



## **Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE)**

# **SDSFIE Quality (SDSFIE-Q) Implementation Guidance**

**6 October 2021**

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**Prepared By:**

**The Installation Geospatial Information and Services Governance Group (IGG)**

**For:**

**The Assistant Secretary of Defense (Sustainment)**

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### **Executive Summary**

This document contains implementation guidance for the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) – Quality standard, or SDSFIE-Q. Since quality implementation guidance can be found in numerous existing IGI&S guidance documents and memos, the key goal of this document is to gather and coordinate these requirements in a single place. Requirements for SDSFIE-Q implementation are combined in this guidance document, including their source and section reference for additional information. The source documents include the SDSFIE Governance Plan, SDSFIE-Q, SDSFIE-M, SDSFIE-M Implementation Guidance, ADS Implementation Guidance, CIP Procedures document, and the memorandum from the Assistant Secretary of Defense for Sustainment (ASD(S)) titled “Metadata and Quality Spatial Data Standards for Facilities, Infrastructure, and Environment” (hereafter “Mandate Memo”). See Section 1.1 References for complete listings of each source document. The intent of this document is for Components to use it to identify requirements and reference the source documents as needed for additional metrics and procedures.

As the core IGI&S standard regarding quality, SDSFIE-Q defines processes, metrics and measures to assess the quality and completeness of geospatial data. Anytime IGI&S data or services are created, updated, maintained, or shared, Components must adhere to the data quality guidance and processes in SDSFIE-Q and this Implementation Guidance. This applies to improving and reporting data quality (at an applicable level) of all vector and raster based data, as well as services.

**Revision History**

| <b>Description</b>                     | <b>Date</b> | <b>Version</b> |
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## Part 1: Overview

### 1 Introduction

This document contains implementation guidance for the Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) – Quality standard, or SDSFIE-Q. SDSFIE-Q specifies overarching guidance for how the Department of Defense (DoD) will implement a tiered approach to quality, including data quality processes, measures, and metrics for vector, raster, and geospatial services developed and used by the installation geospatial information and services (IGI&S) community. This standard does not include a required schema or data model, and therefore is not registered in the DoD IT Standards Registry (DISR). SDSFIE-Q is based on the ISO 19157 conceptual model of quality for geographic data.

The intent of this SDSFIE-Q Implementation Guidance (SQIG) is to provide the DoD Components who implement IGI&S with a central, comprehensive reference for a wide range of IGI&S quality requirements. Since the quality factors of geospatial data are already described in a variety of IGI&S source documents, one of the key functions of this document is to gather those in a single place. To aid the reader, the text of this document includes superscript numbers which correspond to the list of source documents in Section 1.1, References, and specifically the “Reference Numbers” listed in Table 1. Table 1 includes the reference number, document, section, sub-reference (Table Number, Figure Number, etc.), and the page number where the source material may be found in the referenced document. The source documents include the SDSFIE Governance Plan, SDSFIE-Q, SDSFIE – Metadata Standard (SDSFIE-M), SDSFIE-M Implementation Guidance, Authoritative Data Source (ADS) Implementation Guidance, Common Installation Picture (CIP) Procedures document, and the memorandum from the Assistant Secretary of Defense for Sustainment (ASD(S)) titled “Metadata and Quality Spatial Data Standards for Facilities, Infrastructure, and Environment” (hereafter “Mandate Memo”). Section 1.1, References, includes a complete listing of all source documents and links for where to download them. As an additional aid to the reader, all of the major data quality requirements which the DoD Components must implement (e.g. the “Components shall...” statements) are summarized in a single table at Appendix A. This table is available as a sortable spreadsheet from the Defense Installations Spatial Data Infrastructure (DISDI) office within OASD(S).

Section 3.1 of the SDSFIE-Q Standard<sup>15</sup> defines SDSFIE-Q roles and responsibilities. Particularly, the Office of the Assistant Secretary of Defense for Sustainment (OASD(S)) Geospatial Information Officer (GIO) is responsible for leadership and support of the IGI&S Governance Group (IGG) regarding data quality processes and quality management plans, leadership of the data quality working group, and for publishing data content specifications (DCSSs) at the OSD level in coordination with the data Quality Working Group. The Office of the Secretary of Defense (OSD) will establish guidance and processes, and will collect Component CIP data and corresponding data quality metrics, as described in the SDSFIE-Q Standard and below. Per Section 3.1 of the SDSFIE-Q Standard<sup>15</sup>, Component IGI&S Programs are responsible for coordinating and directing the creation, maintenance, and distribution of IGI&S data at the Component level. Components will develop Component level data quality metrics and guidance through quality management plans and data content specifications, as described in the SDSFIE-Q Standard and below.

As the core IGI&S standard regarding quality, SDSFIE-Q defines processes, metrics and measures to assess the quality and completeness of geospatial data. Anytime IGI&S data or services are created, updated, maintained, or shared, Components must adhere to the data quality guidance and processes in SDSFIE-Q and this Implementation Guidance<sup>9</sup>. This applies to improving and reporting data quality (at an applicable level) of all vector and raster based data, as well as services. Components shall perform actions as indicated in the SDSFIE-Q “Responsible, Approval, Consulted, Informed” (RACI) chart and displayed in Figure 4, IGI&S Quality Management Operational Activity Diagram<sup>14</sup>.

This document is organized into five parts:

Part 1: Quality guidance rules for all IGI&S data and services.

Part 2: Quality guidance rules specific to vector datasets - SDSFIE-V.

Part 3: Quality guidance rules specific to raster datasets - SDSFIE-R.

Part 4: Quality guidance rules specific to geospatial data aggregates (e.g. CIP) and repositories (e.g. ADS).

Part 5: Quality guidance rules specific to services - SDSFIE-S.

## 1.1 References

[ASD\(S\), Spatial Data Standards for Facilities, Infrastructure, and Environment \(SDSFIE\) Governance Plan, Revision 3, 31 January 2019](#): The SDSFIE Governance Plan defines the SDSFIE as a family of standards, and provides a description of the roles, responsibilities, governance objectives, and related processes that guide the development and use of the SDSFIE within the enterprise. This plan is intended to apply specifically to the Installations and Environment (I&E) community as well as the US Army Corps of Engineers (USACE) Civil Works community, and any other DoD organization mandated to use SDSFIE as specified in the DoD IT Standards Registry (DISR).

[ASD\(S\), Spatial Data Standards for Facilities, Infrastructure, and Environment \(SDSFIE\) Metadata \(SDSFIE-M\): Implementation Guidance, Version 2.0., 10 June 2020](#): This document provides implementation guidance for the SDSFIE-M standard.

[ASD\(S\), Spatial Data Standards for Facilities, Infrastructure, and Environment \(SDSFIE\) Metadata \(SDSFIE-M\), Version 2.0, Revision 4.0, 10 June 2020](#): SDSFIE-M is a standard which defines the conceptual schema profile for specifying geospatial metadata in and for the EI&E community. This document defines the mandatory and common elements of the SDSFIE-M conceptual schema.

[ASD\(S\), Spatial Data Standards for Facilities, Infrastructure, and Environment \(SDSFIE\) Quality \(SDSFIE-Q\), Revision 2, 12 March 2020](#): SDSFIE-Q specifies over-arching guidance for how DoD will implement a tiered approach to quality, including data quality processes, measures, and metrics for vector, raster, and geospatial services developed and used by the installation geospatial information and services (IGI&S) community.

[ASD\(S\), Installation Geospatial Information and Services \(IGI&S\) Authoritative Data Source \(ADS\) Implementation Guide, 13 March 2019](#): This document defines what an IGI&S ADS is and establishes the intent of the policy requirement for them. It also provides a set of implementation rules regarding the content and technical level capabilities of IGI&S ADS within a Component.

[Fiscal Year 2020 Common Installation Picture \(CIP\) Collection, Storage, and Dissemination Procedures, 30 September 2020](#): Requirements for the FY20 CIP data call.

[ASD\(S\), Metadata and Quality Spatial Data Standards for Facilities, Infrastructure, and Environment Memo, 26 August 2020](#): Signed memorandum from ASD(Sustainment) mandating the SDSFIE-M and SDSFIE-Q standards.

[DoDI 8130.01, Installation Geospatial Information and Services \(IGI&S\), Change 3, 04 August 2020](#): DoD Instruction that establishes policy, assigns responsibilities, and provides governance procedures for IGI&S.

## 1.2 Document Maintenance

This document shall be maintained by the IGI&S Governance Group (IGG) and will be updated according to the change management process defined in the SDSFIE Governance Plan.

## 2 The SDSFIE-Q Quality Management Workflow

### 2.1 *Quality Management Workflow*

Figure 1<sup>16</sup> details the workflow of quality management activities for the IGI&S data lifecycle, from requirements gathering to completeness<sup>1</sup>. These activities correspond to Quality Management Activities on the SDSFIE-Q RACI matrix<sup>14</sup>. General implementation rules for each operational activity are presented in the following sections:

- Define Geospatial Requirements (Section 2.22.2)
- Create Geospatial Information (Section 2.3)
- Validate Geospatial Information (Section 2.4)
- Maintain Geospatial Information (Cleansing) (Section 2.5)
  - Obtain Resources (Section 2.5.1)
- Provide Geospatial Information (Section 2.6)

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<sup>1</sup> Figure 1 is an OV-5 Operational Activity Diagram. Department of Defense Architecture Framework (DoDAF)-described Models in the "Operational Viewpoint" describe the tasks and activities, operational elements, and resource flow exchanges required to conduct operations. The "OV-5b: Operational Activity Model," provides the context of capabilities and activities (operational activities) and their relationships among activities, inputs, and outputs. Additional data can show cost, performers, or other pertinent information. The model included here is depicted using the Business Process Modeling and Notation (BPMN) standard.

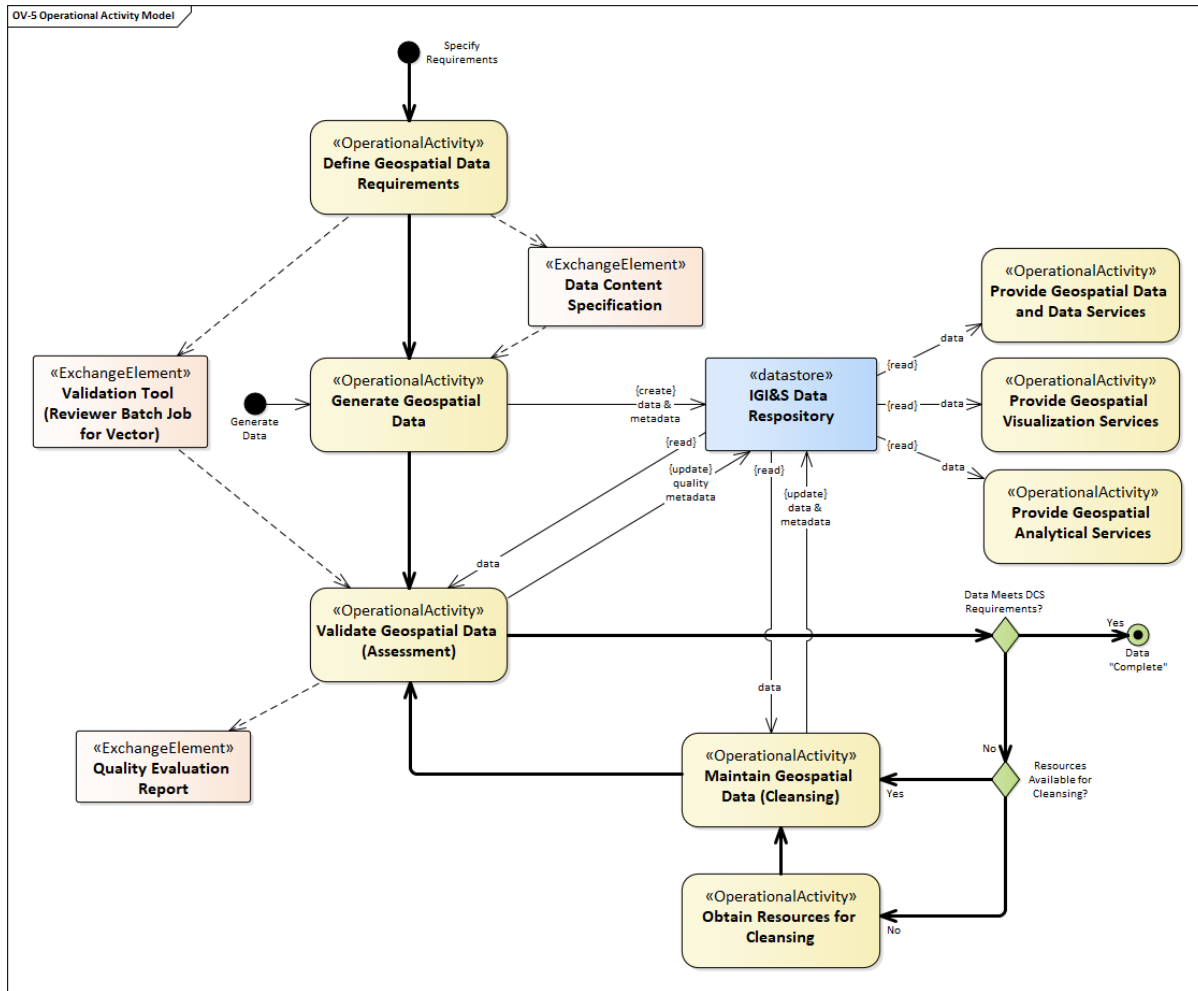


Figure 1: IGI&amp;S Quality Management Operational Activity Diagram

## 2.2 Quality Management Rules: Define Geospatial Requirements

Quality Management actions are undertaken to define geospatial requirements and execute quality control and assurance through guidance, contract language, DCSs and metrics. The following quality management actions are identified in SDSFIE-Q and implementation rules are identified below:

- Develop Quality Management Plans (Section 2.2.1)
- Develop data content specification (DCS) (Section 2.2.2)
- Specify SDSFIE Quality Contract Language (Section 2.2.3)
- Define Quality Metrics (Section 2.2.4)

### 2.2.1 Rules for Quality Management Plans

- A. Components shall develop a strategy for measuring and documenting Component-level data quality metrics and guidance through quality management plans (QMPs) and DCSs<sup>15</sup>.
- B. Component QMPs shall include the following information<sup>17</sup>:
  - i. Roles and responsibilities for data quality management at the Component level. (Including a RACI chart or similar language.)<sup>14</sup>

- ii. Data quality units that are Component-specific, in addition to those established in SDSFIE-Q (if desired or necessary for the Component).
- iii. Metrics and associated measures to be reported to the Component headquarters and the process for identifying and establishing new metrics. Components should refer to the standardized ISO 19157 measures listed in SDSFIE-Q Appendix A to aid in developing new metrics requirements.
- iv. Identification of IGI&S data repositories, and their structure.
- v. For the Component IGI&S ADS, develop a plan for how quality at the repository will be measured and documented as the repository changes over time and for actually measuring and documenting the ADS repository quality.
- vi. DCSs defined at the HQ level; these may be incorporated by reference if desired. See DCS General Guidance (Annex F) for detailed guidance on how to structure DCSs.
- vii. A projected timeline for completion/update of DCSs with priority given to CIP feature types.
- viii. Projected milestones for achieving the data quality implementation goals (maturity model levels) defined as part of the annual CIP data call. These data quality maturity goals were incorporated in the FY20 CIP data call and will continue in future years until all Component goals are met. See Section 3.1.1.G of this document for details<sup>7</sup>.
- ix. A description of the organization-level process and plan for data validation and data cleansing/correction.
- x. The process for collecting and maintaining layer-level metadata.

#### 2.2.1.1 Quality Management Plan Implementation Scorecard

- A. Each Component shall report their progress toward implementation of SDSFIE-Q annually to the IGG Chair using the following Implementation Scorecard categories<sup>8, 18</sup>:
  - i. **Green:** A quality management plan exists and a high level of implementation progress has been made.
  - ii. **Yellow:** A quality management plan exists and a significant level of implementation progress has been made.
  - iii. **Red:** No quality management plan exists or little or no implementation progress has been made.

#### 2.2.2 Data Content Specification (DCS)

- A. Components shall develop DCSs for each IGI&S feature type within their registered SDSFIE-V adaptation (for example, Quality Assurance Plans (QAPs), Data Layer Specifications (DLSSs), or Data Collection Guides (DCGs)), according to the timeline/milestones described in Component QMPs. DCSs document the format and quality expectations for a geospatial data layer (or set of layers). See the DCS General Guidance document (Annex F) for guidance applicable to all feature types in SDSFIE-V Gold or registered Adaptations. Additionally, the DCS General Guidance includes data collection guidance applying to subsets of SDSFIE-V data (e.g. CIP or real property feature types)<sup>14, 19, 34</sup>.

#### 2.2.3 SDSFIE Quality Contract Language

- A. Whenever IGI&S data or services are procured, DoD Components shall incorporate contract language which ensures deliverables conform to all standardization and quality requirements specified in the SDSFIE family of standards, including SDSFIE-Q and Component QMPs. For example, DoD contracts for installation geospatial data, installation master plans, or integrated natural resources management plans (INRMPs) should include a section which requires that GIS data collected, established, or prepared by the contractor, and submitted to the government in

any final deliverables must be formatted in accordance with the Component's current, registered Adaptation of SDSFIE-V and applicable QMPs<sup>20</sup>.

- B. Components shall ensure that contract data deliverables include metadata formatted in accordance with the current version of SDSFIE-M, and should also be populated to conform to SDSFIE-Q requirements as well as any applicable Component QMPs. (Appendix C contains more specific guidelines for how to cite SDSFIE standards in DoD contracts pertaining to IGI&S.)<sup>20</sup>

#### **2.2.4 Define Quality Metrics**

- A. Component IGI&S Programs and ADS Managers shall establish data quality metrics for each data quality unit established in SDSFIE-Q, DCSs, or Component QMPs for any IGI&S data or services that are unique to that Component (and thus haven't been covered in SDSFIE). Data quality metrics shall be based on policy drivers and business requirements. Metrics are specific, measureable indicators that address data quality compliance. Metrics are created when measures (as defined by ISO 19157) are assigned a corresponding scope (see SDSFIE-Q Rev 2, Figure 5, page 19)<sup>14, 21, 22</sup>.
- B. When creating Component-specific metrics and reporting data quality results, Components shall identify the data quality scope. SDSFIE-Q Table 3 lists the data quality scopes and corresponding administration levels established in SDSFIE-Q, however Components may establish additional scopes in their QMPs and DCSs such as "feature" and "attribute" that are not included in this list<sup>23</sup>.

### **2.3 Quality Management Rules: Create Geospatial Information**

Data generation includes all activities associated with creating or acquiring geospatial data and metadata resources. Data can be created or acquired using internal or contracted resources. Completed data and metadata will be stored in the IGI&S data repository, in accordance with DoD Component guidance.

- A. Anytime IGI&S data or services are created, updated, maintained, or shared, Components must adhere to the data quality guidance and processes in SDSFIE-Q and the SDSFIE-Q Implementation Guidance<sup>10</sup>.
- B. Metadata shall be populated when data is created (or acquired), in accordance with the SDSFIE-M Implementation Guidance and subsequent Component guidance<sup>24</sup>.

### **2.4 Quality Management Rules: Validate Geospatial Information**

- A. Once it is created or obtained, Components shall assess IGI&S data to determine if it meets requirements and conforms with standards and data quality guidance. The results of this evaluation should be reported in metadata and used to determine if data cleansing is needed<sup>25</sup>.
- B. Components shall routinely assess IGI&S data through validation and defined data quality evaluation processes, which will evaluate metrics established in SDSFIE-Q, DCSs, and Component QMPs. DoD Components or OSD may require the use of automated tools for assessments<sup>26</sup>.
- C. Components shall use direct evaluation methods wherever possible to determine data quality. Indirect evaluation is not recommended for SDSFIE-Q since the results may be subjective, inconsistent, and not repeatable<sup>12</sup>.
- D. Components shall specify the conformance quality level in data content specifications or user requirements for particular datasets<sup>13</sup>.
- E. Descriptive results are not recommended for SDSFIE-Q since the results are based on a subjective, inconsistent, and not repeatable evaluation method. Components shall report quantitative, conformance, or coverage results wherever possible<sup>13</sup>.

### 2.4.1 Report Quality Results - Metadata

- A. Component IGI&S Programs and ADS Managers shall consolidate and report data quality evaluation results to Component Headquarters and OSD by populating data quality metadata elements defined by SDSFIE-M<sup>14, 27</sup>.
- B. Components shall use the SDSFIE-M standard to report metrics associated with data quality and completeness, using the DQ\_DataQuality element<sup>6</sup>.
- C. A stand-alone data quality report may also be required if the data quality results are aggregated or derived from other datasets or subsets of the dataset to provide additional details that cannot be expressed in the metadata<sup>27</sup>.
- D. When reporting data quality in metadata, the metadata must include the scope being evaluated (DQ\_Scope) and at a minimum either the lineage element (LI\_Lineage) or a report for at least one data quality element (DQ\_Element), unless additional data quality elements are required (e.g. CIP)<sup>27</sup>. The data quality reporting elements are described in detail in SDSFIE-Q section 2.1.1.2.
- E. Components shall populate the scope metadata element (DQ\_Scope) from SDSFIE-M based on the scopes identified in SDSFIE-Q Section 3.3.4.1<sup>37</sup>.
- F. If DQ\_Element is populated, a conformance result (DQ\_ConformanceResult), quantitative result (DQ\_QuantitativeResult), or coverage result (QE\_CoverageResult) must be populated for each report. A coverage result (QE\_CoverageResult) is the result of a data measure organizing the measured values as a coverage<sup>27</sup>.
- G. When reporting a data quality result for a metric in the metadata, the SDSFIE-Q metric ID must be recorded in MD\_Identifier:code. Using the SDSFIE-Q metric ID eliminates the need to populate multiple metadata elements and standardizes the reporting method. The SDSFIE-Q metric IDs will be generated and stored in an accessible on-line registry in accordance with SDSFIE-M. These IDs are currently provided in SDSFIE-Q Appendix B, as well as other supporting SDSFIE-Q documentation (e.g. DCS General Guidance (Annex F))<sup>28</sup>.
- H. Complete metadata for Component CIP data containing completed quality metadata is necessary to reach Level 3 in the Metadata Management component of the ADS Maturity Model (ADSM)<sup>2</sup>.
- I. When reporting the quality of metadata associated with IGI&S and services, the “metadata” scope should be used<sup>23</sup>.

## 2.5 Quality Management Rules: Maintain Geospatial Information

Maintaining geospatial information involves reviewing results of a quality evaluation and updating the data. The data steward is responsible for ensuring that the data is maintained at an interval established by the Component.

### 2.5.1 Cleanse Data

- A. When a dataset is validated against IGI&S standards and requirements (e.g. DCSs), corrective actions should be identified if the data does not meet established data quality requirements. The dataset should be cleansed (corrected) and re-evaluated before updating the IGI&S data repository<sup>14, 29</sup>.
- B. If the data steward is unable to allocate resources to cleanse the data, then they will need to obtain resources before cleansing<sup>30</sup>.
- C. If the data cannot be cleansed due to a lack of resources, the metadata of the uncleansed dataset should reflect the results of the data quality evaluation<sup>30</sup>.

## 2.6 Quality Management Rules: Provide Geospatial Information

- A. Components shall ensure that data and services, including information about the quality of the data, are available to all authorized users, in accordance with Operational Security (OPSEC) policy. Data and metadata can be discoverable through Component IGI&S Portals, map viewers, or websites, or through web map services. Components shall establish quality metrics assessing the accessibility and discoverability of their geospatial data, and shall have a feedback

mechanism in place to capture end user comments and questions about IGI&S data. Feedback mechanisms may include a website function, a database attribute, a standard change request form, or comments received via a help desk e-mail or phone number<sup>32</sup>.

- B. Each Component shall report the following metrics for Accessibility<sup>31</sup> annually to the IGG Chair (See SDSFIE-Q Appendix B for the full list of IGG Data Quality Metrics<sup>51</sup>):
- i. Pass or Fail: The Component has an enterprise level map viewer
  - ii. Pass or Fail: The Component has a process and mechanisms for data requests and data delivery
  - iii. The percentage of CIP feature types not visible on the Component enterprise map viewer
  - iv. The percentage of CIP feature types not accessible through a web map service
  - v. The percentage of feature types not available to fulfill a validated request
  - vi. The number of data requests for each CIP feature types within a one-year period
  - vii. The number of users viewing each CIP feature type annually
  - viii. The number of users accessing or downloading each CIP feature type within a one-year period
  - ix. Pass or Fail: The Component has a user feedback mechanism (email feedback, customer surveys, etc.) for all data discovery methods.

**Part 2: Rules for SDSFIE-V Data Quality****3 SDSFIE-V Introduction**

SDSFIE- V is the vector data model for the IGI&S community. This includes the current SDSFIE Specification Document, as well as the current “Gold” Logical Data Model and all Component HQ-level Adaptation Logical Data Models. Part 2 of this document describes quality implementation that are specific to vector data. Implementation rules for evaluating overall data quality results for aggregated datasets, such as CIP, Component CIP, and IGI&S data repositories are covered in Part 4: Rules for Data Quality of Aggregates and Repositories.

**3.1 IGI&S Vector Datasets**

Vector data used in IGI&S Programs exists in several forms; CIP, Component CIP, additional data that conforms to the SDSFIE-V standard, data that is included in the Component IGI&S data repository that is not SDSFIE-V compliant and data that is created or acquired for a specific purpose or project. Vector datasets that are required for upward reporting must adhere to more stringent collection and quality requirements than datasets that are project specific or reserved for local use only.

- A. Components must develop DCS documents (QAPs, DLSSs, DCGs) for all feature types as described in Component QMPs. See the DCS General Guidance document (Annex F) for guidance applicable to all feature types in SDSFIE-V Gold or registered Adaptations. Additionally, the DCS General Guidance includes data collection guidance applying to subsets of SDSFIE-V data (e.g. CIP or real property feature types)<sup>34</sup>.
- B. The DCS for each IGI&S layer mandated for collection shall include well-defined metrics and corresponding evaluation methods for applicable data quality reporting elements. The metrics shall be mapped to the appropriate data quality element so that the quality of the feature type can be consistently reported in the metadata<sup>19, 38</sup>. All IGG Data Quality Metrics and their corresponding data quality element are listed in Table 5 in the SDSFIE Quality Standard Rev 2 (page 40) and IGI&S Feature Type Metrics are listed in Table 3 of the DCS General Guidance (Annex F of this document). Each feature type DCS shall include a table showing the feature type’s applicable metrics and appropriate data quality element. See Annex G: DCS Example Table 11: Building Metrics for an example of a table showing these mappings.
- C. The DCS General Guidance shall be used in conjunction with feature type-specific DCSs and includes metrics and evaluation methods that will be used to assess data quality for IGI&S data. Mandatory metrics that apply to all CIP feature types or all real property feature types are identified in the DCS General Guidance document. Each feature type-specific DCS includes additional mandatory metrics for that feature type<sup>35</sup>.
- D. Each Component shall report the following metrics for DCS implementation annually to the IGG Chair (See SDSFIE-Q Appendix B for the full list of IGG Data Quality Metrics):
  - i. The percentage of feature types that are required for collection by a Component headquarters that do not have a DCS.
  - ii. The percentage of feature types for the CIP that do not have a DCS.
  - iii. The percentage of feature types in SDSFIE-V Gold that do not have a DCS.

**3.1.1 Common Installation Picture (CIP)**

- A. As described in DoDI 8130.01, Enclosure 3<sup>11</sup>, Components shall annually provide the ASD(S) with an authoritative geospatial feature dataset (with mandatory attribute fields populated) including all CIP layers identified in the annual CIP memo. The annual CIP memo includes requirements for geospatial data, metadata, data quality reports and certification letters. Refer to the annual CIP memo for specific collection and reporting requirements. The quality-related CIP requirements are described in the sub-paragraphs below.
- B. CIP Collection Requirements (Metadata):
  - i. Components must provide metadata compiled at the HQ level for each submitted CIP layer.

- ii. Components must provide metadata for the CIP aggregate dataset (i.e. the geodatabase level).
  - iii. Metadata must include all required SDSFIE-M 2.0 elements.
- C. CIP Data Quality Reports:
  - i. The IGG shall develop and maintain a DCS for each CIP layer designated by the ASD(S).
  - ii. The DCS for each CIP layer will describe the required metrics. The scope for layer-specific metrics will be dataset<sup>33</sup>.
  - iii. Mandatory metrics that apply to all CIP feature types or all real property feature types are identified in the DCS General Guidance document. Each feature type-specific DCS includes additional mandatory metrics for that feature type<sup>35</sup>. A list of all mandatory and optional metrics for each CIP feature type are also included in Appendix D: CIP Quality Metrics.
  - iv. Components shall validate their CIP data against the DCS requirements prior to submitting to OSD. Components may also develop validation tools to assist with adherence to QMPs and Component DCSs<sup>36</sup>.
  - v. Data quality results for CIP layers shall be reported as both conformance results (DQ\_ConformanceResult) and quantitative results (DQ\_QuantitativeResult). The DCS and the explanation of the result must be cited in the metadata, along with an indication of whether or not the layer passed the evaluation. A conformance result is determined by comparing a CIP layer against a DCS. Quantitative results are the values obtained from applying data quality measures defined in the DCS<sup>38</sup>.
- D. CIP Data Quality Reports – Aggregate Datasets:
  - i. OSD will aggregate the data quality results of all Component CIP data<sup>49</sup> and will release a report of these results back to the Components when it becomes available each year. The following metrics for the aggregated CIP dataset shall be evaluated<sup>45</sup>:
    - The percentage of feature types required for the CIP that were submitted by each Component.
    - The percentage of reported Real Property assets that do not have a geospatial representation in the CIP.
    - The percentage of CIP layers that passed all validation checks required by the DCSs.
    - The percentage of CIP feature types that have SDSFIE-M compliant metadata records.
    - The percentage of CIP layers that do not have metadata with at least one data quality reporting element populated.
  - ii. Components shall assess and report each of the CIP Quality Metrics for each CIP dataset and CIP aggregate. The metrics must be assessed and reported with the annual Component CIP submission. See the CIP Quality Metrics spreadsheet for details on required metrics at the dataset scope and aggregate scope<sup>3</sup>.
- E. CIP Data Quality Maturity Model:
  - i. Component CIP quality will be assessed in accordance with the CIP Maturity Model levels (consistent with the levels delineated in the ADS Implementation Guidance). This maturity model was first incorporated in the FY20 CIP data call and will continue in future years until all Components achieve Level 4. Components must identify milestones for when they will achieve the data quality levels defined below. These milestones shall be documented in their Component's QMP.<sup>3</sup>:

Level 1 (Performed) – Current State – end of FY21:

- Level 1 represents the current state of CIP quality. Components have not migrated data to an approved HQ Adaptation of SDSFIE-V 4.0.x, but are evaluating a minimum set of quality metrics. Required Level 1 metrics include all checks that were previously required on the CIP Quality checklist, where mandatory for a feature type.

- Level 1 Maturity Requirements:

- All required CIP layers are delivered, where applicable and are compliant with an approved HQ Adaptation (SDSFIE 3.0 or greater). Justifications shall be provided if not delivered.
- All submitted CIP layers have SDSFIE-M compliant metadata.
- 50% or greater of submitted CIP layers meet minimum acceptable quality levels for Level 1 metrics.

Level 2 (Defined) – 0-2 years – end of FY23:

- Level 2 represents a basic maturity level, where Component CIP data is migrated to an approved HQ Adaptation of SDSFIE-V 4.0.x and Components are beginning to evaluate and report quality in accordance with SDSFIE-Q and SDSFIE-M requirements. Required Level 2 metrics include all Level 1 metrics, where mandatory for a given CIP layer, and an additional four metrics (sdsId and installationId population) that are not yet included in SDSFIE-Q.

- Level 2 Maturity Requirements:

- All required CIP layers are delivered, where applicable and are compliant with SDSFIE-V 4.0.x or an HQ Adaptation thereof. Justifications provided if not delivered.
- All submitted CIP layers have SDSFIE-M 2.0 compliant metadata with at least one quality reporting element populated.
- 75% or greater of submitted CIP layers meet minimum acceptable quality levels for Level 1 and 2 metrics.

Level 3 (Managed) – 2-4 years – end of FY25:

- Level 3 represents an advanced maturity level, where Component CIP data is migrated to an approved HQ Adaptation of SDSFIE-V 4.0.x. Components are consistently evaluating and reporting mandatory quality metrics (per SDSFIE-Q and SDSFIE-M requirements) and quality assessments are generally meeting the acceptable quality levels defined in SDSFIE-Q. Required Level 3 metrics include all Level 1 and 2 metrics as well as all mandatory metrics for each CIP layer, as described in each DCS.

- Level 3 Maturity Requirements:

- All required CIP layers are delivered, where applicable and are compliant with SDSFIE-V 4.0.x or an HQ Adaptation thereof. Justifications provided if not delivered.
- All submitted CIP layers have SDSFIE-M 2.0 compliant metadata with quality reporting elements populated for 50% of required metrics.
- 90% or greater of submitted CIP layers meet minimum acceptable quality levels for Level 1 and 2 metrics.
- 75% or greater of submitted CIP layers meet minimum acceptable quality levels for all mandatory metrics established in DCSs (Level 1, 2 and 3 metrics. May also include Level 4 metrics if mandatory in the DCS).

Level 4 (Measured – Quantitatively Managed) – 4+ years – end of FY25 or later):

- Level 4 represents a full maturity level, where Component CIP data is migrated to an approved HQ Adaptation of SDSFIE-V 4.0.x. Components are consistently evaluating and reporting mandatory and optional quality metrics (per SDSFIE-Q and SDSFIE-M requirements) and quality assessments meet all acceptable quality levels defined in SDSFIE-Q. Required Level 4 Metrics include all Level 1, 2 and 3 Metrics as well as optional metrics established in SDSFIE-Q and the DCSs.

- Level 4 Maturity Includes:
  - All required CIP layers are delivered, where applicable and are compliant with SDSFIE-V 4.0.x or an HQ Adaptation thereof. Justifications provided if not delivered.
  - All submitted CIP layers have SDSFIE-M compliant metadata with quality reporting elements populated for all mandatory metrics.
  - 90% or greater of submitted CIP layers meet minimum acceptable quality levels for all Level 1 and 2 metrics.
  - 90% or greater of submitted CIP layers meet minimum acceptable quality levels for all mandatory metrics established in DCSs (Level 1, 2 and 3 metrics. May also include Level 4 metrics if mandatory in the DCS).
  - 50% or greater of submitted CIP layers meet minimum acceptable quality levels for all non-mandatory metrics established in DCSs (Level 4 metrics).

F. CIP Data Quality Tools:

- i. OSD has developed rule expression language for each CIP layer to enforce compliance with DCS requirements<sup>36</sup>. OSD provides a Data Reviewer Batch Job (RBJ) file that checks Component data against applicable Level 1 and 2 metrics. For Level 3 and 4 metrics, Components should refer to the published DCSs and associated RBJs.
- ii. Components shall use the RBJ files provided by OSD for each CIP feature type to complete their data quality assessment. Components are responsible for obtaining necessary resources, performing the data quality checks, and correcting errors prior to submitting CIP data<sup>4</sup>.

## Part 3: Rules for SDSFIE-R Data Quality

### 4 SDSFIE-R Introduction

SDSFIE-R is the IGI&S standard for raster data. This includes the SDSFIE-R document and its annex, the Raster Standards Compendium. SDSFIE-R identifies community recommended practices and format preferences for all forms of raster data (raster maps, raster imagery, elevation, etc.) based on specific use cases identified by the IGI&S community. The quality of IGI&S raster data obtained by the Components shall be evaluated for compliance with OSD requirements, and Component quality management plans. Part 3 of this document describes implementation rules for data quality assessment, guidance and reporting that are specific to raster data.

- A. IGI&S raster data quality assessments shall focus on if the imagery/raster dataset meets the minimum resolution, horizontal accuracy, and currency requirements established in SDSFIE-R for each use case. The quality assessment of IGI&S elevation data (e.g. LiDAR) will also include adherence to minimum vertical accuracy and point density requirements<sup>39</sup>.
- B. OSD and each Component shall establish their own recommended metrics for each use case in SDSFIE-R, as well as higher level metrics for overall Component raster data holdings<sup>41</sup>. Components should include these in their QMPs.
- C. Each Component shall report the following metrics for raster metadata implementation annually to the IGG Chair (see SDSFIE-Q Appendix B for the full list of IGG Data Quality Metrics):
  - i. The percentage of raster datasets that have SDSFIE-M compliant metadata records.
  - ii. The percentage of DoD sites covered by raster datasets that meet the minimum recommended resolution stated in SDSFIE-R.
  - iii. The percentage of DoD sites covered by raster datasets that meet the minimum recommended accuracy stated in SDSFIE-R.
- D. The Dataset scope shall be used to measure quality of raster (or vector) datasets comprised of a single or multiple feature types. The Dataset scope shall not be used when measuring the overall quality of CIP datasets and IGI&S data repositories<sup>23</sup>.
- E. When reporting raster data quality in metadata, the metadata must include the scope being evaluated (DQ\_Scope) and at a minimum either the lineage element (LI\_Lineage) or a report for at least one data quality element (DQ\_element). The data quality reporting elements are described in detail in SDSFIE-Q Section 2.1.1.2. For raster data, the data quality scope will be dataset<sup>42</sup>.
- F. Data quality results for raster data shall be reported either as conformance results (DQ\_ConformanceResult) or as quantitative results (DQ\_QuantitativeResult). Raster data quality can also be represented as a coverage result (QE\_CoverageResult), which is the result of a data quality measure organizing the measured values as a coverage<sup>42</sup>.
- G. If a DoD Component or installation contracts a company to collect raster data, the Component shall specify the data quality and metadata collection requirements through contract language (Appendix C)<sup>40</sup>.
- H. If a DoD Component or installation collects raster data internally, they are required to meet the minimum standards for resolution and accuracy identified in SDSFIE-R and report this information in metadata, formatted in accordance with SDSFIE-M<sup>40</sup>.
- I. If a DoD Component or installation acquires raster data from an outside vendor, the Component is responsible for evaluating the quality of the data to ensure it meets the minimum standards identified in SDSFIE-R<sup>40</sup>.

**Part 4: Rules for Data Quality of Aggregates and Repositories****5 Aggregate and Repository Introduction**

IGI&S data (vector, raster) may be combined into collections of datasets. In SDSFIE-Q, these combined datasets can have a scope code of either repository (e.g. IGI&S data repository) or aggregate (CIP, Component CIP, etc.). This section will discuss rules for data quality evaluation for repositories and aggregates.

- A. All IGI&S repositories and aggregates shall have current and complete metadata, including the quality metadata elements. The organization that creates and maintains an IGI&S data repository and the aggregate datasets derived from it shall ensure that current and complete metadata exist<sup>48</sup>.
- B. IGI&S data (vector, raster) which has been combined into collections of datasets shall have a scope code of either repository (e.g. IGI&S data repository) or aggregate (CIP, Component CIP, etc.)<sup>43</sup>.

**5.1 Repository**

- A. Each Component shall report the following metrics for IGI&S data repositories annually to the IGG Chair (see SDSFIE-Q Appendix B for the full list of IGG Data Quality Metrics):
  - i. The percentage of required datasets that exist in the repository (as defined by the Component).
  - ii. The percentage of repository datasets that passed all required validation checks.
  - iii. The percentage of repository datasets that have SDSFIE-M compliant metadata records.
  - iv. The percentage of repository datasets that do not have metadata with at least one data quality reporting element populated.
- B. OSD and Components shall develop metrics that measure the quality and completeness of IGI&S data repositories (e.g. data store, ADS), CIP and Component CIP. These metrics will be evaluated at the repository scope. Data quality results reported at the aggregate or dataset level may also be derived or aggregated for the repository. A list of these metrics is included in SDSFIE-Q Appendix B<sup>23, 47</sup>. Components should include these in their QMPs.
- C. Components shall define the contents of an IGI&S data repository and establish data quality validation processes through which data can be standardized, normalized, and validated for conformance with all applicable standards. Data quality validation is best done before data is accepted into a repository<sup>44</sup>.

**5.2 Aggregate**

- A. Metrics that measure the quality of an aggregated dataset (data and services that are compiled at the OSD or Component HQ-level (e.g. CIP, Component CIP); may be extracted from a data repository) as a whole shall be evaluated at the aggregate data quality scope<sup>23, 45</sup>.
- B. Quality results reported at the dataset scope may be rolled up to the aggregate scope. An aggregate dataset may be combined into a single database or exist within multiple databases<sup>45</sup>.
- C. The layers included in the CIP dataset are aggregated at both the Component HQ and the OSD level and, therefore, additional data quality requirements apply. Metrics for the CIP dataset will be evaluated at the OSD level. If aggregated data is part of the CIP, OSD will aggregate the data quality results of all Component data<sup>46, 49</sup>. Refer to Section 3.1.1 for CIP-specific requirements.
- D. All IGI&S ADS metadata for SDSFIE-V structured vector data, shall contain quality elements in compliance with the currently mandated SDSFIE-Q version and applicable content standards<sup>1</sup>.
- E. All IGI&S ADS metadata for non-SDSFIE-V structured vector data, should contain minimum quality elements in compliance with the currently mandated SDSFIE-Q version<sup>1</sup>.

## Part 5: Rules for SDSFIE-S Data Quality

### 6 SDSFIE-S Introduction

- A. Components shall document service metadata in a manner than enables users to access, ingest, and assess the quality of the service<sup>50</sup>.
- B. Components shall document in metadata the endpoint URL for a service and ensure that the service adheres to a standard implementation specification (e.g. OGC Web Map Service version 1.1)<sup>50</sup>.
- C. To fully document the quality of a service in metadata, Components shall create a stand-alone metadata record for the service. However, stand-alone service metadata records are not often created in a typical workflow. In these cases, metadata for services may also be documented as part of the metadata for the dataset. SDSFIE-Q Appendix B contains non-mandatory metrics that Components may use to document the quality of a service in metadata<sup>50</sup>.
- D. Data quality measured for web services shall be reported as a “service” in DQ\_Scope<sup>23</sup>.
- E. Data quality measured for applications shall be reported as an “application” in DQ\_Scope<sup>23</sup>.

## Part 6: References, Acronyms, Terms, and Definitions

### 6.1 Reference Table

**Table 1 – References Cited in SDSFIE-Q Implementation Guidance Text**

| Reference Number | Document                     | Section                                       | Other Reference                                                 | Page Number |
|------------------|------------------------------|-----------------------------------------------|-----------------------------------------------------------------|-------------|
| 1                | ADS Implementation Guidance  | Section 3                                     | Rule 3-4                                                        | Page 03     |
| 2                | ADS Implementation Guidance  | Section C.2.2.1                               |                                                                 | Page 31     |
| 3                | CIP Procedures               | Data Quality Reports                          |                                                                 | Page 04     |
| 4                | CIP Procedures               | Quality Assessment and Reporting Requirements |                                                                 | Page 07     |
| 5                | DoDI 8130.01                 | Enclosure 3                                   | Letter f                                                        | Page 11     |
| 6                | Mandate Memo                 | SDSFIE-M Implementation                       | Number 1                                                        | Page 02     |
| 7                | Mandate Memo                 | SDSFIE-Q Implementation                       | Number 3                                                        | Page 02     |
| 8                | SDSFIE Governance Plan Rev 3 | Section 3.3.5.5                               |                                                                 | Page 23     |
| 9                | SDSFIE-Q Rev 2               | Section 1                                     |                                                                 | Page 01     |
| 10               | SDSFIE-Q Rev 2               | Section 1                                     |                                                                 | Page 02     |
| 11               | SDSFIE-Q Rev 2               | Section 2.1.1.2                               |                                                                 | Page 09     |
| 12               | SDSFIE-Q Rev 2               | Section 2.1.3                                 |                                                                 | Page 11     |
| 13               | SDSFIE-Q Rev 2               | Section 2.1.4                                 |                                                                 | Page 11     |
| 14               | SDSFIE-Q Rev 2               | Section 3.1                                   | Table 2: Data Quality RACI Chart                                | Page 16     |
| 15               | SDSFIE-Q Rev 2               | Section 3.1                                   |                                                                 | Page 16     |
| 16               | SDSFIE-Q Rev 2               | Section 3.2                                   | Figure 4: IGI&S Quality Management Operational Activity Diagram | Page 17     |
| 17               | SDSFIE-Q Rev 2               | Section 3.3.1                                 |                                                                 | Page 18     |
| 18               | SDSFIE-Q Rev 2               | Section 3.3.1.1                               |                                                                 | Page 18     |
| 19               | SDSFIE-Q Rev 2               | Section 3.3.2                                 |                                                                 | Page 18     |
| 20               | SDSFIE-Q Rev 2               | Section 3.3.3                                 |                                                                 | Page 19     |
| 21               | SDSFIE-Q Rev 2               | Section 3.3.4                                 | Figure 5: Quality Measures vs. Quality Metrics                  | Page 19     |
| 22               | SDSFIE-Q Rev 2               | Section 3.3.4                                 |                                                                 | Page 19     |
| 23               | SDSFIE-Q Rev 2               | Section 3.3.4.1                               |                                                                 | Page 20     |
| 24               | SDSFIE-Q Rev 2               | Section 3.4.2                                 |                                                                 | Page 22     |
| 25               | SDSFIE-Q Rev 2               | Section 3.5                                   |                                                                 | Page 22     |
| 26               | SDSFIE-Q Rev 2               | Section 3.5.1                                 |                                                                 | Page 22     |

|    |                |                 |                                           |          |
|----|----------------|-----------------|-------------------------------------------|----------|
| 27 | SDSFIE-Q Rev 2 | Section 3.5.2   |                                           | Page 22  |
| 28 | SDSFIE-Q Rev 2 | Section 3.5.2.1 |                                           | Page 23  |
| 29 | SDSFIE-Q Rev 2 | Section 3.6.1   |                                           | Page 23  |
| 30 | SDSFIE-Q Rev 2 | Section 3.6.1.1 |                                           | Page 23  |
| 31 | SDSFIE-Q Rev 2 | Section 3.7.2   |                                           | Page 24  |
| 32 | SDSFIE-Q Rev 2 | Section 3.7.3   |                                           | Page 24  |
| 33 | SDSFIE-Q Rev 2 | Section 4.2     |                                           | Page 26  |
| 34 | SDSFIE-Q Rev 2 | Section 4.3     |                                           | Page 26  |
| 35 | SDSFIE-Q Rev 2 | Section 4.3.1   |                                           | Page 26  |
| 36 | SDSFIE-Q Rev 2 | Section 4.3.2   |                                           | Page 27  |
| 37 | SDSFIE-Q Rev 2 | Section 4.4     |                                           | Page 27  |
| 38 | SDSFIE-Q Rev 2 | Section 4.4.1   |                                           | Page 27  |
| 39 | SDSFIE-Q Rev 2 | Section 5       |                                           | Page 28  |
| 40 | SDSFIE-Q Rev 2 | Section 5.1     |                                           | Page 28  |
| 41 | SDSFIE-Q Rev 2 | Section 5.2     |                                           | Page 28  |
| 42 | SDSFIE-Q Rev 2 | Section 5.3     |                                           | Page 28  |
| 43 | SDSFIE-Q Rev 2 | Section 6       |                                           | Page 30  |
| 44 | SDSFIE-Q Rev 2 | Section 6.1     |                                           | Page 30  |
| 45 | SDSFIE-Q Rev 2 | Section 6.2     |                                           | Page 30  |
| 46 | SDSFIE-Q Rev 2 | Section 6.2.1   |                                           | Page 30  |
| 47 | SDSFIE-Q Rev 2 | Section 6.3     |                                           | Page 31  |
| 48 | SDSFIE-Q Rev 2 | Section 6.4     |                                           | Page 31  |
| 49 | SDSFIE-Q Rev 2 | Section 6.4.1   |                                           | Page 31  |
| 50 | SDSFIE-Q Rev 2 | Section 7       |                                           | Page 32  |
| 51 | SDSFIE-Q Rev 2 | Appendix B      | Table 5: IGG Data Quality Metrics         | Page 40  |
| 52 | SDSFIE-Q Rev 2 | Annex C         | SDSFIE Quality Contract Language Examples | Page C-1 |

## 6.2 Acronyms

|        |                                                        |
|--------|--------------------------------------------------------|
| ADS    | Authoritative Data Source                              |
| APSR   | Accountable Property System of Record                  |
| ASD(S) | Assistant Secretary of Defense for Energy, Sustainment |
| CIP    | Common Installation Picture                            |
| CIO    | Chief Information Officer                              |
| DCG    | Data Content Guidance                                  |
| DCS    | Data Content Specification                             |
| DISDI  | Defense Installations Spatial Data Infrastructure      |
| DISR   | DoD IT Standards Registry                              |
| DoD    | Department of Defense                                  |

|           |                                                                                   |
|-----------|-----------------------------------------------------------------------------------|
| DoDM      | DoD Manual                                                                        |
| DLS       | Data Layer Specification                                                          |
| DoDD      | Department of Defense Directive                                                   |
| DoDI      | Department of Defense Instruction                                                 |
| DUSD(I&E) | Deputy Under Secretary of Defense for Installations and Environment               |
| EI&E      | Energy, Installations, and Environment                                            |
| GEOINT    | Geospatial Intelligence                                                           |
| GIO       | Geospatial Information Officer                                                    |
| GWG       | Geospatial Intelligence Standards Working Group                                   |
| HQ        | Headquarters                                                                      |
| I&E       | Installations and Environment                                                     |
| IGG       | IGI&S Governance Group                                                            |
| IGI&S     | Installation Geospatial Information and Services                                  |
| ISO       | International Standards Organization                                              |
| JESC      | Joint Enterprise Standards Committee                                              |
| NGA       | National Geospatial-Intelligence Agency                                           |
| NMF       | National System for Geospatial-Intelligence (NSG) Metadata Foundation             |
| NMIS      | NSG Metadata Implementation Specification                                         |
| NSG       | National System for Geospatial-Intelligence                                       |
| OASD(S)   | Office of the Assistant Secretary of Defense (Sustainment)                        |
| OSD       | Office of the Secretary of Defense                                                |
| QAP       | Quality Assurance Plan                                                            |
| RACI      | Responsible, Approval, Consulted, Informed                                        |
| RAM       | Responsibility Assignment Matrix                                                  |
| RBJ       | Data Reviewer Batch Job                                                           |
| RPIR      | Real Property Inventory Requirements                                              |
| SDSFIE    | Spatial Data Standards for Facilities, Infrastructure, and Environment            |
| SDSFIE-M  | Spatial Data Standards for Facilities, Infrastructure, and Environment – Metadata |
| SDSFIE-Q  | Spatial Data Standards for Facilities, Infrastructure, and Environment - Quality  |
| SDSFIE-R  | Spatial Data Standards for Facilities, Infrastructure, and Environment - Raster   |
| SDSFIE-S  | Spatial Data Standards for Facilities, Infrastructure, and Environment - Services |
| SDSFIE-V  | Spatial Data Standards for Facilities, Infrastructure, and Environment - Vector   |
| SMIS      | SDSFIE Metadata Implementation Specification                                      |
| SQIG      | SDSFIE-Q Implementation Guidance                                                  |

### 6.3 Terms and Definitions

#### Accessible

Data and services can be accessed via the global information grid (GIG) by users and applications in the enterprise. Data and services are made available to any user or application except where limited by law, policy, security classification, or operational necessity. [DoD CIO Memorandum]

**Accuracy**

Closeness of agreement between a test result or measurement result and the true value. [ISO 3534-2:2006]

**Aggregate**

A data quality scope used to evaluate metrics applied to a dataset that is aggregated from other datasets.

**Authoritative Data Source**

A recognized or official data source with a designated mission statement, source, or product to publish reliable and accurate data for subsequent use by customers. An authoritative data source may be the functional combination of multiple separate data sources. [DoDD 8320.03]

**Common Installation Picture**

The distinct minimum set of geospatial features and imagery necessary to provide a foundational map depicting DoD installations and sites. The purpose of the CIP is to provide a readily available, standardized map background to serve as the basis for planning and execution of EI&E responsibilities and functions. [DoDI 8130.01]

**Conformance**

Fulfillment of specified requirements. [ISO 19105]

**Conformance Quality Level**

Threshold value or set of threshold values for data quality results used to determine how well a dataset meets the criteria set forth in its DCS or user requirements. [ISO 19157]

**Correctness**

Correspondence with the universe of discourse. [ISO 19157]

**Data Content Specification**

Detailed description of a dataset or dataset series together with additional information that will enable it to be created, supplied to and used by another party. [ISO 19131]

Note: The above definition is for a data product specification. In SDSFIE-Q data product specifications are called data content specifications.

**Data Quality Basic Measure**

Generic data quality measure used as a basis for the creation of specific data quality measures. [ISO 19157]

Note: Data quality basic measures are abstract data types. They cannot be used directly when reporting data quality.

**Data Quality Element**

A component describing a certain aspect of the quality of geographic data.

**Data Quality Result**

The output of a data quality evaluation.

**Data Quality Scope**

Specifies the extent, spatial and/or temporal, and/or common characteristic(s) that identify the data on which data quality is to be evaluated.

**Data Quality Unit**

The combination of a scope and one or more data quality elements.

**Dataset**

Identifiable collection of data. [ISO 19115]

**Data Steward**

An organization within an authoritative source that is charged with the collection and maintenance of authoritative data.

**Direct Evaluation Method**

Method of evaluating the quality of a dataset based on inspection of the items within the dataset. [ISO 19157]

**Feature**

Abstraction of real world phenomena. [ISO 19101]

**Feature Attribute**

Characteristic of a feature. [ISO 19101]

**Feature type**

Class of features having common characteristics. [ISO 19156]

**IGI&S**

The subset of GI&S activities that apply to the management of DoD installations and environment to support military readiness in the Active, Guard, and Reserve Components with regard to facility construction, sustainment, and modernization, including: housing; base closures and reuse, including economic assistance for affected communities; privatization and competitive sourcing; base operations; energy use and conservation; real property management; property accountability and valuation; managing DoD compliance with national environmental, natural resource, and historic preservations laws; environmental management systems, natural infrastructure capabilities and sustainment; safety; occupational health; fire protection; pest management; explosive safety; encroachment management; and the operation and sustainment of military test and training ranges. IGI&S supports and is enabled by geospatial engineering and general engineering as defined in Joint Publication 3-34. [DoDI 8130.01]

**Interoperability**

The ability of systems, units, or forces to provide data, information, materiel, and services to and accept the same from other systems, units, or forces and to use the data, information, materiel, and services so exchanged to enable them to operate effectively together. IT and National Security Systems interoperability includes both the technical exchange of information and the end-to-end operational effectiveness of that exchange of information as required for mission accomplishment. More than just information exchange, it includes systems, processes, procedures, organizations, and missions over the lifecycle and must be balanced with information assurance. [DoDI 8130.01]

**Measure**

A description of the type of evaluation being assessed to determine a data quality result.

**Metric**

A specific, measurable indicator that addresses data quality compliance.

Note: metrics are created when measures are assigned a scope.

**Metadata**

Information describing the characteristics of data, data or information about data, or descriptive information about an entity's data, data activities, systems and holdings. For example, discovery metadata allows data assets to be found using enterprise search capabilities. Metadata can be structural (specifying the format structure), semantic (specifying the meaning), or descriptive (providing amplifying or interpretive information) for data, information, or IT services. [DoDI 8130.01]

**Metaquality**

Information describing the quality of data quality. [ISO 19157]

**Quality**

Degree to which a set of inherent characteristics fulfills requirements. [ISO 19157]

**Repository**

A data quality scope used to evaluate metrics applied to a data repository.

**Standalone Quality Report**

Free text document providing fully detailed information about data quality evaluations, results and measures used. [ISO 19157]

**Trusted**

Users and applications can determine and assess the suitability of the source because the pedigree, security level and access control level of each data asset or service is known and available. [DoD CIO Memorandum]

**Understandable**

Users and applications can comprehend the data, both structurally and semantically, and readily determine how the data may be used for their specific needs. [DoD CIO Memorandum]

**Visible**

The property of being discoverable. All data assets (intelligence, non-intelligence, raw, and processed) are advertised or “made visible” by providing metadata, which describes the asset. [DoD CIO Memorandum]

## Appendix A: Summary of Major Quality Requirements for DoD Components

Appendix A Table 1 – List of Major Data Quality Implementation Requirements for Components

| Data Type      | Action Category | Statement                                                                                                                                                                                                                                                                                                                                                        | SQIG Section(s) | SQIG Page(s) |
|----------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------|
| All            | General         | Components shall perform actions as indicated in the SDSFIE-Q “Responsible, Approval, Consulted, Informed” (RACI) chart and displayed in Figure 4, IGI&S Quality Management Operational Activity Diagram.                                                                                                                                                        | Introduction    | 1            |
| All            | QMP             | Components shall develop quality management plans (QMPs) documenting their strategy for measuring and documenting Component-level data quality metrics and guidance. QMPs shall include the information listed in the SQIG Section 2.2.1.B, pages 4-5.                                                                                                           | 2.2.1           | 4            |
| Vector         | CIP             | Components shall assess and report each of the CIP Quality Metrics for each CIP dataset and CIP aggregate submitted as part of the annual CIP data submission.                                                                                                                                                                                                   | 3.1.1           | 11           |
| Vector         | CIP             | In order to meet data quality requirements, Components shall submit 1) a completed site reconciliation spreadsheet, 2) a completed CIP Quality Assessment, and 3) a data certification letter with their CIP data call.                                                                                                                                          | 3.1.1           | 10           |
| Vector         | CIP             | Components shall validate their CIP data against the DCS requirements (using the provided RBJ files) prior to submitting to OSD.                                                                                                                                                                                                                                 | 3.1.1           | 13           |
| Vector         | CIP             | Components shall reconcile “Site” feature type data against the site list in the OSD Real Property Asset Database compiled from the Component’s accountable property system of record (APSR).                                                                                                                                                                    | 3.1.1           | 10           |
| Vector         | CIP             | Components shall close data “gaps,” correct errors, and ensure conformance with approved Component HQ Adaptations prior to submitting CIP data.                                                                                                                                                                                                                  | 3.1.1           | 9, 10, 13    |
| Vector         | CIP             | Components must cite the DCS and the explanation of applicable quality metric results in the metadata, along with an indication of whether or not the layer passed the evaluation. Data quality results for CIP layers shall be reported as both conformance results (DQ_ConformanceResult) and quantitative results (DQ_QuantitativeResult).                    | 3.1.1           | 10           |
| Vector, Raster | Contract        | Whenever IGI&S data or services are procured (vector, raster, etc.), Components shall incorporate contract language which ensures deliverables conform to all standardization and quality requirements specified in the SDSFIE family of standards, including SDSFIE-Q and applicable Component QMPs, and metadata formatted in accordance with SDSFIE-M.        | 2.2.3, 4        | 5, 6, 14     |
| Vector         | DCS             | Components shall develop DCSs for each IGI&S feature type within their registered SDSFIE-V adaptation (also known as Quality Assurance Plans (QAPs), Data Layer Specifications (DLSSs), or Data Collection Guides (DCGs)), according to the timeline/milestones described in Component QMPs. DCSs shall meet the requirements described in the SQIG Section 3.1. | 2.2.2           | 5            |

|        |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |    |
|--------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----|
| Vector | DCS, Metrics | Each Component shall report the following metrics for DCS implementation annually to the IGG Chair (See SDSFIE-Q Appendix B for the full list of IGG Data Quality Metrics):<br>1. The percentage of feature types that are required for collection by a Component headquarters that do not have a DCS.<br>2. The percentage of feature types for the CIP that do not have a DCS.<br>3. The percentage of feature types in SDSFIE-V Gold that do not have a DCS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.1     | 9  |
| All    | General      | Each Component shall report their progress toward implementation of SDSFIE-Q annually to the IGG Chair using the Implementation Scorecard categories. See SQIG section 2.2.1.1 for the specific scorecard categories.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2.2.1.1 | 5  |
| Raster | Metrics      | Each Component shall report the following metrics for raster metadata implementation annually to the IGG Chair (see SDSFIE-Q Appendix B for the full list of IGG Data Quality Metrics):<br>1. The percentage of raster datasets that have SDSFIE-M compliant metadata records.<br>2. The percentage of DoD sites covered by raster datasets that meet the minimum recommended resolution stated in SDSFIE-R.<br>3. The percentage of DoD sites covered by raster datasets that meet the minimum recommended accuracy stated in SDSFIE-R.                                                                                                                                                                                                                                                                                                                                                                                                            | 4       | 14 |
| Raster | Metadata     | When reporting raster data quality in metadata, Components shall include the scope being evaluated (DQ_Scope) and at a minimum either the lineage element (LI_Lineage) or a report for at least one data quality element. Data quality results for raster data shall be reported as either conformance results (DQ_ConformanceResult) or as quantitative results (DQ_QuantitativeResult).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4       | 14 |
| All    | Metrics      | Each Component shall report the following metrics for Accessibility annually to the IGG Chair:<br>1. Pass or Fail: The Component has an enterprise level map viewer.<br>2. Pass or Fail: The Component has a process and mechanisms for data requests and data delivery.<br>3. The percentage of CIP feature types not visible on the Component enterprise map viewer.<br>4. The percentage of CIP feature types not accessible through a web map service.<br>5. The percentage of feature types not available to fulfill a validated request.<br>6. The number of data requests for each CIP feature type within a one-year period.<br>7. The number of users viewing each CIP feature type annually.<br>8. The number of users accessing or downloading each CIP feature type within a one-year period.<br>9. Pass or Fail: The Component has a user feedback mechanism (e-mail feedback, customer surveys, etc.) for all data discovery methods. | 2.6     | 8  |

|                                                             |                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |              |
|-------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------|
| Vector,<br>Raster,<br>Aggregate/<br>Repository,<br>Services | Metrics, QMP                | Component IGI&S Programs and ADS Managers shall establish data quality metrics for each data quality unit established in SDSFIE-Q, DCSs, or Component QMPs for any IGI&S data (vector (including CIP), raster, aggregate (repositories)) or services that are unique to that Component (and thus haven't been covered in SDSFIE). Data quality metrics shall be based on policy drivers and business requirements and shall be included in their QMPs. When creating Component-specific metrics and reporting data quality results, Components shall identify the data quality scope. See SDSFIE-Q Table 5 for full list of IGG Data Quality Metrics and associated data quality scopes. | 2.2.4, 4, 5.1 | 6, 14,<br>15 |
| Aggregate/<br>Repository                                    | Metrics                     | Each Component shall report the following metrics for IGI&S data repositories annually to the IGG Chair:<br>1. The percentage of required datasets that exist in the repository (as defined by the Component).<br>2. The percentage of repository datasets that have passed all required validation checks.<br>3. The percentage of repository datasets that have SDSFIE-M compliant metadata records.<br>4. The percentage of repository datasets that do not have metadata with at least one data quality reporting element populated.                                                                                                                                                 | 5.1           | 15           |
| Vector,<br>Raster,<br>Aggregate/<br>Repository              | Data Quality<br>Validation  | Once it is created or obtained and routinely thereafter, Components shall assess IGI&S data (vector, raster, aggregate) to determine if it meets requirements and conforms with standards and data quality guidance. The results of a data quality assessment should be reported in metadata and used to determine if data cleansing is needed. Components shall assess IGI&S data through validation and defined data quality evaluation processes, which will evaluate metrics established in SDSFIE-Q, DCSs, and Component QMPs. Refer to SQIG Section 2.4 for more specific requirements.                                                                                            | 2.4           | 6            |
| Vector,<br>Raster                                           | Data Quality<br>Improvement | When a dataset is validated against IGI&S standards and requirements (e.g. DCSs), Components shall identify corrective action if the data does not meet established data quality requirements. The dataset should be cleansed (corrected) and re-evaluated before updating the IGI&S data repository. If the data cannot be cleansed due to a lack of resources, the metadata of the uncleansed dataset should reflect the results of the data quality evaluation.                                                                                                                                                                                                                       | 2.5.1         | 7            |
| Vector,<br>Raster,<br>Aggregate/<br>Repository,<br>Services | Metadata                    | Components shall use the SDSFIE-M standard to report metrics associated with data quality and completeness, using the DQ_DataQuality element. When reporting data quality in metadata, the metadata must include 1) the scope being evaluated (DQ_Scope) and 2) at a minimum either the lineage element (LI_Lineage) or a report for at least one data quality element (DQ_element), unless additional data quality elements are required (e.g. CIP). Data quality metadata shall be captured for vector, raster, aggregate, and repository data as well as web services and applications. Refer to SQIG Section 2.4.1 for more specific requirements.                                   | 2.4.1         | 7            |

|                          |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |     |    |
|--------------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|
| Vector                   | Metadata                | All IGI&S ADS metadata for SDSFIE-V structured vector data shall contain quality elements in compliance with the currently mandated SDSFIE-Q version and applicable content standards.                                                                                                                                                                                                                                                                                      | 5.2 | 15 |
| Vector                   | Metadata                | All IGI&S ADS metadata for non-SDSFIE-V structured vector data shall contain minimum quality elements in compliance with the currently mandated SDSFIE-Q version.                                                                                                                                                                                                                                                                                                           | 5.2 | 15 |
| Raster                   | Data Quality Validation | If a DoD Component or installation collects raster data internally, they are required to meet the minimum standards for resolution and accuracy identified in SDSFIE-R and report this information in metadata, formatted in accordance with SDSFIE-M. If a DoD Component or installation acquires raster data from an outside vendor, the Component is responsible for evaluating the quality of the data to ensure it meets the minimum standards identified in SDSFIE-R. | 4   | 14 |
| Aggregate/<br>Repository | Data Quality Validation | Components shall define the contents of an IGI&S data repository and establish data quality validation processes through which data can be standardized, normalized, and validated for conformance with all applicable standards.                                                                                                                                                                                                                                           | 5.1 | 15 |
| Services                 | Metadata                | Components shall document service metadata in a manner that enables users to access, ingest, and assess the quality of the service. Components shall document in metadata the endpoint URL for a service and ensure that the service adheres to a standard implementation specification (e.g. OGC Web Map Service version 1.1). To fully document the quality of a service in metadata, Components shall create a stand-alone metadata record for the service.              | 6   | 16 |

## Appendix B: Metadata Examples

The following metadata examples display the DQ\_DataQuality elements in SDSFIE-M for both an aggregate (e.g. CIP) and repository (e.g. ADS) data quality scope. Refer to the DCS General Guidance (Annex F) for metadata examples reported at the dataset scope. In the examples below, red text indicates that the element is mandatory in SDSFIE-M. For additional guidance on formatting metadata and the SDSFIE Metadata style, please see the SDSFIE-M Standard, Version 2.0 (11 September, 2019) and the SDSFIE-M Implementation Guidance, Version 2.0 (10 June, 2020).

Following each table below is an example of the metadata populated using the SDSFIE-M 2.0 Metadata Style for ArcGIS.

Appendix B Table 1: Metadata Example - Aggregate Scope

| Metadata Element      |                                                                   | Example                                                                                                                                                           | Comment                                                                                                                            |
|-----------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <b>DQ_DataQuality</b> |                                                                   |                                                                                                                                                                   |                                                                                                                                    |
|                       | <b>scope: DQ_Scope</b>                                            |                                                                                                                                                                   |                                                                                                                                    |
|                       | <b>level: MD_ScopeCode</b>                                        | aggregate                                                                                                                                                         |                                                                                                                                    |
|                       | standaloneQualityReport:<br>DQ_StandaloneQualityReportInformation |                                                                                                                                                                   |                                                                                                                                    |
|                       | reportReference: CI_Citation                                      |                                                                                                                                                                   |                                                                                                                                    |
|                       | title: CharacterString                                            | Common Installation Picture<br>(CIP) Data Quality Report                                                                                                          |                                                                                                                                    |
|                       | date: CI_Date                                                     |                                                                                                                                                                   |                                                                                                                                    |
|                       | date: Date                                                        | 13-May-16                                                                                                                                                         |                                                                                                                                    |
|                       | dateType: CI_DateTypeCode                                         | Creation                                                                                                                                                          |                                                                                                                                    |
|                       | abstract: CharacterString                                         | Report containing detailed<br>descriptions of procedures<br>used to evaluate the CIP<br>dataset and descriptions of<br>the quality results in a report<br>format. |                                                                                                                                    |
|                       | <b>report: DQ_Element</b>                                         | <b>Logical Consistency<br/>Conceptual Consistency</b>                                                                                                             | <b>Conditional: "report" or "lineage" role is mandatory. In this example, "report" was chosen, so DQ_Element is now mandatory.</b> |
|                       | nameOfMeasure: CharacterString                                    | IGG6                                                                                                                                                              | <b>SDSFIE-M currently says use should be avoided. This element may be used until the metrics registry is finalized.</b>            |
|                       | measureIdentification: MD_Identifier                              |                                                                                                                                                                   | <b>I&amp;E community preferred method to identify the measure.</b>                                                                 |
|                       | authority                                                         |                                                                                                                                                                   |                                                                                                                                    |
|                       | Title: CharacterString                                            | IGI&S Metrics Registry                                                                                                                                            |                                                                                                                                    |
|                       | date: CI_Date                                                     |                                                                                                                                                                   |                                                                                                                                    |
|                       | date: Date                                                        | 5/13/2016                                                                                                                                                         |                                                                                                                                    |
|                       | dateType:<br>CI_DateTypeCode                                      | Creation                                                                                                                                                          |                                                                                                                                    |
|                       | citedResponsibleParty:<br>CI_ResponsibleParty                     | DISDI Program                                                                                                                                                     |                                                                                                                                    |
|                       | code: CharacterString                                             | IGG6                                                                                                                                                              | <b>Currently optional: This code must correspond to the SDSFIE-Q Metric ID identified in the metrics registry</b>                  |

| Metadata Element |                                                   | Example                                                                                                                           | Comment                                                                                                                            |
|------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
|                  | measureDescription: CharacterString               | The percentage of required CIP feature types that do not have SDSFIE-M compliant metadata records                                 | <b>SDSFIE-M currently says use should be avoided. This element may be used until the metrics registry is finalized.</b>            |
|                  | evaluationMethodType: DQ_EvaluationMethodTypeCode | Direct Internal                                                                                                                   | Refer to the metrics table in the DCS General Guidance or individual DCSs for additional information to populate this value.       |
|                  | evaluationMethodDescription: CharacterString      |                                                                                                                                   | Optional, but may be required by a DCS                                                                                             |
|                  | <b>result: DQ_Result</b>                          | Quantitative Result                                                                                                               |                                                                                                                                    |
|                  | <b>value: Record</b>                              | 5%                                                                                                                                |                                                                                                                                    |
|                  | <b>valueUnit: UnitOfMeasure</b>                   | None                                                                                                                              |                                                                                                                                    |
|                  | <b>report: DQ_Element</b>                         | <b>Completeness Omission</b>                                                                                                      | <b>Conditional: "report" or "lineage" role is mandatory. In this example, "report" was chosen, so DQ_Element is now mandatory.</b> |
|                  | nameOfMeasure: CharacterString                    | IGG7                                                                                                                              | <b>SDSFIE-M currently says use should be avoided. This element may be used until the metrics registry is finalized.</b>            |
|                  | measureIdentification: MD_Identifier              |                                                                                                                                   | <b>I&amp;E community preferred method to identify the measure.</b>                                                                 |
|                  | authority                                         |                                                                                                                                   |                                                                                                                                    |
|                  | Title: CharacterString                            | IGI&S Metrics Registry                                                                                                            |                                                                                                                                    |
|                  | date: CI_Date                                     |                                                                                                                                   |                                                                                                                                    |
|                  | date: Date                                        | 5/13/2016                                                                                                                         |                                                                                                                                    |
|                  | dateType: CI_DateTypeCode                         | Creation                                                                                                                          |                                                                                                                                    |
|                  | citedResponsibleParty: CI_ResponsibleParty        | DISDI Program                                                                                                                     |                                                                                                                                    |
|                  | code: CharacterString                             | IGG7                                                                                                                              | <b>Currently optional: This code must correspond to the SDSFIE-Q Metric ID identified in the metrics registry</b>                  |
|                  | measureDescription: CharacterString               | The percentage of required CIP feature types that do not have metadata with at least one data quality reporting element populated | <b>SDSFIE-M currently says use should be avoided. This element may be used until the metrics registry is finalized.</b>            |
|                  | evaluationMethodType: DQ_EvaluationMethodTypeCode | Direct Internal                                                                                                                   | Refer to the metrics table in the DCS General Guidance or individual DCSs for additional information to populate this value.       |
|                  | evaluationMethodDescription: CharacterString      |                                                                                                                                   | Optional, but may be required by a DCS                                                                                             |
|                  | <b>result: DQ_Result</b>                          | Quantitative Result                                                                                                               |                                                                                                                                    |
|                  | <b>value: Record</b>                              | 8%                                                                                                                                |                                                                                                                                    |
|                  | <b>valueUnit: UnitOfMeasure</b>                   | None                                                                                                                              |                                                                                                                                    |

Appendix B Figure 1: Aggregate Metadata Example (SDSFIE-M 2.0 Metadata Style for ArcGIS)

Data Quality Scope:

Level:

+ Add Scope Extent

Report

Report Type:

Measure Reference

Name of Measure:

Code:

Codespace:

Version:

Description:

Authority Citation

Measure Description:

Authority Citation

Titles: IGI&S Metrics Registry

Title

Alternate Title

Collective Title

+ New Online Resource

+ New Presentation Form

+ New Identifier

Dates

Creation I 2016-05-13 00:00:00

^ Evaluation Method

Evaluation Method

Evaluation Method Type: Direct Internal

Evaluation Method Description:

+ Add Evaluation Procedure

+ Add Evaluation Reference Document

Data Evaluation

**Direct Evaluation Type**

☒ Full Inspection ☐ Sample-Based Inspection

^ Result Element

+ Add Conformance Result

^ Quantitative Result

Level: Aggregate

+ Add Scope Extent

Result Date/Time 2021-08-30 15 00:00:00

Value Type

Value 5%

Value Unit Empty

Report

Report Type: Completeness Omission

Measure Reference

Name of Measure: IGG7

Code: IGG7

Codespace:

Version:

Description: The percentage of required CIP feature types that do not have metadata with at least one quali

Authority Citation

Titles: IGI&S Metrics Registry

Title IGI&S Metrics Registry

Alternate Title

Collective Title

+ New Online Resource

+ New Presentation Form

+ New Identifier

Dates

Creation I 2016-05-13 15 00:00:00

^ Evaluation Method ✕

Evaluation Method

Evaluation Method Type: Direct Internal ▼

Evaluation Method Description:

+ Add Evaluation Procedure

+ Add Evaluation Reference Document

Data Evaluation

**Direct Evaluation Type**  
☒ Full Inspection ☐ Sample-Based Inspection

^ Result Element ✕

+ Add Conformance Result

^ Quantitative Result ✕

Level: Aggregate ▼

+ Add Scope Extent

Result Date/Time 2021-08-30 15 00:00:00 ✕

Value Type

Value 8% ✕ +

Value Unit Empty ▼

^ Standalone Quality Report

Abstract:  
Report containing detailed descriptions of procedures used to evaluate the CIP dataset and descriptions of the quality results in a report format.

Report Reference

^ Titles: Common Installation Picture (CIP) Data Quality Report

TitleCommon Installation Picture (CIP) Data Quality Report

Alternate Title

Collective Title

+ New Online Resource

+ New Presentation Form

+ New Identifier

^ Dates

Appendix B Table 2: Metadata Example: Repository Scope

| Metadata Element      |                                                                   | Example                                                                        | Comment                                                                                                                      |
|-----------------------|-------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| <b>DQ_DataQuality</b> |                                                                   |                                                                                |                                                                                                                              |
|                       | <b>scope: DQ_Scope</b>                                            |                                                                                |                                                                                                                              |
|                       | <b>level: MD_ScopeCode</b>                                        | repository                                                                     |                                                                                                                              |
|                       | standaloneQualityReport:<br>DQ_StandaloneQualityReportInformation |                                                                                |                                                                                                                              |
|                       | reportReference: CI_Citation                                      |                                                                                |                                                                                                                              |
|                       | title: CharacterString                                            |                                                                                |                                                                                                                              |
|                       | date: CI_Date                                                     |                                                                                |                                                                                                                              |
|                       | date: Date                                                        |                                                                                |                                                                                                                              |
|                       | dateType: CI_DateTypeCode                                         |                                                                                |                                                                                                                              |
|                       | abstract: CharacterString                                         |                                                                                |                                                                                                                              |
|                       | <b>report: DQ_Element</b>                                         | Completeness Omission                                                          | Conditional: "report" or "lineage" role is mandatory. In this example, "report" was chosen, so DQ_Element is now mandatory.  |
|                       | nameOfMeasure: CharacterString                                    |                                                                                | SDSFIE-M currently says use should be avoided. This element may be used until the metrics registry is finalized.             |
|                       | measureIdentification: MD_Identifier                              |                                                                                | I&E community preferred method to identify the measure.                                                                      |
|                       | authority                                                         |                                                                                |                                                                                                                              |
|                       | Title: CharacterString                                            | IGI&S Metrics Registry                                                         |                                                                                                                              |
|                       | date: CI_Date                                                     |                                                                                |                                                                                                                              |
|                       | date: Date                                                        | 5/13/2016                                                                      |                                                                                                                              |
|                       | dateType:<br>CI_DateTypeCode                                      | Creation                                                                       |                                                                                                                              |
|                       | citedResponsibleParty:<br>CI_ResponsibleParty                     | DISDI Program                                                                  |                                                                                                                              |
|                       | code: CharacterString                                             | IGG24                                                                          | Currently optional: This code must correspond to the SDSFIE-Q Metric ID identified in the metrics registry                   |
|                       | measureDescription: CharacterString                               | The Component does not have an established ADS for vector, raster and services | SDSFIE-M currently says use should be avoided. This element may be used until the metrics registry is finalized.             |
|                       | evaluationMethodType:<br>DQ_EvaluationMethodTypeCode              | Direct Internal                                                                | Refer to the metrics table in the DCS General Guidance or individual DCSs for additional information to populate this value. |
|                       | evaluationMethodDescription:<br>CharacterString                   |                                                                                | Optional, but may be required by a DCS                                                                                       |
|                       | <b>result: DQ_Result</b>                                          | Quantitative Result                                                            |                                                                                                                              |
|                       | <b>value: Record</b>                                              | FALSE                                                                          |                                                                                                                              |
|                       | <b>valueUnit: UnitOfMeasure</b>                                   | None                                                                           |                                                                                                                              |

Appendix B Figure 2: Repository Metadata Example (SDSFIE-M 2.0 Metadata Style for ArcGIS)

Data Quality Scope:

Level:

+ Add Scope Extent

Report

Report Type:

Measure Reference

Name of Measure:

Code:

Codespace:

Version:

Description:

+ New Authority Citation

Measure Description:

Authority Citation

Titles: IGI&S Metrics Registry

Title

Alternate Title

Collective Title

+ New Online Resource

+ New Presentation Form

+ New Identifier

Dates

Creation I 2016-05-13 15 00:00:00

^ Evaluation Method

Evaluation Method

Evaluation Method Type: Direct Internal

Evaluation Method Description:

+ Add Evaluation Procedure

+ Add Evaluation Reference Document

Data Evaluation

**Direct Evaluation Type**

☒ Full Inspection ☐ Sample-Based Inspection

^ Result Element

+ Add Conformance Result

^ Quantitative Result

Level: Repository

+ Add Scope Extent

Result Date/Time 2021-08-30 15 00:00:00

Value Type

Value False

Value Unit Empty

## Appendix C: SDSFIE Quality Contract Language Examples

The purpose of this appendix is to provide example contract language for tasks required to procure IGI&S data through contracts. Identifying common contract language across the IGI&S community helps to ensure that data and deliverables obtained and created for installations meet DoD standards (e.g. SDSFIE) and policy requirements.

Based on available Component contract examples, the following elements are recommended for inclusion in geospatial data collection contracts:

- 1) Requirement that data be collected and submitted using the SDSFIE Component Adaptation schema, as determined by the Component.
- 2) Requirement that data be collected in accordance with current existing Component DCSs (or equivalent), including accuracy standards, geospatial reference systems, and attribution
- 3) Requirement that accuracy and quality assessments be recorded in the metadata
- 4) Requirement that metadata be complete and compliant with mandated metadata standards
- 5) Required QA/QC procedures and reporting
- 6) Component- or project-specific requirements

Below find specific contract language examples from the *Naval Facilities Engineering Systems Command (NAVFAC) Southeast GeoReadiness Center (SEGRC) Geospatial Data Delivery and Maintenance Standards (FY19)* and *Air Force Contract Guidance for Geospatial Data*. Additional information on these specific documents may be sought from the Navy and Air Force Component POCs.

**Naval Facilities Engineering Systems Command (NAVFAC) Southeast GeoReadiness Center (SEGRC) Geospatial Data Delivery and Maintenance Standards (FY19 Version)** – (Navy’s document describing “the standards that must be met for the successful completion of a contracted delivery of data to be incorporated into... the Geographic Information System (GIS) at NAVFACSE.”):

- “Standard contracts will require contractors to utilize existing SDSFIE NDM 4.1 (OR CURRENT VERSION) definitions of features and predefined attribute table structures. Deviations from, or additions to, the existing SDSFIE NDM 4.1 (OR CURRENT VERSION) objects must be approved by the NAVFAC SEGRC in writing prior to the delivery of any GIS product. SDSFIE NDM 4.1 (OR CURRENT VERSION) documentation is available at NAVFACSE GRC.”
- “The Geodatabase schema shall follow the GIS Data Guide implementation of the SDSFIE data model and data layers will be captured accordingly. Information on the SDSFIE data model can be found at: <http://www.sdsfieonline.org/>.”
- “Data accuracy standards for all deliverables will be in accordance with those set forth in the section entitled GPS Data Collection Specifications. All deliverables should follow the Data Collection Guidance (DCG) chapters associated with the data being collected and shall include an accuracy report in the metadata. The DCG chapters can be obtained from the NAVFAC SEGRC or after requesting an account at <http://www.datacollectionadvisor.com/>.”
- “The contractor shall employ appropriate QA/QC standards to ensure that data is topologically correct, accurate and complete (to include):
  - No erroneous overshoots, undershoots, dangles, or intersections in the line work
  - Point and line features will be snapped together where appropriate to support networks. For example, do not break linear features for labeling or other aesthetic purposes.
  - Lines should be continuous and point features should be digitized as points. For example, point features, such as manholes, should not be drawn using only a circle (polygon) to represent its location. Preferably, use an attribute block symbol that has an insertion point in the center of the manhole.
  - No sliver polygons
  - Digital representation of the common boundaries for all graphic features must be coincident, regardless of feature type
  - Geometric network connectivity must be maintained for utility networks.”
- “A summary of the methods used to correct inconsistencies and any remaining errors by case should be included in the metadata under the “Logical Consistency Report” and “Completeness Report” sections.””

- “All mapping data will be delivered for NAVFAC SEGRC with clean line work using the following parameters:
  - All intersecting lines shall be processed to remove overshoots and undershoots
  - Zero length segments shall be removed
  - All area features must be closed polygon shapes
  - All delivered files shall be checked to see that they are corruption-free
  - All feature elements shall have a unique Primary key assigned, consult with NAVFAC SEGRC for any applicable naming conventions
  - All feature classes shall have metadata, consult with NAVFAC SEGRC for minimum metadata requirements
  - All feature classes shall have all specified minimum attribution populated, consult with NAVFAC SEGRC for minimum attribute requirements”
- “Accompanying the final GIS delivery shall be a digital data dictionary file that has been previously approved by the <INSTALLATION> and NAVFAC SEGRC in terms of expected content and format. For all parts of the data dictionary that match the SDSFIE NDM 4.1 (OR CURRENT VERSION), the data dictionary may reference the SDSFIE NDM 4.1 stating each feature class table being provided and each column within the table for which data has been populated. If additional codes or values outside of the SDSFIE NDM 4.1 (OR CURRENT VERSION) and the current NAVFAC SEGRC data structure domains will be utilized to populate a column, these values must first be approved by NAVFAC SEGRC and must be provided as part of the data dictionary documentation submittal. All domain list values must be accompanied by a description especially in the case of abbreviations.”
- “Should the contractor need to create new feature classes not in the current CNRSE GIS or the SDSFIE NDM 4.1 (OR CURRENT VERSION), NAVFAC SEGRC must first approve them. New features that are created by the contractor for inclusive use into the CNRSE GIS shall be defined in an appendix as part of the data dictionary documentation. Documentation of added feature classes shall follow the SDSFIE NDM 4.1 (OR CURRENT VERSION) documentation standards. Elements of the feature that must be declared in this documentation include:
  - Data Set (Category) name
  - Feature class (table) name with definition
  - Geometry type (point, line, polygon)
  - Associated attributes with definitions
  - Data type, data precision, domain table assignment, Primary Key and Foreign Key assignments, required field assignments, etc. “
- “All geospatial data stored by the GRC resides in WSG84 datum with the appropriate UTM coordinate system for US States, Territories, and insular areas.” (includes table showing UTM zones for applicable region)
- “The contractor will turn over, at a minimum, metadata for each feature class in XML format. The following elements of the FGDC Content Standard for Digital Geospatial Data (CSDGM) that must be included as part of the deliverable. Feature-level metadata may be required at the discretion of the government. Details on the standard can be found at <http://www.fgdc.gov/metadata/geospatial-metadata-standards>
  - Identification Information
    - Contact (Details) – contact information for the data steward
      - Person
      - Organization
      - Position
      - Telephone
      - Email
    - Description – characterization of the data
      - Abstract
      - Purpose
    - Time Period – explains how current the dataset is
      - Currentness Reference
      - Date

- Keywords – word/phrase descriptors of the data
- Data Quality
  - Positional Accuracy – accuracy assessment of the data
    - Horizontal Accuracy Report
    - Vertical Accuracy Report (if applicable)
  - Source Information – list of sources and a short citation of each
    - Source Citation (Details)
      - Title
      - Originator
      - Publication Date
  - Process Step – an explanation of how/when the data was created
    - Process Description
    - Process Date
- Spatial Reference
  - Horizontal Coordinate System
  - Vertical Coordinate System (if applicable) – vertical datum information
    - Datum Name
    - Distance Units
- “<INSTALLATION> GIS will accept GPS data only if the positional data are differentially corrected to assure locational accuracy. Exact accuracy levels of each data feature shall be agreed upon with the <INSTALLATION> and NAVFAC SEGRC prior to contract start.”
- “Where field data collection is stipulated in the contract, the contractor shall utilize conventional and other methods, such as a total station, or Global Positioning System (GPS) in accordance with the applicable Geospatial Positioning Accuracy Standards published by the Federal Geographic Data Committee (FGDC).”
- “At a minimum, the contractor shall provide resource grade GPS collection at an accuracy level of +/- < 1m and shall use differential correction to target accuracies of +/- .5 m.”
- “All GPS data collection specifications should follow what is outlined in the DCG chapters associated with the data being collected and shall include an accuracy report in the metadata. The DCG chapters can be obtained from the NAVFAC SEGRC or after requesting an account at <http://www.datacollectionadvisor.com/>.”
- “Unless otherwise specified in the SOW the contractor is responsible for performing quality assurance and quality control checks of all GIS data files prior to delivery to the <INSTALLATION> and NAVFAC SEGRC. All data (graphic and non-graphic) must work with the existing <INSTALLATION> and NAVFAC SEGRC system upon submittal. Erroneous files will not be accepted and will be returned to the contractor for review and correction prior to formal acceptance of the GIS product delivery.”

**Air Force Contract Guidance for Geospatial Data (“Contract Addendum Guidance for Geospatial Data”):**

- “All products associated with this contract that provide a map representation of the location of features (historical, existing, or planned) including installation maps, site plans, area development plans, walls-out as-built depictions, or other related overhead (plan) views of an the installation (partial or entire) shall adhere to the following requirements.”
- “1) All geospatial data features shall comply with the latest version of Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) available from <http://www.sdsfieonline.org> or provided by the government at contract award. Guidance on the latest version of SDSFIE is available from the installation’s Geo Integration Office (GIO).”
- “2) A File Geodatabase containing SDSFIE dataset and feature class schema shall be adhered to. All attribute data as specifically outlined in the task order contract shall be included either in the GIS data file or as a separate table with a SDSFIE key variable that may be used to relationally join the separate table with the GIS data file (feature-based file structures with one-to-one or one-to-many cardinality between spatial records and attribute records). Metadata shall be provided in accordance with Federal Geographic Data Committee (FGDC), Content Standards for Digital Geospatial Metadata (CSDGM) standards.”

- “3) Geospatial data shall be horizontally referenced to NAD 83 State Plane Colorado FIPS 0502 U.S. Feet Coordinate System and vertical coordinates shall be based on the North American Vertical Datum of 1988 (NAVD 88). Reference datum and coordinate systems used shall be clearly identified. (Reference: the Geospatial Positioning Accuracy Standards, PART 4: Standards for Architecture, Engineering, Construction (A/E/C) and Facility Management (FGDC-STD-007.4-2002)). Questions concerning guidance on mapping units, coordinate systems and projections are available from the Installation GIO.”
- “4) Field survey data collection activities shall be at an accuracy level of 10 cm (4”) or less. A Quality Control (QC) report shall be submitted for surveyed features and state whether all inconsistencies in the data generated were corrected, or it must detail the remaining errors by case. Utility line locations shall be captured at 50ft intervals and at each bend, junction, or turn.”

As additional contract language examples are received or updated, this appendix shall be updated and expanded.

## Appendix D: CIP Quality Metrics

Appendix D Table 1: SDSFIE-Q Dataset Metrics

| Data Quality Element     | ISO Measure Identifier | SDSFIE-Q Metric Identifier | DCS General Guidance Metric Description                                                                                                                         | Suggested Evaluation Method                                                                  | Acceptable Quality Level | Mandatory for CIP                | Level | Comments                           | Required for Feature Types                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------|------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------|----------------------------------|-------|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Completeness: Commission | 2                      | DCS1                       | The number of features included in the layer that are excess to the Real Property Inventory (i.e. features in the dataset that are not reported to the RPI)     | Direct External: Comparison against database of known features (i.e. APSR)                   | N/A                      | Real Property feature types only | 1     | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, Installation, LandParcel, MilitaryRange, MilitaryTrainingLocation, ParkingArea, PavementSection, RailSegment, RailTrack, Site, Tower                                                                                                                                                                     |
| Completeness: Commission | 3                      | DCS2                       | The percentage of features included in the layer that are excess to the Real Property Inventory (i.e. features in the dataset that are not reported to the RPI) | Direct External: Comparison against database of known features (i.e. APSR)                   | 5% (maximum)             | Real Property feature types only | 1     | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, Installation, LandParcel, MilitaryRange, MilitaryTrainingLocation, ParkingArea, PavementSection, RailSegment, RailTrack, Site, Tower                                                                                                                                                                     |
| Completeness: Commission | 4                      | DCS5                       | The number of duplicated features in the layer. (Features that either have identical geometries or identical attribution within a specified search tolerance)   | Direct Internal: Geoprocessing tool to identify duplicate geometries or identical attributes | N/A                      | Yes                              | 1     | Included on previous CIP Checklist | AccessControl, AirAccidentPotentialZone, Bridge, Building, DockOrWharf, EnvironmentalRestorationSite, Fence, GolfCourse, HistoricDistrict, ImpactArea, Installation, LandParcel, LandUse, MilitaryRange, MilitaryTrainingLocation, EsqdComposite, NoiseZone, Outgrant, ParkingArea, PavementSection, RailSegment, RailTrack, RecreationBoundary, RoadCenterline, Site, Tower, Wetland |

|                             |     |       |                                                                                                                                                                   |                                                                                                 |                 |                                  |   |                                    |                                                                                                                                                                                                                                                                                                                                                                                       |
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| Completeness:<br>Commission | N/A | DCS6  | The percentage of duplicated features in the layer. (Features that either have identical geometries or identical attribution within a specified search tolerance) | Direct Internal:<br>Geoprocessing tool to identify duplicate geometries or identical attributes | 5%<br>(maximum) | Yes                              | 1 | Included on previous CIP Checklist | AccessControl, AirAccidentPotentialZone, Bridge, Building, DockOrWharf, EnvironmentalRestorationSite, Fence, GolfCourse, HistoricDistrict, ImpactArea, Installation, LandParcel, LandUse, MilitaryRange, MilitaryTrainingLocation, EsqdComposite, NoiseZone, Outgrant, ParkingArea, PavementSection, RailSegment, RailTrack, RecreationBoundary, RoadCenterline, Site, Tower, Wetland |
| Completeness:<br>Omission   | 6   | DCS7  | The number of reported Real Property assets for each feature type that do not have a geospatial representation                                                    | Direct External:<br>Comparison against database of known features (i.e. APSR)                   | N/A             | Real Property feature types only | 1 | Included on previous CIP Checklist | Bridge, Building, DockOrWharf, Fence, GolfCourse, Installation, LandParcel, ParkingArea, PavementSection, RailSegment, RailTrack, Site, Tower                                                                                                                                                                                                                                         |
| Completeness:<br>Omission   | 7   | DCS8  | The percentage of reported Real Property assets for each feature type that do not have a geospatial representation                                                | Direct External:<br>Comparison against database of known features (i.e. APSR)                   | 5%<br>(maximum) | Real Property feature types only | 1 | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, Installation, LandParcel, MilitaryRange, MilitaryTrainingLocation, ParkingArea, PavementSection, RailSegment, RailTrack, Site, Tower                                                                                                                                                                     |
| Completeness:<br>Omission   | 6   | DCS11 | The number of Real Property assets for each feature type that do not have an RPUID                                                                                | Direct Internal:<br>Analysis of attributes (manual or tool)                                     | N/A             | Real Property feature types only | 1 | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, LandParcel, MilitaryRange, MilitaryTrainingLocation, ParkingArea, PavementSection, RailSegment, RailTrack, Tower                                                                                                                                                                                         |

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| Completeness:<br>Omission                       | 7  | DCS12 | The percentage of Real Property assets for each feature type that do not have an RPUID | Direct Internal:<br>Analysis of attributes (manual or tool)                                                                                                                                      | 5%<br>(maximum) | Real Property feature types only | 1 | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, LandParcel, MilitaryRange, MilitaryTrainingLocation, ParkingArea, PavementSection, RailSegment, RailTrack, Tower |
| Completeness:<br>Omission                       | 6  | DCS53 | The number of features for each feature type that do not have an RPSUID                | Direct Internal:<br>Analysis of attributes (manual or tool)                                                                                                                                      | N/A             | Yes                              | 1 | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, LandParcel, ParkingArea, PavementSection, RailSegment, RailTrack, RoadCenterline, Site, Tower                                |
| Completeness:<br>Omission                       | 7  | DCS54 | The percentage of features for each feature type that do not have an RPSUID            | Direct Internal:<br>Analysis of attributes (manual or tool)                                                                                                                                      | 5%<br>(maximum) | Yes                              | 1 | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, LandParcel, ParkingArea, PavementSection, RailSegment, RailTrack, RoadCenterline, Site, Tower                                |
| Logical Consistency:<br>Topological Consistency | 25 | DCS21 | The number of features that are invalid sliver surfaces                                | Direct Internal:<br>Geoprocessing tool to identify polygons under a specified thinness ratio. All polygons under the minimum thinness ratio defined in the DCS should be evaluated and verified. | N/A             | No                               | 1 | Included on previous CIP Checklist | ImpactArea, Installation, LandParcel, MilitaryRange, MilitaryTrainingLocation, Site                                                                                                           |

|                                              |     |       |                                                                                             |                                                                                                                                                                                               |              |     |   |                                    |                                                                                                                                                                                                                                                                                                                                                  |
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| Logical Consistency: Topological Consistency | N/A | DCS22 | The percentage of features that are invalid sliver surfaces                                 | Direct Internal: Geoprocessing tool to identify polygons under a specified thinness ratio. All polygons under the minimum thinness ratio defined in the DCS should be evaluated and verified. | 5% (maximum) | No  | 1 | Included on previous CIP Checklist | ImpactArea, Installation, LandParcel, MilitaryRange, MilitaryTrainingLocation, Site                                                                                                                                                                                                                                                              |
| Logical Consistency: Topological Consistency | 26  | DCS23 | The number of features included in the layer that have self-intersect errors (polygons)     | Direct Internal: Geoprocessing tool to identify invalid geometry                                                                                                                              | N/A          | No  | 1 | Included on previous CIP Checklist | Installation, LandParcel, Site                                                                                                                                                                                                                                                                                                                   |
| Logical Consistency: Topological Consistency | N/A | DCS24 | The percentage of features included in the layer that have self-intersect errors (polygons) | Direct Internal: Geoprocessing tool to identify invalid geometry                                                                                                                              | 5% (maximum) | No  | 1 | Included on previous CIP Checklist | Installation, LandParcel, Site                                                                                                                                                                                                                                                                                                                   |
| Logical Consistency: Topological Consistency | N/A | DCS55 | The number of features with NULL geometry                                                   | Direct Internal: Geoprocessing tool to identify invalid geometry                                                                                                                              | N/A          | Yes | 1 | Included on previous CIP Checklist | AccessControl, AirAccidentPotentialZone, Bridge, Building, DockOrWharf, EnvironmentalRestorationSite, Fence, GolfCourse, HistoricDistrict, ImpactArea, LandParcel, LandUse, MilitaryRange, EsqdArcComposite, NoiseZone, Outgrant, ParkingArea, PavementSection, RailSegment, RailTrack, RecreationBoundary, RoadCenterline, Site, Tower, Wetland |

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| Logical Consistency: Topological Consistency | N/A | DCS56 | The percentage of features with NULL geometry                                                                   | Direct Internal: Geoprocessing tool to identify invalid geometry                                        | 5% (maximum) | Yes | 1 | Included on previous CIP Checklist | AccessControl, AirAccidentPotentialZone, Bridge, Building, DockOrWharf, EnvironmentalRestorationSite, Fence, GolfCourse, HistoricDistrict, ImpactArea, LandParcel, LandUse, MilitaryRange, EsqdcArcComposite, NoiseZone, Outgrant, ParkingArea, PavementSection, RailSegment, RailTrack, RecreationBoundary, RoadCenterline, Site, Tower, Wetland |
| Logical Consistency: Topological Consistency | N/A | DCS27 | The number of features that are not entirely contained within the site boundary associated with the feature     | Direct Internal: Geoprocessing tool to identify polygons that are not entirely within the site boundary | N/A          | No  | 1 | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, EnvironmentalRestorationSite, Fence, GolfCourse, LandParcel, LandUse, Outgrant, ParkingArea, PavementSection, RailSegment, RailTrack, RoadCenterline, Site, Tower, Wetland                                                                                                                          |
| Logical Consistency: Topological Consistency | N/A | DCS28 | The percentage of features that are not entirely contained within the site boundary associated with the feature | Direct Internal: Geoprocessing tool to identify polygons that are not entirely within the site boundary | 5% (maximum) | No  | 1 | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, EnvironmentalRestorationSite, Fence, GolfCourse, ImpactArea, LandParcel, LandUse, MilitaryRange, MilitaryTrainingLocation, Outgrant, ParkingArea, PavementSection, RailSegment, RailTrack, RoadCenterline, Site, Tower, Wetland                                                                     |

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| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65 | DCS39 | The number of features in the layer that have an incorrect RPSUID  | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the RPSUID matches the RPSUID of the site boundary in which the feature is located. | N/A           | Yes                              | 1 | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, LandParcel, MilitaryRange, MilitaryTrainingLocation, ParkingArea, PavementSection, RailSegment, RailTrack, RoadCenterline, Site, Tower |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66 | DCS40 | The percentage of features in the layer that have a correct RPSUID | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the RPSUID matches the RPSUID of the site boundary in which the feature is located. | 95% (minimum) | Yes                              | 1 | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, LandParcel, MilitaryRange, MilitaryTrainingLocation, ParkingArea, PavementSection, RailSegment, RailTrack, RoadCenterline, Site, Tower |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65 | DCS41 | The number of features in the layer that have an invalid RPUID     | Direct Internal: Geoprocessing tool to assess adherence to a numerical value.                                                                                                                                         | N/A           | Real Property feature types only | 1 | Included on previous CIP Checklist | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, LandParcel, MilitaryRange, MilitaryTrainingLocation, ParkingArea, PavementSection, RailSegment, RailTrack, RoadCenterline, Site, Tower |

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| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66 | DCS42 | The percentage of features in the layer that have a valid RPUID  | Direct Internal: Geoprocessing tool to assess adherence to a numerical value. | 95% (minimum) | Real Property feature types only | 1 | Included on previous CIP Checklist                                       | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, LandParcel, MilitaryRange, MilitaryTrainingLocation, ParkingArea, PavementSection, RailSegment, RailTrack, RoadCenterline, Site, Tower |
| Completeness: Omission                                    | 6  | DCS65 | The number of features with NULL installationId                  | Direct Internal: Analysis of attributes (manual or tool)                      | 5% (maximum)  | Yes                              | 2 | New – Will be mandatory for all CIP feature types once DCSs are revised. |                                                                                                                                                                                                                     |
| Completeness: Omission                                    | 7  | DCS66 | The percentage of features with NULL installationId              | Direct Internal: Analysis of attributes (manual or tool)                      | 5% (maximum)  | Yes                              | 2 | New – Will be mandatory for all CIP feature types once DCSs are revised. |                                                                                                                                                                                                                     |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65 | DCS67 | The number of features in the layer that have a unique SdsId     | Direct External: Geoprocessing tool to determine if the SdsId is unique       | N/A           | Yes                              | 2 | New – Will be mandatory for all CIP feature types once DCSs are revised. |                                                                                                                                                                                                                     |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66 | DCS68 | The percentage of features in the layer that have a unique SdsId | Direct External: Geoprocessing tool to determine if the SdsId is unique       | 95% (minimum) | Yes                              | 2 | New – Will be mandatory for all CIP feature types once DCSs are revised. |                                                                                                                                                                                                                     |

|                                                           |    |       |                                                                             |                                                                                                                                                                                                                                                 |               |     |   |  |                                                                                                                                                                                                                                                                                                  |
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| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65 | DCS33 | The number of features in the layer that have an incorrect installation ID  | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the installation ID matches the installation ID of the installation boundary in which the feature is located. | N/A           | Yes | 3 |  | AirAccidentPotentialZone, Bridge, Building, DockOrWharf, EnvironmentalRestorationSite, Fence, GolfCourse, HistoricDistrict, Installation, LandParcel, LandUse, EsqdArcComposite, NoiseZone, Outgrant, ParkingArea, PavementSection, RailSegment, RailTrack, RoadCenterline, Site, Tower, Wetland |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66 | DCS34 | The percentage of features in the layer that have a correct installation ID | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the installation ID matches the installation ID of the installation boundary in which the feature is located. | 95% (minimum) | Yes | 3 |  | AirAccidentPotentialZone, Bridge, Building, DockOrWharf, EnvironmentalRestorationSite, Fence, GolfCourse, HistoricDistrict, Installation, LandParcel, LandUse, EsqdArcComposite, NoiseZone, Outgrant, ParkingArea, PavementSection, RailSegment, RailTrack, RoadCenterline, Site, Tower, Wetland |
| Thematic Accuracy: Classification Correctness             | 60 | DCS46 | The number of features that are incorrectly classified                      | Direct External: Comparison against database of known features (i.e. APSR). For real property feature types, the classification of the feature should be compared to the CATCODE reported in the real property database.                        | N/A           | Yes | 3 |  | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, MilitaryRange, MilitaryTrainingLocation, LandParcel, ParkingArea, PavementSection, Site, Tower                                                                                                                      |

|                                               |    |       |                                                                                                                                                         |                                                                                                                                                                                                                          |              |     |   |  |                                                                                                                                                                             |
|-----------------------------------------------|----|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----|---|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Thematic Accuracy: Classification Correctness | 61 | DCS47 | The percentage of features that are incorrectly classified                                                                                              | Direct External: Comparison against database of known features (i.e. APSR). For real property feature types, the classification of the feature should be compared to the CATCODE reported in the real property database. | 5% (maximum) | Yes | 3 |  | AccessControl, Bridge, Building, DockOrWharf, Fence, GolfCourse, ImpactArea, MilitaryRange, MilitaryTrainingLocation, LandParcel, ParkingArea, PavementSection, Site, Tower |
| Completeness: Commission                      | 2  | DCS3  | The number of features included in the layer that are excess to real world features (i.e. features in the dataset that are not real world features)     | Direct External: Visual or automated inspection against imagery                                                                                                                                                          | N/A          | No  | 4 |  |                                                                                                                                                                             |
| Completeness: Commission                      | 3  | DCS4  | The percentage of features included in the layer that are excess to real world features (i.e. features in the dataset that are not real world features) | Direct External: Visual or automated inspection against imagery                                                                                                                                                          | 5% (maximum) | No  | 4 |  |                                                                                                                                                                             |
| Completeness: Omission                        | 6  | DCS63 | The number of records reported in an authoritative database (other than real property) that do not have a geospatial representation                     | Direct External: Comparison against database of known features (i.e. NRHP)                                                                                                                                               | N/A          | No  | 4 |  |                                                                                                                                                                             |

|                           |   |       |                                                                                                                                         |                                                                                                                                                       |                 |    |   |  |                 |
|---------------------------|---|-------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----|---|--|-----------------|
| Completeness:<br>Omission | 7 | DCS64 | The percentage of records reported in an authoritative database (other than real property) that do not have a geospatial representation | Direct External:<br>Comparison against database of known features (i.e. NRHP)                                                                         | 5%<br>(maximum) | No | 4 |  |                 |
| Completeness:<br>Omission | 6 | DCS9  | The number of actual Real Property assets for each feature type that do not have a geospatial representation                            | Direct External:<br>Visual inspection against imagery<br>Direct External:<br>Comparison against database of known features (i.e. APSR)                | N/A             | No | 4 |  | PavementSection |
| Completeness:<br>Omission | 7 | DCS10 | The percentage of actual Real Property assets for each feature type that do not have a geospatial representation                        | Direct External:<br>Visual inspection against imagery<br>Direct External:<br>Comparison against database of known features (i.e. APSR)                | 5%<br>(maximum) | No | 4 |  | PavementSection |
| Completeness:<br>Omission | 6 | DCS57 | The number of actual (real world) features that are not reported to the RPI                                                             | Direct External:<br>Visual inspection against imagery.<br>Direct External:<br>Comparison against database of features reported to the RPI (i.e. APSR) | N/A             | No | 4 |  |                 |
| Completeness:<br>Omission | 7 | DCS58 | The percentage of actual (real world) features that are not reported to the RPI                                                         | Direct External:<br>Visual inspection against imagery.<br>Direct External:<br>Comparison against database of features reported to the RPI (i.e. APSR) | 5%<br>(maximum) | No | 4 |  |                 |

|                                                  |    |       |                                                                                                                                                                            |                                                             |                 |    |   |  |  |
|--------------------------------------------------|----|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|-----------------|----|---|--|--|
| Completeness:<br>Omission                        | 6  | DCS13 | The number of unpopulated values in non-nullable attribute fields (No NULL or blank values)                                                                                | Direct Internal:<br>Analysis of attributes (manual or tool) | N/A             | No | 4 |  |  |
| Completeness:<br>Omission                        | 7  | DCS14 | The percentage of unpopulated values in non-nullable attribute fields (No NULL or blank values)                                                                            | Direct Internal:<br>Analysis of attributes (manual or tool) | 5%<br>(maximum) | No | 4 |  |  |
| Logical<br>Consistency:<br>Domain<br>Consistency | 16 | DCS15 | The number of features included in the layer that have values in operationalStatus that are not conformant with the domain values in a registered Component Adaptation     | Direct Internal:<br>Analysis of attributes (manual or tool) | N/A             | No | 4 |  |  |
| Logical<br>Consistency:<br>Domain<br>Consistency | 18 | DCS16 | The percentage of features included in the layer that have values in operationalStatus that are not conformant with the domain values in a registered Component Adaptation | Direct Internal:<br>Analysis of attributes (manual or tool) | 5%<br>(maximum) | No | 4 |  |  |

|                                              |     |       |                                                                                                                                                                     |                                                          |              |     |   |                                                                   |  |
|----------------------------------------------|-----|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|--------------|-----|---|-------------------------------------------------------------------|--|
| Logical Consistency: Domain Consistency      | 16  | DCS17 | The number of features included in the layer that have values in rplnterest that are not conformant with the domain values in a registered Component Adaptation     | Direct Internal: Analysis of attributes (manual or tool) | N/A          | No  | 4 |                                                                   |  |
| Logical Consistency: Domain Consistency      | 18  | DCS18 | The percentage of features included in the layer that have values in rplnterest that are not conformant with the domain values in a registered Component Adaptation | Direct Internal: Analysis of attributes (manual or tool) | 5% (maximum) | No  | 4 |                                                                   |  |
| Logical Consistency: Topological Consistency | N/A | DCS19 | The total number of topological errors in the layer                                                                                                                 | Direct Internal: Aggregation of topological errors       | N/A          | Yes | 4 | This shouldn't be mandatory - Need to revise DCS General Guidance |  |
| Logical Consistency: Topological Consistency | N/A | DCS20 | The percentage of topological errors in the layer                                                                                                                   | Direct Internal: Aggregation of topological errors       | 5% (maximum) | Yes | 4 | This shouldn't be mandatory - Need to revise DCS General Guidance |  |

|                                                 |     |       |                                                                                                                       |                                                                                                                                           |              |    |   |  |                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------|-----|-------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|--------------|----|---|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Logical Consistency:<br>Topological Consistency | 27  | DCS25 | The number of features that incorrectly intersect other features                                                      | Direct Internal: Geoprocessing tool to identify intersecting polygons in conjunction with analysis to determine if the overlap is correct | N/A          | No | 4 |  | AirAccidentPotentialZone, Bridge, Building, DockOrWharf, EnvironmentalRestorationSite, GolfCourse, HistoricDistrict, ImpactArea, Installation, LandParcel, LandUse, MilitaryRange, MilitaryTrainingLocation, EsqArcComposite, NoiseZone, Outgrant, ParkingArea, PavementSection, Site, Wetland |
| Logical Consistency:<br>Topological Consistency | N/A | DCS26 | The percentage of features that incorrectly intersect other features                                                  | Direct Internal: Geoprocessing tool to identify intersecting polygons in conjunction with analysis to determine if the overlap is correct | 5% (maximum) | No | 4 |  | AirAccidentPotentialZone, Bridge, Building, DockOrWharf, EnvironmentalRestorationSite, GolfCourse, HistoricDistrict, ImpactArea, Installation, LandParcel, LandUse, MilitaryRange, MilitaryTrainingLocation, EsqArcComposite, NoiseZone, Outgrant, ParkingArea, PavementSection, Site, Wetland |
| Logical Consistency:<br>Topological Consistency | 27  | DCS59 | The number of features that incorrectly intersect features from another layer (layers will be defined in the DCS)     | Direct Internal: Geoprocessing tool to identify intersecting points and/or polygons                                                       | Yes          | No | 4 |  | MilitaryRange, MilitaryTrainingLocation                                                                                                                                                                                                                                                        |
| Logical Consistency:<br>Topological Consistency | N/A | DCS60 | The percentage of features that incorrectly intersect features from another layer (layers will be defined in the DCS) | Direct Internal: Geoprocessing tool to identify intersecting points and/or polygons                                                       | 5% (maximum) | No | 4 |  | MilitaryRange, MilitaryTrainingLocation                                                                                                                                                                                                                                                        |

|                                                           |     |       |                                                                                                                     |                                                                                                           |               |    |   |  |                          |
|-----------------------------------------------------------|-----|-------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------|----|---|--|--------------------------|
| Logical Consistency: Topological Consistency              | N/A | DCS61 | The number of features that do not intersect a feature/s from another layer (layers will be defined in the DCS)     | Direct Internal: Geoprocessing tool to identify features that do not intersect.                           | N/A           | No | 4 |  | MilitaryTrainingLocation |
| Logical Consistency: Topological Consistency              | N/A | DCS62 | The percentage of features that do not intersect a feature/s from another layer (layers will be defined in the DCS) | Direct Internal: Geoprocessing tool to identify features that do not intersect.                           | 5% (maximum)  | No | 4 |  | MilitaryTrainingLocation |
| Logical Consistency: Topological Consistency              | N/A | DCS29 | The number of features that are not coincident with bounding features                                               | Direct Internal: Geoprocessing tool to identify polygons that are not coincident with other features      | N/A           | No | 4 |  |                          |
| Logical Consistency: Topological Consistency              | N/A | DCS30 | The percentage of features that are not coincident with bounding features                                           | Direct Internal: Geoprocessing tool to identify polygons that are not coincident with other features      | 5% (maximum)  | No | 4 |  |                          |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65  | DCS31 | The number of features in the layer that have an incorrect feature name                                             | Direct External: Comparison against database of known features (e.g. APSR or a defined naming convention) | N/A           | No | 4 |  |                          |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66  | DCS32 | The percentage of features in the layer that have a correct feature name                                            | Direct External: Comparison against database of known features (e.g. APSR or a defined naming convention) | 95% (minimum) | No | 4 |  |                          |

|                                                           |     |       |                                                                                                             |                                                                                                         |               |    |   |  |                                                     |
|-----------------------------------------------------------|-----|-------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------|----|---|--|-----------------------------------------------------|
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65  | DCS35 | The number of features in the layer that have an incorrect operational status                               | Direct External: Comparison against database of known features (i.e. APSR)                              | N/A           | No | 4 |  |                                                     |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66  | DCS36 | The percentage of features in the layer that have a correct operational status                              | Direct External: Comparison against database of known features (i.e. APSR)                              | 95% (minimum) | No | 4 |  |                                                     |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65  | DCS37 | The number of features in the layer that have an incorrect real property interest type                      | Direct External: Comparison against database of known features (i.e. APSR)                              | N/A           | No | 4 |  | ImpactArea, MilitaryRange, MilitaryTrainingLocation |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66  | DCS38 | The percentage of features in the layer that have a correct real property interest type                     | Direct External: Comparison against database of known features (i.e. APSR)                              | 95% (minimum) | No | 4 |  |                                                     |
| Temporal Accuracy: Temporal Validity                      | N/A | DCS43 | The number of features that are accurately represented by the currentness reference required in the DCS     | Direct External: Comparison of DCS requirement to the date the dataset was last updated in the metadata | N/A           | No | 4 |  |                                                     |
| Temporal Accuracy: Temporal Validity                      | N/A | DCS44 | The percentage of features that are accurately represented by the currentness reference required in the DCS | Direct External: Comparison of DCS requirement to the date the dataset was last updated in the metadata | 95% (minimum) | No | 4 |  |                                                     |

|                                                    |    |       |                                                                  |                                                                           |              |    |   |  |  |
|----------------------------------------------------|----|-------|------------------------------------------------------------------|---------------------------------------------------------------------------|--------------|----|---|--|--|
| Positional Accuracy: Absolute or external accuracy | 39 | DCS45 | The horizontal accuracy of the layer (based on DCS requirements) | Direct External: Comparison of reported coordinate values to known values | Refer to DCS | No | 4 |  |  |
|----------------------------------------------------|----|-------|------------------------------------------------------------------|---------------------------------------------------------------------------|--------------|----|---|--|--|

Appendix D Table 2: SDSFIE-Q Aggregate Metrics

| Category | SDSFIE Part | Reporting Level | Data Quality Scope | Element                | ISO Measure ID | SDSFIE-Q Metric ID | Metric Description                                                                                                                | Recommended Evaluation Method                                                         | Acceptable Quality Level | Level |
|----------|-------------|-----------------|--------------------|------------------------|----------------|--------------------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------|-------|
| CIP      | V           | OSD/ Component  | aggregate          | Conceptual Consistency | 12             | IGG6               | The percentage of CIP feature types that do not have SDSFIE-M compliant metadata records                                          | Direct Internal: Check of SDSFIE-M mandatory elements for each submitted CIP layer    | 5%                       | 1     |
| CIP      | V           | OSD/ Component  | aggregate          | Omission               | 7              | IGG9               | The percentage of required feature types not included in the CIP                                                                  | Direct External: Comparison of CIP submittal against the list of required CIP layers. | 5%                       | 1     |
| CIP      | V           | OSD/ Component  | aggregate          | Omission               | 7              | IGG7               | The percentage of required CIP feature types that do not have metadata with at least one data quality reporting element populated | Direct Internal: Check of SDSFIE-M mandatory elements for each submitted CIP layer    | 5%                       | 2     |
| CIP      | V           | OSD/ Component  | aggregate          | Omission               | 7              | IGG8               | The percentage of reported Real Property assets for the CIP that do not have a geospatial representation                          | Aggregation of DCS 8 result for each CIP Real Property layer                          | 5%                       | 2     |

|     |   |                   |           |                           |     |       |                                                                                                                   |                                                                                          |     |   |
|-----|---|-------------------|-----------|---------------------------|-----|-------|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|-----|---|
| CIP | V | OSD/<br>Component | aggregate | Conceptual<br>Consistency | 12  | IGG10 | The percentage of<br>CIP feature types<br>that are not<br>compliant with an<br>approved<br>SDSFIE-V<br>adaptation | Direct Internal: Check<br>to confirm that the CIP<br>submittal has the correct<br>schema | 5%  | 2 |
| CIP | V | OSD/<br>Component | aggregate | N/A                       | N/A | IGG11 | Which CIP layers<br>have the most<br>data quality<br>errors?                                                      | Aggregation:<br>Comparison of the<br>results for metric DCS51<br>for each CIP layer      | N/A | 4 |
| CIP | V | OSD/<br>Component | aggregate | N/A                       | N/A | IGG12 | Which CIP layers<br>have the least<br>data quality<br>errors?                                                     | Aggregation:<br>Comparison of the<br>results for metric DCS51<br>for each CIP layer      | N/A | 4 |

## Appendix E: Instructions for CIP RBJs

To facilitate Component data quality assessments, DISDI will provide a Data Reviewer Batch Job (RBJ) file that checks Component data against applicable Level 1 and 2 metrics. For Level 3 and 4 metrics, Components should refer to the published DCSs and associated RBJs. RBJs are built in and intended for use in ArcGIS Desktop software.

- Components must have Data Reviewer installed and licensed to run the RBJ file.
- Instruction for running the RBJ file follow:
  - Open ArcMap
  - Add CIP data
  - Add RPAD Site table (or Component equivalent, if available)
  - Add Data Reviewer toolbar
  - Open Reviewer Session Manager (on Data Reviewer toolbar) and start a new session.
  - Open Batch Validate (on Data Reviewer toolbar) and Select “Add from File” to import the CIP RBJ file.
  - Point file to your Component data
    - Click on the Workspace button and link any check that did not match to a feature type in the Component CIP data.
    - If a feature type was not provided in the CIP submission, uncheck the batch job for that feature type in the main window.
  - Click “Run”
  - Open the Reviewer Table to view results

Correct errors prior to submitting data to OSD.

## Annex F: Data Content Specification (DCS) General Guidance



# SDSFIE-Q Annex F: Data Content Specification (DCS) General Guidance FINAL DRAFT

Revision 4  
20 September 2021

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Prepared By:

The Installation Geospatial Information and Services Governance Group (IGG)

For:

The Assistant Secretary of Defense (Sustainment)

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**Revision History**

| <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>Date</b> | <b>Version</b> |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------------|
| DCS General Guidance Rev 1 <ul style="list-style-type: none"> <li>Updated scope from featureType to dataset for data quality evaluation and reporting of CIP layers</li> <li>Changed RPAD references to DAIS</li> <li>Section 3.1: Changed language to state that Components may “augment” the attribute guidance.</li> <li>Table 1: Updated installationID and mediaID definition, description and note to match SDSFIE-V 4.0</li> <li>Revised metrics DCS41 – DCS42</li> <li>Added metrics DCS53 – DCS57</li> </ul> | 1 May 2018  | DRAFT          |
| DCS General Guidance Rev 1 Approved                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 12 Sep 2018 | Rev 1          |
| DCS General Guidance Rev 4 <ul style="list-style-type: none"> <li>Updated as part of SDSFIE-Q Implementation Guidance production</li> </ul>                                                                                                                                                                                                                                                                                                                                                                           | TBD         | TBD            |

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## 1 Introduction

The Spatial Data Standards for Facilities, Infrastructure, and Environment Quality standard (SDSFIE-Q) requires that data content specifications (DCS) be created for all IGI&S vector data. As defined in ISO 19131 Geographic Information – Geomatics, a DCS is a detailed description of a dataset or data layer, together with additional information that will enable it to be created, supplied to, and used by other organizations. The DCS is a technical document that provides essential information for data collection and metadata population. A DCS describes the ideal dataset or “how a dataset should be”. In contrast, the actual state of the dataset and how closely it conforms to the DCS are described in a dataset’s associated metadata.

The DCS General Guidance provides a framework of concepts that apply to all feature types in the SDSFIE Vector Standard (SDSFIE-V), so common elements do not need to be repeated in each feature type specific DCS. Therefore, the DCS General Guidance must be used in conjunction with each DCS. In combination, the DCS General Guidance and the DCSs collectively define minimum acceptable quality levels for IGI&S data. Components should use these documents to assist in developing Component-level guidance.

The DISDI Program will initially create DCSs for each feature type included in the Common Installation Picture (CIP), and eventually for every feature type in SDSFIE-V Gold.

### 1.1 Purpose

This general guidance document provides information for developing DCSs, including enterprise level guidance for data collection, source selection, and data quality evaluation procedures applicable to all feature types in SDSFIE-V Gold and registered Adaptations thereof. This document also provides guidance for reporting data quality evaluation results in SDSFIE-M compliant metadata. The individual DCS produced for each feature type will provide additional guidance that is specific to the feature type. Refer to Component level guidance for any additional Component-specific requirements.

### 1.2 Authority

In accordance with DoDI 8130.01, this guidance applies to installation geospatial information and services (IGI&S). IGI&S is applicable to the management of DoD installations and environment to support military readiness in the Active, Guard, and Reserve Components with regard to facility construction, sustainment, and modernization including the operation and sustainment of military test and training ranges as well as the US Army Corps of Engineers Civil Works community. Its applicability for other interested organizations is suggested but not mandatory. This guidance is derived from the SDSFIE-Q standard, which establishes a framework for evaluating the quality of IGI&S data and defines the requirement for DCSs at the OSD and Component levels.

### 1.3 Document Maintenance

This document will be reviewed and updated as needed, with each action documented in a revision history log. When changes occur, the version number will be updated to the next increment and the date, owner making the change, and change description will be recorded in the revision history log of the document.

### 1.4 References

ASD (EI&E) *Real Property Inventory Management (RPIM)*, v. 10.0, 29 Sep 2017

ASD(EI&E), *Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) Quality (SDSFIE-Q Revision 2)*, 12 Mar 2020

DoD Instruction 4165.14, *Real Property Inventory (RPI) and Forecasting*, 17 Jan 2014, as amended

DoD Instruction 8130.01, *Installation Geospatial Information and Services (IGI&S)*, 9 Apr 2015, as amended

DUSD(I&E), *Spatial Data Standards for Facilities, Infrastructure, and Environment (SDSFIE) Metadata (SDSFIE-M)*, Version 2.0, Revision 4, 10 Jun 2020

ISO Reference 19131 *Geographic Information – Data product specification*, Aug 2006

ISO Reference 19157 *Geographic Information – Data quality*, Dec 2013

## 1.5 Acronyms

|          |                                                                                  |
|----------|----------------------------------------------------------------------------------|
| ADS      | Authoritative Data Source                                                        |
| APSR     | Accountable Property System of Record                                            |
| CADD     | Computer Automated Drafting and Design                                           |
| CIP      | Common Installation Picture                                                      |
| DAIS     | Data Analytics and Integration Support Platform                                  |
| DCS      | Data Content Specification                                                       |
| DISDI    | Defense Installations Spatial Data Infrastructure                                |
| DoD      | Department of Defense                                                            |
| DoDI     | Department of Defense Instruction                                                |
| EI&E     | Energy, Installations, and Environment                                           |
| FOIA     | Freedom of Information Act                                                       |
| GCS      | Geographic Coordinate System                                                     |
| GIO      | Geospatial Information Officer                                                   |
| GPS      | Global Positioning System                                                        |
| GUID     | Globally Unique Identifier                                                       |
| HQ       | Headquarters                                                                     |
| IGG      | IGI&S Governance Group                                                           |
| IGI&S    | Installation Geospatial Information and Services                                 |
| ISO      | International Organization for Standardization                                   |
| MIM      | Military Installation Map                                                        |
| NGA      | National Geospatial-Intelligence Agency                                          |
| NMF      | National System for Geospatial Intelligence Metadata Foundation                  |
| OASD     | Office of the Assistant Secretary of Defense                                     |
| OSD      | Office of the Secretary of Defense                                               |
| PKI      | Public Key Infrastructure                                                        |
| RPI      | Real Property Inventory                                                          |
| RPIM     | Real Property Information Model                                                  |
| RPUID    | Real Property Unique Identifier                                                  |
| SDSFIE   | Spatial Data Standards for Facilities, Infrastructure and Environment            |
| SDSFIE-M | Spatial Data Standards for Facilities, Infrastructure and Environment - Metadata |
| SDSFIE-V | Spatial Data Standards for Facilities, Infrastructure and Environment - Vector   |
| SDSFIE-Q | Spatial Data Standards for Facilities, Infrastructure and Environment - Quality  |
| SOP      | Standard Operating Procedure                                                     |
| UUID     | Universally Unique Identifier                                                    |

## 2 DCS Content

### 2.1 DCS Format

OSD level DCSs will include the following key sections and content:

1. **Introduction** – The introduction will provide the overview of the layer (or feature type). This includes the name, definition, description and note established in SDSFIE-V along with other information to characterize the layer. The introduction will include the scope of the DCS, along with any policies, regulations or other requirements for collecting and maintaining the layer. A detailed source citation of DoD, Federal, or other policy must be outlined for each feature type.
2. **Data Collection Requirements** – This section contains the description and rules to collect and attribute the layer and metadata and will include sub-sections describing the applicability of the ISO Data Quality categories (completeness, logical consistency, positional accuracy, thematic accuracy, and temporal accuracy). This section will also describe the source selection criteria if it differs from the criteria in the DCS General Guidance document.
3. **Data Quality Evaluation and Reporting** – The data quality evaluation and reporting section shall identify required metrics and evaluation methods, including existing toolsets, for the feature type and provide guidance for populating the SDSFIE-M data quality metadata elements. This section will also describe the acceptable quality levels related to each metric for DCS conformance.

Component level DCSs must include the content specified above. The Component level DCSs may, but are not required, to follow the same format as the OSD level DCSs.

### 2.2 DCS Data Collection Requirements

Each DCS will outline the information required to maintain the feature type as per IGG guidelines and in a standard format. The ISO 19157 categories, which are defined in SDSFIE-Q Section **Error!**

**Reference source not found.**, must be described for each layer. This guidance and the DCS for each feature type will define metrics that relate to these data quality categories. Examples are provided for reference:

- **Completeness** is defined as the presence or absence of features, their attributes and relationships. Component datasets must include all required features as determined by the installation or in a known database of record and must contain all SDSFIE-V required elements. For example, the SDSFIE-V feature type *Fence* should include all features reported as Real Property Assets and must include the required attributes RPUID and RPSUID.
- **Logical Consistency** is the adherence to the ruleset for the data structure, attribution and relationships, including conceptual consistency, domain consistency, format consistency and topological consistency. This element requires that the feature type follow the rules established in SDSFIE-V. For example, all features in the SDSFIE feature type *LandParcel* should be complete, connected polygons, void of dangling lines, and should maintain consistent topological relationships with all other *LandParcel* features without overlapping polygons.
- **Positional Accuracy** is the accuracy of the position of features within a designated spatial reference system, including absolute and relative accuracy. For example, when using the SDSFIE feature type *Building*, all features should maintain positional accuracy in relation to other features in the *Building* feature type.
- **Temporal Quality** describes the quality of the temporal aspect of the feature type, including accuracy of a time measurement, temporal consistency and temporal validity. For example, the SDSFIE feature type *Installation* should reflect the most current conditions either by survey, through a means of source upload, or other resources as described by the Real Property Inventory Requirements (RPIR).

- **Thematic Accuracy** is the accuracy or correctness of attributes. This element requires that feature types contain accurate attributes and adhere to the defined SDSFIE classification for the feature type. For example, a *Bridge* feature that includes attribute values for National Bridge Inventory Bridge Design Type must maintain the accuracy of the classification of the bridge and the values for both verticalClearanceClosed and verticalClearanceOpen for navigation in the channel when the bridge is closed and open.
- **Usability** is used to determine overall adherence to the DCS requirements and will be defined and established in detail in each DCS.

### 3 General Collection Requirements

#### 3.1 SDSFIE-V Gold Foundational Attributes

As defined in the SDSFIE-V 4.0 Implementation Guidance, all SDSFIE-V 4.0 feature types must contain the SDSFIE-V Gold foundational attributes. Components must provide a justification for profiling any non-required attributes (as part of their Adaptation). Table 1 below contains a list of SDSFIE-V Gold foundational attributes. Each individual feature type may have additional Gold attributes. The DCS for each feature type may include Gold attributes in addition to those listed in **Error! Reference source not found.** according to the feature type modeling. The field “Attribute Guidance” describes requirements for populating each attribute. Components may augment the attribute guidance for the SDSFIE-V foundational attributes in the Component DCS.

| Attribute Name     | Definition, Description and Note                                                                                                                                                                                                                                          | Data Type   | Nullable | Required | Attribute Guidance                                                                                                                                          |
|--------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| featureDescription | A narrative describing the feature.                                                                                                                                                                                                                                       | String(Max) | Yes      | Yes      | None.                                                                                                                                                       |
| entityNameIdpk     | Primary Key. A unique, user-defined identifier for each record or instance of an entity.                                                                                                                                                                                  | String (40) | No       | Yes      | None.                                                                                                                                                       |
| featureName        | The common name of the feature.                                                                                                                                                                                                                                           | String (80) | Yes      | Yes      | The official name of the feature found on installation maps or in authoritative databases of record.                                                        |
| installationId     | The official code assigned by the Military Service (includes Washington Headquarters Services) used to identify the site or group of sites that make up an installation. <sup>2</sup>                                                                                     | String (11) | Yes      | No       | The installation ID should match the Installation Code reported to the RPI. All sites and assets within an installation shall have the same installationId. |
| mediaId            | Used to link the record to associated multimedia records that reference data. Example media types include imagery, video, audio, scanned documents, and drawings. See your DoD Component service implementation guidance for details as to the content of this attribute. | String (40) | Yes      | Yes      | None.                                                                                                                                                       |
| metadataId         | Used to represent or link to feature level metadata.                                                                                                                                                                                                                      | String (80) | Yes      | No       | None.                                                                                                                                                       |
| sdsId              | A unique identifier for all entities in the SDSFIE.                                                                                                                                                                                                                       | GUID        | Yes      | Yes      | GUID. See Section 3.1.1                                                                                                                                     |

<sup>2</sup> The “Note” for installationId was profiled via FCR-17-313.

**Annex F Table 1: SDSFIE Gold Attributes****3.1.1 Populating sdsId**

The sdsID is an identifier that is intended to be practically unique and used to identify a single entity record from the time of its creation (or first distribution) so that the entity record can be determined to refer to the same record in a future distribution of the dataset containing the record.

The sdsID shall be populated as a globally unique identifier (GUID) value. The term GUID typically refers to various implementations of the universally unique identifier (UUID) standard (IETF-RFC-4122). This guidance specifically refers to the UUID version 2 as that is the implementation used by Microsoft and is common among database systems.

A UUID is simply a 128-bit value. The meaning of each bit is defined by any of several variants. For human-readable display, many systems use a canonical format employing hexadecimal text with inserted hyphen characters. For example, "123e4567-e89b-12d3-a456-426655440000". The intent of UUIDs is to enable distributed systems to uniquely identify information without significant central coordination. In this context, the word unique should be taken to mean "practically unique" rather than "guaranteed unique".

Once an entity record is created the sdsID value for the record can be assigned. The sdsID value must be assigned before distribution beyond the installation context (i.e., to Component HQ or the DISDI Program Office). Once an sdsID value is distributed, the value must not change.

In practice, the sdsId shall be a version 4 UUID, meaning that it is a random UUID. Using the Python uuid package, this corresponds to the uuid.uuid4() method. The following example code for Esri-based Python will populate the sdsID column in every row where it is not already assigned:

```
import arcpy
import uuid
arcpy.env.workspace = 'C:\Geodata\MyGeodatabase.gdb'
fc = 'MyFeatureClass'
rows = arcpy.UpdateCursor(fc)
for row in rows:
    if row.sdsID is None:
        row.sdsID = '{' + str(uuid.uuid4()) + '}'
rows.updateRow(row)
```

**3.2 Real Property**

For all real property feature types, Components shall ensure that there is a match between features/records in the feature type and the Component accountable property system of record (APSR). The Real Property Unique Identifier (RPUID) and Real Property Site Unique Identifier (RPSUID) attributes must be populated so that IGI&S data can be linked to the data in the Data Analytics and Integration Support Platform (DAIS), a requirement of DoDI 4165.14. DCSs will identify any additional required real property attribution specific to the feature type, such as Real Property Network Identifier or RPA Interest Type.

**3.3 Source Selection**

Components shall evaluate potential data sources and establish criteria for which sources are most appropriate for a given layer. Component level DCSs should specify the selection criteria for the source used to create and maintain both the geographic representation of the feature and the attribution. Components should consider any data source requirements they have established for their IGI&S data repository, if applicable to a given feature type DCS.

**Error! Reference source not found.** below describes common sources that may be used to locate existing geospatial data, collect new data or populate attributes for existing data. Refer to the DCS for additional sources for each feature type.

The source material used should be captured in the layer's metadata under LI\_Lineage>LI\_Source. All dataset processing steps should be captured in LI\_ProcessStep.<sup>3</sup>

**Annex F Table 2: Common Sources for IGI&S Data**

| Source                                    | Description                                                                                                                                                                                                                                                         | Example                                                                                                    | Use                                       | Conditions/Requirements                                                                                           |
|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| Existing Installation Geospatial Data     | Existing geospatial data available within the Component installation or IGI&S Program.                                                                                                                                                                              | Using an existing building dataset as a starting point for a dataset update or revision.                   | Geographic Representation and Attribution | None provided.                                                                                                    |
| External Geospatial Organization Data     | Tabular and spatial data obtained from organizations outside of the Component. Examples include the National Geospatial-Intelligence Agency (NGA) and Military installation Maps (MIMs).                                                                            | Downloading Digital Aeronautical Flight Information File (DAFIF) data from NGA.                            | Geographic Representation and Attribution | None provided.                                                                                                    |
| Traditional Survey                        | A traditional survey is a field survey performed by a state licensed surveyor. The field survey will identify boundary features such as fences, rivers, lakes, roads, etc. and presence or absence of any monuments that were found or set.                         | Using a geospatial file or recorded legal description to determine a boundary of a feature.                | Geographic Representation                 | Depending on the format of the survey result, the GIS analyst may need to export or georeference the data.        |
| Computer Aided Drafting and Design (CADD) | CADD files include real property master plans, construction design or as-built drawings.                                                                                                                                                                            | Using CADD files to determine the location of utilities on an installation.                                | Geographic Representation                 | Must be georeferenced.                                                                                            |
| Planimetric Data                          | Planimetric data is created from surveying or photogrammetric processes. Planimetric data represent only the horizontal position of features on the Earth's surface, which show geographic objects, as well as natural and cultural physical features and entities. | Using aerial photography to digitize road features.                                                        | Geographic Representation                 | None provided.                                                                                                    |
| GPS                                       | Differentially corrected GPS field survey data.                                                                                                                                                                                                                     | Collecting GPS data to determine the boundary of a military range.                                         | Geographic Representation and Attribution | None provided.                                                                                                    |
| Imagery                                   | Imagery includes orthorectified aerial and satellite imagery, which will be used for manual or automated feature extraction.                                                                                                                                        | Using satellite imagery to extract water features on an installation.                                      | Geographic Representation                 | The minimum resolution requirement is 1 meter. The heads-up digitizing extraction scale shall not exceed 1:1,200. |
| Hardcopy Documents                        | Existing installation hard-copy maps, blue-prints, master planning maps, etc.                                                                                                                                                                                       | Georeferencing a map from an installation master plan and digitizing locations of future projects.         | Geographic Representation and Attribution | Must be georeferenced                                                                                             |
| Tabular Data                              | Attribute data available in tabular form that may be obtained from Component business systems.                                                                                                                                                                      | Using the Component real property system to populate the interest type of an asset in the geospatial data. | Geographic Representation and Attribution | Must include coordinates to be used for geographic representation.                                                |

<sup>3</sup> All references to metadata elements in this document refer to elements of SDSFIE-M.

| Source                              | Description                                                                                    | Example                                                                                     | Use                                       | Conditions/Requirements |
|-------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------------------------------|-------------------------|
| Standard Operating Procedures (SOP) | A set of procedural instructions, which may include maps and spatial data for an installation. | Using the process in an SOP to create data or locating geospatial data included in the SOP. | Geographic Representation and Attribution | None provided.          |

## 4 Data Quality Evaluation

### 4.1 Feature Type Metrics

Table 3 provides a list of metrics, suggested evaluation methods, and acceptable quality levels that will be used to evaluate IGI&S vector data at the feature type scope. The metrics and evaluation results will be reported in the metadata using the data quality elements. The metrics in **Error! Reference source not found.** are derived from the ISO 19157 standard measures provided in SDSFIE-Q Appendix A (see “ISO Measure Identifier” column). Each DCS will identify which of these metrics are required for the specific feature type. Metrics that are mandatory for all CIP feature types or all CIP real property feature types are indicated in Table 3. Component-level DCSs should include all mandatory metrics established in the OSD-level DCS for that feature type.

In the “Suggested Evaluation Method” column, metrics with an associated Data Reviewer Batch Job (RBJ) contain a link to the section of this document that describes the RBJ check.

Annex F Table 3: IGI&amp;S Feature Type Metrics

| Data Quality Element     | ISO Measure Identifier | SDSFIE-Q Metric Identifier | DCS General Guidance Metric Description                                                                                                                           | Suggested Evaluation Method                                                                                                                              | Acceptable Quality Level | Mandatory for CIP                |
|--------------------------|------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------|
| Completeness: Commission | 2                      | DCS1                       | The number of features included in the layer that are excess to the Real Property Inventory (i.e. features in the dataset that are not reported to the RPI)       | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ Guidance – <b>Error! Reference source not found.</b>                   | N/A                      | Real Property feature types only |
| Completeness: Commission | 3                      | DCS2                       | The percentage of features included in the layer that are excess to the Real Property Inventory (i.e. features in the dataset that are not reported to the RPI)   | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ Guidance – <b>Error! Reference source not found.</b>                   | 5% (maximum)             | Real Property feature types only |
| Completeness: Commission | 2                      | DCS3                       | The number of features included in the layer that are excess to real world features (i.e. features in the dataset that are not real world features)               | Direct External: Visual or automated inspection against imagery                                                                                          | N/A                      | No                               |
| Completeness: Commission | 3                      | DCS4                       | The percentage of features included in the layer that are excess to real world features (i.e. features in the dataset that are not real world features)           | Direct External: Visual or automated inspection against imagery                                                                                          | 5% (maximum)             | No                               |
| Completeness: Commission | 4                      | DCS5                       | The number of duplicated features in the layer. (Features that either have identical geometries or identical attribution within a specified search tolerance)     | Direct Internal: Geoprocessing tool to identify duplicate geometries or identical attributes<br>RBJ Guidance – <b>Error! Reference source not found.</b> | N/A                      | Yes                              |
| Completeness: Commission | N/A                    | DCS6                       | The percentage of duplicated features in the layer. (Features that either have identical geometries or identical attribution within a specified search tolerance) | Direct Internal: Geoprocessing tool to identify duplicate geometries or identical attributes<br>RBJ Guidance – <b>Error! Reference source not found.</b> | 5% (maximum)             | Yes                              |
| Completeness: Omission   | 6                      | DCS7                       | The number of reported Real Property assets for each feature type that do not have a geospatial representation                                                    | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                   | N/A                      | Real Property feature types only |
| Completeness: Omission   | 7                      | DCS8                       | The percentage of reported Real Property assets for each feature type that do not have a geospatial representation                                                | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                   | 5% (maximum)             | Real Property feature types only |
| Completeness: Omission   | 6                      | DCS63                      | The number of records reported in an authoritative database (other than real property) that do not have a geospatial representation                               | Direct External: Comparison against database of known features (i.e. NRHP)                                                                               | N/A                      | No                               |

| Data Quality Element   | ISO Measure Identifier | SDSFIE-Q Metric Identifier | DCS General Guidance Metric Description                                                                                                 | Suggested Evaluation Method                                                                                                                     | Acceptable Quality Level | Mandatory for CIP                |
|------------------------|------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------|
| Completeness: Omission | 7                      | DCS64                      | The percentage of records reported in an authoritative database (other than real property) that do not have a geospatial representation | Direct External: Comparison against database of known features (i.e. NRHP)                                                                      | 5% (maximum)             | No                               |
| Completeness: Omission | 6                      | DCS65                      | The number of features with NULL installationId                                                                                         | Direct Internal: Analysis of attributes (manual or tool)                                                                                        | 5% (maximum)             | Yes                              |
| Completeness: Omission | 7                      | DCS66                      | The percentage of features with NULL installationId                                                                                     | Direct Internal: Analysis of attributes (manual or tool)                                                                                        | 5% (maximum)             | Yes                              |
| Completeness: Omission | 6                      | DCS9                       | The number of actual Real Property assets for each feature type that do not have a geospatial representation                            | Direct External: Visual inspection against imagery<br>Direct External: Comparison against database of known features (i.e. APSR)                | N/A                      | No                               |
| Completeness: Omission | 7                      | DCS10                      | The percentage of actual Real Property assets for each feature type that do not have a geospatial representation                        | Direct External: Visual inspection against imagery<br>Direct External: Comparison against database of known features (i.e. APSR)                | 5% (maximum)             | No                               |
| Completeness: Omission | 6                      | DCS11                      | The number of Real Property assets for each feature type that do not have an RPUID                                                      | Direct Internal: Analysis of attributes (manual or tool)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                            | N/A                      | Real Property feature types only |
| Completeness: Omission | 7                      | DCS12                      | The percentage of Real Property assets for each feature type that do not have an RPUID                                                  | Direct Internal: Analysis of attributes (manual or tool)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                            | 5% (maximum)             | Real Property feature types only |
| Completeness: Omission | 6                      | DCS53                      | The number of features for each feature type that do not have an RPSUID                                                                 | Direct Internal: Analysis of attributes (manual or tool)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                            | N/A                      | Yes                              |
| Completeness: Omission | 7                      | DCS54                      | The percentage of features for each feature type that do not have an RPSUID                                                             | Direct Internal: Analysis of attributes (manual or tool)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                            | 5% (maximum)             | Yes                              |
| Completeness: Omission | 6                      | DCS57                      | The number of actual (real world) features that are not reported to the RPI                                                             | Direct External: Visual inspection against imagery.<br>Direct External: Comparison against database of features reported to the RPI (i.e. APSR) | N/A                      | No                               |
| Completeness: Omission | 7                      | DCS58                      | The percentage of actual (real world) features that are not reported to the RPI                                                         | Direct External: Visual inspection against imagery.<br>Direct External: Comparison against database of features reported to the RPI (i.e. APSR) | 5% (maximum)             | No                               |
| Completeness: Omission | 6                      | DCS13                      | The number of unpopulated values in non-nullable attribute fields (No NULL or blank values)                                             | Direct Internal: Analysis of attributes (manual or tool)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                            | N/A                      | No                               |

| Data Quality Element                         | ISO Measure Identifier | SDSFIE-Q Metric Identifier | DCS General Guidance Metric Description                                                                                                                                    | Suggested Evaluation Method                                                                                                                                                                                                                               | Acceptable Quality Level | Mandatory for CIP |
|----------------------------------------------|------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|
| Completeness: Omission                       | 7                      | DCS14                      | The percentage of unpopulated values in non-nullable attribute fields (No NULL or blank values)                                                                            | Direct Internal: Analysis of attributes (manual or tool)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                                                                                      | 5% (maximum)             | No                |
| Logical Consistency: Domain Consistency      | 16                     | DCS15                      | The number of features included in the layer that have values in operationalStatus that are not conformant with the domain values in a registered Component Adaptation     | Direct Internal: Analysis of attributes (manual or tool)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                                                                                      | N/A                      | No                |
| Logical Consistency: Domain Consistency      | 18                     | DCS16                      | The percentage of features included in the layer that have values in operationalStatus that are not conformant with the domain values in a registered Component Adaptation | Direct Internal: Analysis of attributes (manual or tool)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                                                                                      | 5% (maximum)             | No                |
| Logical Consistency: Domain Consistency      | 16                     | DCS17                      | The number of features included in the layer that have values in rplInterest that are not conformant with the domain values in a registered Component Adaptation           | Direct Internal: Analysis of attributes (manual or tool)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                                                                                      | N/A                      | No                |
| Logical Consistency: Domain Consistency      | 18                     | DCS18                      | The percentage of features included in the layer that have values in rplInterest that are not conformant with the domain values in a registered Component Adaptation       | Direct Internal: Analysis of attributes (manual or tool)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                                                                                      | 5% (maximum)             | No                |
| Logical Consistency: Topological Consistency | N/A                    | DCS19                      | The total number of topological errors in the layer                                                                                                                        | Direct Internal: Aggregation of topological errors                                                                                                                                                                                                        | N/A                      | Yes               |
| Logical Consistency: Topological Consistency | N/A                    | DCS20                      | The percentage of topological errors in the layer                                                                                                                          | Direct Internal: Aggregation of topological errors                                                                                                                                                                                                        | 5% (maximum)             | Yes               |
| Logical Consistency: Topological Consistency | 25                     | DCS21                      | The number of features that are invalid sliver surfaces                                                                                                                    | Direct Internal: Geoprocessing tool to identify polygons under a specified thinness ratio. All polygons under the minimum thinness ratio defined in the DCS should be evaluated and verified.<br>RBJ Guidance - <b>Error! Reference source not found.</b> | N/A                      | No                |
| Logical Consistency: Topological Consistency | N/A                    | DCS22                      | The percentage of features that are invalid sliver surfaces                                                                                                                | Direct Internal: Geoprocessing tool to identify polygons under a specified thinness ratio. All polygons under the minimum thinness ratio defined in the DCS should be evaluated and verified.<br>RBJ Guidance - <b>Error! Reference source not found.</b> | 5% (maximum)             | No                |
| Logical Consistency: Topological Consistency | 26                     | DCS23                      | The number of features included in the layer that have self-intersect errors (polygons)                                                                                    | Direct Internal: Geoprocessing tool to identify invalid geometry                                                                                                                                                                                          | N/A                      | No                |

| Data Quality Element                         | ISO Measure Identifier | SDSFIE-Q Metric Identifier | DCS General Guidance Metric Description                                                                               | Suggested Evaluation Method                                                                                                                                                                           | Acceptable Quality Level | Mandatory for CIP |
|----------------------------------------------|------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|
| Logical Consistency: Topological Consistency | N/A                    | DCS24                      | The percentage of features included in the layer that have self-intersect errors (polygons)                           | Direct Internal: Geoprocessing tool to identify invalid geometry                                                                                                                                      | 5% (maximum)             | No                |
| Logical Consistency: Topological Consistency | N/A                    | DCS55                      | The number of features with NULL geometry                                                                             | Direct Internal: Geoprocessing tool to identify invalid geometry<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                          | N/A                      | Yes               |
| Logical Consistency: Topological Consistency | N/A                    | DCS56                      | The percentage of features with NULL geometry                                                                         | Direct Internal: Geoprocessing tool to identify invalid geometry<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                          | 5% (maximum)             | Yes               |
| Logical Consistency: Topological Consistency | 27                     | DCS25                      | The number of features that incorrectly intersect other features                                                      | Direct Internal: Geoprocessing tool to identify intersecting polygons in conjunction with analysis to determine if the overlap is correct<br>RBJ Guidance - <b>Error! Reference source not found.</b> | N/A                      | No                |
| Logical Consistency: Topological Consistency | N/A                    | DCS26                      | The percentage of features that incorrectly intersect other features                                                  | Direct Internal: Geoprocessing tool to identify intersecting polygons in conjunction with analysis to determine if the overlap is correct<br>RBJ Guidance - <b>Error! Reference source not found.</b> | 5% (maximum)             | No                |
| Logical Consistency: Topological Consistency | 27                     | DCS59                      | The number of features that incorrectly intersect features from another layer (layers will be defined in the DCS)     | Direct Internal: Geoprocessing tool to identify intersecting points and/or polygons                                                                                                                   | Yes                      | No                |
| Logical Consistency: Topological Consistency | N/A                    | DCS60                      | The percentage of features that incorrectly intersect features from another layer (layers will be defined in the DCS) | Direct Internal: Geoprocessing tool to identify intersecting points and/or polygons                                                                                                                   | 5% (maximum)             | No                |
| Logical Consistency: Topological Consistency | N/A                    | DCS61                      | The number of features that do not intersect a feature/s from another layer (layers will be defined in the DCS)       | Direct Internal: Geoprocessing tool to identify features that do not intersect.                                                                                                                       | N/A                      | No                |
| Logical Consistency: Topological Consistency | N/A                    | DCS62                      | The percentage of features that do not intersect a feature/s from another layer (layers will be defined in the DCS)   | Direct Internal: Geoprocessing tool to identify features that do not intersect.                                                                                                                       | 5% (maximum)             | No                |
| Logical Consistency: Topological Consistency | N/A                    | DCS27                      | The number of features that are not entirely contained within the site boundary associated with the feature           | Direct Internal: Geoprocessing tool to identify polygons that are not entirely within the site boundary<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                   | N/A                      | No                |
| Logical Consistency: Topological Consistency | N/A                    | DCS28                      | The percentage of features that are not entirely contained within the site boundary associated with the feature       | Direct Internal: Geoprocessing tool to identify polygons that are not entirely within the site boundary<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                   | 5% (maximum)             | No                |

| Data Quality Element                                      | ISO Measure Identifier | SDSFIE-Q Metric Identifier | DCS General Guidance Metric Description                                                 | Suggested Evaluation Method                                                                                                                                                                                                                                                                                 | Acceptable Quality Level | Mandatory for CIP |
|-----------------------------------------------------------|------------------------|----------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|
| Logical Consistency: Topological Consistency              | N/A                    | DCS29                      | The number of features that are not coincident with bounding features                   | Direct Internal: Geoprocessing tool to identify polygons that are not coincident with other features                                                                                                                                                                                                        | N/A                      | No                |
| Logical Consistency: Topological Consistency              | N/A                    | DCS30                      | The percentage of features that are not coincident with bounding features               | Direct Internal: Geoprocessing tool to identify polygons that are not coincident with other features                                                                                                                                                                                                        | 5% (maximum)             | No                |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS31                      | The number of features in the layer that have an incorrect feature name                 | Direct External: Comparison against database of known features (e.g. APSR or a defined naming convention)                                                                                                                                                                                                   | N/A                      | No                |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS32                      | The percentage of features in the layer that have a correct feature name                | Direct External: Comparison against database of known features (e.g. APSR or a defined naming convention)                                                                                                                                                                                                   | 95% (minimum)            | No                |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS33                      | The number of features in the layer that have an incorrect installation ID              | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the installation ID matches the installation ID of the installation boundary in which the feature is located.<br>RBJ Guidance - <b>Error! Reference source not found.</b> | N/A                      | Yes               |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS34                      | The percentage of features in the layer that have a correct installation ID             | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the installation ID matches the installation ID of the installation boundary in which the feature is located.<br>RBJ Guidance - <b>Error! Reference source not found.</b> | 95% (minimum)            | Yes               |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS35                      | The number of features in the layer that have an incorrect operational status           | Direct External: Comparison against database of known features (i.e. APSR)                                                                                                                                                                                                                                  | N/A                      | No                |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS36                      | The percentage of features in the layer that have a correct operational status          | Direct External: Comparison against database of known features (i.e. APSR)                                                                                                                                                                                                                                  | 95% (minimum)            | No                |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS37                      | The number of features in the layer that have an incorrect real property interest type  | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                                                                                                                      | N/A                      | No                |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS38                      | The percentage of features in the layer that have a correct real property interest type | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                                                                                                                      | 95% (minimum)            | No                |

| Data Quality Element                                      | ISO Measure Identifier | SDSFIE-Q Metric Identifier | DCS General Guidance Metric Description                                                                     | Suggested Evaluation Method                                                                                                                                                                                                                                                       | Acceptable Quality Level | Mandatory for CIP                |
|-----------------------------------------------------------|------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|----------------------------------|
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS39                      | The number of features in the layer that have an incorrect RPSUID                                           | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the RPSUID matches the RPSUID of the site boundary in which the feature is located.<br>RBJ Guidance - <b>Error! Reference source not found.</b> | N/A                      | Yes                              |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS40                      | The percentage of features in the layer that have a correct RPSUID                                          | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the RPSUID matches the RPSUID of the site boundary in which the feature is located.<br>RBJ Guidance - <b>Error! Reference source not found.</b> | 95% (minimum)            | Yes                              |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS41                      | The number of features in the layer that have an invalid RPUID                                              | Direct Internal: Geoprocessing tool to assess adherence to a numerical value.<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                                                                                         | N/A                      | Real Property feature types only |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS42                      | The percentage of features in the layer that have a valid RPUID                                             | Direct Internal: Geoprocessing tool to assess adherence to a numerical value.<br>RBJ Guidance - <b>Error! Reference source not found.</b>                                                                                                                                         | 95% (minimum)            | Real Property feature types only |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS67                      | The number of features in the layer that have a unique SdsId                                                | Direct External: Geoprocessing tool to determine if the SdsId is unique                                                                                                                                                                                                           | N/A                      | Yes                              |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS68                      | The percentage of features in the layer that have a unique SdsId                                            | Direct External: Geoprocessing tool to determine if the SdsId is unique                                                                                                                                                                                                           | 95% (minimum)            | Yes                              |
| Temporal Accuracy: Temporal Validity                      | N/A                    | DCS43                      | The number of features that are accurately represented by the currentness reference required in the DCS     | Direct External: Comparison of DCS requirement to the date the dataset was last updated in the metadata                                                                                                                                                                           | N/A                      | No                               |
| Temporal Accuracy: Temporal Validity                      | N/A                    | DCS44                      | The percentage of features that are accurately represented by the currentness reference required in the DCS | Direct External: Comparison of DCS requirement to the date the dataset was last updated in the metadata                                                                                                                                                                           | 95% (minimum)            | No                               |
| Positional Accuracy: Absolute or external accuracy        | 39                     | DCS45                      | The horizontal accuracy of the layer (based on DCS requirements)                                            | Direct External: Comparison of reported coordinate values to known values                                                                                                                                                                                                         | Refer to DCS             | No                               |
| Thematic Accuracy: Classification Correctness             | 60                     | DCS46                      | The number of features that are incorrectly classified                                                      | Direct External: Comparison against database of known features (i.e. APSR). For real property feature types, the classification of the feature should be compared to the CATCODE reported in the real property database.                                                          | N/A                      | Yes                              |

| Data Quality Element                          | ISO Measure Identifier | SDSFIE-Q Metric Identifier | DCS General Guidance Metric Description                    | Suggested Evaluation Method                                                                                                                                                                                                                                                                     | Acceptable Quality Level | Mandatory for CIP |
|-----------------------------------------------|------------------------|----------------------------|------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------|
|                                               |                        |                            |                                                            | <p>RBJ Guidance - <b>Error! Reference source not found.</b></p>                                                                                                                                                                                                                                 |                          |                   |
| Thematic Accuracy: Classification Correctness | 61                     | DCS47                      | The percentage of features that are incorrectly classified | <p>Direct External: Comparison against database of known features (i.e. APSR). For real property feature types, the classification of the feature should be compared to the CATCODE reported in the real property database.</p> <p>RBJ Guidance - <b>Error! Reference source not found.</b></p> | 5%<br>(maximum)          | Yes               |

## 4.2 DCS Conformance Metrics

Components shall compare the results of the data quality evaluation for each mandatory metric listed in **Error! Reference source not found.** against the acceptable quality level. These results will be aggregated and evaluated against the Usability metrics listed in **Error! Reference source not found.** and reported as conformance results. If all reported values meet the acceptable quality level, the conformance result for SDSFIE-Q Metric Identifier DCS 50 (highlighted in red) will be "Pass." Each DCS will establish the mandatory requirements for each feature type.

**Annex F Table 4: IGI&S DCS Conformance Metrics**

| Data Quality Element | ISO Measure Identifier | SDSFIE-Q Metric Identifier | DCS General Guidance Metric Description                                             | Suggested Evaluation Method                                                            | Acceptable Quality Level |
|----------------------|------------------------|----------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------------|
| Usability            | 102                    | DCS48                      | The number of mandatory DCS requirements that were not met by the feature type.     | The number of "fail" results of the quality evaluations for each mandatory metric.     | 0 (maximum)              |
| Usability            | 103                    | DCS49                      | The number of mandatory DCS requirements that were met by the feature type.         | The number of "pass" results of the quality evaluations for each mandatory metric.     | N/A                      |
| Usability            | 104                    | DCS50                      | The percentage of mandatory DCS requirements that were not met by the feature type. | The percentage of "fail" results of the quality evaluations for each mandatory metric. | 0% (maximum)             |
| Usability            | 105                    | DCS51                      | The percentage of mandatory DCS requirements that were met by the feature type.     | The percentage of "pass" results of the quality evaluations for each mandatory metric. | 100% (minimum)           |
| Usability            | 101                    | DCS52                      | The layer passed all validation checks required by the DCS.                         | 100% pass fail aggregation of each mandatory requirement expressed in the DCS          | Pass                     |

## 4.3 Data Quality Metadata: Reporting Results

Each mandatory data quality reporting element must have a corresponding data quality evaluation result populated in the metadata. As stated in SDSFIE-Q, metadata for non-CIP IGI&S vector data must adhere to SDSFIE-M with no additional requirements.

CIP feature types must have at least one data quality reporting element (DQ\_Element) populated. The DCS for the feature type will specify which element(s) are required and what data quality units will be evaluated. For CIP feature types, the result of each mandatory metric shall be reported as both a quantitative result (DQ\_QuantitativeResult) and a conformance result (DQ\_ConformanceResult) as described in SDSFIE-Q. If the acceptable quality level for a metric is "N/A," the metric must be reported as a quantitative result only. The result will not be used to evaluate conformance with a DCS, therefore a conformance result is not required. Overall DCS Conformance should also be reported as a conformance result. Appendix A contains an example metadata record for a CIP feature type that includes both quantitative and conformance results.

The SDSFIE-Q Metric Identifier is a unique code assigned to each metric. This code must be referenced in the metadata for the feature type in MD\_Identifier:code. Using the SDSFIE-Q metric ID eliminates the need to populate multiple metadata elements and standardizes the reporting method. The SDSFIE-Q Metric ID is included in **Error! Reference source not found.** and 4, as well as the DCS for each feature type. An online registry will also be established to store these IDs and their associated information.

## 5 DCS Data Reviewer Batch Job (RBJ) Guidance

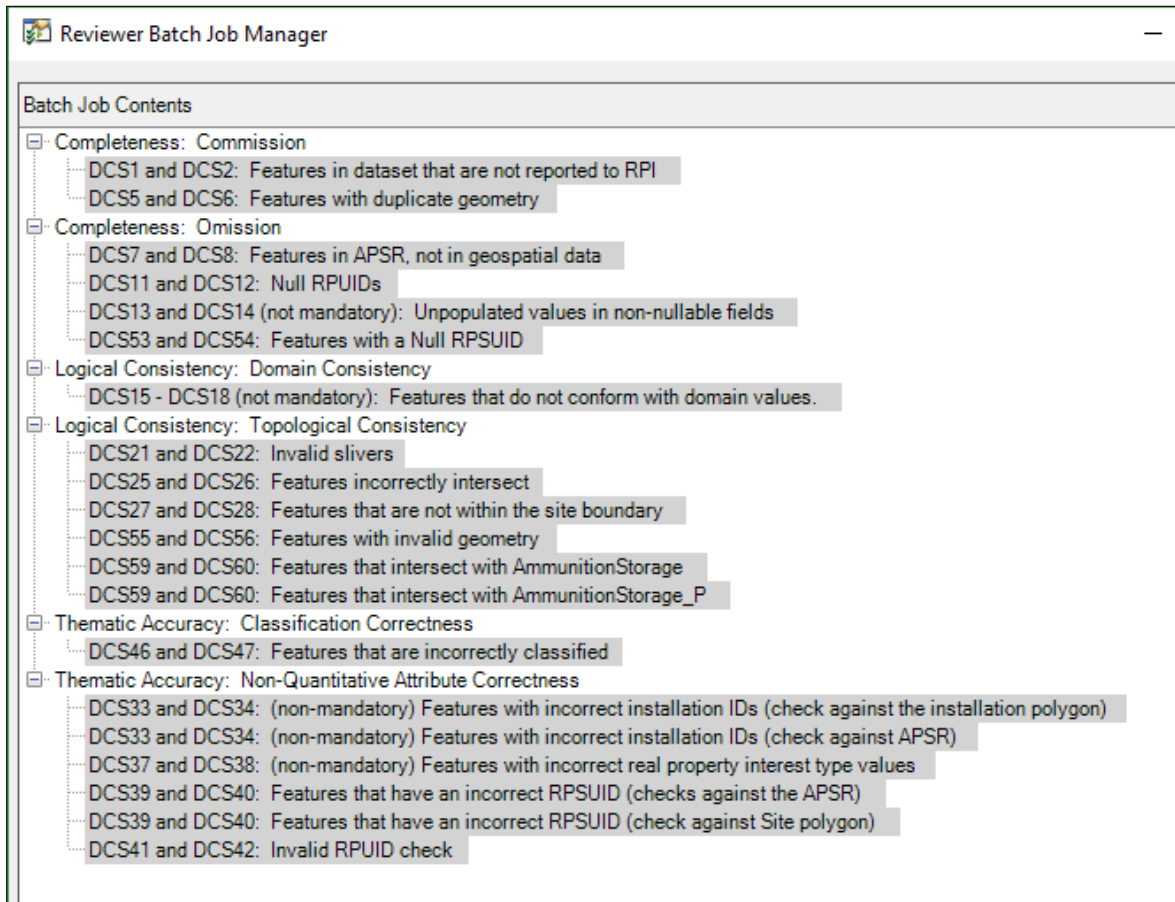
### 5.1 RBJ Introduction

As described in SDSFIE-Q, OSD will create a Data Reviewer Batch Job (RBJ) to accompany each DCS. The RBJs are an optional tool to assist with implementation of SDSFIE-Q. This section explains the RBJ creation process and provides details for each check. The RBJ files are built in ArcGIS 10.3.1 (Desktop)

to allow for interoperability among ArcGIS Desktop versions in use throughout DoD. All RBJs are built using a blank SDSFIE-V 4.0 database and a RPAD database and tested using sample Component data. OSD will deliver the RBJs, a blank SDSFIE-V 4.0 database and an MXD (also in 10.3.1) to assist with Component implementation.

## 5.2 RBJ Check Descriptions

Each check is part of a metric pair, where one metric describes the “number” and the other metric describes the “percentage.” Since the reports generated through DataReviewer express results as both numbers and percentages, each check is associated with at least two metrics. The Check Title for each check corresponds to the SDSFIE-Q Metric Identifier (e.g. DCS1, DCS25). Checks are grouped by Data Quality Element (Completeness: Omission, etc.) as shown in **Error! Reference source not found.** Only metrics that have a “Yes” value in the “Included in RBJ?” field are included in the RBJ and the accompanying documentation.



Annex F Figure 1: Example Reviewer Batch Job Contents

Each check is assigned a severity rating from 1 (High) to 5 (Low). It is recommended to correct errors identified in checks with a severity of “1” before re-running the checks with lower severity ratings. This document is organized by severity rating. Generally, the severity ratings follow the following criteria:

**Severity 1:** Checks for mandatory metrics whose results must be corrected to ensure that the results of other, lower severity checks are correct.

**Severity 3:** Checks for mandatory metrics with results that do not affect other checks.

**Severity 5:** Checks for non-mandatory metrics that are included in the RBJ.

The following sections provide descriptions of how each check is structured in Data Reviewer.

## 5.2.1 RBJ Check Severity 1 (HIGH)

### 5.2.1.1 DCS 5-6: Features with Duplicate Geometry

Metric Description: The number/percentage of duplicated features in the layer. (Features with identical geometries). An RBJ example is shown in **Error! Reference source not found.**

Annex F Figure 2: DCS 5-6 Duplicate Geometry Check

### 5.2.1.2 DCS 11-12: Features with Null RPUIDs

Metric Description: The number of Real Property Assets for the layer that do not have a populated RPUID

This check identifies features where the RPUID is NULL. If the dataset includes features that are not Real Property Assets, the query may be revised to ignore placeholders for non-RPA data (e.g. 9999, -1111). An RBJ example is shown in **Error! Reference source not found.**

**Execute SQL Check Properties**

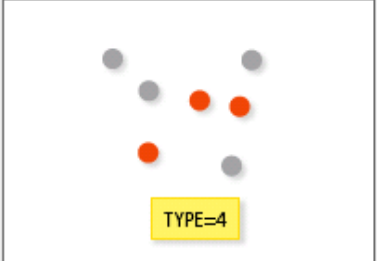
Check Title  
DCS11 and DCS12: Null RPUIDs

Feature Class  
Feature Class/Subtype  
MilitaryRange - Group1DCS.gdb

☐ Always Run on Full Database

Where Clause  
rpuid IS NULL SQL

Check Description



Returns features or rows resulting from an SQL Query whereclause

Annex F Figure 3: DCS 11-12 Null RPUID Check

### 5.2.1.3 DCS 41-42: Features with invalid RPUIDs

Metric Description: The number/percentage of features in the layer that have a valid RPUID.

This check identifies values in the RPUID field that are not integers greater than 4 characters long. The character limit for the field is 18. An RBJ example is shown in **Error! Reference source not found..**

**Regular Expression Check Properties**

Check Title  
DCS41 and DCS42: Invalid RPUID check

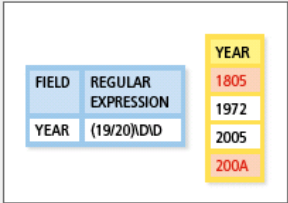
Feature Class  
Feature Class/Subtype  
MilitaryRange - Group1DCS.gdb

☐ Always Run on Full Database

Where Clause SQL

Null Values Check  
☐ Search For Null Values

Check Description



Returns features that fail to match the regular expression.  
Metacharacters are: . [ ] ^ - ? + \* ?? +? \*? ( ) \ \$ !  
Shortcuts are: \a \b \c \d \h \n \q \w \z

Regular Expression Editor

| Field             | Regular Expression    |
|-------------------|-----------------------|
| militaryRangeldpk |                       |
| operationalStatus |                       |
| rpInterest        |                       |
| rpuid             | [0-9][0-9][0-9][0-9]+ |

Clear Regular Expressions

Annex F Figure 4: DCS 41-42 Invalid RPUID Check

#### 5.2.1.4 DCS 53-54: Features with Null RPSUIDs

Metric Description: The number/percentage of features in the layer that do not have a populated RPSUID

This check identifies features where the RPSUID is NULL. An RBJ example is shown in **Error! Reference source not found.**

**Execute SQL Check Properties**

Check Title: DCS53 and DCS54: Features with a Null RPSUID

Feature Class: MilitaryRange - Group1DCS.gdb

☐ Always Run on Full Database

Where Clause: rpsuid IS NULL

SQL

Check Description: Returns features or rows resulting from an SQL Query whereclause

TYPE=4

Annex F Figure 5: DCS 53-54 Null RPSUID Check

#### 5.2.1.5 DCS 55-56: Features with Invalid Geometry

Metric Description: The number/percentage of features with NULL geometry

This check identifies all features with invalid geometry. An RBJ example is shown in **Error! Reference source not found.**

**Invalid Geometry Check Properties**

Check Title: DCS55 and DCS56: Features with invalid geome

Feature Class: MilitaryRange - Group1DCS.gdb

☐ Always Run on Full Database

Where Clause:

SQL

Check Description: Returns features with invalid geometry. This includes null geometries, empty geometries, features with empty envelopes, and non-simple geometries.

| OBJECTID | SHAPE    | FCSUBTYPE         |
|----------|----------|-------------------|
| 1        | POLYLINE | AQ040-BRIDGE LINE |
| 2        | POLYLINE | AQ040-BRIDGE LINE |
| 3        | NULL     | AQ040-BRIDGE LINE |

Annex F Figure 6: DCS 55-56 Null Geometry Check

### 5.2.2 RBJ Check Severity 3 (MEDIUM)

#### 5.2.2.1 DCS 1-2: Features Not Reported in the APSR

Metric Description: The number/percentage of features included in the layer that are excess to the Real Property Inventory (i.e. features in the dataset that are not reported to the RPI)

This check joins the geospatial data to the APSR data using the RPUID attribute. The check identifies records in the geospatial data that have no corresponding RPUID in the Component APSR.

#### Assumptions:

- RPUIDs are populated in GIS data: User should run checks and cleanse data for DCSs 11-12 and 41-42 prior to running this check.
  - *Components can add a query to ensure that this check only runs on features with a populated RPUID*
- Table with Component RPI assets is available (OSD checks use RPAD)

RPUID\_Text is a DISDI-created field to allow a placeholder for RPUID string values. This field is used to compare attributes with the RPUID field in the geospatial data, which is also a string.

RBJ examples are shown in **Error! Reference source not found.**

**Table to Table Attribute Check Properties**

Check Title: DCS1 and DCS2: Features in dataset that are nc

Feature or Object Class 1: MilitaryRange - Group1DCS.gdb

☒ Always Run on Full Database

Where Clause:  SQL

Feature or Object Class 2: RPAD - Group1DCS.gdb

☒ Always Run on Full Database

**Check Description**

| FEATURE CLASS |        | SCALE  |
|---------------|--------|--------|
| OID           | SCALE  |        |
| 1             | 10,000 | 10,000 |
| 2             | 20,000 | 20,000 |
| 3             | 10,000 | 30,000 |
| 4             | 30,000 |        |

Returns rows whose attributes match those of a feature class or table and/or comply with a user defined where clause comparing the attributes between feature classes and/or tables.

**Table to Table Attribute Check Properties**

SQL

Attributes

☐ Compare All Attributes

☐ Attributes to Ignore (Feature Level Metadata)

Select Attributes...

☒ Compare Attributes

Select Attributes...

☒ Not - find rows that do not match

**Compare Attributes**

Data Source 1: MilitaryRange

Data Source 2: RPAD

Data Source 1 Attribute: featureDescription

Operator: =

Data Source 2 Attribute: Address\_Street\_Name

Build Error Condition: featureDescription = Address\_Street\_Name

Add

Error Conditions: rpuuid = RPUID\_Text

Remove Selected

OK Cancel

Annex F Figure 7: DCS 1-2 Features that are not in the APSR

### 5.2.2.2 DCS 7-8: Features in APSR, Not in Geospatial Data

**Metric Description:** The number/percentage of reported Real Property assets for each feature type that do not have a geospatial representation.

This check joins the geospatial data to the APSR data using the RPUID attribute. The check identifies records in the Component APSR that have a Category Code (CATCODE) that maps to the geospatial feature type, but no corresponding geospatial feature.

#### Assumptions:

- RPUIDs are populated in GIS data: User should run checks and cleanse data for DCSs 11-12 and 41-42 prior to running this check.
- Table with Component RPI assets is available (OSD checks use RPAD)
- All CATCODEs that apply are included in the query

RBJ examples are shown in **Error! Reference source not found.**

**Table to Table Attribute Check Properties**

Check Title: DCS7 and DCS8: Features in APSR, not in geos

Feature or Object Class 1: RPAD - Group1DCS.gdb

Where Clause: RPA\_Predominant\_Current\_Use\_CA1

Feature or Object Class 2: MilitaryRange - Group1DCS.gdb

Where Clause:

Check Description:

| FEATURE CLASS | OID    | SCALE  | SCALE  |
|---------------|--------|--------|--------|
| 1             | 10,000 | 10,000 | 10,000 |
| 2             | 20,000 | 20,000 | 20,000 |
| 3             | 10,000 | 10,000 | 10,000 |
| 4             | 30,000 | 30,000 | 30,000 |

Returns rows whose attributes match those of a feature class or table and/or comply with a user defined where clause comparing the attributes between feature classes and/or tables.

Where Clause:

RPA\_Predominant\_Current\_Use\_CATCODE IN (14820, 149721, 17121, 171393, 171475, 171476, 171623, 171625, 171873, 17501, 17502, 17510, 175121, 17520, 175221, 17531, 175321, 175422, 17550, 175521, 17560, 17561, 175621, 17570, 175721, 17573, 17580, 17581, 17582, 175821, 17610, 17620, 176221, 17631, 176322, 176521, 176621, 17670, 17671, 176721, 176722, 17680, 17681, 176821, 17710, 17711, 177121, 177122, 17730, 177421, 17750, 17751, 17752, 177521, 17760, 177621, 177622, 17771, 177710, 17801, 17802, 17803, 17804, 17805, 17806, 17807, 17808, 17809, 17810, 17811, 17812, 178121, 17813, 17814, 17816, 17821, 17822, 17823, 17829, 17830, 17831, 17832, 178322, 17833, 17834, 17841, 17842, 17843, 17844, 17845, 17851, 17852, 17854, 17855, 17856, 17857, 17858, 17859, 17860, 17861, 17862, 17863, 17864, 17865, 17866, 17867, 17868, 17869, 17870, 17871, 17872, 17878, 17879, 17880, 17881, 17882, 17883, 17884, 17885, 17886, 17887, 17888, 17891, 17892, 17893, 17894, 17895, 17896, 17897, 17898, 179001, 179002, 17901, 17902, 179019, 179021, 179022, 179023, 179024, 179025, 179026, 179027, 179028, 17908, 17910, 17911, 17912, 17913, 17914, 179219, 179221, 17926, 17930, 17936, 17937, 179371, 17940, 17941, 179475, 179476, 179477, 179481, 179621, 17971, 17972, 179723, 179724, 179921, 179922, 179923, 17995, 17996, 17997, 390222, 39069)

Clear Verify Load... Save... OK Cancel

**Table to Table Attribute Check Properties**

Attributes

☐ Compare All Attributes

☐ Attributes to Ignore (Feature Level Metadata)

Select Attributes...

☒ Compare Attributes

Select Attributes...

☒ Not - find rows that do not match

**Compare Attributes**

Data Source 1: RPAD

Data Source 2: MilitaryRange

Data Source 1 Attribute: Address\_Street\_Name

Operator: =

Data Source 2 Attribute: featureDescription

Build Error Condition: Address\_Street\_Name = featureDescription

Add

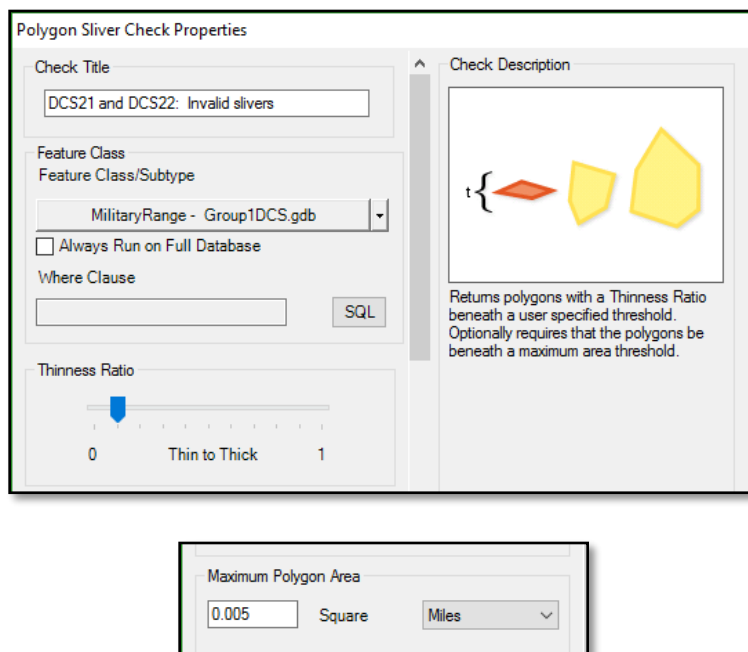
Error Conditions: RPUID\_Text = rpuuid

Annex F Figure 8: DCS 7-8 Features in APSR, Not in Geospatial Data

### 5.2.2.3 DCS 21-22: Invalid Slivers

Metric Description: The number/percentage of features in the layer that are invalid sliver surfaces.

This check identifies features that are under a specified thinness ratio. This ratio may be adjusted as needed to properly identify errors. An RBJ example is shown in **Error! Reference source not found.**



Annex F Figure 9: DCS 21-22 Invalid Sliver Check

### 5.2.2.4 DCS 25-26: Features Incorrectly Intersect (Overlaps)

Metric Description: The number/percentage of features that incorrectly intersect other features

This check identifies features within the same layer that incorrectly overlap. An RBJ example is shown in **Error! Reference source not found.**

**Polygon Overlap/Gap is Sliver Check Properties**

Check Title  
DCS25 and DCS26: Features incorrectly intersec

Feature Class 1  
Feature Class/Subtype  
MilitaryRange - Group1DCS.gdb

☐ Always Run on Full Database

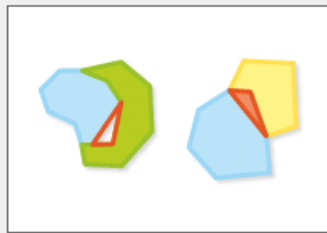
Where Clause  
 SQL

Feature Class 2  
Feature Class/Subtype  
MilitaryRange - Group1DCS.gdb

☐ Always Run on Full Database

Where Clause  
 SQL

Check Description



Returns overlap/gap geometries between polygon features from two feature classes that have a Thinness Ratio beneath a user specified threshold. Optionally requires that the overlap/gap polygons be beneath a maximum area threshold.

Search Goal:

☐ Find Gaps and Overlaps

☒ Find Overlaps

☐ Find Gaps

Thinness Ratio

0 Thin to Thick 1

Maximum Polygon Area

5 SQ. Meters

Annex F Figure 10: DCS 25-26 Overlapping Polygons Check

#### 5.2.2.5 DCS 27-28: Features Not Within Site Boundary

Metric Description: The number/percentage of features that are not entirely contained within the site boundary.

This check compares features to the site layer and identifies features that are not within the boundary.

**Assumptions:**

- The Site dataset is complete and site boundaries are correct.

An RBJ example is shown in **Error! Reference source not found.**

**Geometry on Geometry Check Properties**

**Check Title**  
DCS27 and DCS28: Features that are not within

**Feature Class 1**  
Feature Class/Subtype  
MilitaryRange - Group1DCS.gdb  
☐ Always Run on Full Database  
Where Clause  
SQL

**Feature Class 2**  
Feature Class/Subtype  
Site - Group1DCS.gdb  
☐ Always Run on Full Database  
Where Clause  
SQL

**Spatial Relation Check**  
Type: Within  
Custom Spatial Relation

**Check Description**  
Returns relationship specific geometries for features in Feature Class 1 that have a user-defined relationship to features in Feature Class 2. Relationships include: crosses, intersects, touches, and others. Any 9-Intersection relationship can be used by providing a string containing "t," "f," or "m." An optional tolerance can be applied to the relationship for features in both feature classes.

**Geometry on Geometry Check Properties**

☒ Not - find features not in this relationship  
☐ Merge features from feature class 2

**Tolerance**  
Meters

**Attributes**  
☒ None  
☐ Compare All Attributes  
☐ Attributes to Ignore (Feature Level Metadata)  
Select Attributes...  
☐ Compare Attributes  
Select Attributes...

**Reviewer Remarks**  
Notes

Annex F Figure 11: DCS 27-28 Features Outside Site Boundaries Check

### 5.2.2.6 DCS 39-40: Features with Incorrect RPSUIDs

**Metric Description:** The number/percentage of features in the layer that have an incorrect RPSUID

These metrics consist of two Data Reviewer checks. One compares the geospatial data against the APSR and the other compares against the site polygon encompassing the feature.

#### Assumptions:

- RPSUIDs are populated in GIS data: User should run checks and cleanse data for DCSs 11-12, 41-42 and 53-54 prior to running this check.
  - Components can add a query to ensure that this check only runs on features with a populated RPSUID

#### 5.2.2.6.1 Check against site polygon:

This check spatially intersects features with the site polygon and compares the RPSUID attribute value in both features. The check identifies where the values are different. An RBJ example is shown in **Error!**  
**Reference source not found.**

**Geometry on Geometry Check Properties**

**Check Title**  
DCS39 and DCS40: Features that have an incor...

**Feature Class 1**  
Feature Class/Subtype  
MilitaryRange - Group1DCS.gdb  
☐ Always Run on Full Database  
Where Clause  
SQL

**Feature Class 2**  
Feature Class/Subtype  
Site - Group1DCS.gdb  
☐ Always Run on Full Database  
Where Clause  
SQL

**Spatial Relation Check**  
Type: Intersects  
Custom Spatial Relation

**Check Description**  
Returns relationship specific geometries for features in Feature Class 1 that have a user-defined relationship to features in Feature Class 2. Relationships include: crosses, intersects, touches, and others. Any 9-Intersection relationship can be used by providing a string containing "1," "f," or "t." An optional tolerance can be applied to the relationship for features in both feature classes.

**Attributes**  
☐ None  
☐ Compare All Attributes  
☐ Attributes to Ignore (Feature Level Metadata)  
Select Attributes...  
☒ Compare Attributes  
Select Attributes...

**Compare Attributes**

Data Source 1: MilitaryRange  
Data Source 2: Site

Data Source 1 Attribute: featureDescription  
Operator: =  
Data Source 2 Attribute: featureDescription

Build Error Condition  
featureDescription = featureDescription  
Add

Error Conditions  
rpsuid <> rpsuid

Annex F Figure 12: DCS 39-40 Site Polygon RPSUID Check

**5.2.2.6.2 Check against APSR:**

This check joins the geospatial data to the APSR data using the RPUID attribute. The check compares the RPSUID value for the record in the APSR to the RPSUID value in the geospatial feature. The check identifies where the values are different.

**Assumptions:**

- RPUIDs are populated in GIS data: User should run checks and cleanse data for DCSs 11-12 and 41-42 prior to running this check.
  - Components can add a query to ensure that this check only runs on features with a populated RPUID

- Table with Component RPI assets is available (OSD checks use RPAD)

An RBJ example is shown in **Error! Reference source not found..**

**Table to Table Attribute Check Properties**

**Check Title**  
DCS39 and DCS40: Features that have an incor

**Feature or Object Class 1**  
Feature or Object Class/Subtype  
MilitaryRange - Group1DCS.gdb

☐ Always Run on Full Database

**Where Clause**  
SQL

**Feature or Object Class 2**  
Feature or Object Class/Subtype  
RPAD - Group1DCS.gdb

☐ Always Run on Full Database

**Check Description**

| FEATURE | CLASS  | SCALE  |
|---------|--------|--------|
| 1       | 10,000 | 20,000 |
| 2       | 20,000 | 30,000 |
| 3       | 10,000 | 30,000 |
| 4       | 30,000 |        |

Returns rows whose attributes match those of a feature class or table and/or comply with a user defined where clause comparing the attributes between feature classes and/or tables.

**Attributes**

☐ Compare All Attributes

☐ Attributes to Ignore (Feature Level Metadata)

Select Attributes...

☒ Compare Attributes

Select Attributes...

☐ Not - find rows that do not match

**Compare Attributes**

Data Source 1: MilitaryRange

Data Source 2: RPAD

Data Source 1 Attribute: featureDescription

Operator: =

Data Source 2 Attribute: Address\_Street\_Name

**Build Error Condition**  
featureDescription = Address\_Street\_Name

Add

**Error Conditions**

rpuid = RPUID\_Text  
rpuid <> RPSUID

Remove Selected

OK Cancel

Annex F Figure 13: DCS 39-40 Site APSR RPSUID Check

### 5.2.2.7 DCS46 and DCS47: Incorrectly Classified Features

**Metric Description:** The number/percentage of features in the layer that are incorrectly classified

This check joins the geospatial data to the APSR data using the RPUID attribute. The check identifies records in the geospatial data that have a Category Code (CATCODE) that does not map to the geospatial feature type.

#### Assumptions:

- RPUIDs are populated in GIS data: User should run checks and cleanse data for DCSs 11-12 and 41-42 prior to running this check.

- Components can add a query to ensure that this check only runs on features with a populated RPUID
- Table with Component RPI assets is available (OSD checks use RPAD)
- All CATCODEs that apply are included in the query.

An RBJ example is shown in **Error! Reference source not found.**

Table to Table Attribute Check Properties

Check Title  
DCS46 and DCS47: Features that are incorrectly

Feature or Object Class 1  
Feature or Object Class/Subtype  
MilitaryRange - Group1DCS.gdb

☐ Always Run on Full Database

Where Clause  
 SQL

Feature or Object Class 2  
Feature or Object Class/Subtype  
RPAD - Group1DCS.gdb

☐ Always Run on Full Database

Where Clause  
RPA\_Predominant\_Current\_Use\_CA1 SQL

Check Description

| FEATURE | CLASS  |
|---------|--------|
| OID     | SCALE  |
| 1       | 10,000 |
| 2       | 20,000 |
| 3       | 10,000 |
| 4       | 30,000 |

SCALE  
20,000  
30,000

Returns rows whose attributes match those of a feature class or table and/or comply with a user defined where clause comparing the attributes between feature classes and/or tables.

Where Clause:

RPA\_Predominant\_Current\_Use\_CATCODE NOT IN (14820, 149721, 17121, 171393, 171475, 171476, 171623, 171625, 171873, 17501, 17502, 17510, 175121, 17520, 175221, 17531, 175321, 175422, 17550, 175521, 17560, 17561, 175621, 17570, 175721, 17573, 17580, 17581, 17582, 175821, 17610, 17620, 176221, 17631, 176322, 176521, 176621, 17670, 17671, 176721, 176722, 17680, 17681, 176821, 17710, 17711, 177121, 177122, 17730, 177421, 17750, 17751, 17752, 177521, 17760, 177621, 177622, 17771, 177710, 17801, 17802, 17803, 17804, 17805, 17806, 17807, 17808, 17809, 17810, 17811, 17812, 178121, 17813, 17814, 17816, 17821, 17822, 17823, 17829, 17830, 17831, 17832, 178322, 17833, 17834, 17841, 17842, 17843, 17844, 17845, 17851, 17852, 17854, 17855, 17856, 17857, 17858, 17859, 17860, 17861, 17862, 17863, 17864, 17865, 17866, 17867, 17868, 17869, 17870, 17871, 17872, 17878, 17879, 17880, 17881, 17882, 17883, 17884, 17885, 17886, 17887, 17888, 17891, 17892, 17893, 17894, 17895, 17896, 17897, 17898, 179001, 179002, 17901, 17902, 179019, 179021, 179022, 179023, 179024, 179025, 179026, 179027, 179028, 17908, 17910, 17911, 17912, 17913, 17914, 179219, 179221, 17926, 17930, 17936, 17937, 179371, 17940, 17941, 179475, 179476, 179477, 179481, 179621, 17971, 17972, 179723, 179724, 179921, 179922, 179923, 17995, 17996, 17997, 390222, 39069)

Clear Verify Load... Save... OK Cancel

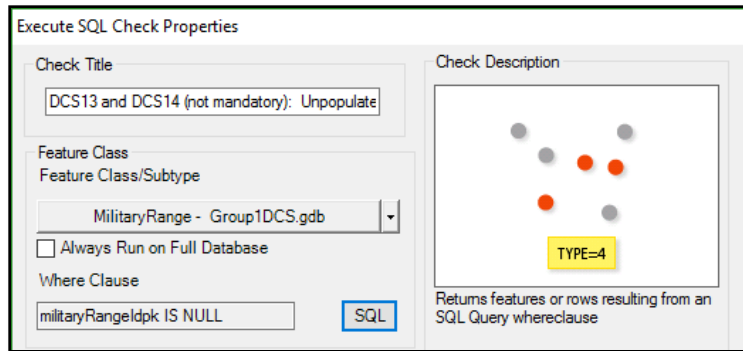
Annex F Figure 14: DCS 46-47 Incorrect Classification Check

### 5.2.3 RBJ Check Severity 5 (LOW)

#### 5.2.3.1 DCS13 - DCS14 (not mandatory): Features with unpopulated values in non-nullable fields

Metric Description: The number/percentage of unpopulated values in non-nullable attribute fields (no NULL values).

An RBJ example is shown in **Error! Reference source not found.**



Annex F Figure 15: DCS 13-14 NULL Values in Non-nullable Fields Check

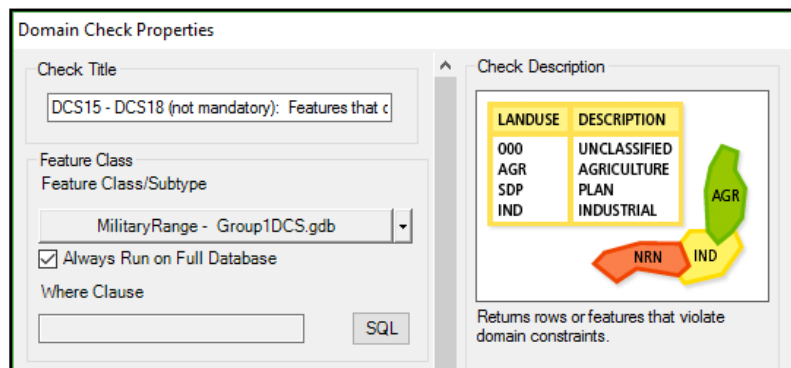
### 5.2.3.2 DCS15 - DCS18 (not mandatory): Features that do not conform with domain values.

Metric Description: The number/percentage of features in the layer that have values that are not conformant with the domain values in a registered Component Adaptation.

These checks are currently written for operationalStatus and rpInterest, but additional metrics may be expanded to include any enumeration in a registered Component Adaptation.

There is only one check for all domain values, therefore this check applies to metrics DCS15-18.

An RBJ example is shown in **Error! Reference source not found..**



Annex F Figure 16: DCS 15-18 Domain Value Check

### 5.2.3.3 DCS33 and DCS34: Features with incorrect installation IDs

Metric Description: The number/percentage of features in the layer that have an incorrect installation ID.

These metrics consist of two Data Reviewer checks. One compares geospatial data against the APSR and the other compares against the installation polygon encompassing the site.

#### 5.2.3.3.1 Check against installation polygon:

This check spatially intersects features with the installation polygon and compares the installationId attribute value in both features. The check identifies where the values are different.

#### Assumptions:

- All installation IDs are populated, both in the layer being assessed and the Installation layer.

An RBJ example is shown in **Error! Reference source not found..**

**Table to Table Attribute Check Properties**

Check Title: DCS33 and DCS34: Features with incorrect instz

Feature or Object Class 1: MilitaryRange - Group1DCS.gdb

Feature or Object Class 2: Installation - Group1DCS.gdb

Check Description:

| FEATURE CLASS |        | SCALE  |
|---------------|--------|--------|
| OID           | SCALE  |        |
| 1             | 10,000 | 20,000 |
| 2             | 20,000 | 30,000 |
| 3             | 10,000 |        |
| 4             | 30,000 |        |

Returns rows whose attributes match those of a feature class or table and/or comply with a user defined where clause comparing the attributes between feature classes and/or tables.

**Attributes**

☐ Compare All Attributes

☐ Attributes to Ignore (Feature Level Metadata)

☒ Compare Attributes

☒ Not - find rows that do not match

**Compare Attributes**

Data Source 1: MilitaryRange

Data Source 2: Installation

Data Source 1 Attribute: featureDescription

Operator: =

Data Source 2 Attribute: dateRecorded

Build Error Condition: featureDescription = dateRecorded

Error Conditions: installationId = installationId

Annex F Figure 17: DCS 33-34 Installation ID check against Installation Polygon

#### 5.2.3.3.2 Check against APSR

This check joins the geospatial data to the APSR data using the RPUID attribute. The check compares the Installation\_Code value for the record in the APSR to the installationId value in the geospatial feature. The check identifies where the values are different.

##### Assumptions:

- RPUIDs are populated in GIS data: User should run checks and cleanse data for DCSs 11-12 and 41-42 prior to running this check.
  - Components can add a query to ensure that this check only runs on features with a populated RPUID
- Table with Component RPI assets is available (OSD checks use RPAD)

An RBJ example is shown in **Error! Reference source not found.**

**Table to Table Attribute Check Properties**

Check Title: DCS33 and DCS34: Features with incorrect instz

Feature or Object Class 1: MilitaryRange - Group1DCS.gdb

Feature or Object Class 2: RPAD - Group1DCS.gdb

Check Description:

| FEATURE | CLASS | SCALE  |
|---------|-------|--------|
| 1       |       | 10,000 |
| 2       |       | 20,000 |
| 3       |       | 10,000 |
| 4       |       | 30,000 |

Returns rows whose attributes match those of a feature class or table and/or comply with a user defined where clause comparing the attributes between feature classes and/or tables.

Attributes:

☐ Compare All Attributes

☐ Attributes to Ignore (Feature Level Metadata)

☒ Compare Attributes

☐ Not - find rows that do not match

Compare Attributes:

Data Source 1: MilitaryRange

Data Source 2: RPAD

Data Source 1 Attribute: featureDescription

Operator: =

Data Source 2 Attribute: Address\_Street\_Name

Build Error Condition: featureDescription = Address\_Street\_Name

Error Conditions:

rpuid = RPUID\_Text  
installationId <> Installation\_Code

Annex F Figure 18: DCS 33-34 Installation ID Check against the APSR

#### 5.2.3.4 DCS37-38: (not mandatory) Features with incorrect real property interest types

Metric Description: The number/percentage of features in the layer that have an incorrect real property interest type.

This check joins the geospatial data to the APSR data using the RPUID attribute. The check compares the RPA Interest Type Code value for the record in the APSR to the rplinterest value in the geospatial feature. The check identifies where the values are different.

#### Assumptions:

- RPUIDs are populated in GIS data: User should run checks and cleanse data for DCSs 11-12 and 41-42 prior to running this check.
  - Components can add a query to ensure that this check only runs on features with a populated RPUID
- Table with Component RPI assets is available (OSD checks use RPAD)

An RBJ example is shown in **Error! Reference source not found..**

**Table to Table Attribute Check Properties**

Check Title: DCS37 and DCS38: Features with incorrect real

Feature or Object Class 1: MilitaryRange - Group1DCS.gdb

Feature or Object Class 2: RPAD - Group1DCS.gdb

Check Description:

| FEATURE CLASS |        | SCALE  |
|---------------|--------|--------|
| OID           | SCALE  |        |
| 1             | 10,000 | 20,000 |
| 2             | 20,000 | 30,000 |
| 3             | 10,000 |        |
| 4             | 30,000 |        |

Returns rows whose attributes match those of a feature class or table and/or comply with a user defined where clause comparing the attributes between feature classes and/or tables.

Attributes:

☐ Compare All Attributes

☐ Attributes to Ignore (Feature Level Metadata)

☒ Compare Attributes

Not - find rows that do not match

**Compare Attributes**

Data Source 1: MilitaryRange

Data Source 2: RPAD

Data Source 1 Attribute: featureDescription

Operator: =

Data Source 2 Attribute: Address\_Street\_Name

Build Error Condition: featureDescription = Address\_Street\_Name

Error Conditions:

rpuid = RPUID\_Text  
rpInterest <> RPA\_Interest\_Type\_Code

Annex F Figure 19: DCS 37-38 RPA Interest Type Check against the APSR

### 5.3 Running the RBJ Checks

- RBJs are built in and intended for use in ArcGIS Desktop software.
- Before running the RBJs, make sure that Data Reviewer is installed and licensed.
- Use the OSD-provided MXD
- Add Component data, or load Component data into the blank database provided
- Add Component APSR data or load data into the blank RPAD table provided
  - The RPUID field in the geospatial data is a string, not a number, so you have to convert the Component APSR RPUID value from a number to a string, using the RPUID\_Text field provided
  - The following Real Property fields must be populated to run the checks:
    - i. RPUID: Real Property Unique Identifier
    - ii. RPUID\_Text: Real Property Unique Identifier (string)

- iii. RPSUID: Real Property Site Unique Identifier
  - iv. CATCODE (RPA\_Predominant\_Current\_Use\_CATCODE): Category Code for Real Property Assets
  - v. Installation\_Code: Installation ID
- Other fields in the real property table may be populated as needed by Component
- The RBJs capture OSD requirements only. Components may modify the RBJs as needed to tailor the checks to Component data. For example, if the Component data uses placeholders (e.g. 9999, -1111.11) in their data, they may add parameters to a check to ignore features with these values.
- Instructions for running the RBJ file in ArcMap:
  - Add Data Reviewer toolbar
  - Open Reviewer Session Manager (on Data Reviewer toolbar) and start a new session.
  - Open Batch Validate (on Data Reviewer toolbar) and Select “Add from File” to import the RBJ file.
  - Point file to your Component data
  - Click on the Workspace button and link any check that did not match
  - Click “Run”
  - Open the Reviewer Table to view results

## 5.4 Data Reviewer Reports

After running the RBJ, users can create a report within Data Reviewer which displays the results of the checks and includes the percent accuracy. These results can be used to populate the data quality results in metadata. An example is included below in **Error! Reference source not found..**

| Check Type                            | Check Title                                                                          | Total Records* | Total Results | Total Percent Accuracy |
|---------------------------------------|--------------------------------------------------------------------------------------|----------------|---------------|------------------------|
| <b>Execute SQL Check</b>              |                                                                                      |                |               |                        |
|                                       | DCS11 and DCS12: Null RPUIDs                                                         | 1613           | 760           | 52.88%                 |
|                                       | DCS53 and DCS54: Features with a Null RPSUID                                         | 1613           | 1235          | 23.43%                 |
| <b>Geometry on Geometry Check</b>     |                                                                                      |                |               |                        |
|                                       | DCS39 and DCS40: Features that have an incorrect RPSUID (check against Site polygon) | 1613           | 168           | 89.58%                 |
| <b>Invalid Geometry Check</b>         |                                                                                      |                |               |                        |
|                                       | DCS55 and DCS56: Invalid Geometry Check                                              | 1613           | 1             | 99.94%                 |
| <b>Regular Expression Check</b>       |                                                                                      |                |               |                        |
|                                       | DCS41 and DCS42: Invalid RPUID check                                                 | 1613           | 425           | 73.65%                 |
| <b>Table to Table Attribute Check</b> |                                                                                      |                |               |                        |
|                                       | DCS46 and DCS47: Features that are incorrectly classified                            | 1613           | 55            | 96.59%                 |
| <b>Table to Table Attribute Check</b> |                                                                                      |                |               |                        |
|                                       | DCS7 and DCS8: Features in APSR, not in geospatial data                              | 10778          | 2322          | 78.46%                 |

Annex F Table 5: Data Reviewer Report Example

## DCS General Guidance Annex F: Appendix A: Metadata Example

The following metadata examples display the DQ\_DataQuality elements in SDSFIE-M for the dataset data quality scope. Refer to Annex B for metadata examples reported at the aggregate and repository scopes. In the examples below, red text indicates that the element is mandatory in SDSFIE-M. For additional guidance on formatting metadata and the SDSFIE Metadata style, please see the SDSFIE-M Standard, Version 2.0 (11 September, 2019) and the SDSFIE-M Implementation Guidance, Version 2.0 (10 June, 2020).

Following the table below is an example of the metadata populated using the SDSFIE-M 2.0 Metadata Style for ArcGIS.

| Metadata Element      |                                                                   | Example                                                                                                                                                                                                 | Comment                                                                                                          |
|-----------------------|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <b>DQ_DataQuality</b> |                                                                   |                                                                                                                                                                                                         |                                                                                                                  |
|                       | <b>scope: DQ_Scope</b>                                            |                                                                                                                                                                                                         |                                                                                                                  |
|                       | <b>level: MD_ScopeCode</b>                                        | dataset                                                                                                                                                                                                 |                                                                                                                  |
|                       | standaloneQualityReport:<br>DQ_StandaloneQualityReportInformation |                                                                                                                                                                                                         |                                                                                                                  |
|                       | reportReference: CI_Citation                                      |                                                                                                                                                                                                         |                                                                                                                  |
|                       | title: CharacterString                                            | Military<br>Range Data<br>Quality<br>Report                                                                                                                                                             |                                                                                                                  |
|                       | date: CI_Date                                                     |                                                                                                                                                                                                         |                                                                                                                  |
|                       | date: Date                                                        | 25-Feb-16                                                                                                                                                                                               |                                                                                                                  |
|                       | dateType: CI_DateTypeCode                                         | Creation                                                                                                                                                                                                |                                                                                                                  |
|                       | abstract: CharacterString                                         | Report<br>containing<br>detailed<br>descriptions<br>of<br>procedures<br>used to<br>evaluate the<br>Military<br>Range layer<br>and<br>descriptions<br>of the quality<br>results in a<br>report<br>format |                                                                                                                  |
|                       | <b>report: DQ_Element</b>                                         | Completeness Omission                                                                                                                                                                                   | Mandatory for CIP Layers                                                                                         |
|                       | nameOfMeasure: CharacterString                                    | DCS6                                                                                                                                                                                                    | SDSFIE-M currently says use should be avoided. This element may be used until the metrics registry is finalized. |
|                       | measureIdentification: MD_Identifier                              |                                                                                                                                                                                                         | I&E community preferred method to identify the measure.                                                          |
|                       | authority                                                         |                                                                                                                                                                                                         |                                                                                                                  |

| Metadata Element |                                                   | Example                                   | Comment                                                                                                                      |
|------------------|---------------------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
|                  | Title: CharacterString                            | SDSFIE-Q Metrics Registry                 |                                                                                                                              |
|                  | date: CI_Date                                     |                                           |                                                                                                                              |
|                  | date: Date                                        | 3/31/2016                                 |                                                                                                                              |
|                  | dateType: CI_DateTypeCode                         | Creation                                  |                                                                                                                              |
|                  | citedResponsibleParty: CI_ResponsibleParty        | DISDI Program                             |                                                                                                                              |
|                  | code: CharacterString                             | DCS6                                      | Currently optional: This code must correspond to the SDSFIE-Q Metric ID identified in the metrics registry                   |
|                  | measureDescription: CharacterString               |                                           | SDSFIE-M currently says use should be avoided. This element may be used until the metrics registry is finalized.             |
|                  | evaluationMethodType: DQ_EvaluationMethodTypeCode | Direct<br>Internal                        | Refer to the metrics table in the DCS General Guidance or individual DCSs for additional information to populate this value. |
|                  | evaluationMethodDescription: CharacterString      |                                           | Optional, but may be required by a DCS                                                                                       |
|                  | <b>result: DQ_Result</b>                          | Quantitative Result                       |                                                                                                                              |
|                  | <b>value: Record</b>                              | .02%                                      |                                                                                                                              |
|                  | <b>valueUnit: UnitOfMeasure</b>                   | None                                      |                                                                                                                              |
|                  | <b>result: DQ_Result</b>                          | Conformance Result                        | A Conformance Result is not required for metrics with an acceptable quality level of "N/A"                                   |
|                  | <b>specification:CI_Citation</b>                  |                                           |                                                                                                                              |
|                  | <b>Title: CharacterString</b>                     | Military Range Data Content Specification |                                                                                                                              |
|                  | <b>date: CI_Date</b>                              |                                           |                                                                                                                              |
|                  | <b>date: Date</b>                                 | 3/31/2016                                 |                                                                                                                              |
|                  | <b>dateType: CI_DateTypeCode</b>                  | Publication                               |                                                                                                                              |
|                  | <b>citedResponsibleParty: CI_ResponsibleParty</b> | DISDI Program                             |                                                                                                                              |
|                  | <b>explanation: CharacterString</b>               | Meets acceptable quality level in DCS     |                                                                                                                              |
|                  | <b>pass: Boolean</b>                              | 1                                         | 0 = fail and 1 = pass                                                                                                        |
|                  | <b>report: DQ_Element</b>                         | Usability Element                         | Mandatory for CIP Layers                                                                                                     |
|                  | nameOfMeasure: CharacterString                    | DCS52                                     | SDSFIE-M currently says use should be avoided. This element may be used until the metrics registry is finalized.             |
|                  | measureIdentification: MD_Identifier              |                                           | I&E community preferred method to identify the measure.                                                                      |
|                  | authority                                         |                                           |                                                                                                                              |

| Metadata Element |                                                   | Example                                                                      | Comment                                                                                                    |
|------------------|---------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|
|                  | Title: CharacterString                            | SDSFIE-Q Metrics Registry                                                    |                                                                                                            |
|                  | date: CI_Date                                     |                                                                              |                                                                                                            |
|                  | date: Date                                        | 3/31/2016                                                                    |                                                                                                            |
|                  | dateType: CI_DateTypeCode                         | Creation                                                                     |                                                                                                            |
|                  | citedResponsibleParty: CI_ResponsibleParty        | DISDI Program                                                                |                                                                                                            |
|                  | code: CharacterString                             | DCS52                                                                        | Currently optional: This code must correspond to the SDSFIE-Q Metric ID identified in the metrics registry |
|                  | measureDescription: CharacterString               |                                                                              | Optional, but may be required by a DCS. SDSFIE-M currently says use should be avoided.                     |
|                  | evaluationMethodType: DQ_EvaluationMethodTypeCode |                                                                              | Optional, but may be required by a DCS. SDSFIE-M currently says use should be avoided.                     |
|                  | evaluationMethodDescription: CharacterString      | 100% pass fail aggregation of each requirement expressed in the DCS          | Optional, but may be required by a DCS                                                                     |
|                  | result: DQ_Result                                 | Conformance Result                                                           |                                                                                                            |
|                  | resultScope: MD_Scope                             |                                                                              | same as DQ_Scope in SDSFIE-Q                                                                               |
|                  | level: MD_ScopeCode                               |                                                                              | same as DQ_Scope in SDSFIE-Q                                                                               |
|                  | value: Record                                     | 100%                                                                         |                                                                                                            |
|                  | valueUnit: UnitOfMeasure                          | None                                                                         |                                                                                                            |
|                  | specification:CI_Citation                         |                                                                              |                                                                                                            |
|                  | Title: CharacterString                            | Military Range Data Content Specification                                    |                                                                                                            |
|                  | date: CI_Date                                     |                                                                              |                                                                                                            |
|                  | date: Date                                        | 3/31/2016                                                                    |                                                                                                            |
|                  | dateType: CI_DateTypeCode                         | Creation                                                                     |                                                                                                            |
|                  | citedResponsibleParty: CI_ResponsibleParty        | DISDI Program                                                                |                                                                                                            |
|                  | explanation: CharacterString                      | 2 requirements of 2 are fulfilled. The feature type is conformant to the DCS |                                                                                                            |
|                  | pass: Boolean                                     | 1                                                                            | When populating metadata using the SDSFIE-M 2.0 Metadata Style, check or uncheck the "Pass" box            |

Annex F Figure 3: Dataset Metadata Example (SDSFIE-M 2.0 Metadata Style for ArcGIS)

Data Quality Scope:

Level: Dataset

[+ Add Scope Extent](#)

[^](#) Report ✕

Report Type: Completeness Commission

Measure Reference

Name of Measure: DCS6 ✕ [+](#)

Code: DCS6

Codespace:

Version:

Description: The percentage of duplicated features in the layer

[^](#) Authority Citation ✕

[^](#) Titles: SDSFIE-Q Metrics Registry

Title SDSFIE-Q Metrics Registry

Alternate Title

Collective Title

[+ New Online Resource](#)

[+ New Presentation Form](#)

[+ New Identifier](#)

[^](#) Dates

Created: 2016-03-31 15 00:00:00 ✕ [+](#)

⬆ Evaluation Method ✖

Evaluation Method

Evaluation Method Type: Direct Internal

Geoprocessing tool to identify duplicate geometries

Evaluation Method Description:

+ Add Evaluation Procedure

+ Add Evaluation Reference Document

Data Evaluation

Direct Evaluation Type

☒ Full Inspection ☐ Sample-Based Inspection

Result Element

Conformance Result

Level: Dataset

+ Add Scope Extent

Result Date/Time 2021-06-21 15 00:00:00

Meets acceptable quality levels in DCS

Explanation

Specification

☒ Pass

Quantitative Result

Level: Dataset

+ Add Scope Extent

Result Date/Time 15

Value Type

Value 0.2%

Value Unit Empty

+ Add Descriptive Result

+ Add Coverage Result

Specification

Titles: DCS MilitaryRange SDSFIE-V 4.0

Title

DCS MilitaryRange SDSFIE-V 4.0

Alternate Title

Collective Title

+ New Online Resource

+ New Presentation Form

+ New Identifier

Dates

Creat

15

Publi

2016-03-31

15

00:00:00

Edition

Edition

SDSFIE-V 4.0

Date

2020-01-31

15

ISBN

ISSN

Series

Name

Issue

Page

Contact: The DISDI Program

Name

The DISDI Program

Organization

Office of the Assistant Secretary of Defense for

Position

Custodian

Role

PointOfContact

^ Standalone Quality Report

Abstract:  
Report containing detailed descriptions of procedures used to evaluated the MilitaryRange layer and descriptions of the quality results in a report format.

Report Reference

^ Titles: MilitaryRange Data Quality Report

Title MilitaryRange Data Quality Report

Alternate Title

Collective Title

^ Result Element

^ Conformance Result

Level: Dataset

+ Add Scope Extent

Result Date/Time 15

The layer passed all validation checks required by the DCS

Explanation

^ Specification

☒ Pass

|  |
|--|
|  |
|--|

## Annex G: Data Content Specification (DCS) Example



# SDSFIE-Q IG Annex G: Data Content Specification (DCS) Example *Building* SDSFIE-V Gold 4.0

20 September 2021

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Prepared By:

The Installation Geospatial Information and Services Governance Group (IGG)

For:

The Assistant Secretary of Defense (Sustainment)

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**Revision History**

| <b>Description</b>                                                                                                                 | <b>Date</b> | <b>Version</b>    |
|------------------------------------------------------------------------------------------------------------------------------------|-------------|-------------------|
| Final                                                                                                                              | 13 MAR 2019 | Final Version 4.0 |
| Revision 1 <ul style="list-style-type: none"><li>Updated in conjunction with SDSFIE-Q Implementation Guidance production</li></ul> | TBD         | TBD               |
|                                                                                                                                    |             |                   |
|                                                                                                                                    |             |                   |

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## 1 Introduction

This data content specification (DCS) provides OSD-level guidance regarding the collection and population of standardized IGI&S data and metadata for the *Building* feature type, defined in the Spatial Data Standards for Facilities Infrastructure and Environment Vector standard, also known as SDSFIE-V.

**Annex G Table 1: *Building* SDSFIE-V Gold 4.0**

| <i>Building</i> SDSFIE-V Gold 4.0 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alias                             | Building                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Definition                        | The roofed and floored facility enclosed by exterior walls and consisting of one or more levels.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Description                       | It is generally distinguished from a wall by the solidity of construction; a wall is usually restricted to such barriers made from solid brick or concrete. Source: Office of the Under Secretary of Defense for Acquisition, Technology and Logistics. 2014. "Real Property Inventory (RPI) and Forecasting". Available at: <a href="http://www.dtic.mil/whs/directives/corres/pdf/416514p.pdf">http://www.dtic.mil/whs/directives/corres/pdf/416514p.pdf</a> . (Department of Defense Instruction no. 4165.14). <sup>4</sup> |
| Note                              | A note does not exist for this entity.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Default Geometry                  | Area                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Permissible Geometry              | Area / Line / Point                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

Table 1 shows the definition, description, note, and geometry established in SDSFIE-V Gold 4.0 for *Building*. Components are required to collect features in this layer that are reported as Real Property Assets (RPA), and should include a Real Property Unique Identifier (RPUID). Components may, but are not required to include non-RPA features.

Table 2 includes all SDSFIE-V Gold 4.0 attributes. All *Building* feature types shall include the required SDSFIE-V Gold 4.0 attributes in Table 2 and the SDSFIE Gold 4.0 foundational attributes listed in the DCS General Guidance. In accordance with the SDSFIE-V 4.0 Implementation Guidance, Components must provide a justification for profiling any non-required attributes (as part of their HQ Adaptation). Refer to Component implementation guidance for any additional required attributes.

In Table 2, the field "Attribute Guidance" describes mandatory requirements for populating each attribute. Components may provide additional guidance for each attribute as long as it does not conflict or overwrite the guidance provided in Table 2.

---

<sup>4</sup> CR-18-056 removes the first sentence from the description. This change will be implemented in future versions of the *Building* DCS.

**Annex G Table 2: SDSFIE-V Gold 4.0 Attributes for *Building***

| Attribute Name                                                                                                                                                                                                  | Definition, Description and Note                                                                                                                                               | Data Type    | Nullable | Required | Constraining Enumeration | Attribute Guidance                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|----------|----------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| All SDSFIE-V Gold 4.0 Foundational Attributes provided in the DCS General Guidance document. If any additional attribute guidance is required for a Foundational Attribute, the attribute is also listed below. |                                                                                                                                                                                |              |          |          |                          | Refer to DCS General Guidance                                                                                                     |
| addressNumber*                                                                                                                                                                                                  | The number of the building used in the address.<br>For example, ½ or ¾. <sup>5</sup>                                                                                           | String (10)  | Yes      | No       | N/A                      | None.                                                                                                                             |
| addressNumber Suffix*                                                                                                                                                                                           | The extension of the number of the building used in the address.                                                                                                               | String (4)   | Yes      | No       | N/A                      | None.                                                                                                                             |
| cityOrCommunity Name*                                                                                                                                                                                           | Valid service community name as identified by the MSAG.                                                                                                                        | String (32)  | Yes      | No       | N/A                      | None.                                                                                                                             |
| facilityNumber                                                                                                                                                                                                  | The locally developed asset number used for identification of the feature.<br>The number is normally used for visual identification and indicated through paint or by signage. | String (10)  | Yes      | No       | N/A                      | None.                                                                                                                             |
| isHeritageAsset                                                                                                                                                                                                 | A yes or no indicator of whether the building has historical, cultural, or archaeological value and/or significance.                                                           | YesOr No (3) | Yes      | No       | N/A                      | None.                                                                                                                             |
| roadName                                                                                                                                                                                                        | The name of the street or road without prefix or suffix.                                                                                                                       | String (255) | Yes      | No       | N/A                      | None.                                                                                                                             |
| roadPost Directional                                                                                                                                                                                            | The directional suffix associated with the road name.                                                                                                                          | String (3)   | Yes      | No       | Directional Indicator    | Attribute is constrained by the DirectionalIndicator enumeration.<br><br>Values include e (East), n (North), ne (Northeast), etc. |
| roadPrefix Directional                                                                                                                                                                                          | The directional prefix associated with the road name.                                                                                                                          | String (3)   | Yes      | No       | Directional Indicator    | Attribute is constrained by the DirectionalIndicator enumeration.<br><br>Values include e (East), n (North), ne (Northeast), etc. |

---

<sup>5</sup> A pending change request is under consideration to move the text "For example, ½ or ¾" to the addressNumberSuffix attribute in SDSFIE-V Gold. This was identified as an error.

| Attribute Name             | Definition, Description and Note                                                                                                                                                                                                                                                                                                                                                                                                 | Data Type   | Nullable | Required | Constraining Enumeration  | Attribute Guidance                                                                                                                                                             |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|----------|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| roadSuffix                 | Valid Street abbreviation, as defined by the US Postal Service Publication 28. (e.g. AVE)<br>For example, AVE or RD                                                                                                                                                                                                                                                                                                              | String (10) | Yes      | No       | N/A                       | None.                                                                                                                                                                          |
| rpaConstructionType        | The type of construction, with respect to permanence, for the real property facility.<br>Source: Office of the Assistant Secretary of Defense for Energy, Installations, and Environment. 2015. "Real Property Information Model Version 8.1 for Use in DoD Real Property Systems and Reporting" (RPIM Version 8.1 March 31, 2015).                                                                                              | String (4)  | Yes      | No       | Rpa Construction TypeCode | Attribute is constrained by the RpaConstructionTypeCode enumeration.<br><br>Values include perm (Permanent Facility), relo (relocatable), semi (Semi-permanent Facility), etc. |
| rpaPredomCurrentUseCatCode | The real property category code (CATOCDE) that classifies the current use of the asset and corresponds to the largest quantity of the asset that is utilized for a single purpose.<br>Source: Office of the Assistant Secretary of Defense for Energy, Installations, and Environment. 2015. "Real Property Information Model Version 8.1 for Use in DoD Real Property Systems and Reporting" (RPIM Version 8.1 March 31, 2015). | String (5)  | Yes      | Yes      | N/A                       | None.                                                                                                                                                                          |
| rpInterest                 | A designator used to identify the type of legal interest that DoD holds in a real property asset.<br>Source: RPIM Version 8.1 March 31, 2015.                                                                                                                                                                                                                                                                                    | String (4)  | Yes      | Yes      | RpaInterest Type          | This value should match the value reported to the Component accountable property system of record (APSR).                                                                      |

| Attribute Name | Definition, Description and Note                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Data Type  | Nullable | Required         | Constraining Enumeration | Attribute Guidance                                                                                                    |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------|
| rpnid          | <p>The designator that distinguishes one real property network (RPN) from another within a RPI database.</p> <p>Each Real Property Network Identifier is system dependent (likely system generated) at the site/installation level. For combined data from multiple databases and upward reporting, the Real Property Network Identifier can be concatenated with the Real Property Site Unique Identifier (RPSUID) to identify the specific network. Each real property network shall have an installation unique Real Property Network Identifier in the base/installation RPI database. A site/installation may have multiple real property networks of the same type; each independent network must have its own Real Property Network Identifier. There must be at least one linear structure assigned to each Real Property Network Identifier.</p> <p>All of the characters in the RPNID value must be alphanumeric [0-9a-zA-Z]. Source: RPIM Version 8. 1 March 31, 2015.</p> | String (4) | Yes      | Yes <sup>6</sup> | N/A                      | This attribute shall only be populated if the feature participates in a RPN. Otherwise, the value should remain Null. |

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<sup>6</sup> CR-18-081 changes the rpnid attribute to "not required." This change will be implemented in future versions of the *Building* DCS.

| Attribute Name   | Definition, Description and Note                                                                                                                                                                                                                                                           | Data Type   | Nullable | Required | Constraining Enumeration | Attribute Guidance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|----------|----------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| rpsuid           | A non-intelligent code used to permanently and uniquely identify a DoD real property site. RPSUIDs are exclusively issued by the Real Property Unique Identifier Registry (RPUIR). Source: DoDI 4165.14, January 17, 2014.                                                                 | Integer     | Yes      | Yes      | N/A                      | If features in the dataset are not in the Component APSR, populate with the RPSUID of the associated site.<br><br>If the RPSUID for a feature is unknown, not yet determined or not applicable, Components may assign Component-defined numeric placeholder values (e.g. 99999. 11111). Placeholder values cannot be the same number as a valid RPUID or RPSUID for the Component.<br><br>Any placeholder value must be standardized throughout the Component datasets and must be reported to OSD when submitting data (e.g. CIP). |
| rpuid            | A non-intelligent code used to permanently and uniquely identify a DoD real property asset. RPUIDs are exclusively issued by the Real Property Unique Identifier Registry (RPUIR). All of the characters in the RPUID value must be numeric [0-9]. Source: DoDI 4165.14, January 17, 2014. | String (18) | Yes      | Yes      | N/A                      | The RPUID should match the RPUID reported to the Component APSR.<br><br>If the RPUID for a feature is unknown, not yet determined or not applicable, Components may assign Component-defined numeric placeholder values (e.g. 99999. 11111). Placeholder values cannot be the same number as a valid RPUID or RPSUID for the Component.<br><br>Any placeholder value must be standardized throughout the Component datasets and must be reported to OSD when submitting data (e.g. CIP).                                            |
| stateName*       | Alpha state abbreviation. For example, TX.                                                                                                                                                                                                                                                 | String (3)  | Yes      | No       | States                   | Attribute is constrained by the States enumeration.<br><br>Values include ak (AK), al (AL), ct (CT), etc.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| zipCode*         | Postal or Zip code as identified on the left side of the street.                                                                                                                                                                                                                           | String (5)  | Yes      | No       | N/A                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| zipCodePlusFour* | Four-digit ZIP Code extension.                                                                                                                                                                                                                                                             | String (4)  | Yes      | No       | N/A                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

\*Aligned to: National Emergency Number Association (NENA) Joint Data Technical/PSAP Operations & Next Generation Integration Committees, Next Generation Data Development Working Group. 2009. "NENA Information Document for Synchronizing Geographic Information System databases with MSAG & ALI." Available at: [http://www.nena.org/resource/collection/F2E0D66A-4824-418C-8670-3238D262B84A/NENA\\_71-501-v1\\_Synchronizing\\_GIS\\_Databases\\_with\\_MSAG\\_and\\_ALI.pdf](http://www.nena.org/resource/collection/F2E0D66A-4824-418C-8670-3238D262B84A/NENA_71-501-v1_Synchronizing_GIS_Databases_with_MSAG_and_ALI.pdf) (NENA 71-501, Version 1.1).

## 1.1 Scope

This document provides OSD-level guidance regarding the collection and population of standardized IGI&S data and metadata for *Building* features. This DCS also defines data quality evaluation methods and metrics. OSD may require the DoD Components to report the results of the quality evaluation for these metrics under a future mandate, such as the annual Common Installation Picture (CIP) data call. Each DoD Component should use this document to structure DCS requirements at their level.

## 1.2 Policy

Requirements and justifications for the *Building* layer are established in the following DoD guidance and policy documents:

- **DoDI 8130.01:** The CIP annual data call is defined in this policy. The ASD(EI&E) has designated *Building* as a required CIP layer since FY 2016.
- **DoDI 4165.14:** DoDI 4165.14 established the requirement for each Component's real property inventory to include a "geospatial feature" documenting the location of each asset reported. This policy also defines the elements of the real property information model, including installations, sites, and assets (buildings, structures, and linear structures).
- **DoDI 6055.17:** DoDI 6055.17 requires installations to identify and manage critical assets, such as buildings, as part of a common operating picture for emergency response.
- **DoDI 3020.45:** This policy requires that task critical assets (TCAs) be identified as part of the Mission Assurance Construct. *Building* features may be considered TCAs.
- **Presidential Policy Directive 21:** This directive requires Components to coordinate with federal departments and agencies to map geospatially, image, analyze, and sort critical infrastructure (e.g. buildings) by employing commercial satellite and airborne systems, as well as existing capabilities within other departments and agencies.
- **DoDM 6055.09:** DoD 6055.09-M states that installations shall develop and maintain current installation maps and drawings that show explosive safety quantity distance (ESQD) arcs or risk-based evaluation distances that are used to assess future building development and determine what facilities are located within ESQD arcs.
- **DoDM 4715.20:** DoDM 4715.14 requires the identification, demolition and removal of unsafe buildings and structures.
- **UFC 2-100-01:** This UFC, *Installation Master Planning*, implies a requirement for geospatial location data of existing buildings as being necessary for Installation Master Plans, to determine facility utilization, and for future development planning.

## 1.3 Document Maintenance

This document will be reviewed and updated as needed, with each action documented in a revision history log. When changes occur, the version number will be updated to the next increment and the date, owner making the change, and change description will be recorded in the revision history log of the document.

## 1.4 References

Army IGI&S Program, *Geospatial Data Layer Quality Assurance Plan (QAP)-Building* v. 3.3, 10 Jan 2017

Army IGI&S Program, *Quality Assurance Plan (QAP) General Guidance* v. 2.0, 11 Aug 2014

DoDM 6055.09, *DoD Ammunition and Explosives Safety Standards: Explosives Safety Construction Criteria*, 29 Dec 2017

DoDI 3020.45, *Mission Assurance (MA) Construct*, 14 Aug 2018

DoDI 4165.14, *Real Property Inventory (RPI) and Forecasting*, 17 Jan 2014

DoDI 4165.71, *Real Property Acquisition*, 6 Jan 2005

DoDI 6055.17, *DoD Emergency Management (EM) Program*, 14 Nov 2017

DoDI 8130.01, *Installation Geospatial Information and Services (IGI&S)*, 9 Apr 2015

DoDM 4715.20, *Defense Environmental Restoration Program (DERP) Management*, 9 Mar 2012

FGDC-STD-007.3-1998. Federal Geographic Data Committee (FGDC), *Geospatial Positioning Accuracy Standards Part 3: National Standard for Spatial Data Accuracy*, 1998

ISO 19157:2013 *Geographic Information – Data quality*, Dec 2013

Navy GeoReadiness Program, *NAVFAC Data Collection Guide – Building v.6.0*

Navy GeoReadiness Program, *NAVFAC Data Collection Guide – BuildingP v. 6.0*

OASD(EI&E) *Real Property Inventory Management (RPIM)*, v. 10.0

UFC 2-100-01 *Unified Facilities Criteria (UFC) Installation Master Planning*, 15 May 2012

## 1.5 Acronyms

|         |                                                   |
|---------|---------------------------------------------------|
| APSR    | Accountable Property System of Record             |
| ASD(S)  | Assistant Secretary of Defense (Sustainment)      |
| CATCODE | Category Code                                     |
| CIP     | Common Installation Picture                       |
| DAIS    | Data Analytics and Integration Support            |
| DCS     | Data Content Specification                        |
| DISDI   | Defense Installations Spatial Data Infrastructure |
| DoD     | Department of Defense                             |
| DoDI    | Department of Defense Instruction                 |
| DoDM    | Department of Defense Manual                      |
| EI&E    | Energy, Installations, and Environment            |
| FGDC    | Federal Geographic Data Committee                 |
| GIS     | Geographic Information Systems                    |
| HQ      | Headquarters                                      |
| IGG     | IGI&S Governance Group                            |
| IGI&S   | Installation Geospatial Information and Services  |
| ISO     | International Organization for Standardization    |
| NENA    | National Emergency Number Association             |
| NSSDA   | National Standard for Spatial Data Accuracy       |
| OASD    | Office of the Assistant Secretary of Defense      |
| OSD     | Office of the Secretary of Defense                |
| QAP     | Quality Assurance Plan                            |
| RBJ     | Reviewer Batch Job                                |
| RPA     | Real Property Asset                               |
| RPAD    | Real Property Asset Database                      |
| RPI     | Real Property Inventory                           |

|          |                                                                                  |
|----------|----------------------------------------------------------------------------------|
| RPIM     | Real Property Information Model                                                  |
| RPN      | Real Property Network                                                            |
| RPNID    | Real Property Network Identifier                                                 |
| RPSUID   | Real Property Site Unique Identifier                                             |
| RPUID    | Real Property Unique Identifier                                                  |
| RPUIR    | Real Property Unique Identifier Registry                                         |
| SDSFIE   | Spatial Data Standards for Facilities, Infrastructure, and Environment           |
| SDSFIE-Q | Spatial Data Standards for Facilities, Infrastructure, and Environment - Quality |
| SDSFIE-V | Spatial Data Standards for Facilities, Infrastructure, and Environment - Vector  |
| TCA      | Task Critical Asset                                                              |
| UFC      | Unified Facilities Criteria                                                      |

## 2 Data Collection Requirements

### 2.1 ISO 19157 Data Quality Element Categories

The following section contains guidance and rules for collecting and attributing *Building* features based on the ISO 19157 element categories for data quality (completeness, logical consistency, positional accuracy, thematic accuracy, temporal quality, and usability).

#### 2.1.1 Completeness

Features that represent buildings as defined by real property should be captured in the *Building* layer. However, Components may include features in the *Building* layer that are not real property assets. Features that represent structures (e.g. water tanks, pads, standalone covered walkways, etc.), linear structures, and personal property (e.g. relocatables, trailers, equipment, etc.) shall not be included in the *Building* layer.

RPA features shall be captured in the *Building* layer once an RPUID is assigned. The RPUID is assigned when DoD acquires a legal interest in the building (DoDI 4165.71). Non-RPA features, if included, may be captured when the feature is constructed or installed.

Only real property assets with an RPA Type Code of "B" shall be considered for inclusion in the *Building* layer.

The feature shall remain in the *Building* layer until the building is disposed or demolished.

Components shall ensure that there is a one-to-one match between RPA features/records in the *Building* layer and their Component APSR. Components should also compare the features in the dataset with the known real-world features. For RPAs, the RPUID attribute must be populated to link the building data to the Data Analytics and Integration Support (DAIS) platform, which contains additional attribution.

Non- RPA features with no known CATCODE must have a building use populated in the description and should also have an RPUID placeholder value, as defined by the Component's guidance.

#### 2.1.2 Logical Consistency

The *Building* feature type will adhere to the data structure, attribution and relationship rules established in SDSFIE-V 4.0 and the SDSFIE-V Implementation Guidance.

Components shall ensure that domain values for the *rpInterest*, *rpaConstructionType*, *state*, *roadPostDirectional*, and *roadPrefixDirectional* attributes adhere to those described in a registered Adaptation of SDSFIE-V.

### 2.1.2.1 Topological Consistency

*Building* polygon features should represent the building footprint (or adjusted roofline). The building footprint shall include attached building protrusions (e.g. porches, canopies, etc.) that are considered part of the building. Covered walkways that are not attached to the building should not be included in the building footprint.

*Building* polygon features should not typically overlap with other buildings or structures. Examples of acceptable overlap include, but are not limited to:

- Sidewalks, or other structures that are located within the extent of the eaves of a building.
- Roads that run beneath an enclosed covered walkway that is part of the building.

Other features that are coincident to *Building* features should be snapped to the *Building* features.

All *Building* polygon features must be closed polygons.

All *Building* polygon features should be topologically correct, and should be corrected to avoid polygons with invalid geometry; polygons with negative area values, polygons with two or fewer vertices, and slivers.

If captured, point features should represent the centroid of the building.

While not recommended, if captured, line features should represent the building footprint or adjusted roofline.

Line features should be topologically correct, and should be corrected to avoid undershoots, overshoots and dangles.

### 2.1.3 Positional Accuracy

Positional accuracy is dependent on the positional accuracy of the source data from which it is compiled.

#### 2.1.3.1 Horizontal Accuracy

Horizontal accuracy is an important quality element, but can be time consuming and difficult to assess and report. Therefore, *Building* features should have a minimum absolute horizontal accuracy of +/-1 meter. The horizontal accuracy should be compiled, tested and reported in accordance with Part 3 of the Federal Geographic Data Committee's Geospatial Positioning Accuracy Standards: the National Standard for Spatial Data Accuracy (NSSDA). Spatial accuracy should be reported at the 95% confidence level. More information about the spatial accuracy standard is available at the following URL:

[http://www.fgdc.gov/standards/standards\\_publications/index.html](http://www.fgdc.gov/standards/standards_publications/index.html).

Component-level guidance should include more specific information about how to assess horizontal accuracy measures.

#### 2.1.3.2 Vertical Accuracy

There is no requirement for vertical accuracy for *Building* features.

### 2.1.4 Thematic Accuracy

Thematic accuracy is the adherence to the defined SDSFIE classification for the feature type.

Components should ensure that only *Building* features that fit the SDSFIE-V definition are captured in this layer.

Components should ensure attributes for *Building* features are correct and complete by comparing the dataset against an authoritative database of known features (e.g. APSR), where applicable.

### 2.1.5 Temporal Quality

The *Building* layer should be evaluated annually at a minimum in conjunction with the real property inventory and CIP annual data calls. In the metadata, the MaintenanceFrequencyCode should be

populated with “annually.” The *Building* layer may need to be evaluated more frequently at the Component level in response to Component-level data calls, if new buildings are added or demolished, or if the existing building footprints are modified. If the Component has a requirement to update the feature type more frequently, the MaintenanceFrequencyCode in the metadata should reflect the required timeframe.

### 2.1.6 Usability

Components should evaluate the usability of the *Building* layer based on the Usability metrics in Table 4.

## 2.2 Source Selection

Refer to the DCS General Guidance for a list of acceptable sources.

## 2.3 Relationship to Other SDSFIE-V Feature Types

Refer to the following individual DCSs or Component DCSs for the following feature types for definitions and specific data collection guidance:

- *Site*: The *Building* feature must be within 20 feet of the outer extent of the *Site* feature to which the building is assigned. If the building is a stand-alone facility, the *Site* may be represented by a point. All *Building* features must have an RPSUID that matches the site to which it is assigned or located within.
- *Structure*: Features that meet the criteria of a *Structure* (i.e. RPA Type Code = “S” or “LS”, should not be stored in the *Building* layer. These features should be stored in either *Structure* or the corresponding feature type in SDSFIE Gold (e.g. *StorageTank*, *Wall*, etc.).

## 3 Data Quality Evaluation and Reporting

The *Building* layer will be evaluated using the dataset scope. Table 3 includes the data quality units that will be evaluated for *Building*. Refer to SDSFIE-Q for an explanation of data quality units and scopes for IGI&S data and services.

Annex G Table 1: *Building* Data Quality Units

| Data Quality Units       |                                                           |
|--------------------------|-----------------------------------------------------------|
| Scope                    | Element                                                   |
| dataset- <i>Building</i> | Completeness: Commission                                  |
| dataset- <i>Building</i> | Completeness: Omission                                    |
| dataset- <i>Building</i> | Logical Consistency: Domain Consistency                   |
| dataset- <i>Building</i> | Logical Consistency: Topological Consistency              |
| dataset- <i>Building</i> | Thematic Accuracy: Non-Quantitative Attribute Correctness |
| dataset- <i>Building</i> | Thematic Accuracy: Classification Correctness             |
| dataset- <i>Building</i> | Positional Accuracy: Absolute or external accuracy        |
| dataset- <i>Building</i> | Temporal Quality: Temporal Validity                       |
| dataset- <i>Building</i> | Usability                                                 |

### 3.1 DCS Metrics

The DCS General Guidance document provides a list of metrics that may apply to all CIP layers. Table 4 indicates which of these metrics are recommended or mandatory for *Building*. These metrics were derived from the data collection guidance rules described in Section 2 and will be evaluated to determine the quality of each dataset.

## **3.2 DCS Evaluation Methods**

Each metric will be evaluated by an appropriate direct internal or external method, which could include a visual inspection with imagery, a comparison of the dataset against an external database, a direct analysis of the attributes or a quality assurance tool that is run on the dataset. Table 4 includes suggested evaluation methods for each metric.

### **3.2.1 Data Reviewer Batch Jobs (RBJ)**

The DISDI Program creates an RBJ for each CIP layer, when the DCS is created. Components may use the RBJ to evaluate their data quality for select metrics. Table 4 indicates which metrics can be evaluated using the RBJ file. Components can use the results of the evaluation to assist with completing their quality metadata (as discussed in Section 3.4). Each data quality check included in the RBJ file includes the SDSFIE-Q metric identifier in the check name.

## **3.3 Conformance Requirements**

All metrics are associated with an acceptable quality level, which is used to determine overall conformance with the DCS for that layer. For a dataset to be conformant with this data content specification, all of the quality requirements mandatory to the *Building* DCS listed in Table 4 must be met. If the acceptable quality level for a metric is “N/A,” the metric must be reported as a quantitative result only.

## **3.4 Data Quality Metadata Reporting**

Metadata for CIP layers will be reported using the dataset scope (i.e. “dataset” value in MD\_ScopeCode).

Components shall report data quality evaluation results for *Building* as Quantitative results and Conformance results. Quantitative results will be reported for the mandatory metrics identified in Table 4. Conformance results will report if the layer passed the conformance requirements for DCS compliance described in Table 4 and the DCS General Guidance. Refer to the DCS General Guidance for metadata population guidance and a metadata example.

Annex G Table 4: *Building Metrics*

| Data Quality Element     | ISO Measure Identifier | SDSFIE-Q Metric Identifier | Building Metric Description                                                                                                                                            | Suggested Evaluation Method                                                                                                                           | Included in RBJ? | Acceptable Quality Level | Mandatory for Building |
|--------------------------|------------------------|----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------|------------------------|
| Completeness: Commission | 2                      | DCS1                       | The number of features in the <i>Building</i> layer that are excess to the real property inventory (i.e. features in the dataset that are not reported to the RPI)     | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ: Can check with the RBJ file if a table of RPI assets is available. | Yes              | N/A                      | Yes                    |
| Completeness: Commission | 3                      | DCS2                       | The percentage of features in the <i>Building</i> layer that are excess to the real property inventory (i.e. features in the dataset that are not reported to the RPI) | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ: Can check with the RBJ file if a table of RPI assets is available. | Yes              | 5% (maximum)             | Yes                    |
| Completeness: Commission | 2                      | DCS3                       | The number of features included in the layer that are excess to real world features (i.e. features in the dataset that are not real world features)                    | Direct External: Visual or automated inspection against imagery                                                                                       | No               | N/A                      | No                     |
| Completeness: Commission | 3                      | DCS4                       | The percentage of features included in the layer that are excess to real world features (i.e. features in the dataset that are not real world features)                | Direct External: Visual or automated inspection against imagery                                                                                       | No               | 5% (maximum)             | No                     |
| Completeness: Commission | 4                      | DCS5                       | The number of duplicated features in the <i>Building</i> layer.                                                                                                        | Direct Internal: Geoprocessing tool to identify duplicate geometries                                                                                  | Yes              | N/A                      | Yes                    |
| Completeness: Commission | N/A                    | DCS6                       | The percentage of duplicated features in the <i>Building</i> layer.                                                                                                    | Direct Internal: Geoprocessing tool to identify duplicate geometries                                                                                  | Yes              | 5% (maximum)             | Yes                    |
| Completeness: Omission   | 6                      | DCS7                       | The number of reported Real Property assets for the <i>Building</i> layer that do not have a geospatial representation                                                 | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ: Can check with the RBJ file if a table of RPI assets is available. | Yes              | N/A                      | Yes                    |
| Completeness: Omission   | 7                      | DCS8                       | The percentage of reported Real Property assets for the <i>Building</i> layer that do not have a geospatial representation                                             | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ: Can check with the RBJ file if a table of RPI assets is available. | Yes              | 5% (maximum)             | Yes                    |
| Completeness: Omission   | 6                      | DCS9                       | The number of actual Real Property assets for each feature type that do not have a geospatial representation                                                           | Direct External: Visual inspection against imagery                                                                                                    | No               | N/A                      | No                     |
| Completeness: Omission   | 7                      | DCS10                      | The percentage of actual Real Property assets for each feature type that do not have a geospatial representation                                                       | Direct External: Visual inspection against imagery                                                                                                    | No               | 5% (maximum)             | No                     |
| Completeness: Omission   | 6                      | DCS11                      | The number of features in the <i>Building</i> layer that do not have an RPUID                                                                                          | Direct Internal: Analysis of attributes (manual or tool)                                                                                              | Yes              | N/A                      | Yes                    |

| Data Quality Element                         | ISO Measure Identifier | SDSFIE-Q Metric Identifier | Building Metric Description                                                                                                                                                 | Suggested Evaluation Method                                                                                                                              | Included in RBJ? | Acceptable Quality Level | Mandatory for Building |
|----------------------------------------------|------------------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------|------------------------|
| Completeness: Omission                       | 7                      | DCS12                      | The percentage of features in the <i>Building</i> layer that do not have an RPUID                                                                                           | Direct Internal: Analysis of attributes (manual or tool)                                                                                                 | Yes              | 5% (maximum)             | Yes                    |
| Completeness: Omission                       | 6                      | DCS53                      | The number of features in the <i>Building</i> layer that do not have an RPSUID                                                                                              | Direct Internal: Analysis of attributes (manual or tool)                                                                                                 | Yes              | N/A                      | Yes                    |
| Completeness: Omission                       | 7                      | DCS54                      | The percentage of features in the <i>Building</i> layer that do not have an RPSUID                                                                                          | Direct Internal: Analysis of attributes (manual or tool)                                                                                                 | Yes              | 5% (maximum)             | Yes                    |
| Completeness: Omission                       | 6                      | DCS57                      | The number of actual (real world) buildings that are not reported to the RPI                                                                                                | Direct External: Visual inspection against imagery.<br>Direct External: Comparison against database of features reported to the RPI (i.e. APSR)          | No               | N/A                      | No                     |
| Completeness: Omission                       | 7                      | DCS58                      | The percentage of actual (real world) buildings that are not reported to the RPI                                                                                            | Direct External: Visual inspection against imagery.<br>Direct External: Comparison against database of features reported to the RPI (i.e. APSR)          | No               | 5% (maximum)             | No                     |
| Completeness: Omission                       | 6                      | DCS13                      | The number of unpopulated values in non-nullable attribute fields (No NULL or blank values)                                                                                 | Direct Internal: Analysis of attributes (manual or tool)                                                                                                 | Yes              | N/A                      | No                     |
| Completeness: Omission                       | 7                      | DCS14                      | The percentage of unpopulated values in non-nullable attribute fields (No NULL or blank values)                                                                             | Direct Internal: Analysis of attributes (manual or tool)                                                                                                 | Yes              | 5% (maximum)             | No                     |
| Logical Consistency: Domain Consistency      | 16                     | DCS17                      | The number of features in the <i>Building</i> layer that have values in rplInterest that are not conformant with the domain values in a registered Component Adaptation     | Direct Internal: Analysis of attributes (manual or tool)                                                                                                 | Yes              | N/A                      | No                     |
| Logical Consistency: Domain Consistency      | 18                     | DCS18                      | The percentage of features in the <i>Building</i> layer that have values in rplInterest that are not conformant with the domain values in a registered Component Adaptation | Direct Internal: Analysis of attributes (manual or tool)                                                                                                 | Yes              | 95% (minimum)            | No                     |
| Logical Consistency: Topological Consistency | N/A                    | DCS19                      | The number of topological errors found in <i>Building</i> features.                                                                                                         | Direct Internal: Aggregation of topological errors                                                                                                       | No               | N/A                      | No                     |
| Logical Consistency: Topological Consistency | N/A                    | DCS20                      | The percentage of topological errors found in <i>Building</i> features.                                                                                                     | Direct Internal: Aggregation of topological errors                                                                                                       | No               | 5% (maximum)             | No                     |
| Logical Consistency: Topological Consistency | 25                     | DCS21                      | The number of features included in the <i>Building</i> layer that are invalid sliver surfaces                                                                               | Direct Internal: Geoprocessing tool to identify polygons under a minimum thinness ratio of .1. Each identified polygon should be evaluated and verified. | Yes              | N/A                      | No                     |
| Logical Consistency: Topological Consistency | N/A                    | DCS22                      | The percentage of features included in the <i>Building</i> layer that are invalid sliver surfaces                                                                           | Direct Internal: Geoprocessing tool to identify polygons under a minimum thinness ratio of .1. Each identified polygon should be evaluated and verified. | Yes              | 5% (maximum)             | No                     |

| Data Quality Element                                      | ISO Measure Identifier | SDSFIE-Q Metric Identifier | Building Metric Description                                                                                          | Suggested Evaluation Method                                                                                                                                                                                                                     | Included in RBJ? | Acceptable Quality Level | Mandatory for Building |
|-----------------------------------------------------------|------------------------|----------------------------|----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------|------------------------|
| Logical Consistency: Topological Consistency              | 26                     | DCS23                      | The number of features included in the <i>Building</i> layer that have self-intersect errors (polygons)              | Direct Internal: Geoprocessing tool to identify invalid geometry                                                                                                                                                                                | Yes              | N/A                      | No                     |
| Logical Consistency: Topological Consistency              | N/A                    | DCS24                      | The percentage of features included in the <i>Building</i> layer that have self-intersect errors (polygons)          | Direct Internal: Geoprocessing tool to identify invalid geometry                                                                                                                                                                                | Yes              | 5% (maximum)             | No                     |
| Logical Consistency: Topological Consistency              | N/A                    | DCS55                      | The number of features with NULL geometry                                                                            | Direct Internal: Geoprocessing tool to identify invalid geometry                                                                                                                                                                                | Yes              | N/A                      | Yes                    |
| Logical Consistency: Topological Consistency              | N/A                    | DCS56                      | The percentage of features with NULL geometry                                                                        | Direct Internal: Geoprocessing tool to identify invalid geometry                                                                                                                                                                                | Yes              | 5% (maximum)             | Yes                    |
| Logical Consistency: Topological Consistency              | 27                     | DCS25                      | The number of <i>Building</i> features that incorrectly intersect other <i>Building</i> features                     | Direct Internal: Geoprocessing tool to identify intersecting polygons in conjunction with analysis to determine if the overlap is correct                                                                                                       | Yes              | N/A                      | Yes                    |
| Logical Consistency: Topological Consistency              | N/A                    | DCS26                      | The percentage of <i>Building</i> features that incorrectly intersect other <i>Building</i> features                 | Direct Internal: Geoprocessing tool to identify intersecting polygons in conjunction with analysis to determine if the overlap is correct                                                                                                       | Yes              | 5% (maximum)             | Yes                    |
| Logical Consistency: Topological Consistency              | N/A                    | DCS27                      | The number of <i>Building</i> features that are not within the site boundary associated with the <i>Building</i>     | Direct Internal: Geoprocessing tool to identify features that are not within 20 feet of the site boundary                                                                                                                                       | Yes              | N/A                      | Yes                    |
| Logical Consistency: Topological Consistency              | N/A                    | DCS28                      | The percentage of <i>Building</i> features that are not within the site boundary associated with the <i>Building</i> | Direct Internal: Geoprocessing tool to identify features that are not within 20 feet of the site boundary                                                                                                                                       | Yes              | 5% (maximum)             | Yes                    |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS33                      | The number of features in the <i>Building</i> layer that have an incorrect installation ID                           | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the installation ID matches the installation ID of the installation boundary in which the feature is located. | Yes              | N/A                      | Yes                    |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS34                      | The percentage of features in the <i>Building</i> layer that have a correct installation ID                          | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the installation ID matches the installation ID of the installation boundary in which the feature is located. | Yes              | 95% (minimum)            | Yes                    |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS37                      | The number of features in the <i>Building</i> layer that have an incorrect real property interest type               | Direct External: Comparison against database of known features (i.e. APSR)                                                                                                                                                                      | Yes              | N/A                      | No                     |

| Data Quality Element                                      | ISO Measure Identifier | SDSFIE-Q Metric Identifier | Building Metric Description                                                                                  | Suggested Evaluation Method                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Included in RBJ? | Acceptable Quality Level | Mandatory for Building |
|-----------------------------------------------------------|------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------|------------------------|
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS38                      | The percentage of features in the <i>Building</i> layer that have a correct real property interest type      | Direct External: Comparison against database of known features (i.e. APSR)<br>RBJ: Can check with the RBJ file if a table of RPI assets is available.                                                                                                                                                                                                                                                                                                                           | Yes              | 95% (minimum)            | No                     |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS39                      | The number of features in the <i>Building</i> layer that have an incorrect RPSUID                            | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the RPSUID matches the RPSUID of the <i>Site</i> boundary in which the feature is located.                                                                                                                                                                                                                                                    | Yes              | N/A                      | Yes                    |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS40                      | The percentage of features in the <i>Building</i> layer that have a correct RPSUID                           | Direct External: Comparison against database of known features (i.e. APSR)<br>Direct External: Geoprocessing tool to determine if the RPSUID matches the RPSUID of the <i>Site</i> boundary in which the feature is located.                                                                                                                                                                                                                                                    | Yes              | 95% (minimum)            | Yes                    |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 65                     | DCS41                      | The number of features in the <i>Building</i> layer that have an invalid RPUID                               | Direct External: Comparison against database of known features (i.e. APSR)<br>Evaluation Method Example: Check to determine if the RPUID is a 4-18 digit numeric value.                                                                                                                                                                                                                                                                                                         | Yes              | N/A                      | Yes                    |
| Thematic Accuracy: Non-Quantitative Attribute Correctness | 66                     | DCS42                      | The percentage of features in the <i>Building</i> layer that have a valid RPUID                              | Direct External: Comparison against database of known features (i.e. APSR)<br>Evaluation Method Example: Check to determine if the RPUID is a 4-18 digit numeric value.                                                                                                                                                                                                                                                                                                         | Yes              | 95% (minimum)            | Yes                    |
| Temporal Quality: Temporal Validity                       | N/A                    | DCS43                      | The number of features that are accurately represented by the currentness reference required in the DCS.     | Direct External: Comparison of DCS requirement (annually for <i>Building</i> ) to the date the dataset was last updated in the metadata                                                                                                                                                                                                                                                                                                                                         | No               | N/A                      | No                     |
| Temporal Quality: Temporal Validity                       | N/A                    | DCS44                      | The percentage of features that are accurately represented by the currentness reference required in the DCS. | Direct External: Comparison of DCS requirement (annually for <i>Building</i> ) to the date the dataset was last updated in the metadata                                                                                                                                                                                                                                                                                                                                         | No               | 95% (minimum)            | No                     |
| Positional Accuracy: Absolute or external accuracy        | 39                     | DCS45                      | The horizontal accuracy of the features in the <i>Building</i> layer at the 95% confidence level             | Direct External: Comparison of reported coordinate values to known values<br>Evaluation Method Example: All vertices are converted to points. These points are then sampled and the locations for the samples are collected by conventional or GPS surveying methods. The samples are computed to calculate a measure of horizontal accuracy at 95% confidence in accordance with the NSSDA. If the calculated value of horizontal accuracy is larger than 1 m, the test fails. | No               | 1 meter                  | No                     |

| Data Quality Element                          | ISO Measure Identifier | SDSFIE-Q Metric Identifier | Building Metric Description                                                                  | Suggested Evaluation Method                                                                                                                                                                                                                                                       | Included in RBJ? | Acceptable Quality Level | Mandatory for Building |
|-----------------------------------------------|------------------------|----------------------------|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------------------|------------------------|
| Thematic Accuracy: Classification Correctness | 60                     | DCS46                      | The number of features in the <i>Building</i> layer that are incorrectly classified          | Direct External: Comparison against database of known features (i.e. APSR). For <i>Building</i> RPA features, the classification of the features should be compared to either the CATCODE or the RPA Type Code (e.g. RPA Type Code = "B") reported in the real property database. | Yes              | N/A                      | Yes                    |
| Thematic Accuracy: Classification Correctness | 61                     | DCS47                      | The percentage of features in the <i>Building</i> layer that are incorrectly classified      | Direct External: Comparison against database of known features (i.e. APSR). For <i>Building</i> RPA features, the classification of the features should be compared to either the CATCODE or the RPA Type Code (e.g. RPA Type Code = "B") reported in the real property database. | Yes              | 5% (maximum)             | Yes                    |
| Usability                                     | 102                    | DCS48                      | The number of mandatory DCS requirements that were not met by the <i>Building</i> layer.     | The number of "fail" results of the quality evaluations for each mandatory metric.                                                                                                                                                                                                | No               | 0                        | No                     |
| Usability                                     | 103                    | DCS49                      | The number of mandatory DCS requirements that were met by the <i>Building</i> layer.         | The number of "pass" results of the quality evaluations for each mandatory metric.                                                                                                                                                                                                | No               | N/A                      | No                     |
| Usability                                     | 104                    | DCS50                      | The percentage of mandatory DCS requirements that were not met by the <i>Building</i> layer. | The percentage of "fail" results of the quality evaluations for each mandatory metric.                                                                                                                                                                                            | No               | 0% (maximum)             | No                     |
| Usability                                     | 105                    | DCS51                      | The percentage of mandatory DCS requirements that were met by the <i>Building</i> layer.     | The percentage of "pass" results of the quality evaluations for each mandatory metric.                                                                                                                                                                                            | No               | 100% (minimum)           | No                     |
| Usability                                     | 101                    | DCS52                      | The <i>Building</i> layer pass/fail results of the validation checks required by the DCS.    | The aggregation of the pass/fail results of the quality evaluations for each mandatory metric.                                                                                                                                                                                    | No               | Pass                     | Yes                    |