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Change History:

EGF Version	1.0
Document Version	1.1
Date	April 3, 2023
Description of Change	In Utility Risk section, replaced reference to 'public Verifiable Data Registries (VDRs)' with 'public Witnesses'.

	verifiable LEI (vLEI) Ecosystem Governance Framework 1.0 Risk Assessment						Document Version v1.1_Final		2023-04-03		
	RISK No.	RISK	TOIP Layer	TRUST AREAS AFFECTED	SEVERITY	LIKELIHOOD	RISK IMPACT	RISK CONSIDERATION ACTIONS	RISK TREATMENT	RISK TREATMENT ACTION	RISIDUAL RISK
		GOVERNING AUTHORITY (GLEIF) RISKS						GLEIF - Global Legal Entity Identifier Foundation operates and manages the Global LEI System (GLEIS);			
		Lack of competence to perform role	Ecosystem	Governance	4	1	LOW-MEDIUM	Need for experienced personnel, proper training and governance framework	Mitigation	Mitigated by proper, regular training	Residual risk regarded to be low and acceptable.
		Lack of sufficient policy and practices	Ecosystem	Governance	1	1	LOW	Need for complete governance framework and feedback loop	Mitigation	Mitigated by GLEIF workflows supported by KERI vLEI software	Residual risk regarded to be low and acceptable.
		Lack of consistency in its own operating practices	Ecosystem	Governance	3	1	LOW	Requires independent oversight and trust assurance mechanisms	Acceptance	Covered by ISO 20000 certification along with systematic control	Residual risk regarded to be low and acceptable.
		Lack of consistency in operating practices of Qualified vLEI Issuers	Ecosystem	Governance	3	3	MEDIUM	Requires proper oversight and trust assurance mechanisms	Mitigation	Mitigated by Ecosystem Governance Framework, vLEI Issuer Qualification Program and use of Key Event Receipt Infrastructure (KERI) protocol	Residual risk regarded to be low and acceptable.
		Lack of accountability of roles in network	Ecosystem	Governance	3	1	LOW	Requires proper supervisory and legal oversight and trust assurance mechanisms	Mitigation	Mitigated by Ecosystem Governance Framework, and specifically for Qualified vLEI Issuers, the vLEI Issuer Qualification Agreement	Residual risk regarded to be low and acceptable.
		Lack of legal enforceability of Authentic Chained Data Container (ACDC) credentials in jurisdictions	Ecosystem	Governance	5	3	MEDIUM-HIGH	Requires monitoring of ACDC legal acceptance	Mitigation	GLEIF is researching and monitoring the legal enforceability of ACDCs in jurisdictions.	Residual risk regarded to be low and acceptable.
		Ecosystem lacks industry acceptance or insufficient demand	Ecosystem	Governance	4	3	MEDIUM	Requires members of ecosystems to agree to use the vLEI	Mitigation	Work with industries to support their use cases with vLEI for organizational identification needs	Residual risk regarded to be low and acceptable.
		Qualified vLEI Issuer Risks						Qualified vLEI Issuer – An organization qualified by GLEIF to issue Legal Entity vLEI Credentials and Legal Entity Official Organizational Role vLEI Credentials			
		vLEI Legal Entity Credential or vLEI Legal Entity Official Organizational Role Credential issued without appropriate verification	Credential	Processing Integrity	5	3	MEDIUM-HIGH	Requires training, trust assurance practices, controlled practices and proper workflow	Mitigation	Requires authorization by Legal Entity's Authorized Representatives (LARs), Identification of the person and Official Organizational Role (OOR) of the OOR Person, verification of control of KERI DID. Include a Issuer/Approver workflow in Qualified vLEI Issuer operations	Residual risk regarded to be low and acceptable.
		Legal Entity vLEI Credential Becoming invalid	Credential	Security	5	3	MEDIUM-HIGH	Requires appropriate monitoring of obligations of Legal Entities holding vLEIs	Mitigation	Monitoring of the status of the Legal Entity's LEI by Qualified vLEI Issuers	Residual risk regarded to be low and acceptable.

	Legal Entity Official Organizational Role vLEI Credentials becoming invalid	Credential	Security	1	1	LOW	Requires appropriate action by Legal Entities to manage their vLEI Role Credentials	Acceptance	Risk is not to GLEIF. Legal Entities will be solely responsible for the management of vLEI Role Credentials issued and the composition of their organizational wallets.	Residual risk regarded to be low and acceptable.
	Qualified vLEI Issuer operations unavailable	Credential	Availability	5	3	MEDIUM-HIGH	Requires network redundancy procedures	Mitigation	Requires contingency and system redundancy	Residual risk regarded to be low and acceptable.
	Qualified vLEI Issuer using obsolete and/or untested vLEI software or APIs	Credential	Processing Integrity	5	3	MEDIUM-HIGH	Requires change management process for Qualified vLEI Issuers	Mitigation	Change management process included in the vLEI Issuer Qualification Agreement. GLEIF to manage the change management process for Qualified vLEI Issuers	Residual risk regarded to be low and acceptable.
	Verifier Risks						Verifier - An entity that is verifying the components and provenance of a vLEI credential for a use case			
	Lack of consistent verification practices	Credential	Security	4	1	LOW-MEDIUM	Requires training, trust assurance practices and controlled practices	Mitigation	Mitigated by educating Verifiers of the existence of proof requests to verify credentials	Residual risk regarded to be low and acceptable.
	Evidence of verification incomplete or in incorrect format of proof requests	Credential	Processing Integrity	5	2	MEDIUM	Requires standard formats and formatting controls for proof requests	Mitigation	Develop standard formats and formatting controls for proof requests	Residual risk regarded to be low and acceptable.
	Revoked vLEI being accepted	Credential	Security	5	2	MEDIUM	Requires adequate vLEI status and validity checking procedures	Mitigation	Mitigated by KERI vLEI software that automatically checks revocation status before accepting a credential	Residual risk will be the time between request to revoke is made by the Legal Entity and actual revocation at the Qualified vLEI Issuer.
	Man-in-the-middle attack during legitimate verification	Credential	Security	5	3	MEDIUM-HIGH	Requires Verifier vulnerability practices	Mitigation	Mitigate with security in KERI vLEI software	Residual risk regarded to be low and acceptable.
	Verifier network unavailable	Credential	Availability	5	3	MEDIUM-HIGH	Requires network redundancy procedures	Mitigation	Mitigate with appropriate system redundancy and contingency	Residual risk regarded to be low and acceptable.
	GLEIF Credential Registry Risks						GLEIF manages its own Credential Registry. These are risks associated with that repository.			
	Lack of competence to perform role	Credential	Governance	5	1	LOW-MEDIUM	Requires training, trust assurance practices and controlled practices	Mitigation	Mitigated by proper, regular training	Residual risk regarded to be low and acceptable.
	Unavailable registry	Credential	Availability	5	3	MEDIUM-HIGH	Requires availability controls	Mitigation	Mitigate with appropriate system redundancy and contingency	Residual risk regarded to be low and acceptable.
	Lack of appropriate access to registry	Credential	Security	5	3	MEDIUM-HIGH	Requires appropriate access controls	Mitigation	Mitigate with effective access controls	Residual risk regarded to be low and acceptable.
	Inappropriate access writes to registry	Credential	Security	5	2	MEDIUM	Requires appropriate access management controls	Mitigation	Mitigate with security in KERI vLEI software	Residual risk regarded to be low and acceptable.
	Breach of registry	Credential	Security	5	2	MEDIUM	Requires appropriate security perimeter, breach detection and notification controls	Mitigation	Mitigate with security in KERI vLEI software	Residual risk regarded to be low and acceptable.
	Exploited use of stolen vLEIs	Credential	Security	5	2	MEDIUM	Requires adequate breach notification processes	Mitigation	Mitigated by use of KERI vLEI software with the vLEI Reporting API	Residual risk regarded to be low and acceptable.
	GLEIF vLEI Issuer Qualification Program Risks						GLEIF operates its own vLEI Issuer Qualification program. These are the risks associated with that program.			
	Lack of competence to perform role	Ecosystem	Governance	1	1	LOW	Requires training, sufficient experience and generally accepted auditor practices	Mitigation	Mitigated by proper, regular training	Residual risk regarded to be low and acceptable.
	Inconsistent or biased qualification process	Ecosystem	Governance	2	1	LOW	Requires well-documented requirements and process, applied consistently	Mitigation	Mitigated by comprehensive program, applied consistently	Residual risk regarded to be low and acceptable.
	Legal Entity Risks						Legal Entity – a legal person or structure that is organized under the laws of any jurisdiction that meets the eligibility criteria for registering for a LEI.			

	Counterfeit credentials (not based on valid LEIs) being issued	Credential	Privacy	5	1	LOW-MEDIUM	Requires adequate credential non-repudiation practices	Mitigation	Mitigated, since an invalid LEI would never appear and could not be checked in the GLEIS and a counterfeit vLEI never would be able to connect to the chain of trust of the vLEI system.	Residual risk regarded to be low and acceptable.
	Lack of binding between Legal Entity and vLEIs issued	Credential	Confidentiality	5	2	MEDIUM	Requires adequate vLEI Role Credential issuance measures	Mitigation	This risk must be tackled at the issuance stage. First, the QVI only can issue on receipt of a QVI Authorization vLEI sent by the Legal Entity Authorized Representatives (LARs). Then, as part of the Identity Verification process, the QVI will verify that the OOR Person is in control of their DID. OOR vLEI Role Credentials will have role lists that can act as a guide for the types of OORs expected for the entity legal form of the Legal Entity, preventing OOR Credential issuance for bogus official roles. Assigning roles for Engagement Context Role Credentials entirely will be the responsibility of the Legal Entity.	Residual risk regarded to be low and acceptable.
	Imposter using valid Legal Entity vLEI Credential	Credential	Security	5	2	MEDIUM	Requires adequate wallet protection measures	Mitigation	There will be a list of requirements/features for wallets holding credentials and that will be relied upon by vLEI Holders.	Residual risk is that Holders do not adequately protect their wallets and prevent coercion despite the guidance and requirements in the vLEI Ecosystem Governance Framework.
	Private signing key is compromised	Credential	Security	5	5	HIGH	Requires adequate protection measures for private keys	Mitigation	Mitigated by KERI prerotation and effective wallet management. The best mitigation for a wallet's access key is to use multi-signatures for the identifier which means that multiple wallets must be compromised. Thus compromise of one wallet private key does not result in loss of control of the identifier.	Residual risk regarded to be low and acceptable.
	Lack of portability of vLEIs	Credential	Availability	5	2	MEDIUM	Requires adequate vLEI interoperability practices	Mitigation	KERI will provide vLEI portability.	Residual risk regarded to be low and acceptable.
	Lack of credential federation across ecosystems	Ecosystem	Availability	5	3	MEDIUM-HIGH	Requires adequate credential interoperability practices	Mitigation	The vLEI is designed as an Ecosystem Governance Framework to be able to interoperate within other ecosystems.	Residual risk regarded to be low and acceptable.
	Social engineering attacks successfully gather credentials by perpetrators	Credential	Security	5	2	MEDIUM	Requires adequate wallet protection measures	Mitigation	Credentials will be cryptographically bound to wallets and can be biometrically bound to Holders	Residual risk regarded to be low and acceptable.
	Utility Risks						Risks associated with KERI infrastructure (Part 1) and vLEI Credentials (Part 2)			
	vLE software contains undetected bugs or defects that can be exploited by attackers. *	Utility	Security	5	2	MEDIUM	vLEI software should be tested and/or reviewed or audited for bugs and defects, internally and externally	Mitigation	All vLEI software will be publicly available open source code that will be conformance tested prior to distribution. A TVA (Topological Vulnerability Analysis) scan can be requested to be performed for new applications.	Residual risk regarded to be low and acceptable.

LEGEND		
COLUMN HEADER	EXPLANATION	Potential Values
Risk #	A unique identifier of a risk for reference purposes	#
Risk Description	Description of a unique risk	Text
ToIP Layer	The Governance Stack Layer the risk operates based on the ToIP Governance Stack	Ecosystem Credential Provider Utility
Trust Area Affected	Information trust component affected by the risk	Governance Availability Security Availability Privacy Processing Integrity
Severity	Judgmental evaluation of impact the risk would have on the entity if realized	Negligible Minor Moderate Major Critical
Likelihood	Judgmental evaluation of the potential that the risk will occur risk without controls or other circumstances to prevent it.	Highly Unlikely Unlikely Possible Likely Highly Unlikely
Impact	Judgmental scoring of risk's effect based on severity and and likelihood.	Low Low-Medium Medium Medium-High High
Risk Consideration Actions	Factors to consider regarding risk treatment	Text
Risk Treatment	Recommended action category to take to handle the risk	Mitigation Avoidance Transference Acceptance Other
Risk Treatment Action	High level action identified to treat risk	Text
Residual Risk	Judgmental level or state of risk after applying risk treatment	Text or Impact Level

SCALE OF LIKELIHOOD		NEGLIGIBLE (1)	MINOR (2)	MODERATE (3)	MAJOR (4)	CRITICAL (5)
	HIGHLY UNLIKELY (1)	LOW	LOW	LOW	LOW - MEDIUM	LOW - MEDIUM
	UNLIKELY (1)	LOW	LOW - MEDIUM	LOW - MEDIUM	MEDIUM	MEDIUM
	POSSIBLE (3)	LOW	LOW - MEDIUM	MEDIUM	MEDIUM	MEDIUM-HIGH
	LIKELY (4)	LOW - MEDIUM	MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH
	HIGHLY LIKELY (5)	LOW - MEDIUM	MEDIUM	MEDIUM-HIGH	HIGH	HIGH