

CADNSDI Standard Compliance Guidance - PLSS

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Table of Contents

2. Compliance with the PLSS Publication Standard.....	3
2.1 Data Stewardship .....	3
2.1.1 Stewardship Boundaries.....	3
2.2 Data Set Format and Structure.....	4
2.3 Metadata and Data Quality Reporting .....	4
2.3.1 Linking Metadata Records to Features .....	5
2.4 Completeness and Consistency of Attribution .....	6
2.4.1 Corner Aliases .....	6
2.4.2 Required Attributes .....	6
2.5 Completeness of Coverage .....	7
2.6 Topology.....	8
2.6.1 Topology Rules.....	8
2.7 Vertical Alignment .....	9
3. Sample Score Card.....	10
Data Steward.....	10
Data Set Format and Structure.....	10
Metadata and Data Quality Reporting .....	10
Completeness and Consistency of Attribution.....	10
Completeness of Coverage .....	11
Topology .....	11
Vertical Alignment .....	11
Appendix A – Standardized PLSS Data Content .....	12
Appendix B – PLSS Corner Standard Identifier .....	33
Introduction .....	33
PLSS Points .....	33

## 1. Overview

For the purposes of the CADNSDI the Public Land Survey System (PLSS) is the cadastral reference data theme that provides a graphic basis for legal land descriptions in GIS as well as mapping the rights and interests in land. Where federal interests and rights exist the Bureau of Land Management (BLM) is the legally identified authority and Data Steward for the PLSS under the Office of Management and Budget (OMB) Revised Circular A-16. Individual States and Counties have authority and/or data stewardship where no such federal interests or rights exist.

This document provides guidance to data stewards and data publishers on the Federal Geographic Data Committee (FGDC) Cadastral Subcommittee requirements for compliance with the Public Land Survey System (PLSS) data publication standards and guidelines as described in the CADNSDI data sets and templates.

The FGDC Cadastral Publication Guideline is available at;  
<http://www.nationalcad.org/showdocs.asp?docid=1149&navsrc=Standards&navsrc2=>

Metadata is an important part of the PLSS Publication Guideline. The Cadastral Subcommittee has worked with the Federal Geographic Data Committee (FGDC) Metadata Committee on determining the essential metadata requirements for cadastral data. These requirements are available at;  
<http://www.nationalcad.org/showdocs.asp?docid=1153&navsrc=Standards&navsrc2=>

Information for data publishers and data stewards along with the underlying principles that support the standardized data sets can be found in the document PLSS Publication Stewardship. This document is still in review but will be posted to the Subcommittee's publication site (<http://www.nationalcad.org>) when it is completed.

This version of the CADNSDI Standard Compliance Guidance for PLSS represents the initial assembly of compliance criteria gleaned from meeting notes, decision, documents, experience from converting data, and customer feedback. This document will continue to be refined as different situations are encountered and issues arise. Updates and revisions to this document shall be done in coordination with the PLSS Work Group of the FGDC Subcommittee for Cadastral Data.

## **2. Compliance with the PLSS Publication Standard**

Compliance with the publication guideline for the PLSS is dependent upon a number of factors that address data stewardship and standardization as well as data quality and content. Seven classifications of compliance criteria have been determined and are documented in this section. These classifications include (1) data stewardship, (2) data set format and structure (3) metadata and data quality reporting, (4) completeness and consistency of attribution, (5) topology, (6) completeness of coverage, and (7) vertical alignment. The elements within these criteria are essential for Minimum Compliance with the Cadastral Data Standards and Publication Guidelines. Data sets can be assessed according to the criteria to determine the degree to which they comply with the standards/guidelines.

It should be noted that the publication template could be implemented for any software and has been tested in open source GIS. The physical data structure component of this document applies to an implementation in Esri's ArcGIS software in a geodatabase format. With this implementation, the Subcommittee defined the standard publication data set for the PLSS as a series of features that are interrelated and based on the hierarchical nature of the PLSS. The descriptions of these features are in Appendix A.

### ***2.1 Data Stewardship***

The reason for this critical compliance element is that the information in the Data Steward field is how users will recognize which agency to contact regarding, updates, questions or additional information. The data steward's information in the database must identify the specific organization that has the authority and responsibility for the information and has to be linked to the metadata for direct contact information.

#### ***2.1.1 Stewardship Boundaries***

The PLSS Stewardship boundaries are a fixed line that will not be adjusted or changed without the mutual agreement of all stewards identified for that boundary. The PLSS stewardship boundary must be defined corner by corner along the stewardship boundary. This is the nature of the PLSS and having clear identification of all corners involved in a stewardship arrangement is essential for maintaining seamless PLSS data. There are occasions when there are more than two PLSS Stewards for a corner, for example the four corner area in the Southwest where Colorado, Utah, Arizona and New Mexico meet. In this case one of the stewards is defined as the lead and the other three stewards are listed as the secondary stewards.

Compliance with this component is measured by

the percentage of records that have the data steward identified in a clearly understandable and consistent manner. For example for the BLM the standard for identifying the data steward is to list the administrative state followed by the managing office.

Minimum requirements

Data stewards are identified. If data stewardship boundaries have been established then they need to be agreed upon by all abutting data stewards. The data stewardship boundaries are a minimum requirement. See 2.3 for linking requirement.

### ***2.2 Data Set Format and Structure***

The feature attribute content, entity or feature naming conventions and the topologic and logical relationship among the features are described in the FGDC Data Content Standard and provided in a physical format in the FGDC Cadastral Subcommittee Publication Guidelines. Domains of values can be adjusted as necessary and still conform to the standard guideline. These deviations should be documented in the metadata to assist consumers that may want to merge data across data stewardship boundaries.

Compliance with this component is measured by:

Percentage of features and attributes that have the same name and type as the standardized format (listed in Appendix A). The domains used for attributes with domains should be included in the look up tables at the root level of the database.

Minimum requirements

The data structure has to align and match with the standard template. For systems running Esri software a physical format is also included in the template and is required.

### ***2.3 Metadata and Data Quality Reporting***

The information in the attribute fields that describe the quality or basis of the information for a feature needs to be correctly identified. This information is important for consumers to understand the quality and fitness for use of the provided data. Additionally the data set metadata must be completed to the level of the essential metadata as defined by the FGDC Cadastral Subcommittee.

The FGDC Cadastral Subcommittee worked with the FGDC Metadata Committee to develop the essential metadata standard for the CADNSDI. The content and data elements requirements for the essential cadastral data metadata were finalized in November 2009.

Because the CADNSDI Data Set has so many feature classes and the essential metadata contains information that is the same across all of those feature classes the Cadastral Subcommittee developed an input format for Arc Catalogue that allows data stewards to capture the data set information once, at the data set level. Information specific to individual feature classes and attributes in those feature classes (the entity and attribute information) are captured at the individual feature class level.

The data stewards may manage the metadata in a database or related tables.

The compliance is determined by the ability to create a single file describing the data set metadata for each data steward.

#### Data Set Metadata

##### Section 1 - Identification Information

Summary information about the data set as a whole, Data Steward contact information, the publication date and keywords

##### Section 2 – Data Quality

Summary information on the processes and sources used to create the data set including the lineage of the data.

##### Section 3 - Spatial Data Organization and Section 4 – Spatial Reference

Information on the coordinate system and projection of the published data set.

##### Section 6 – Data Distribution Contact Information

Contact information for the data publisher

##### Section 7 – Metadata Reference

Contact information for the metadata contact

#### Feature Class Information

##### Section 5 – Entity and Attribute Information

Definitions of feature classes and attributes in the feature classes.

#### **2.3.1 Linking Metadata Records to Features**

In the feature classes there is an attribute for the data steward. The content of this field should be standardized so it can be linked to the metadata file.

There is also a feature class called Metadata at a Glance. This feature class has an attribute for the data steward and expresses the spatial extent of the area of responsibility of the data steward.

This feature class is built by dissolving on the data steward attribute at the most granular level of the data set. For example federal lands may be intermingled with private land holdings. The Bureau of Land Management will be the data steward of the federally managed lands and a county, city or state may be the data steward for the privately owned lands.

Compliance with this component is measured by:

The metadata files must be present and should be current and correct. Compliancy is a yes or no determination. The identified data steward in the data set must link to a metadata file. The data stewards contact information is in the metadata file.

#### Minimum requirements

Metadata file must be present and related to the appropriate records in the data set.

### ***2.4 Completeness and Consistency of Attribution***

Attributes that are used to uniquely identify features or identify a location need to be populated for all features. Consumers of the data sets use these attributes in queries, labeling and reports. Attributes need to be used consistently throughout the data set for consumers to be able to understand and use the data correctly.

Appendix A defines the attributes that are mandatory to uniquely identify the separated PLSS features.

#### **2.4.1 Corner Aliases**

A critically important aspect of the completeness of attribution for standardized PLSS data is the identification of multiple names or identifiers for PLSS Corners. Many PLSS naming or corner identification systems are PLSS Township based. This means that one corner on a township boundary can and often does have multiple names or identifiers but it is one logical corner. Maintaining one record for each corner and assigning an alias to the corner is an important component for maintaining edge matching between adjoining townships. There is more than one approach to accomplishing this important aspect and these have been described in more technical and detailed implementation documents.

#### **2.4.2 Required Attributes**

The following are the required attributes for features

PLSS Townships must have a Principal Meridian, State, Township Number, Township Direction, Range Number and Range Direction.

PLSS Townships must have a unique PLSSID formatted as described in the Publication Standard.

PLSS First Division must have a unique identifier and a PLSS Township Identifier.

PLSS Second Division must have a unique identifier and a PLSS First Division Identifier.

PLSS Special Survey must have a special survey type code with the special survey type as a description. The survey number, if available, should be present. The type codes and the description should be included in the look up table at the root level of the database.

Compliance with this component is measured by

The presence and consistent use of all required attributes.

Minimum requirements

The required attributes must be present for all features included in the data set. All features included must be attributed.

### ***2.5 Completeness of Coverage***

The data set needs to provide a continuous and complete coverage to the extent of the PLSS or to the extent of the data steward's boundaries. Gaps in the data sets create inconsistencies that create misunderstandings for the consumers. The data set will have as complete a representation of the PLSS as possible from the data steward.

Compliance with this component is measured by:

The percent of completeness of infill or coverage. Completeness also includes a statement on the percentage of features included as well as extent.

Minimum requirements

The provided features must be complete. For example if a standardized data set provides PLSS Rectangular data to the section level than all of the sections need to be provided.

## **2.6 Topology**

The PLSS features will be edge matched. If there is a known gap or overlap in the PLSS coverage this area will be described and placed in the Conflicted Area feature class. These areas represent a conflict in the survey record, indicating that the actual boundary has not been reconciled.

### **2.6.1 Topology Rules**

No slivers or gaps or overlaps at PLSS Township boundaries including at the state boundaries. This also means that each township boundary must have the same number of corners along the boundary. Closing, offset and minor subdivision corners from an adjacent township must be accounted for in the adjoining township.

No overlaps of PLSS First Division in the rectangular PLSS. There may be gaps in the PLSS First division but there can be no overlaps.

First Division Lines on the exterior of the PLSS Township must be coincident with the PLSS Township boundaries.

No overlaps of the PLSS Second division in the rectangular PLSS. There may be gaps in the PLSS second division but there can be no overlaps.

PLSS Corners must be exactly under PLSS lines. Rectangular and special survey corners must be on the lines defining the features. There maybe control or location monuments that are not on the PLSS lines but all corners must be on a line.

Land Grants cannot overlap.

Donation Land Claims cannot overlap.

Tracts cannot overlap.

Homestead Entries cannot overlap.

Other special surveys may have overlaps.

Compliance with this component is measured by:

The data sets conformance to the topology rules in terms of percentage of records that conform to the specified topology rules.



## Minimum requirements

The data set has to pass topology rule analysis for all data features provided. This includes edge match with adjoining data steward areas such as edge match along state boundaries.

### **2.7 Vertical Alignment**

The data themes need to be vertically aligned, this means that if a line or boundary is common between two layers or themes then the line must be coincident in the two themes. For example exterior section boundaries need to be coincident with the Township line and PLSS corners need to be coincident with polygons, unless the corner is non-polygon bounding corner such as location monument or a geodetic control monument. Consumers of the data need to have confidence that the data set is internally consistent and not be placed in a position of having to select one representation over another.

In the publication data standard the PLSS features are derived from a single feature class called the PLSS Fully Intersected Feature Class. The PLSS Fully Intersected Feature Class was defined to assure that the essential vertical alignment of PLSS features or layers are sustained.

Compliance with this component is measured by:

The percentage of the data set that is in conformance to the vertical alignment requirements with exceptions flagged or placed in a conflicted area feature class.

## Minimum requirements

The data set has to pass topology rule analysis for vertical alignment of all data features provided.

### **3. Sample Score Card**

The analysis of the compliance can be reported in a scorecard that describes the compliance with each of the seven components. The scoring is based on percent of features or records that comply with the requirements of the standard. It is sometimes difficult to estimate the percentage but this is an example of the items that were compliant and the notations on the findings. The following is an example scorecard that was generated for a sample data set.

#### ***Data Steward***

The internal data steward information was all present and coded according to the standard. The data stewards for adjoining states were not included on common corners.

Score 90% compliant

#### ***Data Set Format and Structure***

No issues were identified with the format or structure.

Score 100% compliant

#### ***Metadata and Data Quality Reporting***

The metadata for the data set was not submitted with the data set. The feature level metadata was all present and coded as expected.

Score 50 % compliant

The feature level metadata was all present and coded as expected. The data steward may want to consider adding the unit to the end of the point reliability, or alternatively update the metadata and indicate the units of measure in the metadata document. The second approach would be the most sustainable.

#### ***Completeness and Consistency of Attribution***

426 polygons do not have the State, PM, Township codes and some of these polygons have a second division identifier but no associated first division identifier or PLSSID. Corners are missing alias records. All other records appear to have complete and consistent application of primary keys. Some of the second division types (unnumbered lots and government lots) were missing from the second division

Score 60 % compliant

***Completeness of Coverage***

The PLSS Special Surveys were not included in the data set. For the rectangular PLSS that was delivered the data set is complete.

Score 100 % compliant for delivered data

***Topology***

The PLSS Corners are not coincident with the PLSS polygon lines. PLSS Rectangular passed all topology analysis.

Score 75 % compliant

***Vertical Alignment***

Vertical alignment was not completely checked since only the PLSS rectangular was submitted and alignment with adjoining states could not be verified.

Score 100% of the lines that should be coincident were coincident, corners were not coincident but these are reflected in the topology score.

## **Appendix A – Standardized PLSS Data Content**

This appendix is taken from Cadastral Data Publication Guideline<sup>1</sup>. The land parcel elements of the publication standard have been removed from the information in this appendix.

In the feature class definitions elements in red are required fields. If data for these features are present than the attributes coded in red should be present.

### **Geodatabase Documentation**

#### **Feature Datasets and Feature Classes**

[CadastralReference - Feature Dataset](#)

[MeanderedWater - Simple](#)

[MetadataGlance - Simple](#)

[PLSSFirstDivision - Simple](#)

[PLSSIntersected - Simple](#)

[PLSSPoint - Simple](#)

[PLSSQuarterReference - Simple](#)

[PLSSReferenceGrid - Simple](#)

[PLSSSecondDivision - Simple](#)

[PLSSSpecialSurvey - Simple](#)

[PLSSTownship - Simple](#)

[SurveySystem - Simple](#)

#### **Tables and Feature Classes**

[LU Direction - Table](#)

[LU PLSSFirstDiv - Table](#)

[LU PLSSSecDiv - Table](#)

[LU PrincipalMeridian - Table](#)

[LU State - Table](#)

[LU SurSysDivision - Table](#)

[LU SurveyNameOhio - Table](#)

[LU SurveySystem - Table](#)

[LU SurveyType - Table](#)

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<sup>1</sup> The Cadastral Publication Reference Document can be found at this link  
<http://www.nationalcad.org/showdocs.asp?docid=1149&navsrc=Standards&navsrc2=>

### CadastralReference - FeatureDataset

**Name** CadastralReference

**Description** These are the cadastral reference features that provide the basis and framework for parcel mapping.

**DataTheme** cadastral

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### MeanderedWater - FeatureClass

**Name** MeanderedWater

**ShapeType** Polygon

**FeatureType** Simple

**AliasName** MeanderedWater

**Description** These are areas of water that are defined from meander lines of the GLO surveys. These are not the official representations of coast or water lines and are representations of the lines marked by the survey along the boundaries of the water bodies and the upland at the time of survey

**Purpose** To provide the polygons of the originally meandered water areas

**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
SURVTYP	String	2	Survey Type Code	Survey type code for the meandered water features. These are the survey types from the BLM GCDB and for this data set this should be W for Water
SURVTYPTXT	String	50	Survey Type Description	The survey type as a text string

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### MetadataGlance - FeatureClass

**Name** MetadataGlance

**ShapeType** Polygon

**FeatureType** Simple

**AliasName** MetadataGlance

**Description** This is a graphic representation of the data stewards for the PLSS Data. The minimum resolution of the PLSS Data Steward is the Township. For western states the identification of the data stewards at the township level is a general indication of the agency that will be responsible for updates within the township. In other implementations this may have been termed the alternative source, meaning alternative to the BLM. But in the shared environment of the NSDI the steward for an area is the primary coordinator or agency responsible for making updates or causing updates to be made. Over time it is expected that the data stewards will be more finely described than at the Township level.

**Purpose** To provide a visual reference for the metadata about stewards and revision dates

**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
<b>PLSSID</b>	String	16	PLSS Identifier	Concatenation of the principal meridian, township, range, and duplication code that form a unique id.
<b>TWNSHPLAB</b>	String	25	Label for PLSS Township	Township label that is used for cartographic output or web display.
<b>STEWARD</b>	String	50	Data Steward	Data steward for the township.
<b>REVISEDDATE</b>	Date	8	Last Revised Date	The last date of any revision in the Township

### PLSSFirstDivision - FeatureClass

**Name** PLSSFirstDivision

**ShapeType** Polygon

**FeatureType** Simple

**AliasName** PLSSFirstDivision

**Description** The PLSS First Division is commonly the section. This is the first set of divisions for a PLSS Township.

**Purpose** to provide the polygons for the first divisions of the PLSS Township

**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
<b>FRSTDIVID</b>	String	22	First Division Identifier	This is a unique identifier for the first division that is built by appending the first division elements on the Township identifier.
<b>FRSTDIVNO</b>	String	3	First Division Number	This is the number, letter or designator for the first division of the PLSS Township

FRSTDIVDUP	String	1	First Division Duplicate	This is a code to indicate whether the first division is a duplicated area or identifier
<b>FRSTDIVTYP</b>	String	2	First Division Type Code	This is the type of first division and is commonly the section but may be a lot, parcel, tract or other division.
<b>FRSTDIVTXT</b>	String	50	First Division Type Description	This is the first division type as a text field
<b>PLSSID</b>	String	16	PLSS Identifier	This is the unique identifier for the PLSS Township in which the first division is located. Concatenation of the principal meridian, township, range, and duplication code that form a unique identifier for the township.
<b>FRSTDIVLAB</b>	String	5	First Division Label	This is the label for the first division that is used for cartographic or web display purposes.
SURVTYP	String	2	Survey Type Code	Code of the type of survey. This indicates if the township first division has been surveyed, protracted or unprotracted (extended)
SURVTYPTXT	String	50	Survey Type Text	Survey type text description.

### PLSSIntersected - FeatureClass

**Name** PLSSIntersected

**ShapeType** Polygon

**FeatureType** Simple

**AliasName** PLSSIntersected

**Description** The fully intersect data is the atomic level of the PLSS that is similar to the coverage or the smallest pieces used to build the PLSS. Polygons may overlap in this feature class.

**Purpose** The fully intersected polygons are used for conversion and for maintenance. This contains the atomic and fully attributed components of the other PLSS features. This is a useful data set for maintenance and may be needed by consumers who rely on the NSDI data for production.

**DataTheme** Cadastral

Note – the required fields are not highlighted in the PLSS Intersected because the required attributes depend on the feature(s) identified or described in the atomic polygon.

<b>Field</b>	<b>Data Type</b>	<b>Length</b>	<b>Alias Name</b>	<b>Description</b>
STATEABBR	String	2	State Abbreviation	State abbreviation code two letter postal code
PRINMERC	String	2	Prime Meridian Code	Principal meridian code from the BLM PM Code list
PRINMER	String	40	Primer Meridian Discussion	Principal meridian name as a text
TWNSHPNO	String	3	PLSS Township Number	Township number. The Township Number indicates the number of rows of townships, north or south from a Public Land Survey System Origin.
TWNSHPFRAC	String	1	PLSS Township Fraction	Township fraction. Township Fractions are created when there are gaps between surveyed Township boundaries or due to excess size in Townships that arose from executing original surveys.
TWNSHPDIR	String	1	PLSS Township Direction	Township direction. The direction of a row of Townships from a Public Land Survey System Origin. These are typically North and South in the West but may be East and West in Ohio
RANGENO	String	3	PLSS Range Number	Range number. The Range Number indicates the number of columns of townships, east or west from a Public Land Survey System Origin.
RANGEFRAC	String	1	PLSS Range Fraction	Range fraction. Range Fractions are created when there are gaps between surveyed Township boundaries or due to excess size in Townships that arose from executing original surveys.
RANGEDIR	String	1	PLSS Range Direction	Range direction. The direction of a column of townships from a Public Land Survey System Origin. These are typically East or West in the west but may be north or south in Ohio
TWNSHPDPCD	String	1	PLSS Township Duplicate	If there are multiple townships in a Public Land Survey System Origin, State and Survey Name, the Township Duplicate Status is used to establish uniqueness. When more than one Public Land Survey System Township has the same Township and Range numbers and directions and



				fractions, and are in the same State, this attribute is used to distinguish among duplicate values.
PLSSID	String	16	PLSS Identifier	Concatenation of the principal meridian, township, range, and duplication code that form a unique id.
STEWARD	String	50	PLSS Data Steward	Data steward for a particular township.
TWNSHPLAB	String	20	PLSS Township Label	Township label that is used for cartographic output or web display
FRSTDIVID	String	22	PLSS First Division Identifier	This is a unique identifier for the first division that is built by appending the first division elements on the Township identifier.
FRSTDIVNO	String	3	PLSS First Division Number	This is the number, letter or designator for the first division of the PLSS Township
FRSTDIVDUP	String	1	PLSS First Division Duplicate	This is a code to indicate whether the first division is a duplicated area or identifier
FRSTDIVTYP	String	2	PLSS First Division Type Code	This is the type of first division and is commonly the section but may be a lot, parcel, tract or other division.
FRSTDIVTXT	String	50	PLSS First Division Type Text	This is the first division type as a text field
FRSTDIVLAB	String	5	PLSS First Division Type Label	This is the label for the first division that is used for cartographic of web display purposes.
SECDIVID	String	25	PLSS Second Division Identifier	Unique identifier for the second division.
SECDIVNO	String	50	PLSS Second Division Number	Second division number or aliquot part reference.
SECDIVSUF	String	10	PLSS Second Division Suffix	Second division suffix.
SECDIVTYP	String	1	PLSS Second Division Type	Code of the type of second division.
SECDIVNOTE	String	50	PLSS Second Division Note	Code for the survey note of the second division
SECDIVTEXT	String	50	PLSS Second Division Type	Second division type text description

			Text	
SECDIVLAB	String	50	PLSS Second Division Label	PLSS Second Division label for cartographic output or web display.
SURVTYP	String	1	PLSS Special Survey Type Code	Code of the type of special survey.
SURVTYPTEXT	String	50	PLSS Special Survey Type Text	Special survey type text description.
SURVNO	String	10	PLSS Special Survey Number	Special survey number.
SURVSUF	String	5	PLSS Special Survey Suffix	Special survey suffix designation that makes the identification of the area unique.
SURVNOTE	String	50	PLSS Special Survey Type Note	Notes about the polygon feature that are important for using or understanding the feature. From the BLM SurvNotes are A = Approximate Acreage, C = Conflict or Questionable, D = Non-added Acreage
SURVLAB	String	50	PLSS Special Survey Note	Label that is used for cartographic output or web display.
ACRES	Double	8	PLSS Special Survey Area in Acres	Area of the second division in official acres.
QSEC	String	4	Quarter Section	Quarter section reference
GOVLOT	String	4	Government Lot Number	These are the Government Lots
QQSEC	String	4	Quarter Quarter Section	This is the quarter quarter PLSS reference

**PLSSPoint - FeatureClass**

**Name** PLSSPoint

**ShapeType** Point

**FeatureType** Simple

**AliasName** PLSSPoint

**Description** These are the corners of the PLSS. This data set contains summary information about the coordinate location and reliability of corner coordinate information.

**Purpose** To provide the essential observed coordinate information for PLSS corners. This

is not the complete data set for corners. These are the most current coordinates. The National PLSS point identifier documentation is provided in Appendix B.

**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
POINTLAB	String	6	Corner Point Label	PLSS Point label for cartographic output or web display.
<b>POINTID</b>	String	24	Corner Point Identifier	Unique point identifier for the corner that follows the national point identification standard
PLSSID	String	16	PLSS Area Identification	Concatenation of the principal meridian, township, range, and duplication code that form a unique identifier for the township. If a corner is in multiple townships, on a border, this is the PLSS ID for the lowest GCDB number.
<b>XCOORD</b>	Double	8	X or East Coordinate	X, longitude or east coordinate value for the corner.
<b>YCOORD</b>	Double	8	Y or North Coordinate	Y, latitude or north coordinate value for the corner
ZCOORD	Double	8	Z or Height Coordinate	Z, Height, Observed Elevation for the corner
ELEV	Double	8	Average Township Elevation	This is an average elevation for the entire PLSS Township
ERRORX	SmallInteger	2	Error in X	The error in the X direction
ERRORY	SmallInteger	2	Error in Y	The error in the y direction
ERRORZ	SmallInteger	2	Error in Z	The error in the Z direction
<b>HDATUM</b>	String	20	Horizontal Datum	the horizontal datum for the coordinate value, this is the datum the reported coordinate value is reported in and may be different than the GIS horizontal datum
VDATUM	String	20	Vertical Datum	The vertical datum for an observed Z or height
<b>STEWARD1</b>	String	50	Steward for the PLSS Point	the primary data steward for the plss point
STEWARD2	String	50	Second Steward for	the second data steward for the PLSS point if there is a second steward, such

			PLSS Point	as on a county boundary or a federal ownership boundary
LOCAL1	String	25	First PLSS Point Alternate Name	the first alias for the control point, most common on PLSS Township boundaries
LOCAL2	String	25	Second PLSS Point Alternate Name	the second local identifier or alias. Most common on corners on PLSS township boundaries
LOCAL3	String	25	Third PLSS Point Alternate Name	the third alias for the control point most common on PLSS Township boundaries
LOCAL4	String	25	Fourth PLSS Point Alternate Name	the fourth alias for the control point most common when a PLSS corner is common to a special survey
RELY	String	15	PLSS Point Reliability	The reliability or accuracy of coordinate value as a single entry, may be a coded value
COORDPROC	String	20	Coordinate Computation Procedure	The coordinate computation procedure which typically reflects the adjustment method or a standard followed to compute the coordinate from the field observation
COORDSYS	String	20	Coordinate System	the coordinate system for the coordinate value, this may be different than the GIS coordinate system if the reported x,y values are different than the GIS coordinate system.
COORDMETH	String	25	Coordinate Collection Method	the method of observation or measurement for the coordinate value. This typically indicates a technology such as GPS, digitized, line of sight
REVISEDDATE	Date	8	Last Revised Date	The last revision date for the coordinate value for the PLSS Corner

**PLSSQuarterReference - FeatureClass**

**Name** PLSSQuarterReference

**ShapeType** Polygon

**FeatureType** Simple

**AliasName** PLSSFirstDivision

**Description** The PLSS Quarter Section Reference is a companion feature class for the PLSS Reference Grid that provides a quarter section division of the sections for reference only.

**Purpose** This is a mapped reference grid used to support some web and rapid query applications

**DataTheme** Cadastral

Field	Data Type	Length	AliasName	Description
PLSSID	String	16	PLSS Identifier	This is the unique identifier for the PLSS Township in which the first division is located. Concatenation of the principal meridian, township, range, and duplication code that form a unique identifier for the township.
REFGRIDNO	String	20	Reference Grid Number	The number for the reference grid. Some jurisdictions assign a letter or number divisions of the PLSS
REFGRIDNOM	String	4	Reference Grid Nominal Location	The nominal location of the reference grid cell or feature
REFGRIDDUP	String	2	Reference grid Duplication	A duplicate code to indicate if the cell or feature of the reference grid is a duplicate
QSECTION	String	16	Quarter Section	the quarter section label
REFSOURCE	String	16	Source Reference	The reference to the source document could be a reference to a map or plat or a data set such as GCDB
SURVTYP	String	2	Survey Type Code	Code of the type of survey. This indicates if the township quarter reference has been surveyed, protracted or unprotracted (extended)
SURVTYPTXT	String	50	Survey Type Text	Survey type text description.

**PLSSReferenceGrid - FeatureClass**

**Name** PLSSReferenceGrid

**ShapeType** Polygon

**FeatureType** Simple

**AliasName** PLSSReferenceGrid

**Description** The reference Grid is a generalized data set providing the Township and First Divisions of the PLSS as a separate feature class to support data requests, mapping and indexing. The spatial location and position and attributes of this feature class are the same as those in the primary data sets from which this data is built. These data are often used for map sheet layouts and general location reference

**Purpose** This feature class supports indexing and rapid reference and query generally for web applications as well as map book and map sheet layouts

**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
PLSSID	String	16	PLSS Identifier	Concatenation of the principal meridian, township, range, and duplication code that form a unique id.
REFGRIDNO	String	20	Reference Grid Number	Number, letter or designator for the first division of the PLSS Township.
REFGRIDNOM	String	4	Reference Grid Nominal Location	Number, letter or designator for the nominal first division of the PLSS Township.
REFGRIDDUP	String	2	Reference Grid Duplicate Indicator	Code to indicate whether the first division is a duplicated.
EXPIRDATE	String	16	Expiration Date	Expiration date for the dataset. This is the date the data set is expected to be updated.
SOURCEREF	String	25	Reference to Source or Steward	The reference to the source document could be a reference to a map or plat or a data set such as GCDB

**PLSSSecondDivision - FeatureClass**

**Name** PLSSSecondDivision

**ShapeType** Polygon

**FeatureType** Simple

**AliasName** PLSSSecondDivision

**Description** The second division of the PLSS is quarter, quarter-quarter, sixteenth or government lot division of the PLSS. The second and third divisions are combined into this feature class as an intentional de-normalization of the PLSS hierarchical data. The polygons in this feature class represent the smallest division to the sixteenth that has been defined for the first division. For example In some cases sections have only been divided to the quarter. Divisions below the sixteenth are in the Special Survey or Parcel Feature Class.

**Purpose** This feature class provides the graphic of the aliquot or government lot divisions of the PLSS township

**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
SECDIVID	String	25	Second Division Identifier	Unique identifier for the second division.
FRSTDIVID	String	25	First Division Identifier	Unique identifier for the first division.
SECDIVNO	String	50	Second Division Number or Designator	Second division number or aliquot part reference.
SECDIVSUF	String	10	Second Division Suffix	Second division suffix
SECDIVTYP	String	1	Second Division Type Code	Code of the type of second division.
SECDIVTXT	String	50	Second Division Type Text	Second division type text description
ACRES	Double	8	Area in Acres	Area of the second division in official acres.
PLSSID	String	16	PLSS Township Identifier	Concatenation of the principal meridian, township, range, and duplication code that form a unique identifier for the township.
SECDIVLAB	String	50	Second Division Label	PLSS Second Division label for cartographic output or web display.

**PLSSSpecialSurvey - FeatureClass**

**Name** PLSSSpecialSurvey

**ShapeType** Polygon

**FeatureType** Simple

**AliasName** PLSSSpecialSurvey

**Description** Special Surveys are non-rectangular PLSS survey areas from BLM survey records that may represent federal parcels. Special surveys are not part of the rectangular grid. Some special surveys are segregated from the rectangular grid through lotting, some are surveys to protect rights and interests that existed prior to rectangular survey and some are the description of the transfer of rights out of or into federal management.

**Purpose** These are the graphic representation of non-rectangular components of the PLSS and primarily apply to federally managed lands.

**DataTheme** Cadastral

Field	Data Type	Length	AliasName	Description
SURVTYP	String	1	Survey Type Code	Code of the type of special survey.
SURVTYPTXT	String	50	Survey Type Text	Special survey type text description.
SURVNO	String	10	Special Survey Number	Special survey number.
SURVSUF	String	5	Special Survey Number Suffix	Special survey suffix designation that makes the identification of the area unique.
SURVNOTE	String	50	Special Survey Note	Notes about the polygon feature that are important for using or understanding the feature. From the BLM SurvNotes are A = Approximate Acreage, C = Conflict or Questionable, D = Non-added Acreage, R = revised or replaced
ACRES	Double	8	Area in Acres	Official area of the survey in acres as a number. Some survey types will require acres to uniquely identify the feature.
SURVLAB	String	50	Special Survey Label	Label that is used for cartographic output or web display.
REVISEDDATE	Date	8	Revised Date	The last date of revision for the special survey, because special surveys represent federal land transactions they may have distinct revision dates.



**PLSSTownship - FeatureClass**

**Name** PLSSTownship

**ShapeType** Polygon

**FeatureType** Simple

**AliasName** PLSSTownship

**Description** In the Public Land Survey System a Township refers to a unit of land that is nominally six miles on a side, usually containing 36 sections.

**Purpose** These are the graphic displays of the PLSS Townships.

**DataTheme** Cadastral

**Field**            **DataType** **Length** **AliasName** **Description**

Field	DataType	Length	AliasName	Description
STATEABBR	String	2	State Abbreviation	State abbreviation code two letter postal code
PRINMERC	String	2	Prime Meridian Code	Principal meridian code from the BLM PM Code list
PRINMER	String	40	Prime Meridian Text	Principal meridian name as a text
TWNSHPNO	String	3	PLSS Township Number	Township number. The Township Number indicates the number of rows of townships, north or south from a Public Land Survey System Origin.
TWNSHPFRAC	String	1	PLSS Township Fraction	Township fraction. Township Fractions are created when there are gaps between surveyed Township boundaries or due to excess size in Townships that arose from executing original surveys.
TWNSHPDIR	String	1	PLSS Township Direction	Township direction. The direction of a row of Townships from a Public Land Survey System Origin. These are typically North and South in the West but may be East and West in Ohio
RANGENO	String	3	PLSS Range Number	Range number. The Range Number indicates the number of columns of townships, east or west from a Public Land Survey System Origin.
RANGEFRAC	String	1	PLSS Range Fraction	Range fraction. Range Fractions are created when there are gaps between surveyed Township boundaries or due to excess size in Townships that arose from executing original surveys.
RANGEDIR	String	1	PLSS Range Direction	Range direction. The direction of a column of townships from a Public Land Survey System Origin. These are typically East or West in the

				west but may be north or south in Ohio
<b>TWNSHPDCD</b>	String	1	PLSS Township Duplicate Code	If there are multiple townships in a Public Land Survey System Origin, State and Survey Name, the Township Duplicate Status is used to establish uniqueness. When more than one Public Land Survey System Township has the same Township and Range numbers and directions and fractions, and are in the same State, this attribute is used to distinguish among duplicate values.
<b>PLSSID</b>	String	16	PLSS Township Identifier	Concatenation of the principal meridian, township, range, and duplication code that form a unique id.
<b>STEWARD</b>	String	50	Data Steward for PLSS Township Data	Data steward for a township.
<b>TWNSHPLAB</b>	String	20	PLSS Township Label	Township label that is used for cartographic output or web display
<b>SRVNAME</b>	String	60	Survey Name for Ohio PLSS Surveys	The Ohio Named survey area, PLSS original survey areas
<b>SECSRVNAME</b>	String	60	Secondary Survey Name for Ohio Surveys	The secondary name for Ohio survey area, PLSS original survey areas
<b>SURVTYP</b>	String	2	Survey Type Code	Code of the type of survey. This indicates if the township has been surveyed, protracted or unprotracted (extended)
<b>SURVTYPTXT</b>	String	50	Survey Type Text	Survey type text description.

## SurveySystem - FeatureClass

**Name** SurveySystem

**ShapeType** Polygon

**FeatureType** Simple

**AliasName** SurveySystem

**Description** The survey system is a simultaneous conveyance that provides a consistent system for the definition of the boundaries within a defined area. A Subdivision or condominium is a common example of a survey system. This feature class is the outside boundary of these simultaneous conveyance areas

**Purpose** These are the graphic displays of the Survey System external boundaries.

**Data Theme** Cadastral

<b>Field</b>	<b>DataType</b>	<b>Length</b>	<b>AliasName</b>	<b>Description</b>
SURVSYSTYPE	String	50	Survey System Type	Survey System Type indicates the category or major class of the description.
SURVSYNAME	String	200	Survey System Name	The Survey System Name is an identifying name or number for a specific type of Survey System area.
SURSYSCODE	String	50	Survey System Code or Index	any codes or indices for tracking or managing the survey system areas
SURSYSNOTE	String	50	Survey System Note	any notes on the use, name or application of the survey system area
FIRSTDIVTYPE	String	50	Survey System First Division	The First Division Type describes the classification of the First Survey System Division
FIRSTDIVNAME	String	50	Survey System First Division Name	The Survey System First Division Name is an alpha, numeric, or alpha-numeric designator used to identify the First Division of the Survey System
SECDIVTYPE	String	50	Survey System Second Division Type	The Second Division Type describes the classification of the Survey System Second Division.
SECDIVNAME	String	50	Survey System Second Division Name	The Survey System Second Division Name is an alpha, numeric, or alpha-numeric designator used to identify the Second Division of the Survey System.

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### LU\_Direction - Table

**Name** LU\_Direction

**AliasName** LU\_Direction

**Description** Look up table for direction codes N, E, S, W

**Purpose** To provide a domain for referencing source information or translating incoming data sets

**DataTheme** Cadastral

**Field    DataType    Length    AliasName    Description**

DirCode	String	1	Direction Code	the one letter direction code (N, S, E, W)
Name	String	5	Direction	The full text for the direction

---

### LU\_PLSSFirstDiv - Table

**Name** LU\_PLSSFirstDiv

**AliasName** LU\_PLSSFirstDiv

**Description** The First Division Type of a Public Land Survey System Township is the primary or first subdivision category. If the first division type is fractional section, then the metadata for this data set will need to document how fractional sections are labeled.

**Purpose** To provide a domain for referencing source information or translating incoming data sets

**DataTheme** Cadastral

**Field                    DataType    Length    AliasName    Description**

PLSSFirstDiv	String	25	PLSS First Division Type Code	The values for the first division types
PLSSFirstDivDesc	String	250	PLSS First Division Type Description	a description of the division types

---

### LU\_PLSSSecDiv - Table

**Name** LU\_PLSSSecDiv

**AliasName** LU\_PLSSSecDiv

**Description** The Second Division Type of a Public Land Survey System Township is the second subdivision category. The second division has been de-normalized slightly to include a complete non-overlapping representation of the divisions of the PLSS

**Purpose** To provide a domain for referencing source information or translating incoming data sets

**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
PLSSSecDiv	String	25	PLSS Second Division Type Code	The value for the second division types
PLSSSecDivDesc	String	250	PLSS Second Division Type Description	A description of the second division types

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### LU\_PrincipalMeridian - Table

**Name** LU\_PrincipalMeridian

**AliasName** LU\_PrincipalMeridian

**Description** the codes and names of the principal meridians

**Purpose** To provide a domain for referencing source information or translating incoming data sets

**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
PrincipalMeridian	String	50	Principal Meridian Full Name	the name of the principal meridian
PMCode	String	2	Principal Meridian Code	the blm two digit code for the principal meridian
PMShortName	String	25	Principal Meridian Short Name	the short name for the principal meridian

---

### LU\_State - Table

**Name** LU\_State

**AliasName** LU\_State

**Description** state names and fips codes and abbreviations

**Purpose** To provide a domain for referencing source information or translating incoming data sets

**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
StateName	String	30	State Name	the state name
StateCD	String	2	State Postal Abbreviation	the state 2 letter abbreviation
StateFIPSCD	SmallInteger	2	State FIPS Code	the two digit state fips code

---

### LU\_SurSysDivision - Table

**Name** LU\_SurSysDivision

**AliasName** LU\_SurSysDivision

**Description** This table provides the domain of values for the first and second divisions of survey systems. These were combined because the division types can be combined and may vary from state to state.

**Purpose** To provide a domain for referencing source information or translating incoming data sets

**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
SurSysDivCode	String	5	Survey System Division Code	codes for the survey system divisions
SurSysDivName	String	50	Survey System Division Name	the name of the survey division
SurSysDivDesc	String	200	Survey System Division Description	a description of the survey division

---

### LU\_SurveyNameOhio - Table

**Name** LU\_SurveyNameOhio  
**AliasName** LU\_SurveyNameOhio  
**Description** Public Land survey areas in Ohio are identified by a name. The named areas do not an origin of Public Land Survey System value.  
**Purpose** To provide a domain for referencing source information or translating incoming data sets  
**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
SRVNAME	String	60	Ohio Survey System Name	The named survey areas within Ohio
SECSRVNAME	String	60	Ohio Secondary Survey System Name	the secondary names within the named areas. There are only two named areas with a secondary survey named area within them

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### LU\_SurveySystem - Table

**Name** LU\_SurveySystem  
**AliasName** LU\_SurveySystem  
**Description** This is a list of survey system types  
**Purpose** To provide a domain for referencing source information or translating incoming data sets  
**DataTheme** Cadastral

Field	DataType	Length	AliasName	Description
SurvSysTypeCode	String	5	Survey System Type Code	codes for the survey system types
SurvSysType	String	50	Survey System Type Text	the name of the survey system type
SurvSysDescription	String	250	Survey System Type Description	the description of the survey system type

---

### LU\_SurveyType - Table

**Name** LU\_SurveyType  
**AliasName** LU\_SurveyType  
**Description** Values for the federal survey types. This includes the special survey, first and second survey division types.  
**Purpose** To provide a domain for referencing source information or translating incoming data sets  
**DataTheme** Cadastral

<b>Field</b>	<b>DataType</b>	<b>Length</b>	<b>AliasName</b>	<b>Description</b>
SurveyTypeCD	String	2	Special Survey Type Code	the survey type code
SurveyTypeName	String	50	Special Survey Type Text	the name of the survey type
Description	String	200	Special Survey Type Description	the description of the survey type

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## **Appendix B – PLSS Corner Standard Identifier**

This information is taken from the Cadastral Publication Guideline

### ***Introduction***

This paper describes a standard point identifier for Public Land Survey System (PLSS) corners. This standard point identifier conforms to the requirements of the Federal Geographic Data Committee (FGDC) Cadastral Data Content Standard requirements for a unique identifier for cadastral corners. The standard system presented here allows published coordinate information to be related to source data and to perpetuate corner identifiers as coordinate values for corners are improved over time.

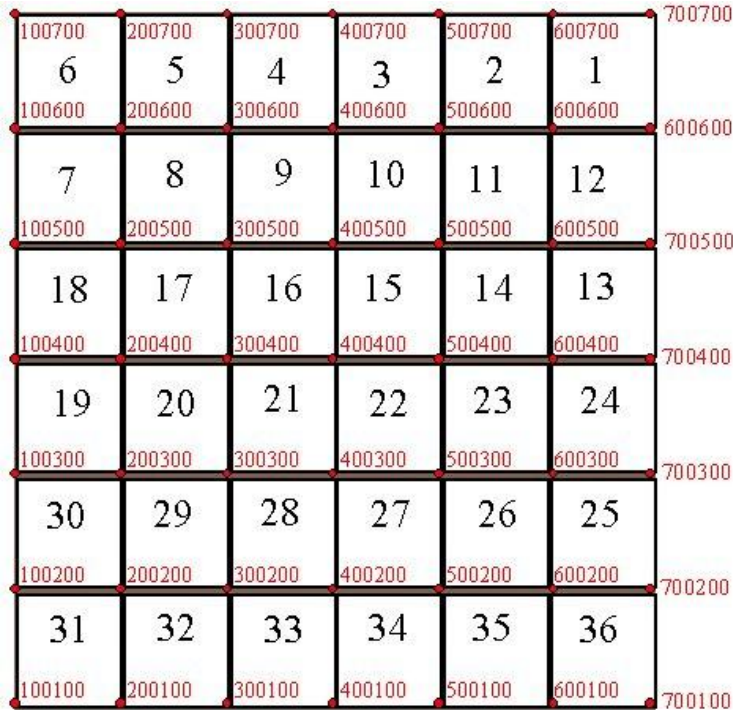
The uniqueness of the survey point ids will help facilitate data maintenance and data sharing within the Bureau of land management (BLM) and other Cadastral Reference data stewards. This paper describes the format and structure of the corner point identifiers for the publication of corner information that conforms to the national cadastral data standards.

### ***PLSS Points***

The Geographic Coordinate Data Base (GCDB) uses a six-digit numbering system to name PLSS points in a township. This six-digit corner number is only unique within a PLSS township. This number is repeated in each township, to make it easier to determine the location of a corner within a Township by its number.

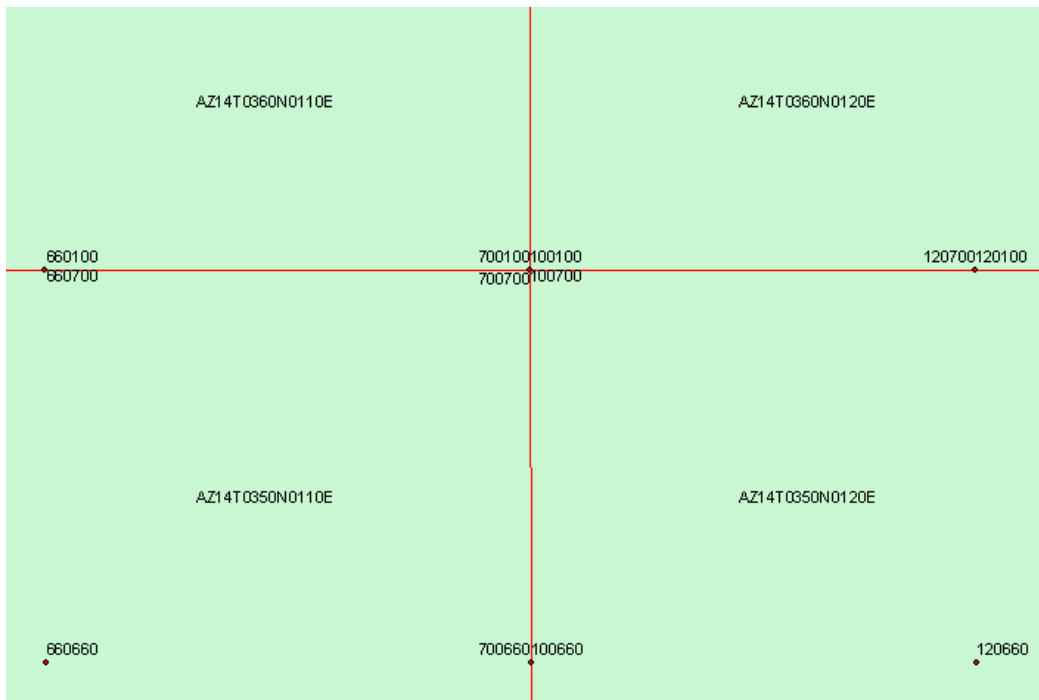
The first three digits of this number refer to the east-west position in the township. The second three digits indicate the north-south position in a township.

The following picture shows the corner numbering convention for a single township subdivided down to sections. This numbering scheme is repeated in each township.



Due to this naming convention, four adjacent townships will name the same corner four different ways (100100, 100700, 700700, 700100). Each corner number should have the exact same coordinate values because this is in fact the same corner.

The following picture shows an example of the point duplication at township corners and township lines where sections subdivisions are coincident.



### Unique PLSS Corner Numbers

To make the corner numbers unique, the proposal is to add a point prefix to the PLSS corner number. This prefix is a concatenation of the State, Principal Meridian, Township and Range in which the point resides. This point prefix can be derived from the directory structure of the output directory from the BLM’s Data Preparation Software (DCCS V 1.04) or from the attributes in the standard PLSS Township Feature classes and is a standard 15 characters long. This identifier has been termed the township identifier or TWIP in other systems.

The uniqueness is established by making a business rule that the lowest six digit corner number will become the primary number and all other numbers will become aliases or other corner numbers for the same corner. The following diagram shows the proposed corner numbering convention.

