SUPPLEMENT_S4: Validation and sensitivity — protocol and minimal results

This lean version of S4 limits reporting to protocol descriptions and minimal computations derivable from the final dataset (S1), so that no additional archival dates or template recalculations are required. It is consistent with S2 (ARP) and S3 (Readiness) while avoiding new data inputs.

S4.1. Protocol summary

• Decision windows: ±3 years (P1–P2); ±2 years (P3–P5).
• Decision thresholds applied to GO fraction: WAIT < 0.20; PREPARE 0.20–0.35; GO ≥ 0.35.
• Wing-combination rule: for phases with both wings (P4–P5), GO/Decision reported only for OW+NW.
• Unit convention: GO stored as fraction [0–1]; presented as percent where denoted [%].

S4.2. Ex post validation (protocol-only statement)

The intended ex post validation compares model GO decisions with the initiation of subsequent major works within the phase-bounded decision windows. As uniform, phase-aligned start dates are not available across all phases, we report the validation rule here without a quantitative Y/N checklist. Narrative cross-checks are provided in Appendix A.

S4.3. Sensitivity analyses (protocol)

A. Lifecycle without partial resets (requires template recomputation; not performed here).
B. ΣO ±0.10 shift (requires re-aggregation of O1–O7; not performed here).
C. Equal Readiness weights (0.20 each) — computable from S1 for phases with stored component scores.

S4.4. Minimal sensitivity results (Scenario C)

Table S4-C (minimal): Scenario C — Equal Readiness weights (0.20 each) for phases with component-level data in S1.

Phase	Baseline Decision	Scenario C Decision	Baseline GO [%]	Scenario C GO [%]
P1	WAIT	WAIT	18.81	19.87
P2	PREPARE	PREPARE	31.88	31.87
P3	GO	GO	46.23	46.23

Note: Component-level F–G–U–D–P scores at the combined level (OW+NW) are not stored in S1 for P4–P5; Scenario C is therefore reported only for P1–P3 without accessing the computation template.

S4.5. Limitations and replication

This lean S4 documents the validation and sensitivity protocols and provides minimal sensitivity computations that depend solely on S1. Full numerical validation (S4-1) and Scenarios A/B can be reproduced by re-running the template workbook as described in S2/S3; results may be added in a future update.