

ROAD SPATIAL DATA STANDARD IMPLEMENTATION



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GIS Council
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1 Introduction to the Road Spatial Data Standard

Geographic information systems (GIS) provide the National Park Service (NPS) with a powerful tool to help manage all aspects of park operations, including transportation management. In order to make the best use of GIS, it is imperative that accurate information about features is recorded and systematically managed by the NPS. Furthermore, it is essential that high-integrity geospatial information is accessible, retrievable, and updateable by NPS staff and readily available to the public. Geospatial data standards greatly reduce data redundancy (and duplication of effort), as well as data loss and misuse; and help ensure that we are using the most accurate, up-to-date data available. In addition, by aggregating this spatial data on an enterprise level and integrating that data with other information systems it enables the NPS to make better data-driven decisions at the Park, Regional, and National levels and to accurately report on the status of NPS assets.

The National Park Service Road Spatial Data Standard (RSDS) is intended to provide a framework for organizing and managing the NPS road infrastructure using centerline spatial data by documenting data quality and lineage to facilitating data integration and sharing. The standards will help insure spatial data consistency, quality and accuracy and will assist in program direction, reporting and information requests.

This standard will include a data model, in the form of an ESRI geodatabase, and an implementation plan to assist users in utilizing this standard, by providing a platform for all data users to quickly migrate data into the standards to accommodate data sharing.

1.1 Background

More and more NPS programs are providing guidelines regarding what kind of spatial information to collect, how to collect that information, and what level of detail that information should have. Providing a foundation for the creation of high quality spatial data and a standardized method of documenting where that data came from, how it was created and how it can be used, allows all users the ability to share data more effectively and use that data to help each park strive towards their mission.

It has been proven that in business the development of data standards greatly reduces the loss of information that occurs due to staff changes, data redundancy, data conflicts, liability, misapplications, duplications of effort and decisions based upon poorly documented data. In addition, the subsequent aggregation of the data on an enterprise level through a standardized schema will allow the NPS to support other service-wide databases in need of spatial data to improve overall data quality. By doing this the NPS can make better data driven decisions at the park, region and national levels.

The establishment of a national, enterprise level NPS Roads Spatial Data Standard provides greater streamlined efficiency and management of road centerline data through the association of the spatial data to our many information management databases. These databases include but are not limited to the Facility Management Software System (FMSS), Federal Real Property Profile (FRPP) and the Financial Business Management System (FBMS).

It should be known that spatial data for roads is a commonly requested dataset by the general public. By making this service-wide dataset available to the general public these request can be fulfilled and could potentially increase visitation and reduce incidents.

1.2 Definition of a Spatial Data Standard

Standards, as defined by [Office of Management and Budget, Circular A-16](#), “...are common and repeated rules, conditions, guidelines or characteristics for data, and related processes, technology and organization.” Spatial data are considered a national capital asset and should therefore be developed and managed appropriately.

A coordinated approach for developing spatial data standards that apply to collecting, maintaining, distributing, using, and preservation of data will improve the quality of federal spatial data and reduce the cost of derivative products created by federal and non-federal users. Applications using spatial data that adhere to FGDC standards enable cost effective public and private policy development, management,

and operations. Implementation of this Circular is essential to help federal agencies eliminate duplication, avoid redundant expenditures, reduce resources spent on unfunded mandates, accelerate the development of electronic government to meet the needs and expectations of citizens and agency programmatic mandates, and improve the efficiency and effectiveness of public management. Many applications are dependent upon accurate spatial data. (OMB Circular A-16, 2002)

The National Spatial Data Infrastructure (NSDI) facilitates the integration of spatial data from multiple sources through the use of standards developed by the Federal Geographic Data Committee (FGDC). The GIS Roads Data Standard was designed to meet NPS data needs as well as support the transfer of data between different hardware and software platforms and public and private partners without the loss of data.

1.3 Contents of the Roads Spatial Data Standard

The road and general spatial data standards developed by the [Federal Geographic Data Committee \(FGDC, 2011\)](#), [US Forest Service \(USFS, 2011\)](#), and [Open Street Map \(OSM, 2015\)](#) were consulted among others while developing the GIS data schema for NPS roads. As a result data stored in this standard can be more readily shared with federal and private partners. Additionally, the NPS road data schema allows for the symbolization and analysis of roads based on attributes such as road functional class and road surface type. Ideally, the LOCATIONID (FMSS Location Identifier) and ASSETID (FMSS Asset Identifier), which provides a link to a wealth of road data stored in the FMSS (including class and surface type), will eventually be populated for each road segment so that visualization and analysis of the FMSS data can easily be done.

In order to accommodate the needs of a park unit and gain the most benefit from integrating transportation data, the Roads Spatial Data Standard addresses two aspects of roads data: descriptive information of the data (attributes) and the physical parameters of the geospatial data. The attributes of the data can be found integrated as part of the database structure. The RSDS database structure layer has information about the type of road, the status of the road, the common name associated with the road, etc. In addition to the road specific information this standard has both mandatory and optional fields taken from the National Park Service Core Spatial Data Standard (CSDS). The CSDS was designed to facilitate the development of future standards and to serve as a starting point, and a minimum requirement, for all NPS spatial data. These attributes include feature level metadata fields, which are a subset of fields for each feature that clarify the origin, validity, and status of each data record. It should be noted that the feature level metadata included in this standard is not meant to replace formal, XML based, dataset metadata. The formal XML based metadata will be provided with the Roads Spatial Data Standard geodatabase template.

Users should be aware that this dataset can be further enhanced by integrating the Extended Core Fields listed in the Appendix of [Core Spatial Data Standard \(NPS, 2016\)](#) as well as any other custom fields that are specific to your particular dataset or project needs. With this, the Roads Spatial Data Standard remains flexible to accommodate any data development needs.

1.4 Who the Road Data Standard Applies To

The goal of creating the RSDS is to promote the sharing of more accurate, reliable and authoritative roads spatial data. The standard applies to anyone creating or collecting roads data that others would need access to for planning, protection, maintenance or recreational purposes either internally for park service personnel or externally for other government agencies or the general public.

As a result, those responsible for data collection should make every effort to create spatial data that meets the standards to enable sharing of this information. Regional GIS coordinators, park GIS staff, program GIS staff, transportation subject matter experts and others can assist the data collector in achieving this goal. It is recommended that these road fields be included in any roads GIS data set especially if there is potential to be distributed either internally or to the public, including when the data leaves the possession of the creator which often occurs during employee turnover. The Roads Spatial Data Standard fields provide additional feature level information that is standardized across NPS and will be present in GIS data into the future.

The intended audience of the Roads Spatial Data Standard is a service-wide, enterprise level use case however this data schema can be used for park level data management. Emphasis is on use by transportation planners, park roads maintenance staff, and cartographic representation of park roads at the service-wide level. Creation of geospatial and attribute data in the RSDS using GIS software is targeted for those personnel that have the knowledge, skills, and abilities to perform advanced editing and data management equivalent to the generic position description of “Cartographic Technician”.

2 Organization of the Road Spatial Data Standard

This standard is designed to facilitate the development of future roads datasets by providing the minimum Road attribute fields that should be included in all future roads datasets. The database fields and domains have been designed to contain specific roads information in order to assist users in understanding what the spatial data represents, when it was created and edited, and whether or not restrictions apply to the data. This attribute field information supports migrating legacy data as well as incorporating new data by utilizing Road specific fields as well as [Core Spatial Data Standard \(NPS, 2016\)](#) fields.

The Roads Spatial Data Standard includes road center-lines only but the standard could be applied to other road features besides centerlines. For the purposes of this data standard a road is defined by [Park Facilities Management Division \(PFMD\) Business Practices: Road \(1100\) Asset \(NPS, 2014\)](#) as “a paved or unpaved surface (maintained or not maintained) used by vehicles and constructed with materials such as asphalt, concrete, gravel, cobblestone, pavers, crushed stone or compacted earth. A park road system contains those roads within or given access to a park or other unit of the NPS which is administered by the NPS or by the Service in cooperation with other agencies.”

2.1 Road Attribute Fields

The Roads Standard is designed to accommodate various spatial data types, including ESRI shapefiles, and therefore the field names do not contain blank spaces and are no more than ten characters in length. Field names longer than ten characters are truncated in an ESRI shapefile. As a result, some of the field names are abbreviated and may appear somewhat abstract. Users should be aware that there is one field from the Core Standard, PUBLICDISPLAY is longer than ten characters all will truncate when utilizing a shapefile.

In order to make the field names more clear, the user can choose to change the “alias” for each field name. The Road Standard has been set up so that the field name and the alias are the same. It is up to the user of the data to keep the alias the same as the field name or to update the alias to represent the field name fully written out. As an example, when an alias is set up to be fully written out, users will not see “PUBLICDISP” after being truncated while using an ESRI shapefile, but will see, “PUBLIC DISPLAY” when viewing the attribute field tables in ESRI ArcGIS.

Some fields, such as GEOMETRYID fields, can be *calculated* within GIS at the enterprise level. Other fields must be manually populated by the user and are considered *mandatory* information, *mandatory if applicable*, or *optional*. For example, the GROUPCODE field is used to identify a network of park units where multiple park units are represented by one pre-established four letter code and is a *mandatory if applicable* field because in most cases a park unit has no need for a GROUPCODE. If a value is present in the GROUPCODE field then the GROUPNAME field will be automatically populated by the region or service-wide data administrator which defines the GROUPCODE for use by the general public. In order to comply with the standard, users must input data only in the *mandatory* fields. Nevertheless, completing information for all fields would ultimately provide the most complete documentation for a data set. Details describing each field, definitions of potential values, and examples of data entered for fields are provided in [Section 4.1](#).

An issue often raised by those testing or utilizing the Road Standard is whether additional descriptive fields can be added to the ESRI geodatabase schema. The fields described in this guidance document represent the minimum requirements and data managers are encouraged to add fields in order to meet Park, Regional, or Programmatic needs. Another example where additional fields may exist is when legacy data is migrated into the Roads Standard or vice versa. The additional legacy fields may provide more descriptive information about the particular features in the dataset than the stand alone road fields. Some legacy data fields may be duplicative or have a very similar meaning as one or more of a Road fields and will therefore need to be managed so that the Road Standard field is the one being utilized and the

duplicate legacy data field is copied into the appropriate Road Standard field prior to removing them.

2.2 Field Domains

One way to enforce data integrity within a dataset is to create attribute field domains. Domains constrain or limit the values for a field through drop down menus or pick lists of acceptable attributes. The tables in [Section 4.2](#) are used to describe and define each of the domain values associated with the field listed in [Section 4.1](#).

The Road Standard domain codes and domain code descriptions are the same in order to avoid confusion when entering data. The domain “Code” is what is written by the GIS software to the database as the attribute value, and the domain “Description” is the text displayed to the GIS user. It is important to note that the “Code” is the value or text displayed when these data are exported to other formats such as GeoJSON and ESRI shapefile.

2.3 Domain Naming Convention

While domains offer many advantages, they present a challenge when they are not standardized. Domains are managed at the database level and can be applied to all relevant fields in any feature class or table stored in the database. We therefore need a way of identifying a domain’s source and the standard it belongs to. A domain naming convention that complements the NPS Layer Naming Conventions (2012), as shown in Figure 1, identifies the field and/or standard that the domain belongs to and provides the ability to quickly sort and find domains.

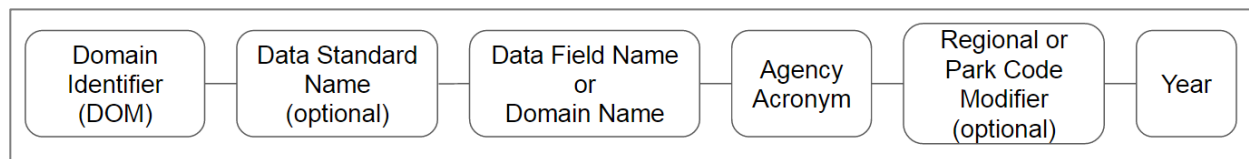


Figure 1 - Domain Naming Convention

Domain Layout (bold text is required): **DomainIdentifier**_StandardName_**DomainName**_AgencyAcronymModifierYear

Provided below are some example domain naming conventions that depend on whether a domain is unique to a single data field or not unique to a single data field. Examples:

- DOM_YES_NO_UNK_NPS2016 where the domain contains Yes, No and Unknown and can be used for multiple fields.
- DOM_PUBLICDISPLAY_NPS2016 where the domain contains No Public Map Display or Public Map Display and is specific to only this data field.

In order to avoid duplication of domains, standard development teams should first check to see if an existing domain could meet their needs. Changing the core field domains is highly discouraged including the addition of new choices to the core field domains. These types of changes to the Road Spatial Data Standard fields will be considered when provided as a suggested update for when the time comes to review and update the RSDS itself. In cases where a park or region wishes to streamline their domain list to only include local applicable values, the name of the altered domain will need to differ from the name of the domain in this standard. Without changing the Core domain, the altered domain should be named using this naming convention and include an abbreviation at the end of the domain name to represent the agency level of the change, such as Region code or Park code (e.g. DOM_MAINTAINER_NPSIMR2016).

For more examples of the domain naming convention, please see the column called “Value Definition” in [Section 4.1](#) where domains are listed for certain fields.

3 Implementation

Within the Road Standard are required core data fields that were designed to provide common general information as well as minimum feature level metadata needed in order to understand the quality of each feature within the geospatial data and the restrictions that should be applied when displaying or sharing the data. All new NPS geospatial data standards will be required to include the core fields and attribute domains approved in this standard.

3.1 Geodatabase Template

“Ready-to-go” feature classes containing the Road Spatial Data Standard will be made available in an ESRI file geodatabase format with NPS compliant schema and domains to facilitate the implementation of current data standards as well as the development of future standards. In order to comply with NPS standards, the feature class in this standard is stored in the geographic coordinate system using the NAD83 datum (GIS, 2011). The RSDS feature class template includes road data fields, the core data fields as well as FGDC compliant metadata and can serve as a starting point for data stewards who are migrating legacy road data or collecting new road data.

3.2 Implementation Examples and Guidance

This section provides recommendations and examples for utilizing some of the Road Standard fields as well as Core Standard fields.

Potentially, most of the road specific attributes (as well as some core attributes) can be populated by using road Location, road Location Specification Template and Traffic Surface Asset Specification Template information from the FMSS database. To utilize this data LOCATIONID's must be associated to the correct line feature. Possible RSDS fields that can be populated using FMSS data are: RDNAME, RDALTNAME, RDSTATUS, RDCLASS (see [Section 4.3](#)), RDSURFACE, RDONEWAY, RDLANES, RTENUMBER, SEASONAL, SEADESC, MAINTAINER, ISEXTENT, RESTRICTIION, ROUTEID and ASSETID. To get access to this data, determine what FMSS fields relate to these RSDS fields and to find out how accurate and complete the FMSS data is, contact that park units FMSS representative.

Other Core Spatial Data Standard fields included in this standard differentiate between features that can be displayed on a map (PUBLICDISPLAY) and those that can be accessed (DATAACCESS) by the public. For example, some road infrastructure is administrative use only and although the data is publicly available, they should not be displayed on public maps so that they are not used. The field attributes for the features in this example would be DATAACCESS = “Unrestricted” and PUBLICDISPLAY = “No Public Map Display”.

Here is an example on how a user can differentiate between “Private”, NPS administrative roads and “Private”, privately owned roads and display this information on a cartographic product. For both of these cases the PUBLICDISPLAY field would equal “Public Map Display,” however the features would need to be labeled as “Privately Owned” or “NPS Administrative Road”. In this case the MAPLABEL field (which is one of the extended Core Data Standard fields) will be used for labeling purposes. The field attributes for the features in this example would be MAPLABEL = “Privately Owned”, RDCLASS = “Private” and MAINTAINER = “Private” or MAPLABEL = “NPS Administrative Road”, RDCLASS = “Private” and MAINTAINER = “National Park Service”.

In the case that a new road or a road reroute is being planned and needs to be represented in GIS but doesn't exist yet, the Road Standard field called RDSTATUS would be marked as either “Proposed” or “Planned”. The PUBLICDISPLAY field should be “No Public Map Display” and the DATAACCESS field should be “Internal NPS Only”. Once the road is actually built on the ground and open to the public, RDSTATUS would be changed to “Existing”, PUBLICDISPLAY would change to “Public Map Display” and DATAACCESS would change to “Unrestricted”.

When contributing data at the enterprise or regional efforts, fields will be populated at the Regional and/or National levels and therefore do not necessarily need to be filled out by users at the local Park level. For example, Parks usually do not need to use UNITNAME and REGIONCODE in their day to day work and can therefore leave these fields blank. Likewise, GEOMETRYID, a global unique identifier (GUID), can be calculated or auto-populated using scripts in Regional and National databases. Although the GEOMETRYID is needed in order to roll data into Regional and National databases, Park level users may not be required to populate these values.

GEOMETRYID is a text field that uniquely identifies the geometries (e.g. points, lines, and polygons) that are used to represent a feature and is the primary key of the dataset. FEATUREID, on the other hand, is used to keep track of features that have multiple geometries. In other words, a physical entity (such as a Building) represented by a point (center, entrance, photo, other etc.), line (Ex. wall), and polygon (perimeter, buffer etc.) would all share the same FEATUREID but have unique GEOMETRYIDs. The FEATUREID field is a concept that is shared in other NPS

standards such as the Building_ID in the Buildings GIS data standard and the CR_ID in the Cultural Resource data standard.

The CREATEDATE field is date field used as a timestamp for multiple purposes. In 2022 the National Geodetic Survey is going to start using time as a way to move between datum's. Every feature digitized or collected via GPS will need to include the date at minimum and time of creation, if possible. Having the date and time that a feature was created will help with compliance to this National Geodetic Survey datum date requirements. If the date of creation for a feature is not known, it is recommended to use the following criteria:

- If date is known, use full date. (mm/dd/yyyy)
 - If month and year is known, use 01 for the day. (mm/01/yyyy)
 - If season and year is known, use 03 for Spring, 06 for Summer, 09 for Fall, and 12 for Winter for the month and use 01 for the day. (03/01/yyyy, 06/01/yyyy, 09/01/yyyy, or 12/01/yyyy)
 - If only year is known, use 01 for the month and use 01 for the day. (01/01/yyyy)
 - If nothing is known on a Mandatory if Applicable (MA) or Optional (O) field, then leave null. On a Mandatory attribute, use 01 for the month and use 01 for the day and make a best guess approximation on the year. (01/01/yyyy)

MAPMETHOD is an important feature level data field used to understand the spatial accuracy in addition to how current the data is. If the MAPMETHOD is not known the field should be populated with "Unknown". If MAPMETHOD equals "Other" please use the notes field to provide additional information on how this data was created. It is critical to know how accurate or current the data is so that highly accurate data is not replaced by less accurate data. For instance, if the MAPMETHOD equals "digitized" and the MAPSOURCE equals "aerial imagery" then the SOURCEDATE will need to be filled out with the date the aerial imagery was created. If the same data is collected using survey grade GPS the following year then we now know that the survey grade data is more accurate and current and should replace the data that was digitized.

There are a series of associated fields where some fields need to be utilized together in order for them to make sense. The groups of associated fields are: SEASONAL and SEASDESC; DATAACCESS, ACCESSNOTES, and ORIGINATOR. For example, if DATAACCESS equals "Internal NPS Only" or "Secure Access Only", the fields called ACCESSNOTES and ORIGINATOR (extended Core Spatial Data field) should also be populated in order to describe why that data is restricted. The ORIGINATOR field is intended to allow users to document the institution, program name or position title which originally created the feature. The ORIGINATOR field also provides a data steward point of contact for anyone that has questions about a feature or how the data can be accessed or distributed when the person listed in CREATEUSER and/or EDITUSER no longer works for the agency. ORIGINATOR is also great information to consider including in the metadata of any dataset.

4 Attribute Data Fields

In the Values column of Table 1 below, the bold text represents the default domain.

4.1 Attribute Data Field Essentials

M = Mandatory value, MA = Mandatory value if applicable, O = Optional value, C = Calculated (automated through scripts or other means)

Table 1: Attribute Schema

Attribute Name	Data Type	Data Width	Value Definition	Description	Values
RDNAME ^{MA}	String	254	Free text using proper case	Official name of road.	Example: Loop Road
RDALTNAME ^O	String	254	Free text; Multiple values controlled by a (pipe) delimiter.	Alternative name(s) of the road. Data Width is flexible based on local technology limits.	Example: HQ VIP RV Loop Road
MAPLABEL ^O	String	100	Free text	Feature label used for labeling purposes where the park or official name does not meet the need of a particular cartographic product.	Example: Loop RD, Loop Rd, Loop Road SW, Loop Road (Closed Seasonally)
RDSTATUS ^M	String	50	Domain Menu = DOM RDSTATUS NPS2016	Current physical state of the road or road segment (FS Travel Routes Data Dictionary, 2009).	Existing; Temporarily Closed; Decommissioned; Planned; Proposed; Unknown
RDCLASS ^M	String	50	Domain Menu = DOM RDCLASS NPS2016	The grouping of roads by the character of service they provide. The Road Class should be classified based on how the road was engineered (US Census Bureau MTFCC, 2009).	Unknown; Primary; Secondary; Local; 4WD; Service; Private; Parking Lot Road
RDSURFACE ^M	String	50	Domain Menu = DOM RDSURFACE NPS2016	The wearing course; usually designed to resist skidding, traffic abrasion, and the disintegrating effects of weather (FS Travel Routes Data Dictionary, 2009 and FMSS, 2016).	Unknown; Asphalt; Concrete; Brick/Pavers; Cobblestone; Gravel; Sand; Native or Dirt; Other Paved; Other Unpaved

Attribute Name	Data Type	Data Width	Value Definition	Description	Values
RDONEWAY ^{MA}	String	20	Domain Menu = DOM_RDONEWAY_NPS2016	Direction of one way roads. Use GIS software to define direction when symbolized.	NULL; With Digitized; Against Digitized;
RDLANES ^{MA}	Long Int		Domain Range = DOM_RDLANES_NPS2016	The maximum number of lanes existing on a road element (FGDC Transportation, 2008 and US Department of Transportation FHWA, 2013).	Domain range limited to 1-8 lanes
RDHICLEAR ^O	String	10	Domain Menu = DOM_YES_NO_UNK_OTH_NPS2016	Indicate if a high ground clearance vehicle is necessary.	No; Yes; Unknown; Other
RTENUMBER ^{MA}	String	25	Free text; Multiple values controlled by a (pipe) delimiter.	The ID-number of a particular route in a given road network as attributed by a national, sub-national or international organization (IE. Federal, state or county). Can be used for labeling purposes using “shields”. Value must have a space between designation and number. Values will be Pipe-delimited for routes that share several numerical designations. Data Width is flexible based on local technology limits (FGDC Transportation, 2008).	Ex: US 441 County 66 SH 14
SEASONAL ^O	String	20	Domain Menu = DOM_YES_NO_UNK_NPS2016	Annual seasonal closures exist for this segment of Road. These closures are not temporary, but known to be annual.	No; Yes; Unknown
SEASDESC ^{MA}	String	254	Free Text	If RDSEASONAL is Yes, please describe the reason for the annual seasonal closure. Include specific dates of closure if known.	Example: Winter seasonal closure.

Attribute Name	Data Type	Data Width	Value Definition	Description	Values
RDMAINTAINER ^{MA}	String	50	Domain Menu = DOM_RDMAINTAINER_NPS2016	The agency or party having primary (largest share) financial responsibility for maintenance (FGDC FTDS, 2011).	Unknown; National Park Service; Bureau of Indian Affairs; Bureau of Land Management; Bureau of Reclamation; County, Parish, Borough; Department of Defense; Department of Energy; Federal Aviation Administration; Federal Highway Administration; Fish and Wildlife Service; Forest Service; Local Government; Other Federal Agency; Private; State; Tribal; US Army Corps of Engineers
ISEXTANT ^M	String	20	Domain Menu = DOM ISEXTANT NPS2016	Indicates feature or features that are no longer in existence or partially in existence. If data represents features that are no longer in existence or only partially in existence following damage, disaster or some other change to its status then the value will be false or partial (NPS Cultural Resources SDTS, 2014).	Unknown; True; False; Partial; Other

Attribute Name	Data Type	Data Width	Value Definition	Description	Values
PUBLICDISPLAY ^M	String	50	Domain Menu = DOM_PUBLI CDISPLAY_N PS2016	Feature is available for 1) public distribution, 2) consumption by a public facing system or service, and 3) display on a public interface. This field gives data providers the flexibility to identify features that are not appropriate to make publicly available. Besides sensitive data, this may include data that does not originate at NPS. Any feature marked as restricted in DATAACCESS field should automatically have a false value here. To prevent distribution of sensitive data, the appropriate query for feature accessibility to the public is: DATAACCESS = “Unrestricted” and PUBLICDISPLAY = “Public Map Display”.	No Public Map Display; Public Map Display
DATAACCESS ^M	String	50	Domain Menu = DOM_DATA ACCESS_NPS2 016	The extent of permitted access to the feature geometry and associated attributes.	Internal NPS Only; Unrestricted; Secure Access Only
UNITCODE ^M	String	10	Free text	NPS alphabetic code (4-characters) of the NPS organizational unit.	Example: YELL
UNITNAME ^C	String	254	Free Text	Full name of the NPS organizational unit.	Example: Yellowstone National Park
GROUPCODE ^{MA}	String	10	Free text	An NPS unit that administers the unit identified in UNITCODE. Can additionally be used to identify a network or other single entity that has a pre-established four letter code.	Example: WEAR; SWAN (I&M Network)

Attribute Name	Data Type	Data Width	Value Definition	Description	Values
GROUPNAME ^C	String	254	Free text	Full name of the NPS organizational unit identified in GROUPCODE.	Examples: Western Arctic Parklands; Southwest Alaska Inventory and Monitoring Network
REGIONCODE ^C	String	4	Domain Menu = DOM_REGIO NCODE_NPS2 016	The alpha code of the NPS Region.	AKR; IMR; MWR; NCR; NER; PWR; SER; WASO
CREATEDATE ^M	Date/Time	NA	Valid Date format	Date the feature was initially created.	Example: 02/17/2015
CREATEUSER ^M	String	50	Free text	The person who initially created the feature.	Example: John Smith
EDITDATE ^M	Date/Time	NA	Valid Date format	Date the feature was last edited.	Example: 02/17/2015
EDITUSER ^M	String	50	Free text	The person who last edited the feature.	Example: John Smith
MAPMETHOD ^M	String	254	Free text	How the geospatial feature was derived.	Examples: Unknown; Digitized; Autonomous GPS; Differential GPS; Surveyed / Geodetically Derived; Geocoded; COGO; Feature Extraction
MAPSOURCE ^M	String	254	Free text	Source from which the feature was derived.	Example: Digitized from NAIP aerial photography; GPS Unit Make/Model: Trimble GeoXH
SOURCEDATE ^{MA}	Date	NA	Valid Date format	The date of the source material.	Example: 02/17/2015

Attribute Name	Data Type	Data Width	Value Definition	Description	Values
XYACCURACY ^M	String	50	Domain Menu = DOM_XYACCURACY_NPS 2016	An estimate of the measurement error in the horizontal (ASPRS, 2014).	Unknown; <5cm; >=5cm and <50cm; >=50cm and <1m; >=1m and <5m; >=5m and <14m; >=14m; Scaled
ROUTEID ^O	String	25	Free text	NPS-UNITCODE-ROUTENUMBER This ID is a Federal Highway Administration (FHWA) identifier that was created for the Road Inventory Program (RIP). This is a unique identifier that can be used to relate to RIP data. The route number contained within this ID is also related to a FMSS road functional class. See Section 4.3 .	Example: NPS-GOGA-0223
FACLOCID ^{MA}	String	10	Free text	Location ID from FMSS database for relationship with FMSS and further population of attributes. String format in order to merge with FMSS output in Excel format (NPS Life-Cycle Business Practices, 2007).	Length of up to 10 numbers
FACASSETID ^{MA}	String	10	Free text	Asset ID from FMSS database for relationship with FMSS and further population of attributes. String format in order to merge with FMSS output in Excel format (NPS PFMD, 2014).	Length of up to 10 numbers
FEATUREID ^O	String	50	GUID (Globally Unique Identifier)	A unique value assigned to a feature for maintaining feature association across geometry types, tables or data sets.	Example: {635D4DA2-181C-4ac1-9178-B40033D448ED}

Attribute Name	Data Type	Data Width	Value Definition	Description	Values
GEOMETRYID ^{MA}	String	38	GUID (Globally Unique Identifier)	A unique identifier for the feature geometry controlled by the user. This identifier is the primary key of the dataset for data sharing purposes. This should NOT be an automated Esri GlobalID attribute.	{635D4DA2-181C-4ac1-9178-B40033D448ED}
NOTES ^O	String	254	Free Text	Notes or remarks regarding unusual or important aspects of the data.	Example: This is a decommissioned road that is now a trail.

4.2 Attribute Domain Tables

Table 2: Road RDSTATUS Domain Values

Domain Name	Code	Description	Definition
DOM_RDSTATUS_NPS2016	Existing	Existing	Road exists, is open to the public, and is physically present and observable.
	Temporarily Closed	Temporarily Closed	Road exists, but is seasonally closed, closed for repairs, or closed due to a hazard. Intent is that the road will reopen at a later date.
	Decommissioned	Decommissioned	A road that was no longer needed and has been removed from service. The road has been permanently closed or altered to return to natural state.
	Planned	Planned	Planned road identified by an appropriate management decision (e.g. NEPA). Also used to describe the road during the construction phase until it becomes open to the public.
	Proposed	Proposed	Road is proposed and no management decision has been made (e.g. NEPA).
	Unknown	Unknown	Road status is unknown.

Table 3: Road RDCLASS Domain Values

Domain Name	Code	Description	Definition
DOM_RDCLASS_NPS2016	Unknown	Unknown	Road class is unknown
	Primary	Primary	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways. (MTFCC Code S1100)
	Secondary	Secondary	Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number. (MTFCC Code S1200)

	Local	Local	Generally a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads. (MTFCC Code S1400)
	4WD	4WD	An unpaved dirt road where a four-wheel drive vehicle is required. These vehicular roads are found almost exclusively in very rural areas. (MTFCC Code S1500)
	Service	Service	These roads can be named and may intersect with other roads for access roads to, or within an industrial estate, campsite, business park, car park etc. (MTFCC Code S1640)
	Private	Private	A road that is maintained for administrative service, extractive, or other purposes. These roads are often unnamed. Agency use road only, not open for the public. Restricted to <i>Agency Concurrence</i> and Distribution is <i>No</i> to the public but the individual parks should use discretion with public maps produced by the parks service. (MTFCC Code S1740)
	Parking Lot Road	Parking Lot Road	The main travel route for vehicles through a paved parking area. (MTFCC Code S1780)

Table 4: Road RDSURFACE Domain Values

Domain Name	Code	Description	Definition
DOM_RDSURFACE_NPS2016	Unknown	Unknown	Road surface is unknown
	Asphalt	Asphalt	Asphalt, is a composite material commonly used for construction of pavement, highways and parking lots.
	Concrete	Concrete	A concrete surface is constructed of Portland cement concrete, sometimes with embedded iron reinforcement bars. Concrete is considered a “rigid” surface since it does not deform with the movement of the underlying base and sub base.
	Brick/Pavers	Brick/Pavers	Interlocking masonry blocks placed to form the wearing surface. Paving stones are equally sized concrete stones, with a flat top. They are comparable to flattened cobblestones (and often used in the same cases), but the gaps between the paving stones are smaller because the stones have a perfectly regular shape (rectangular, or any surface-filling shape). Paving stones are often found in low-traffic streets (like pedestrian zones) because they can't endure heavy traffic.

	Cobblestone	Cobblestone	Small one- to two-inch stones placed in a sand, asphalt or concrete matrix to form the wearing surface. Cobblestone paving. "Cobblestone" is used in the colloquial meaning and includes the type of stones that would more precisely be called "setts".
	Gravel	Gravel	Surfaces of crushed aggregate (gravel, without asphalt). Broken/crushed rock with sharp edges, known as ballast on railways. Usually loosely arranged. Typical size for road and surface construction range between 4 and 8 cm.
	Sand	Sand	Small to very small fractions (less than 2mm) of rock.
	Native or Dirt	Native or Dirt	Native surface material generally the terrain composition that the road travels through; not imported material
	Other Paved	Other Paved	Other paved surface
	Other Unpaved	Other Unpaved	Other unpaved surface

Table 5: Road RDONEWAY Domain Values

Domain Name	Code	Description	Definition
DOM_RDONEWAY_NPS2016	With Digitized	With Digitized	With direction of digitization: the direction of travel is the same as the direction the line was created in mapping software (from the first "vertex" to the "last" vertex).
	Against Digitized	Against Digitized	Against direction in which the line was digitized: the direction of travel is the opposite as the direction the line was created in mapping software (from the last "vertex" to the "first" vertex).

Table 6: Core ISEXTANT Domain Values

Domain Name	Code	Description	Definition
DOM_ISEXTANT_NPS2016	Unknown	Unknown	The condition/status of the feature is not known.
	True	True	The feature is intact with little disturbance.
	False	False	The feature is no longer intact.
	Partial	Partial	The feature is partially extant (partially excavated or in a state of ruin).
	Other	Other	The feature is in some other extant status.

Table 7: Core PUBLICDISPLAY Domain Values

Domain Name	Code	Description	Definition
DOM_PUBLICDISPLAY_NPS 2016	No Public Map Display	No Public Map Display	Feature is NOT available for 1) public distribution, 2) consumption by a public facing system or service, and 3) display on a public interface.
	Public Map Display	Public Map Display	Feature is available for 1) public distribution, 2) consumption by a public facing system or service, and 3) display on a public interface.

Table 8: Core DATAACCESS Domain Values

Domain Name	Code	Description	Definition
DOM_DATAACCESS_NPS20 16	Internal NPS Only	Internal NPS Only	Data access is restricted to Internal NPS Only.
	Unrestricted	Unrestricted	Data access is open to the public.
<i>It is suggested that if DATAACCESS will have a restriction of “Internal NPS Only” or “Secure Access Only”, to add the Extended Core Field called ACCESSNOTES in order to describe why the data is restricted as well as add ORIGINATOR to include a data steward contact.</i>	Secure Access Only	Secure Access Only	Data access is restricted to Secure Access Only where access to the data itself is restricted by permissions assigned to the user.

Table 9: Core XYACCURACY Domain Values

The following XYACCURACY domain value Codes were determined with guidance from the GPS Mobile Mapping Subcommittee (GPSMMS) and are intended to remain static over time and to withstand emerging technologies. The Domain Descriptions describe the current technologies that can yield the given accuracy and will be adapted as needed to remain up-to-date. The Examples provide a sampling of current devices and/or configurations that will meet that accuracy standard.

Domain Name	Code	Description	Domain Description	Examples
DOM_XYACCURACY_NPS2016	Unknown	Unknown	Data of unknown origin, spatial accuracy, unknown scale or resolution where a minimum mapping unit or scale of reference cannot be statistically determined (Qualitative accuracy assessment).	Legacy data with little or no spatial attribute information

Domain Name	Code	Description	Domain Description	Examples
	<5cm	<5cm	Survey-grade mapping with a dual-frequency carrier phase GPS/GNSS receiver used for survey monumentation, vertical assessments, boundary surveys, and SET positions. Often a result of a Real-time Kinematic (RTK), Real-time Network (RTN), Static GNSS surveys or traditional survey methods.	Trimble R10,R8,R6 RTK Systems; Javad Triumph 1,2 RTK Systems; EOS Arrow 200 w/ Real-time Network; Nikon 5" Total Station; Trimble S6 Total Station
	>=5cm and <50cm	>=5cm and <50cm	Resource-grade mapping with a dual-frequency GPS/GNSS receiver likely combined with a dual-frequency antenna using differential corrections. Some Lidar data.	Trimble GeoXH; EOS Arrow 200; Trimble Pathfinder Office/TerraSync w/ differential correction
	>=50cm and <1m	>=50cm and <1m	Resource-grade mapping with a differential-capable GPS/GNSS receiver using differential corrections.	Trimble GeoXT/Geo7X; EOS Arrow 100; Trimble Pathfinder Office/TerraSync w/ differential correction
	>=1m and <5m	>=1m and <5m	Mapping with any GPS/GNSS satellite real-time receiver likely corrected with WAAS.	Garmin handheld w/ WAAS; Trimble Juno handheld; EOS Arrow Lite
	>=5m and <14m	>=5m and <14m	Mapping with an autonomous GPS/GNSS or location-based services (LBS) receiver designed for recreational or consumer use. Data that are heads-up digitized from sources such as 1:24,000.	Handheld Cellular Device; GPS Watch
	>=14m	>=14m	At greater (coarser) than 1:24,000 scale, the National Standard for Spatial Data Accuracy (NSSDA) is 13.9 meters with 95% accuracy (FGDC, 1998 and ASPRS, 2005).	Heads up digitizing using an old 1:100000 scale NAD 27 map; GPS collected point under heavy canopy
	Scaled	Scaled	Map selected; nominal accuracy based on geo-referenced background (imagery or map) data scale; refer to metadata of the specific geo-referenced background data used for a better idea of its spatial accuracy. Any hand-digitized data using background imagery such as from NAIP2015, USDA FSA, or other sources.	Heads up digitized data using background aerial imagery or topographic maps

4.3 Road Class Translation to FMSS Functional Class

Table 10: Functional Class Route Number Relationship

FMSS Functional Class	FMSS Functional Class Description	MTFCC Road Class	MTFCC Road Class Description
I	Principal Park Road/Rural Parkway (Public Roads): Roads which constitute the main access route, circulatory tour or thoroughfare for park visitors. Route numbers 1 – 99 <i>Note: Rural parkways (e.g., The Natchez Trace), are number 1 – 9. All other Class I routes have two digit numbers.</i>	Primary	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways. (MTFCC Code S1100)
II	Connector Park Roads (Public Roads): Roads that provide access within a park to areas of scenic, scientific, recreational or cultural interest (e.g., overlooks and campgrounds). Route numbers 100 – 199	Service	A road, usually paralleling a limited access highway, which provides access to structures along the highway. These roads can be named and may intersect with other roads. (MTFCC Code S1640)
III	Special Purpose Park Roads (Public Roads): Roads that provide circulation within public areas (e.g., campgrounds, picnic areas, visitor center complexes and concessionaire facilities). Route numbers 200 – 299	Local	Generally a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads. (MTFCC Code S1400)
IV	Primitive Park Roads (Public Roads): Roads that provide circulation through remote areas and/or access to primitive campgrounds and undeveloped areas. These roads frequently have no minimum design standards, and use may be limited to specially equipped vehicles. Route numbers 200 – 299 <i>Note: Functional Class III and Functional Class IV roads have the same route numbers because, historically, they were numbered similarly.</i>	4WD	An unpaved dirt road where a four-wheel drive vehicle is required. These vehicular roads are found almost exclusively in very rural areas. Minor, unpaved roads usable by ordinary cars and trucks belong in the S1400 category. (MTFCC Code S1500)
V	Administrative Access Roads (Administrative Roads): All roads intended for access to administrative developments or structures such as park offices, employee quarters or utility areas. Route numbers 400 – 499	Private	A road that is maintained for administrative service, extractive, or other purposes. These roads are often unnamed. Agency use road only, not open for the public. Restricted to <i>Agency Concurrence</i> and Distribution is <i>No</i> to the public but the individual parks should use discretion with public maps produced by the parks service. (MTFCC Code S1740)
VI	Restricted Roads (Administrative Roads): All roads normally closed to the public including patrol roads, truck roads and other similar roads privately owned roads. Route numbers 400 – 499 <i>Note: Functional Class V and Functional Class VI roads have the same route numbers because, historically, they were numbered similarly and often there is little distinction between these routes.</i>	Private	A road that is maintained for administrative service, extractive, or other purposes. These roads are often unnamed. Agency use road only, not open for the public. Restricted to <i>Agency Concurrence</i> and Distribution is <i>No</i> to the public but the individual parks should use discretion with public maps produced by the parks service. (MTFCC Code S1740)

VII	Urban Parkway (Urban Parkways and City Streets): These facilities serve high volumes of park and non-park related traffic and are restricted, limited access facilities in an urban area. This category of roads primarily encompasses the major parkways which serve as gateways to our nation's capital. Other major park roads and portions thereof, however, may be included in this category. Route numbers 1 – 9	Primary	Primary roads are generally divided, limited-access highways within the interstate highway system or under state management, and are distinguished by the presence of interchanges. These highways are accessible by ramps and may include some toll highways. (MTFCC Code S1200)
VIII	City Streets (Urban Parkways and City Streets): City streets are usually extensions of adjoining street systems that are owned and maintained by the NPS. Construction and/or re-construction should conform to accepted local engineering practice and local conditions. Route numbers 600-699	Local, Secondary	Local Roads: Generally a paved non-arterial street, road, or byway that usually has a single lane of traffic in each direction. Roads in this feature class may be privately or publicly maintained. Scenic park roads would be included in this feature class, as would (depending on the region of the country) some unpaved roads. (MTFCC Code S1400) Secondary roads are main arteries, usually in the U.S. Highway, State Highway or County Highway system. These roads have one or more lanes of traffic in each direction, may or may not be divided, and usually have at-grade intersections with many other roads and driveways. They often have both a local name and a route number. (MTFCC Code S1200)

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