NOTICE: This standard has either been superseded and replaced by a new version or withdrawn.
Contact ASTM International (www.astm.org) for the latest information

Designation: E2468 – 05

StandardPractice for Metadata to Support Archived Data Management Systems[1]

This standard is issued under the fixed designation E2468; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This standard practice describes a hierarchical outline of sections and elements to be used in developing metadata to support archived data management systems. Specifically, the standard establishes the names of metadata elements and compound elements to be used in the metadata, the definitions of these metadata elements and compound elements, and suggested information about and examples of the values that are to be provided for the metadata elements.

1.2 The metadata to be developed using this standard includes qualitative and quantitative data that is associated with an information system or information object for the purposes of description, administration, legal requirements, technical functionality, use and usage, and preservation. As such, it can be differentiated from other metadata in that it describes and provides an interpretation of an organized collection of data, not a single data element.

1.3 This standard is intended for use by those developing, managing, or maintaining an archived data management system. For example, public agencies can specify that this standard be used in the development of a metadata framework for data archives. Data collectors and data processing intermediaries may also use this standard to create metadata describing the original collection conditions and intermediate processing steps. The development of metadata by data collectors and data processing intermediaries can greatly assist in the development of comprehensive metadata by the data archive manager. The standard is intended for use by all levels of government and the private sector.

1.4 This standard is applicable to various types of operational data collected by intelligent transportation systems (ITS) and stored in an archived data management system. Similarly, the standard can also be used with other types of historical traffic and transportation data collected and stored in an archived data management system.

1.5 This standard does not specify the means by which metadata is to be organized in a computer system or in a data transfer, nor the means by which metadata is to be transmitted, communicated, or presented to the user. Additionally, the standard is not intended to reflect or imply a specific implementation design. An implementation design requires adapting the structure and form of the standard to meet specific application and environment requirements.

1.6 This standard adopts with minimal changes the Federal Geographic Data Committee's (FGDC's) existing Content Standard for Digital Geospatial Metadata (FGDC-STD-001-1998) as the recommended metadata framework for archived data management systems. The FGDC metadata standard was chosen as the framework because of its relevance and established reputation among the spatial data community. A benefit of using the FGDC standard is the widespread availability of informational resources and software tools to create, validate, and manage metadata (see http://www.fgdc.gov/metadata/links/metalinks.html). Commentary and several examples are provided in this standard to illustrate the use of the FGDC standard in the ITS domain. The detail of the standard may appear intimidating, but the examples in the Appendix illustrate the relative simplicity of the standard when implemented.

1.7 Users of this standard should note that several sections of the metadata standard (that is, Annex A3 and Annex A4) address spatial referencing documentation, which may not be applicable to all data archives. These spatial referencing sections are designated as mandatory-if-applicable, which means that metadata is not required for these sections if spatial referencing is not used. Annex A6, Distribution Information, is also designated as mandatory-if-applicable and thus may not be required.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E867 Terminology Relating to Vehicle-Pavement Systems

E2259 Guide for Archiving and Retrieving Intelligent Transportation Systems-Generated Data

[1] This practice is under the jurisdiction of ASTM Committee E17 on Vehicle - Pavement Systems and is the direct responsibility of Subcommittee E17.52 on Traffic Monitoring.

Current edition approved Oct. 1, 2005. Published January 2006. DOI: 10.1520/E2468-05.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

Copyright © ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States

Documents
Document Sharing Hub
Full document details: ASTM E2468-05

2.2 *American National Standards Institute (ANSI) Standards:*

ANSI INCITS 30-1997 (R2003) Representation of Calendar Date and Ordinal Date for Information Interchange (formerly ANSI X3.30-1985, also formerly FIPS 4-1)[3]

ANSI X3.43-1986 Representations of Local Time of Day for Information Interchange[3]

ANSI X3.51-1975 Representations of Universal Time, Local Time Differentials, and United States Time Zone References for Information Interchange[3]

ANSI INCITS 61-1986 (R2002) Representation of Geographic Point Locations for Information Interchange (formerly ANSI X3.61-1986 (R1997), also formerly FIPS 70-1)[3]

2.3 *Federal Geographic Data Committee (FGDC) Standard:*

FGDC-STD-001-1998 Content Standard for Digital Geospatial Metadata, Version 2.0

2.4 *Federal Information Processing Standards (FIPS):*

FIPS PUB 4-1 (1988) Representation for Calendar Date and Ordinal Date for Information Interchange

FIPS PUB 55-3 (1994) Codes for Named Populated Places, Primary County Divisions, and Other Locational Entities of the United States, Puerto Rico, and the Outlying Areas

FIPS PUB 70-1 (1986) Representation of Geographic Point Locations for Information Interchange

FIPS PUB 173-1 (1994) Spatial Data Transfer Standard (STDS)

2.5 *Department of Defense:*

MIL-STD-600006 (1992) Vector Product Format (VPF)

MIL-A-89007 (1989) ARC Digitized Raster Graphics (ADRG)

2.6 *International Organization for Standardization (ISO):*

ISO 19115 (2003) Geographic Information—Metadata

3. Terminology

3.1 *Definitions:*

3.1.1 *archived data management subsystem, n*—a subsystem of the National ITS Architecture that provides a means for several organizations to collect, store, and subsequently, analyze and retrieve data from ITS data sources, usually by way of one or more ITS centers.

3.1.2 *archived data management system, n*—this is a specific implementation of an archived data management subsystem within the context of a local, regional, or statewide ITS architecture.

3.1.3 *attribute, n*—a defined property or characteristic; subset of an entity. In common terms, an attribute is typically a column in a relational database or a property in an object-oriented environment.

3.1.4 *before the common era, n*—sometimes abbreviated BCE, the period preceding a year near the birth of Jesus, coinciding with the period from 1 BC and earlier. It is synonymous with the period called before the Christian era and is sometimes used as a religiously neutral alternative to it.

3.1.5 *catalog, n*—a structured description of data being stored or transferred in data flows as described in the National ITS Architecture.

3.1.6 *common era, n*—sometimes abbreviated CE, the period beginning with a year near the birth of Jesus, coinciding with the period from AD 1 onwards. It is synonymous with the period called the Christian era and is sometimes used as a religiously neutral alternative to it.

3.1.7 *compound element, n*—a group or combination of groups of metadata elements. All compound elements are described by metadata elements, either directly or through intermediate compound elements. Compound elements represent higher-level concepts that cannot be represented by individual metadata elements.

3.1.8 *data processing intermediary, n*—a person or entity who transforms and supplies data that they did not directly collect themselves.

3.1.9 *data set, n*—a logical collection of data that supports a user function; could include one or more data tables, files, or sources.

3.1.10 *entity, n*—an existing or real thing. In relation to a database, an entity is a single person, place, or thing about which data can be stored. In common terms, an entity can be represented by one or more tables in a relational database or an object in an object-oriented environment.

3.1.11 *metadata, n*—data about data, or more precisely, definitional and descriptive data that provides information about or documentation of other data managed within an application or environment.

3.1.12 *metadata element, n*—a logically primitive item of metadata that forms the basic building block for this metadata standard.

3.1.13 *National ITS Architecture, n*—a document prepared through the sponsorship of the U.S. DOT that provides a common structure for the design of intelligent transportation systems giving a framework around which multiple design approaches can be developed by defining: *(a)* the functions that must be performed to implement a given user service; *(b)* the physical entities or subsystems where these functions reside; *(c)* the interfaces/information flows between the physical subsystems; and *(d)* the communication requirements for the information flows.

3.1.14 *production rules, n*—a standardized method of illustrating how metadata elements and compound elements are combined into a defined hierarchical metadata structure. Production rules also illustrate the optionality and repeating nature of metadata elements and compound elements.

3.2 Additional terms included in this standard but not defined here may be found in the glossary for the existing FGDC metadata standard at the following address: http://geology.usgs.gov/tools/metadata/standard/glossary.html. Many of the terms in the FGDC glossary are from FIPS 173 (Spatial Data Transfer Standard, or SDTS).

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

Documents
Document Sharing Hub

Full document details: ASTM E2468-05

4. Summary of Practice

4.1 The seven basic sections included in this metadata content standard are shown in Fig. 1 and summarized as follows:

4.1.1 *Identification Information,* or basic information about the data set. For example, what is the name of the data set? Who developed the data set? What geographic area does it cover? What themes of information does it cover? How current are the data? Are there restrictions on accessing or using the data?

4.1.2 *Data Quality Information,* or a general assessment of the quality of the data set. For example, how good are the data? Is information available that allows a user to decide if the data are suitable for his or her purpose? What is the positional and attribute accuracy? Are the data complete? Were the consistency of the data verified? What data were used to create the data set, and what processes were applied to these sources?

4.1.3 *Spatial Data Organization Information,* or the mechanism used to represent spatial information in the data set. For example, what spatial data model was used to encode the spatial data? How many spatial objects are there? Are methods other than coordinates, such as street addresses, used to encode locations?

4.1.4 *Spatial Reference Information,* or the description of the reference frame for, and the means to encode, coordinates in the data set. For example, are coordinate locations encoded using longitude and latitude? Is a map projection or grid system, such as the State Plane Coordinate System, used? What horizontal and vertical datums are used? What parameters should be used to convert the data to another coordinate system?

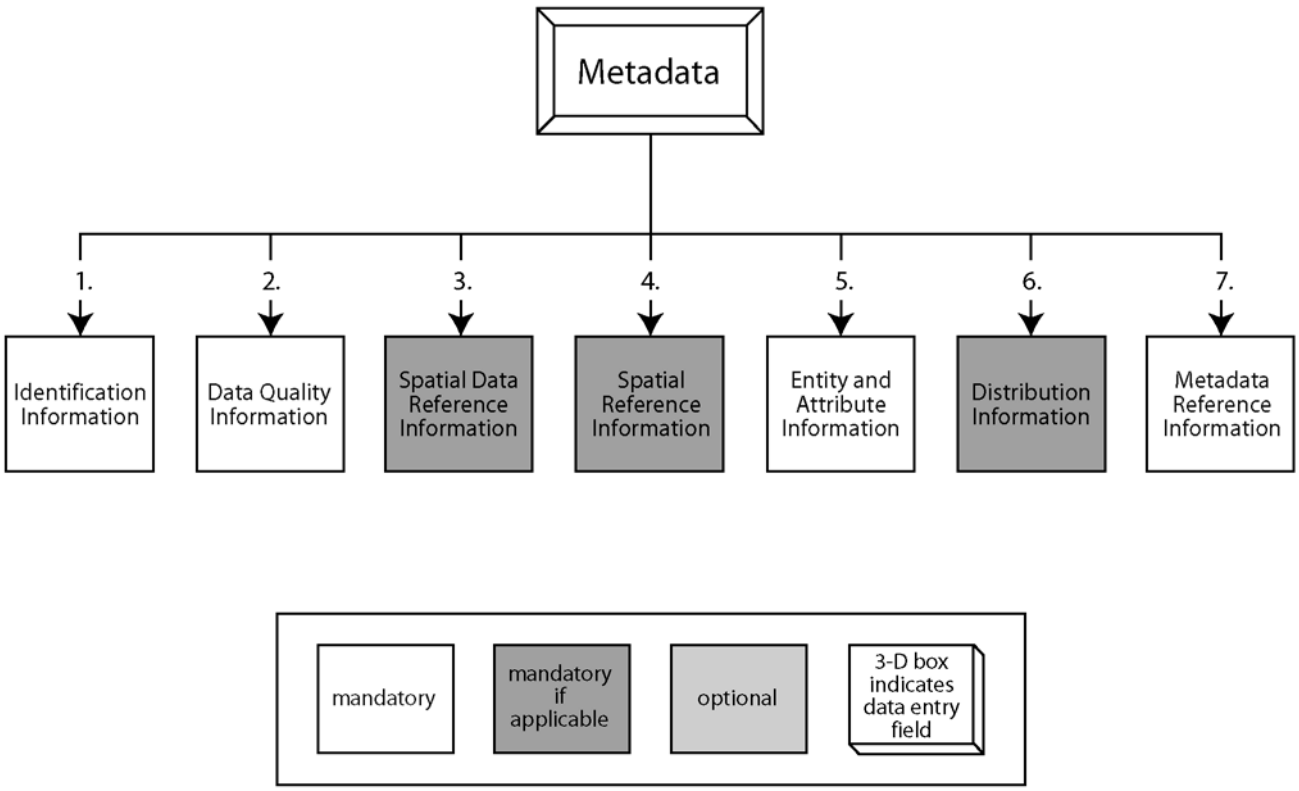
4.1.5 *Entity and Attribute Information,* or details about the information content of the data set, including the entity types, their attributes, and the domains from which attribute values may be assigned. For example, what geographic information (roads, houses, elevation, temperature, etc.) is included? How is this information encoded? Were codes used? What do the codes mean?

4.1.6 *Distribution Information,* or information about the distributor of and options for obtaining the data set. For example, from whom can I obtain the data? What formats are available? What media are available? Are the data available online? What is the price of the data (if any)?

4.1.7 *Metadata Reference Information,* or information on the currentness of the metadata information and the responsible party. For example, when were the metadata compiled? By whom?

4.2 This standard practice adopts with minimal change an existing FGDC metadata standard to document data stored in archived data management systems. This standard addresses the three types of metadata as defined in Guide E2259 and outlined here:

4.2.1 *Archive Structure Metadata,* or descriptive data about the structure of the data archive itself and of the data and information in the archive that facilitate use of the archive



(Source: Adapted from FGDC Metadata Workbook – Version 2.0)

FIG. 1 FGDC Content Standard for Digital Geospatial Metadata

Documents
Document Sharing Hub

Full document details: ASTM E2468-05

(*Identification Information, Spatial Reference Information, Entity and Attribute Information,* and *Distribution Information* in this standard).

4.2.2 *Processing Documentation Metadata,* or information that describes the processes applied to the data from original source data through to storage in an archived data management system (*Data Quality Information* and *Spatial Data Organization Information* in this standard).

4.2.3 *Data Collection System Metadata,* or data about the conditions and procedures under which original source data were observed, surveyed, measured, gathered, collected, as well as about the equipment that was used (*Data Quality Information, Entity and Attribute Information,* and *Metadata Reference Information* in this standard).

4.3 This standard includes three additional sections that are referenced by the other sections of the metadata standard. These last three sections are always used within other sections and are never used alone. The three sections are as follows:

4.3.1 *Citation Information,* or the recommended reference to be used for the data set.

4.3.2 *Time Period Information,* or information about the date and time of an event.

4.3.3 *Contact Information,* or the identity of, and means to communicate with, person(s) and organization(s) associated with the data set.

4.4 Each of the seven basic sections of the metadata content standard has an optionality associated with it: mandatory, mandatory-if-applicable, and optional. Four of the seven sections are mandatory—*Identification Information, Data Quality Information, Entity and Attribute Information,* and *Metadata Reference Information*—and these four sections form what is considered the "core" for metadata that conform to this standard. The remaining three sections are mandatory-if-applicable.

4.5 Within each of the seven basic sections of metadata, there are compound elements and metadata elements that also have an optionality associated with it: mandatory, mandatory-if-applicable, and optional. The optionality of these compound elements and metadata elements are assigned in this standard. Mandatory elements are considered essential for metadata functionality, whereas optional elements are considered desirable but not essential.

5. Significance and Use

5.1 Put simply, metadata is "data about data" and typically describes the content, quality, lineage, organization, availability, and other characteristics of the data. Metadata is typically used to: *(1)* determine the availability of certain data (for example, through searches of a data catalog or clearinghouse); *(2)* determine the fitness of data for an intended use; *(3)* determine the means of accessing data; and *(4)* enhance data analysis and interpretation by better understanding the data collection and processing procedures.

5.2 The use of metadata among current implementations of archived data management systems is limited and is not uniform; in fact, this deficiency was the original impetus for this metadata standard. There are several possible reasons for the limited and inconsistent use of metadata: *(1)* the deployment of archived data management systems is still in the early stages since its formal inclusion in the National ITS Architecture in 1999; *(2)* to date, no formal metadata structure has been designated (the National ITS Architecture only refers to a generic "data catalog"); and *(3)* writing good documentation (that is, metadata) is typically the last and least enjoyed aspect of developing information systems.

5.3 The use of metadata among the spatial data community is widespread and relatively uniform, due mostly to Executive Order 12906 issued in 1994 which called for the creation of a National Spatial Data Infrastructure (NSDI). This Executive Order mandated the creation of metadata standards, which were to be developed and maintained by the FGDC, a 19-member interagency committee. The spatial data community operates several metadata clearinghouses that, in effect, serve as virtual card catalogs to vast collections of online spatial data. Federal, State, and local agencies have adopted the FGDC metadata standard and use it to document available datasets. Significant resources from numerous agencies have been placed into the development of the NSDI and supporting elements like the FGDC metadata standard. Notwithstanding these significant resources, the adoption and implementation of the FGDC metadata standard by other agencies and entities in the past 8 to 10 years has been remarkable.

5.4 The 10-year vision for metadata implementation in archived data management systems should resemble (at a minimum) the current state of metadata implementation in the spatial data community. This vision for ADMS metadata includes the following: *(1)* a consortium of agencies that develop and maintain various metadata standards and supporting guidance; *(2)* metadata clearinghouses that advertise available data sets as well as fully support the operational concept of a virtual data warehouse as defined in the National ITS Architecture; and *(3)* widespread adoption and implementation of standardized ADMS metadata structures among public (Federal, State, and local) transportation agencies and private companies.

5.5 This metadata standard may be implemented in several ways. Some metadata producers may desire to implement metadata that can be easily read by humans, which would likely include many unrestricted free text entries. Other metadata producers may wish to implement metadata that is easily interpreted by computer systems. If automated computer interpretation of metadata is desired, more specificity may have to be applied to certain metadata elements to restrict domain values beyond free text.

5.6 The detail of this standard may appear intimidating, but the examples in the Appendix illustrate the relative simplicity of the standard when implemented. The existing FGDC standard offers the widespread availability of resources and tools to create, validate, and manage metadata (see http://www.fgdc.gov/metadata/links/metalinks.html). The implementation of this metadata standard in a basic information system should require minimal staff time and effort.

AVA Documents
Document Sharing Hub

Full document details: ASTM E2468-05

6. Organization of the Standard

6.1 This standard adopts with minimal changes the existing FGDC *Content Standard for Digital Geospatial Metadata* as the recommended metadata framework, and includes nearly all of the text (with commentary and usage notes included where necessary) of the existing FGDC standard. The commentary has been added to provide additional information and discussion that is to be considered separate from the standard, and is distinguished from the metadata content standard by the use of a leading title of "Usage Note".

6.1.1 *Usage Note*—When commentary has been added as a supplement to this metadata content standard, the commentary will be distinguished from the standard by the use of a leading title of "*Usage Note*."

6.2 *Numbered Sections:*

6.2.1 The standard is organized in a hierarchy of metadata elements and compound elements that define the information content for metadata to document a set of digital data (see Fig. 1). The starting point is *Metadata*. The compound element *Metadata* is composed of other compound elements representing different concepts about the data set. Each of these compound elements has a numbered section in the standard. In each numbered section, these compound elements are defined by other compound elements and metadata elements. The *Citation Information*, *Time Period Information*, and *Contact Information* sections are special sections that specify metadata elements used by other sections. These sections are defined once for convenience in separate sections.

6.2.2 Each section begins with the name and definition of the compound element that defines the section. The name and definition are followed by production rules (see 6.10) that define the compound element in terms of metadata elements, either directly or by the use of intermediate compound elements. When intermediate compound elements are used, the production rules for these elements also are provided in this part of the section.

6.2.3 The production rules are followed by a list of names and definitions of compound elements and metadata elements used in the section. Section and element numbers are provided for user navigation of the standard. They are neither authoritative nor intended for use in implementation and are subject to change in future revisions of the standard.

6.2.4 A detailed description for all sections of the metadata content standard is provided in the Annexes of this standard. The Annexes of an ASTM standard are mandatory sections.

6.3 *Compound Elements:*

6.3.1 A compound element is a group or combination of groups of metadata elements. All compound elements are described by metadata elements, either directly or through intermediate compound elements. Compound elements represent higher level concepts that cannot be represented by individual metadata elements. The form for the definition of compound elements is:

Compound element name—definition.
Type: compound
Short Name: [8 characters or less]

6.3.2 The type of "compound" uniquely identifies the compound elements in the lists of terms and definitions.

6.3.3 Short names consisting of eight alphabetic characters or less are included to assist in implementation of the standard. The eight-character short names are provided for programming convenience and should be used as tags in the Extensible Markup Language (XML).

6.4 *Metadata Elements:*

6.4.1 A metadata element is a logically primitive item of metadata. It is a single unit of metadata that cannot be divided and still have meaning. The entry for a metadata element includes the name of the metadata element, the definition of the metadata element, a description of the values that can be assigned to the metadata element (domain), and a short name for the metadata element. The form for the definition of a metadata element is:

Metadata element name—definition.
Type: [integer, real, text, date, or time]
Domain: [describes valid values that can be assigned]
Short Name: [8 characters or less]

6.4.2 The information about the values for the metadata elements includes a description of the type of the value, and a description of the domain of the valid values. The type of the metadata element describes the kind of value to be provided. The choices are "integer" for integer numbers, "real" for real numbers, "text" for ASCII characters, "date" for day of the year, and "time" for time of the day.

6.4.3 The domain describes valid values that can be assigned to the metadata element. The domain may specify a list of valid values, references to lists of valid values, or restrictions on the range of values that can be assigned to a metadata element.

6.4.4 The domain also may note that the domain is free from restrictions, and any values that can be represented by the "type" of the metadata element can be assigned. These unrestricted domains are represented by the use of the word "free" followed by the type of the metadata element (that is, free text, free date, free real, free time, free integer). Some domains can be partly, but not completely, specified. For example, there are several widely used data transfer formats, but there may be many more that are less well known. To allow a producer to describe its data in these circumstances, the convention of providing a list of values followed by the designation of a "free" domain is used. In these cases, assignments of values shall be made from the provided domain when possible. When not possible, providers may create and assign their own value. A created value shall not redefine a value provided by the standard.

6.4.5 Short names consisting of eight alphabetic characters or less are included to assist in user implementation of the standard. The eight-character short names are provided for programming convenience and should be used as tags in the Extensible Markup Language (XML).

6.4.6 Another issue is the representation of null values (representing such concepts as "unknown") in the domain. While this is relatively simple for textual entries (one would enter the text "Unknown"), it is not as simple for the integer, real, date, and time types. (For example, which integer value means "unknown"?). Because conventions for providing this

AVA Documents
Document Sharing Hub

Full document details: ASTM E2468-05

information vary among implementations, the standard specifies what concepts shall be represented, but does not mandate a means for representing them.

6.4.7 In addition to the values to be represented, the form of representation also is important, especially to applications that will manipulate the metadata elements. The following conventions for forms of values for metadata elements shall be used.

6.5 *Calendar Dates (Years, Months, and Days):*

6.5.1 *Common Era (CE) to December 31, 9999 CE*—Values for day and month of year, and for years, shall follow the calendar date convention (general form of YYYY for year; YYYYMM for month of a year (with month being expressed as an integer), and YYYYMMDD for a day of the year) specified in ANSI INCITS 30-1997 (R2003) (also adopted as FIPS PUB 4-1 1988, formerly ANSI X3.30-1985).

6.5.2 *Before the Common Era (BCE) to 9999 BCE*—Values for day and month of year, and for years, shall follow the calendar date convention, preceded by the lower case letters "bce" (general form of bceYYYY for year; bceYYYYMM for month of a year (with month being expressed as an integer), and bceYYYYMMDD for a day of the year).

6.5.3 *BCE before 9999 BCE*—Values for the year shall consist of as many numeric characters as needed to represent the number of the year BCE, preceded by lower case letters "cc" (general form of ccYYYYYYY...).

6.5.4 *CE after 9999 CE*—Values for the year shall consist of as many numeric characters as needed to represent number of the year CE, preceded by the lower case letters "cd" (general form of cdYYYYYYY...).

6.6 *Time of Day (Hours, Minutes, and Seconds):*

6.6.1 Because some geospatial data and related applications are sensitive to time of day information, three conventions are permitted. Only one convention shall be used for metadata for a data set. The conventions are as follows.

6.6.1.1 *Local Time*—For producers who wish to record time in local time, values shall follow the 24-hour timekeeping system for local time of day in the hours, minutes, seconds, and decimal fractions of a second (to the precision desired) without separators convention (general form of HHMMSSSS) specified in ANSI X3.43-1986.

6.6.1.2 *Local Time with Time Differential Factor*—For producers who wish to record time in local time and the relationship to Universal Time (Greenwich Mean Time), values shall follow the 24-hour timekeeping system for local time of day in hours, minutes, seconds, and decimal fractions of a second (to the resolution desired) without separators convention. This value shall be followed, without separators, by the time differential factor. The time differential factor expresses the difference in hours and minutes between local time and Universal Time. It is represented by a four-digit number preceded by a plus sign (+) or minus sign (-), indicating hours and minutes local time is ahead of or behind Universal Time, respectively. The general form is HHMMSSSSshhmm, where HHMMSSSS is the local time using 24-hour timekeeping (expressed to the precision desired), 's' is the plus or minus sign for the time differential factor, and hhmm is the time differential factor. (This option allows producers to record local time and time zone information. For example, Eastern Standard Time has a time differential factor of -0500, Central Standard Time has a time differential factor of -0600, Eastern Daylight Time has a time differential factor of -0400, and Central Daylight Time has a time differential factor of -0500.) This option is specified in ANSI X3.51-1975.

6.6.1.3 *Universal Time (Greenwich Mean Time)*—For producers who wish to record time in Universal Time (Greenwich Mean Time), values shall follow the 24-hour timekeeping system for Universal Time of day in hours, minutes, seconds, and decimal fractions of a second (expressed to the precision desired) without separators convention, with the upper case letter "Z" directly following the low-order (or extreme right hand) time element of the 24-hour clock time expression. The general form is HHMMSSSSZ, where HHMMSSSS is Universal Time using 24-hour timekeeping, and Z is the letter "Z". This option is specified in ANSI X3.51-1975.

6.7 *Latitude and Longitude:*

6.7.1 Values for latitude and longitude shall be expressed as decimal fractions of degrees. Whole degrees of latitude shall be represented by a two-digit decimal number ranging from 0 through 90. Whole degrees of longitude shall be represented by a three-digit decimal number ranging from 0 through 180. When a decimal fraction of a degree is specified, it shall be separated from the whole number of degrees by a decimal point. Decimal fractions of a degree may be expressed to the precision desired.

6.7.2 Latitudes north of the equator shall be specified by a plus sign (+), or by the absence of a minus sign (-), preceding the two digits designating degrees. Latitudes south of the Equator shall be designated by a minus sign (-) preceding the two digits designating degrees. A point on the Equator shall be assigned to the Northern Hemisphere.

6.7.3 Longitudes east of the prime meridian shall be specified by a plus sign (+), or by the absence of a minus sign (-), preceding the three digits designating degrees of longitude. Longitudes west of the meridian shall be designated by minus sign (-) preceding the three digits designating degrees. A point on the prime meridian shall be assigned to the Eastern Hemisphere. A point on the 180th meridian shall be assigned to the Western Hemisphere. One exception to this last convention is permitted. For the special condition of describing a band of latitude around the earth, the East Bounding Coordinate metadata element shall be assigned the value +180 (180) degrees.

6.7.4 Any spatial address with a latitude of +90 (90) or -90 degrees will specify the position at the North or South Pole, respectively. The component for longitude may have any valid value.

6.7.5 With the exception of the special condition described above, this form is specified in ANSI INCITS 61-1986 (R2002) (formerly ANSI X3.61-1986).

6.8 *Network Addresses and File Names:*

6.8.1 Values for file names, network addresses for computer systems, and related services should follow the Uniform Resource Locator convention of the Internet when possible. See http://www.w3.org/Addressing/ for additional details about the Uniform Resource Locator.

AVA Documents
Document Sharing Hub

Full document details: ASTM E2468-05

6.9 *Optionality:*

6.9.1 The standard categorizes elements as being mandatory, mandatory-if-applicable, or optional as follows. The production rules in section 6.10 are critical for understanding which sections and elements of the metadata must be included to comply with this standard.

6.9.2 Mandatory elements must be provided. Mandatory elements are comparable to a "shall" statement as used in other traffic engineering standards, such as the Manual on Uniform Traffic Control Devices (MUTCD).

6.9.3 Mandatory-if-applicable elements must be provided if the data set exhibits the defined characteristic or the defined characteristic is known. For example, Section 4 of the metadata content standard contains the compound element "Altitude System Definition" as a mandatory-if-applicable element. If the data set being described has an altitude component (such as the flight height for aerial photography), then this element is mandatory. If the data set being described does not have an altitude component, then this element is not mandatory. In another example, suppose the metadata author can not reasonably determine any information in the mandatory-if-applicable Section 3, "Data Quality Information." In this situation, the section is not mandatory.

6.9.4 Optional elements are provided at the discretion of the metadata producer. Optional elements are comparable to a "may" statement as used in other traffic engineering standards, such as the MUTCD.

6.9.5 The optionality of a section or compound element always takes precedence over the metadata elements that it contains. Once a section or compound element is recognized by the data set producer as applicable, then the optionality of its subordinate elements is to be interpreted. See production rules (see 6.10) for additional interpretive guidance.

6.9.6 Mandatory sections in the standard have some metadata elements that are always required for all types of geospatial data sets. For comparison with other metadata standards, these elements are referred to as "core" elements.

6.10 *Production Rules:*

6.10.1 A production rule specifies the relationship between a compound element, metadata elements, and other (lower-level) compound elements. The production rules in this section are critical for understanding how different sections and elements of the metadata standard fit together when producing metadata. Each production rule has a left side (identifier) and a right side (expression) connected by the symbol "=", meaning that the term on the left side is replaced by or produces the term on the right side. Terms on the right side are either other compound elements or individual metadata elements. By making substitutions using matching terms in the production rules, one can explain higher-level concepts using metadata elements. The symbols used in the production rules have the following meaning.

6.10.1.1 *Symbol Meaning:*

=	is replaced by, produces, consists of
+	and
[|]	selection; select one term from the list of enclosed terms (exclusive or). Terms are separated by "|"
m{ }n	iteration; the term(s) enclosed is(are) repeated from "m" to "n" times
( )	optional; the term(s) enclosed is(are) optional

6.10.1.2 *Examples:*

a = b + c	"a consists of b and c"
a = [b | c]	"a consists of one of b or c"
a = 4{b}6	"a consists of four to six occurrences of b"
a = b + (c)	"a consists of b and optionally c"

6.10.2 *Interpreting the Production Rules*—The terms bounded by parentheses, "(" and ")," are optional and are provided at the discretion of the data producer. If a producer chooses to provide information enclosed by parentheses, the producer shall follow the production rules for the enclosed information. For example, if the producer decides to provide the optional information described in the term "(a + b + c)," the producer shall provide all elements within the parentheses—that is, "a" and "b" and "c."

6.10.3 Only for terms bounded by parentheses does the producer have the discretion of deciding whether or not to provide the information.

6.10.4 The variation among the ways in which geospatial data are produced and distributed, the fact that all geospatial data does not have the same characteristics, and the issue that all details of data sets that are in work or are planned may not be decided, caused the need to express the concept of "mandatory-if-applicable." This concept means that if the data set exhibits (or, for data sets that are in work or planned, it is known that the data set will exhibit) a defined characteristic, then the producer shall provide the information needed to describe that characteristic. This concept is described by the production rule: 0{ term }1.

6.11 *Extensibility:*

6.11.1 Extended metadata elements may be defined by a data set producer or a user community. Extended elements are metadata elements outside the standard, but needed by the data set producer.

6.12 *User Feedback and Input on Metadata:*

6.12.1 The domain values of many metadata elements in this standard are free text, which means that metadata producers have the flexibility to include as little or as much documentation as they desire. Metadata producers should consider the feedback and input from the respective data users in determining the appropriate level of detail for free text fields in metadata.

7. Overview of the Metadata Standard

7.1 Fig. 1 provides an overview of the sections included in the metadata standard. The sections are shown with a shading corresponding to the optionality of each section. The details for

Documents
Document Sharing Hub
Full document details: ASTM E2468-05

each section, including information for each compound element and metadata element, are contained in the Annexes, which are mandatory sections of the standard.

7.2 Fig. 2 provides an overview of Section 1, *Identification Information*. This section of the metadata content is to contain basic information about the data set. The details on compound elements and metadata elements for Section 1 are provided in Annex A1.

7.3 Fig. 3 provides an overview of Section 2, *Data Quality Information*. This section of the metadata content is to contain a general assessment of the quality of the data set. The details on compound elements and metadata elements for Section 2 are provided in Annex A2.

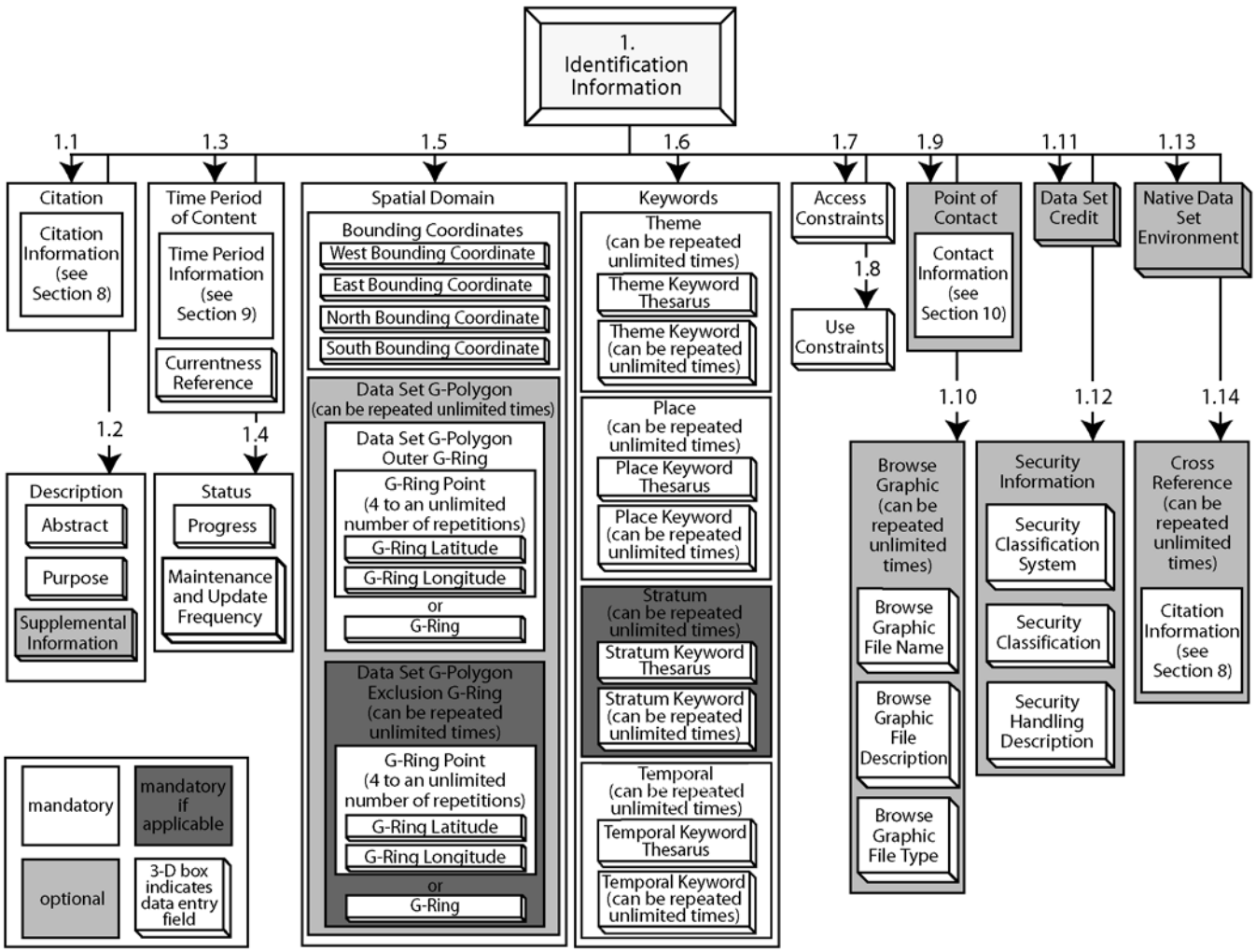
7.4 Fig. 4 provides an overview of Section 3, *Spatial Data Organization Information*. This section of the metadata content is to describe the general mechanism used to represent spatial information in the data set. The details on compound elements and metadata elements for Section 3 are provided in Annex A3.

7.5 Fig. 5 provides an overview of Section 4, *Spatial Reference Information*. This section of the metadata content is to describe the reference frame for, and the means to encode, coordinates in the data set. The details on compound elements and metadata elements for Section 4 are provided in Annex A4.

7.6 Fig. 6 provides an overview of Section 5, *Entity and Attribute Information*. This section of the metadata content is to contain details about the information content of the data set, including the entity types, their attributes, and the domains from which attribute values may be assigned. The details on compound elements and metadata elements for Section 5 are provided in Annex A5.

7.7 Fig. 7 provides an overview of Section 6, *Distribution Information*. This section of the metadata content is to provide information about the distributor of and options for obtaining the data set. The details on compound elements and metadata elements for Section 6 are provided in Annex A6.

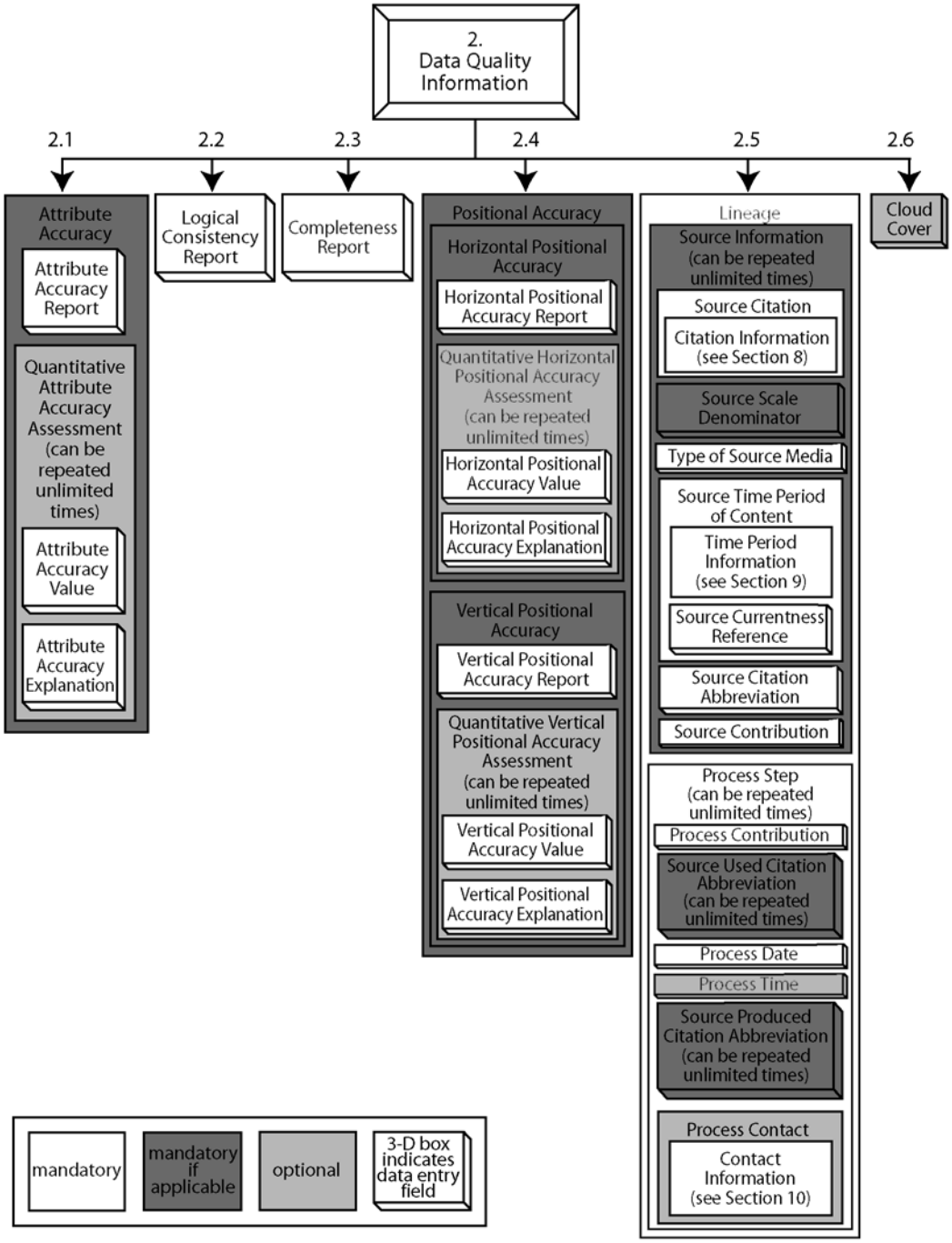
7.8 Fig. 8 provides an overview of Section 7, *Metadata Reference Information*. This section of the metadata content is to contain information on the currentness of the metadata and the responsible party. The details on compound elements and metadata elements for Section 7 are provided in Annex A7.



(Source: Adapted from FGDC Metadata Workbook – Version 2.0)

FIG. 2 Metadata for Identification Information (Annex A1)

Documents
Document Sharing Hub
Full document details: ASTM E2468-05



(Source: Adapted from FGDC Metadata Workbook – Version 2.0)

FIG. 3 Metadata for Data Quality Information (Annex A2)

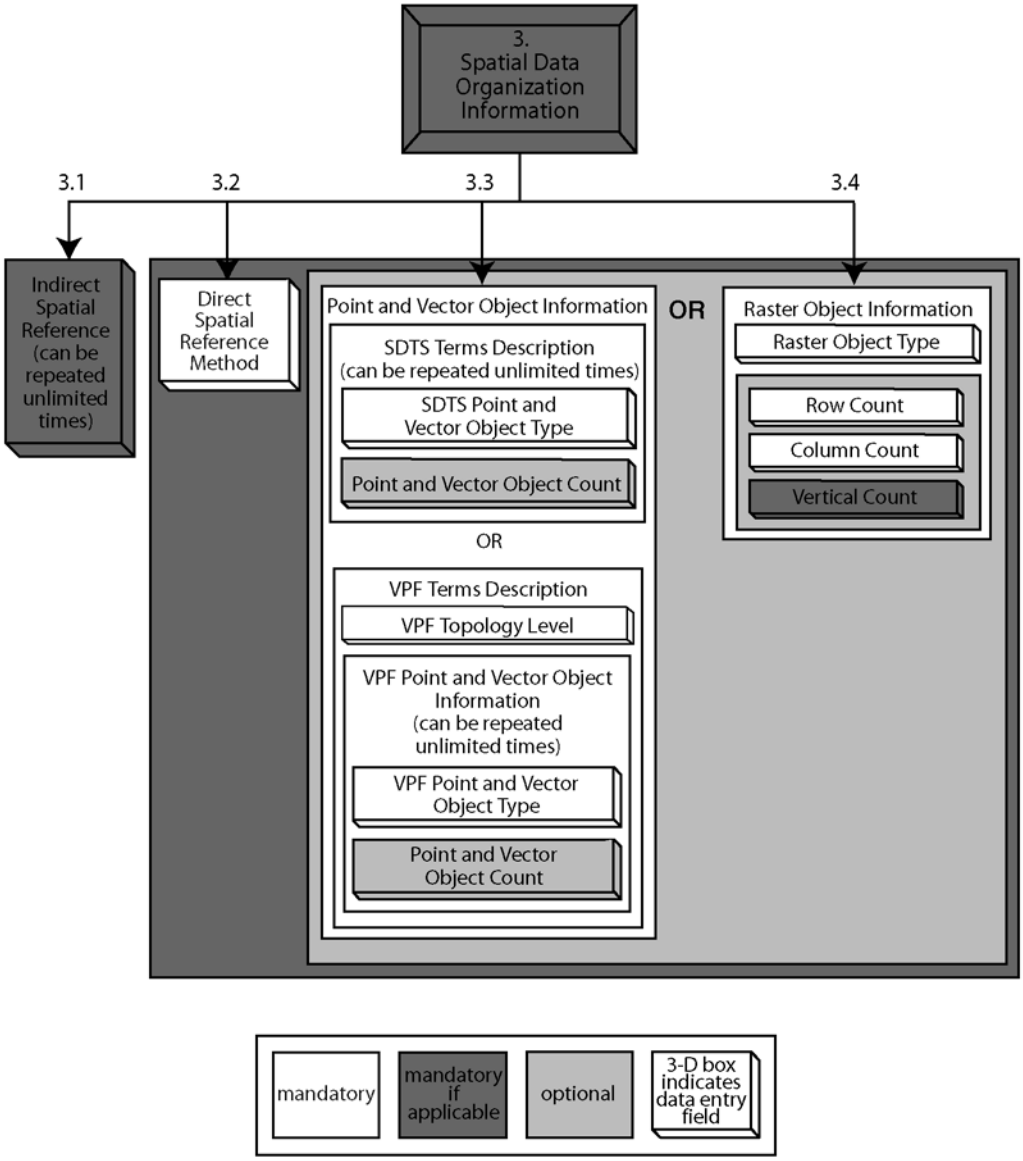
7.9 Fig. 9 provides an overview of Section 8, *Citation Information*; Section 9, *Time Period Information*; and Section 10, *Contact Information*. These supplemental sections are referenced in several other primary sections of the metadata content standard. The details on compound elements and metadata elements for Sections 8 through 10 are provided in Annex A8 through Annex A10, respectively.

8. Keywords

8.1 archived data; archived data management system; data set documentation; metadata

Documents
Document Sharing Hub

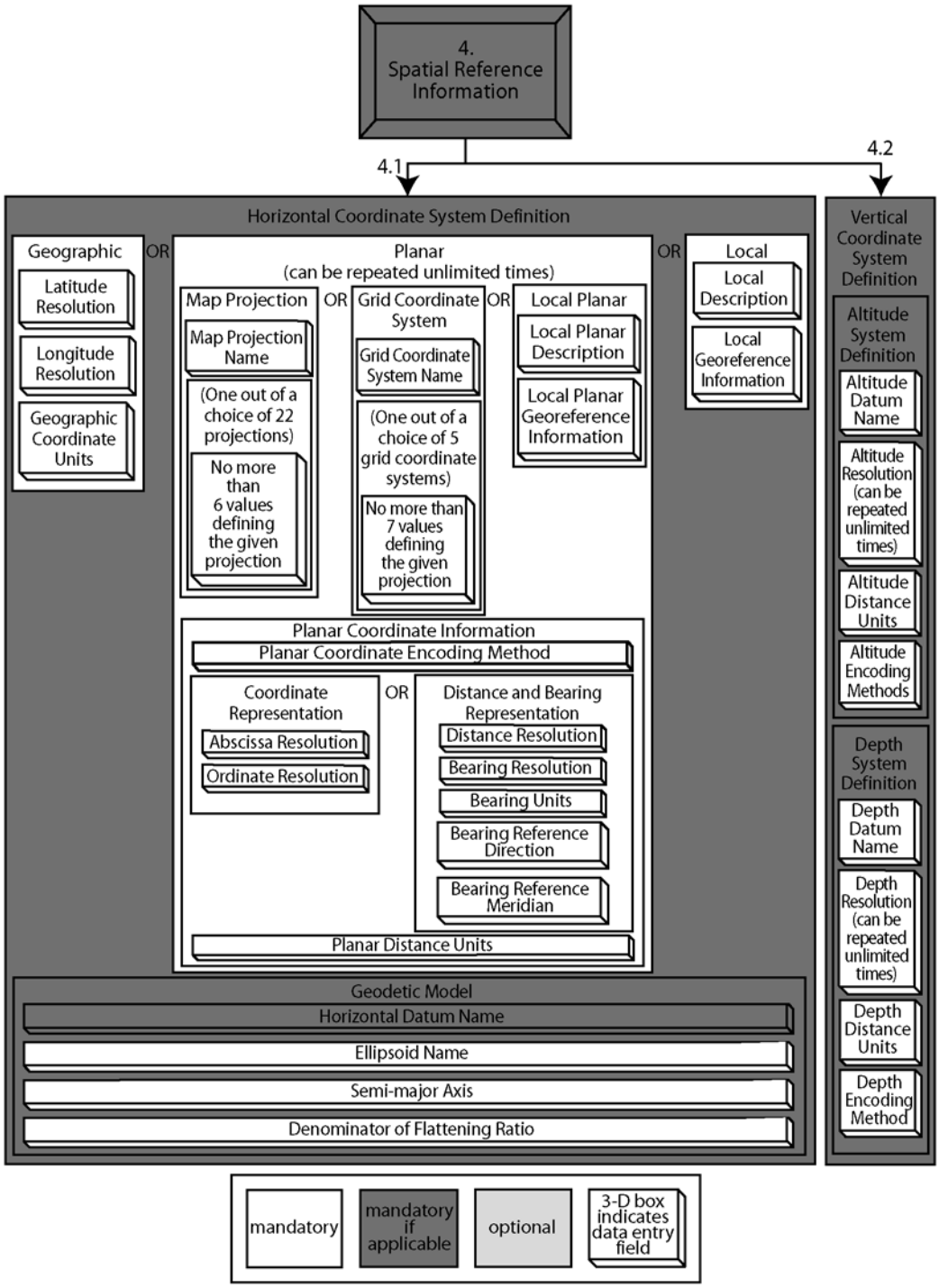
Full document details: ASTM E2468-05



(Source: Adapted from FGDC Metadata Workbook – Version 2.0)

FIG. 4 Metadata for Spatial Data Organization Information (Annex A3)

Documents
Document Sharing Hub
Full document details: ASTM E2468-05

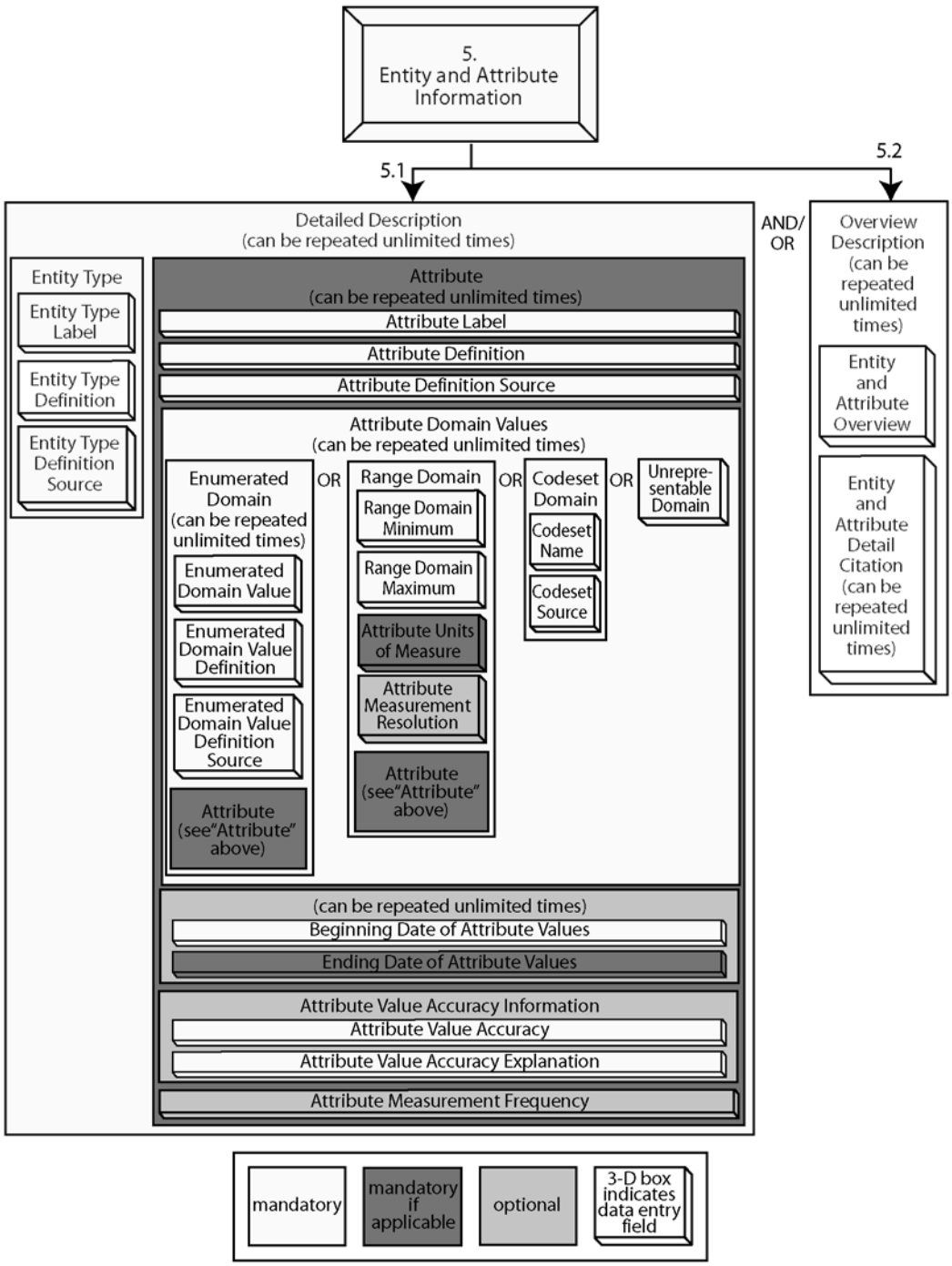


(Source: Adapted from FGDC Metadata Workbook – Version 2.0)

FIG. 5 Metadata for Spatial Reference Information (Annex A4)

Documents
Document Sharing Hub

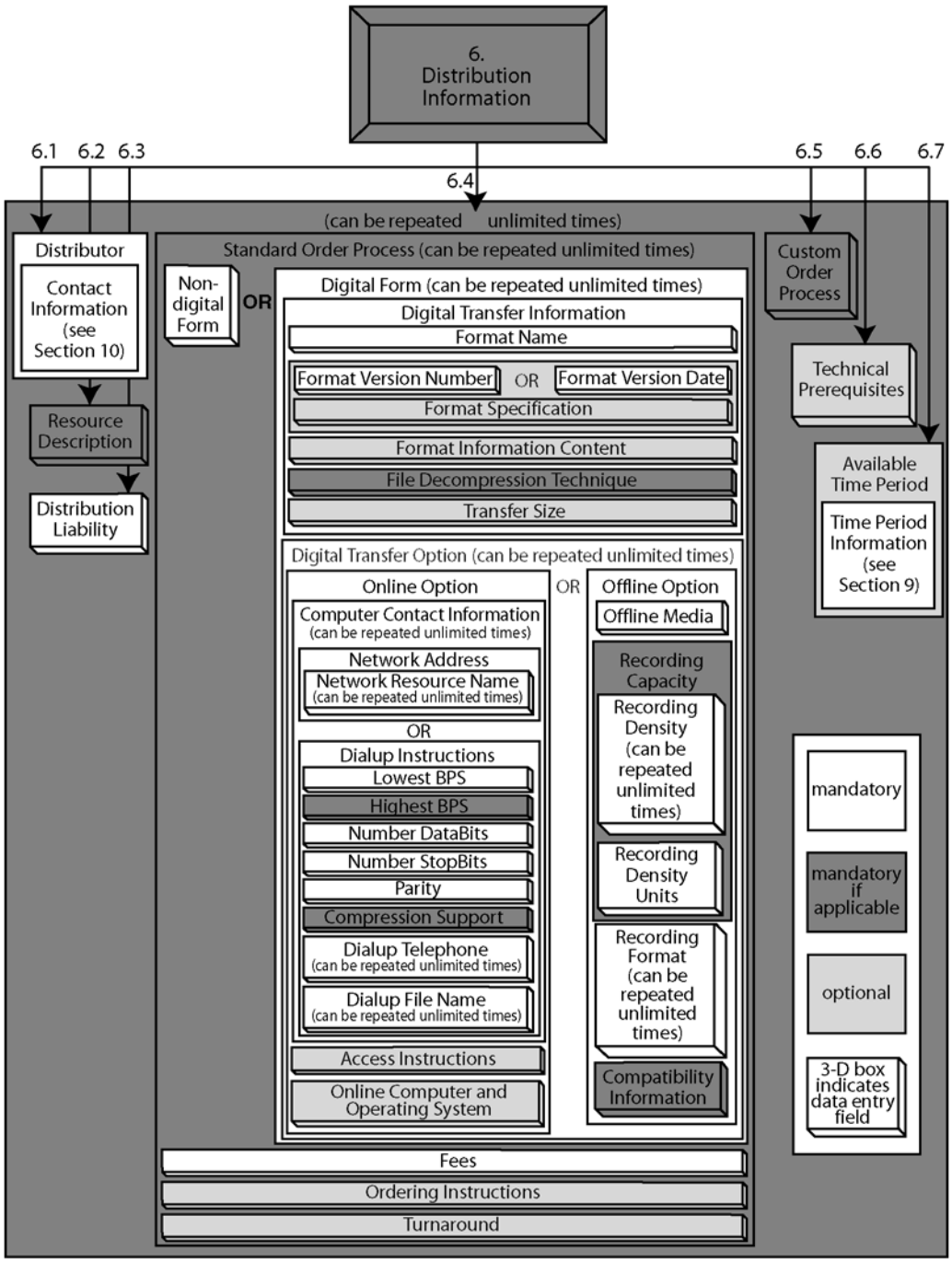
Full document details: ASTM E2468-05



(Source: FGDC Metadata Workbook – Version 2.0)

FIG. 6 Adapted from Metadata for Entity and Attribute Information (Annex A5)

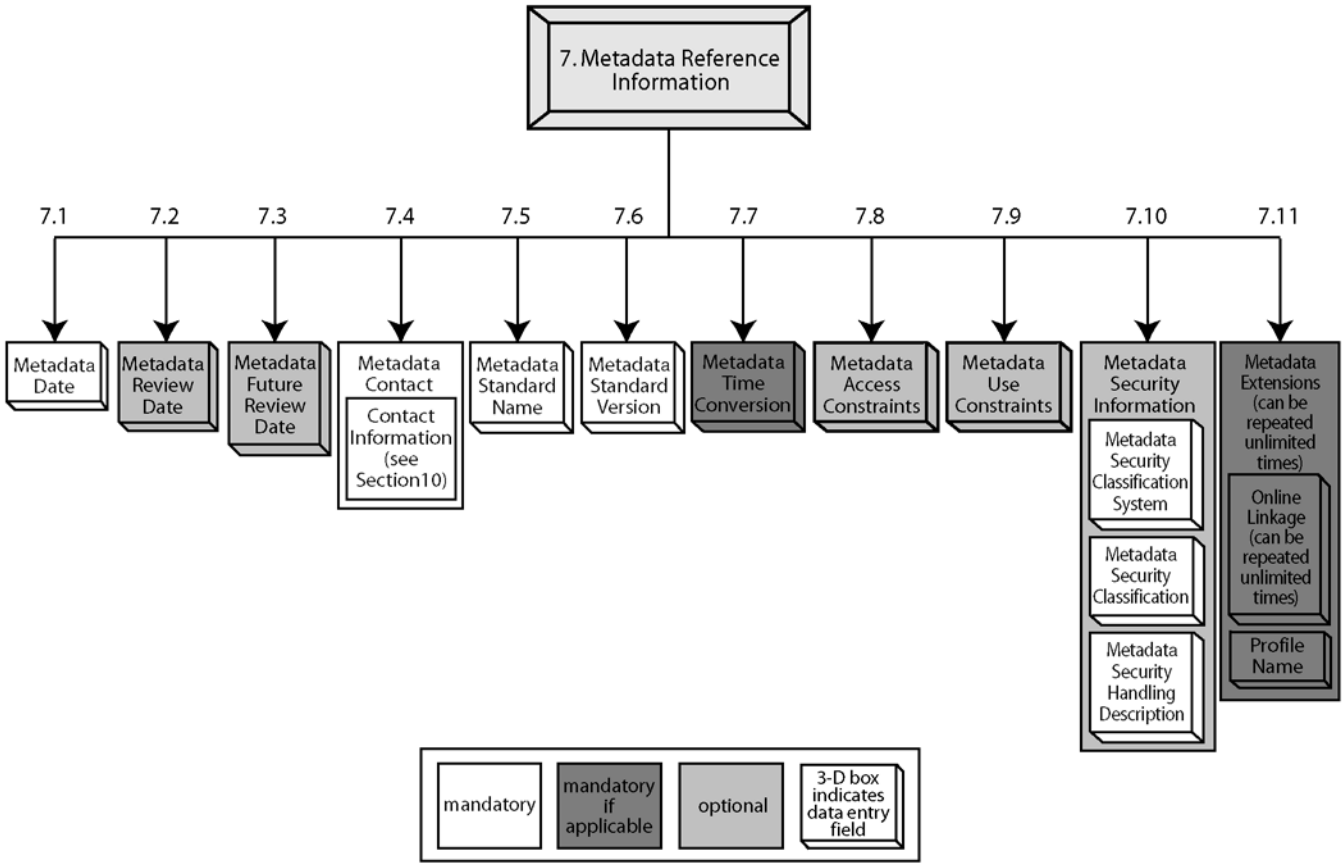
Documents
Document Sharing Hub
Full document details: ASTM E2468-05



(Source: Adapted from FGDC Metadata Workbook – Version 2.0)

FIG. 7 Metadata for Distribution Information (Annex A6)

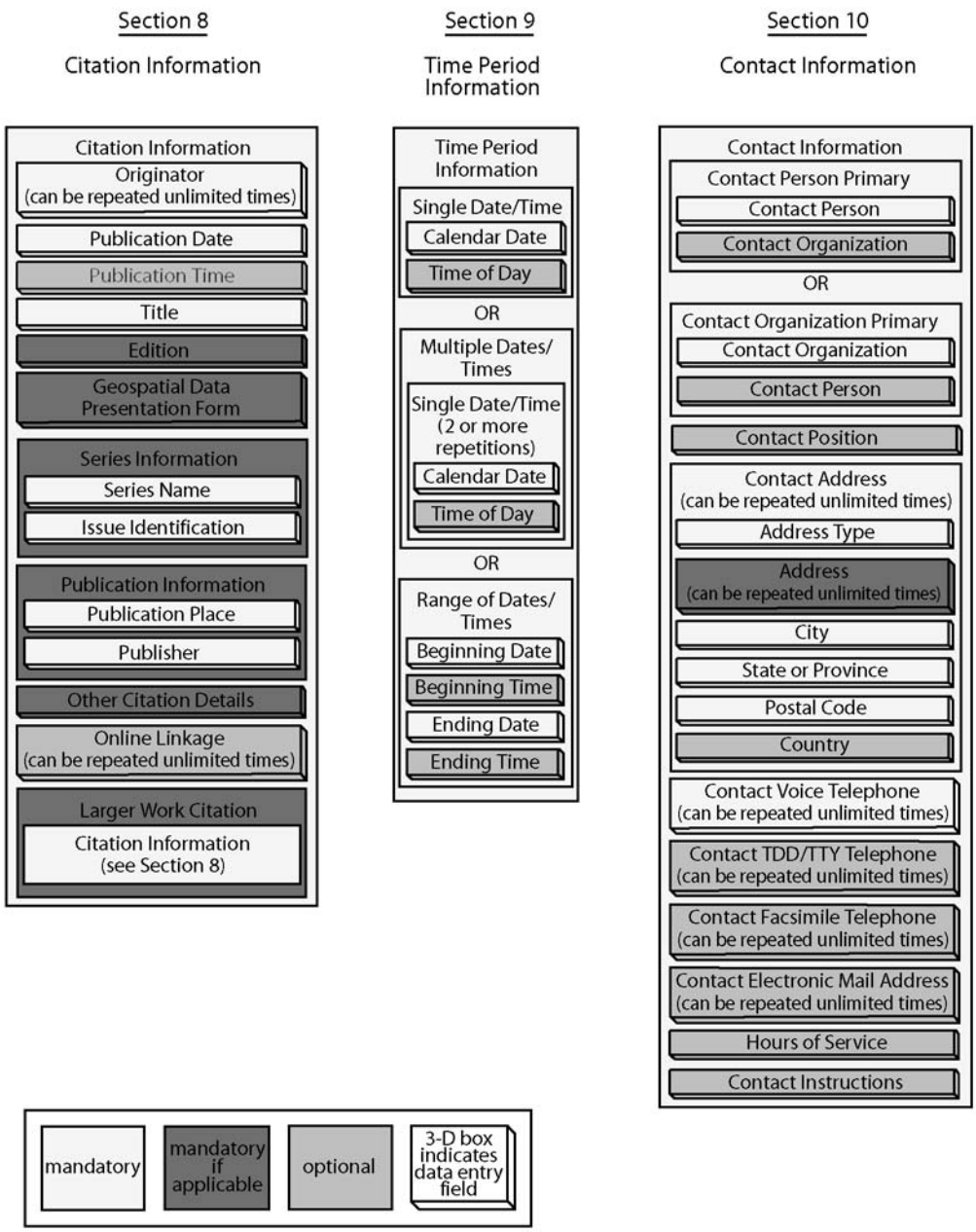
Documents
Document Sharing Hub
Full document details: ASTM E2468-05



(Source: Adapted from FGDC Metadata Workbook – Version 2.0)

FIG. 8 Metadata for Metadata Reference Information (Annex A7)

Documents
Document Sharing Hub
Full document details: ASTM E2468-05



(Source: Adapted from FGDC Metadata Workbook – Version 2.0)

FIG. 9 Metadata for Citation Information (Annex A8), Time Period Information (Annex A9), and Contact Information (Annex A10)

Documents
Document Sharing Hub

Full document details: ASTM E2468-05

ANNEXES

(Mandatory Information)

METADATA

Metadata—Data about the content, quality, condition, and other characteristics of data (see Fig. 1). Annex A1 through Annex A7 define the terms on the right side of the production rule.

```
Type: compound
Short Name: metadata

Metadata =
        Identification_Information +
        Data_Quality_Information +
        0{Spatial_Data_Organization_Information}1 +
        0{Spatial_Reference_Information}1 +
        Entity_and_Attribute_Information +
        0{Distribution_Information}n +
        Metadata_Reference_Information
```

A1. IDENTIFICATION INFORMATION

INTRODUCTION

Identification Information—Basic information about the data set (see Fig. 2).

```
Type: compound
Short Name: idinfo

Identification_Information =
        Citation +
        Description +
        Time_Period_of_Content +
        Status +
        Spatial_Domain +
        Keywords +
        Access_Constraints +
        Use_Constraints +
        (Point_of_Contact) +
        (1{Browse_Graphic}n) +
        (Data_Set_Credit) +
        (Security_Information) +
        (Native_Data_Set_Environment) +
        (1{Cross_Reference}n)

Citation =
        Citation_Information (see Annex A8 for production rules)

Description =
        Abstract +
        Purpose +
        (Supplemental_Information)

Time_Period_of_Content =
        Time_Period_Information (see Annex A9 for production rules) +
        Currentness_Reference

Status =
        Progress +
        Maintenance_and_Update_Frequency

Spatial_Domain =
        Bounding_Coordinates +
        (1{Data_Set_G-Polygon}n)

Bounding_Coordinates =
        West_Bounding_Coordinate +
        East_Bounding_Coordinate +
        North_Bounding_Coordinate +
        South_Bounding_Coordinate
```


Documents
Document Sharing Hub
Full document details: ASTM E2468-05

```
Data_Set_G-Polygon =
                    Data_Set_G-Polygon_Outer_G-Ring +
                    0{Data_Set_G-Polygon_Exclusion_G-Ring}n

Data_Set_G-Polygon_Outer_G-Ring =
                    [4{G-Ring_Point}n | G-Ring]

Data_Set_G-Polygon_Exclusion_G-Ring =
                    [4{G-Ring_Point}n | G-Ring]

G-Ring_Point =
                    G-Ring_Latitude +
                    G-Ring_Longitude

Keywords =
                    1{Theme}n +
                    1{Place}n +
                    0{Stratum}n +
                    1{Temporal}n

Theme =
                    Theme_Keyword_Thesaurus +
                    1{Theme_Keyword}n

Place =
                    Place_Keyword_Thesaurus +
                    1{Place_Keyword}n

Stratum =
                    Stratum_Keyword_Thesaurus +
                    1{Stratum_Keyword}n

Temporal =
                    Temporal_Keyword_Thesaurus +
                    1{Temporal_Keyword}n

Point_of_Contact =
                    Contact_Information (see Annex A10 for production rules)

Browse_Graphic =
                    Browse_Graphic_File_Name +
                    Browse_Graphic_File_Description +
                    Browse_Graphic_File_Type

Security_Information =
                    Security_Classification_System +
                    Security_Classification +
                    Security_Handling_Description

Cross_Reference =
                    Citation_Information (see Annex A8 for production rules)
```

A1.1 *Citation*—Information to be used to reference the data set.

Type: compound
Short Name: citation

Usage Note—Metadata elements for the "Citation" element—Because the "Citation" elements are required by several sections of the metadata, these elements were grouped in Annex A8 rather than being repeated in each applicable section.

Usage Note—Unique identifiers for linking metadata to the data it describes—In implementing a metadata solution, it will be necessary for data archive administrators to unambiguously link the metadata to the data it describes. Several metadata elements in this section, when taken in combination, can serve as a unique identifier for metadata. For example, "Title" and "Edition" could be used to form a unique identifier. Similarly, "Title" and "Metadata Date" (see A7.1) could also be used as a unique identifier.

A1.2 *Description*—A characterization of the data set, including its intended use and limitations.

Type: compound
Short Name: descript

A1.2.1 *Abstract*—A brief narrative summary of the data set.

Type: text
Domain: free text
Short Name: abstract

Documents
Document Sharing Hub

Full document details: ASTM E2468-05

A1.2.2 *Purpose*—A summary of the intentions with which the data set was developed.

Type: text
Domain: free text
Short Name: purpose

Usage Note—Difference between the "Abstract" and the "Purpose" elements—The "Abstract" elements briefly describes the "what" aspects of the data set , such as defining the information contained in the data set, defining the area covered, defining the functional roadway class or facility type that is described and identifying the roads and travel routes that are included. The "Purpose" describes the "why" aspects of the data set. (For example, why was the data set created?)

A1.2.3 *Supplemental Information*—Other descriptive information about the data set.

Type: text
Domain: free text
Short Name: supplinf

Usage Note—Supplemental information for archived traffic data—This section can include overview information about the spatial and temporal granularity of data. For example, how closely spaced are roadway sensors that collect data? How often do sensors provide data updates? Descriptive information of the coverage of the data can also be included here. For example, for which routes or areas are data reported?

A1.3 *Time Period of Content*—Time period(s) for which the data set corresponds to the currentness reference.

Type: compound
Short Name: timeperd

Usage Note—Metadata elements for the "Time Period of Content" element—Because the "Time Period of Content" elements are required by several sections of the metadata, these elements were grouped in Annex A9 rather than being repeated in each applicable section.

A1.3.1 *Currentness Reference*—The basis on which the time period of content information is determined.

Type: text
Domain: "ground condition" "publication date" free text
Short Name: current

Usage Note—Meaning of the "Currentness Reference"—Information about the currentness of a data set (that is, information about how "up-to-date" is a data set) is important to many, if not most, potential users. Most users are interested in the currentness of a data set related to the "ground condition" (that is, when the "real world" looked the way it is described in the data set). Unfortunately, sometimes only the time that the information was recorded or published is known. The "Currentness Reference" element requires the producer to identify if the "Time Period of Content" dates and times refer to the ground condition, or some later time when the information was recorded, published, etc.

A1.4 *Status*—The state of and maintenance information for the data set.

Type: compound
Short Name: status

A1.4.1 *Progress*—The state of the data set.

Type: text
Domain: "Complete" "In work" "Planned"
Short Name: progress

A1.4.2 *Maintenance and Update Frequency*—The frequency with which changes and additions are made to the data set after the initial data set is completed.

Type: text
Domain: "Continually" "Daily" "Weekly" "Monthly" "Annually" "Unknown" "As needed" "Irregular" "None planned" free text
Short Name: update

Usage Note—Difference between "Update Frequency" and temporal granularity—The temporal granularity of a data set is the time resolution at which the data set is stored, whereas the update frequency describes how often new data values are added or included. For example, a data archive may store traffic detector data that has been summarized into 15-minute increments throughout the day. Now assume this archive receives new data every day from the previous day. In this example, the temporal granularity is 15 minutes, whereas the update frequency is daily. The update frequency may vary widely; therefore, only common update frequencies are provided in the enumerated domain values. If your update frequency does not match one of these domain values, then metadata producers may use the free text domain value to more accurately characterize the update frequency.

A1.5 *Spatial Domain*—The geographic areal domain of the data set.

Type: compound
Short Name: spdom

A1.5.1 *Bounding Coordinates*—The limits of coverage of a data set expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern-most. For data sets that include a complete band of latitude around the earth, the West Bounding Coordinate shall be assigned the value -180.0, and the East Bounding Coordinate shall be assigned the value 180.0.

Type: compound
Short Name: bounding

Usage Note—Mandatory nature of "Bounding Coordinates" for data sets that do not contain spatially referenced data—The "Bounding Coordinates" are mandatory for all data sets. If the data set does not contain spatially referenced data, approximate latitude and longitude values for bounding coordinates can be obtained from a variety of sources, including consumer mapping software and web-based applications. For example, approximate latitude and longitude values can easily be obtained from the U.S. Geological Survey (USGS) National Map at http://nationalmap.gov. Please note that only valid latitude and longitude values can be entered for the "Bounding Coordinates." Ordinary place names (such as King County or Seattle, Washington) can be entered as "Place Keywords" in Section A1.6.

A1.5.1.1 *West Bounding Coordinate*—Western-most coordinate of the limit of coverage expressed in longitude.

Type: real
Domain: -180.0 <= West Bounding Coordinate < 180.0
Short Name: westbc

A1.5.1.2 *East Bounding Coordinate*—Eastern-most coordinate of the limit of coverage expressed in longitude.

AVA Documents
Document Sharing Hub

Full document details: ASTM E2468-05

Type: real
Domain: -180.0 <= East Bounding Coordinate <= 180.0
Short Name: eastbc

A1.5.1.3 *North Bounding Coordinate*—Northern-most coordinate of the limit of coverage expressed in latitude.

Type: real
Domain: -90.0 <= North Bounding Coordinate <= 90.0;
North Bounding Coordinate >= South Bounding Coordinate
Short Name: northbc

A1.5.1.4 *South Bounding Coordinate*—Southern-most coordinate of the limit of coverage expressed in latitude.

Type: real
Domain: -90.0 <= South Bounding Coordinate <= 90.0;
South Bounding Coordinate <= North Bounding Coordinate
Short Name: southbc

A1.5.2 *Data Set G-Polygon*—Coordinates defining the outline of an area covered by a data set.

Type: compound
Short Name: dsgpoly

A1.5.2.1 *Data Set G-Polygon Outer G-Ring*—The closed nonintersecting boundary of an interior area.

Type: compound
Short Name: dsgpolyo

A1.5.2.1.1 *G-Ring Point*—A single geographic location.

Type: compound
Short Name: grngpoin

A1.5.2.1.1.1 *G-Ring Latitude*—The latitude of a point of the g-ring.

Type: real
Domain: -90.0 <= G-Ring Latitude <= 90.0
Short Name: gringlat

A1.5.2.1.1.2 *G-Ring Longitude*—The longitude of a point of the g-ring.

Type: real
Domain: -180.0 <= G-Ring Longitude < 180.0
Short Name: gringlon

A1.5.2.1.2 *G-Ring*—A set of ordered pairs of floating-point numbers, separated by commas, in which the first number in each pair is the longitude of a point and the second is the latitude of the point. Longitude and latitude are specified in decimal degrees with north latitudes positive and south negative, east longitude positive and west negative.

Type: text
Domain: -90<= Latitude_elements <= 90, -180 <= Longitude_
Elements = 180
Short Name: gring

A1.5.2.2 *Data Set G-Polygon Exclusion G-Ring*—The closed nonintersecting boundary of a void area (or "hole" in an interior area).

Type: compound
Short Name: dsgpolyx

Usage Note—Definition of G-Polygon, G-Ring, and "outer" and "inner" G-Ring—The terminology of G-Polygon and G-Ring is taken from the Spatial Data Transfer Standard. In simple terms, a G-Polygon is a closed, connected (contiguous) area. A G-Ring is a set of coordinates that defines a boundary of the area. The first and last points in the set of coordinates must be the same. The "outer" G-Ring describes the outside edge of the G-Polygon. "Inner" G-Rings describe any "holes" that may occur in the G-Polygon.

Usage Note—Difference between the "Bounding Coordinates" and the "Data Set G-Polygon"—The "Bounding Coordinates" are the west-, east-, north-, and south-most extent of the data set. The g-rings that describe the "Data Set G-Polygon" form the outline of the data set.

Usage Note—Supplemental information on "Bounding Coordinates" and "Data Set G-Polygons"—The purpose of the "Spatial Domain" compound element is to describe the "footprint" of the data set. This footprint can be used for spatial searches in data catalogs and other purposes. Comments received during the development of the standards recommended requiring the "Bounding Coordinates" instead of the more demanding (but more exact) "Data Set G-Polygons". To provide a common means of conducting spatial searches on all metadata, "Bounding Coordinates" were made mandatory. Many users indicated a desire to provide the "Data Set G-Polygons" to allow the results of spatial searches to be more exact, and so the "Data Set G-Polygon" elements were added as an option.

Usage Note—Inclusion of four or more points in a G-Ring—The ring must be closed (that is, the first and last points must be the same). So the minimum number of points to describe a triangle is four (point 1, point 2, point 3, point 1).

A1.6 *Keywords*—Words or phrases summarizing an aspect of the data set.

Type: compound
Short Name: keywords

Usage Note—Purpose of "Keywords" element—A keyword is a word or phrase that signifies the meaning or main ideas of a data set. They often are used as an index to the contents of a data set. The standards provide for four types of keywords: theme (the subject of the data set, such as wetlands, vegetation, etc.), place (the geographic location of the data set, such as Montgomery County, Yellowstone National Park), stratum (the vertical location of the data set, such as seafloor, seabed, troposphere, stratosphere), and temporal (time references for a data set, such as a specific date or range of dates expressed in days, months, or years).

A1.6.1 *Theme*—Subjects covered by the data set.

Type: compound
Short Name: theme

A1.6.1.1 *Theme Keyword Thesaurus*—Reference to a formally registered thesaurus or a similar authoritative source of theme keywords. (For example, the Transportation Research Board's (TRB's) Transportation Research Thesaurus at http://www4.trb.org/trb/tris.nsf/web/trt is one possible thesaurus from which theme keywords could be selected.)

Type: text
Domain: "None" free text
Short Name: themekt

A1.6.1.2 *Theme Keyword*—Common-use word or phrase used to describe the subject of the data set.

Type: text
Domain: free
text Short Name: themekey

A1.6.2 *Place*—Geographic locations characterized by the data set.

AVA Documents
Document Sharing Hub

Full document details: ASTM E2468-05

Type: compound
Short Name: place

A1.6.2.1 *Place Keyword Thesaurus*—Reference to a formally registered thesaurus or a similar authoritative source of place keywords. (For example, the USGS Geographic Names Information System (GNIS) at http://geonames.usgs.gov is one possible thesaurus from which place keywords could be selected. The Federal Information Processing Standard (FIPS) 55 is another authoritative source from which state, county, city, and other place names and codes can be selected.)

Type: text
Domain: "None" "Geographic Names Information System" free text
Short Name: placekt

A1.6.2.2 *Place Keyword*—The geographic name of a location covered by a data set.

Type: text
Domain: free text
Short Name: placekey

A1.6.3 *Stratum*—Layered, vertical locations characterized by the data set.

Type: compound
Short Name: stratum

A1.6.3.1 *Stratum Keyword Thesaurus*—Reference to a formally registered thesaurus or a similar authoritative source of stratum keywords.

Type: text
Domain: "None" free text
Short Name: stratkt

A1.6.3.2 *Stratum Keyword*—The name of a vertical location used to describe the locations covered by a data set.

Type: text
Domain: free text
Short Name: stratkey

A1.6.4 *Temporal*—Time period(s) characterized by the data set.

Type: compound
Short Name: temporal

A1.6.4.1 *Temporal Keyword Thesaurus*—Reference to a formally registered thesaurus or a similar authoritative source of temporal keywords.

Type: text
Domain: "None" free text
Short Name: tempkt

A1.6.4.2 *Temporal Keyword*—The name of a time period covered by a data set.

Type: text
Domain: free text
Short Name: tempkey

A1.7 *Access Constraints*—Restrictions and legal prerequisites for accessing the data set. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the data set.

Type: text
Domain: "None" free text
Short Name: accconst

A1.8 *Use Constraints*—Restrictions and legal prerequisites for using the data set after access is granted. These include any use constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on using the data set.

Type: text
Domain: "None" free text
Short Name: useconst

Usage Note—Information provided for "Access Constraints" and "Use Constraints"— The types of constraints intended are those applied to ensure rights of privacy or intellectual property, and any other special restrictions, limitations, or warranties on obtaining or using the information resources, or its component products. Recommendations on the types of uses to which the data set may or may not be applied should be described in the "Purpose" metadata element (see A1.2.2). Descriptions of data quality should be provided using the elements in Annex A2.

A1.9 *Point of Contact*—Contact information for an individual or organization that is knowledgeable about the data set.

Type: compound Short
Name: ptcontac

Usage Note—Metadata elements for the "Point of Contact" element—Because the "Point of Contact" elements are required by several sections of the metadata, these elements were grouped in Annex A10 rather than being repeated in each applicable section.

Usage Note—Difference between the "Originator" in compound element "Citation" (see A1.1) and the "Point of Contact" element—The "Originator" is the person(s) and organization(s) that developed the data set. The "Point of Contact" is the person(s) and organization(s) that can be contacted if questions arise about the data set. The "Originator" and the "Point of Contact" may be the same.

A1.10 *Browse Graphic*—A graphic that provides an illustration of the data set. The graphic should include a legend for interpreting the graphic.

Type: compound Short
Name: browse

Usage Note—Purpose of a "Browse Graphic"—A "Browse Graphic" is an image of the data set. The image allows prospective users to move beyond textual descriptions and see what the data set looks like. The image might show a simple display of the data set, the results of an application that used the data set, different aspects of the quality of the data set, or other information.

A1.10.1 *Browse Graphic File Name*—Name of a related graphic file that provides an illustration of the data set.

Type: text
Domain: free text
Short Name: browsen

A1.10.2 *Browse Graphic File Description*—A text description of the illustration.

Type: text
Domain: free text Short
Name: browsed

A1.10.3 *Browse Graphic File Type*—Graphic file type of a related graphic file.

Documents
Document Sharing Hub

Full document details: ASTM E2468-05