → net_position mapping in cycle reconciliation checkpoint.
Failure Modes	Funding failure for net payer (K4.3); late break in netting set (K4.3); net DvP timeout triggering unwind of net position (returns all included trades to gross state).
Material Change Triggers	Change to netting window length; change to concentration extraction threshold; change to cycle frequency; change to minimum participant count; any of these require CCB review, documentation, and recertification check.

K6.2 Pattern 2: Atomic for High-Value; Netting for Low-Value Microflows (Institutional Participants Only)

Attribute	Detail
Objective	Route high-value trades directly to atomic gross DvP (maximum principal risk control) while routing high-frequency low-value institutional flows through netting (efficiency).
Applicability	Programs where participant flow has a bimodal distribution: a small number of large trades + a high volume of small trades; operator has configured a high-value threshold and a low-value threshold with a defined separation band.
Steps	(1) At submission, each trade's notional is evaluated against the high-value threshold (operator-configured). (2) If notional ≥ high-value threshold: routed directly to atomic DvP queue; processed independently per K5. (3) If notional < low-value threshold: routed to netting input set for current open cycle. (4) If notional falls in separation band between thresholds: Settlement Operator determines routing; routing decision logged with justification. (5) Both queues operate concurrently; operational logs tagged per mode.
Guardrails	(a) High-value and low-value thresholds must be documented in program governance; changes require CCB review. (b) No trade may be split across both modes to avoid the high-value threshold (splitting is a prohibited practice; logged as anomaly if detected). (c) Yield boundary (P4 separation) applies independently of value routing; P4 trades always require Compliance Officer approval for netting inclusion regardless of notional. (d) Concentration check applies independently to each mode's queue.
Evidence Outputs	Per-trade routing decision log (tagged ATOMIC_ROUTED or NETTING_ROUTED); atomic DvP evidence per K5.3 for high-value trades; netting cycle evidence per K4.4 for low-value flows; separation band routing decision log for mid-range trades.
Failure Modes	Threshold misconfiguration causing systematic mis-routing (detect via distribution analysis in examiner query K8.2-QP-04); deliberate trade splitting to avoid high-value threshold (detect via K8.2-QP-05); both detected by standard check NC-CHK-08.
Material Change Triggers	Any change to high-value threshold, low-value threshold, or separation band; change to routing logic; addition of a new instrument category with different threshold parameters.

K6.3 Pattern 3: Stress-Mode — Tighten Netting Windows and Elevate Liquidity Gates

Attribute	Detail
Objective	During STRESS posture, reduce the accumulation of open netting exposure by shortening netting windows and increasing cycle frequency, while elevating liquidity gate vigilance to prevent compounding of stress dynamics.
Applicability	Active during STRESS posture state (as defined in Appendix H and the body of this constitution); may be pre-configured as an automatic response to posture transition or manually activated by dual approval.
Steps	(1) On STRESS posture declaration: Settlement Operator automatically or manually shortens netting window to operator-configured stress-mode minimum (e.g., 25–50% of normal window length). (2) Cycle frequency increases proportionally. (3) Liquidity gate thresholds (Appendix H.3) are reviewed; if any trigger is approaching, gate pre-activation preparation begins. (4) Concentration checks run at every VALIDATE state regardless of normal-mode frequency setting. (5) New submissions to netting set are subject to enhanced preconditions gate review (all gates re-run regardless of caching). (6) If OFFBOARDING posture declared: netting cycle accepts no new submissions; final cycle drains existing input set; remaining open trades routed to atomic DvP queue for processing per offboarding Phase 2 (Appendix I.6).
Guardrails	(a) Netting window shortening is a material parameter change; logged as EP Delta STRESS_STATE_CHANGE with both approver identities. (b) Stress-mode cycle manifests are tagged STRESS_MODE_CYCLE for examiner identification. (c) If stress conditions result in cycle failure rate > operator-configured threshold (e.g., > 2 consecutive failed cycles): automatic escalation to Governance Officer; assessment of whether netting should be suspended and all flows routed to atomic DvP. (d) Return to normal-mode netting window requires dual approval and posture state confirmation of NORMAL or LIMITED.
Evidence Outputs	Stress-mode cycle manifests tagged STRESS_MODE_CYCLE; window parameter change log; posture state transition records; consecutive failure count log; Governance Officer escalation records if threshold reached.
Failure Modes	Shortened window causes increased exclusions (late submissions unable to make window); detect via K8.2-QP-03. Increased cycle frequency causes funding confirmation bottlenecks; detect via funding confirmation latency monitoring.
Material Change Triggers	Change to stress-mode minimum window length; change to stress-mode cycle frequency; change to consecutive-failure escalation threshold; change to stress-mode concentration check frequency.

K7. Liquidity and Capital Efficiency (Operational, Non-Advocacy)

This table translates liquidity and capital dynamics into control objectives and evidence requirements. It does not make claims about commercial advantages.

Mode	Liquidity Demand Profile	Buffer Needs	Intraday Risk	Controls Required	Evidence Outputs
Atomic Gross DvP	Peak: full gross notional of all concurrent in-flight trades must be funded	Buffer sized to cover operator-configured maximum	Risk distributed across trade timeline; each	Per-trade funding availability check at DvP gate; intraday funding	Per-trade funding check log; intraday funding utilization log; concentration

Mode	Liquidity Demand Profile	Buffer Needs	Intraday Risk	Controls Required	Evidence Outputs
	simultaneously; demand is continuous and trade-arrival-dependent	concurrent in-flight trades × average trade notional + concentration allowance	trade independently contributes intraday exposure; no end-of-cycle spike	monitor; concentration check per trade	check log
Bilateral Netting	Moderate: net funding demand ≤ gross; reduction magnitude depends on bilateral flow symmetry; peak concentrated at end-of-cycle net settlement	Buffer sized to cover maximum expected net pay position per participant per cycle + operator-configured buffer percentage	Risk concentrated at net settlement execution; if net settlement fails, entire cycle's trades are at risk; bilateral failure impacts two participants	Funding sufficiency check at FUND state; net position anomaly detection; DvP discipline at net settlement	Funding confirmation log per cycle; net position distribution log; net DvP lock/release/finality records
Multilateral Netting	Low: maximum liquidity compression across all participants; net demand may approach theoretical minimum; peak at single multilateral settlement event	Buffer sized to cover maximum net pay position across all participants + operator-configured systemic buffer; systemic buffer larger than bilateral equivalent due to concentration of risk	Risk maximally concentrated at single multilateral settlement event; a single participant's failure can cascade across the full cycle if not isolated quickly	Concentration check per participant per cycle; partial participation failure mode (K4.3) controls; DvP discipline at net settlement; enhanced anomaly detection	Funding confirmation log per participant per cycle; concentration distribution log; partial-failure isolation records; multilateral net DvP evidence
Hybrid: Intraday netting + end-cycle atomic DvP (K6.1)	Moderate-low: netting compresses intraday demand; atomic DvP at cycle end requires full net position funding	Buffer = largest expected net position + atomic DvP buffer; less than gross atomic DvP but more predictable than pure netting	Risk split: accumulates during netting window; resolved at cycle-end atomic DvP; window length determines exposure accumulation rate	Netting window length governance; funding confirmation at FUND state; atomic DvP discipline at net settlement; window tightening in STRESS posture	Combined netting cycle manifest + net DvP evidence per K4.4 and K5.3
Hybrid: Tiered routing by value (K6.2)	Mixed: high-value trades drive continuous gross demand; low-value	Dual buffer: atomic DvP buffer for high-value queue + netting	High-value: continuous intraday risk per trade; low-	Both sets of controls applied independently; routing decision	Routing decision log; independent atomic DvP evidence for high-

Mode	Liquidity Demand Profile	Buffer Needs	Intraday Risk	Controls Required	Evidence Outputs
	flows drive cyclical net demand	buffer for low-value queue	value: concentrated at cycle end	log prevents threshold gaming	value; netting cycle evidence for low-value
OFFBOARDING posture (any mode)	Declining: no new submissions; existing obligations resolved in priority order per Appendix I.6	Buffer maintained until final open obligation resolved; not reduced until Open Breaks Attestation issued	Residual: open obligations in queue; risk diminishes as queue drains	Phase 2 Work List controls (Appendix I.6); posture state OFFBOARDING log; final cycle manifests tagged OFFBOARDING	Offboarding EP per Appendix I; final cycle manifests; Open Breaks Attestation

K8. Examiner Readiness: Standard Checks and Query Pack Inserts

K8.1 Standard Checks — Netting-Specific (12 Checks)

Check ID	Objective	Pass Condition	Fail Condition	Evidence Inputs	Frequency	Escalation Trigger	Retention Tag
NC-CHK-01	Netting input completeness and timestamping	Every submission in a cycle has: submission_id, trade_id, submission_timestamp, submitter_ref, instrument_category, notional, counterparty_ref — all populated	Any required field null or blank	Netting Input Set Manifest	Per cycle	Missing fields on > 1% of submissions in a cycle	NC_INPUT_[CycleID]
NC-CHK-02	Netting window compliance — no late inclusions without exception	All submission_timestamps ≤ window_close_timestamp; late-inclusion exceptions documented per K1.4	Any submission_timestamp > window_close_timestamp without a documented and dual-approved exception	Input set manifest; window parameter log	Per cycle	Any undocumented late inclusion	NC_INPUT_[CycleID]; NW_LATE_INCLUSION
NC-CHK-03	Computation reproducibility	Re-running the computation on the sealed input set (same hash) produces identical net	Any deviation between original computation and re-run	Netting Computation Summary; input set manifest	Weekly (sampled cycles); always after anomaly	Any deviation	NC_COMPUTE_[CycleID]

Check ID	Objective	Pass Condition	Fail Condition	Evidence Inputs	Frequency	Escalation Trigger	Retention Tag
		positions					
NC-CHK-04	Funding sufficiency at net settlement time	Each net payer's confirmed_balance ≥ net_position + operator-configured buffer at FUND state	Any net payer confirmed_balance < net_position + buffer	Funding confirmation log	Per cycle	Any net payer fails funding check	NC_FUND_[CycleID]
NC-CHK-05	DvP integrity at net settlement execution — lock symmetry	Every net position DvP has matching asset-leg lock_id and cash-leg lock_id referencing the same net_position_id	Any net position with unpaired lock records	Net DvP lock event logs	Per cycle	Any unpaired lock	NC_LOCK_[CycleID]; DVP_ANOMALY_[pos_id]
NC-CHK-06	Finality marker uniqueness per cycle	One and only one netting_cycle_finality_marker exists per cycle_id	Zero markers (cycle not finalized) or > 1 marker (duplicate finality)	Net Settlement Finality Proof Bundle	Per cycle	Duplicate or missing marker	NC_FINAL_MARKER_[CycleID]
NC-CHK-07	Concentration check compliance	No net position in a cycle exceeds operator-configured concentration threshold without documented Compliance Officer approval	Net position above threshold without approval	Netting Computation Summary; concentration check log; approval log	Per cycle	Threshold breach without approval	NC_COMPUTE_[CycleID]; approval record
NC-CHK-08	Trade splitting detection	No two submissions share a common economic reference (same underlying trade, same	Suspicious pair detected with time separation < threshold	Input set manifest; routing decision log (Pattern K6.2)	Daily (full input set scan)	Any suspicious pair detected	NC_INPUT_[CycleID]; anomaly record

Check ID	Objective	Pass Condition	Fail Condition	Evidence Inputs	Frequency	Escalation Trigger	Retention Tag
		counterparty pair, same instrument, different notionals) entered in the same cycle at < operator-configured minimum time separation					
NC-CHK-09	Yield boundary compliance	No P4 instrument submissions included in a P1/P2/P3 netting cycle without documented Compliance Officer approval	P4 submission in non-P4 cycle without approval	Input set manifest instrument_category field; gate NG-G03 log	Per cycle	Any P4 inclusion without approval	NC_INPUT_[CycleID]; YIELD_BOUNDARY_NETTING_EXCEPTION
NC-CHK-10	Cycle reconciliation completeness	Every trade_id in the input set manifest is accounted for in the cycle reconciliation checkpoint with a terminal outcome: SETTLED, FAILED, or RETURNED	Any trade_id with no outcome recorded	Cycle reconciliation checkpoint; input set manifest	Per cycle	Any unaccounted trade_id	NC_RECON_[CycleID]
NC-CHK-11	EP Delta cadence — netting cycles	An EP Delta is issued for every netting cycle; delta tag NC_DELTA_[CycleID] present in EP chain	Missing EP Delta for any completed cycle	EP chain index	Daily	Missing EP Delta	NC_DELTA_[CycleID]
NC-CHK-12	Anomaly detection — unexpected net exposure spikes	No participant's net position in a cycle deviates >	Deviation above threshold without investigation	Netting Computation Summary; rolling average	Per cycle	Spike above threshold	NC_COMPUTE_[CycleID]; anomaly investigation record

Check ID	Objective	Pass Condition	Fail Condition	Evidence Inputs	Frequency	Escalation Trigger	Retention Tag
		operator-configured spike threshold (% deviation from rolling average) without explanation	record	baseline; investigation records			

K8.2 Query Pack Inserts (Schema-Abstract Pseudocode; 10 Queries)

Usage note: The following queries are expressed in schema-abstract pseudocode. They reference field names as defined in the netting and atomic DvP evidence schemas above. They are illustrative; actual implementation adapts to the operator's logging infrastructure. No specific platform, database, or query language is implied.

QP-01 — Compare Gross vs Net Exposures by Participant and Time Window

// Purpose: Identify the compression ratio achieved by netting per participant per cycle.

// Examiner use: Verify that netting is providing meaningful compression; detect cycles

// where netting adds complexity with minimal liquidity benefit.

FOR EACH netting_cycle_id IN netting_cycles WHERE cycle_date BETWEEN [start] AND [end]:

FOR EACH participant_ref IN cycle.participants:

gross_buy = SUM(notional) WHERE submission.participant_ref = participant_ref

AND submission.direction = BUY

AND submission.cycle_id = netting_cycle_id

gross_sell = SUM(notional) WHERE submission.participant_ref = participant_ref

AND submission.direction = SELL

AND submission.cycle_id = netting_cycle_id

net_position = gross_buy - gross_sell // from NC_COMPUTE manifest

compression_ratio = (gross_buy + gross_sell - ABS(net_position))

/ (gross_buy + gross_sell)

OUTPUT: cycle_id, participant_ref, gross_buy, gross_sell, net_position, compression_ratio, cycle_date

```
ORDER BY compression_ratio ASC // Low ratio cycles warrant review
```

QP-02 — Detect Late Entries into Netting Set

```
// Purpose: Identify any submission included in a netting cycle with a timestamp
//           after window_close_timestamp.
// Examiner use: Confirm late-inclusion exception policy is being followed;
//           detect undocumented late inclusions.
```

```
SELECT submission_id, trade_id, submitter_ref, submission_timestamp,
       cycle_id, window_close_timestamp,
       (submission_timestamp - window_close_timestamp) AS lateness_seconds,
       late_inclusion_exception_id // NULL if no exception documented
FROM netting_input_set_manifest
WHERE submission_timestamp > window_close_timestamp
ORDER BY cycle_id, lateness_seconds DESC
```

```
// Flag rows where late_inclusion_exception_id IS NULL → undocumented late
inclusion
```

```
// Flag rows where exception exists but dual_approval_confirmed = FALSE →
incomplete approval
```

QP-03 — Detect Repeated Unwind / Timeout Clusters

```
// Purpose: Identify participants or instrument categories with repeated DVP
unwind
```

```
//           or timeout events within a configurable time window.
```

```
// Examiner use: Detect operational distress patterns, systematic funding
failures,
```

```
//           or configuration issues causing repeated settlement failures.
```

```
SELECT trade_id_or_net_position_id, participant_ref, instrument_category,
       event_type, // DVP_TIMEOUT or DVP_UNWIND or NC_OPEN_POSITION
       event_timestamp, cycle_id
FROM settlement_events
WHERE event_type IN ('DVP_TIMEOUT', 'DVP_UNWIND', 'NC_OPEN_POSITION')
       AND event_timestamp BETWEEN [start] AND [end]
```

AGGREGATE:

```
cluster_count = COUNT(*) GROUP BY participant_ref, instrument_category,  
DATE_TRUNC('day', event_timestamp)
```

```
// Flag: cluster_count > operator-configured daily threshold for same  
participant/category
```

```
// Output: participant_ref, instrument_category, date, cluster_count, event_ids  
ORDER BY cluster_count DESC
```

QP-04 — Detect Concentration Spikes Caused by Netting Compression

```
// Purpose: Identify cycles where netting compression has increased the relative  
// weight of a single participant's net position (concentration  
amplification).
```

```
// Examiner use: Verify concentration checks are effective; detect cases where  
// netting creates higher concentration than the underlying gross  
flows.
```

```
FOR EACH netting_cycle_id:
```

```
total_cycle_net_notional = SUM(ABS(net_position)) for all participants in  
cycle
```

```
FOR EACH participant_ref:
```

```
participant_net_weight = ABS(net_position_participant) /  
total_cycle_net_notional
```

```
gross_weight_avg = (gross_buy + gross_sell) / total_gross_cycle_notional
```

```
concentration_amplification = participant_net_weight - gross_weight_avg
```

```
// Flag: participant_net_weight > concentration_threshold
```

```
// OR concentration_amplification > operator-configured  
amplification_threshold
```

```
OUTPUT: cycle_id, participant_ref, participant_net_weight, gross_weight_avg,  
concentration_amplification, concentration_check_result, approval_ref
```

```
ORDER BY participant_net_weight DESC
```

QP-05 — Detect Trade Splitting (Threshold Gaming)

```
// Purpose: Identify potential deliberate splitting of a single trade into  
multiple
```

```
// submissions to avoid high-value routing threshold (Pattern K6.2).
```

```
// Examiner use: Confirm no participant is gaming the tiered routing decision matrix.
```

```
SELECT s1.submission_id, s1.trade_id, s1.participant_ref, s1.counterparty_ref,
       s1.instrument_category, s1.notional AS notional_1,
       s2.submission_id AS submission_id_2, s2.notional AS notional_2,
       (s1.notional + s2.notional) AS combined_notional,
       ABS(s1.submission_timestamp - s2.submission_timestamp) AS
time_delta_seconds,
       high_value_threshold
FROM netting_input_set_manifest s1
JOIN netting_input_set_manifest s2
  ON s1.participant_ref = s2.participant_ref
  AND s1.counterparty_ref = s2.counterparty_ref
  AND s1.instrument_category = s2.instrument_category
  AND s1.cycle_id = s2.cycle_id
  AND s1.submission_id < s2.submission_id // avoid self-join duplication
WHERE s1.notional < high_value_threshold
      AND s2.notional < high_value_threshold
      AND (s1.notional + s2.notional) >= high_value_threshold
      AND ABS(s1.submission_timestamp - s2.submission_timestamp)
          < operator_configured_split_detection_window_seconds
// Output: suspicious pairs for manual review
```

QP-06 — Trace Net Settlement from Input Set → Computation → DvP Execution → Finality Marker

```
// Purpose: End-to-end audit trace of a specific netting cycle.
// Examiner use: Reconstruct the full settlement chain for any cycle; verify
//               that every input trade is accounted for in the finality record.
```

STEP 1 – Input set:

```
SELECT * FROM netting_input_set_manifest WHERE cycle_id = [target_cycle_id]
→ Returns: all submissions; input_set_hash
```

STEP 2 – Computation:

```
SELECT * FROM netting_computation_summary WHERE cycle_id = [target_cycle_id]
```

VERIFY: computation_input_set_hash = input_set_hash from STEP 1

→ Returns: net positions per participant; approvals chain

STEP 3 – Funding confirmation:

```
SELECT * FROM funding_confirmation_log WHERE cycle_id = [target_cycle_id]
```

→ Returns: per net payer: confirmed_balance, net_position, buffer_satisfied

STEP 4 – DvP execution:

```
SELECT * FROM net_dvp_lock_events WHERE cycle_id = [target_cycle_id]
```

```
SELECT * FROM net_dvp_release_events WHERE cycle_id = [target_cycle_id]
```

VERIFY: every net_position_id from STEP 2 has both lock and release records

STEP 5 – Finality:

```
SELECT * FROM finality_markers WHERE cycle_id = [target_cycle_id]
```

VERIFY: exactly one netting_cycle_finality_marker for cycle_id

STEP 6 – Reconciliation:

```
SELECT * FROM cycle_reconciliation_checkpoint WHERE cycle_id =  
[target_cycle_id]
```

VERIFY: every trade_id from STEP 1 has a terminal outcome
(SETTLED/FAILED/RETURNED)

OUTPUT: Full trace report; flag any step where verification fails

QP-07 — Netting Cycle Failure Rate Over Time

// Purpose: Track cycle failure rate (partial or full cancellation) over time.

// Examiner use: Identify systemic operational stress; confirm stress-mode
controls

// are effective; detect deteriorating operational performance.

```
SELECT DATE_TRUNC('week', cycle_date) AS week,  
       COUNT(*) AS total_cycles,  
       COUNT(*) FILTER (WHERE cycle_outcome = 'COMPLETED') AS completed,  
       COUNT(*) FILTER (WHERE cycle_outcome = 'PARTIAL') AS partial,  
       COUNT(*) FILTER (WHERE cycle_outcome = 'CANCELLED') AS cancelled,  
       (COUNT(*) FILTER (WHERE cycle_outcome IN ('PARTIAL', 'CANCELLED'))
```

```

        / COUNT(*)::FLOAT) * 100 AS failure_rate_pct
FROM netting_cycle_summary
WHERE cycle_date BETWEEN [start] AND [end]
GROUP BY week
ORDER BY week ASC
// Flag: failure_rate_pct > operator-configured alert threshold

```

QP-08 — Yield Boundary Compliance Across Netting Cycles

```

// Purpose: Confirm no P4 instruments were included in P1/P2/P3 netting cycles
//           without documented approval.
// Examiner use: Verify yield separation discipline is maintained at the netting
// level.

```

```

SELECT cycle_id, submission_id, trade_id, submitter_ref, instrument_category,
       gate_NG_G03_result, compliance_officer_exception_id, exception_timestamp
FROM netting_input_set_manifest
WHERE instrument_category = 'P4'
      AND gate_NG_G03_result != 'EXCLUDED_NO_EXCEPTION'
// Returns: all P4 submissions that were not excluded at gate NG-G03
// For each: verify compliance_officer_exception_id IS NOT NULL
// Flag rows with NULL exception_id → P4 included without approval

```

QP-09 — Posture State vs Netting Window Parameter Alignment

```

// Purpose: Confirm netting window parameters are consistent with declared
// posture state.
// Examiner use: Verify that stress-mode window tightening was applied when
// required;
//           detect cycles that ran with normal-mode parameters during STRESS
// posture.

```

```

SELECT cycle_id, cycle_start_timestamp, declared_posture_state,
       netting_window_seconds, normal_mode_window_seconds,
       stress_mode_minimum_window_seconds,
       CASE WHEN declared_posture_state = 'STRESS'
            AND netting_window_seconds > stress_mode_minimum_window_seconds
            THEN 'MISALIGNED'

```

```

        ELSE 'ALIGNED'
    END AS alignment_status,
    window_change_ep_delta_ref // EP Delta reference for parameter change
FROM netting_cycle_parameter_log
WHERE cycle_date BETWEEN [start] AND [end]
// Flag: alignment_status = 'MISALIGNED' → cycle ran with non-stress window
during STRESS posture

```

QP-10 — Input Set Hash Chain Integrity Across Cycles

```

// Purpose: Verify that sealed input set hashes form an unbroken, reproducible
chain.

// Examiner use: Confirm no netting input set was retroactively modified;
//               detect any integrity failure in the netting audit chain.

SELECT cycle_id, cycle_date, input_set_hash,
       computation_manifest_input_hash,
       (input_set_hash = computation_manifest_input_hash) AS hash_match,
       previous_cycle_finality_marker_hash,
       chain_link_verified
FROM netting_cycle_hash_chain_log
ORDER BY cycle_date ASC

// Flag: hash_match = FALSE → computation manifest references different input
set than sealed manifest

// Flag: chain_link_verified = FALSE → break in sequential hash chain between
cycles

```

K9. Templates (Paste-Ready)

K9.1 Netting Cycle Manifest Template

NETTING CYCLE MANIFEST

Cycle ID: NC-[YYYYMMDD]-[CycleNumber]

Cycle Type: [BILATERAL / MULTILATERAL]

Posture State at Cycle Open: [NORMAL / LIMITED / STRESS]

Program ID: [Program identifier]

CYCLE TIMELINE

Window open timestamp (UTC):

Window close timestamp (UTC):
VALIDATE state complete (UTC):
COMPUTE NET state complete (UTC):
FUND state complete (UTC):
DvP SETTLE state complete (UTC):
FINALIZE state complete (UTC):
Cycle outcome: [COMPLETED / PARTIAL / CANCELLED]

NETTING WINDOW PARAMETERS

Window length (seconds):
Operator-configured mode: [NORMAL / STRESS]
Stress-mode minimum applied: [YES / NO]
Window parameter change EP Delta ref (if changed this cycle):

INPUT SET SUMMARY

Total submissions received:
Submissions excluded at gate: [count] – see exclusion log
Submissions validated and included:
Input set sealed at (UTC):
Input set hash (SHA-256):

EXCLUSIONS

Submission ID	Gate ID	Failed	Exclusion Reason	Participant Notified (Y/N)
---	---	---	---	---
...

PRECONDITIONS GATES (per K4.2)

NG-G01 (Eligibility): [PASS / FAIL count]
NG-G02 (Hold Status): [PASS / FAIL count]
NG-G03 (Category Homogeneity): [PASS / FAIL count / EXCEPTION count]
NG-G04 (Window Compliance): [PASS / FAIL count / EXCEPTION count]
NG-G05 (Concentration Pre-Check): [PASS / FAIL count / ESCALATION count]
NG-G06 (Disclosure Version): [PASS / FAIL count]
NG-G07 (Duplicate Check): [PASS / FAIL count]

NET POSITIONS SUMMARY (reference to Computation Summary K9.2)

Computation Summary ID:

Net positions computed: [count]

Largest net position (notional): [value – no participant identification for summary]

Concentration threshold breached: [YES / NO] – if YES, see approval log

SETTLEMENT OUTCOME

Net positions settled:

Net positions failed/residual:

Cycle reconciliation checkpoint ref:

Netting cycle finality marker ID:

Finality marker timestamp (UTC):

APPROVALS AND ATTESTATIONS

Settlement Operator: _____ Timestamp (UTC): _____

Compliance Officer: _____ Timestamp (UTC): _____

Governance Officer (required if: partial cycle, exception, or STRESS mode):
_____ Timestamp (UTC): _____

EP DELTA REFERENCE

EP Delta ID: NC_DELTA_[CycleID]

EP Delta hash:

Previous EP Delta hash (chain link):

Document hash (SHA-256): _____

K9.2 Netting Computation Summary Template (Schema-Abstract)

NETTING COMPUTATION SUMMARY

Computation ID: NC_COMPUTE-[CycleID]

Cycle ID: [NC-YYYYMMDD-NNN]

Computation timestamp (UTC):

Computation method reference: [operator-documented method identifier – no implementation detail]

Input set hash (must match NC_INPUT manifest hash):

REPRODUCIBILITY ATTESTATION

Computation produces deterministic output for this input set: [YES / NO]

Reproducibility test last run: [timestamp] Result: [PASS / FAIL]

NET POSITIONS TABLE (per participant / per counterparty pair for bilateral)

Position ID	Participant Ref	Counterparty Ref (bilateral) or MULTILATERAL	Instrument Category	Gross Buy Notional	Gross Sell Notional	Net Position	Direction	Net Position as % of Cycle Total
-------------	-----------------	--	---------------------	--------------------	---------------------	--------------	-----------	----------------------------------

|---|---|---|---|---|---|---|---|---|

NP-001	[ref]	[ref / MULTILATERAL]	P1	PAY / RECEIVE	...
--------	-------	----------------------	----	-----	-----	-----	---------------	-----

APPROVALS CHAIN (if required by program governance for cycle execution)

Approver Role	Approval Timestamp (UTC)	Scope of Approval
---------------	--------------------------	-------------------

|---|---|---|

Settlement Operator	...	Computation verified; proceed to FUND state
---------------------	-----	---

Compliance Officer (if concentration threshold approached)	...	Concentration review completed
--	-----	--------------------------------

Governance Officer (if exception condition)	...	Exception approved
---	-----	--------------------

ANOMALY FLAGS

Net position anomaly threshold: [operator-configured value]

Positions flagged as anomalous: [count] – if > 0, see anomaly investigation records

Anomaly investigation record refs:

COMPUTATION HASH (SHA-256 of net positions table in canonical order):

Document hash (SHA-256 of full computation summary): _____

Input set hash cross-reference confirmed: [YES / NO]

K9.3 Net Settlement Finality Proof Bundle Checklist

NET SETTLEMENT FINALITY PROOF BUNDLE CHECKLIST

Cycle ID: [NC-YYYYMMDD-NNN]

Bundle assembled at (UTC):

Assembled by (Settlement Operator):

REQUIRED COMPONENTS – CHECK ALL PRESENT AND HASH-VERIFIED

- Netting Cycle Manifest (K9.1)

Manifest ID: _____ Hash: _____

- Netting Computation Summary (K9.2)

Computation ID: _____ Hash: _____

Input set hash cross-reference: [VERIFIED / MISMATCH]

- Funding Confirmation Log (per net payer)

Log ID: NC_FUND_[CycleID] Hash: _____

All net payers funded: [YES / NO – if NO, see failure mode record]

- Net DvP Lock Event Log (per net position)

Log ID: NC_LOCK_[CycleID] Hash: _____

All net positions have lock records: [YES / NO]

- Net DvP Release Event Log (per net position)

Log ID: NC_RELEASE_[CycleID] Hash: _____

All net positions have release records: [YES / NO]

Lock-release symmetry check: [PASS / FAIL]

- Netting Cycle Finality Marker

Marker ID: NC_FINAL_MARKER_[CycleID] Hash: _____

Marker uniqueness confirmed (no duplicate for this cycle_id): [YES / NO]

Marker timestamp (UTC):

- Cycle Reconciliation Checkpoint

Checkpoint ID: NC_RECON_[CycleID] Hash: _____

All trade_ids accounted for: [YES / NO]

Unaccounted trade_ids: [count – must be zero for PASS]

- EP Delta for this cycle

Delta ID: NC_DELTA_[CycleID] Hash: _____

Chain link to previous EP Delta verified: [YES / NO]

EXCEPTION RECORDS (attach if any box above is NO)

- Partial cycle failure record (if applicable): NC_PARTIAL_FUND_FAIL_[CycleID]
- Late-inclusion exception record (if applicable): NW_LATE_INCLUSION_[sub_id]
- Concentration exception approval (if applicable): Compliance Officer approval record
- Yield boundary exception record (if applicable):
YIELD_BOUNDARY_NETTING_EXCEPTION

FINALITY DETERMINATION

- All required components present and hash-verified.
- No open net positions (or residuals documented in Open Breaks Attestation Appendix H.5.6).
- Cycle reconciliation shows zero unaccounted trade_ids.
- Finality marker is unique and timestamp is within cycle finalization window.

OPERATIONAL FINALITY CONDITIONS MET: [YES / NO – if NO, list outstanding conditions]

ATTESTATION

Settlement Operator: _____ Timestamp (UTC): _____

Compliance Officer: _____ Timestamp (UTC): _____

Bundle hash (SHA-256 of all component hashes concatenated in canonical order):

K9.4 Incident / Anomaly Preservation Checklist for Netting Cycles

NETTING CYCLE INCIDENT / ANOMALY PRESERVATION CHECKLIST

Incident / Anomaly ID: NC-ANOM-[YYYYMMDD]-[NNN]

Cycle ID affected: [NC-YYYYMMDD-NNN]

Preservation triggered at (UTC):

Triggered by (automated / manual):

Trigger description:

PRESERVATION SCOPE – CHECK ALL ITEMS FROZEN AND HASH-RECORDED

- Netting Input Set Manifest at time of trigger
Snapshot hash: _____ Freeze timestamp (UTC): _____
- Netting Computation Summary at time of trigger (if COMPUTE NET state reached)
Snapshot hash: _____ Freeze timestamp (UTC): _____
- All gate logs (NG-G01 through NG-G07) for affected cycle
Log set hash: _____
- Funding confirmation log at time of trigger (if FUND state reached)
Snapshot hash: _____
- All lock and release event logs up to trigger timestamp
Lock log hash: _____ Release log hash: _____
- Anomaly alert record / automated trigger record
Alert ID: _____ Alert hash: _____
- System state log at trigger timestamp (posture state, active parameters)
State log hash: _____
- Any participant communications relevant to the incident
Communication log hash: _____
- EP Delta issued at trigger: NC_DELTA_[CycleID] capturing trigger event
Delta hash: _____

INCIDENT CLASSIFICATION (initial)

- [] Data error (computation / input field error)
- [] Netting drift / anomalous net exposure spike
- [] Late break (disputed submission post-window-close)
- [] Partial participation / funding failure
- [] Concentration threshold breach without approval
- [] Yield boundary violation
- [] Lock-release asymmetry

[] Hash chain integrity failure

[] Other: _____

IMMEDIATE CONTAINMENT ACTIONS TAKEN

| Action | Actor | Timestamp (UTC) |

|---|---|---|

| Cycle paused: [YES / NO] | ... | ... |

| Governance Officer notified: [YES / NO] | ... | ... |

| Supervisory notification required: [YES / NO] | ... | ... |

| Affected submissions returned to gross state: [YES / NO – count] | ... | ... |

PRESERVATION ATTESTATION

All items above are frozen in immutable storage as of:

Preservation timestamp (UTC):

Frozen by (Settlement Operator): _____

Reviewed by (Compliance Officer): _____

Preservation bundle hash (SHA-256 of all frozen item hashes concatenated):

Supervisory access: Preserved bundle accessible via Tier 1/Tier 2 access per baseline tiered access model; purpose limitation and TTL disciplines apply.

Appendix L — Capital Efficiency & Intraday Liquidity Impact Analysis (Operational) (Non-Normative)

Classification: Operational Measurement Framework — Paste-Ready

Baseline Anchors: Baseline A (FCCK Pilot Proposal and No-Action Request); Baseline B (Operationalization Track, Dec 2025); Baseline C (FCCK Pilot Operational Assurance Artifacts Addendum, 20260113); Baseline D (FCCK Companion Stable-Value Oversight, 20260217)

Parent Document: Payments & Settlement Constitution: Stable-Value Rails, Tokenized Deposits, Wholesale Settlement, and Atomic DvP Finality (Examiner-Ready Operating Model and Evidence Artifacts) (Non-Normative)

L0. Non-Normative Note: Measurement, Not Claims

This appendix defines an operational measurement framework for assessing how different settlement modes and operating conditions affect intraday liquidity demand, prefunding requirements, settlement completion timing, fail rates, and capital usage associated with settlement frictions within the stable-value settlement rail.

This appendix does:

- Define a reproducible, evidence-backed metrics catalog derived from immutable logs and standard artifacts established in this constitution and its baselines.
- Provide comparison templates, examiner validation workflows, and packaging constructs that operators and examiners can use to assess settlement mode impacts over a defined observation period.
- Map stress-mode triggers to expected metric shifts and required evidence outputs.
- Apply the tiered supervision discipline (Tier 0 / Tier 1 / Tier 2) to metric aggregation, ensuring purpose limitation and data minimization govern the level of detail exposed at each supervisory layer.

This appendix does not:

- Guarantee, promise, or advocate for any specific outcome in terms of liquidity savings, capital reduction, or operational efficiency.
- Make legal conclusions. No statement constitutes legal finality, legal netting enforceability, or a regulatory determination.
- Endorse or reference specific banks, central counterparties, central securities depositories, payment networks, or platforms.
- Mandate fixed numeric thresholds. All bands are configurable by the operator within program governance parameters and subject to recertification cadence and material change governance.
- Introduce new supervisory tier systems. The Tier 0 / Tier 1 / Tier 2 framework established in the baseline documents governs all metric aggregation and access levels in this appendix.

Positioning: The metrics and templates in this appendix produce evidence artifacts that feed into Evidence Packs (EP) and EP Deltas as defined in Baselines B and C. They do not create new artifact types; they populate existing EP categories with liquidity- and capital-impact-specific measurement data.

L1. Measurement Scope and Scenarios

The following six scenarios define the primary comparison dimensions for this impact analysis framework. Each scenario specifies scope, observation time window, and evidence sources. Operators select the applicable scenario set based on their program configuration; all selected scenarios must be documented in the program governance record and are subject to recertification cadence.

Scenario ID	Name	Description	Scope	Observation Time Window	Primary Evidence Sources
SC-01	Atomic Gross DvP — Baseline	All settlements executed as individual atomic DvP trades with no netting; cash-leg and asset-leg	All participant types; all instrument categories P1–P3; normal posture	Configurable: minimum 5 consecutive business days; recommended 20 business days for statistical validity	Per-trade lock/release event logs; DvP finality markers; funding availability check logs; intraday funding utilization log

Scenario ID	Name	Description	Scope	Observation Time Window	Primary Evidence Sources
		settled per-trade simultaneously.			
SC-02	Multilateral Netting — End-of-Cycle Atomic DvP	Trade submissions collected in defined netting windows; net positions settled via atomic DvP at cycle close per Appendix K, K6.1.	Same participant scope as SC-01; netting-eligible flows only	Same window as SC-01; run concurrently for direct comparison	Netting cycle manifests; computation summaries; net DvP lock/release logs; cycle finality markers; funding confirmation logs per cycle
SC-03	Short Netting Window vs Long Netting Window	Comparison of netting cycle outcomes with operator-configured short window (lower bound of configurable band) vs long window (upper bound).	Multilateral netting participant set	Minimum 10 business days per window configuration; windows compared over same calendar period where feasible	Netting cycle manifests by window configuration; queue depth logs; late-inclusion exception records; funding confirmation timing logs
SC-04	Normal Posture vs Stress Posture	Comparison of all settlement mode metrics across normal-posture operating periods and stress-posture periods (including liquidity gate activations).	All participant types; all modes active	Full observation period including any STRESS posture events; minimum one STRESS posture event required for meaningful stress comparison; if no event occurs, use synthetic stress scenario with documented governance approval	Posture state logs; liquidity gate activation/deactivation records; stress-mode cycle manifests; escalation logs; EP Deltas tagged STRESS_STATE_CHANGE
SC-05	Stable-Value Rail (P1/P2) vs Tokenized Deposit Rail (P2 variant)	Comparison of cash-leg settlement mechanics and intraday liquidity dynamics between Category P1 (payment/settlement stable-value instrument) and Category P2 (tokenized deposit) as cash-leg instruments.	Participants using both instrument categories; identical asset-leg flows used for comparability	Same observation window as SC-01	Instrument category logs; cash-leg lock/release events by instrument category; redemption queue logs; funding source confirmation logs by instrument type
SC-06	Tiered	Comparison of	All participant	Same observation	Participant class rollup logs

Scenario ID	Name	Description	Scope	Observation Time Window	Primary Evidence Sources
	Participant Class Comparison	intraday liquidity and settlement performance metrics across participant classes (e.g., high-volume vs low-volume; prefunded vs credit-line-funded) without identifying individual participants at Tier 0.	types; aggregated by class	window as SC-01	(aggregate only; Tier 0 by default); funding source type logs; per-class queue depth and fail rate aggregates

L2. Metrics Dictionary

The following catalog defines 36 operational metrics for use in this impact analysis framework. Each metric specifies its definition, abstract data source, aggregation level aligned with the baseline tiered supervision model, reporting cadence band, alert threshold band (configurable), and evidence output tag.

Aggregation levels:

- **Tier 0:** Aggregate statistics only; no individual participant or trade identification; default for all routine reporting.
- **Tier 1:** Participant-class or cycle-level aggregates; accessible under routine supervisory analytics with purpose limitation and TTL.
- **Tier 2:** Trade-level or participant-level detail; accessible only under objective trigger conditions with dual approval and post-event review per baseline tiered access model.

Metric ID	Name	Definition	Data Source (Abstract)	Aggregation Level	Reporting Cadence Band	Alert Threshold Band	Evidence Output Tag
LQ-01	Intraday Liquidity Buffer Utilization — Peak	Maximum ratio of cash-leg locks simultaneously outstanding to total available funding at any point in the observation day. Expressed as a percentage.	Intraday funding utilization log; cash-leg lock event log	Tier 0 (aggregate across all participants) ; Tier 1 (per participant class)	Daily	Configurable; illustrative: warn ≥ 70%, alert ≥ 85%	IL_METRIC_[Date]
LQ-02	Intraday Liquidity Buffer Utilization — Average	Mean ratio of cash-leg locks outstanding to available funding across all intraday	Intraday funding utilization log	Tier 0	Daily	Configurable; illustrative: warn ≥ 50%, alert ≥ 70%	IL_METRIC_[Date]

Metric ID	Name	Definition	Data Source (Abstract)	Aggregation Level	Reporting Cadence Band	Alert Threshold Band	Evidence Output Tag
		observation points (e.g., per 15-minute interval).					
LQ-03	Liquidity Compression Ratio (Netting)	For netting cycles: ratio of net settled notional to gross submitted notional per cycle. Formula: (Gross Notional – Net Notional) / Gross Notional. Higher ratio = greater compression.	Netting computation summary; input set manifest	Tier 0 (cycle aggregate); Tier 1 (by participant class)	Per cycle; daily summary	Configurable; alert if ratio unexpectedly low (suggesting netting is not compressing as expected)	NC_COMPUTE_[CycleID]
LQ-04	Prefunding Ratio by Participant Class	For each participant class: ratio of prefunded cash-leg balance to total settlement obligations submitted in observation window. Formula: Prefunded Balance / Gross Submitted Notional.	Funding source confirmation log; participant class rollup	Tier 1	Daily	Configurable; alert if ratio < operator-configured minimum prefunding floor	IL_METRIC_[Date]
LQ-05	Credit Line Utilization Rate	For participants using intraday credit lines: ratio of credit line drawn to credit line limit at peak and average.	Funding source confirmation log; credit line type flag	Tier 1	Daily	Configurable; alert if utilization ≥ 90% at any point	IL_METRIC_[Date]
LQ-06	Funding Source Availability — Uptime	Percentage of intraday observation window during which each funding source type was confirmed available.	Funding source health monitor log	Tier 0	Daily	Alert if any primary funding source unavailable > operator-configured downtime tolerance	FS_HEALTH_[Date]
LQ-07	Intraday Velocity Proxy	Number of DvP settlement events (atomic or net) completed per hour in each hourly band. Reflects throughput	Finality marker log; settlement event log	Tier 0	Hourly; daily summary	Alert if velocity drops > operator-configured threshold vs prior-period	IL_METRIC_[Date]

Metric ID	Name	Definition	Data Source (Abstract)	Aggregation Level	Reporting Cadence Band	Alert Threshold Band	Evidence Output Tag
		of the settlement layer.				baseline (potential congestion signal)	
LQ-08	Queue Wait Time — p50	Median time from submission of a DvP or redemption request to settlement execution or first processing action.	Queue depth log; submission timestamp; processing timestamp	Tier 0	Per cycle (netting); daily (atomic)	Configurable; alert if p50 > operator-configured SLA	QD_METRIC_[Date]
LQ-09	Queue Wait Time — p95	95th-percentile time from submission to processing action. Measures tail experience.	Queue depth log	Tier 0	Per cycle; daily	Configurable; alert if p95 > 3× p50 (disproportionate tail) or > absolute SLA threshold	QD_METRIC_[Date]
LQ-10	Queue Depth — Peak	Maximum number of submissions simultaneously in the settlement queue at any point during the observation window.	Queue depth log	Tier 0	Hourly; daily peak	Configurable; alert if peak ≥ operator-configured maximum queue depth	QD_METRIC_[Date]
LQ-11	Queue Depth — Average	Mean number of submissions in queue across all intraday observation intervals.	Queue depth log	Tier 0	Daily	Alert if average queue depth persistently rising over rolling observation period	QD_METRIC_[Date]
TF-01	Time-to-Finality — p50 (Atomic DvP)	Median elapsed time from DvP submission to operational finality marker issuance, measured for atomic DvP trades.	Submission log; finality marker log	Tier 0	Daily	Configurable; alert if p50 > operator-configured target	DVP_FINAL_MARKER_[trade_id]; IL_METRIC_[Date]
TF-02	Time-to-Finality — p95 (Atomic DvP)	95th-percentile elapsed time from submission to finality marker, atomic DvP.	Submission log; finality marker log	Tier 0	Daily	Configurable; alert if p95 > 3× p50	IL_METRIC_[Date]

Metric ID	Name	Definition	Data Source (Abstract)	Aggregation Level	Reporting Cadence Band	Alert Threshold Band	Evidence Output Tag
TF-03	Time-to-Finality — p50 (Net Settlement)	Median elapsed time from netting window open to netting cycle finality marker issuance. Measures full cycle latency.	Netting cycle manifest; cycle finality marker	Tier 0	Per cycle	Configurable; alert if p50 exceeds cycle SLA	NC_FINAL_MARKER_[CycleID]; IL_METRIC_[Date]
TF-04	Time-to-Finality — p95 (Net Settlement)	95th-percentile cycle latency.	Netting cycle manifest	Tier 0	Per cycle	Configurable	IL_METRIC_[Date]
TF-05	Inter-Cycle Gap	Elapsed time between the finality timestamp of one netting cycle and the open timestamp of the next. Measures continuity of settlement coverage.	Netting cycle manifests (sequential)	Tier 0	Daily	Alert if gap > operator-configured maximum inter-cycle gap	NC_INPUT_[CycleID]
SF-01	Settlement Fail Rate — Atomic DvP	Ratio of DvP timeout events to total DvP submissions in observation window. Formula: $\text{timeout_count} / \text{submission_count}$.	DvP timeout event log; submission log	Tier 0	Daily	Configurable; alert if rate > operator-configured fail rate ceiling	DVP_TIMEOUT_[trade_id]; IL_METRIC_[Date]
SF-02	Settlement Fail Rate — Net Settlement	Ratio of failed or cancelled netting cycles (partial or full) to total cycles in observation window.	Netting cycle manifests; cycle outcome log	Tier 0	Daily; per cycle	Configurable; alert if rate > operator-configured ceiling	NC_DELTA_[CycleID]; IL_METRIC_[Date]
SF-03	Unwind Frequency — Atomic DvP	Number of DvP unwind events per observation day. Broken down by unwind trigger type: TIMEOUT / MISMATCH / FUNDING_UNAVAIL / GOVERNANCE.	DvP unwind records (DVP_UNWIND_[trade_id]); unwind cause log	Tier 0 (count by cause); Tier 1 (by instrument category)	Daily	Alert if any single cause type > operator-configured daily threshold	DVP_UNWIND_[trade_id]; IL_METRIC_[Date]
SF-04	Unwind Frequency	Number of net position unwind	Net position unwind	Tier 0	Daily	Alert if net position	NC_OPEN_POSITION_[CycleID]

Metric ID	Name	Definition	Data Source (Abstract)	Aggregation Level	Reporting Cadence Band	Alert Threshold Band	Evidence Output Tag
	— Net Positions	events per observation day, with cause breakdown.	records; netting cycle manifests			unwind rate > operator-configured threshold	; IL_METRIC_[Date]
SF-05	Retry Rate — Lock Confirmation	Ratio of DvP lock confirmation retries to total lock attempts. High retry rate indicates funding source or asset registry latency.	Lock confirmation retry log	Tier 0	Daily	Alert if retry rate > operator-configured ceiling	DVP_CONFIRM_[trade_id]; IL_METRIC_[Date]
CN-01	Net Exposure Concentration — Largest Net Position as % of Cycle Total	For each netting cycle: largest single net position as a percentage of total cycle net notional.	Netting computation summary	Tier 0 (% metric only; no participant identification)	Per cycle	Alert if % > operator-configured concentration threshold	NC_COMPUTE_[CycleID]
CN-02	Gross Exposure Concentration — Largest Participant as % of Daily Gross	Largest single participant's gross submitted notional as a percentage of total daily gross. Measured in Tier 0 aggregate.	Submission log aggregate	Tier 0	Daily	Alert if % > operator-configured gross concentration threshold	IL_METRIC_[Date]
CN-03	Netting Concentration Amplification	Difference between a participant class's weight in net positions vs its weight in gross submissions (per Appendix K, QP-04 logic). Positive value indicates netting is concentrating this class's risk.	Netting computation summary; submission log	Tier 1 (by class; no individual identification)	Per cycle	Alert if amplification > operator-configured amplification threshold	NC_COMPUTE_[CycleID]
CN-04	Large-Holder Redemption Pressure Index	Ratio of redemption requests from the top-N participant class (by holding size) to total redemption requests in a rolling window. Proxy for run-like	Redemption queue log; participant class rollup	Tier 0	Hourly during stress; daily in normal posture	Alert if index > operator-configured threshold (approaching liquidity gate LG-T02 per Appendix H)	QD_METRIC_[Date]; LG_ALERT

Metric ID	Name	Definition	Data Source (Abstract)	Aggregation Level	Reporting Cadence Band	Alert Threshold Band	Evidence Output Tag
		dynamics indicator.					
GA-01	Liquidity Gate Activation Frequency	Number of liquidity gate activations in observation window.	Gate activation log	Tier 0	Weekly; per event	Alert if > operator-configured frequency threshold in rolling 30-day window	LG_GATE_ACTIVATION
GA-02	Liquidity Gate Duration — Average	Mean duration of liquidity gate events from activation to deactivation.	Gate activation log; deactivation log	Tier 0	Per event; monthly summary	Alert if average duration > operator-configured threshold	LG_LIFECYCLE_[GateID]
GA-03	Liquidity Gate Duration — Maximum	Maximum single gate duration in observation window.	Gate activation log; deactivation log	Tier 0	Per event	Alert if maximum duration > operator-configured threshold	LG_LIFECYCLE_[GateID]
GA-04	Gate Trigger Type Distribution	Count and percentage breakdown of gate activations by trigger type (LG-T01 through LG-T05 per Appendix H).	Gate activation log trigger type field	Tier 0	Monthly	Alert if any single trigger type dominates (> operator-configured % of total activations)	LG_GATE_REQUEST
CL-01	Collateral / Cash-Leg Lock Duration — Average	Mean duration of cash-leg locks from initiation to release (settled, unwound, or timed out). Proxy for average capital immobilization per settlement.	Cash-leg lock event log; release event log	Tier 0	Daily	Alert if average duration > operator-configured target (indicates slow settlement or timeout clustering)	DVP_LOCK_CASH_[trade_id]
CL-02	Collateral / Cash-Leg Lock Duration — p95	95th-percentile lock duration.	Cash-leg lock event log	Tier 0	Daily	Alert if p95 > operator-configured ceiling	IL_METRIC_[Date]
CL-03	Asset-Leg Lock	Mean duration of asset-leg locks from	Asset-leg lock event	Tier 0	Daily	Alert if average	DVP_LOCK_ASSET_[trade_id]

Metric ID	Name	Definition	Data Source (Abstract)	Aggregation Level	Reporting Cadence Band	Alert Threshold Band	Evidence Output Tag
	Duration — Average	initiation to release.	log; release event log			duration > operator-configured target	
CL-04	Asset-Leg Lock Duration — p95	95th-percentile asset-leg lock duration.	Asset-leg lock event log	Tier 0	Daily	Alert if p95 > operator-configured ceiling	IL_METRIC_[Date]
PF-01	Prefunding Adequacy — Buffer Headroom	For each funding cycle: ratio of available-but-unused prefunded balance to total prefunded balance at cycle close. Measures headroom remaining after settlement obligations are met.	Funding confirmation log; end-of-cycle balance log	Tier 1 (by participant class)	Per cycle; daily	Alert if headroom < operator-configured minimum buffer floor (potential underfunding signal)	NC_FUND_[CycleID]; IL_METRIC_[Date]
PF-02	Intraday Funding Shortfall Events	Count of instances where a participant's available balance fell below the net position + buffer requirement during a funding check. Does not imply settlement failure; shortfall may be resolved before timeout.	Funding availability check log; shortfall event log	Tier 0 (count); Tier 1 (by participant class)	Daily	Alert if count > operator-configured daily shortfall ceiling	NC_FUND_[CycleID]; IL_METRIC_[Date]
PF-03	Settlement Efficiency Index	Ratio of successfully settled notional to total submitted notional in observation window. Formula: settled_notional / submitted_notional. Captures both fail rate and partial settlement effects.	Settlement event log; submission log; finality marker log	Tier 0	Daily	Alert if index < operator-configured minimum efficiency floor	IL_METRIC_[Date]

L3. Evidence Inputs and Integrity Requirements

Metric Group	Required Artifacts	Integrity Checks	Retention Tag	Preservation Trigger
Intraday Liquidity (LQ-01 through LQ-07)	Intraday funding utilization log; cash-leg lock event log; funding source health monitor log; netting computation summary (for LQ-03); participant class rollup (for LQ-04/LQ-05)	Hash chain continuity on funding utilization log; timestamp synchronization within operator-configured tolerance (e.g., < 1 second skew vs authoritative time source); funding source confirmation cross-reference	IL_METRIC_[Date]	Any LQ-01 or LQ-02 alert breach; any funding source downtime event > tolerance; any LQ-04 prefunding shortfall
Queue Depth and Wait Time (LQ-08 through LQ-11)	Queue depth log; submission timestamp log; processing timestamp log	Timestamp ordering: every queue entry must have submission_timestamp ≤ processing_timestamp; queue depth log must be append-only (tamper-evident); queue depth count cross-validated against submission log record count	QD_METRIC_[Date]	Any LQ-09 tail alert (p95 > 3× p50); any queue depth peak breach; any manual queue intervention by Settlement Operator
Time-to-Finality (TF-01 through TF-05)	Submission log; DvP finality marker log (DVP_FINAL_MARKER); netting cycle finality marker log (NC_FINAL_MARKER); netting cycle manifests	Finality marker uniqueness enforced (one per trade_id / one per cycle_id); timestamp delta between submission and finality marker is non-negative and bounded by operator-configured maximum settlement window; hash chain verified on marker log	DVP_FINAL_MARKER_[trade_id]; NC_FINAL_MARKER_[Cycle ID]	Any TF-02 or TF-04 p95 alert; any duplicate finality marker detection; any TF-05 inter-cycle gap alert
Settlement Fails and Unwinds (SF-01 through SF-05)	DvP timeout event log; DvP unwind records; netting cycle outcome log; lock confirmation retry log	Every timeout event must reference a corresponding lock event; every unwind record must reference the timeout or mismatch that triggered it; unwind records must confirm both legs released (per Appendix H.5.3 symmetry requirement)	DVP_TIMEOUT_[trade_id]; DVP_UNWIND_[trade_id]; NC_OPEN_POSITION_[Cycle ID]	Any SF-01 or SF-02 rate alert; any unwind where both legs not confirmed released; any SF-05 retry rate breach; any repeat unwind cluster (per Appendix K, QP-03)

Metric Group	Required Artifacts	Integrity Checks	Retention Tag	Preservation Trigger
Concentration (CN-01 through CN-04)	Netting computation summary; submission log aggregate; redemption queue log; participant class rollup	CN-01 percentage metric must be reproducible from NC_COMPUTE manifest: re-derive % from stored net positions; CN-03 amplification must reference both the gross submission log and the computation summary for the same cycle; CN-04 rolling window must have consistent window definition across observation periods	NC_COMPUTE_[CycleID]; IL_METRIC_[Date]	Any CN-01 concentration threshold breach; any CN-04 large-holder index approaching LG-T02 trigger; any CN-03 amplification alert
Gate Activations (GA-01 through GA-04)	Gate activation log; gate deactivation log; gate lifecycle EP; posture state log	Every gate activation event must have a corresponding dual-approval record (Appendix H.3.2 Phase 1); gate duration calculated from logged activation and deactivation timestamps only (no estimated durations); trigger type field must match one of LG-T01 through LG-T05	LG_GATE_ACTIVATE; LG_GATE_REQUEST; LG_LIFECYCLE_[GateID]	Any gate activation event (per Appendix H escalation ladder); any gate duration exceeding 4-hour escalation threshold; any gate with undocumented trigger type
Lock Durations (CL-01 through CL-04)	Asset-leg lock event log; cash-leg lock event log; release event log; timeout event log	Lock duration = release_timestamp – lock_timestamp; must be non-negative; for timed-out locks: lock duration = timeout_timestamp – lock_timestamp; every lock must have exactly one corresponding release or timeout record (no orphaned locks)	DVP_LOCK_ASSET_[trade_id]; DVP_LOCK_CASH_[trade_id]	Any orphaned lock (lock with no release or timeout within operator-configured maximum lock duration); any CL-02 or CL-04 p95 alert
Prefunding and Efficiency (PF-01 through PF-03)	Funding confirmation log; end-of-cycle balance log; settlement event log; submission log; finality	PF-01 headroom = confirmed_balance – net_position – buffer, must be non-negative	NC_FUND_[CycleID]; IL_METRIC_[Date]	Any PF-01 headroom below minimum buffer floor; any PF-02 shortfall event; any PF-03

Metric Group	Required Artifacts	Integrity Checks	Retention Tag	Preservation Trigger
	marker log	for PASS; PF-03 efficiency index denominator must equal total unique submission_ids in observation window (no double-counting); all arithmetic verified against immutable log inputs		efficiency index below floor

L4. Comparative Analysis Templates (Paste-Ready)

L4.1 Baseline vs Target Comparison Table Template

CAPITAL EFFICIENCY & INTRADAY LIQUIDITY – BASELINE VS TARGET COMPARISON

Program ID: [Program identifier]

Report ID: IL-COMPARE-[YYYYMMDD]-[NNN]

Observation Period: [start date] → [end date]

Scenarios Compared: [SC-01 vs SC-02 / SC-03 short vs long / SC-04 normal vs stress / etc.]

Prepared By: [Settlement Operator Name]

Report Timestamp (UTC):

COMPARISON TABLE

(All values are aggregates at Tier 0; no individual participant identification)

Metric ID	Metric Name	Scenario A Value	Scenario B Value	Delta (B-A)	Delta %	Alert Triggered (Y/N)	Notes
LQ-01	Intraday Liquidity Buffer Utilization – Peak	...%	...%	...	...
LQ-02	Intraday Liquidity Buffer Utilization – Average	...%	...%	...	...
LQ-03	Liquidity Compression Ratio (Netting)	N/A (if SC-01)	...%	-	-		Netting only
LQ-04	Prefunding Ratio – [Class A]	...%	...%	...	...%
LQ-07	Intraday Velocity Proxy (settlements/hour – peak)	...	...	...	...
LQ-08	Queue Wait Time – p50 (seconds)	...	...	...	...%

| LQ-09	| Queue Wait Time – p95 (seconds)	| ...	| ...	| ...	| ...%	| ...	| |
| TF-01	| Time-to-Finality – p50 Atomic (seconds)	| ...	| ...	| ...	| ...%	| ...	| |
| TF-02	| Time-to-Finality – p95 Atomic (seconds)	| ...	| ...	| ...	| ...%	| ...	| |
| TF-03	| Time-to-Finality – p50 Net (seconds)	| N/A	| ...	| –	| –	| ...	|
Netting only |							
| SF-01	| Settlement Fail Rate – Atomic DvP	| ...%	| ...%	| ...	| ...%	| ...	| |
| SF-02	| Settlement Fail Rate – Net Settlement	| N/A	| ...%	| –	| –	| ...	|
Netting only |							
| SF-03	| Unwind Frequency – Atomic (per day)	| ...	| ...	| ...	| ...%	| ...	| |
| CN-01	| Largest Net Position as % of Cycle	| N/A	| ...%	| –	| –	| ...	|
Netting only |							
| CN-02	| Largest Participant Gross as % of Daily Total	| ...%	| ...%	| ...	| ...%	| ...	|
| CL-01	| Cash-Leg Lock Duration – Average (seconds)	| ...	| ...	| ...	| ...%	| ...	| |
| CL-03	| Asset-Leg Lock Duration – Average (seconds)	| ...	| ...	| ...	| ...%	| ...	| |
| PF-01	| Prefunding Buffer Headroom (avg %)	| ...%	| ...%	| ...	| ...%	| ...	| |
| PF-03	| Settlement Efficiency Index	| ...%	| ...%	| ...	| ...%	| ...	| |
| GA-01	| Gate Activations (count)	| ...	| ...	| ...	| ...%	| ...	| |

INTERPRETATION NOTES (operational, not advocacy)

Key differences observed:

Alert breaches requiring follow-up:

Material change triggers identified (if any):

DATA INTEGRITY ATTESTATION

All metrics derived from immutable log inputs; hash chain verified: [YES / NO]

Tier 0 aggregation confirmed (no individual participant data exposed): [YES / NO]

Computation reproducibility verified: [YES / NO]

Settlement Operator: _____ Timestamp (UTC): _____

Compliance Officer: _____ Timestamp (UTC): _____

Document hash (SHA-256): _____

L4.2 Intraday Timeline Template (Hourly Bands)

INTRADAY LIQUIDITY TIMELINE

Report ID: IL-TIMELINE-[YYYYMMDD]

Date: [YYYY-MM-DD]

Scenario: [SC-01 / SC-02 / etc.]

Observation resolution: [15-minute / 30-minute / 60-minute intervals – operator-configured]

Prepared By: [Settlement Operator Name]

Report Timestamp (UTC):

HOURLY BAND TABLE

(All values Tier 0 aggregate; no individual participant identification)

| Hour Band (UTC) | Submissions Received | Settlements Completed | Queue Depth (peak) | Cash-Leg Locks Outstanding (peak) | Funding Utilization % (peak) | Gate Active (Y/N) | Posture State | Velocity (settlements/hr) | Finality Markers Issued |

Hour Band (UTC)	Submissions Received	Settlements Completed	Queue Depth (peak)	Cash-Leg Locks Outstanding (peak)	Funding Utilization % (peak)	Gate Active (Y/N)	Posture State	Velocity (settlements/hr)	Finality Markers Issued
00:00-01:00%
01:00-02:00%
02:00-03:00%
03:00-04:00%
04:00-05:00%
05:00-06:00%
06:00-07:00%
07:00-08:00%
08:00-09:00%
09:00-10:00%
10:00-11:00%
11:00-12:00%
12:00-13:00%
13:00-14:00%
14:00-15:00%
15:00-16:00%
16:00-17:00%

| 17:00-18:00	| ...	| ...	| ...	| ...	| ...%	| ...	| ...	| ...	| ...	| ...
| 18:00-19:00	| ...	| ...	| ...	| ...	| ...%	| ...	| ...	| ...	| ...	| ...
| 19:00-20:00	| ...	| ...	| ...	| ...	| ...%	| ...	| ...	| ...	| ...	| ...
| 20:00-21:00	| ...	| ...	| ...	| ...	| ...%	| ...	| ...	| ...	| ...	| ...
| 21:00-22:00	| ...	| ...	| ...	| ...	| ...%	| ...	| ...	| ...	| ...	| ...
| 22:00-23:00	| ...	| ...	| ...	| ...	| ...%	| ...	| ...	| ...	| ...	| ...
| 23:00-00:00	| ...	| ...	| ...	| ...	| ...%	| ...	| ...	| ...	| ...	| ...
| **DAILY TOTAL / PEAK**	|	|	|	|	|	|	|	|	|	|

PEAK HOUR ANALYSIS

Peak submission hour: [HH:00] Volume:
 Peak funding utilization hour: [HH:00] Utilization: ...%
 Peak queue depth hour: [HH:00] Depth:
 Lowest velocity hour: [HH:00] Settlements/hr:

GATE / STRESS EVENTS (if any)

| Event Type	| Start (UTC)	| End (UTC)	| Duration	| Posture Before	| Posture After
---	---	---	---	---	---
...

Document hash (SHA-256): _____
 Settlement Operator attestation: _____ Timestamp (UTC): _____

L4.3 Participant Class Rollup Template (Aggregate Only by Default)

PARTICIPANT CLASS ROLLUP – INTRADAY LIQUIDITY & SETTLEMENT METRICS
 Report ID: IL-CLASS-[YYYYMMDD]-[NNN]
 Observation Period: [start date] → [end date]
 Tiering: Tier 1 (participant-class aggregate; no individual participant identification)
 Access Authorization: [Tier 1 authorization reference; purpose limitation confirmed]
 TTL for this report: [operator-configured; e.g., 30 days from generation]
 Prepared By: [Settlement Operator Name]
 Report Timestamp (UTC):

CLASS DEFINITIONS (operator-defined; documented in program governance)

| Class ID | Class Description (operational, not identifying) | Basis for Classification |

Class ID	Class Description (operational, not identifying)	Basis for Classification
CLS-A	[e.g., High-volume – > N submissions/day]	Submission frequency
CLS-B	[e.g., Low-volume – ≤ N submissions/day]	Submission frequency
CLS-C	[e.g., Prefunded – funding source = prefunded balance]	Funding source type
CLS-D	[e.g., Credit-line-funded]	Funding source type
CLS-E	[operator-defined additional class]	[basis]

CLASS METRICS TABLE

| Metric ID | Metric Name | CLS-A | CLS-B | CLS-C | CLS-D | CLS-E | All Classes (aggregate) |

Metric ID	Metric Name	CLS-A	CLS-B	CLS-C	CLS-D	CLS-E	All Classes (aggregate)
LQ-01	Peak Liquidity Buffer Utilization	...%	...%	...%	...%	...%	...%
LQ-04	Prefunding Ratio	...%	...%	...%	...%	...%	...%
LQ-05	Credit Line Utilization (avg)	N/A	N/A	N/A	...%	...%	...%
LQ-08	Queue Wait Time p50 (sec)	...	...	...	...	...	...
LQ-09	Queue Wait Time p95 (sec)	...	...	...	...	...	...
TF-01	Time-to-Finality p50 Atomic (sec)	...	...	...	...	...	...
SF-01	Settlement Fail Rate	...%	...%	...%	...%	...%	...%
SF-03	Unwind Frequency (per day avg)	...	...	...	...	...	...
CN-02	Gross Concentration Share	...%	...%	...%	...%	...%	100%
CL-01	Cash-Leg Lock Duration avg (sec)	...	...	...	...	...	...
PF-01	Prefunding Headroom avg	...%	...%	...%	...%	...%	...%
PF-02	Shortfall Events (count)	...	...	...	...	...	...
PF-03	Settlement Efficiency Index	...%	...%	...%	...%	...%	...%

CLASS-LEVEL OBSERVATIONS (operational; no advocacy)

Class(es) with highest fail rate:

Class(es) with highest liquidity buffer utilization:

Class(es) with prefunding headroom below floor:

Material change triggers identified:

PURPOSE LIMITATION CONFIRMATION

This report is generated for [stated supervisory / operational purpose].

Access expires: [TTL date]

Post-access review scheduled: [date]

This report does not contain individual participant identification.

Settlement Operator: _____ Timestamp (UTC): _____

Compliance Officer: _____ Timestamp (UTC): _____

Tiered Access Authorization Ref: _____

Document hash (SHA-256): _____

L5. Examiner Validation Workflow

The following validation steps allow an examiner to confirm that the metrics in this appendix are reproducible, integrity-verified, and collected with appropriate data minimization. Steps are ordered from least-sensitive (Tier 0) to most-sensitive (Tier 2), consistent with the baseline tiered supervision model.

Step	Validation Action	Tier Level	Tools / Artifacts	Expected Result	Escalation if Fails
LV-01	Confirm metric report generation timestamps fall within the observation period declared in the report header	Tier 0	Baseline vs Target comparison report (L4.1)	All metric timestamps \leq report generation timestamp and \geq observation start	Flag as temporal integrity issue; request re-generation from source logs
LV-02	Verify hash chain continuity on intraday funding utilization log	Tier 0	Intraday funding utilization log; IL_METRIC series	Each log entry's hash links correctly to prior entry; no breaks	Preserve log state; escalate as integrity failure (Tier 2 investigation may be required)
LV-03	Confirm finality marker uniqueness: one marker per trade_id (atomic) and one per cycle_id (netting)	Tier 0	Finality marker log (DVP_FINAL_MARKER; NC_FINAL_MARKER)	Zero duplicates; zero missing markers for settled trades or completed cycles	Duplicate marker triggers DVP_ANOMALY preservation; missing marker triggers settlement completeness review
LV-04	Verify that LQ-03 (Liquidity Compression Ratio) is reproducible from the sealed input set manifest	Tier 0	Netting input set manifest (NC_INPUT); netting computation summary (NC_COMPUTE)	Re-derived ratio matches reported ratio within operator-configured tolerance (e.g., $< 0.01\%$)	Hash mismatch: flag as computation integrity failure; do not rely on this cycle's compression ratio data
LV-05	Confirm time-to-finality	Tier 0	Submission log;	All time-to-finality	Any imputed value

Step	Validation Action	Tier Level	Tools / Artifacts	Expected Result	Escalation if Fails
	metrics (TF-01 through TF-04) are derived from immutable log timestamps only (no estimated or imputed values)		finality marker log	values = finality_marker_timestamp – submission_timestamp; no imputed values in dataset	requires re-derivation from raw logs; imputed values flagged as data quality issue
LV-06	Verify lock symmetry for CL-01 and CL-03: every lock has exactly one corresponding release or timeout	Tier 0	Asset-leg and cash-leg lock/release event logs	Lock count = release count + timeout count; no orphaned locks	Orphaned lock triggers CL preservation hook; escalate to Settlement Operator
LV-07	Confirm Tier 0 aggregation: verify that no individual participant identification appears in any Tier 0 metric report	Tier 0	Baseline vs Target report (L4.1); Intraday Timeline (L4.2)	No participant_ref, account_ref, or trade_id fields populated in Tier 0 reports	Any individual identification in Tier 0 report is a purpose limitation violation; escalate immediately
LV-08	Confirm Tier 1 access authorization and TTL for participant class rollup (L4.3)	Tier 1	Tier 1 access authorization record; TTL field in L4.3 report	Valid authorization reference present; TTL has not expired at time of examiner access	Expired TTL requires re-authorization before access; access without authorization is a tiered access violation
LV-09	Verify SF-01 (Atomic DvP Fail Rate) against source logs: re-count timeout events in log for observation period	Tier 1	DvP timeout event log (DVP_TIMEOUT); submission log	Re-count matches reported SF-01 value within operator-configured rounding tolerance	Mismatch indicates either log incompleteness or metric computation error; investigate both
LV-10	Verify SF-03 (Unwind Frequency) cause breakdown: confirm cause codes are drawn from defined taxonomy (TIMEOUT / MISMATCH / FUNDING_UNAVAIL / GOVERNANCE / OTHER)	Tier 1	DvP unwind records	All cause codes valid; no undocumented cause codes	Undocumented cause code requires investigation; treated as anomaly
LV-11	Re-derive CN-01 (Largest Net Position %) from computation manifest for a sampled set of cycles	Tier 1	Netting computation summary (NC_COMPUTE); cycle net positions table	Re-derived percentage matches reported CN-01 within rounding tolerance	Mismatch: flag as computation integrity failure for affected cycles
LV-12	Verify GA-01 through GA-04 gate metrics against gate lifecycle EPs: confirm gate duration = deactivation_timestamp –	Tier 1	Gate activation log; gate lifecycle EP (LG_LIFECYCLE)	Computed duration matches reported GA-02 / GA-03 values	Any duration discrepancy: re-derive from raw timestamps; flag report as requiring correction

Step	Validation Action	Tier Level	Tools / Artifacts	Expected Result	Escalation if Fails
	activation_timestamp				
LV-13	Confirm EP Delta chain includes an IL_METRIC_[Date] entry for every observation day in the reporting period	Tier 1	EP Delta chain index	One IL_METRIC entry per business day; no gaps	Missing entry for any business day: investigate whether metric generation failed or was suppressed; treat as control gap
LV-14	For any Tier 2 access to trade-level or participant-level detail (required only if anomaly investigation is triggered): verify dual approval, objective trigger documentation, and post-event review scheduling	Tier 2	Tier 2 access authorization record; objective trigger log; post-event review calendar	Valid dual approval present; trigger documented; post-event review scheduled within operator-configured window	Any Tier 2 access without documentation is a tiered access violation; escalate immediately
LV-15	Confirm that the Impact Analysis Pack (Section L7) bundle seal hash matches the hash computed over all constituent artifact hashes in canonical order	Tier 0	Impact Analysis Pack bundle manifest; bundle seal hash	Re-computed seal hash matches reported seal hash	Mismatch: bundle has been modified after sealing; treat as integrity failure; do not rely on pack contents without re-validation

L6. Stress-Mode Impact Notes (Operational)

Stress Trigger	Expected Metric Shifts	Required Controls	Evidence Outputs	Escalation Actions
LG-T01: Aggregate redemption requests \geq hard threshold (\geq 15% of outstanding balance, rolling 24h)	CN-04 (large-holder index) rises sharply; LQ-10 queue depth spikes; LQ-08/LQ-09 wait times lengthen; PF-03 settlement efficiency index declines; GA-01 gate activation increments	Liquidity gate activated per Appendix H.3.2; netting windows tightened per K6.3; enhanced concentration monitoring	Gate activation log; stress-mode cycle manifests tagged STRESS_MODE_CYCLE; updated IL_METRIC; EP Delta STRESS_STATE_CHANGE	Dual-approval state transition to STRESS; supervisory notification within 2 hours; Governance Officer briefed at 4-hour mark
LG-T02: Single-holder concentration \geq hard threshold (\geq 25% of outstanding balance)	CN-01 and CN-02 breach alert thresholds; CN-04 large-holder index spikes; netting compression ratio (LQ-03) may improve artificially (large holder compressing bilateral	Concentration extraction from netting set per K3 matrix; Compliance Officer approval required; enhanced position monitoring	NC_COMPUTE manifest flagged; concentration exception log; Compliance Officer approval record	Compliance Officer notified immediately; if concentration persists $>$ operator-configured hold period, escalate to Governance Officer

Stress Trigger	Expected Metric Shifts	Required Controls	Evidence Outputs	Escalation Actions
	obligations)			
LG-T03: Intraday funding shortfall — available < 90% of queued obligations	PF-02 shortfall events spike; LQ-01 peak utilization approaches 100%; PF-01 headroom near zero; SF-01 fail rate begins rising; LQ-07 velocity proxy drops	Liquidity gate activated; queue processing priority elevated for DvP-locked items per Appendix H.4.3; funding source health monitored continuously	Funding shortfall event log; gate activation log; queue priority reorder log; funding source health monitor	Supervisory notification within 2 hours; funding source failover procedure initiated; Governance Officer assesses whether offboarding posture warranted at 8 hours
LG-T04: Redemption queue depth ≥ hard threshold (≥ 50 concurrent requests)	LQ-10 queue depth at hard threshold; LQ-08/LQ-09 wait times exceed SLA; SF-02 netting cycle fail rate rises if queue congestion spills into netting input sets; PF-03 efficiency index declines	Queue management per Appendix H.4; FIFO processing with timeout-critical prioritization; gate activation assessed	Queue snapshot manifest; queue status reports at 30-minute cadence; EP Delta QD_METRIC	Settlement Operator immediate response; Compliance Officer notified; queue congestion log
LG-T05: Primary funding source unavailable > 30 minutes	LQ-06 funding source uptime falls below floor; PF-02 shortfall events spike; SF-01 fail rate rises as DvP lock confirmations fail; LQ-07 velocity proxy drops sharply	Funding source failover per program governance; DvP lock confirmation timeout shortened if alternative source slower; gate activation assessed	Funding source downtime log; DvP timeout event spike log; gate activation log if triggered	Funding source incident declared; Settlement Operator initiates failover; supervisory notification if gate activated
Posture: STRESS declared (any hard-threshold breach)	LQ-01 peak utilization elevated; LQ-07 velocity drops; SF-01 and SF-03 rates rise; TF-02 and TF-04 p95 values widen; GA-01 gate activation count increments	All stress-mode controls per Appendix H; netting windows tightened per K6.3; no new submissions accepted if gate active	Posture state log (STRESS); all stress-mode cycle manifests; EP Delta STRESS_STATE_CHANGE; running IL_METRIC log	Supervisory notification within 2 hours; escalation ladder per Appendix H.3.3
Posture: OFFBOARDING declared	SF-01 / SF-02 approach zero (no new submissions); queue drains toward zero; LQ-07 velocity declines to	Offboarding Phase 2 controls per Appendix I.6; final netting cycle drain; atomic DvP for residual queue	IL_METRIC tagged OFFBOARDING; Phase 2 Completion Report; Open Breaks Attestation	Continuous supervisory updates per Appendix I; Legacy Transition Manifest prepared

Stress Trigger	Expected Metric Shifts	Required Controls	Evidence Outputs	Escalation Actions
	zero at end; PF-03 efficiency index approaches 100% as only settled items remain			
Netting cycle consecutive failures > threshold	SF-02 rate spikes; TF-03 / TF-04 latency increases (or N/A if cycles cancelled); LQ-03 compression ratio undefined for cancelled cycles	Governance Officer escalation per K6.3; potential suspension of netting and reversion to atomic DvP	NC_CANCELLED manifests; consecutive failure count log; Governance Officer decision log	Governance Officer determines whether netting suspended; Settlement Operator routes flows to atomic DvP queue; supervisory notification if material
Synthetic stress scenario (no actual event; governance-approved test)	All metrics observed against pre-defined synthetic stress parameters	Governance Officer approval documented; scenario parameters logged; actual metric values clearly flagged as synthetic	Synthetic scenario declaration log; all IL_METRIC entries tagged SYNTHETIC_STRESS; EP Delta with scenario reference	Post-scenario review by Compliance Officer; lessons learned documented; no supervisory notification required unless scenario reveals actual control gap

L7. Production Bundle for "Impact Analysis Pack"

L7.1 Bundle Contents

The Impact Analysis Pack (IAP) is a periodic production bundle — generated at the cadence defined in program governance (e.g., monthly, quarterly, or upon request) — that packages all intraday liquidity and capital efficiency metric outputs into a single, integrity-sealed artifact set for delivery to supervisory authorities, internal governance bodies, or examiners.

The IAP uses existing EP and EP Delta artifact types; it does not create new artifact categories. The bundle is a structured packaging construct that references and seals existing tagged artifacts.

Required Contents (minimum):

Item	Artifact Type	Tag(s)	Cadence Covered
Baseline vs Target Comparison Reports	EP insert	IL_METRIC_[Date] series	All observation days in bundle period
Intraday Timeline Reports	EP insert	IL_METRIC_[Date] series	All observation days in bundle period
Participant Class Rollup Reports (Tier 1)	EP insert (Tier 1 access)	IL_METRIC_[Date] series	All observation days; access authorization reference included
Netting Cycle Manifests (all cycles in period)	EP	NC_INPUT_[CycleID]; NC_COMPUTE_[CycleID];	All netting cycles in bundle period

Item	Artifact Type	Tag(s)	Cadence Covered
		NC_DELTA_[CycleID]	
Net Settlement Finality Proof Bundles	EP	NC_FINAL_MARKER_[CycleID]	All completed netting cycles
Atomic DvP Finality Markers	EP	DVP_FINAL_MARKER_[trade_id] series	All atomic DvP trades in bundle period
Gate Lifecycle EPs (if any activations)	EP	LG_LIFECYCLE_[GateID]	All gate events in bundle period
Stress-Mode Cycle Manifests (if any)	EP	Tagged STRESS_MODE_CYCLE	All stress-mode cycles in bundle period
EP Delta chain covering bundle period	EP Delta	NC_DELTA_[CycleID]; IL_METRIC_[Date]	Continuous chain; no gaps
Unwind and anomaly records (if any)	EP	DVP_UNWIND_[trade_id]; DVP_ANOMALY_[trade_id]; NC_ANOM_[NNN]	All events in bundle period
Supervisory access log for Tier 1 and Tier 2 accesses to metric data (if any)	Access log	Tiered access authorization records	All accesses in bundle period

L7.2 Bundle Manifest Template

IMPACT ANALYSIS PACK – BUNDLE MANIFEST

Bundle ID: IAP-[YYYYMM]-[NNN]

Bundle Period: [start date] → [end date]

Program ID: [Program identifier]

Manifest Creation Timestamp (UTC):

Prepared By: [Settlement Operator Name]

BUNDLE SCOPE

Scenarios covered: [SC-01 / SC-02 / SC-03 / SC-04 / SC-05 / SC-06 – check all applicable]

Settlement modes observed: [Atomic DvP only / Netting only / Hybrid]

Posture states observed: [NORMAL / LIMITED / STRESS / OFFBOARDING – check all that occurred]

Total observation days:

Total netting cycles covered:

Total atomic DvP trades covered:

Gate activation events in period:

ARTIFACT INVENTORY

```

| Seq | Artifact ID | Tag | Description | Creation Timestamp (UTC) | SHA-256
Hash | Integrity Verified (Y/N) | Tier Level |
|-----|-----|-----|-----|-----|-----|-----|
| 001 | IL-COMPARE-[date]-[NNN] | IL_METRIC_[Date] | Baseline vs Target
Comparison | ... | ... | ... | Tier 0 |
| 002 | IL-TIMELINE-[date] | IL_METRIC_[Date] | Intraday Timeline | ... | ...
| ... | Tier 0 |
| 003 | IL-CLASS-[date]-[NNN] | IL_METRIC_[Date] | Participant Class Rollup
| ... | ... | ... | Tier 1 |
| ... | ... | ... | ... | ... | ... | ... | ... |

```

INTEGRITY SUMMARY

Total artifacts in bundle:
Artifacts with integrity verified (hash match):
Artifacts with integrity failure: [must be zero for sealed bundle]
EP Delta chain continuity verified (no gaps): [YES / NO]

BUNDLE SEAL

Canonical ordering: artifact creation timestamp ascending
Bundle Seal Hash (SHA-256 of concatenated sorted artifact hashes):
Seal Computation Timestamp (UTC):

THREE-PARTY CO-ATTESTATION

Settlement Operator: _____ Timestamp (UTC): _____
Compliance Officer: _____ Timestamp (UTC): _____
Governance Officer (required if bundle covers any STRESS or OFFBOARDING period):
_____ Timestamp (UTC): _____

L7.3 QA Gate Checklist (Pass/Fail)

The following checks must all pass before the IAP bundle is sealed and transmitted. Any failing check must be resolved or documented as an exception with Governance Officer approval before sealing.

IMPACT ANALYSIS PACK – QA GATE CHECKLIST

Bundle ID: IAP-[YYYYMM]-[NNN]
QA Executed By: [Settlement Operator Name]
QA Timestamp (UTC):

COMPLETENESS GATES

QA-01: All required artifact categories per L7.1 are present for the full bundle period.

[PASS / FAIL – if FAIL, list missing categories]

QA-02: IL_METRIC_[Date] entry exists for every business day in bundle period.

Business days in period: [N] | IL_METRIC entries present: [N]

[PASS / FAIL]

QA-03: All netting cycle manifests cover every netting cycle that occurred in the bundle period.

Cycles expected: [N] | Manifests present: [N]

[PASS / FAIL]

QA-04: All gate lifecycle EPs are present for every gate activation event in the bundle period.

Gate events in period: [N] | Gate EPs present: [N]

[PASS / FAIL]

INTEGRITY GATES

QA-05: Zero artifacts with hash integrity failures in the bundle.

[PASS / FAIL – if FAIL, list artifact IDs]

QA-06: EP Delta chain is continuous across the full bundle period; no gap days.

[PASS / FAIL]

QA-07: All netting cycle computation summaries have input_set_hash cross-reference verified.

[PASS / FAIL – list any failed cross-references]

QA-08: All finality markers are unique (no duplicate trade_id or cycle_id markers).

[PASS / FAIL]

QA-09: All lock/release pairs are symmetric (no orphaned locks in the bundle period).

[PASS / FAIL – list any orphaned lock IDs]

TIERING AND ACCESS GATES

QA-10: All Tier 0 reports contain no individual participant identification.

[PASS / FAIL – if FAIL, redact before sealing or escalate]

QA-11: All Tier 1 reports include a valid access authorization reference and non-expired TTL.

[PASS / FAIL]

QA-12: All Tier 2 access events (if any) have dual-approval documentation and post-event review scheduled.

Tier 2 events in period: [N] | Fully documented: [N]

[PASS / FAIL]

STRESS AND EXCEPTION GATES

QA-13: All STRESS posture periods are covered by stress-mode cycle manifests tagged STRESS_MODE_CYCLE.

[PASS / FAIL / N-A – no stress events in period]

QA-14: All gate activation events in the bundle period have dual-approval records (per Appendix H.3.2 Phase 1).

[PASS / FAIL / N-A]

QA-15: All exception records (late-inclusion, concentration exception, yield boundary exception) have Compliance Officer or Governance Officer approval references.

[PASS / FAIL / N-A]

QA GATE RESULT

Total gates: 15 | Passed: [N] | Failed: [N] | N-A: [N]

ALL GATES PASSED – bundle may proceed to sealing.

EXCEPTION – [N] gate(s) failed. Exception approval obtained from Governance Officer:

Exception reference: _____ Governance Officer timestamp (UTC): _____

Exception description: [brief narrative of what failed and why sealing is nonetheless approved]

QA ATTESTATION

Settlement Operator (QA executed by): _____ Timestamp (UTC): _____

Compliance Officer (QA reviewed by): _____ Timestamp (UTC): _____

L7.4 Chain-of-Custody Notes

The Impact Analysis Pack, once sealed, follows the same chain-of-custody and transmission discipline as Evidence Packs established in Baseline B (Audit and Examination Evidence Pack Playbook) and Appendix I of this constitution.

Step	Action	Responsible Actor	Evidence Output
IAP-COC-01	Bundle sealed (QA gates all passed or exception approved); bundle seal hash computed	Settlement Operator	Bundle Manifest with seal hash
IAP-COC-02	Bundle transmitted to designated recipient (supervisory authority, internal governance, or examiner) via designated secure channel	Settlement Operator	Transmission log; delivery confirmation
IAP-COC-03	Recipient verifies bundle seal hash upon receipt	Recipient (examiner / supervisory authority)	Receipt acknowledgment with integrity verification result
IAP-COC-04	Transmission and receipt records retained per program retention schedule (minimum 7 years)	Compliance Officer	Retention confirmation
IAP-COC-05	Post-access review: if Tier 1 or Tier 2 data included in bundle, confirm purpose limitation observed; log access event	Compliance Officer	Post-access review log; access purpose confirmation
IAP-COC-06	TTL enforcement: Tier 1 class rollup reports expire per TTL field; recipient notified of TTL; access to expired reports requires re-authorization	Compliance Officer	TTL expiry notification; re-authorization log if access extended

Purpose limitation statement: The Impact Analysis Pack is produced for the stated operational measurement and supervisory review purpose. Recipient use is bounded by the purpose stated at transmission. Onward transfer to third parties requires documented authorization per the tiered access model and purpose limitation discipline established in Baseline B. Data minimization applies: recipients access the minimum tier level sufficient to answer their examination or governance question; Tier 2 detail is accessed only where Tier 0 and Tier 1 data are insufficient and an objective trigger exists.

References and Supporting Materials

This section provides a compilation of key references cited throughout the document, primarily drawn from the FCCK Pilot Suite baselines upon which this constitution is built. It also lists supporting materials, including internal artifacts, templates, and appendices that extend or operationalize the concepts discussed. All references are internal to the suite unless otherwise noted, reflecting the non-normative, implementation-agnostic design. No external citations (e.g., regulatory texts or academic papers) are explicitly referenced in the document, as it focuses on operational extensions of the baselines.

References

The following baselines form the foundational framework for this constitution. They are reused for vocabulary, artifact structures, governance principles, and control objectives without modification.

Reference	Title	Date	Role/Description
Baseline A	FCCK Pilot Proposal & No-Action Request	Dec 2025	Architecture: federated identity, tiered supervisory access (Tier 0/1/2), pilot structure (Shadow → Limited Live → Expansion phases), purpose-limitation principles, and phased deployment posture.
Baseline B	Operationalization Track	Dec 2025	Governance: playbooks (e.g., redress and error correction), reference profiles, conformance testing, RACI matrices, material change governance, no-master-key principles (Section IX.4), hold and release mechanics (Section V.5), and audit/evidence production standards.
Baseline C	Operational Assurance Artifacts Addendum	Jan 2026	Execution: Evidence Pack (EP) templates, EP Deltas, logging schemas (e.g., immutable logs, chain-of-custody), examiner query packs, RACI matrices, liability trigger catalogs (Section B.3), and implementation roadmap.
Baseline D	Stable-Value Oversight Companion	Feb 2026	Boundary logic: payment vs. yield taxonomy (Categories 1–3), deposit stability controls, stress-mode patterns (Sections 3.2–3.3), yield separation (Pattern B), concentration monitoring (e.g., top-N holder, HHI metrics), liquidity gate invocation, and preservation bundles (Section 1.3).

These baselines are companions to the FCCK Pilot Suite and are cross-referenced extensively (e.g., in Sections 0.3, 1.3, 2.1–2.3, 5, 7, and 8). Legal or regulatory determinations remain with competent authorities; this document does not cite specific laws or external standards.

Supporting Materials

Supporting materials include operational artifacts, templates, playbooks, and appendices referenced or implied in the document. These are designed as examiner-ready, evidence-backed tools to reduce supervisory friction. They are positioned as extensions of baseline concepts and are agnostic to specific technologies.

- **Evidence Packs (EPs) and EP Deltas:** Templates for settlement-specific manifests, including precondition gate logs, atomic execution logs, finality state transitions, reconciliation checkpoints, and failure-mode records (Sections 0.4, 5.5, 8.3). Aligned with Baseline C (Section A.1) and used for boundary events, material changes, and stress escalations.
- **RACI Matrices:** Accountability matrices for DvP operations, finality change control, gate activation, and liability triggers (Sections 1.3, 5, 7). Derived from Baseline B (Section IX) and Baseline C (Section B).
- **Playbooks and Procedures:**
 - Settlement Queue Unwind Playbook: For timeouts, partial locks, and failure containment (Section 5.4).
 - Liquidity Gate and Queue Activation Protocols: Pre-defined procedures for stress events, including quorum approvals and evidence production (Section 7.2).
 - Stress Escalation Ladder: Four postures (Normal / Limited / Stress / Offboarding) with entry/exit conditions and logging (Section 7.4).
 - Operational Dispute Resolution and Error Correction Playbook: For duplicates, oracle errors, sanctions matches, and reversals (Section 2.4).
- **Boundary Test Discipline Templates:** Decision records for cash-leg instrument classification (P1–P4 categories) and yield separation (Sections 2.2, 3.5). Based on Baseline D (Section 2.4).
- **Examiner Query Packs and Standard Checks:** Pre-packaged queries for DvP verification, yield ambiguity, liquidity stress, and finality conditions (Section 8). Includes preservation bundle procedures for disputes and stress events (Section 7.5).
- **Appendices (Referenced Constructs):**
 - Appendix B: Logging Schemas and Immutable Log Examples (e.g., for gate activations, finality markers).
 - Appendix C: Evidence Pack Manifest Templates (settlement-specific).
 - Appendix I: Cross-Border Harmonization Notes (out-of-scope for Phase 1, but conditional).
 - Appendix L: Production Bundle Templates (e.g., Impact Analysis Pack for intraday metrics, as in Section L7).

These materials are intended for use in controlled institutional pilots and can be requested as part of supervisory reviews. For full implementation, refer to the baselines for foundational templates.
