



USAID
FROM THE AMERICAN PEOPLE

ANE MIS/GIS PILOT SUPPORT PROGRAM STANDARDS REFERENCE

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1 Document Overview

The ANE MIS/GIS Pilot Support Standards Reference document has been developed to meet some of the requirements outlined in Task 3, Standards and Interoperability Support. The following descriptions summarize the content in each of the three sections of this document.

Part I: Introduction and Background to Information Standards

This section describes the concepts that define standards and the ideas that help the reader understand what a standard is and why it is important to use standards. These concepts and definitions are presented to the reader in plain language to help the reader understand the basic ideas that surround the use of standards and assist with understanding the more technical sections that follow.

Part II: Core Standards of the ANE MIS/GIS Pilot

This section contains the actual standards that are being recommended for use in the ANE MIS/GIS Pilot Demonstration and continuing efforts forward with other MIS/GIS efforts. First, commonly used types of standards and the organizations that are implementing these standards are described to help the reader understand the US Government and International Organization efforts to increase the use of common standards. Next, two technical areas are examined with 1) Geospatial Data Framework and 2) the Data Models that are the basis for draft MIS/GIS standards. The Geospatial standards are described by outlining the tabular details that need to be present in each layer that has been identified for use in the MIS/GIS Pilot. The data model diagrams are the basic component of the ANE MIS/GIS System Design that will allow the design and development phase to move forward using a standards approach and also allow the system to integrate with other USAID standard data models.

Part II: The Standards Cookbook

This section offers the reader a step by step approach to developing standards and other useful details that help to clarify terms and concepts used in the document. This section has been included to help the reader understand the process and methodology that was used to determine the standards for the MIS/GIS Pilot and the process that can be used for any other standards development effort in the future. Many definitions and terms used in the document are described to help readers with any questions they might have with the previous sections.

Part I: Introduction and Background to Information Standards

This section provides:

- The rationale for the use of standards
- An overview of this document

2 Introduction: The rationale for standards

The purpose of this document is to introduce and establish draft information standards to support the Asia and the Near East (ANE) Bureau's MIS/GIS pilot. The standards introduced here are intended as a framework for the development of broad-based information standards specifically for economic development and humanitarian assistance efforts. In this regard, the standards serve as a foundation to build upon for USAID and its partners working in these areas.

Standards allow all actors to easily share information that can enhance the understanding of the situation and needs. There are three main reasons to adopt information standards for the ANE MIS/GIS:

- Standards provide a framework for repeatable processes, thereby formalizing and preserving core business knowledge and contributing to the maturity of system capabilities.
- Standards help to make the logic and interface of the disparate parts of the MIS/GIS understandable for the entire community of users.
- Standards provide an unambiguous means of evaluating system components that enables the system to flex with changing requirements and technologies.

In short, standardization is a tool for providing consistency, regularity, and repeatability. Therefore, standardization is an effective means for building and maintaining Agency information management capabilities in support of international development assistance.

The growth in networked information systems has placed greater emphasis on standards as a means for facilitating interaction among computer systems. Many of these existing systems were created as stand-alone cuff systems, with limited attention given to information sharing capabilities. As the demand for Internet access to information increases, standards provide consensus-based rules and protocols for exchanging information between computer systems. For the MIS/GIS pilot project, there is a need for interoperability standards that will allow different information management systems in the ANE Bureau and from across the Agency to easily work together and with the MIS/GIS.

2.1 Scope & Applicability of this document

The scope of this document is specific to the USAID ANE MIS/GIS Pilot. A central objective of the pilot is to improve reporting to within the Administration and to Congress. Therefore, only the standards that support that function are referenced in this document.

It is important to note, however, that at the time of this writing, several additional efforts are underway to develop and implement standards within USAID, with a broader emphasis on the Agency as a whole. These initiatives include, but are not limited to, the Enterprise Information System (EIS), the Enterprise Architecture, PSIP/JAMS, and, possibly, a results reporting system supporting the new strategic planning and performance metrics of the recently appointed Director of Foreign Assistance (DFA). To the extent possible, we have made

efforts to understand these processes, and identify the intersections between the MIS/GIS data models with USAID's enterprise architecture models and standards. There is a need to coordinate and harmonize these standards in the near future.

There are also numerous standards that apply to computational machinery or to the networking interfaces. Those specifications and standards do not fall within the scope of this document.

2.2 Usage of this document

This document is intended for use by USAID/ANE staff engaged in designing, building, developing data, information systems and services in support of the Bureau. However, the information provided in this document also can assist USAID and other partners establish draft standards for future information management efforts in other areas. For ANE staff, this document has two broad uses:

1. To recommend and endorse existing national, government, and industry standards, and to provide new draft standards profiles that ANE should adopt and implement for the MIS/GIS pilot.
2. To provide USAID/ANE staff the toolset necessary to sponsor, develop, and maintain information standards related to the USAID/ANE MIS/GIS.

This document is divided into sections that correspond to these purposes and further develop the ideas. The process of standards development is outlined in the USAID ANE MIS/GIS Standards Cookbook. As a supplement to the core materials, definitions of terms used in this document can be found in Appendix A and a discussion of gazetteers as a source for place names is found in Appendix B.

Part II: Core standards of the ANE MIS/GIS Pilot

This section provides:

- References to other standards documents under development within USAID
- Technical documentation of Framework geospatial data
- Technical documentation of draft MIS/GIS standards

3 USAID, ANE and Industry Standards

3.1 Families of standards

A central objective of the ANE MIS/GIS pilot is to improve the reporting functionality between USAID headquarters and the Bureau's widely dispersed missions and heterogeneous information systems. Improving reporting functionality is dependent on enabling the systems and the data to interact on their own, i.e., being *interoperable*. The ANE MIS/GIS System Design document outlines the technical architecture required to supply the interoperability necessary for the ANE MIS/GIS.

The standards documented in this section are implemented in the ANE MIS/GIS in order to deliver an interoperable system that meets ANE's requirements. These standards can be grouped in to three broad categories that correspond to the MIS/GIS system architecture. They are:

- Service-oriented architecture (SOA) standards,
- Geographic information system (GIS) standards
- Other Federal and national standards

Table 1 summarizes the federal, national, commercial, and Bureau standards that we endorse and recommend be adopted by the ANE MIS/GIS pilot.

Table 1- Summary of Endorsed Standards

Standards Type	Standards endorsed	Sponsoring Agency	Description	Notes
Federal	FIPS 10-4 (Two letter country codes)	National Institute for Standards and Technology	Federal Information Processing Standards (FIPS)	Source of 2-letter country codes for NGA's GeoNET Nameserver. Proposed for withdrawal; maintenance to be assumed by ANSI.
National, geospatial	(Framework Standards (draft))	Information Technology Industry Council, (accredited by American National Standards Institute)	ANSI standards for geospatial data and geospatial data handling	Framework standards submitted to ANSI, in process for adoption as national standard

Standards Type	Standards endorsed	Sponsoring Agency	Description	Notes
Geospatial	Content Standard for Digital Geospatial Metadata, 1998, Framework Standards (draft)	Federal Geographic Data Committee	Federal Geographic Data Committee standards for geospatial data and metadata	Framework standards submitted to ANSI, in process for adoption as national standard
SOA	(Family)	Organization for the Advancement of Structured Information Standards	Organization for the Advancement of Structured Information Standards that regulate software service interfaces	(Actual specification and implementation determined by final MIS/GIS architecture)
SOA, Web	Simple Object Access Protocol (SOAP) , others	World Wide Web Consortium (W3C)	Standards used by web services, including HTML, HTTP, URI/URL, and XML	(Implementation determined by final MIS/GIS architecture)
SOA	Universal Modeling Language	Object Management Group (OMG)	Modeling specifications for architecture and web service interfaces	(Implementation determined by final MIS/GIS architecture)
USAID	Enterprise Information System (EIS) Core Information Standards and Enterprise Architecture Data Model	USAID	Standardized semantic definitions for USAID business operations, high level reference model for USAID business functions	(Under development)
USAID	Data Stewardship Policy	USAID	Standardized policies outlining data stewardship best practices	(Under development)
USAID	PSIP/JAMS reporting codes	USAID	Standardized reporting codes for acquisition and assistance	(Under development)

Standards Type	Standards endorsed	Sponsoring Agency	Description	Notes
USAID	Phoenix reporting codes	USAID	Standardized reporting codes for financial and budgetary information	
USAID	Annual Report reporting codes	USAID	Standardized reporting codes for financial and budgetary information	

As a development goal, the ANE MIS/GIS pilot intends to support the other USAID efforts to implement standardized information systems. These efforts are part of programs to develop systems that provide consistent enterprise-level functionality across the Agency. In the future, the models and terminology of the ANE MIS/GIS should be harmonized with these other systems.

3.2 Enterprise Information System Core Information Standards

It is the intent of the ANE MIS/GIS Pilot development team to leverage the ongoing efforts within USAID for the Enterprise Information System (EIS) in order to provide uniform reporting functionality. As of this version, the MIS/GIS Pilot development team is working to identify the points of intersection between the data models and identify common vocabularies between the EIS and MIS/GIS.

3.3 Data Stewardship Policy

USAID has contracted with SRA/Touchstone to produce guidelines for establishing agency-wide data stewards. The data stewardship policy will require harmonization with standards in this document in the future.

3.4 PSIP/JAMS Joint Reporting Codes

At the time of this writing, Joint Reporting Codes were under development for the PSIP/JAMS system. When developed, these codes should be adopted by the ANE MIS/GIS, where appropriate.

3.5 GEOnet Names Server for Place Names

Consistent use of accurate place names is an essential element of effective communication worldwide and is a necessary component of any successful geospatial application. There are numerous national programs and agencies whose mission is to standardize names of cities, villages, land and water features. For the purpose of the ANE MIS/GIS pilot, Booz Allen has followed guidance provided by the [U.S. Board on Geographic Names](#) (US BGN) database of foreign geographic feature names, called the

GEOnet Names Server (GNS)¹. The database is maintained by the National Geospatial Intelligence Agency (NGA), and is the official repository of foreign place-name decisions approved by the US BGN. The geographic area of coverage is worldwide, but excludes the United States and Antarctica. We recommend the ANE MIS/GIS program endorse the use of GNS. GNS provides access to the NGA and the US BGN database of foreign geographic feature names. Place names in the U.S. and Antarctica are hosted by the [United States Geological Survey \(USGS\)](http://www.usgs.gov) on the [Geographic Names Information System \(GNIS\)](http://geonames.usgs.gov)² web site.

The GNS contains 4.0 million features with 5.5 million names (approximate). The coordinate system for data served by GNS is the [World Geodetic System \(WGS84\)](http://www.its.bldr.nsl.gov)³. Coordinates in the GEOnet Names Server are approximate and are intended for finding purposes only.

3.6 Framework (Geospatial) Data

3.6.1 Background

The notion of Framework data for the provision of fundamental thematic layers of data is endorsed in this document. Framework data is comprised of seven, common thematic layers that form a basis for mapping and georeferencing ANE's business data. These seven layers are:

Geodetic – Reference points used for measuring the shape and dimensions of the earth.

Cadastral – Public records and surveys associated with land parcel ownership and valuation

Orthoimagery - Map-accurate aerial photography from which all tilt and displacement has been removed

Elevation – Height above mean sea level

Hydrography – Rivers, streams, and bodies of water

Administrative Units – Governmental units

Transportation – Roads, railroads, waterways, airfields, bus routes

¹ National Geospatial Intelligence Agency: GNS; GEOnet Names Server. Retrieved at <http://gnswww.nga.mil/geonames/GNS/index.jsp> on 14 March 2006.

² United States Geological Survey: Geographic Names Information Service (GNIS). Retrieved at <http://geonames.usgs.gov/> on 14 March 2006.

³ National Geospatial Intelligence Agency: Department of Defense, World Geodetic System. Retrieved at http://earth-info.nga.mil/GandG/publications/tr8350.2/tr8350_2.html on 5 April 2006.

A set of framework geospatial data have been adopted with two purposes in mind; first, the data will be utilized during the demonstration phase of the Pilot to show how standardized geospatial data can be used to populate a MIS/GIS system. Second, the framework data serve as formatted and standardized data for immediate incorporation into future ANE MIS/GIS application development and implementation efforts. For a more detailed explanation on framework data and how it serves as the data “backbone” consult the Federal Geographic Data Committee (FGDC) web site.

3.6.2 Purpose of Framework Data

The direct benefits to USAID ANE are that framework data allows the agency to focus data gathering efforts on issues central to their business, e.g. donor information, humanitarian aid assistance, grants, and so forth. Use of consistent geographic data among all users yields significant savings for data collection and use and enhances decision making. Framework data will reduce duplication of effort among missions, improve quality and reduce costs related to geographic information, and make geographic data more accessible to the Missions, implementing partners and donor organizations.

The framework data serves as a base mapping reference for information in the MIS/GIS pilot during the demonstration phase. The framework will provide basic geographic data in a common format and an accessible environment that anyone can use and to which anyone can contribute. It is:

- Basic data that can be used for general applications
- A base reference to which users can add or attach geographic features
- A reference source for accurately registering and compiling participants' own data sets
- A reference map for displaying the locations and the results of an analysis

The framework is a growing data resource to which geographic data producers can contribute. It will continually evolve and improve.

3.6.3 Sources of Framework Data & Framework Data Standards

Currently, there is an abundance of geospatial data available from various sources, including multiple government agencies and international organizations. The challenge faced by USAID in developing the MIS/GIS for use across multiple missions is in choosing among sets of meaningful framework geospatial data. It is conceivable that multiple sets of framework data could be used, depending on business need. Map scale is a key consideration. Framework data should be broad enough in scope to allow for uniform data coverage across large global areas, e.g. multiple countries, yet also provide enough detail to be meaningful at the regional and local level. Primarily, the sources for framework geospatial data are:

- National Geospatial Intelligence Agency (NGA)
- Central Intelligence Agency (CIA)
- U.S. Department of State (DOS)

- Environmental Systems Research Institute (ESRI)

3.6.4 Framework Data Summary

The MIS/GIS pilot utilizes geospatial data sets that cover the entire globe. While the nominal scale for the initial data set is 1:1,000,000, the data will allow depiction at larger scales. All data is organized into thematic “layers” that will contain data sets which are related logically.

For the MIS/GIS Pilot, four layers of framework data are provided. Table 2 - provides a summary of the attribution and table structure for framework level data layers.

Table 2 - MIS/GIS Framework Data Layer Summary

Feature Class	Layer Name	Feature Name	Geometric Representation	Source / Lineage
Transportation	Airport	airfield_facility	point	NGA
	Railroad	rail_line	arc	NGA
	Road	road	arc	NGA
	Harbor or Port	port_facility	point	NGA
Boundaries	Political Boundary	Country	polygon	NGA / CIA
	Political Boundary	Administrative Area	polygon	NGA / CIA
Hydrography	Water Course	River	arc	ESRI
Population	Cities	populated place	point	NGA

The following tables provide details on the layers provided for the MIS/GIS pilot:

DRAFT

FEATURE SET NAME: Transportation

FEATURE TYPE NAME: airfield_facility

DEFINITION: The surface areas that aircraft utilize. These include runways and the facilities associated with air operations.

Table 3 - Description of airfield facilities layer

Attribute Name	Definition	Data Type	Character Length
air_sur_id	Primary Key. A unique, user defined identifier for each record or instance of an entity	Text	20
map_id	Foreign Key. Used to link the record to the appropriate map.	Integer	9
meta_id	Foreign key. Used to link the record to the applicable feature level metadata record(s).	Text	20
media_id	Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, scanned documents, and other digital media.	Text	20
coord_id	Foreign Key. Used to link the record to the appropriate point coordinate record(s).	Text	20
run_stt_d	The predominant status of the airfield facility surface site.	Text	16
air_cls_d	The general classification of the airfield	Text	16
coord_x	The x (longitude) component of individual coordinate point.	Double	19
coord_y	The y (latitude) component of individual coordinate point.	Double	19
feat_name	The name of the feature	Text	50
remarks	Any narrative remarks concerning the airfield surface.	Text	50

DRAFT

FEATURE SET NAME: Transportation

FEATURE TYPE NAME: rail_line

DEFINITION: The center of a railway as measured from the outside edge of the rails. The centerline is comprised of segments that represent rail portions with similar characteristics such as the number of tracks or the segment between two switches.

Table 4 - Description of Railway Layer

Attribute Name	Definition	Data Type	Character Length
railrd_id	Primary Key. A unique, user defined identifier for each record or instance of an entity	Text	20
map_id	Foreign Key. Used to link the record to the appropriate map.	Integer	9
meta_id	Foreign key. Used to link the record to the applicable feature level metadata record(s).	Text	20
media_id	Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, scanned documents, and other digital media.	Text	20
coord_id	Foreign Key. Used to link the record to the appropriate point coordinate record(s).	Text	20
line_stt_d	The current status of the rail line in terms of whether tracks are in use.	Text	16
remarks	Any narrative remarks concerning the railroad	Text	240

DRAFT

FEATURE SET NAME: Transportation

FEATURE TYPE NAME: Road

DEFINITION: The center of the roadway as measured from the edge of the paved surface. The segments of a road centerline will coincide with the road segments in order to have similar characteristics.

Table 5 - Description of the Roads Layer

Attribute Name	Definition	Data Type	Character Length
cline_id	Primary Key. A unique, user defined identifier for each record or instance of an entity	Text	20
map_id	Foreign Key. Used to link the record to the appropriate map.	Integer	9
meta_id	Foreign key. Used to link the record to the applicable feature level metadata record(s).	Text	20
media_id	Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, scanned documents, and other digital media.	Text	20
coord_id	Foreign Key. Used to link the record to the appropriate point coordinate record(s).	Text	20
category_d	The importance of the road for transportation	Text	16
feat_name	Any narrative remarks concerning the railroad	Text	40
rclass_d	The category of roads based on their design and weather ability	Text	16

DRAFT

FEATURE SET NAME: Transportation

FEATURE TYPE NAME: Port_facility

DEFINITION: The location of a structure critical to the operations and/or maintenance of a port. Included are such things as container transfer facilities, fuel transfer facilities, and maintenance facilities.

Table 6 - Description of Port Facilities Layer

Attribute Name	Definition	Data Type	Character Length
portfac_id	Primary Key. A unique, user defined identifier for each record or instance of an entity	Text	20
map_id	Foreign Key. Used to link the record to the appropriate map.	Integer	9
meta_id	Foreign key. Used to link the record to the applicable feature level metadata record(s).	Text	20
media_id	Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, scanned documents, and other digital media.	Text	20
coord_id	Foreign Key. Used to link the record to the appropriate point coordinate record(s).	Text	20
coord_x	The x (longitude) component of individual coordinate point.	Double	19
coord_y	The y (latitude) component of individual coordinate point.	Double	19
feat_name	A commonly used name for the port	Text	50
berths	The total number of ship berths available at the harbor facility	Integer	9
fac_type	The type or special type of the port facility	Text	50
remarks	Any narrative remarks concerning the port facility	Text	240

DRAFT

FEATURE SET NAME: Boundaries

FEATURE TYPE NAME: Country

DEFINITION: Land and water under the right, power, or authority of various national governments.

Table 7 - Description of National Political Jurisdiction Features

Attribute Name	Definition	Data Type	Character Length
juris_id	Primary Key. A unique, user defined identifier for each record or instance of an entity	Text	20
map_id	Foreign Key. Used to link the record to the appropriate map.	Integer	9
meta_id	Foreign key. Used to link the record to the applicable feature level metadata record(s).	Text	20
media_id	Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, scanned documents, and other digital media.	Text	20
coord_id	Foreign Key. Used to link the record to the appropriate point coordinate record(s).	Text	20
govern_d	Discriminator. The type of government having dominion over a particular area.	Text	16
polit_name	The common name associated with the property area.	Text	50
polit_desc	A general or legal description of the property area.	Text	100
populate	The total population of the political jurisdiction.	Double	19
poc_id	Foreign Key. Used to link the record to the Point of Contact record for correspondence about the jurisdiction associated with the area.	Text	50
area_size	The size of the area, zone, or polygon in square units.	Double	19
area_u_d	The unit of measure for area.	Text	16
perim	The distance around the boundary of the area, zone, or subject item in linear units.	Double	19

DRAFT

Attribute Name	Definition	Data Type	Character Length
perim_u_d	The unit of measure for length	Text	16
narrative	A description or other unique information concerning the subject item, limited to 240 characters.	Text	240
sub_region	The text that indicates a specific area of the World, for example Middle East	Text	50
country_d	The 3 letter code that represents the location of the country.	Text	16

DRAFT

FEATURE SET NAME: Boundaries

FEATURE TYPE NAME: administrative_area

DEFINITION: Land and water under the right, power, or authority of various national governments.

Table 8 - Description of Administrative Political Jurisdictions Layer

Attribute Name	Definition	Data Type	Character Length
juris_id	Primary Key. A unique, user defined identifier for each record or instance of an entity	Text	20
map_id	Foreign Key. Used to link the record to the appropriate map.	Integer	9
meta_id	Foreign key. Used to link the record to the applicable feature level metadata record(s).	Text	20
media_id	Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, scanned documents, and other digital media.	Text	20
coord_id	Foreign Key. Used to link the record to the appropriate point coordinate record(s).	Text	20
govern_d	Discriminator. The type of government having dominion over a particular area.	Text	16
polit_name	The common name associated with the property area.	Text	50
polit_desc	A general or legal description of the property area.	Text	100
populate	The total population of the political jurisdiction.	Double	19
poc_id	Foreign Key. Used to link the record to the Point of Contact record for correspondence about the jurisdiction associated with the area.	Text	50
area_size	The size of the area, zone, or polygon in square units.	Double	19
area_u_d	The unit of measure for area.	Text	16
perim	The distance around the boundary of the area, zone, or subject item in linear units.	Double	19

DRAFT

Attribute Name	Definition	Data Type	Character Length
perim_u_d	The unit of measure for length	Text	16
narrative	A description or other unique information concerning the subject item, limited to 240 characters.	Text	240
sub_region	The text that indicates a specific area of the World, for example Middle East	Text	50
country_d	The 3 letter code that represents the location of the country.	Text	16

DRAFT

FEATURE SET NAME: Hydrography

FEATURE TYPE NAME: River

DEFINITION: The center line of a flowing course of water as measured at a location equidistant between opposite shorelines or waterlines.

Table 9 - Description of the Rivers Layer

Attribute Name	Definition	Data Type	Character Length
sur_crs_id	Primary Key. A unique, user defined identifier for each record or instance of an entity	Text	20
map_id	Foreign Key. Used to link the record to the appropriate map.	Integer	9
meta_id	Foreign key. Used to link the record to the applicable feature level metadata record(s).	Text	20
media_id	Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, scanned documents, and other digital media.	Text	20
coord_id	Foreign Key. Used to link the record to the appropriate point coordinate record(s).	Text	20
perman_d	A code indicating the permanence of the surface course	Text	16
crs_name	A commonly used name identifying the water course	Text	30
crs_desc	A description of the water course	Text	60

DRAFT

FEATURE SET NAME: Population

FEATURE TYPE NAME: Populated_place

DEFINITION: An area of population which is commonly known by a unique name.

Table 10 - Description of Populated Places Layer

Attribute Name	Definition	Data Type	Character Length
place_id	Primary Key. A unique, user defined identifier for each record or instance of an entity	Text	20
map_id	Foreign Key. Used to link the record to the appropriate map.	Integer	9
meta_id	Foreign key. Used to link the record to the applicable feature level metadata record(s).	Text	20
media_id	Foreign Key. Used to link the record to associated multimedia records that reference data such as imagery, video, scanned documents, and other digital media.	Text	20
polit_name	The common name associated with the property area.	Text	50
polit_desc	A general or legal description of the property area.	Text	50
coord_x	The x component of individual coordinate point	Double	19
coord_y	The y component of individual coordinate point	Double	19

3.7 Draft Standard MIS/GIS Data Models

The data model is a basic component of the ANE MIS/GIS System Design⁴ and is put forth here as a draft standard model for ANE MIS/GIS usage and for later harmonization with other USAID standard data models. The ANE MIS/GIS data model has six principal sub-components. These are:

- The Business model – Describes the actors, drivers, and components of USAID activities
- The Feature model – Describes real world features of concern to USAID operations
- The Feature Association model – Describes how features relate to other parts of the model
- The Forms model – Describes how data are collected
- The Indicators model – Describes how attributes of Features are aggregated to satisfy reporting requirements
- The Keyword model – Describes metadata used to facilitate reporting across subject matter domains

The foundation of the ANE data model is the Feature Model. It is foundational in the sense that the Feature Model is a framework for representing the elements of day-to-day ANE mission operations. To be clear, features are simply a data representation of some real world object or event. Examples of features include landscape elements such as roads, buildings, boundaries, rivers, and public utilities. Other, less tangible elements--, such as negotiations, lectures, teaching sessions, and outreach activities-- can also be represented as features. Characteristics common to features are that they physically occur somewhere, may have a geometric representation in a GIS, and have attributes that are of interest to ANE's core business objectives.

⁴ This section of the document references the data model section of the ANE MIS/GIS System Design document and readers should consult that document for a discussion of the data model as it relates to overall system architecture.

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By disaggregating Features from Indicators, Strategic Objectives, and other reporting concepts, the Feature Model provides a flexible and standardized framework for developing the georeferenced data needed to meet the flexible reporting requirements of the MIS/GIS Pilot. Moreover, the Feature Model is an implementation of ISO 19109, a mature standard for the modeling and representations of real world things in geospatial information systems, thereby spatially-enabling the MIS through the data model framework.

3.7.1 ANE Metamodel

The ANE metamodel is a formalized way of depicting the subset of all real world features that ANE missions have as their specific operating concern. Figure 1 shows that these features can be grouped in several feature collections that have meaning in a particular application, such as public health infrastructure, environmental management, or wastewater utilities.

The ANE metamodel is a profile of the ISO Rules for Application Schemas Standard (ISO 19109), which provides an extensible framework for creating and maintaining the universe of features under the purview of ANE MIS/GIS. It also may be implemented for EIS as a mechanism to manage data steward roles and responsibilities across USAID.

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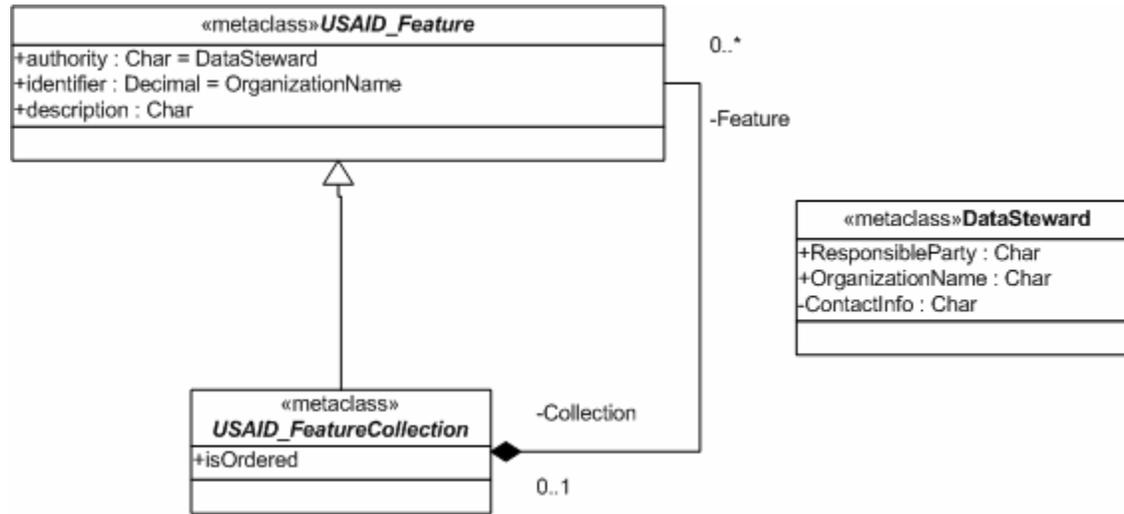


Figure 1 - The ANE Metamodel

3.7.2 Business Reference Model

The Business Reference model is shown in Figure 2. The Business Reference model describes the actors, the documents and instruments, and the rationale for the operations carried out by ANE missions. Details for each class are given in Table 3.

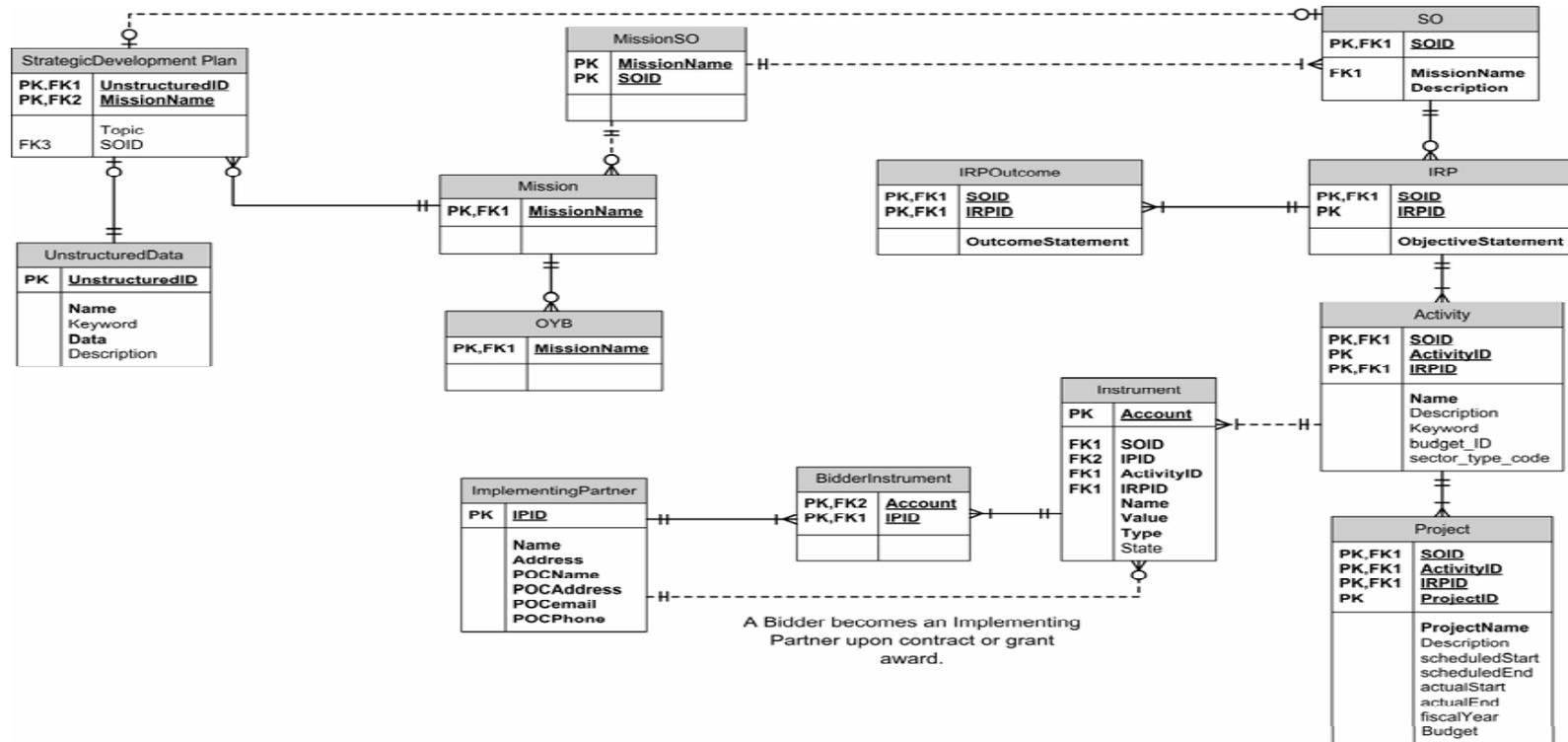


Figure 2 – The Business Reference Model

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Table 3 - Business Reference Model Code List

Class Name	Description	Attributes	Keys	Obligation
SO	Strategic Objective	MissionName Description	Primary: SOID Foreign: MissionName	Mandatory
IRP	Intermediate Results Package	ObjectiveStatement	Primary: IRPID Foreign: SOID	Mandatory
Activity	Activity	Name, Description, Keyword, budget_ID, sector_type_code	Primary: ActivityID Foreign: SOID, IRPID	Mandatory
Project	Project	ProjectName, Description, scheduledStart, scheduledEnd, actualStart, actualEnd, fiscalYear, Budget	Primary: ProjectID Foreign: SOID, IRPID, ActivityID	Mandatory, if known
IRPOutcome	IRP Outcome	OutcomeStatement	Foreign: IRPID, SOID	Mandatory, if known
MissionSO	Lookup table linking missions and SO's	-	Foreign: MissionName, SOID	Mandatory
Mission	Name of Mission	MissionName	Primary: MissionName	Mandatory
OYB	Operating Year Budget	MissionName	Foreign: MissionName	Optional
CountryOperationalPlan	Country Operational Plan	Topic, SOID	Foreign: UnstructuredID, SOID	Mandatory, if present
UnstructuredData	Text of Strategic Development Plan	Name, Keyword, Data, Description	Primary: UnstructuredID	Mandatory, if known

Class Name	Description	Attributes	Keys	Obligation
Instrument	Contract or grant instrument	Account, Name, Value, Type, State	Primary: Account Foreign: SOID, IRPID, IPID, ActivityID	Mandatory
BidderInstrument	Lookup table linking ImplementingPartner with Instrument	-	Foreign: Account, IPID	Mandatory
ImplementingPartner	Implementing partner organization	Name, Address, POCName, POCAddress, POCemail, POCphone	Primary: IPID	Mandatory

3.7.3 The Feature model

The Feature model is essential to providing the level of granularity necessary to facilitate good reporting. The classes and relationships for Features are depicted in Figure 3. A Feature is simply an abstraction of a real world feature, such as a school, road, clinic, enterprise, boundary, etc. that has relevance for ANE operations. Two examples of these features, School and Road, are provided as informative examples for implementing the model. Details for each class are given in Table 4.

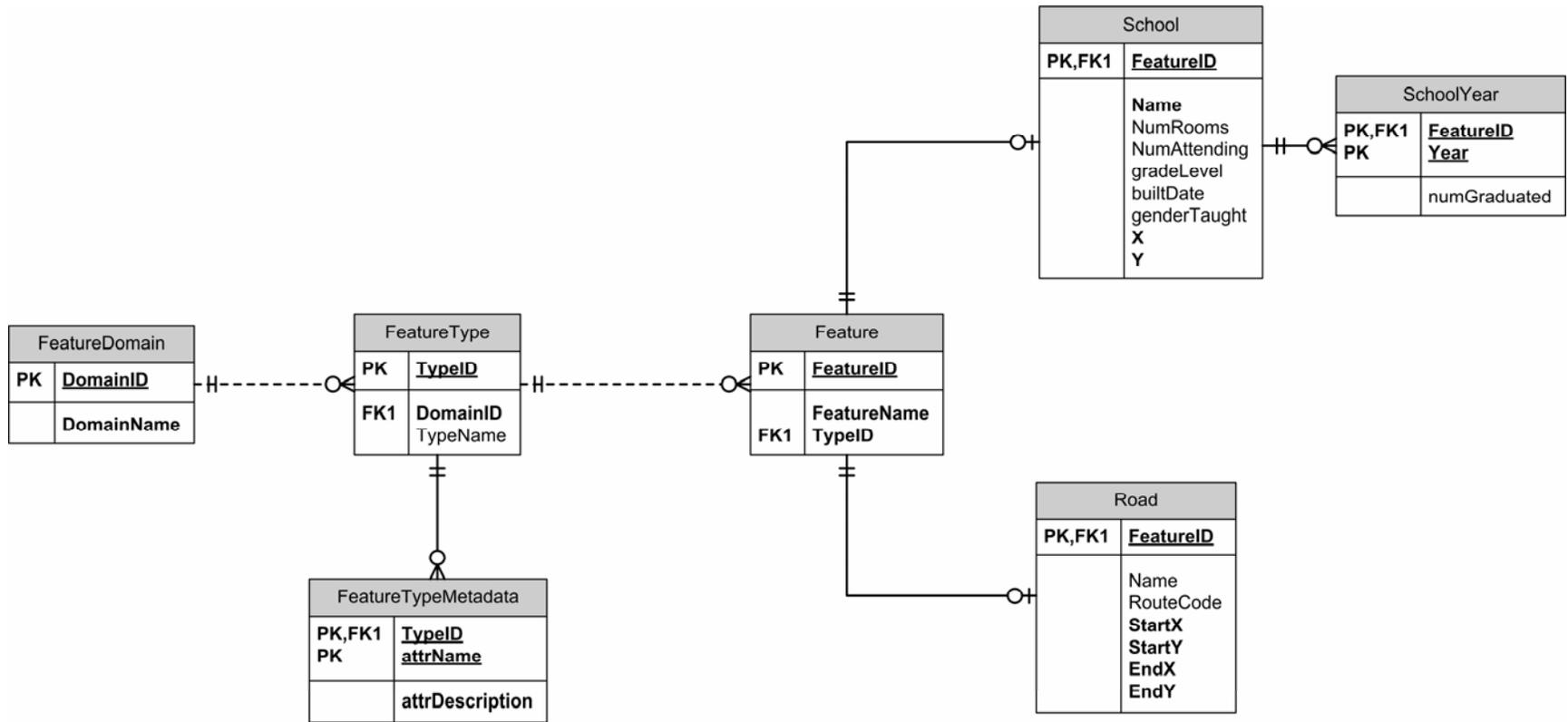


Figure 3 – The Feature Model

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Table 4 - Feature Model Code List

Class Name	Description	Attributes	Keys	Obligation
FeatureType	A feature	DomainID, TypeName	Primary: TypeID	Mandatory
FeatureDomain	A higher order grouping for features (e.g. public health, transportation)	DomainName	Primary: DomainID	Mandatory, if known
FeatureTypeMetadata	Keyword or other description of FeatureType	attrDescription	Primary: TypeID, attrName	Mandatory
Feature	A specific instance of a FeatureType	FeatureName, TypeID	Primary: FeatureID	Mandatory
(Road)	(Example FeatureType)	(Examples: Name, RouteCode, StartX, StartY, EndX, EndY)	(Primary: FeatureID)	(Mandatory)
(School)	(Example FeatureType)	(Examples: Name, NumRooms, NumAttending, gradeLevel, builtData, genderTaught, X, Y)	(Primary: FeatureID)	(Mandatory)
SchoolYear	(Example Feature subclass)	(Examples: numGraduated)	(Primary: Year) (Foreign: FeatureID)	(Mandatory, when applicable)

3.7.4 The Feature Association Model

Features have a number of associations that aggregate features by attributes to support the reporting process. These associations are shown in Figure 4. Because of the universal nature of the Feature, the Feature Association model facilitates direct association of Features to other models. Details for each class are given in Table 5.

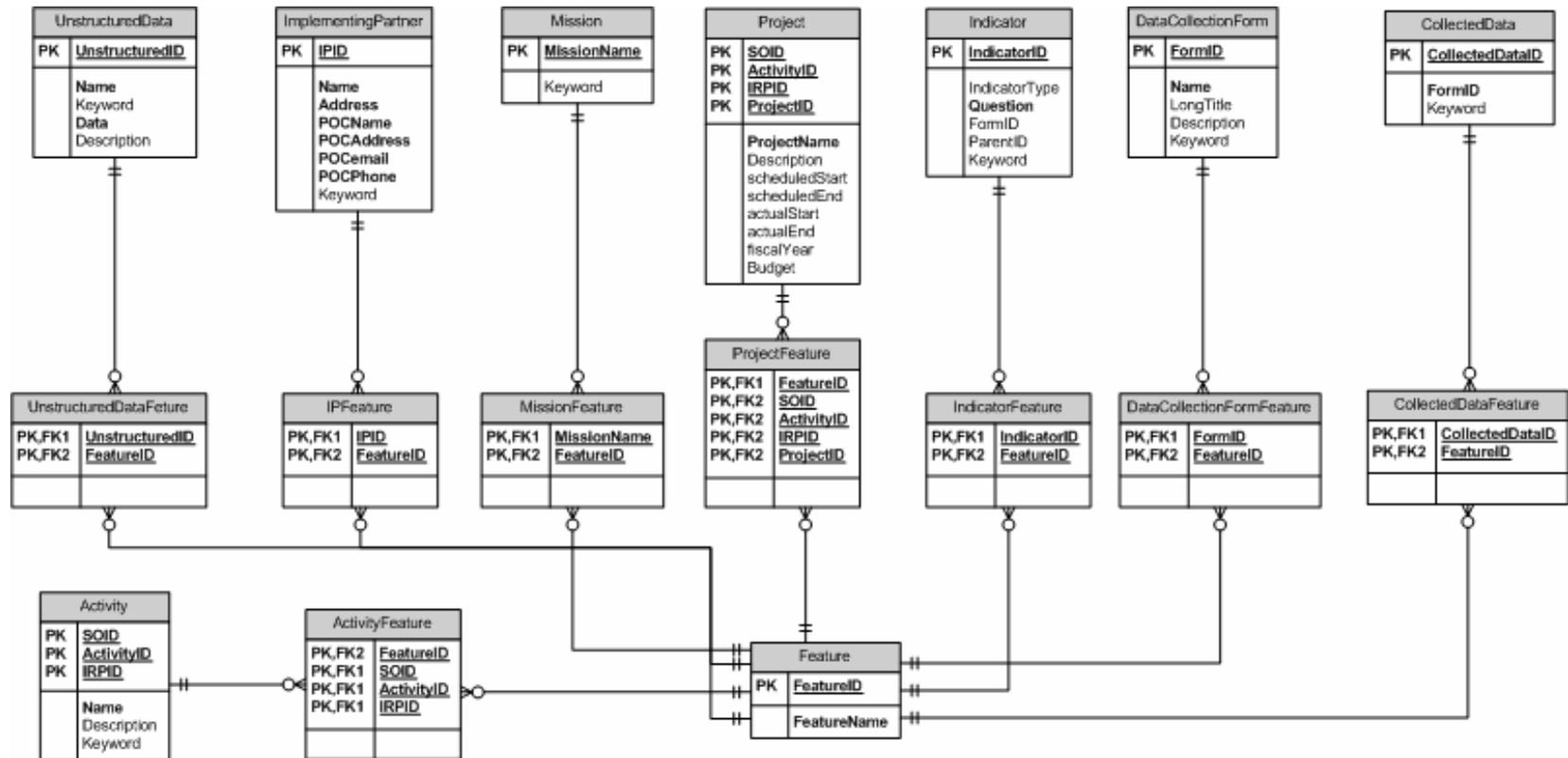


Figure 4 – The Feature Association Model

Table 5 - Feature Association Code List

Class Name	Description	Attributes	Keys	Obligation
Project	Project at Mission Level	ProjectName, Description, scheduledStart, scheduledEnd, actualStart, actualEnd, fiscalYear, Budget	Primary: SOID, ActivityID, IRPID, ProjectID	Mandatory, if collected
ProjectFeature	Lookup table linking Features to Projects	-	Foreign: FeatureID, SOID, ActivityID, IRPID, ProjectID	Mandatory, if Project class data are collected
Feature	Specific instance of a feature type	featureName	Primary: FeatureID	Mandatory
Indicator	Aggregated criteria for reporting purposes	IndicatorType, Question, FormID, ParentID, Keyword	Primary: IndicatorID	Mandatory
IndicatorFeature	Lookup table linking Feature with Indicator	-	Foreign: IndicatorID, FeatureID	Mandatory
DataCollectionForm	Form for primary data collection	Name, LongTitle, Description, Keyword	Primary: FormID	Mandatory
DataCollectionFormFeature	Lookup table linking Feature with Data Collection Form	-	Foreign: FormID, FeatureID	Mandatory

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Class Name	Description	Attributes	Keys	Obligation
Activity	Activity	Name, description, Keyword	Primary: SOID, ActivityID, IRPID	Mandatory
ActivityFeature	Lookup table linking Feature with Activity	-	Foreign: ActivityID, FeatureID	Mandatory
CollectionData	Data collected	FormID, Keyword	Primary: CollectedDataID	Mandatory
CollectionDataFeature	Lookup table linking Feature with Collected Data	-	Foreign: CollectedDataID, FeatureID	Mandatory
Mission	An instance of a USAID Mission	MissionName, Keyword	Primary: MissionName	Mandatory
MissionFeature	Lookup table linking Feature with Mission	-	Foreign: MissionName, FeatureID	Mandatory
ImplementingPartner	Organization contracted to execute work	Name, Address, POCName, POCAddress, POCemail, POCPhone, Keyword	Primary: IPID	Mandatory
ImplementingPartnerFeature	Lookup table linking Feature with Implementing Partner	-	Foreign: IPID, FeatureID	Mandatory
UnstructuredData	Unstructured data and free text	Name, Keyword, Data, Description	Primary: UnstructuredID	Mandatory, if collected
UnstructuredDataFeature	Lookup table linking	-	Foreign: UnstructuredID,	Mandatory, if collected

Class Name	Description	Attributes	Keys	Obligation
	Feature with UnstructuredData		FeatureID	

3.7.5 Keyword model

Keywords are essentially supplemental metadata which serve to facilitate flexible reporting. Keywords extend the metadata model to the feature level, thereby playing an important function in the location of features and identifying measures and indicators. Figure 5 shows the classes in the Keyword model. The notion of keywords is consistent with the notion of a “minimum searchable set” of metadata that could include theme, subject, topic, and feature type. Details for each class are given in Table 6.

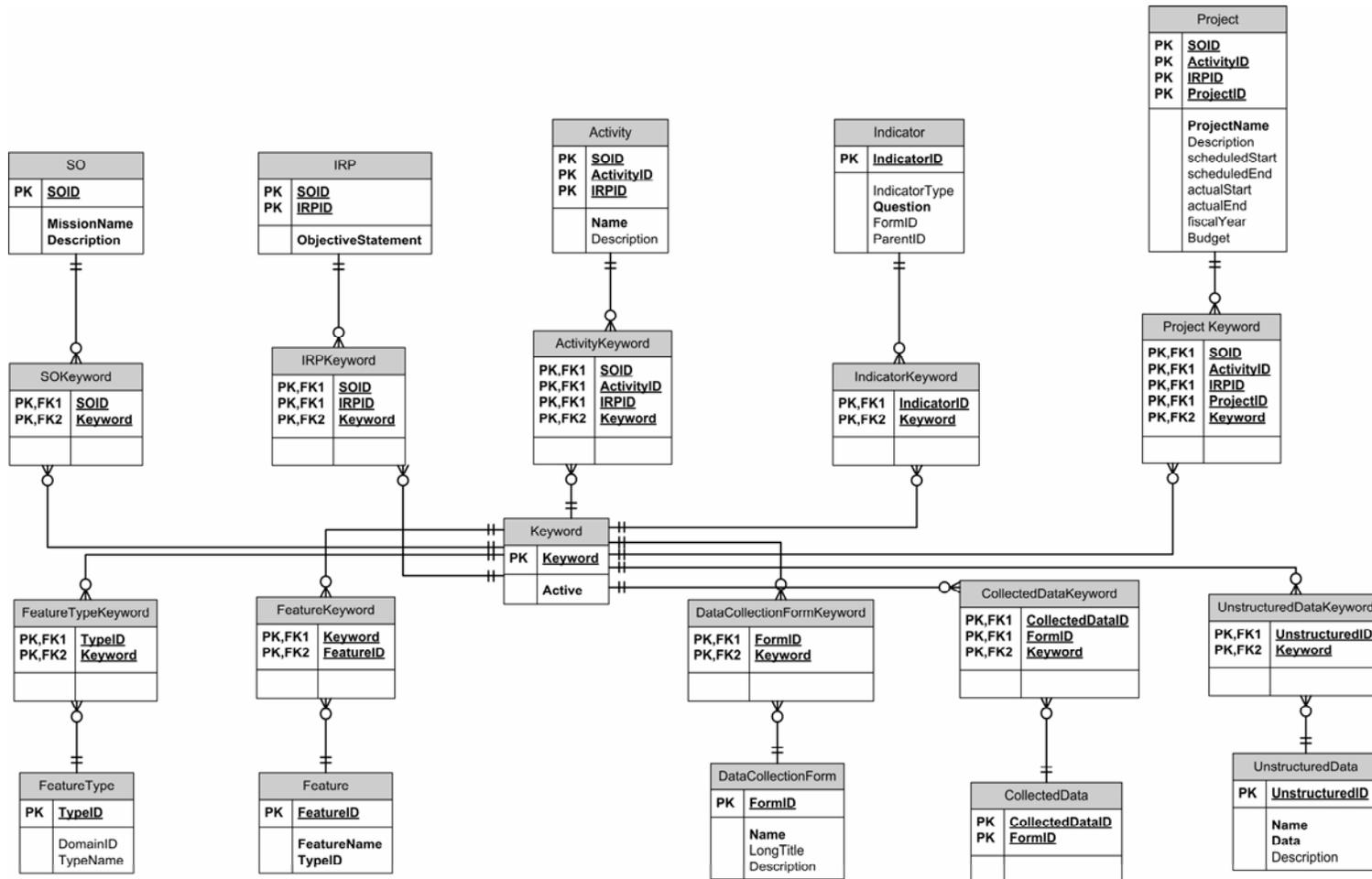


Figure 5 – The Keyword Model

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Table 6 - Keyword Model Code List

Class Name	Description	Attributes	Keys	Obligation
Keyword	Keyword metadata	Active	Primary: Keyword	Mandatory
SO	Strategic Objective	MissionName, Description	Primary: SOID	Mandatory
SOKeyword	Lookup table linking Keyword with SO	-	Foreign: SOID, Keyword	Mandatory
IRP	Intermediate Results Package	ObjectiveStatement	Primary: IRPID, SOID	Mandatory
IRPKeyword	Lookup table linking Keyword with IRP	-	Foreign: IRPID, Keyword	Mandatory
Activity	Activity	Name, Description	Primary: ActivityID, SOID, IRPID	Mandatory
ActivityKeyword	Lookup table linking Keyword with Activity	-	Foreign: ActivityID, Keyword	Mandatory
Indicator	Aggregated criteria for reporting purposes	IndicatorType, Question, FormID, ParentID	Primary: IndicatorID	Mandatory
IndicatorKeyword	Lookup table linking Keyword with Indicator	-	Foreign: IndicatorID, Keyword	Mandatory
Project	Project at Mission Level	ProjectName, Description, scheduledStart, scheduledEnd, actualStart, actualEnd, fiscalYear, Budget	Primary: SOID, ActivityID, IRPID, ProjectID	Mandatory, if collected

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Class Name	Description	Attributes	Keys	Obligation
ProjectKeyword	Lookup table linking Keyword with Project	-	Foreign: ProjectID, Keyword	Mandatory, if collected
FeatureType	A feature	DomainID, TypeName	Primary: TypeID	Mandatory
FeatureTypeKeyword	Lookup table linking Keyword with FeatureType	-	Foreign: FeatureTypeID, Keyword	Mandatory
Feature	Specific instance of a feature type	featureName	Primary: FeatureID	Mandatory
FeatureKeyword	Lookup table linking Keyword with an instance of a Feature	-	Foreign: FeatureID, Keyword	Mandatory
DataCollectionForm	Form for primary data collection	Name, LongTitle, Description, Keyword	Primary: FormID	Mandatory
DataCollectionFormKeyword	Lookup table linking Keyword with Data Collection Form	-	Foreign: FormID, Keyword	Mandatory
CollectedData	Primary source data collected at Project level	(user determined)	Primary: CollectedDataID	Mandatory, if collected
CollectedDataKeyword	Lookup table linking Keyword with CollectedData	-	Foreign: CollectedDataID, Keyword	Mandatory, if collected
UnstructuredData	Unstructured data and	Name, Keyword, Data,	Primary: UnstructuredID	Mandatory, if collected

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Class Name	Description	Attributes	Keys	Obligation
	free text	Description		
UnstructuredDataFeature	Lookup table linking Keyword with UnstructuredData	-	Foreign: UnstructuredID, Keyword	Mandatory, if collected

3.7.6 The Forms Model

Forms support the need for input and editing of primary data, including features. The Forms model is shown in Figure 6. The term ‘form’ is used broadly in this context and is intended to indicate paper-based data collection forms such as surveys, but also extended to any data collection application. The FormElement is analogous to an individual survey question on a survey form, and should be also construed broadly to be a step in any data collection process. Details for each class are given in Table 7.

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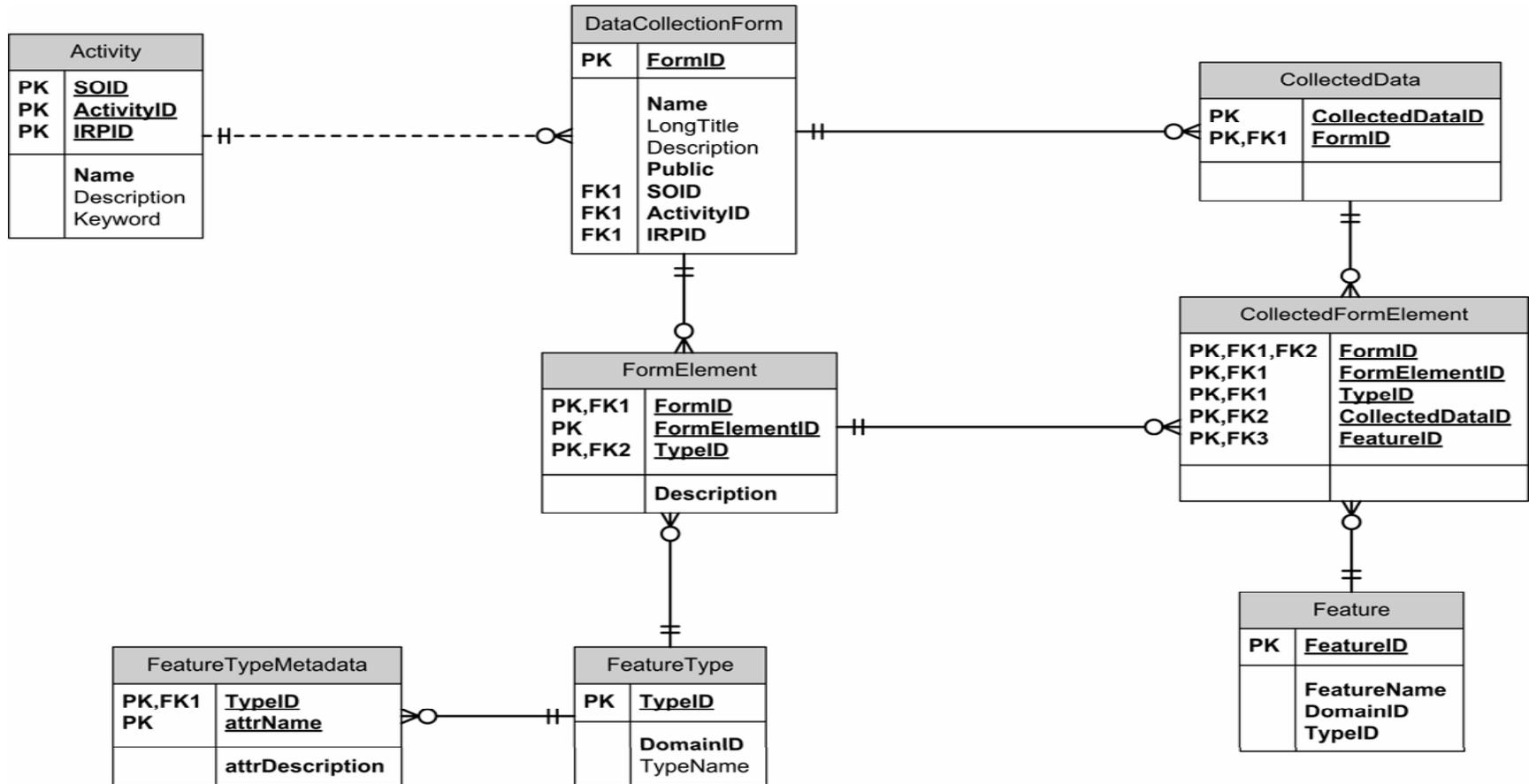


Figure 6 – The Forms Model

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Table 7 - Forms Model Code List

Class Name	Description	Attributes	Keys	Obligation
FormElement	Specific entry or step in data collection process	Description	Primary: FormElementID Foreign: FormID, TypeID	Mandatory, where applicable
DataCollectionForm	A data collection form or process	Name, LongTitle, Description, Public	Primary: FormID Foreign: SOID, ActivityID, IRPID	Mandatory
Activity	Activity	Name, Description, Keyword	Primary: ActivityID, SOID, IRPID	Mandatory
FeatureType	Generic name of Feature	DomainID, TypeName	Primary: TypeID	Mandatory
FeatureTypeMetadata	Metadata associated with FeatureType	attrDescription	Primary: attrName Foreign: TypeID	Mandatory, if FeatureType exists
Feature	Specific instance of a feature type	featureName	Primary: FeatureID	Mandatory
CollectedData	Primary source data collected at Project level	(user determined)	Primary: CollectedDataID	Mandatory, if collected
CollectedFormElement	Lookup table linking FormElement with CollectedData	-	Foreign: CollectedDataID, FormElement	Mandatory, if collected

3.7.7 Indicators Model

The Indicators model is pivotal because it facilitates the reporting functions between the Features and drivers found in the Business Reference model. In Figure 7, the central position of the Indicator class shows how it facilitates linkages between Program Component and TargetMeasure, and between Activity and ProgramComponent. Details for each class are given in Table 8.

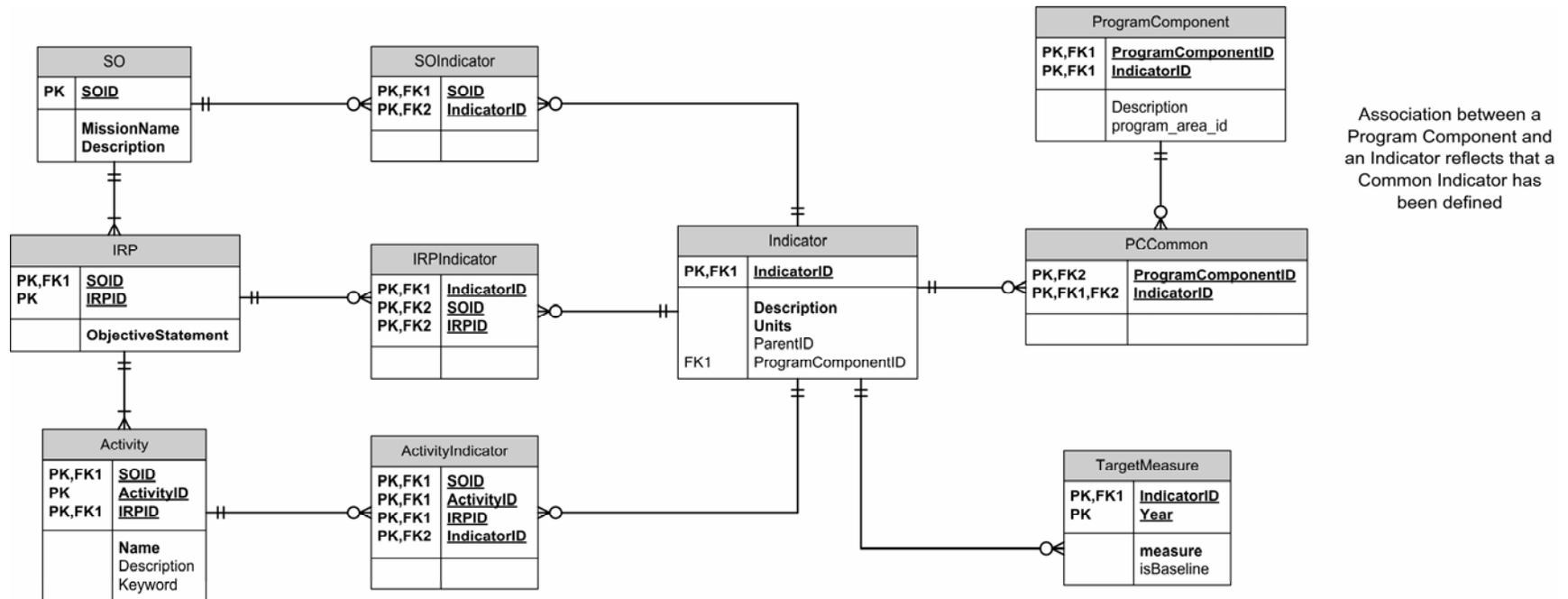


Figure 7 – The Indicators Model

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Table 8 - Indicators Model Code List

Class Name	Description	Attributes	Keys	Obligation
Indicator	Aggregated measure	Description, Units, ParentID, ProgramComponentID	Primary: IndicatorID	Mandatory
SO	Strategic Objective	MissionName, Description	Primary: SOID	Mandatory
SOIndicator	Lookup table linking Indicator with SO	-	Foreign: IndicatorID, SOID	Mandatory, when aggregated by SO
IRP	Intermediate Results Package	ObjectiveStatement	Primary: IRPID Foreign: SOID	Mandatory
IRPIndicator	Lookup table Indicator linking with IRP	-	Foreign: Indicator, IRP	Mandatory, when aggregated by IRP
Activity	Activity	Name, Description, Keyword	Primary: ActivityID Foreign: SOID, IRPID	Mandatory
ActivityIndicator	Lookup table Indicator linking with Activity	-	Foreign: Indicator, Activity	Mandatory, when aggregated by Activity
ProgramComponent	Program component	Description, program_area_id	Primary: ProgramComponentID Foreign: IndicatorID	Optional
PCCCommon	Lookup table linking Indicator with ProgramComponent	-	Primary: ProgramComponentID	Mandatory, when ProgramComponent present

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Class Name	Description	Attributes	Keys	Obligation
			Foreign: IndicatorID	
TargetMeasure		Measure, isBaseline	Primary: IndicatorID, Year	Mandatory

3.8 Metadata

Metadata is descriptive information about data, analogous to the library card catalog. A metadata record is information which captures the basic characteristics of a data or information resource. It contains information which the user can use to judge the fitness of the data resource for a particular use, such as accuracy, currency, and data integrity. Geospatial metadata are used to document geographic digital resources such as Geographic Information System (GIS) files, geospatial databases, and earth imagery. A geospatial metadata record includes core library catalog elements such as Title, Abstract, and Publication Data; geographic elements such as Geographic Extent and Projection Information; and database elements such as Attribute Label Definitions and Attribute Domain Values.

3.8.1 FGDC Content Standard for Geospatial Metadata

The [Federal Geographic Data Committee \(FGDC\)](#) is an interagency committee that promotes the coordinated development, use, sharing, and dissemination of geospatial data on a national basis. As a part of activities authorized by Executive Order 12906, the FGDC has developed the [Content Standard for Digital Geospatial Metadata \(CSDGM\)](#) which has been established as the Federal metadata standard.

In the course of its operations, USAID may obtain supplemental geospatial data from international sources. These data may be accompanied by metadata that follows the [International Organization of Standards \(ISO\)](#) specification, known as ISO 19115. ISO 19115 was developed under the auspices of [Technical Committee 211 \(TC211\)](#). As a member of ISO, the US is required to harmonize the FGDC metadata standard in accord with ISO 19115.

The FGDC is developing a US [Profile](#) of the (ISO) international metadata standard, ISO 19115. The status of those efforts can be found on the [FGDC web site](#). For the purpose of this pilot study, FGDC-compliant metadata was assembled for the Framework data layers so that all layers had metadata for the seven mandatory elements found in the CSDGM specification. These elements are summarized in Table 9.

Table 9 - Obligation associated with various FGDC Metadata Elements

Mandatory Elements:	Conditional Elements:
Dataset title	Dataset responsible party
Dataset reference date	Geographic location by coordinates
Dataset language	Dataset character set
Dataset topic category	Spatial resolution

Mandatory Elements:	Conditional Elements:
Abstract	Distribution format
Metadata point of contact	Spatial representation type
Metadata date stamp	Reference system
	Lineage statement
	On-line Resource
	Metadata file identifier
	Metadata standard name
	Metadata standard version
	Metadata language
	Metadata character set

Part III: The Standards Cookbook

This section provides:

- Approaches to the standardization process
- A process to guide USAID ANE Bureau in establishing and implementing information standards

4 The Standards Cookbook

This section consists of a “how-to” manual for creating and maintaining standards. It provides the toolset for USAID/ANE MIS/GIS users to establish and extend information standards and specifications employed in the development of the MIS/GIS Pilot. It is formatted so that users can identify the procedures that should be followed, the roles that must be filled, and the products that should result at each stage of the process.

4.1 Consider what to standardize and when to standardize

The things that should be standardized:

- Data
- Names
- Place names
- Data field types
- Allowable domain values
- Cardinality
- Predicates
- Data obligation

When to standardize:

- When one or more applications must share data or information
- When implementing new systems
- New technology segments of a federated enterprise
- Extending information technology capabilities with new applications.

4.2 Data models and terminology

Standard data models and standard terminology facilitate the exchange of data by making the semantics and structure of data understandable to a group of users outside the maintaining organization. Data models can be expressed in Universal Modeling Language (UML) or as an Entity-Relationship (E-R) diagram in order to formally define classes, their attributes, data types, domains, allowable values, and their interrelationships. The UML specification is maintained by

the Object Management Group (OMG).⁵ Extensive documentation, tools, and tutorials are available from the OMG web site.

4.3 A Suggested ANE Standards Development Procedure

Table 10 below provides a simple overview of the process ANE should consider adopting for development and maintenance of standards. The process is an abridged form of procedures used by accredited standards development organizations and conforms to best practices adopted by those organizations.

Table 10 - Suggested Standards Development and Maintenance Procedure

Action	Description
Identify business need	Determine what needs to be standardized and why
Steering group	Responsible for guiding the standardization process
Develop a draft standard	Develop usage information, data models, terminology
Issue review draft	Provide draft for comment and correction
Revised draft	Incorporate comments, corrections for final draft
Issue final draft	Issue final draft with rules for adoption and compliance

As the business need has already been identified, each of the succeeding steps outlined in Table 10 are expanded below.

4.3.1 Form a steering group drawn from a variety of experts

A committee or steering group that provides leadership and momentum is essential to determining business case/rationale and developing a consensus around which the standard is drawn. The steering group should be drawn from three broad user groups that have a vested interest in the development and adoption of the standard. These groups consist of:

- Potential users
- Systems administrators
- Other general interest users with concern or expertise

⁵ Object Management Group. Unified Modeling Language. Retrieved at <http://www.uml.org/> on 13 March 2006.

The activities of the steering group will be to define a working vocabulary and develop a model that defines the standard features and the relationships between them.

Output: A list of steering group members and contact information.

4.3.2 Prepare a draft standard

The FGDC also publishes guidance on standards formatting with special reference to geographic data, but extendable to other data as well.⁶

The advantages of adopting the style of an established standards organization is that the look and feel will be consistent with other standards and the elements will already be defined. Regardless of what template is selected, the template should contain certain minimal content:

Business purpose – Why is the standard needed and what it is supposed to accomplish?

Scope – What are the subject matter boundaries encompassed by the standard?

References – Does this standard derive from or depend on other standards, protocols, or business rules? Are there business drivers for the standard, such as OMB directives, Executive Orders, or other internal agency directives?

Definitions, Acronyms – What terms are introduced or defined in the standard? What terms are essential to the implementation of the standard? Does the standard make use of recurring abbreviations?

Formalized Conceptual Model – The conceptual model is essential for showing how the subjects (e.g., information packages, data classes, system interfaces, actors, organizations, documents) relate to one another. In recent practice, Unified Modeling Language (UML) has emerged as the favored method for expressing these formal relationships, but there are other methods, such as Entity-Relationship (E-R) diagrams.

Document information – In short, information about the standards document, e.g., date, contributing authors, committee/working group members, version, status (i.e. steering group draft, review draft, public review draft, final published standard), and sponsor.

Output: The steering group draft is the output of this step. It is used primarily to crystallize and clarify the concepts, models, and definitions developed by the steering group.

⁶ Federal Geographic Data Committee. Formatting Standards Directives. Retrieved at <http://www.fgdc.gov/standards/process/standards-directives/Directive6/index.html> on 22 March 2006.

4.3.3 Issue review draft

The review draft is issued to list of reviewers, which is typically drawn from a wider circle of technical and subject matter experts, as well as other staff with a material interest. Reviewers verify the scope and substance of the steering group draft and provide both editorial and substantive comments on the standard. A defined comment period--usually 30, 60, or 90 days--is provided to give time for sufficient review and to solicit the greatest number of useful comments. The comments received during a review are an important means for generating consensus around the new standard. A template for comments is a useful tool to insure that comments can be systematically reviewed and incorporated.

Output: The products of the public review are the consolidated comments of the reviewers.

4.3.4 Review comments and incorporate edits

Once the comments from the public review have been submitted, the steering group then addresses each comment and either incorporates the suggested changes or rejects the change. In either case, the decision and supporting rationale are documented and provided to public reviewers.

Output: The product of this process is a report listing each comment and how it was disposed of during the process.

4.3.5 Publish the final standard

For standards that are intended for agency-wide adoption, the steering group will submit them to the appropriate authority to insure compliance. The standards development organization will review the standard and conduct a ballot vote that will determine if the standard will be published or returned to the steering group for further revisions.

Appendix A: ANE MIS/GIS Standard Terms and Acronyms

5 Purpose

This section contains standard definitions of terms used in this document and within the ANE MIS/GIS. These terms are drawn from the Mission Engineering documentation that was developed in the Needs Assessment phase of this project. Review of these terms will help users better understand the text that is presented in this document.

5.1 Standard Terms defining Roles and Responsibilities - USAID MIS/GIS Actors

The definitions listed in this section are taken from the USAID ANE MIS/GIS Mission Engineering document and define *specific roles* found in the typical ANE Bureau. (These titles are generalized from the business model and do not reflect actual position titles or descriptions currently used by USAID):

Data Analyst - This user will have the ability to collect and input the data into the system. They would manage the creation, edits, and deletions of templates, reports, and all other data.

Financial Manager - This user would have the ability to review financial and strategic plans provided by the Strategic Planning Officer. They would have the ability to manage reports and input all financial data.

General User - All people who will "read" data from the system. For example, General Users will be able to access Information Discovery Activities, view the Common Operating Picture, Generate Visualizations from Search results, Annotate Maps, Publish Maps and Imagery, and Access the Reference Library. These users will generally be the principal users at the Washington level.

Geospatial Analyst - This user would have the capability of creating and running advanced geospatial queries. The user will also have the ability to create, edit, import, and manipulate geospatial data.

Implementing Partner - This user would have the ability to input data into the system as well as view reports that they have been given access to.

Instrument Manager - This user manages instruments (contracts, grants, cooperative agreements) by creating, reviewing, editing, and/or deleting them. Has the ability to assign them to an implementing partner. He/she will also have the ability to periodically update Mission Activities with instrument information.

Mission Manager - This user will have the ability to manage the creation, edition and deletion of implementers. They will also have the ability to input and manipulate data in the system along with creating and managing forms to collect data.

Systems Administrator - This user has the responsibility to maintain the system by providing any necessary updates, performing routine maintenance and by managing access to the system.

Technical Officer - This user type uses the ANE MIS/GIS to plan how a particular mission carries out its Strategic Objectives (SOs). The Technical Officer will use the system to register their Mission specific SOs with the ANE MIS/GIS, utilizing interfaces that allow for the definition of their project Results Framework. Additionally, they will have the ability to manage the data collection forms, schedule the input of data, and report management.

USAID/W Manager - Will have the ability to access the system to manage keywords from Washington. They will also have the ability to manage reports. They will have the ability to perform searches and perform queries in the system.

5.2 Standardized Definitions:

The definitions found in this section are taken from the MIS/GIS Mission Engineering document and are *components* of USAID ANE Bureau *business functions*. (These business functions were identified by the Needs Assessment, and may need to be adapted to the rapidly evolving organizational structure of USAID):

Activity (USAID definition) - A set of actions through which inputs such as commodities, technical assistance and training are mobilized to produce specific outputs such as vaccinations given, schools built, and micro-enterprise loans issued. Activities are undertaken to achieve Strategic Objectives as part of an Intermediate Results Package. They are performed through one to many Instruments by one to many Implementing Partners. Activities are measured by one to many indicators.

Activity Description - The details of the workflow, actions and results of performing the activity. One or two paragraphs describing what the actor sees and does, inputs and receives from the system.

Activity Functions - Discrete operational or application steps within the activity. Illustrated within the top layer of the MRV, this is the business process for the activity as performed by a human actor through a graphical user interface (GUI). Functions may also ‘just’ be illustrated within the Application layer of the MRV if there are no human actors performing the activity.

Activity Goal - The objective end result by completing the Activity. Not for an entire business process, just focused on the activity as a standalone object. Example: ‘Provide the capability to select agency-wide Strategic Objectives and define them for applicability at a specific Mission.’

Actor (general definition) - Actors comprise the collective characteristics of the persons or systems (in the case where there is no GUI) that perform work within the enterprise. In most

cases Actors will be human, but there are cases where autonomous systems are the actor.

Examples: Program Manager, Data Analyst

Bureau - A major organizational unit of USAID that is responsible to the Office of the Administrator; a Level I organization. A bureau administers complex and diverse programs involving a designated geographic area; major policy, program and technical advisory services; or management and program support functions.

Feature Type – A feature type is an abstraction of some real world feature and a feature is a specific real world instance of a feature type. A feature could have a physical representation (e.g., a road, building, river) or not (e.g., administrative boundary, trade negotiation, judiciary).

Features may have an optional associated geographic location.

Functional Activity (Mission Engineering definition) - Bounded piece of work performed by an Actor on or with the system. Activity has a defined Goal and Description. An activity is comprised of people, process and technology. People are the human or system (in cases where there is no GUI) actors that perform the work of the activity. Process is the workflow steps to achieve the goal of the activity. Technology is the COTS/GOTS or custom code that enables the functions within the workflow. Examples include Review Strategic Plans, Input Data.

Intermediate Results Package - A package of one to many activities that satisfies an intermediate step towards the completion of a Strategic Objective.

Indicator - A metric used to track performance regarding a specific activity, intermediate result or strategic objective. Indicators can measure inputs, outputs, and results. Indicators can also be used to measure other indicators; for example, an indicator to measure the number of healthy women could be supported by an indicator to measure the number of women who have been vaccinated.

Informative – In standards document, the word *informative* indicates information that is provided for descriptive or informative purposes and not necessarily to be interpreted literally. (Contrast with **Normative**).

Instrument - A contract, grant, cooperative agreement, bilateral agreement, or other mechanism that obligates or sub-obligates program or Operating Expenses (OE) funds.

Mission - The Agency field office that oversees USAID activities in a host country.

Normative – In standards documents, the word *normative* indicates that the user must follow the provisions of the standard, specification, or procedures in order to be in conformance with the standard. (Contrast with **Informative**).

Profile – As applied to standards, a method to extend, constrain, or tailor a standard for a specific business use or application.

Program Component - One of forty standard USAID products and services that cover the breadth of USAID program activities. A component comes with a set of common indicators to be used for Agency-level reporting.

Role - A person or entity with specific user access privileges.

Service/Service Area - A contextual grouping of like activities. Service areas can be used as architectural elements or in the case of web services, these service areas can be synonymous with the web services being developed. Example: Field Mission Planning, Workflow Management.

Strategic Objective - The most ambitious result that an Agency operational unit, along with its partners, can materially affect, and for which it is willing to be held accountable within the time period of the strategic objective.

Tools - COTS, GOTS or custom software applications or components that enable or support the activity. Activities can have one to many COTS/GOTS tools within an activity. Example: Phoenix, ArcGIS.

Workflow - A step-by-step process to complete a work assignment. Workflows execute autonomous processes, stage data and information, route data and information, and provide alerts.

5.3 Acronyms cited in this document

This section contains common or frequently used acronyms used in this document.

5.3.1 Derived from USAID business flow:

EIS – Enterprise Information System

DA – Data Analyst

GA - Geospatial Analyst

GU – General User

FM - Financial Manager

IM - Instrument Manager

IP - Implementing Partner

MM - Mission Manager

SA - Systems Administrator

TO - Technical Officer

WM - USAID/W Manager

5.3.2 Other related acronyms:

BGN – Board on Geographic Names

FGDC – Federal Geographic Data Committee

GNS – GeoNet Names Server

GIRM - Geospatial Interoperability Reference Model

GIS - Geographic Information System

NGS – National Geodetic Survey

NGA – National Geospatial Intelligence Agency

OMB – Office of Management and Budget

WGS 84 – World Geodetic System, 1984 (revised 2004)

USGS – United States Geological Survey

Appendix B: Gazetteer Usage Discussion

A gazetteer is simply an index of place names and their associated geographic identifiers. In order for the MIS/GIS pilot to succeed, foreign place names must be standardized. The value of gazetteers in digital libraries and their current limitations as spatial identification and retrieval tools has been well documented. Specifically, we identified the following criteria for developing and integrating gazetteers into digital libraries:

1. **Content Standard:** There is a need for a standard conceptual schema for gazetteer information, so that this information may be more easily created and shared. There are many sources of spatially referenced geographic names, but they are mostly for specific purposes only and not designed to be interoperable or shareable.
2. **Feature Types:** There is a need for a type scheme to categorize individual features for shared gazetteers. This scheme needs to be hierarchical, rich in term variants, and extensible to accommodate greater depth in terminology where needed. To be practical, this scheme needs to incorporate variant forms of terminology from established feature type schemes so that it can provide mappings between the various schemes.
3. **Temporal aspects:** Geographic names, their footprints, their relationships to other places, and their associated descriptive elements all change through time. Gazetteers must therefore incorporate temporal ranges for this data.
4. **Quality aspects:** Several aspects of gazetteer data quality need to be addressed. One is how to indicate the accuracy of latitude and longitude data. Another is the need to ensure that the reported coordinates agree with the other elements of the description. In general, data quality checks should be built in wherever possible for all data elements.
5. **Spatial extents:** Many currently available gazetteers contain point locations only, often derived as a by-product of map production. Points do not represent the extent of the geographic locations and are therefore only minimally useful. Bounding boxes, while sufficient for many search purposes, often misrepresent the feature by including too much territory. In general, there is a need to represent the spatial extent of gazetteer entries with more bounding boxes and detailed boundaries.

Establishing the standards that will enable the sharing of gazetteer data will assist in accessing data from many sources, but ultimately deriving spatial locations and extents from digital mapping products and other sources automatically will be required.