Oregon/Washington Bureau of Land Management

Culverts

Spatial Data Standard

Culvert at North Fork Alsea Access Road. Photo by BLM Northwest Oregon District.

Document Revisions

Revision	Date	Author	Description	Affected Pages
1.0	8/27/2020	Dana Baker-Allum et al	Initial Release	All

Navigation	
	This document uses hyperlinks to display additional information on topics. External links are displayed with an underline. Internal links are blue text, not underlined. After clicking on an internal link, press the **Alt**  **+left arrow**  keys to return to the original location from the target location.

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1 General Information

This dataset defines attributes for major and minor culvert structures. According to BLM Manual 9100, a culvert is "a conduit or passageway, not classified as a bridge, under a road, trail, or other facility usually consisting of a round pipe, a pipe-arch, or an open or closed bottom box or arch." Major culverts are defined as "a culvert having a clear opening of more than 35 square feet or multiple installations of culverts placed adjacent or contiguous as units and having a combined clear opening of more than 35 square feet."

This dataset only reflects the most current condition of the culvert as of the last visit and does not track the history of the culvert over time. Historic (removed) features may be retained in the parent Structures dataset.

- Dataset (Theme) Name: Culverts
- Dataset (Feature Class): CULVERTS_TBL

1.1 Roles and Responsibilities

Table 1 Roles and Responsibilities

Roles	Responsibilities
State Data Steward	The State Data Steward responsibilities include approving data standards and business rules, developing Quality Assurance/Quality Control procedures, identifying potential Privacy issues, and managing that data as a corporate resource. The State Data Steward coordinates with field office data stewards, the State Data Administrator, Geographic Information System (GIS) coordinators, and national data stewards. The State Data Steward reviews geospatial metadata for completeness and quality.
GIS Technical Lead	The GIS Technical Lead works with data stewards to convert business needs into GIS applications and derive data requirements and participates in the development of data standards. The GIS technical lead coordinates with system administrators and GIS coordinators to manage the GIS databases. The GIS technical lead works with data editors to ensure the consistency and accordance with the established data standards of data input into the enterprise Spatial Database Engine (SDE) geodatabase. The GIS technical lead provides technical assistance and advice on GIS analysis, query, and display of the dataset.
State Data Administrator	The State Data Administrator provides information management leadership, data modeling expertise, and custodianship of the state data models. The State Data Administrator ensures compliance with defined processes for development of data standards and metadata, and process consistency and completeness. The State Data Administrator is responsible for making data standards and metadata accessible to all users. The State Data Administrator coordinates with data stewards and GIS coordinators to respond to national spatial data requests.
State Records Administrator	The State Records Administrator assists the state data steward to identify any privacy issues related to spatial data. The state records administrator also provides direction and guidance on data release and fees. The state records administrator classifies data under the proper records retention schedule and determines the appropriate Freedom of Information Act category.

1.2 FOIA Category

This dataset falls under the standard Records Access Category 1(B) – BLM records that may contain protected information that must be considered for segregation prior to release.

1.3 Records Retention Schedule

The DRS/GRS/BLM Combined Records Schedule, under Schedule 20/52a3 (Electronic Records/Geographic Information Systems), lists this theme, infrastructure, as one of the system-centric themes that are significant for BLM's mission that must be permanently retained.

"PERMANENT. Cutoff at the end of each Fiscal Year (FY) or when significant changes and additions have been made, before and after the change. Use BLM 20/52a. Transfer to the National Archives every three years after cutoff. Under the instruction in 36 CFR 1235.44-50 or whichever guidance is in place at the time of the transfer. Submissions are full datasets and are in addition to, not replacements of, earlier submissions."

Oregon/Washington (OR/WA) Bureau of Land Management (BLM) Guidebook for Management of Geospatial Data (v1) Section 15.2 - Corporate Data Online Archives prescribes:

"Vector annual archives are retained online for 12 years. Each year, data that has reached 12 years old is copied off-line to be retained until no longer needed (determined by data stewards and program leads) with format and readability maintained in a five (5) year "tech refresh" update cycle."

1.4 Security/Access/Sensitivity

The Culverts theme does not require any additional security other than that provided by the General Support System (the hardware/software infrastructure of the OR/WA BLM).

This dataset is not sensitive and there are no restrictions on access to this data, either from within the BLM or external to the BLM. This dataset falls under the standard Records Access Category 1(B) – BLM records that may contain protected information that must be considered for segregation prior to release.

There are no privacy issues or concerns associated with these data themes. A privacy impact assessment was submitted for this dataset on 8/24/2020.

1.5 Keywords

Keywords that can be used to locate this dataset include:

- BLM Thesaurus: Geospatial, Facility, Disturbance, Hydrology
- Additional keywords: Culvert
- ISO Thesaurus: environment, structure

1.6 Subject Function Codes

BLM Subject Function codes used to describe this dataset include:

- 1283 - Data Administration
- 9112 - Bridges and Major Culverts
- 6720 - Aquatic Resource Management
- 6762 - Stream Management
- 9167 – Geographic Information System (GIS)

2 Dataset Overview

2.1 Usage

This dataset is used for depicting culverts on maps and for:

- Prioritizing roads for restoration projects.
- Condition assessments for roads in preparation for timber sale projects.
- Helps identify roads that need maintenance. Contributes to the overall asset inventory and maintaining the deferred maintenance backlog. Used as input when creating deferred maintenance proposals.

This dataset is for recording detailed measurements and attributes about culverts. If detailed information is not available or not collected, then editors may record the culvert point in the Structures Point dataset with a type of "Culvert" and not record data in the related Culverts dataset.

2.2 Sponsor/Affected Parties

The sponsor for this data set is the Deputy State Director for the Division of Management Services.

Affected parties are Oregon Department of Transportation and private timber companies. Both entities may be interested in viewing the data, but it is not necessary to coordinate with them on the data.

2.3 Relationship to Other Datasets, Databases, or Files

Culverts are related to the following datasets:

- Structures - the Culverts dataset is related to the OR/WA Structures dataset. Culverts inherits its spatial location and core attributes from Structures. There is a 1:1 relationship between the Structures feature class and the Culverts table (i.e. a structure point may have zero or 1 related Culverts records).
- Fish Passage Barriers - like Culverts, Fish Passage Barriers (FPB) are related to Structure points. A single structure point can be related to a Culvert record and a Fish Passage Barrier record.
- GTRN - This is the master dataset for roads and trails. There is a relationship between the two datasets because Culverts are structures that allow water to flow under roads or trails.
- FAMS - A limited set of attributes for major culverts are recorded in the Facility Asset Management System (FAMS). There may be some slight overlap between this data standard and FAMS. However, FAMS does not contain minor culverts and it does not contain the detailed attributes defined in this data standard.
- Hydrography - Culverts may occur at the intersection between streams and roads.

2.4 Data Category/Architecture Link

This data theme is a portion of the Oregon Data Framework (ODF) shown in Figure 1, Oregon Data Framework (ODF) Overview on page 9. The illustration is a simplified schematic of the entire ODF showing the overall organization and entity inheritance. The ODF utilizes the concept of inheritance to define specific instances of data. The ODF divides all OR/WA resource-related data into three general categories:

- Activities
- Resources
- Boundaries

These data themes are a portion of the Oregon Data Framework (ODF). The ODF utilizes the concept of inheritance to define specific instances of data. All OR/WA resource-related data are divided into three general categories: Activities, Resources, and Boundaries.

These general categories are broken into sub-categories that inherit spatial characteristics and attributes from their parent category. These sub-categories may be further broken into more specific groups until the basic data set cannot be further sub-divided. Those basic data sets inherit all characteristics of all groups/categories above them. The basic data sets are where physical data gets populated. Those groups/categories above them do not contain actual data but set parameters which all data of that type must follow.

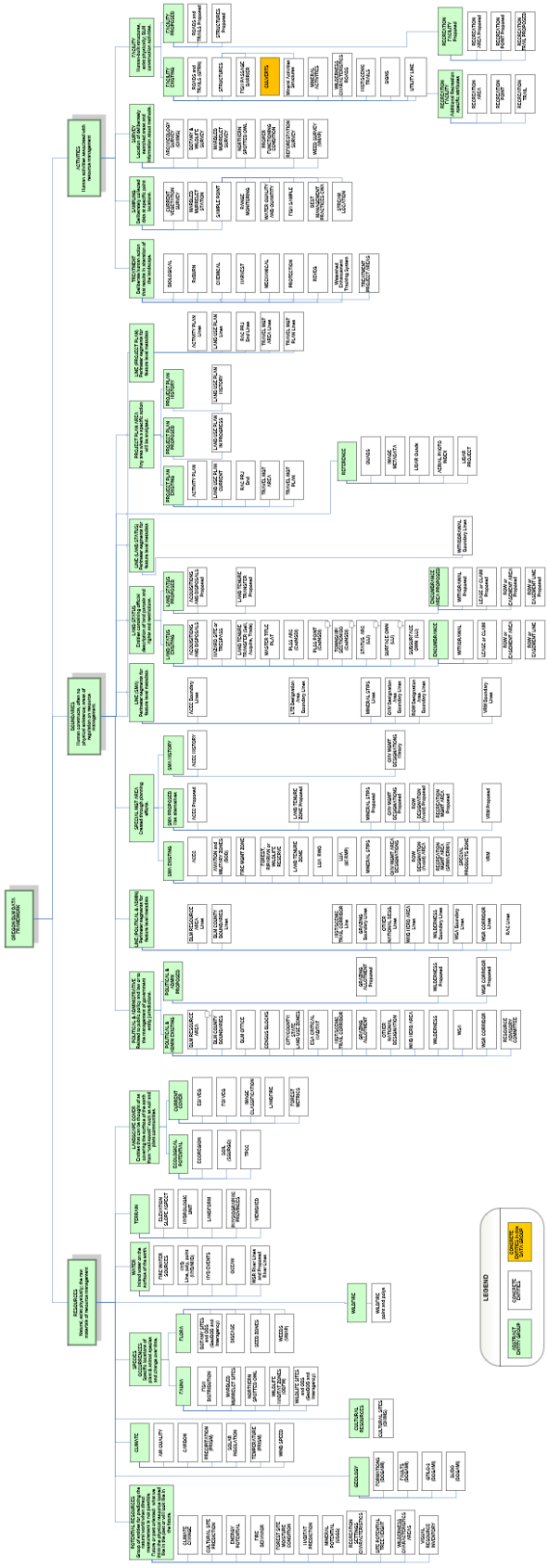

Figure 1 Oregon Data Framework Overview

Physical data is populated in the basic data sets. Those groups/categories above them do not contain actual data but set parameters that all data of that type must follow. See Figure 2, Data Organization Structure for a simplified schematic of the entire ODF showing the overall organization and entity inheritance. The Culverts entities are highlighted. For additional information about the ODF, contact the State Data Administrator. The State Data Administrator's contact information can be found at the following link:

https://www.blm.gov/about/data/oregon-data-management

In the ODF, Culverts are considered an Activity and categorized as follows:

ODF

Activities

Facility

CULVERTS_TBL

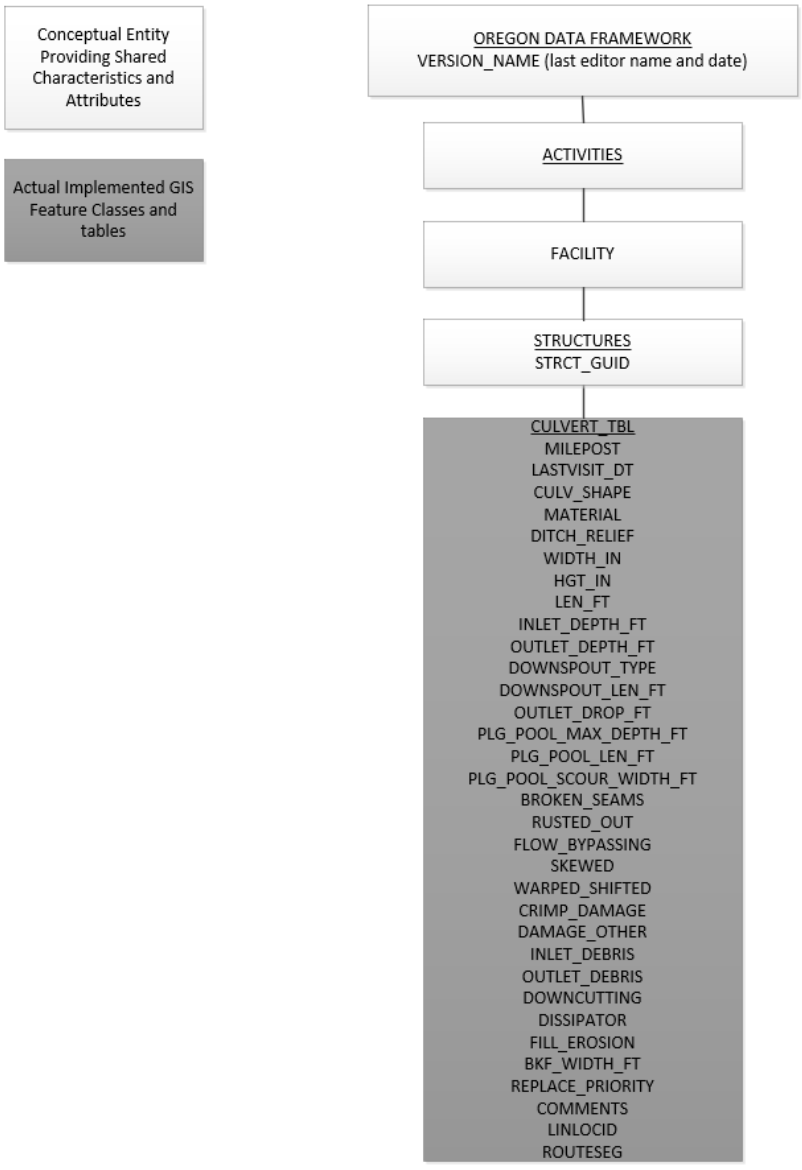

Figure 2 Data Organization Structure

2.5 Relationship to DOI Enterprise Architecture Data Resource Model

The Department of the Interior (DOI) Enterprise Architecture contains a component called the Data Resource Model. This model addresses the concepts of data sharing, data description, and data context. This data standard provides information needed to address each of those areas. Data sharing is addressed through complete documentation and simple data structures which make sharing easier. Data description is addressed through the section on Attribute Descriptions. Data context is addressed through the data organization and structure portions of this document. In addition, the DOI Data Resource Model categorizes data by use of standardized Data Subject Areas and Information Classes. For this data set, the Data Subject Area and Information Class are:

- Data Subject Area: Geospatial
- Information Class: Location

3 Data Management Protocols

3.1 Accuracy Requirements

Culverts inherit their spatial location from the Structures dataset. Since structures have a physical existence on the ground, it is possible to map their locations with a high degree of accuracy. Accuracy is, however, variable because of a wide variety of sources. The claimed +/- range is captured in the attribute ACCURACY_FT. Entering structure locations using the Global Positioning System (GPS) or by careful mapping improves the accuracy.

3.2 Collection, Input, and Maintenance Protocols

Resource specialists have the option of entering data from paper field forms in the office using Desktop ArcGIS or field-going staff may collect data using the S1 Mobile for Android application.

To collect mobile data, a staff member must first obtain the appropriate mobile editor user account within the BLM ArcGIS Online (AGOL) organization. Then, administrators will add mobile editors to the designated group in AGOL which allows them to access the editable feature service. Specific decisions about how to manage AGOL users can be made at the District or Field Office level.

Once added to the correct group, users can log in to the S1 Mobile for Android Application and download an editable replica of the Maintenance Tracking System dataset to their device for offline use in the field. This application allows users to create new features or edit existing features.

When the user returns to the office and re-establishes wireless internet connectivity on the device, they will then choose the option to sync and submit their data from the mobile application. This will add the created, updated, and/or deleted features/records to a BLM SDE Version queue. Authorized editors will then import this mobile version into ArcGIS Desktop, where they will review the data, perform any needed corrections or updates, and submit the version for automated QAQC, reconcile, and posting. The automated QAQC process performed during version submission will check the version for missing values in required fields, values outside of applied range and/or coded value domains, and other data rules.

Detailed editing guidance is available in section 9 of this document.

3.3 Update Frequency and Archival Protocols

Updates are potentially frequent but usually involve only a few structures. District resource specialists should check the themes frequently for spatial and attribute accuracy within their districts and inform the GIS editor when features are ready to move from Proposed to Completed.

Data is archived annually at the end of the fiscal year.

3.4 Statewide Monitoring

The State Data Steward, assisted by the GIS Technical Lead, are responsible for checking consistency across districts for the theme. The State Data Steward is responsible for coordinating the response to national BLM and interagency data calls.

Each year, the Resource Science Data team of the BLM Division of Resources, Lands, Minerals and Fire meets with each state data steward for every corporate geospatial theme to conduct an annual review of the data. During the annual review, geospatial staff present the state data stewards with a report detailing Quality Assurance/Quality Control (QAQC) results performed on the data. The QAQC does the following:

- Checks that all attribute values conform to the range or coded-value domains to which they are applied.
- Checks that all attributes marked as required in the data standard have values.
- Checks for duplicate features which have the same geometry and attributes.
- Checks for overlapping features if forbidden by the data standard.
- Checks for invalid geometry.
- Other checks as necessary (can be customized according to the data standard).

In addition to this report, geospatial staff conduct a qualitative needs assessment with the steward to identify any unmet needs or problems with the status of the data. At the conclusion of the review, the team records the steward's approval of the datasets reviewed. These approvals are then added to the corporate metadata.

4 Culverts Schema (simplified)

General Information: Attributes are listed in the order they appear in the geodatabase feature class. The order is an indication of the importance of the attribute for theme definition and use. There are no aliases unless specifically noted. The domains used in this data standard can be found in Appendix A. These are the domains at the time the data standard was approved. Domains can be changed without a re-issue of the data standard. Current domains are found on the internal OR/WA SharePoint data management page. Some of the domains used in this data standard are also available at the following web site: https://www.blm.gov/about/data/oregon-data-management

For domains not listed at that site contact: State Data Administrator.

4.1 CULVERTS_TBL (Culverts Table)

For domain and default values, see Section 0, **There are no spatial** entities described in this data standard. All culvert records are related to a parent Structure point, which is described in a separate data standard.

Attribute Characteristics and Definition (In alphabetical order)in this document.

Attribute Name	Data Type	Length	Default Value	Required	Domain
MILEPOST	Double			Yes **	
LASTVISIT_DT	Date			Yes	
CULV_SHAPE	String	30		Yes	dom_CULV_SHAPE
MATERIAL	String	10		Yes	dom_CULV_MATERIAL
DITCH_RELIEF	String	1		Yes	dom_YN
WIDTH_IN	Short Integer			Yes	
HGT_IN	Short Integer			Yes	
LEN_FT	Short Integer			Yes	
INLET_DEPTH_FT	Short Integer			Yes	
OUTLET_DEPTH_FT	Short Integer			Yes	
DOWNSPOUT_TYPE	String	10		No	dom_CULV_DWNSPT_TYPE
DOWNSPOUT_LEN_FT	Short Integer			No	
OUTLET_DROP_FT	Short Integer			Conditional	
PLG_POOL_YN	String	1		Yes	dom_YN
PLG_POOL_MAX_DEPTH_FT	Double			Conditional	
PLG_POOL_LEN_FT	Short Integer			Conditional	
PLG_POOL_SCOUR_WIDTH_FT	Short Integer			Conditional	
BROKEN_SEAMS	String	1		No	dom_YN
RUSTED_OUT	String	20		No	dom_CULV_RUSTED_OUT
FLOW_BYPASSING	String	1		No	dom_YN
SKEWED	String	1		No	dom_YN
WARPED_SHIFTED	String	1		No	dom_YN
CRIMP_DAMAGE	String	1		No	dom_YN
DAMAGE_OTHER	String	1		No	dom_YN
INLET_DEBRIS	String	30		No	dom_CULV_DEBRIS
OUTLET_DEBRIS	String	30		No	dom_CULV_DEBRIS
DOWNCUTTING	String	1		No	dom_YN

DISSIPATOR	String	1		No	dom_YN
FILL_EROSION	String	20		No	dom_CULV_FILL_EROSION
BKF_WIDTH_FT	Double	7,2		Conditional	
REPLACE_PRIORITY	String	10		No	dom_CULV_REP_**PRI**
COMMENTS	String	255		No	
ROADNUM	String	30		No	
ROUTESEG	String	35		No	
STRCT_GUID	GUID			Yes *	
VERSION_NAME	String	50	InitialLoad	Yes *	
GLOBALID	GUID			Yes *	

* Values automatically generated

** Enforced during quality control, may appear in data as not required

5 Projection and Spatial Extent

All feature classes and feature datasets are in Geographic, North American Datum 83. Units are decimal degrees. Spatial extent (area of coverage) includes all lands managed by the BLM OR/WA in Western Oregon. See the metadata for this data for a more precise description of the extent.

6 Spatial Entity Characteristics

There are no spatial entities described in this data standard. All culvert records are related to a parent Structure point, which is described in a separate data standard.

7 Attribute Characteristics and Definition (In alphabetical order)

7.1 BKF_WIDTH_FT

Geodatabase Name	BKF_WIDTH_FT
BLM Structured Name	Water_Cross_Section_Bankfull_Width_Feet_Measure
Inheritance	Not Inherited
Alias Name	Bankfull Width (ft)
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	The horizontal distance in feet across a stream channel measured at bankfull stage. Bankfull is the upper most bank elevation prior to water spilling over into the floodplain. The measurement should be taken outside the influence of the culvert. This field is optional for cross drains (DITCH_RELIEF = Y). If a value cannot be determined, -1 can be used. However, a warning will be displayed when the data is submitted to the corporate database.
Required/Optional	Conditional. If DITCH_RELIEF = N, then this field is required.
Domain (Valid Values)	No domain. Examples: 11.34, 6.1
Data Type	Double (7,2)

7.2 BROKEN_SEAMS

Geodatabase Name	BROKEN_SEAMS
BLM Structured Name	Culvert_Broken_Seams_or_Splits_YN_Code
Inheritance	Not Inherited
Alias Name	Broken Seams, Splits or Disbanded?
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if the culvert has broken seams, splits, or if the culvert has separated at the band.
Required/Optional	Optional
Domain (Valid Values)	dom_YN
Data Type	String (1)

7.3 COMMENTS

Geodatabase Name	COMMENTS
BLM Structured Name	Comments_Text
Inheritance	Not Inherited
Alias Name	Comments

Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Additional information about the culvert.
Required/Optional	Optional
Domain (Valid Values)	No domain. Examples: "Culvert inlet plugged.", "Needs 15 CY of riprap to fill void at culvert outlet."
Data Type	String (255)

7.4 CRIMP_DAMAGE

Geodatabase Name	CRIMP_DAMAGE
BLM Structured Name	Culvert_Crimp_Damage_YN_Code
Inheritance	Not Inherited
Alias Name	Crimp Damage?
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if the culvert has been pinched closed or unraveled at the inlet or outlet. Generally caused by heavy equipment during maintenance operations or logging.
Required/Optional	Optional
Domain (Valid Values)	dom_YN
Data Type	String (1)

7.5 CULV_SHAPE

Geodatabase Name	CULV_SHAPE
BLM Structured Name	Culvert_Shape_Code
Inheritance	Not Inherited
Alias Name	Shape +
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	The shape of the cross-section or end area of the culvert (prior to mechanical damage). If "Other" is selected, additional details must be added to the Comments field.
Required/Optional	Required
Domain (Valid Values)	dom_CULV_SHAPE
Data Type	String (30)

7.6 DAMAGE_OTHER

Geodatabase Name	DAMAGE_OTHER

BLM Structured Name	Culvert_Other_Damage_YN_Code
Inheritance	Not Inherited
Alias Name	Other Damage?
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if the culvert has other types of damage not otherwise recorded in another field. Additional details must be recorded in the comments field.
Required/Optional	Optional
Domain (Valid Values)	dom_YN
Data Type	String (1)

7.7 DISSIPATOR

Geodatabase Name	DISSIPATOR
BLM Structured Name	Culvert_Dissipator_YN_Code
Inheritance	Not Inherited
Alias Name	Dissipator?
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if the culvert has an energy dissipator. Energy dissipators reduce downstream erosion by reducing the energy of the water to prevent road fill erosion. Examples: rocks or riprap.
Required/Optional	Optional
Domain (Valid Values)	dom_YN
Data Type	String (1)

7.8 DITCH_RELIEF

Geodatabase Name	DITCH_RELIEF
BLM Structured Name	Culvert_Ditch_Relief_Culvert_YN_Code
Inheritance	Not Inherited
Alias Name	Ditch Relief Culvert? +
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	A ditch relief culvert, generally made of metal or plastic, is a conduit placed under the road surface to remove ditch water from the road prism. This feature drains water from the ditch or inboard side of the road, and not from a continuous stream channel.
Required/Optional	Required
Domain (Valid Values)	dom_YN

Data Type	String (1)

7.9 DOWNCUTTING

Geodatabase Name	DOWNCUTTING
BLM Structured Name	Culvert_Downcutting_YN_Code
Inheritance	Not Inherited
Alias Name	Downcutting?
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if there is a vertical erosion caused by a hydraulic action or drop between the culvert outlet invert and the streambed. Generally undersized culverts or poorly installed culverts lower and widen the streambed immediately downstream.
Required/Optional	Optional
Domain (Valid Values)	dom_YN
Data Type	String (1)

7.10 DOWNSPOUT_LEN_FT

Geodatabase Name	DOWNSPOUT_LEN_FT
BLM Structured Name	Culvert_Downspout_Length_Feet_Measure
Inheritance	Not Inherited
Alias Name	Downspout Length (ft)
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Length of the downspout recorded in feet.
Required/Optional	Optional
Domain (Valid Values)	No domain. Examples: 10, 20, 50
Data Type	Short Integer

7.11 DOWNSPOUT_TYPE

Geodatabase Name	DOWNSPOUT_TYPE
BLM Structured Name	Culvert_Downspout_Type_Code
Inheritance	Not Inherited
Alias Name	Downspout Type
Feature Class Use/Entity Table	CULVERTS_TBL

Definition	Type of downspout. A downspout is a round or half round section of culvert placed at the outlet of a culvert to move discharge away from the fill slope thereby preventing erosion within the road prism.
Required/Optional	Optional
Domain (Valid Values)	dom_CULV_DWNSPT_TYPE
Data Type	String (10)

7.12 FILL_EROSION

Geodatabase Name	FILL_EROSION
BLM Structured Name	Culvert_Fill_Erosion_Code
Inheritance	Not Inherited
Alias Name	Erosion of Fill?
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if there is erosion of roadbed fill caused by the size, skew, or condition of the culvert.
Required/Optional	Optional
Domain (Valid Values)	dom_CULV_FILL_EROSION
Data Type	String (20)

7.13 FLOW_BYPASSING

Geodatabase Name	FLOW_BYPASSING
BLM Structured Name	Culvert_Flow_Bypassing_YN_Code
Inheritance	Not Inherited
Alias Name	Flow Bypassing?
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if water is moving through the road fill outside of the culvert.
Required/Optional	Optional
Domain (Valid Values)	dom_YN
Data Type	String (1)

7.14 GLOBALID

Geodatabase Name	GLOBALID
BLM Structured Name	Global_ID_Identifier
Inheritance	Not Inherited

Alias Name	None
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	System generated unique identifier.
Required/Optional	Required
Domain (Valid Values)	No domain.
Data Type	GUID

7.15 HGT_IN

Geodatabase Name	HGT_IN
BLM Structured Name	Culvert_Height_Inches_Measure
Inheritance	Not Inherited
Alias Name	Height (inches) +
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Vertical pipe height at its tallest point measured in inches. If the culvert is round, enter the diameter in both the width and height fields.
Required/Optional	Required
Domain (Valid Values)	No domain. Examples: 24, 36, 120
Data Type	Short Integer

7.16 INLET_DEBRIS

Geodatabase Name	INLET_DEBRIS
BLM Structured Name	Culvert_Inlet_Debris_Code
Inheritance	Not Inherited
Alias Name	Inlet Debris?
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if the culvert has debris that is lodged inside the culvert inlet or substantially reducing the end area at the inlet. This does not include rocks or sticks that can easily pass through the culvert. Provide an estimate of how much the culvert is blocked.
Required/Optional	Optional
Domain (Valid Values)	dom_CULV_DEBRIS
Data Type	String (30)

7.17 INLET_DEPTH_FT

Geodatabase Name	INLET_DEPTH_FT

BLM Structured Name	Culvert_Inlet_Depth_Feet_Measure
Inheritance	Not Inherited
Alias Name	Inlet Fill Depth (ft) +
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Fill vertical height over the top of the pipe inlet. Measured from the road edge to the top of the culvert. Round to the nearest foot, 1 foot minimum.
Required/Optional	Required
Domain (Valid Values)	No domain. Examples: 2, 11, 20
Data Type	Short Integer

7.18 LASTVISIT_DT

Geodatabase Name	LASTVISIT_DT
BLM Structured Name	Last_Visit_Date
Inheritance	Not Inherited
Alias Name	Inspection Date +
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	The date the culvert was last inspected or visited.
Required/Optional	Required
Domain (Valid Values)	No Domain. Examples: 6/24/2009, 10/1/2020
Data Type	Date

7.19 LEN_FT

Geodatabase Name	LEN_FT
BLM Structured Name	Culvert_Length_Feet_Measure
Inheritance	Not Inherited
Alias Name	Length (ft) +
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Pipe length measured in feet from end to end at invert (pipe bottom).
Required/Optional	Required
Domain (Valid Values)	No domain. Examples: 35, 50, 100
Data Type	Short Integer

7.20 MATERIAL

Geodatabase Name	MATERIAL
BLM Structured Name	Culvert_Material_Type_Code

Inheritance	Not Inherited
Alias Name	Material +
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Materials used to create the culvert. Values are specific to culverts and may be more detailed than what is recorded in the parent Structure Material field.
Required/Optional	Required
Domain (Valid Values)	dom_CULV_MATERIAL
Data Type	String (10)

7.21 MILEPOST

Geodatabase Name	MILEPOST
BLM Structured Name	Road_Milepost_Number
Inheritance	Not Inherited
Alias Name	Milepost +
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Distance measured from the beginning milepost of the road (0.0) to the pipe. This field is not required during mobile data collection but must be completed before data is submitted to the corporate database.
Required/Optional	Required
Domain (Valid Values)	No domain. Examples: 0.07, 0.5, 1.8
Data Type	Double

7.22 OUTLET_DEBRIS

Geodatabase Name	OUTLET_DEBRIS
BLM Structured Name	Culvert_Outlet_Debris_Code
Inheritance	Not Inherited
Alias Name	Outlet Debris?
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if the culvert has debris that is lodged inside the culvert outlet or substantially reducing the end area at the outlet. This does not include rocks or sticks that can easily pass through the culvert. Provide an estimate of how much the culvert is blocked.
Required/Optional	Optional
Domain (Valid Values)	dom_CULV_DEBRIS

Data Type	String (30)

7.23 OUTLET_DEPTH_FT

Geodatabase Name	OUTLET_DEPTH_FT
BLM Structured Name	Culvert_Outlet_Depth_Feet_Measure
Inheritance	Not Inherited
Alias Name	Outlet Fill Depth (ft) +
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Fill height measured vertically over the top of the pipe outlet. Measured from the road edge to the top of the culvert. Round to the nearest foot, 1 foot minimum.
Required/Optional	Required
Domain (Valid Values)	No domain. Examples: 1, 10, 24
Data Type	Short Integer

7.24 OUTLET_DROP_FT

Geodatabase Name	OUTLET_DROP_FT
BLM Structured Name	Culvert_Outlet_Drop_Feet_Measure
Inheritance	Not Inherited
Alias Name	Outlet Drop (ft)
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Vertical distance from the outlet invert (interior bottom of the pipe) to the water surface below the water surface drop. Measure all drops and record the cumulative water surface drop in this field. If the value is greater than zero, then it is assumed the culvert is perched. A perched culvert is where the outlet invert is elevated above the downstream water surface, creating a water surface drop.
Required/Optional	Conditional. If DITCH_RELIEF = 'N', then this field is required.
Domain (Valid Values)	No domain. Examples: 1, 3, 10
Data Type	Short Integer

7.25 PLG_POOL_LEN_FT

Geodatabase Name	PLG_POOL_LEN_FT
BLM Structured Name	Plunge_Pool_Length_Feet_Measure
Inheritance	Not Inherited
Alias Name	Plunge Pool Length (ft)

Feature Class Use/Entity Table	CULVERTS_TBL
Definition	The length from outlet to pool tail out measured to the nearest foot. Measured from the outlet invert to the center of the riffle controlling the water surface elevation of the plunge pool. If value is less than 1 foot, round up to 1. Enter 0 if the field is required and no data is available.
Required/Optional	Conditional. If PLG_POOL_YN = Y (Yes), then this field is required.
Domain (Valid Values)	No domain. Examples:12, 15, 20
Data Type	Short Integer

7.26 PLG_POOL_MAX_DEPTH_FT

Geodatabase Name	PLG_POOL_MAX_DEPTH_FT
BLM Structured Name	Plunge_Pool_Maximum_Depth_Feet_Measure
Inheritance	Not Inherited
Alias Name	Plunge Pool Maximum Depth (ft)
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	The maximum depth in the scour pool below a perched culvert. Measured to the tenth of a foot. Enter 0 if the field is required and no data is available.
Required/Optional	Conditional. If PLG_POOL_YN = Y (Yes), then this field is required.
Domain (Valid Values)	No domain. Examples: 3.2, 5.5
Data Type	Double

7.27 PLG_POOL_SCOUR_WIDTH_FT

Geodatabase Name	PLG_POOL_SCOUR_WIDTH_FT
BLM Structured Name	Plunge_Pool_Scour_Line_Width_Feet_Measure
Inheritance	Not Inherited
Alias Name	Plunge Pool Scour Line Width (ft)
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	The maximum distance, bank scour line to bank scour line, over the plunge pool and perpendicular to the culvert outlet, measured to the nearest foot. If value is less than 1 foot, round up to 1. Enter 0 if the field is required and no data is available.
Required/Optional	Conditional. If PLG_POOL_YN = Y (Yes), then this field is required.
Domain (Valid Values)	No domain. Examples:10, 12, 15
Data Type	Short Integer

7.28 PLG_POOL_YN

Geodatabase Name	PLG_POOL_YN

BLM Structured Name	Plunge_Pool_Code
Inheritance	Not Inherited
Alias Name	Plunge Pool?
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if there is a plunge pool.
Required/Optional	Required
Domain (Valid Values)	dom_YN
Data Type	String (1)

7.29 REPLACE_PRIORITY

Geodatabase Name	REPLACE_PRIORITY
BLM Structured Name	Culvert_Replacement_Priority_Code
Inheritance	Not Inherited
Alias Name	Replacement Priority
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	The priority for replacing the culvert.
Required/Optional	Optional
Domain (Valid Values)	dom_CULV_REP_**PRI**
Data Type	String (10)

7.30 ROADNUM

Geodatabase Name	ROADNUM
BLM Structured Name	Ground_Transportation_Road_Number_Text
Inheritance	Inherited from GTRN
Alias Name	RoadNum
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	The intent of this field is to hold the road number of the primary route owner.
Required/Optional	Optional
Domain (Valid Values)	No domain. Examples: 13-5-30.0, 7175-BA

Data Type	String (8)

7.31 ROUTESEG

Geodatabase Name	ROUTESEG
BLM Structured Name	Facilities_Asset_Management_System_Route_Segment_Text
Inheritance	Inherited from FAMS
Alias Name	RouteSeg
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	FAMS Route Segment. This field provides the route segment identifier for O & C routes. When combined with route number, the full route segment identifier is formed.
Required/Optional	Optional
Domain (Valid Values)	No domain. Examples: “A”, “B”
Data Type	String (35)

7.32 RUSTED_OUT

Geodatabase Name	RUSTED_OUT
BLM Structured Name	Culvert_Rusted_Out_Code
Inheritance	Not Inherited
Alias Name	Rusted Out
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if the culvert has rusted out. Surface or freckle rust is formed on the culvert, usually on the surface area that has flow on it. May be rusted all the way through the metal, developing holes or cracks that allow the water to seep through and into the road fill. This is only applicable to metal culverts.
Required/Optional	Optional
Domain (Valid Values)	dom_CULV_RUSTED_OUT
Data Type	String (20)

7.33 SKEWED

Geodatabase Name	SKEWED
BLM Structured Name	Culvert_Skewed_YN_Code
Inheritance	Not Inherited
Alias Name	Skewed?
Feature Class Use/Entity Table	CULVERTS_TBL

Definition	Indicates if the culvert is adversely skewed and is causing flow or erosion problems. May indicate if the culvert was improperly installed.
Required/Optional	Optional
Domain (Valid Values)	dom_YN
Data Type	String (1)

7.34 STRCT_GUID

Geodatabase Name	STRCT_GUID
BLM Structured Name	Structures_Global_Unique_Identifier
Inheritance	Inherited from Entity STRUCTURES
Alias Name	None
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Unique number identifier for the structure entity. Used to relate the Culvert record to the parent Structure feature.
Required/Optional	Required
Domain (Valid Values)	No domain.
Data Type	GUID

7.35 VERSION_NAME

Geodatabase Name	VERSION_NAME
BLM Structured Name	Geodatabase_Version_Text
Inheritance	Inherited from Entity ODF
Alias Name	None
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Name of the corporate geodatabase version previously used to edit the record. This field is auto populated by the software.
Required/Optional	Required
Domain (Valid Values)	No domain. Example: sfrazier.GRA-121211-111034
Data Type	String (50)

7.36 WARPED_SHIFTED

Geodatabase Name	WARPED_SHIFTED
BLM Structured Name	Culvert_Warped_or_Shifted_YN_Code
Inheritance	Not Inherited
Alias Name	Warped/Shifted?

Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Indicates if the culvert has warped, bent, or shifted. Includes deformation of the culvert shape inside of the culvert. Includes major warps and shifts only.
Required/Optional	Optional
Domain (Valid Values)	dom_YN
Data Type	String (1)

7.37 WIDTH_IN

Geodatabase Name	WIDTH_IN
BLM Structured Name	Culvert_Width_Inches_Measure
Inheritance	Not Inherited
Alias Name	Width (inches) +
Feature Class Use/Entity Table	CULVERTS_TBL
Definition	Horizontal pipe diameter at its widest point measured in inches. If the culvert is round, enter the diameter in both the width and height fields.
Required/Optional	Required
Domain (Valid Values)	No domain. Examples: 18, 24, 120
Data Type	Short Integer

8 Layer Files (Publication Views)

8.1 General

Master corporate feature classes/datasets maintained in the edit database (currently ORSOEDIT) are "published" to the user database (currently ORSOVCTR) in several ways:

- Copied completely with no changes (replicated).
- Copied with no changes except to omit one or more feature classes from a feature dataset.
- Minor changes made (e.g., clip, dissolve, union with ownership) to make the data easier to use. Feature classes that have been changed are indicated by "PUB" in their name. They are created through scripts that can be automatically executed and are easily rebuilt from the master (ORSOEDIT) data whenever necessary.

Layer files are not new data requiring storage and maintenance but point to existing data. They have appropriate selection and symbolization for correct use and display of the data. They provide the guidance for data published on the web. Layer files are created by simple, documented processes, and can be deleted and recreated at any time.

8.2 Specific to This Dataset

A publication dataset, CULVERTS_PUB_PT, will be provided that meets these requirements:

- The publication dataset will join the Culverts table to the Structure Points feature class using the STRCT_GUID field. This is a 1 to 1 relationship. Only Structure Points with a related Culvert record will be included in the publication datasets.
- Records related to proposed structures will not be posted on the web and structures privately owned (FAC_ADMIN = PV, PVI or PVN) will be removed.
- Structures CLASSIFIER field will not be included in the data posted on the public web because of privacy reasons.
- The VERSION_NAME field will be removed because it has no meaning outside of the internal editing environment.
- Features in the layer browser should be separated into two separate layers (current/historic). Features should be symbolized by status.
- Attributes in the publication dataset are listed in Table 2 below.

Table 2 Culverts Publication Dataset Fields

Attribute	Source
STRCT_NAME	STRCT_PT
STRCT_PT_TYPE	STRCT_PT
STRCT_STATUS	STRCT_PT
PROJ_NAME	STRCT_PT
STRCT_DT	STRCT_PT
MAINT_DT	STRCT_PT
LASTVISIT_DT	CULVERTS_TBL
CLASSIFIER *	STRCT_PT
FAMSKEY	STRCT_PT
MILEPOST	CULVERTS_TBL
ROADNUM	CULVERTS_TBL

ROUTESEG	CULVERTS_TBL
ELEVATION_FT	STRCT_PT
CULV_SHAPE	CULVERTS_TBL
MATERIAL	CULVERTS_TBL
DITCH_RELIEF	CULVERTS_TBL
WIDTH_IN	CULVERTS_TBL
HGT_IN	CULVERTS_TBL
LEN_FT	CULVERTS_TBL
INLET_DEPTH_FT	CULVERTS_TBL
OUTLET_DEPTH_FT	CULVERTS_TBL
DOWNSPOUT_TYPE	CULVERTS_TBL
DOWNSPOUT_LEN_FT	CULVERTS_TBL
OUTLET_DROP_FT	CULVERTS_TBL
PLG_POOL_MAX_DEPTH_FT	CULVERTS_TBL
PLG_POOL_LEN_FT	CULVERTS_TBL
PLG_POOL_SCOUR_WIDTH_FT	CULVERTS_TBL
BROKEN_SEAMS	CULVERTS_TBL
RUSTED_OUT	CULVERTS_TBL
FLOW_BYPASSING	CULVERTS_TBL
SKEWED	CULVERTS_TBL
WARPED_SHIFTED	CULVERTS_TBL
CRIMP_DAMAGE	CULVERTS_TBL
DAMAGE_OTHER	CULVERTS_TBL
INLET_DEBRIS	CULVERTS_TBL
OUTLET_DEBRIS	CULVERTS_TBL
DOWNCUTTING	CULVERTS_TBL
DISSIPATOR	CULVERTS_TBL
FILL_EROSION	CULVERTS_TBL
BKF_WIDTH_FT	CULVERTS_TBL
REPLACE_PRIORITY	CULVERTS_TBL
ALTERNATIVE	STRCT_PT
LOCAL_LINK	STRCT_PT
BLM_ORG_CD	STRCT_PT
FAC_ADMIN	STRCT_PT
REASON	STRCT_PT
REASON2	STRCT_PT
PLANID	STRCT_PT

INITIATIVE	STRCT_PT
INITIATIVE2	STRCT_PT
BUDGET_CD	STRCT_PT
WORKAGENT	STRCT_PT
COORD_SRC	STRCT_PT
ACCURACY_FT	STRCT_PT
FILEPATH	STRCT_PT
COMMENTS	STRCT_PT
COMMENTS (renamed CULV_COMMENTS)	CULVERTS_TBL
STRCT_GUID	STRCT_PT
CURRENT_CD	STRCT_PT

* Attribute not included in external publication dataset.

9 Editing Procedures

9.1 Editing Quality Control

Duplicate features. Checking for undesired duplicates is critical. Polygons or arcs that are 100% duplicate are easily found by searching for identical attributes along with identical Shape_Area and/or Shape_Length. Searching for partially overlapping arcs or polygons is harder, and each case must be inspected to determine if the overlap is desired or not.

To avoid overlapping polygons on the same area, polygons from different input themes are incorporated with the Union spatial overlay tool, not copied.

Union rather than Intersect is used to prevent unintended data loss.

Gap and overlap slivers. These can be hard to find if there are no topology rules. A temporary map topology can be created to find overlap slivers. Gap slivers can be found by constructing polygons from all arcs and checking polygons with very small area.

Buffer and dissolve considerations. Where polygons are created with the buffer tool, the correct option must be selected. The default option is "None," which means overlap will be retained. Sometimes the overlap should be dissolved, and the option changed to "All." Lines resulting from buffer have vertices too close together, especially around the end curves. They should be generalized to thin the vertices. If the dissolve tool is used on polygons or arcs, the "Create multipart features" should be unchecked.

GPS considerations. GPS linework is often messy and should always be checked and cleaned up, as necessary. Often vertices need to be thinned (generalize) especially at line ends. Multi-part polygons are sometimes inadvertently created when GPS files with vertices too close together or crossing lines or spikes are brought into ArcGIS. Tiny, unwanted polygons are created but are "hidden" because they are in a multi-part.

Be careful when merging lines. Multi-part lines will be created if there are tiny unintentional (unknown) gaps and it can be difficult to find these unless the multi-parts are exploded.

Null geometry. Check any features that have 0 or very small Shape_Area or Shape_Length. If a feature has 0 geometry and you cannot zoom to it, it is probably an inadvertently created "Null" feature and should be deleted. Very small features may also be unintended, resulting from messy line work.

Check tolerances. In general, set Cluster Tolerance as small as possible. This is 0.000000009 Degree (0.000007 degree is approximately 1 meter).

Snapping considerations. Where line segments with different COORD_SRC meet, the most accurate or important (in terms of legal boundary representation) are kept unaltered, and other lines snapped to them. In general, the hierarchy of importance is PLSS (CadNSDI points/lines) first, with DLG or SOURCEL next, then DEM, and MAP last. When snapping to the data indicated in COORD_SRC (as opposed to duplicating with copy/paste), be sure there are the same number of vertices in the target, and source theme arcs. When the DEF_FEATURE is "SUBDIVISION," snap the line segment to PLSS points, and make sure there are the same number of vertices in the line as PLSS points.

Check that all date fields contain valid dates in YYYYMMDD, YYYYMM or YYYY format. If an attribute has a domain, check for invalid values. The values must be exact.

Check for capitalization and spacing differences in attribute values that should be the same. Check for leading or **trailing** blanks what will make a different value even if it looks identical.

9.2 Theme Specific Guidance

There is much in the data standard that addresses editing and provides guidance especially in the Data Management Protocols (Section 3).

9.2.1 Additional Data Rules

The following additional data rules will be enforced when submitted data to the corporate database. These rules are not enforced during editing or mobile data collection.

- If CULV_SHAPE = 'Other', Comments must not be null (error).
- If DAMAGE_OTHER = 'Y', Comments must not be null (error).
- If DITCH_RELIEF = 'N', then OUTLET_DROP_FT is required (error).
- If OUTLET_DROP_FT > 0, then PLG_POOL_LEN_FT is required (error).
- If OUTLET_DROP_FT > 0, then PLG_POOL_MAX_DEPTH_FT is required (error).
- If OUTLET_DROP_FT > 0, then PLG_POOL_SCOUR_WIDTH_FT is required (error).
- If DITCH_RELIEF = N, then BKF_WIDTH_FT is required (error).
- If ROADNUM is null (warning).
- If ROUTESEG is null (warning).
- If BKF_WIDTH_FT = -1 (warning).

9.2.2 Removed Culverts

When a culvert is removed, there may be a need to retain the feature for historic purposes. Those include:

- WETS reporting. For a feature to be reported to the WETS system as a culvert removal, the feature must exist in the Structures layer. Deleting the Structure point would make it impossible to include the record in WETS. Once the feature has been recorded in WETS, the culvert may be removed from the Structures layer.
- District needs on a case-by-case basis.

To retain a Culvert record in the GIS data after the Culvert has been removed, edit the parent Structure point record, and set the CURRENT value = "H" (Historic).

10 Abbreviations and Acronyms

Does not include abbreviations/acronyms used as codes for data attributes or domain values.

Table 3 Abbreviations/Acronyms Used

Abbreviations	Descriptions
ARC	GIS line feature
AGOL	ArcGIS Online
BLM	Bureau of Land Management, U.S. Department of the Interior
CADNSDI	Cadastral National Spatial Data Infrastructure
DEM	Digital Elevation Model
DLG	Digital Line Graphs
FOIA	Freedom of Information Act
FPB	Fish Passage Barriers
GIS	Geographic Information System
GPS	Global Positioning System
GTRN	Ground Transportation GIS dataset
IDP	Interdisciplinary
NAD	North American Datum
NARA	National Archives and Records Administration
NEPA	National Environmental Policy Act
POLY	GIS polygon feature
PUB	Publication
RMP	Resource Management Plan
ODF	Oregon Data Framework
OR/WA	Oregon/Washington BLM Administrative State
USFS	United States Forest Service, U.S. Department of Agriculture
USGS	United States Geological Survey, U.S. Department of the Interior
SDE	Spatial Database Engine
WEB	Worldwide Web (internet)
WODDB	Western Oregon Digital Database

A Domains (Valid Values)

These are the domains at the time the data standard was approved. Domains can be changed without a re-issue of the data standard. Current domains are found on the internal OR/WA SharePoint data management page. Some of the domains used in this data standard are also available at the following web site: http://www.blm.gov/or/datamanagement/index.php

For domains not listed at that site contact: contact the State Data Administrator.

A.1 dom_CULV_DEBRIS

Culvert Debris Blocked Code. Indicates if the culvert has debris that is lodged inside the culvert or substantially reducing the end area at the inlet. Codes are in logical order and are aligned to BLM Handbook H-9113-2 Roads Inventory and Condition Assessment Guidance and Instructions.

Code	Description
Clear	Clear - No debris blockage
<1/4 full	<1/4 full
1/4 to 1/2 full	1/4 to 1/2 full
>1/2 full	>1/2 full
Buried	Buried - Completely full and blocked

A.2 dom_CULV_DWNSPT_TYPE

Culvert Downspout Type Code. Type of downspout.

Code	Description
Flume	Flume
Full Round	Full Round
Half Round	Half Round
None	None

A.3 dom_CULV_FILL_EROSION

Culvert Fill Erosion Code. Indicates if there is erosion of roadbed fill caused by the size, skew, or condition of the culvert. Codes are in logical order.

Code	Description
Inlet Erosion	Inlet Erosion
Outlet Erosion	Outlet Erosion
Both	Both

A.4 dom_CULV_MATERIAL

Culvert Material Code. Materials used to create the culvert. Codes are in logical order.

Code	Description
CMP	CMP - Corrugated Metal Pipe
HDPE	HDPE - High-density Polyethylene Pipe. This is flexible, corrugated plastic pipe that comes in two types: Type S (double-walled with corrugated outside wall and smooth inside wall) and Type C (single corrugated wall).
RCP	RCP - Reinforced Concrete Pipe
Wood	Wood - Log culverts
Other	Other - Describe in comments

A.5 dom_CULV_REP_PRI

Culvert Replacement Priority Code. The priority for replacing the culvert. Codes are in logical order.

Code	Description
Failed	Failed - Culvert has failed, replacement or removal is urgent.
High	High - Culvert is in poor condition and requires repair or replacement as soon as possible.
Medium	Medium - Culvert is in poor condition and will require replacement or repair soon.
Low	Low - Culvert is in fair condition and is not in need of immediate replacement.
None	None - Culvert is in good condition and does not need replacement.

A.6 dom_CULV_RUSTED_OUT

Culvert Rusted Out Code. Code to quantify the amount of rust present on the culvert. Codes are in logical order.

Code	Description
Light Rust	Light Rust - just starting to discolor
Moderate Rust	Moderate Rust - beginning to build up or flakes are developing
Heavy Rust	Heavy Rust - buildup and flaking throughout the rusted area
Rusted Through	Rusted Through - holes or cracking developed and water lost
None	None - no rust present

A.7 dom_CULV_SHAPE

Culvert Shape Code. Code to describe the shape of the cross-section or end area of the culvert. Codes are in logical order.

Code	Description
Arch	Arch - Circular in shape, only a half-circle. Generally bottomless and can be used to provide a natural stream bottom where the stream bottom is naturally erosion resistant. Structure will sit on footings.
Box	Box - Rectangular in shape and have an integral floor.

Code	Description
Horizontal Elliptical	Horizontal Elliptical - Ellipse shape with the width greater than the height. Used for shallow fill or headroom situations, and when a wider section is desirable during low flows. Vertical Elliptical is also available.
Pipe Arch	Pipe Arch - Horizontal ellipse with a radius that is larger for the bottom piece than for the top piece, leaving the bottom piece flatter. The corner plate radii are sharp and located towards the bottom third of the pipes cross-sectional area, where the top and bottom pieces meet. Used for shallow fill or headroom situations, and when a wider section is desirable during low flows.
Round (circular) Pipe	Round (circular) Pipe - Circular in shape. The most common shape. Hydraulically and structurally efficient in most conditions. May cause some reduction in stream width during low flows. May be more prone to clogging or plugging.
Other	Other - Describe in comments

A.8 dom_YN

Yes/No Flag. Standard OR/WA BLM Yes/No flag domain.

Code	Description
Y	Yes
N	No
U	Unknown