FEDERAL GEOGRAPHIC DATA COMMITTEE DATA CONTENT STANDARD FOR LOCATION AND IDENTIFICATION OF FACILITIES
FINAL DRAFT

Facilities Working Group
Federal Geographic Data Committee

December 1998

Federal Geographic Data Committee

Established by Office of Management and Budget Circular A-16, the Federal Geographic Data Committee (FGDC) promotes the coordinated development, use, sharing, and dissemination of geographic data.

The FGDC is composed of representatives from the Departments of Agriculture, Commerce, Defense, Energy, Housing and Urban Development, the Interior, State, and Transportation; the Environmental Protection Agency; the Federal Emergency Management Agency; the Library of Congress; the National Aeronautics and Space Administration; the National Archives and Records Administration; and the Tennessee Valley Authority. Additional Federal agencies participate on FGDC subcommittees and working groups. The Department of the Interior chairs the committee.

FGDC subcommittees work on issues related to data categories coordinated under the circular. Subcommittees establish and implement standards for data content, quality, and transfer; encourage the exchange of information and the transfer of data; and organize the collection of geographic data to reduce duplication of effort. Working groups are established for issues that transcend data categories.

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1.0 INTRODUCTION

The Federal Geographic Data Committee (FGDC) was established by the Office of Management and Budget (OMB) under Circular A-16 to promote the coordinated development, use, sharing, and dissemination of geospatial data. The committee, which is composed of representatives from 14 departments and independent agencies, oversees and provides policy guidance for agency efforts to coordinate geographic data activities. The FGDC created the Facilities Working Group (FWG) in January 1995, to address data issues that will enhance facility management. The objectives of the FWG are to: promote standards of accuracy and currentness in facilities data which is financed in whole or in part by Federal funds; exchange information on technological improvements for collecting facilities data; encourage the Federal and non-Federal community to identify and adopt standards and specifications for facilities data; and to promote the sharing of facilities data among Federal and non-Federal organizations.

On June 9, 1996, the FWG accepted a proposal to develop a Facility Identification Data Standard that supports location and identification of place-based objects that are generally known as facilities. The Facilities Identification Project Team was established for the purpose of developing a geospatial standard to consist of a set of standardized data elements which locate and identify facilities. This standard is the product of that project team.

1.1 Mission and Goals of Standard

The mission of this FGDC data content standard is to provide a set of standardized data elements that supports the location and identification of place-based objects that are generally known as facilities. A “facility” is defined in this standard as a distinct real property entity, including all objects managed by facility management and work management systems. Examples of facilities include such locational entities as factories, military bases, colleges, hospitals, power plants, national parks, office buildings,

space command centers, and prisons. The term “facility” does not include furnishings such as are included in personal property management systems. Facilities incorporate the properties of being (1) objects, established at (2) specific places for (3) specific purposes.

The variety and breadth of facilities, according to the above definition, result in a collection of data with a variety of themes or categories of information. A complex facility would include multiple functions and multiple buildings and structures, such as a military base or a college campus. The simplest facilities would include such objects as pipes, stacks, signs, and monuments significant enough to be identified. Because of the variety and complexity of data collections about facilities, this standard has been developed to provide a consistent set of data uniquely identifying a facility that will promote the sharing of data about facilities among federal and non-federal agencies as well as private sector organizations.

1.2 Scope

The scope of this standard is the identification of a core set of information that is necessary to locate, identify, and categorize a facility. The core set of information includes the facility name and type, data that specifies the location of the facility, and a unique identifier. This standard does not apply to furniture and other personal property objects. The core set of identification data, including descriptive and spatial locational data elements are listed in normative Appendix A. Standard data elements for data about the organizations that own or operate a facility are listed in informative Appendix B. A representative set of type categories to classify the place-based objects that comprise the set of objects generally known as "facilities” are listed in informative Appendix C. Informative Appendix D describes a methodology for developing a standard unique identification number (UID), and informative Appendix E describes the use of the UID to identify child-parent relationships and cross-references.

Standard reference domains for data elements are not included in this standard, but are incorporated by reference to other, existing standards. This standard also does not include standard data content for attributes that are specific to facility management or to other data collected about a facility. These data are addressed in separate standards (e.g., the Utilities Data Content Standard and the Environmental Hazards Data Content Standard).

This standard does not include implementation procedures for a central registry to assign UID to facilities. The standard recognizes the potential for more than one organization to assign a UID to the same facility. Therefore, the source of a UID must be used for all data transfer, and a UID must be unique for that source. The core data is used to resolve any concerns about the exact identity and location of a facility.

1.3 Applicability and Intended Uses of Standard

Government agencies own, operate, regulate, and monitor a wide variety of types of place-based objects known as facilities. This standard is applicable to all governmental agencies and private sector organizations that identify and manage information about facilities. This standard uniquely identifies facilities according to facility type and location. It provides for the assignment of a unique identification number that will facilitate the association of location and identification data about the facility to other data about the facility (e.g., facility management data and environmental concerns); it can be used as a cross reference to other identifiers that have been assigned to the same facility; and it can be used to show relationships among facilities that have a parent-child relationship (e.g., buildings and structures within an installation or utility objects within a utility network). It facilitates data sharing and transfer of data about a facility among agencies and private sector organizations.

1.4 Relationship to Existing Standards and Organizations

Under the auspices of the National Spatial Data Infrastructure (NSDI), a basic geographic data set or "framework" is being produced. The framework will be a consistent set of digital geospatial data and supporting services that will satisfy the needs of users to maintain and manage the variety of common information being collected by the public and private sector. The FGDC established the Framework Working Group to identify the purpose, goals, and content of the framework, as well as the operating procedures and perceived benefits to participating organizations. The FGDC recognizes the need to coordinate with the Framework Working Group in this arena. Facility data, often the most accurate and detailed data available for a geographic location, will be part of the basic framework.

The FGDC Ground Transportation Subcommittee is currently in the process of developing a standard for defining and assigning unique identifiers to transportation network segments in general, and to road segments in particular. The *Framework Road Data Model Standard* is significantly more detailed in defining how a road network should be segmented than the "network" example of facility types provided in Appendix C. The problem of segmentation for transportation networks is sufficiently complex that, without guidance or specific standards, the assignment of a unique identifier to a road segment is meaningless. This standard is not intended to define transportation networks as an alternative to the *Framework Road Data Model Standard*. It does, however, include transportation networks as examples of facilities for which location and identification information might be required.

Since facility data management can involve processing and integrating high and low resolution data and large and small scale data, the Facilities Working Group (FWG) also recognizes its opportunity to be a link between the FGDC and other entities such as the National Institute for Building Sciences (NIBS) and the American Public Works Association (APWA).

The *Cadastral Standard for the National Spatial Data Infrastructure (NSDI)*, FGDC, November 1994, defines the data and processes required to support the collection, storage, dissemination, and maintenance

of landownership and land records data for the NSDI. Land records and land ownership are not the subject of this Facility Identification Standard.

The data content for address information described in this standard in normative Appendix A is consistent with the U.S. Postal Service address standards, and the data content for organizations and points of contact in informative Appendix B is consistent with Dan Tasker's *Fourth Generation Data, A Guide to Data Analysis for New and Old Systems*. The data content is expected to be consistent with the draft *Address Content Standard* currently being prepared by the FGDC Subcommittee on Cultural and Demographic Data. The address data elements are listed in this data content standard in the absence of an approved FGDC address content standard.

The American National Standard for Information Systems (ANSI) X3.61-1986, Representation of Geographic Point Locations for Information Interchange, provides uniform formats for representing geographic point location data in digital format for interchange between and among data systems. This standard is in conformance with ANSI X3.61-1986, and supports the use of those data formats.

1.5 Standard Development Procedures

This standard has been developed by the Facilities Identification project team of the FWG according to the guidance and direction provided by the FGDC Standards Working Group (SWG) in their Standards Reference Model, dated March 1996, and the SWG Directive #6, Formatting FGDC Standards Document, dated July 1997. Members of the project team contributed information about the types of facilities managed by their individual organizations, and the data that is needed to identify and locate a facility. The Environmental Protection Agency provided editorial leadership for preparing the document. Participants in the standards development included representatives from:

Naval Facilities Engineering Command

U.S. Air Force

Department of Commerce, Bureau of the Census

U.S. Environmental Protection Agency

Federal Aviation Administration

U.S. Army Corps of Engineers

U.S. Forest Service

U.S. Geological Survey

National Aeronautics and Space Administration

Tri-Service Computer-Aided Design and Drafting/Geographic Information Systems Technology Center

Federal Emergency Management Agency

1.6 Maintenance of the Standard

The Environmental Protection Agency, as a participant in the FGDC Facilities Working Group under the leadership of the Department of Defense, U.S. Army Corps of Engineers, will maintain the Facility Location and Identification Data Content Standard. All questions concerning this standard should be addressed to the Chair of the Facilities Working Group at:

U.S. Army Corps of Engineers
General Engineering Branch, CECW-EP-S
20 Massachusetts Avenue, NW
Washington, DC 20314-1000

2.0 DEFINITIONS

For the purpose of this facility location and identification standard, the following definitions apply:

2.1 Unique Identifier (UID) -- A unique identifier (UID) is a non-intelligent number or alphanumeric string that has no inherent meaning and can be permanently assigned to a place or an object.

2.2 Facility -- A facility is a distinct real property entity (i.e., a man-made object and its surrounding real estate), including all objects managed by facility management system, but not including furnishings which are included in property management systems. Facilities incorporate the properties of being (1) objects, established at (2) specific places for (3) specific purposes. For the purpose of this standard, facilities are limited to place-based objects that are subject to facilities management and work management systems.

2.3 Complex Facility -- A complex facility consists of functionally interrelated objects for which a central authority has been established with responsibility for management. A complex facility includes multiple functions and multiple buildings and structures.

2.4 Objects -- Objects are regulatory management items that are man-made for a particular use.

2.5 Place -- A place is a geographic location (i.e., a spatial reference) that does not move, although the place associated with an object might increase in area (e.g., as when facilities annex more land) or decrease in area (e.g., when land is sold and the place becomes associated with another object).

2.6 Place-Based Objects -- Place-based objects are things that have been established at a place for a specific purpose, including the wide variety of facilities that are managed by governmental agencies and private sector organizations. Examples of place-based objects include factories, military bases, colleges, hospitals, power plants, national parks, office buildings, space command centers, and prisons.

2.7 Facility Type -- Facility type is a characteristic of a facility that categorizes the facility by functionality and physical considerations.

2.8 Organization -- An organization is a business group that is affiliated with a company, including the owners, operators, and other parties responsible for activities at a facility.

3.0 THE STANDARD FOR LOCATION AND IDENTIFICATION OF FACILITIES

Facilities within the scope established for this standard shall be characterized by the following:

A **core set** of required, descriptive information that uniquely distinguishes a facility, including:

- **Locational** information that will specify the place where the facility is located.

    - A **facility name** and a **type descriptor** that will categorize the individual facility or the relationships between facilities.

    - **A non-intelligent UID** that has no inherent meaning and can be permanently assigned to a facility for purposes of associating data about that facility and the **source of the UID**.

Associated data that will include optional information about organizations and points of contact.

3.2 Core Set of Identification and Location Data

The core set of identification data that is required to describe a facility and the place where it exists include facility name and type, a unique identifier and its source, and a minimum of two types of locational data: descriptive information (i.e., geographic address) and spatial coordinates. Mandatory core data elements for facility name and type, unique identifier and source, and spatial coordinate data are detailed in normative Appendix A. In addition, Appendix A provides an example of descriptive locational information. The optionality of data elements for descriptive locational information has not been defined, subject to the forthcoming *Address Content Standard*.

3.2.1 Facility Name and Type

The name of the facility is general information that provides a convenient reference for identifying the facility. The type indicator associated with a facility shall categorize the type of facility, not the type of place in which a facility is located. An example of the types of facilities (i.e., place-based objects) identified by this standard include the categories listed below. Examples of facilities included in each category are provided in informative Appendix C.

Installation -- One or more land tracts, with facilities, for which a central authority has been established with responsibility for management.

Land Tract -- A contiguous parcel of land under a single ownership that might contain one or more facilities.

Network -- An interconnected or interrelated chain or system of facilities, under a common ownership or management, that fulfill a common purpose.

Building -- A roofed and walled structure constructed for permanent use, as for habitation or for business purposes.

Establishment -- A place of business, generally at the same physical location, where service or industrial operations are conducted or performed.

Structure --A man-made object that has been constructed for a purpose but is not intended for habitation.

Utility Object -- The man-made objects of a network that provides a service (e.g., light, power, water) to the public.

Transportation Object -- The man-made objects of a network that provides a means of conveyance or travel from one place to another.

Surface Area - -A portion of the surface of the earth that is distinguished by ownership or boundaries. The area is managed as a facility, but is not characterized by a structure.

Appendix C is not inclusive of all place-based objects that are identified as facilities; it is intended to provide guidance for categorizing and relating facility types (e.g., to indicate parent/child relationships such a transportation network and its subordinate transportation objects).

Other typing schemes might be developed and used as appropriate to the individual needs of a particular organization, depending upon the extent of facilities and facility types managed by the organization. For example, an organization might choose to categorize facilities as:

Complex Facility -- An object that can be identified by a 2-digit Standard Industrial Classification (SIC) Major Group Code and which contains multiple facilities.

Single Facility -- An object at which a specific business function occurs, such as can be identified by a 4-digit SIC code.

Feature -- A subentity of a facility, such as a smoke stack, discharge pipe, or incinerator.

3.2.2 Locational Information

This subsection provides a list of descriptive and spatial data that are used to identify and locate a facility. The following two kinds of locational information are required for clearly establishing the location of a facility:

Descriptive Locational Information, including such address data elements as:

- Street Address.
- City, town, village, or rural area.
- U.S. Postal Service ZIP code with ZIP + 4 extension (e.g., 22303-3210).
- Geopolitical area data (e.g., county, state, country, and tribal area).

Spatial Coordinate Data, including:

- Latitude and longitude coordinates.

- Metadata as required by the *Content Standard for Digital Geospatial Metadata*.

3.2.3 Unique Identifier (UID) and Source

A non-intelligent unique identifier (UID) shall be assigned to place-based objects of interest to the federal government, state and local governments, and non-governmental organizations that share data based on geographical location. The name of the agency or other organization that assigned a UID (i.e., the source of the UID) must be associated with that UID for data sharing. Characteristics of a facility UID, usage of a UID for facility identification, and procedures needed to assign and maintain a UID for facility identification are described in informative Appendix D.

3.3 Associated Facility Data

The associated data elements, outlined in informative Appendix B, provide additional information about a facility. These data elements are common to most types of facilities, regardless of the purpose or function of the facility. The associated data elements that are incorporated in this standard as optional data include the following:

Organization that owns or operates the facility.

Relationship of organization to the facility.

Organization's mailing address.

Point of Contact.

Relationship of contact to the facility.

Telephone number.

Facsimile telephone number.

Electronic mail address.

4.0 IMPLEMENTATION

This Facility Location and Identification Data Content Standard can be implemented in information systems where facility management data or other data relevant to a facility is maintained. The example of a public water system illustrated in Appendix E demonstrates the use of unique identifiers and other core data elements to identify a facility. It also demonstrates how data about the components of the public water system can be related to each other and to other information systems that maintain data about those components.

The Environmental Protection Agency (EPA) has recently reengineered its Facility Index System to an enhanced facility identification system using a relational database management system. The EPA is assigning unique, unintelligent identification numbers, using the algorithm described in Appendix D, and is categorizing facilities as complex and single. EPA has included in its facility system geographic address; spatial data; including latitude, longitude, altitude, and metadata that represent method, accuracy and description; and associated data, including organizations, points of contact, and mailing addresses, as described in informative Appendix B. Facility features are managed at EPA by media-specific programs, and not by the facility identification system.

This data content standard specifies the data that are needed to identify a facility in any manual or automated information; it is not intended to mandate or recommend any implementation product.

5.0 BIBLIOGRAPHIC REFERENCES

ANSI X3.61-1986, *Representation of Geographic Point Locations for Information Interchange*.

Credit Card Validation -- Check Digits, http://www.websitter.com/cardtype.html, for Modulus Ten Check Digit algorithm.

EPA Environmental Data Registry, http://www.epa.gov/edr.

Executive Order 12906, *Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure*, published in the April 13, 1994, edition of the Federal Register, Volume 59, Number 71, pp. 17671-17674.

Federal Geographic Data Committee. *Cadastral Standard for the National Spatial Data Infrastructure (NSDI)*, November 1994

Federal Geographic Data Committee. *Content Standard for Digital Geospatial Metadata* (revised April, 1997). Washington, D.C.

Federal Information Processing Standards (FIPS) Publications 10-4, *Countries, Dependencies, Areas of Special Sovereignty, and their Principal Administrative Divisions*, April 1995; 6-4, *Counties and Equivalent Entities of the United States, its Possessions, and Associated Areas*, August 1990; and 5-2, *Codes for the Identification of the States, the District of Columbia and the Outlying Areas of the United States, and Associated Areas*, May 1987.

Fourth Generation Data, A Guide to Data Analysis for New and Old Systems, Dan Tasker, Prentice Hall, 1988, Chapter 10, Fourth Generation Data Types, describes person-name groupings and address groupings of data elements.

HUD Address Quality Standards, Central Information Management, U.S. Department of Housing and Urban Development, draft March 27, 1996.

ISO 11180:1993 *Standard for Postal Addressing*, November 20, 1991.

Standard Facility Requirements, Air Force (AF) Instruction 32-1024, May 31, 1994, implements Department of Defense (DoD) Instruction 4165.3, *Department of Defense Facility Classes and Construction Categories*, October 24, 1978, and portions of MIL-HDBK-1190, *Facility Planning and Design Guide, Part II, Technical Guidance*. It provides general guidance for developing standard facility requirements.

The Standard Industrial Classification of Establishments, 1987 edition, PB 94-502085HDY.

United States Postal Service, *Publication 28: Postal Address Standards*; *Publication 65: National Five-Digit ZIP Code and Post Office Directory*; *Notice 186: ZIP + Code*.

Appendix A

A Core Set of Identification Data

(Normative)

A.1 Unique Identifier. The mandatory data elements listed in the following table make up a unique facility identifier.

Data Element Name	Description	Max Characters	Example	Validate
Unique Identifier	The unique identifier assigned to a facility when it is registered. See Appendix D.	12 char	000000316946	None
Source of UID	The agency or organization assigning the UID.	50 char	Department of Defense, Environmental Protection Agency	None

A.2 General Identification Data. The mandatory data elements listed in the following table provide general information about a facility.

Data Element Name	Description	Max Characters	Example	Validate
Descriptive Name	The name of the facility.	50 char	Center Dry Cleaners, Discharge Pipe #2	None
Facility Type	A label describing the type of facility. See Appendix C.	50 char	Installation, Building	None

A.3 Descriptive Locational Information. Descriptive locational data are required to establish the location of a facility. The data elements indicated in the following table are examples of the descriptive locational data that will be required, subject to the forthcoming *Address Content Standard*.

Data Element Name	**Description**	**Max Characters**	**Example**	**Validate**
Building name	Name of building where the facility is located.	30 char	Pulaski Building	None
Urban-style street address	The street where the facility is located.	30 char	215A N Oak Rd SE Ste 300	USPS Pub 28
Rural-style street address	The rural route and box number or the highway contract route and box number where the establishment is located.	30 char	RR5 Box 10, HC5 Box 45	USPS Pub 28
Descriptive street address	A brief explanation of where the facility is located.	50 char	Hwy 23 5 mi W of I 95, Rt 50 - Rt 29 intersection, Fire road 3 on Mt. Hood	None
City, town, village, or rural area	The city, town, village, or rural area where the establishment is located.	30 char	Arlington, Falls Church	USPS Pub 28

County	The name of a U.S. county or county equivalent	30 char	Fairfax	FIPS Pub 6-4
Tribal area	The name of an American Indian or Alaskan native area.	30 char	Cheyenne River	FIPS Pub 55-3
State	The code or name of the primary administrative subdivision of the country where the establishment is located.	35 char	VA (abbrev), 51 (FIPS code), Virginia (name) Note: Either form is valid.	FIPS Pub 5-2
ZIP Code	The ZIP Code where the establishment is located.	5 num	22003	USPS Pub 65
ZIP+4 Extension	The geographic segment code where the establishment is located.	4 num	2307	USPS Notice 186
Country	The country where the establishment is located.	35 char	United States Canada	FIPS Pub 10-4

A.4 Mandatory Spatial Coordinate Data. Spatial Coordinates are required for establishing the location of a facility. One or more sets of coordinates should be collected, to define a point, a line, or an area. The definitions and representation of latitude and longitude are specified by the *Content Standard for Digital Geospatial Metadata.* Metadata are not itemized in this standard. Metadata are required, however, in conformance with the metadata standard.

Data Element Name	**Description**	**Max Characters**	**Example**	**Validate**
Latitude	The angular distance measured on a meridian north or south from the equator. Format +/- DD.dddddd	10 char	Decimal degrees + 84.123456	Range 0-90
Longitude	The angular distance between the plane of a meridian east or west from the plane of the meridian of Greenwich. Format +/- DDD.dddddd	11 char	Decimal degrees - 126.654321	Range 0-180

Appendix B

Associated Facility Data

(Informative)

B.1 Organization Name. The following data elements are used to define organizations. Note that, although a place does not move, the organizations associated with the place might change, requiring that "organization" be identified separately from the place and the object.

Data Element Name	Description	Max Characters	Example	Validate
Type of Organization	The type of function performed by an organization in relation to a facility.	20 char	Owner, Operator	None
Organization Name	Identifies the legal entity that is associated with the facility.	50 char	Eastman Kodak Chemical Corp.	None
Department of the Organization	Narrows the scope of the facility or other place within the organization.	50 char	Manufacturing Division	None

B.2 Point of Contact. The following data elements are used to identify contact persons.

Data Element Name	Description	Max Characters	Example	Validate
Type of Contact	The function of the contact person.	30 char	Facility Manager, Water Permit Manager	None
Last Name	The surname of the contact person. Optionally, the name qualifier and educational degree can be included in this element.	20 char	Johnson, Kersey, Johnson Jr MD	None

First Name and Middle Initial(s) or Middle Name	The given name of a contact person, and the middle initial(s) or name. Optionally, the title can be included as a prefix in this data element.	15 char	James B, Joseph J L, Mary Ann, Mr James A	None
Name Prefix	The title that precedes a person's name.	5 char	Mr, Major	None
Name Qualifier	A qualifier to indicate that the name is reused in the family.	4 char	Jr, III	None
Educational Degree	One or more advanced degrees.	10 char	PhD, MD, JD	None
Occupational Title	The generic title for the occupation of the person.	30 char	Chemist, Economist	None
Organiza-tional Title	The official title held by the contact person.	30 char	Environmental Manager	None
Telephone Number	The telephone number where a contact person can be reached. Extension number is optional	15 char	7039082400, 703908240012345	None
FAX Number	The telephone number where a contact person can receive a FAX.	15 char	7039082405, 703908240512345	None
E-Mail Address	The code where a contact person can receive electronic mail.	128 char	JoeW@aol.com	None

425 **B.3 Mailing Address**. The following data elements identify mailing address for both a contact
426 person and organization. The international postal code is required where the country to which mail is
427 delivered is outside the United States. One of the two conditional address (*) styles is required: delivery
428 point urban style or alternative delivery point rural style.

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Data Element Name	**Description**	**Max Characters**	**Example**	**Validate**
Building Name	The name of a well-known building where the postal delivery point for the establishment is located.	30 char	WORLD TRADE CENTER, CITY HALL	None
*Delivery Point -- Urban-style street address	The mail delivery point, including the building no., pre-directional symbol, name of the street, the street type, and post-directional symbol for where the mail is delivered.	30 char	1600 N WILSON BLVD	None
Secondary Unit Designator	The room, suite, or apartment number, where the mail is delivered.	15 char	APT 6, RM 300, STE 1300	None
*Alternate Delivery Point -- Rural-style address	Post office box number, rural route and box, or highway contract and box where a street address is not available or where preferred by the addressee for mail delivery.	30 char	PO BOX 234, RR5 BOX 10, HC5 BOX 45	None

City/Town/ Village	Name of the postal delivery office or the name of the city where the delivery point is located.	30 char	ARLINGTON, FALLS CHURCH	USPS table
State	Name or abbreviation of the state or province where the postal delivery point is located.	35 char	VA (2 char), VIRGINIA, PQ (2 char), QUEBEC	FIPS 6-4
ZIP Code	ZIP Code where the postal delivery point is located.	5 num	22003	USPS table
ZIP+4 Extension	Code that subdivides the ZIP Code into smaller geographic units to facilitate mail delivery.	4 num	2307	USPS table
International Postal Code	The postal code specific to the country where the delivery point is located if outside the U.S.	14 char	BH21 2QU	None
Country	The country where the delivery point for the establishment is located when outside the U.S.	35 char	CANADA, FRANCE	FIPS 10-4

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Appendix C

Types of Facilities

(Informative)

This informative Appendix provides examples of one typing scheme for place-based objects known as facilities. Section C.1 addresses nine category types and examples. Section C.2 describes relationships of categories and objects:

C.1 Categories. Objects, known as facilities, can be grouped into major categories. Eight such categories and examples are given in this informative Appendix.

C.1.1 Installation. One or more land tracts, with facilities, for which a central authority has been established with responsibility for management. Examples include:

C.1.1.1 Airport -- a tract of land or water that is maintained for the landing and takeoff of aircraft and for the receiving and discharge of passengers and cargo and that usually has facilities for the shelter, supply, and repair of planes.

C.1.1.2 Military base -- the locality or the installation on which a military force is quartered, trained, and supplied, or from which it initiates operations.

C.1.1.3 Colleges/Universities -- a building or building complex used for an educational purpose.

C.1.1.4 Industrial park -- a group of buildings and structures established for business purposes.

C.1.1.5 Mobile home park -- a community of trailers that are used as permanent dwellings, usually connected to utilities, and designed without a permanent foundation.

C.1.1.6 Prison -- a place where persons are incarcerated for safe custody, usually while on trial for an offense or for punishment after trial and conviction.

C.1.2 Land Tract. A contiguous parcel of land under a single ownership that might contain one or more facilities, such as buildings or structures.

C.1.2.1 Plant -- the land, buildings, machinery, apparatus, and fixtures employed in carrying on a trade or an industrial business. Examples of plants include:

A waste treatment plant is a plant that carries out the business of treating and cleaning up waste.

A water treatment plant is a structure containing equipment, processes, piping, or components; used to treat and remove unwanted materials from water.

A manufacturing plant is a structure containing equipment that is used to produce something from raw materials by hand or by machinery.

C.1.2.2 Refinery complex -- the land, buildings, machinery, apparatus, and fixtures employed in the process of purifying a crude substance.

C.1.2.3 Hospital -- an institution, including apparatus, equipment, and fixtures, where the sick or injured are given medical or surgical care.

C.1.2.4 Park areas -- a tract of land, including all structures, equipment, and apparatus, maintained for recreation.

C.1.2.5 Golf course -- an area of land laid out for the game of golf, including buildings, structures, and equipment.

C.1.2.6 Service station -- an establishment that services motor vehicles, usually including land, building, pumps, and fuel storage tanks.

C.1.3 Network. An interconnected or interrelated chain or system of facilities, under a common ownership or management, that fulfills a common purpose.

C.1.3.1 Public water system -- a source, means, or process of supplying water (as for a community) usually including reservoirs, water treatment plants, pumping stations, and pipelines.

C.1.3.2 Electric utility system -- a distribution system for electricity, including power plants and equipment (e.g., lines, poles, transformers) needed to carry the electricity to a consumer.

C.1.3.3 Gas utility system -- a distribution system for gas, including the equipment (e.g., pipes and valves) needed to carry the gas to a consumer.

C.1.4 Building. A roofed and walled structure constructed for permanent use, as for habitation or for business purposes.

C.1.4.1 Office Building -- a building that contains offices, e.g., a medical arts building.

C.1.4.2 Train station -- a building that provides shelter for passengers and where business related to transportation of passengers and cargo is conducted.

C.1.4.3 Habitable building -- a building established for habitation, including house, apartment building, and condominium.

C.1.4.4 School -- a building established for educational purposes.

C.1.4.5 Refinery Building -- a building and equipment for refining or processing, especially metals, oil, or sugar.

C.1.5 Establishment. A place of business, generally at the same physical location, where service or industrial operations are conducted or performed.

C.1.5.1 Small business -- a simple business establishment, e.g., a dry cleaning establishment or a paint store.

C.1.5.2 Laboratory -- a place that performs fee-for-service analytical or medical tests, prepares dental devices, dispenses eyeglasses, or other technical services as a business, e.g. a pathology laboratory.

C.1.5.3 Medical or dental offices -- organizations that perform medical or dental services, usually within a space located within a larger area, e.g. a medical arts building.

C.1.5.4 Warehouse -- a storage facility which occupies rental or leased space, e.g. in a commercial industrial park.

C.1.6 Structure. A man-made object that has been constructed for a purpose but is not intended for habitation.

C.1.6.1 Car wash -- a structure where motor vehicles are cleaned.

C.1.6.2 Power plant -- an electric utility generating station.

C.1.6.3 Pumping Station -- a device that raises, transfers, or compresses fluids or that attenuates gases by suction or pressure or both.

C.1.6.4 Smoke stack -- a vertical pipe which might include multiple flues that rises above a roof to carry off smoke and other emissions to the air.

C.1.6.5 Outfall pipe -- the outlet of a body of water, especially the mouth of a drain or a sewer.

C.1.6.6 Storage tank -- a large receptacle for holding and storing liquids. Storage tanks might be above ground or underground.

C.1.6.7 Monitoring station -- a device where air, water, or soil pollutants are observed.

C.1.6.8 Monument -- a stone or other structure used as a memorial or to mark a boundary.

C.1.6.9 Tower -- a building or structure that is higher than its diameter and high relative to its surroundings. It may stand apart or be attached to a building.

C.1.6.10 Levee -- an embankment (i.e., a continuous dike or ridge) for containing water in an irrigation area or to prevent flooding.

C.1.6.11 Dam -- a barrier to prevent the flow of liquid, gas, or loose solid materials (e.g., sand or snow). Usually in reference to a barrier built across a watercourse for impounding water.

C.1.6.12 Incinerator -- a furnace or a container for burning waste materials.

C.1.6.13 Ash monofill -- a receptacle where residue from an incinerator or similar combustion process is placed.

C.1.7 Utility Object. Equipment or other object that is part of a system that provides a service.

C.1.7.1 Pipe -- A pipe used to carry a substance from location to location (main line, service line, vent line, etc). Pipes can carry liquids (e.g., water or fuel oil) or gases (e.g., natural gas).

C.1.7.2 Water reservoir -- A body of water which supplies water to a water distribution system.

C.1.7.3 Water meter -- A device installed in a line for measuring the quantity and or rate of water flowing to a facility or through a section of line.

C.1.7.4 Electric Cable -- A group of conductors of electrical energy used to carry electrical power from source to load.

C.1.7.5 Transformer -- A device for increasing or decreasing voltage levels in an electrical system.

C.1.7.6 Electric meter -- A device installed in a line for measuring the quantity and or rate of electrical current to a facility or through a section of line.

C.1.7.7 Pole -- A structure used to elevate items above the ground surface.

C.1.7.8 Gas pipe -- A pipe used to carry a substance from location to location (main line, service line, vent line, etc).

C.1.7.9 Gas meter --A device installed in a line for measuring the quantity and or rate of gas to a facility or through a section of line.

C.1.8 Transportation Object. The man-made components of a system that provides a means of conveyance or travel from one place to another.

C.1.8.1 Culvert -- A structure intended for the interception and removal of ground water or surface water.

C.1.8.2 Highway bridge -- A structure used by vehicles that allows passage over or under an obstacle such as a river, chasm, or road.

C.1.8.3 Tunnel -- A passage under the ground or under the water.

C.1.8.4 Road feature -- A feature associated with a road, such as road signs, mile posts, and traffic lights.

C.1.8.5 Railroad bridge -- A structure used by a railroad that allows passage over an obstacle such as a river, chasm, mountain, or road.

C.1.8.6 Railroad feature -- A feature associated with a railroad such as signals, lights, road crossings, mile posts, and switches.

C.1.9 Surface Area. A portion of the surface of the earth that is distinguished by ownership or boundaries. The area is managed as a facility, but is not characterized by a structure.

C.1.9.1 Landfill -- an area built up by a system of trash and garbage disposal in which the waste is buried between layers of earth to build up low-lying land.

C.1.9.2 Solid waste dump -- a place where there is an accumulation of refuse and discarded materials.

C.1.9.3 Recreation area -- a land area set aside for recreational activities, as a ball field, hunting reserve, nature trails, etc.

C.1.9.4 Parking lot -- An area used for parking vehicles.

C.2 Relationships. Within this typing system, objects can be related to others as equal relationships (e.g., where different identifiers have been assigned to the same facility) or as parent/child relationships (e.g., the land tracts that exist within an installation and the buildings and structures that exist within a land tract). Table C.2.1 table has been created to illustrate how parent/child relationships might apply to the categories defined in Section C.1. Table C.2.2 illustrates how some common characteristics of management, ownership, property boundaries, and relative size apply to the categories.

C.2.1 Mandatory, Optional and Conditional Relationships of Categories. This table illustrates the parent/child relationships that would exist under the typing scheme suggested in Section C.1. The row headers indicate the parent, and the column headers indicate the child relationship. An “M” in a cell indicates that the object in the column header is mandatory when related to the object in the row; O indicates that the column object is optional; and C that the column object is conditional (i.e., at least one of the objects must exist). An X indicates that the column object is not applicable to a parent/child relationship.

	Instal-lation	Land Tract	Network	Building	Establish-ment	Structure	Utility Object	Transpor-tation Object	Surface Area
Installation		M	O	C	O	C	O	O	O
Land Tract	X		O	C	O	C	O	O	O
Network	O	O		O	O	O	C	C	O
Building	X	X	X		O	O	O	X	X
Establish-ment	X	X	X	X		O	O	X	X

Structure	X	X	X	X	X		O	O	X
Utility Object	X	X	X	X	X	X		X	X
Transportation Object	X	X	X	X	X	X	X		X
Surface Area	X	X	X	X	X	X	X	X	

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648 **C.2.2 Common Characteristics of Categories**. The categories suggested in Section C.1 have some
649 characteristics in common and some that are specific to a category. The following table illustrates how
650 the characteristics of management, ownership, property boundaries (i.e., contiguous), and relative size
651 apply to the categories.

652

	Instal-lation	Land Tract	Network	Building	Establish-ment	Structure	Utility Object	Transpor-tation Object	Surface Area
Type of Management	Single	Single	Single	Single	Single	Single	Single	Single	Single
Type of Owner	Multiple or Single	Single	Single	Single	Single	Single	Single	Single	Single
Contiguous	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Relative Size	Large	Medium	Medium	Small	Small	Small	Small	Small	Small

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658 **Appendix D**

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660 Unique Identifier (UID)

661 (Informative)

D.1 Background

A non-intelligent UID is required by the facility identification standard because it can be permanently assigned to a facility to provide a unique identifier for data linkages and data sharing. Examples of non-intelligent UIDs that are commonly used are:

Social Security Number. The number is permanently assigned to an individual in the United States (U.S.), and used to identify that individual regardless of his or her residence, place of employment, or any other characteristic of that individual.

Chemical Abstracts Service (CAS) Registry Number. All chemical substances reported in published literature are assigned a unique, non-intelligent registry number that is used nationally and internationally to identify that substance. Over 10 million CAS registry numbers have been assigned.

Data Universal Numbering System (DUNS) number. DUNS numbers are assigned and maintained by Dun and Bradstreet to uniquely identify business establishments. The DUNS number is recognized worldwide as a business identification standard. Over 14 million DUNS numbers have been assigned in the U.S. and over 9 million outside the U.S.

Intelligent identification numbers (those that contain some kind of information), by contrast, are not permanent; they change as the criteria for their assignment changes. For example, the following usage of intelligent identification numbers has resulted in the need for ongoing changes to data collections:

FIPS Codes. FIPS codes are assigned sequentially within a state, so that counties and other geopolitical units are always alphabetized within a state. When county names change, or a

688 county is divided into more than one county, the numbers assigned to several counties can
689 change whenever there is a need to re-alphabetize the counties. This has resulted in the need
690 to change data within a database.
691
692 EPA Facility Identification Codes. At one time, the EPA created a facility identification code
693 by combining the U.S. Postal Service state code with the DUNS number for a facility. About
694 65% of the facilities regulated and monitored by the EPA, however, are not businesses to
695 which DUNS numbers have been assigned. In addition, the EPA's objective is to uniquely
696 identify a facility at a location, regardless of ownership. The DUNS number is assigned to a
697 business (including ownership), regardless of location. Therefore, the DUNS number for a
698 facility changed as ownership changed, making that methodology for identification number
699 inappropriate for EPA usage. This has resulted in the need to use a non-intelligent
700 methodology for assigning identification numbers.
701
702 **D.2 Characteristics of the Facility UID**
703
704 The following attributes will characterize the UID:
705
706 D.2.1 Non-intelligent unique identifiers (i.e., UID) will be used to permanently, uniquely identify all
707 facilities of interest.
708
709 D.2.2 The facility UID is assigned to the facility, not to the owner or environmental concern
710 associated with the place.
711
712 D.2.3 The UID will be a 12-digit number that has no relation to any sequencing of records in the
713 database.

D.2.5 A check digit shall be incorporated into the UID to enable detection of transposition, transcription, and transmission errors, thus providing validity to the numbers.

D.2.5.1 The first 11 digits of the UID shall be a unique number.

D.2.5.2 The 12th digit (i.e., right-most digit) will be the check digit. Note that the resultant 12-digit number is also a unique number.

D.2.5.3 The check digit shall be determined using the *Modulus Ten Check Digit*, a defacto, commonly recognized standard for validating identification numbers. Modulus Ten is used to validate credit card numbers, DUNS numbers, UPC bar code numbers, and others. A detailed description of the algorithm for calculating the check digit, with examples, follows.

Step 1. Double the value of alternate digits of the unique 11 digit number beginning with the second digit from the left.

Step 2. Add the individual digits comprising the products obtained in Step 1 to each of the unaffected digits in the original number. Note that 10 becomes 1 and 0, 11 becomes 1 and 1, 19 becomes 1 and 9.

Step 3. Subtract the total from the next highest multiple of 10 to determine the check digit (i.e., the right-most digit of the 12-digit UID).

For example, to calculate a check digit for the 11-digit number 01234598765:

Step 1: 0 1 2 3 4 5 9 8 7 6 5

1 3 5 8 6

X2 X2 X2 X2 X2

2 6 10 16 12

Step 2: 0 +(2) +2 +(6) +4 +(1+0) +9+ (1+6) +7 +(1+2) +5 = 46

Step 3: The next highest multiple of 10 from 46 is 50.

50 - 46 = 4

4 is the check digit, resulting in the number: 012345987654

D.2.5.4 The total number of UIDs that can be created, based on an 11-character unique number and a check digit is nearly 100 billion. The above algorithm catches 100% of single digit errors and 98% of single transposition errors (i.e., adjacent digits) according to Dun and Bradstreet.

D.2.6 No spaces, hyphens, or other edit characters shall be used in the UID for data transfer.

D.3 Usage of the Facility UID

The proposed facility UID can be used to maintain the following data relationships:

D.3.1 A UID can be used to link a facility to any related data in other databases.

D.3.2 The UID can be cross-referenced to any other identifiers or associated data for the same facility, including other facility identifiers, permit numbers, or Dun and Bradstreet numbers. Other identifiers must be identified by source and type. Informative Appendix E contains an example of the use of UID to provide a cross-reference to associated data for the same facility.

D.3.3 A UID can be referenced in a child-parent relationship to any UIDs for related subsets of facility as needed for data linkages. For example, a structure might be referenced to a building (e.g., where an air emission stack is located on a manufacturing plant) or multiple buildings and structures might be referenced to an installation. Informative Appendix E contains an example of the use of UID to identify child-parent relationships.

D.3.4 In a child-parent relationship a child can have more than one parent and a parent can have more than one child. For example, a building might be parent to two stacks and one discharge pipe. A locomotive barn might be a child to a transportation network and also be a child to an installation.

D.4 Procedures for Assignment and Maintenance of the UID

This standard does not provide implementation procedures for registration of a UID. It does, however, propose procedures that are appropriate for assignment and maintenance of the UID. These proposed procedures are listed as follows:

D.4.1 The UID to identify a place-based object will be assigned by any agency or organization with a direct concern for identification of the facility. Where more than one organization assigns a UID to the same facility, a cross-reference of the UIDs can be maintained wherever it is appropriate.

D.4.2 The identity of the source of the UID (i.e., the agency or organization assigning the UID) will be maintained among the General Identification Data (Appendix A.1) and will be required for data transfer. The source of the UID is necessary to maintain a cross reference of UIDs assigned to the same facility by different organizations.

D.4.3 Each organization will maintain its own registry for maintaining the UID. The UID will always represent the same type of object at the same place, and will never be deleted from a registry system.

D.4.4 A UID identifies one facility, regardless of ownership or environmental concern.

D.4.5 If ownership of the facility changes or if the type of object associated with a place changes, the history of ownership and object type will be maintained by audit procedures that track cross references to the UID.

D.4.6 New facility UIDs will be created to identify a facility that has not previously been identified to the registry.

D.4.7 New facility UIDs are required for existing facilities where the actual location of the facility changes (e.g., when a building is physically moved to another location) or the facility type changes (e.g., a hospital is constructed at the former site of a school). Note that changes to locational data such as those made by municipal governments to street names and numbers, and changes made by the U.S. Postal Service to ZIP Codes, do not constitute a change of location and do not require assignment of a new UID.

D.4.8 New facility UIDs are not required where organization and point of contact information change.

D.4.9 A UID will never be used to represent a different facility than that to which it was initially assigned.

D.4.10 If the boundaries of a facility change, either by subdivision or acquisition, all resultant places will be assigned new UIDs to reflect the new facilities with their new boundaries. The UID for subdivisions of a place will be cross-referenced to the UID of the previous place, and the UID for an expanded place will be cross-referenced to any UIDs that previously were assigned to identify its component facilities. For example, a UID assigned to an airport complex, can be cross referenced as a parent to UIDs assigned to single facilities within the airport, such as the passenger facility, the cargo facility, and the military facility within that airport. See Appendix E for examples of parent/child cross references.

D.4.11 Access to the UID and core data that identify a facility shall be accessible to Federal, State, local, and tribal governments and "to the public to the extent permitted by law, current policies, and relevant OMB circulars, including OMB Circular No. A-130 ("Management of Federal Information resources") and any implementing bulletins" as directed by Executive Order 12906, *Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure*.

Appendix E

Use of UID to Identify Child-Parent Relationships and Cross-References

(Informative)

The following example of an identification scheme illustrates the use of unique identifiers in the fictitious Homewood County Public Water System for identifying child-parent relationships and cross-references. The Homewood County Public Works Department assigns Unique Identifiers (UIDs), calculated as described in informative Appendix D, to the utility elements that make-up the utility network. Some of these items are also identified in different ways by other public agencies. The UID assignments are based on the typing scheme described in informative Appendix C.

E.1 Water System Component Diagram. The following graphic illustrates the relationship of some of the components in the Homewood County Public Water System. Each component of the system is identified with a 12 digit UID.

Homewood Public Water System, UID is 000000316946

Components and Unique identifiers

E.2 Water System Component Descriptions. Each of the components in the Homewood County Water system can be identified by the mandatory data elements, including a unique identifier, source of the UID, descriptive name, "Facility Type," based on the scheme described in Appendix C, latitude, and longitude. Descriptive locational information and metadata for coordinates are not provided in this example. Coordinates are included for only one reference point for each of the objects (i.e., the centroid of the object).

Unique Identifier	Source of UID	Descriptive Name	Facility Type	Latitude	Longitude
000000316946	Public Works	Homewood Co. Public Water System	Network	36.754321	-76.432158
000000010017	Public Works	River Intake Pipe	Utility Object	36.928275	-76.461351
000000100009	Public Works	River Intake Pump	Structure	36.928275	-76.458623
000000010204	Public Works	Water Pipe	Utility Object	36.928275	-76.452312

000000020220	Public Works	Homewood Lake Reservoir	Utility Object	36.998113	-76.432158
000000010035	Public Works	Water Pipe	Utility Object	37.001113	-76.432158
000000110007	Public Works	Pumping Station	Structure	37.001113	-76.289511
000000010044	Public Works	Water Pipe	Utility Object	36.921513	-76.289511
000000032468	Public Works	Water Treatment Plant	Building	36.796666	-76.289511
000000010053	Public Works	Water Pipe	Utility Object	36.108764	-76.289511
000000125634	Public Works	Water Tower	Structure	35.853212	-76.289511
000000010062	Public Works	Discharge Pipe	Utility Object	35.853212	-76.412138
000000000705	Public Works	Shut-off Valve	Utility Object	35.853212	-76.432146

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875

876 **E.3 Parent-Child Relationships for the Public Water System.** Within a system, components can
877 be interrelated as parents and children. The following illustrates this relationship within the Public Water
878 System.

879

Parent UID	Type of Facility	Child UID	Type of Facility
000000316946	Network	000000010017	Utility Object
000000316946	Network	000000100009	Structure
000000316946	Network	000000010204	Utility Object
000000316946	Network	000000020220	Utility Object
000000316946	Network	000000010035	Utility Object
000000316946	Network	000000110007	Structure
000000316946	Network	000000010044	Utility Object
000000316946	Network	000000032468	Building

000000316946	Network	000000010053	Utility Object
000000316946	Network	000000125634	Structure
000000316946	Network	000000010062	Utility Object
000000316946	Network	000000000705	Utility Object

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881

882 **E.4 Cross Reference of Public Water System Components to Other Identifiers.** Within any system

883 there can be items that are of interest to other authorities. Identification numbers can be assigned by all interested

884 parties. A cross reference scheme is necessary to link information. The following gives cross references between some

885 components of the Public Water system and other assigned identifiers.

886

Public Water System UID	Source	Other Identifier	Source of Other Identifier	Description
000000020220	Public Works	P2022	Parks & Recreation	Homewood Lake
000000125634	Public Works	T936B	Airport Authority	Water Tower with Beacon

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