Hawai‘i State Historic Preservation Division

*Standards and Guidance for the Creation of Cultural Resources Geospatial Data (*Version 1.1.1*)*

Executive Summary:

The State Historic Preservation Division (hereafter referred to as “SHPD”) has established standards and guidelines for the submission of cultural resources GIS data. These standards have been developed in conjunction with the National Park Service. These standards meet cultural resource spatial data transfer standards established by the Cultural Resources Subcommittee of the National Park Service GIS Council (hereafter referred to as “the Cultural Resources Subcommittee”).

As a spatial data transfer standard, the cultural resource standards only address the spatial representation of cultural resources, accuracy of data and feature level metadata which describes how each of the spatial entities was created. The standards do not address descriptive information already captured in existing SHPD cultural resource databases.

The standards do establish a series of 25 data layers, based on National Register of Historic Places cultural resource types as well as 3 data layers addressing burial sites, which are usually subsumed within archaeology outside of Hawai‘i. In addition to the data layers, the standards include 28 fields of feature level metadata to describe the geographic parameters of each feature. To accompany the standards themselves a data model, in the form of a Geodatabase, has been created to assist users in complying with the standards, providing a platform for agencies and firms to quickly migrate data into the standards to accommodate data sharing. It should be noted that the standards do not establish an inventory of historic properties, as mandated by both federal and state law, but displays locational information for cultural resources, metadata about the locational information, and provide a means of connecting to tabular data visually and geographically. As of the writing of this document, a new State Inventory of Historic Properties (hereafter referred to as “SIHP”) database is under development. Upon completion of the database, it is expected that the Geodatabase will readily integrate with the SIHP database containing tabular, descriptive information.

By establishing a data standard, integrating incoming data, and migrating legacy data into the standard, users of the Geodatabase can better assess the distribution and nature of cultural resources throughout the State. This tool will provide increased support and capacity as SHPD and other agencies work to meet their State and Federal mandates.

Versioning:

As GIS is a rapidly changing and expanding technology, it is expected that both these standards and the Geodatabase will change and evolve over time. Therefore it is important to version both this document and the corresponding Geodatabase. The format for versioning will be: *x.y.z*. The first number ('x') will be reserved for substantial changes or re-development. The second number ('y') will correspond to minor tweaks and updates to the current version. Both 'x' and 'y' will match the Geodatabase so that it is evident if a particular Guidance document corresponds with the appropriate version of the Cultural Resources Geodatabase. Finally, the third number ('z') will be reflected in this document *only*. This will be utilized for events such as minor grammatical edits or wording changes which do not affect the structure of the Geodatabase or standards defined, but do, technically, produce a new version of the document.

Versioning will be reflected in both the filename and any corresponding metadata.

Version History:

1.1.1:

- Clarified who these guidelines apply to in order to include compliance activities
- Added Section 304 as an example of laws governing data availability
- Clarified that the Burial Buffer Polygon corresponds to an official determination

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Cultural Resource Spatial Data Standards Introduction:

The State of Hawai`i is comprised of a complex, multivariate fabric of cultural resources. As stewards of this heritage, the appropriate way to manage and protect these resources is through a comprehensive overview of all resources paired with accurate locational information. Throughout the field of historic preservation, accurate locational data remains a fundamental component to understanding cultural resources. Examining resources in a geographic context allows preservationists to study the interaction of those resources and to identify larger trends across landscapes. Using technological tools such as Geographic Information Systems (GIS) to better manage and protect our cultural resources is, therefore, increasingly critical. With the implementation of such systems, however, comes the need for improved data management, which in turn necessitates the development of standardized elements to facilitate data sharing and dissemination.

Geospatial technology facilitates a more comprehensive and systematic way of visualizing resources than has been available in the past. Through GIS, cultural resource managers can better understand how past human activity has shaped, constructed, and built upon and in our environment. Beyond simple understanding, cultural resource managers are empowered to enact, to protect, and to preserve, the cultural resources for our future generations.

However, current data is derived from many non-standardized data sets developed throughout time using differing methodologies and approaches. These perspectives are important to preserve and maintain, however geography can integrate these disparate databases by using one location to reference multiple sources of descriptive information. To accomplish this efficiently and effectively, locational data must be standardized to ensure consistency and quality.

The majority of existing cultural resource databases allow for the inclusion of coordinate pairs, however these are often fields where data entry is not required. Over time, guidelines regarding what kind of locational information to collect, how to collect that information or what level of detail that information should take have not been consistently implemented. Providing a foundation for the creation of true spatial data (points, lines, polygons), and a standardized method of documenting where that data originated, how it originated and how it can be used, allows all cultural resource specialists throughout the State of Hawai‘i to share data more effectively and use that data for planning, compliance as well as protection of these important resources.

Definition of a Spatial Data Transfer Standard:

Spatial data transfer standards focus on reporting what the data contains. These types of standards do not address descriptive information about the subject matter represented as points, lines or polygons, but do address documentation of where the data was created, who created it, and how it was created, enabling others to use the data more effectively. The format of a data transfer standard is designed to support blind transfer of data between different hardware and software platforms without losing data. The standards

additionally support the inclusion of legacy data, which is found in a variety of formats, by describing what is known and not known about the accuracy and constraints of the data. These types of standards do not replace databases already in use.

Purpose and Benefit of Using the Standards:

The purpose of creating and utilizing such cultural resource spatial data standards is to consolidate our spatial representations of resources and integrate this data with the existing descriptive attribute databases. Creating a foundation of accurate locations, based on agreed upon methods of spatially representing cultural resources, which can then be associated with any existing database will significantly enhance our collective ability to manage and share cultural resource data in a meaningful way. Additionally, by using a data transfer standard we can better document the origins of our spatial data to insure the data is used appropriately.

The standards will help to insure spatial data consistency, quality and accuracy so that users can be confident in incorporating cultural resource data in any application they may need. By using location as a way of linking external, existing descriptive databases together, the standards also allow users to explore all facets of a cultural resource in ways that are not currently possible. Visualizing trends in cultural resource data geographically through a GIS and accessing all available descriptive information at the same time, without needing to physically combine databases creates a powerful cultural resource management tool. In this way, planners, resource managers, firms and cultural resource specialists can bring all of the various perspectives which may relate to a single cultural resource together via a GIS, enabling them to visualize trends and explore how resources of different types may relate to each other and their contexts.

Ultimately, use of the cultural resource standards will lead to more comprehensive access to all of our available cultural resource data and provide a more integrated approach to cultural resource data management across the State of Hawai‘i. The use of feature level metadata as the primary focus of the standards records the lineage of our current as well as legacy cultural resource data, ensuring it can be used appropriately for applications such as Chapter 6E, Section 106, Section 110, daily resource management and preservation, or integration with other agencies and firms. Establishing one location for a resource that can be shared reduces redundancy and clarifies the cultural resource data as a whole, verifying that everyone accessing the data is indeed referring to the right resource at the right location.

As cultural resource specialists and managers gradually move their legacy data into the standard and begin to collect new data in the standard, it will eventually allow a more comprehensive understanding of all known resources in the State of Hawai‘i. As the dataset becomes more complete and data distribution practices become defined, organizations and agencies would have access to a single authoritative data source, insuring that the data is always current, accurate and the best available. This type of data set (with restrictions applied) could be made available to the public, other State and Federal agencies or researchers.

Contents of the Cultural Resources Spatial Data Standards:

In order to accommodate the needs of cultural resource managers and gain the most benefit from integrating cultural resource data, the cultural resource spatial data standards address two aspects of cultural resource data: the lineage of the data (feature level metadata) and the physical parameters of the spatial data. Metadata, often referred to as, "data about your data," records necessary information that describes where the data originated, how it originated, who created it and other critical information needed to assess whether the data is appropriate for any one specific task. The physical parameters of the spatial data include items such as coordinate system, datum, and level of accuracy to insure that data can be shared, integrated and combined into a single spatial data layer if necessary.

The FGDC requires all Federal agencies to complete data set metadata for any spatial data layer that they produce and share. This data set metadata describes the data layer as a whole, its source, persons to contact about distribution, the overall accuracy of all features contained within the data layer and the physical parameters of the data set such as coordinate system or datum. The cultural resource spatial data standards focus on feature level metadata. Because cultural resource specialists have been collecting spatial data for their resources for many years, using many different methods, documenting how each of those various features was created becomes important when combining all the cultural resource spatial data together within a single database. For instance, the Historic American Buildings Survey has collected coordinate pairs for many of the resources it has documented beginning in the 1930s. Some of this data takes the form of latitude/longitude coordinates, some takes the form of UTM coordinates, some UTM coordinates are based on the North American Datum of 1927 and some on the North American Datum of 1983. To create a single data layer of all HABS documented sites, all of these parameters must be documented and reconciled.

Further, because cultural resource specialists use many methods of collecting spatial data for their resources, the existing spatial data may reflect multiple levels of accuracy. For instance, a UTM coordinate collected for an archaeological site, based on a USGS topographic quadrangle map will be significantly less accurate than a UTM coordinate generated from a GPS unit. Additionally, different GPS units reflect different levels of accuracy, some being accurate to 30 meters and some as accurate as a single meter. When integrating our cultural resource data together, it is critical for the data users to understand the origins of this data, the methods used to create this data and consequently what the appropriate use of the data may be.

Although the cultural resource spatial data standards focus primarily on this type of feature level metadata, the standards do also address several key data content/parameter issues which will enable users to share, integrate and combine data together in a useful way. Primary among these content issues is the need to create cultural resource spatial data. Currently, collecting and creating spatial data (points, lines or polygons) to represent cultural resources beyond coordinate pairs is not required by SHPD. In order for planners and cultural resource managers to have useful tools to protect and steward our cultural resources within the State of Hawai‘i, we must have a complete picture of the resources for which SHPD is responsible. For instance, this would include resources that contribute to a larger landscape or historic district, or even the multiple loci of a single archaeological site.

Other content issues relate to the relative accuracy of the spatial data created and incorporated into the cultural resource spatial data layers themselves. In order to capture the best possible data to spatially represent cultural resource locations, new data should be created with the most accurate tools available, whether that means GPS, digitizing from aerial photographs or the use of total stations tied to GPS. Cultural resource specialists may never be able to improve upon the accuracy of legacy data collected via other less accurate methods, particularly if the resources no longer exist, however seeking out the most accurate means to collect new data insures that the quality of our cultural resource data will only improve over time, thus our analysis will improve and the range of tasks we can use the data with will grow.

The cultural resource standards similarly address the parameters of the data itself, insuring that should cultural resource specialists choose to share data or combine their data with other parks and regions this can be accomplished easily. Currently, SHPD collects coordinate pairs that can be converted into a point location and displayed in a GIS. These coordinate pairs most commonly take the form of UTM locations. These UTM coordinates are divided into zones that span across the globe. The eight main Hawaiian Islands fall within two separate UTM zones, and all Hawaiian Islands, including the Northwestern Hawaiian Islands extend through 5 UTM zones. This prevents the points from all zones to be easily displayed in a GIS at the same time. As a result visualizing and analyzing data from multiple UTM zones in a single dataset can be complicated. To avoid such issues, the cultural resource standards establish a common coordinate system that will allow cultural resource specialists to combine data from anywhere on the globe: decimal degrees (or geographic), with a WGS84 datum. This does not prevent local users from continuing to maintain their data in UTM or project it in a different datum/epoch, such as NAD83 (PA11), however it provides a common platform to share or combine data when necessary.

Who the Cultural Resource Standards Apply To:

If the goal of creating the cultural resource spatial data standards is to promote the sharing of more accurate, reliable and authoritative cultural resource spatial data for the purposes of resource stewardship within the State of Hawai‘i, then the standards apply to anyone creating or collecting cultural resource data during the course of State or Federally funded cultural resource management activities or in the process of complying with State or Federal historic preservation laws. At present, those identifying cultural resources are only required to provide a coordinate pair without descriptive information on how it was derived. In the future, individuals and firms will be required to adhere to these standards. Additionally, as previously identified sites without spatial information are encountered during the course of processes, such as review and compliance or preservation planning, it will be strongly encouraged that spatial data conforming to these standards is developed.

In general, the cultural resource spatial data standards serve as a platform that will accept legacy data and can be built upon with newly collected or created cultural resource data. Cultural resource specialists can reasonably expect that data related to specific projects, regular inventory, Section 106, Chapter 6E, etc., will be shared across the various disciplines within SHPD, between other State agencies, and beyond. As a result, cultural resource specialists should make every effort to create spatial data that meets the standards to enable sharing of this information. SHPD will assist cultural resource specialists in achieving this goal.

Centralization of Cultural Resource Spatial Data:

While it is expected that agencies, firms, and organizations will maintain their own internal datasets, SHPD will be responsible for maintaining and aggregating cultural resources spatial data for all known cultural resources in the State of Hawai‘i as a centralize dataset. Having a centralized dataset ensures a comprehensive repository and single-source for spatial data pertaining to cultural resources. The development of a centralized cultural resource spatial data repository is not intended to monopolize ownership of this knowledge, rather, it is meant to provide a resource to the public and add capacity to cultural resource management. As such, SHPD will seek to make the data as accessible as possible, while conforming to State and Federal law, such as Section 304 of the National Historic Preservation Act.

Organization of the Cultural Resource Spatial Data Standards:

Within the State Government of Hawai‘i, Environmental Systems Research Institute (ESRI) products remain the standard for GIS and spatial data. ESRI allows several different file types for spatial data ranging from shapefiles (the most common) to Geodatabases (the most recent). To accommodate the various methods that agencies, firms, and organizations may already be using to create and store cultural resource spatial data, the standards have been organized around individual data layers, rather than a particular file type. These data layers would translate into a single shapefile for instance. Gathered together they could form a Geodatabase (see the discussion of the implementation data model below).

The Cultural Resource Subcommittee felt the best way to organize these various data layers and express their unique needs was to separate them by cultural resource type, as defined by the National Register of Historic Places, then by spatial feature type (point, line and polygon).

Organized in this way, cultural resource specialists in a specific discipline can focus on their specific data layers, rather than working with all cultural resources should they choose to do so. However, cultural resource managers or planners who wish to view all of the cultural resources can view the various data layers together via a GIS, yet distinguish the cultural resource types visually.

The Geodatabase is divided into 10 cultural resource types. Seven cultural resource types are derived from National Register of Historic Places cultural resource types; landscapes and ethnographic features are included as additionally useful resource types; survey areas, while not a resource type, are important to visualize in the context of known resources; and the tenth cultural resource type, “Burial,” is a unique resource classification meant to address specific, unique needs. The cultural resource types and spatial data types include:

Historic Building Point or Polygon

Historic buildings are a resource created principally to shelter any form of human activity, such as a house. These resources would include features such as: farmhouses, homesites, mansions, churches, museums (if the building is historic), courthouses, offices, prisons, train depots, etc.

Historic buildings most often function primarily as dwellings. The point may represent the center of the building, an entrance, a corner, etc., while the polygon may represent the building footprint.

Historic Structure Point, Line or Polygon

Structures are a functional construction made for purposes other than creating shelter, such as a bridge. These resources would include features such as: fortifications, earthworks, roads, fences, canals, dams, engineering features, barns, outbuildings, arsenals, ships, manufacturing facilities, etc. These resources represent sites that do not function primarily as dwellings, however they may serve temporarily to house humans, although their primarily purpose is not a permanent shelter. The point may represent the location of a culvert, while a line may represent a fence or road, and a polygon may represent the circumscribed boundary of a manufacturing plant.

Historic Object Point, Line or Polygon

Historic objects are a construction primarily artistic in nature or relatively small in scale and simply constructed, such as a statue or mile-post marker. These resources would include features such as monuments to individuals, individual tombs, etc. The point may represent a single survey marker, while a line may represent an element of a memorial or a decorative landscape element and a polygon may represent the boundary of a large memorial element, such as a plaza.

Archaeological Site Point, Line or Polygon

Archaeological sites are resources that have yielded or may be likely to yield information important to prehistory or history. These resources lie primarily below ground, but may have some above ground evidence indicating the presence of the potential to yield more information. These resources may include features such as: ruins of a building, the location of where a historic building, structure, or landscape may have once been. These resources represent the site of an event or the location of a resource which may have archaeological value. The point may represent a randomized point inside the archaeological site boundary, while a line may represent the excavated remains of a wall, and a polygon may represent the known extent of an archaeological site.

Ethnographic Resource Point, Line or Polygon

Ethnographic resources are landscapes, objects, plants and animals, or sites and structures that are important to a people's sense of purpose or way of life. These resources represent features understood from the viewpoint of peoples or groups for which they have a special importance. Ethnographic resources would include features such as traditional cultural properties, sacred sites, etc. These are resources primarily significant because of their association with a community's set of beliefs and they may not necessarily be historic in terms of age. A point may represent a significant petroglyph, while a line may represent an important trail, and a polygon may represent the boundary of a sacred site.

Cultural Landscape Polygon

Cultural landscapes are a geographic area (including both cultural and natural resources and the wildlife or domestic animals therein), associated with a historic event, activity, or person exhibiting other cultural or aesthetic values. These resources would include features such as: a plantation, an historic trail, a historic park or preserve, designed landscapes (formal gardens), vernacular landscapes (mill site and associated features), battlefields, cemeteries, rural historic districts, prison camps, mooring locations, etc. These resources have contributing elements which may consist of built or natural features. The polygon should represent the larger cultural landscape boundary itself. Contributing elements to the larger cultural landscape should be included in the appropriate data layer for each element: historic building, historic structure, archaeological site, or ethnographic resource. If a contributing element to a landscape does not fit within these defined cultural resource type categories, they can be included in the Other Cultural Resource data layers, with the specification of what type of feature they represent recorded.

Historic District Polygon

Historic districts are a significant concentration, linkage, or continuity of sites, buildings, structures or objects united historically or aesthetically by plan or physical development. These resources may represent a local urban historic district within a city containing buildings related to a similar theme (such

as commerce, manufacturing, college campus, etc.), or they may represent a rural area containing a series of plantations all from the same era that provide a representative example of typical residences in an area. A Historic District may also contain a series of archaeological sites or other resource types which exhibit some significant connection. The polygon represents the boundary of the district itself, encompassing all of the various contributing elements. Contributing elements to the district should be included in the appropriate data layer for each element: historic building, historic structure, archaeological site, or ethnographic resource. If a contributing element to a district does not fit within these defined cultural resource type categories, they can be included in the Other Cultural Resource data layers, with the specification of what type of feature they represent recorded.

Survey Point, Line or Polygon

A survey does not necessarily represent a cultural resource, but an area within which qualified individuals have made observations to locate cultural resources. These investigations may be undertaken as part of a specific project, in support of compliance with various historic preservation laws, or at the request of another agency, etc. The point may represent a generalized area within which searches were conducted or something as specific as a shovel test pit. While the line may represent a transect along which survey was conducted. The polygon represents a defined area within which survey was conducted.

Other Cultural Resource Point, Line or Polygon

Other Cultural Resources represent those features which do not fit easily into the defined cultural resource categories of historic building, structure, object, site or ethnographic resource. These include primarily elements which contribute to cultural landscapes. One contributing element of a landscape may include historic vegetation, such as an historic tree, a tree alee, a garden bed or parterre, etc. The point may represent a single tree, while a line may represent a tree alee and a polygon may represent a garden boundary. A Type field associated with the Other Cultural Resource data layers allows users to define more specifically what each feature is whether vegetation, water features or some other cultural resource.

Burial Point or Polygon

Burial sites receive additional protection in the State of Hawai‘i beyond that mandated by federal law. While burial sites are normally subsumed within archeology elsewhere, these site types hold significant meaning and value and are accorded special protection. Additionally, there is an extra level of cultural sensitivity connected to this resource type beyond that of other site types. A point may represent the location of a burial, reinterment site, or original location of reinterred remains. A polygon may represent the location of a burial, reinterment site, original location of reinterred remains, or a cluster of associated burials.

Burial Buffer Polygon

Part of the extra level of protection for burials on the State of Hawai‘i is frequently the establishment of a defined buffer zone around the burial within which ground-disturbing activities should not occur. The burial buffer polygon represents this buffer. The Burial Buffer should correspond to an official determination made either by SHPD or the appropriate Burial Council.

The feature level metadata fields associated with the Archaeology Site, Ethnographic Resource, Historic Building, Historic Object, Historic Structure, Historic District and Cultural Landscape data layers consist of:

CR_ID
SURVEY_ID
GEOM_ID
RESNAME
SIHP_ID
feat_cl
CR_NOTES
BND_TYPE
BND_OTHER
IS_EXTANT
EXTANT_OTH
CONTRIBRES
RESTRICT_
SOURCE
SRC_DATE
SRC_SCALE
SRC_ACCU
VERT_ERROR
SOURCE_COORD
MAP_METHOD
MAP_MTH_OT
CREATEDATE
EDIT_DATE
EDIT_BY
ORIGINATOR
CONSTRAINT
ISLAND
UW_Flg

The feature level metadata fields associated with the Cultural Resource Other data layers consist of (those in italics represent those specific to the Other data layers):

CR_ID
SURVEY_ID
GEOM_ID
RESNAME
SIHP_ID
feat_cl
CR_NOTES
BND_TYPE
BND_OTHER
IS_EXTANT
EXTANT_OTH
TYPE
TYPE_OTR
CONTRIBRES
RESTRICT_
SOURCE
SRC_DATE
SRC_SCALE
SRC_ACCU
VERT_ERROR
SOURCE_COORD
MAP_METHOD
MAP_MTH_OT
CREATEDATE
EDIT_DATE
EDIT_BY
ORIGINATOR
CONSTRAINT
ISLAND
UW_Flg

The feature level metadata fields associated with the Cultural Resource Survey data layers consist of (those in italics represent those specific to the Survey data layers):

SURVEY_ID	*BND_OTHER*	*EDIT_DATE*
GEOM_ID	*RESTRICT_*	*EDIT_BY*
RESNAME	*SOURCE*	*ORIGINATOR*
feat_cl	*SRC_DATE*	*CONSTRAINT*
CR_NOTES	*SRC_SCALE*	*ISLAND*
SRVY_TYPE	*SRC_ACCU*	*UW_Flg*
TYPE_OTHER	*VERT_ERROR*	
SRVY_LEVEL	*SOURCE_COORD*	
LEVEL_OTH	*MAP_METHOD*	
SRVY_MTHD	*MAP_MTH_OT*	
BND_TYPE	*CREATEDATE*	

Although the field names may seem abstract, in order to accommodate the ability to share data across any type of spatial data file type, the field names may not contain any blank spaces and must be kept to 10 characters or less. As a result, some of the field names represent abbreviations to fit these parameters. In order to make the field names and meanings more clear, the Cultural Resource Subcommittee assigned an "alias" to each field name. As a result, when viewing the attribute tables in the GIS, users will not see, "CR_ID," but will see, "Cultural Resource GUID." Additionally, some fields represent *mandatory* information, some *mandatory if applicable* and some *optional*. Ultimately, filling in all information in all of the fields would provide the most complete documentation of our cultural resource spatial data, however to comply with the standards users must input data only in the required fields.

The Cultural Resource Subcommittee designed each of the feature level metadata fields to contain specific information to assist those who might use the spatial data in understanding how the spatial data was originally created, when it was created, whether it has been edited, whether the spatial data is restricted, etc. Detailed definitions describing what the Subcommittee intended for each field, definitions of any menu or domain values and examples of what should be entered for these fields should provide help in migrating legacy data as well as incorporating new cultural resource data into any of the various data layers.

Standard fields and definitions for the Archaeology Site, Ethnographic Resource, Historic Building, Historic Object, Historic Structure, Historic District and Cultural Landscape data layers:

- CR_ID (Mandatory)
  Alias: Cultural Resource GUID

The CR_ID represents a unique identifier for the cultural resource which takes the form of a "globally unique identifier (GUID)." A globally unique identifier is a 38 character alpha/numeric randomly generated identifier commonly used in database development. Generated via a Microsoft application, the length and variation in the identifier virtually guarantees its uniqueness helping to insure that each one of the cultural resources in any of the data layers will have at least one ID that does not repeat and can be used to link to any other external SHPD database. The CR_ID does not replace existing identifiers in any of the existing SHPD databases and the CR_ID does not need to be added to any of the existing SHPD databases. The implementation model described in this documentation allows users to take advantage of the spatial representations of cultural resources, using the geography itself to crosswalk between the SHPD databases. In order to accomplish this, a single unique identifier must be assigned for each point, line or polygon used to represent a cultural resource. This guidance document contains information regarding methods of generating these GUIDs automatically (see the implementation model discussion below).

Example of a GUID:

{53D8A74E-AD5A-460A-BA71-D79CE2641AAA}

- SURVEY_ID (Mandatory if Applicable)
  Alias: Survey GUID

The SURVEY_ID represents a unique identifier for the survey through which the cultural resource represented was identified. Similar to the CR_ID, the SURVEY_ID takes the form of a GUID. Because SHPD does not maintain a central database of the various surveys conducted within the parks, entering information into this field is mandatory only if applicable. The CR_ID is intended as a means to link to survey information maintained elsewhere or to identify resources surveyed as part of the same survey. Additionally, assigning an identifier to a survey will allow users to link individual cultural resources to the cultural resource survey data layers. The same methods employed to generate the CR_ID GUID can be used to create the SURVEY_ID.

Example of a GUID:

{37D1B949-ABCB-4C5E-A21E-1033606CD200}

- GEOM_ID (Mandatory)
  Alias: Locational GUID

The GEOM_ID (Geometry ID) represents a unique identifier for the geometry (point, line or polygon) describing the cultural resource in the data layer. Similar to the CR_ID and SURVEY_ID, the GEOM_ID takes the form of a GUID. The primary reason for assigning a geometry ID is to allow for the potential that a single cultural resource may have multiple spatial representations. For instance, a historic building may be represented by a point for the building entrance or as a polygon to describe the building footprint. In these cases, the building point and polygon would have the same CR_ID but two different GEOM_IDs. In the GIS, a user would be able to determine quickly that these two geographic features refer to the same cultural resource. Because maintaining this connection is crucial to understanding what cultural resource spatial data exists to represent a resource, and determining what data may best fit your specific analysis or application, filling in the GEOM_ID field is mandatory.

Example of a GUID:

{17432F80-794D-4DD9-819E-8A8893334A12}

- RESNAME (Optional)
  Alias: Resource Name

The RESNAME field allows users to enter an historic name or site name for the cultural resource. Although the standards are not intended to address descriptive data, the Cultural Resource Subcommittee felt that there should be some way to identify a cultural resource using something other than a GUID that may be difficult to decipher or more familiar to resource specialists. Because any one cultural resource may be known by multiple names or identities, entering information into this field is optional. The RESNAME field is free text (no domain values) with space for 250 characters, therefore it could contain anything from a building name or address to a Smithsonian trinomial number for an archaeological site.

Example:

Fishing shrine, Possible heiau, Fort Barrette, Kamehameha Statue

- SIHP_ID (Optional)
  Alias: SIHP ID

The SIHP_ID field allows users to enter a State Inventory of Historic Properties site number, if the number is known. The full site number should be used. The SIHP_ID field is free text (no domain values) with space for 30 characters.

Example:

50-80-10-00324

- feat_cl (Mandatory)

  Alias: Feature Class

The Feature Class field allows users to select the appropriate feature class from the feature class types defined above. While this may appear redundant, this is included to allow a greater level of self-evidence for particular shapes. Exporting or incorporating data in a non-Geodatabase format is better facilitated by additionally including this as a separate field. The RESNAME field is free text (no domain values) with space for 250 characters, therefore it could contain anything from a building name or address to a Smithsonian trinomial number for an archaeological site. Users should select one of the values to describe the feature class.

Example:

Archaeology Point, Landscape Polygon

- BND_TYPE (Mandatory)
  Alias: Boundary Type

The BND_TYPE field is intended to allow users to indicate what the spatial data represents relative to the cultural resource. For instance, users may describe whether a point location for a building represents the entrance, the center of the building or a corner of the building. Similarly, with polygon features, users may describe whether the area represents a circumscribed boundary, a buffered boundary, etc. In order to insure consistency in entering data and articulating what the spatial data depicts, the Cultural Resource Subcommittee developed menus or domain values for the Boundary Type field. However, because the type of cultural resource and the type of spatial feature determine what the boundary type may be, different menus apply to different data layers. Users should select one of the values to describe the boundary represented by the spatial data.

Domain values for Archaeology Points:

Site datum point	The point data represents the site datum
Center point	The point data represents the center of the archaeological site
Vicinity point	The point data represents a user selected point in the vicinity of the site
Generalized point	The point data represents a computer generated generalized point based on site boundaries or other data
Random point	The point data represents a user selected or computer generated point randomly located on or near the archaeological site
Other point	The point data represents some other point on or near the site

Domain values for Building Points:

Entrance point	The point data represents the entrance of the building
Center point	The point data represents the center of the building footprint
Façade point	The point data represents a location on the façade of the building, other than the entrance
Corner point	The point data represents a corner of the building
Random point	The point data represents a user selected or computer generated point randomly located on or near the building
Generalized point	The point data represents a computer generated generalized point based on site boundaries or other data
Other point	The point data represents some other point near the building

Domain values for Building Polygons:

Footprint polygon	The polygon data represents the actual building footprint, at the foundation
Circumscribed polygon	The polygon data represents a general area including the building
Perimeter polygon	The polygon data represents a detailed perimeter of the building, including rooflines, porches or other features
Buffer polygon	The polygon data represents a computer generated area based on building points or another type of building polygon

Other polygon	The polygon data represents some other polygon area describing the building

Domain values for all line features:

Center line	The line data represents the center line of any linear cultural resource
Edge line	The line data represents the bounding edge of any linear cultural resource
Perimeter line	The line data represents a line beyond the exact edge of the linear cultural resource, at a specific distance
Random line	The line data represents a user selected or computer generated line on or near the linear cultural resource
Derived line	The line data represents a computer generated line based on another spatial representation of the linear cultural resource
Other line	The line data represents some other line describing the linear cultural resource

Domain values for all point features, other than Archaeology and Building Points:

Corner point	The point data represents a corner of the cultural resource
Center point	The point data represents the center of the cultural resource
Vicinity point	The point data represents a user selected point in the vicinity of the cultural resource
Random point	The point data represents a user selected or computer generated point randomly located on or near the cultural resource
Generalized point	The point data represents a computer generated generalized point based on the cultural resource boundaries or other data
Other point	The point data represents some other point on or near the cultural resource

Domain values for all polygon features, other than Building Polygons:

Derived polygon	The polygon data represents a computer generated polygon based on another spatial representation of the cultural resource
Circumscribed polygon	The polygon data represents a general boundary including the cultural

	resource
Perimeter polygon	The polygon data represents a detailed perimeter of the cultural resource
Buffer polygon	The polygon data represents a computer generated boundary describing a specified distance or buffer away from another spatial representation of the cultural resource
Other polygon	The polygon data represents some other polygon describing the cultural resource

- BND_OTHER (Mandatory if Applicable)
  Alias: Boundary Type Comment

The BND_OTHER field is intended to allow users to provide additional information related to the Boundary Type identified. Specifically, if users choose an Other Point, Other Line or Other Polygon menu value, they must enter some explanation of what the spatial data represents into the BND_OTHER field. Additionally, if users wish to provide more clarification related to the Boundary Type value chosen the BND_OTHER field can accommodate up to 250 characters of free text.

Example:

BND_TYPE value: Other point

BND_OTHER value: point represents location of building chimney, as seen on aerial image

BND_TYPE value: Corner point

BND_OTHER value: point represents the northwest corner of the building

- IS_EXTANT (Mandatory)
  Alias: Is Extant?

The IS_EXTANT field is intended to allow users to indicate if the cultural resource is currently extant. Some points, lines or polygons included in the cultural resource data layers may represent cultural resources identified, recorded or documented many years ago. For instance, the Historic American Buildings Survey has recorded locations of resources beginning in the 1930s. As a result, the cultural resource spatial data layers may include points, lines or polygons that represent features no longer in existence or only partially in existence following damage, disaster or some other change to its status. In order to insure consistency in data entry for the IS_EXTANT field, the Cultural Resource Subcommittee developed a menu, or domain, containing specific options to describe the resource condition.

Domain values for the IS_EXTANT field:

True	The cultural resource is intact with little disturbance
False	The cultural resource is no longer intact
Unknown	The condition/status of the cultural resource in not known
Partial	The cultural resource is partially extant (partially excavated or in a state of ruin)
Other	The cultural resource is in some other extant status

- EXTANT_OTH (Mandatory if Applicable)
  Alias: Is Extant Comment

The EXTANT_OTH field is intended to provide additional information related to the Extant status indicated in the IS_EXTANT field. Specifically, if users choose the Other menu value, they must enter some explanation of what condition or intact status of the cultural resource. Additionally, if users wish to provide more clarification related to the Extant value chosen the IS_EXTANT field can accommodate up to 250 characters of free text.

Example:

IS_EXTANT value: Other

EXTANT_OTH value: landscape feature suffered from flooding and is being restored

- CONTRIBRES (Mandatory)
  Alias: Contributing Resource Flag

The CONTRIBRES field is intended to allow users to indicate if the cultural resource represented contributes to a larger historic district (of any resource type) or historic landscape. The Cultural Resource Subcommittee included this field to provide a means for users to record contributing and non-contributing resources to larger districts or landscapes, as well as individually significant resources. Documenting the locations of both contributing and non-contributing resources can significantly aide resource management and protection, as well as Chapter 6E review and compliance, however locational information for non-contributing resources in particular is not consistently collected, therefore flagging these resources easily constitutes an important resource management tool. In order to ensure consistency in data entry for the CONTRIBRES field, the Cultural Resource Subcommittee developed a menu, or domain, containing specific options to describe the contributing status of individual resources.

Domain values for the CONTRIBRES field:

Yes	The cultural resource contributes to an historic district or landscape
No	The feature is a non-contributing element in an historic district or landscape
Not Applicable	The cultural resource does not contribute to an historic district or landscape, yet is historic or significant individually
Unknown	It is not possible to determine if the resource contributes to an historic district or landscape

- RESTRICT_ (Mandatory)
  Alias: Restriction

The RESTRICT_ field is intended to allow users to indicate if the spatial data related to a specific cultural resource should be restricted from release to other parties or general distribution. The Cultural Resource Subcommittee recognizes the sensitivity of cultural resource spatial data and the need to restrict its distribution to the general public. Currently, distribution of cultural resource locational data is primarily determined at the data set level. For instance, all archaeological data is restricted from release. The Cultural Resource Subcommittee acknowledged that a finer level of detail for restricting cultural resource data would be helpful for cultural resource managers, planners and others, resulting in the addition of a field to identify the specific restriction status for each cultural resource point, line or polygon. Providing more flexibility in the restriction status itself by establishing a menu or domain of options also insures consistency in data entry for the RESTRICT_ field. (Note: The RESTRICT_ field contains a trailing "_" character because the word "restrict" is a reserved word in database construction and cannot be used as a field name. Adding the "_" allows the word to be altered enough so that it can be used as a field name.)

Domain values for the RESTRICT_ field:

Unrestricted	There are no restrictions on the release or distribution of the spatial data for the cultural resource
Restricted: No third party release	The spatial data for the cultural resource is restricted to a limited distribution of the data requestor only
Restricted: Affected cultural group concurrence	The affected or affiliated cultural must concur before the cultural resource spatial data is distributed
Restricted: Originating agency concurrence	The originating agency that created the cultural resource spatial data must concur before the data is distributed

Restricted: No release	The spatial data associated with the cultural resource should not be released

- SOURCE (Mandatory)
  Alias: Source

The SOURCE field is intended to allow users to indicate or identify the source from which the point, line or polygon was derived. For instance, if the spatial data was created through a GPS survey, the source would be GPS. Other options might be the name of the image used in digitizing cultural resources or the name of the database tables from which coordinate pairs were used to create point features. The Cultural Resource Subcommittee felt that identifying the source of the geographic data would help cultural resource specialists assess the quality of the data and the utility of the data for specific tasks. Making the distinction between data derived from coordinate pairs in a database and data collected via GPS may directly address the accuracy of the data. Because users may generate points, lines and polygons from many different sources, particularly when working with legacy data, the SOURCE field has no menu or domain values and remains a free text field into which users can enter up to 250 characters. If the original source is not known, users may enter "Unknown" into the field.

Example:

Cultural Landscapes Inventory database

Example:

PA Map Program 2005 Color Orthophotos of PA

- SRC_DATE (Mandatory)
  Alias: Source Date

The SRC_DATE field is intended to allow users to record the date associated with the document, image, file or other data used to create the cultural resource spatial data, and identified in the SOURCE field. The Cultural Resource Subcommittee felt that indicating the date of the source was as important as identifying the source, as the date may provide clues as to the actual parameters of maps or images used to digitize points, lines or polygons. Because of the possible variations in the SOURCE field, the Cultural Resource Subcommittee did not develop a menu or domain for the SRC_DATE field, however the SRC_DATE field is formatted as a date field, as opposed to a text or number field. Date fields always take the form of month/day/year. If the date of the source data is not known, users may leave the field blank.

Example:

5/22/2008

- SRC_SCALE (Mandatory)
  Alias: Source Scale

The SRC_SCALE field is intended to allow users to record the original scale at which the cultural resource was mapped. For instance if a set of UTM coordinates was generated from a USGS quadrangle map, the scale would be 1:24,000. If the point, line or polygon was digitized from an aerial photograph, the resolution of the image (such as 1 foot per pixel) should be indicated. Note that data collected with GPS will not have a scale, but will have an accuracy (see the SRC_ACCU field) assessment. The Cultural Resource Subcommittee felt that because of the large array of possible sources for cultural resource points, lines and polygons used to generate spatial data, documenting the original scale of the source would provide important information to cultural resource specialists and other users of the data regarding the quality of the data and its potential utility for specific applications. If the scale of the source data is not known, users may enter "Unknown" into the field.

Example:

SOURCE: USGS 7.5 minute quadrangle

SRC_SCALE: 1:24,000

(note: users can find scale information for the various standardized USGS map products by looking at the map collar information, located in the border of the map)

SOURCE: GPS

SRC_SCALE: not applicable

- SRC_ACCU (Mandatory)
  Alias: Source Horizontal Accuracy

The SRC_ACCU field is intended to allow users to record the horizontal accuracy of the source data used to generate the spatial data. Like the SRC_SCALE, recording the Source Horizontal Accuracy provides important details regarding the quality of the cultural resource spatial data, which affects the possible uses of the data itself. Because of the variety of possible sources of data and possible scales, the SRC_ACCU field is also a free text field with no menu or domain values, which can hold up to 250 characters. Note that base maps commonly used by cultural resource specialists, such as USGS quadrangle maps, all have a standardized accuracy assessment, which can be found in the National Map Accuracy Standards. For

instance, a typical 7.5 minute USGS quadrangle map accuracy assessment is +/- 12 meters. Similarly, data collected with GPS will have an accuracy assessment related to the quality of the GPS unit used to collect the data, and may range from +/- 20 meters to +/- 1 meter depending on the data collection procedures. Additionally, many horizontal accuracy statements include information regarding the percentage of features on the map that may meet the accuracy. For instance a full map accuracy statement may take the form of a statement such as: +/- 12 meters for 90% of the points tested. If the accuracy of the source data is not known, users may enter "Unknown" into the field.

Example:

SOURCE: USGS quadrangle

SRC_SCALE: 1: 100,000

SRC_ACCU: +/- 50 meters

SOURCE: PA Map Program 2005 Color Orthophotos of PA

SRC_SCALE: 1 foot resolution per pixel

SRC_ACCU: 5 feet for 95% of check points

SOURCE: GPS

SRC_SCALE: not applicable

SRC_ACCU: +/- 3 meters

- VERT_ERROR (Mandatory if Applicable)
  Alias: Vertical Error

The VERT_ERROR field is intended to allow users to record the vertical error for geographic data collected or created in a 3-D format. In general legacy cultural resource data does not contain vertical or Z values, with the exception of some archaeological data. New data collected with GPS or other survey tools have the option of recording a Z value, although accuracy of this measure vary greatly in comparison to horizontal accuracy. If Z values are being collected, vertical error must be similarly documented with each spatial feature. In order to make data entry more consistent and efficient, a menu or domain of potential values to describe the vertical error associated with this type of 3-D data was developed. For cultural resource spatial data, where Z values are rarely collected, users can enter the, "Not Applicable," menu option or value.

Domain values for the VERT_ERROR field:

Unknown	The amount of vertical error is not known
Not Applicable	Vertical data was not collected, therefore vertical error is not applicable
>10 meters	Vertical error is greater than 10 meters
>5 meters <=10 meters	Vertical error is greater than 5 meters but less than or equal to 10 meters
>1 meter <= 5 meters	Vertical error is greater than 1 meter but less than or equal to 5 meters
>15 centimeters <=1 meter	Vertical error is greater than 15 centimeters but less than or equal to 1 meter
<= 15 centimeters	Vertical error is less than or equal to 15 centimeters

- SRC_COORD (Mandatory)
  Alias: Source Coordinate System

The SRC_COORD field is intended to allow users to record the coordinate system associated with the source data used to create the cultural resource point, line or polygon. Many of the SHPD cultural resource databases store coordinate pairs as locations. These coordinate pairs were generated from a source such as a USGS quadrangle map. Each of these map sources has a coordinate system, or map projection, associated with it. This critical information defines what form the coordinate pair numbers take and how they can be mapped or overlaid with data from other sources, such as GPS or aerial photographs. Recording these coordinate systems, and the associated datums that the coordinate systems are measured from is one of the most important aspects of the cultural resource spatial data standards, allowing data to be shared and used with other data types. For instance, the SIHP records at least one coordinate pair for each resource listed in the database. These coordinate pairs are based on the UTM coordinate system. Some are measured from the North American Datum established in 1927 while some are measured from the North American Datum established in 1983. If users map the locations collected based on the 1927 datum with the locations based on the 1983 datum without defining which locations came from each datum, the locations could be up to 200 meters off. Because of the variety of SOURCE options however, the Cultural Resource Subcommittee felt that no menu or domain values should be established. The SRC_COORD field is a free text field with up to 250 characters for users to describe the coordinate system and datum related to their source. If a user is unsure of the Source Coordinate System or datum, this information is often written in the collars or borders of standard quadrangle maps or stored in metadata files that are associated with aerial images and GPS data. If the coordinate system of the source data is not known, users may enter “Unknown” in the field.

Example:

SOURCE: USGS 7.5 minute quadrangle map

SRC_COORD: UTM zone 4 North, NAD83

SOURCE: PA Map Program 2005 Color Orthophotos of PA

SRC_COORD: PA State Plane, NAD83

SOURCE: GPS

SRC_COORD: Geographic, decimal degrees, NAD83

(Note: all GPS data is collected in decimal degrees, World Geodetic System 1984, however the GPS data can be exported from the GPS receiver in any number of coordinate systems. Be sure the coordinate system of the data, as it is exported, is recorded)

- MAP_METHOD (Mandatory)
  Alias: Map Method

The MAP_METHOD field is intended to allow users to indicate the method through which the cultural resource point, line or polygon was created or generated. The method used to create the spatial data will provide important information regarding the quality of the data and any potential applications the data could be incorporated into. In order to insure consistency of data entry, the Cultural Resource Subcommittee developed a menu or domain with a set of values to describe how the spatial data was created.

Domain values for the MAP_METHOD field:

Differential GPS	The spatial data was created via GPS and differentially corrected
Autonomous GPS	The spatial data was created via GPS and was not post-processed
Digitized	The spatial data was created by tracing or drawing features based on a base map or aerial photograph
Derived by XY event point or	The spatial data was computer generated from a table of X/Y coordinate pairs to create points, or computer generated to find a center point of a polygon

centroid generation	
Geo-coded	The spatial data was created by interpolating a location based on a street address
Total Station	The spatial data was created by using a geo-referenced survey grade total station
Theodolite	The spatial data was created by using a surveying instrument geo-referenced to real world coordinates
Other	The spatial data was created via some other method

- MAP_MTH_OT (Mandatory if Applicable)
  Alias: Map Method Comment

The MAP_MTH_OT field is intended to provide additional information related to the Map Method indicated in the MAP_METHOD field. Specifically, if users choose the Other menu value, they must enter some explanation of what method was used to create the point, line or polygon representing the cultural resource. Additionally, if users wish to provide more clarification related to the MAP_METHOD value chosen, the MAP_MTH_OT field can accommodate up to 250 characters of free text.

Example:

MAP_METHOD: Other

MAP_MTH_OT: point location generated via transit and geo-referenced with GPS

- CREATEDATE (Mandatory if Applicable)
  Alias: Creation Date

The CREATEDATE field is intended to allow users to enter the date the point, line or polygon was initially created. Because cultural resource specialists have generated spatial data through various means at different times, if the original creation date is not known, entering data into this field is mandatory only if applicable. The Cultural Resource Subcommittee did not develop a menu or domain for this field because of all the possible variations, however the field is configured as a date field, as opposed to a text or number field. Date fields always follow a month/day/year format.

Example:

9/10/2012

- EDIT_DATE (Mandatory if Applicable)
  Alias: Last Edit Date

The EDIT_DATE field is intended to allow users to enter the date the point, line or polygon was last edited or spatially modified. Because cultural resource specialists do not always revisit the spatial representations of their resources, an edit date subsequent to the Creation Date may not exist. In these cases the field may be left blank. The Cultural Resource Subcommittee did not develop a menu or domain for this field because of all the possible variations, however the field is configured as a date field, as opposed to a text or number field. Date fields always follow a month/day/year format.

Example:

9/10/2012

- EDIT_BY (Mandatory if Applicable)
  Alias: Edited By

The EDIT_BY field is intended to allow users to document the name of the individual who last edited the point, line or polygon, associated with the Last Edit Date. It is important to know who actually made the edits to the spatial data if users need to ask additional questions or get more information about the edits performed. If the data has not been edited since its original creation, this field may be left blank. The EDIT_BY field is a free text field to accommodate any text entry for the name of the editor.

Example:

EDIT_DATE: 9/10/2012

EDIT_BY: Nick Belluzzo

- ORIGINATOR (Mandatory)
  Alias: Originating Institution

The ORIGINATOR field is intended to allow users to document the institution which originally created the point, line or polygon feature. Because SHPD cultural resource data originates in many various places, such as within SHPD, State Parks, or firms, it is important to identify the originator if users need to understand more about the spatial data itself, it's creation process or any of its parameters. Individuals identified in the EDIT_BY field may no longer remain in the office which originally generated the data. This free text field will provide an additional point of contact.

Example:
State Historic Preservation Division

Example:
XYZ Archaeology Consultants

- CONSTRANT (Mandatory)
  Alias: Use Constraint

The CONSTRANT field is intended to allow users to identify the appropriate use of the point, line or polygon or indicate what issues may be relevant for other data users to understand about the spatial data itself and any information that would affect how the spatial data could or should be incorporated into GIS applications. Due to other parameters documented through the cultural resource data feature level metadata, such as date, extant, source, source scale or source accuracy, it may be important for users to understand that some features within the larger cultural resource feature class may not be appropriate for all uses or legal uses in particular. The CONSTRANT field is a free text field which can accommodate a brief statement as necessary.

Example:
None

Example:
Extant status and datum information for resource not recorded by source; coordinate pairs used to generate points not checked for accuracy by source

Example:
Data not suitable for identifying resources potentially affected by a Section 106 undertaking

- CR_NOTES (Optional)
  Alias: Comment on Resource

The CR_NOTES field is intended to allow users a free text field into which general comments regarding the specific resource or the specific spatial data representation can be placed. This optional field can accommodate any brief comment (up to 255 characters) that may be relevant to the point, line or polygon representing the cultural resource.

Example:
Although the point represents a resource listed on the National Register, corrected locational data from the State Historic Preservation Office has been used to replace the original UTM coordinates stored in the National Register Information System.

- ISLAND (Mandatory)
  Alias: Island

The ISLAND field is intended to allow users to specify the island upon which a cultural resource is found. While this could be evident from viewing a map, or reading a site number, it is designed to facilitate advanced querying and data distribution. Please note that no special characters are used. There may be debate about when a resource is offshore versus associated with an island, but, in general, the "Offshore" value should be used when there is no clear connection to an island. In most cases, this will include resources such as shipwrecks or plane wreck sites. To assist data entry, users may choose values from the domain that describes possible resource types:

Domain values for the ISLAND field:

Hawaii	The resource may be found on the island of Hawaii
Kahoolawe	The resource may be found on the island of Kahoolawe
Kauai	The resource may be found on the island of Kauai
Lanai	The resource may be found on the island of Lanai
Maui	The resource may be found on the island of Maui
Molokai	The resource may be found on the island of Molokai

Niihau	The resource may be found on the island of Niihau
Oahu	The resource may be found on the island of Oahu
Northwestern Islands	The resource may be found on one of the Northwestern Hawaiian Islands
Offshore	The resource may be found underwater and offshore, without a clear connection to any island.

- UW_Flg (Mandatory)
  Alias: Submerged Resource Flag

The UW_Flg field is intended to allow users to identify resources which may be submerged or in a tidal zone. This refers to both resources submerged accident, such as shipwrecks, as well as those submerged through natural processes, such as subsidence or sea level change. This does not pertain exclusively to those resources submerged by the ocean, but also those within lakes, reservoirs, or streams and rivers. While many identified resources will not be found underwater, it is important for preservation initiatives to be able to quickly identify submerged resources, particularly those affected by tidal interchange. To assist data entry, users may choose values from the domain that describes possible resource types:

Domain values for the UW_Flg field:

Yes	The resource is fully submerged 100% of the time
No	The resource is never submerged
Unknown	There is no data as to whether or not this resource is submerged
Periodic	The resource spends less than 100% of the time submerged, but more than 0%

Fields and definitions added to the standard group, specific for with the Cultural Resource Other data layers (see list of fields for each feature class above).

- TYPE (Mandatory)
  Alias: Resource Type

The TYPE field is intended to allow users to define what cultural resource type the point, line or polygon classified as, "other," represents. Because the Cultural Resource Other feature classes are intended to provide a category to place resources that do not fit easily into the other defined cultural resource feature classes it is critical to identify what type of resource the point, line or polygon is intended to represent. To assist data entry, users may choose values from the domain that describes possible resource types:

Domain values for the TYPE field:

Vegetation	The resource represents some type of vegetative feature that contributes to a cultural landscape or other cultural feature
Hydrology	The resource represents some type of hydrologic feature that contributes to a cultural landscape or other cultural feature
Topography	The resource represents some type of topographic feature that contributes to a cultural landscape or other cultural feature
Artifact	The resource represents an artifact collected as part of a identified site or an isolated artifact find
Land Use	The resource represents some type of land use feature that contributes to a cultural landscape or other cultural feature
Viewshed	The resource represents a viewshed associated with a cultural landscape or some other cultural feature
Other	The resource represents some other type of cultural feature

- TYPE_OTR (Mandatory if Applicable)
  Alias: Resource Type Comment

The TYPE_OTR field is intended to provide additional information related to the Resource Type indicated in the TYPE field. Specifically, if users choose the Other menu value, they must enter some explanation of what type of resource the point, line or polygon represents. Additionally, if users wish to provide more clarification related to the TYPE value chosen, the TYPE_OTR field can accommodate up to 250 characters of free text.

Example:

TYPE: Other

TYPE_OTR: garden parterre used to delineate areas within a formal garden

Fields and definitions added to the standard group, specific for with the Cultural Resource Survey data layers (see list of fields for each feature class above).

- SRVY_TYPE (Mandatory)
  Alias: Survey Type

The SRVY_TYPE field is intended to allow users to identify the type of cultural resource targeted with the survey undertaken and represented by the point, line or polygon. Because multiple surveys may have taken place within an area, it is critical to identify the type of cultural resource targeted by each individual survey effort. To assist data entry, users may choose values from the domain that describes possible cultural resource types that could be the subject of a survey:

Domain values for the SRVY_TYPE field:

Archaeology	Archaeological resources are the primary subject of the survey delineated
Architecture	Architectural resources are the primary subject of the survey delineated
Structure	Structural resources are the primary subject of the survey delineated
Cultural Landscape	Cultural landscapes and related resources are the primary subject of the survey delineated
Ethnography	Ethnographic resources are the primary subject of the survey delineated
Multiple resource types	Multiple cultural resource types are the subject of the survey delineated
Other	Some other cultural resource, or combination of resources, are the subject of the survey delineated

- TYPE_OTHER (Mandatory if Applicable)
  Alias: Survey Type Comment

The TYPE_OTHER field is intended to provide additional information related to the Survey Type indicated in the SRVY_TYPE field. Specifically, if users choose the Other menu value, they must enter some explanation of what type of survey or the type of cultural resource that is the subject of the survey that the point, line or polygon represents. Additionally, if users wish to provide more clarification related to the SRVY_TYPE value chosen, the TYPE_OTHER field can accommodate up to 250 characters of free text.
Example:

SRVY_TYPE: Other

TYPE_OTHER: National survey of Civil War battlefields in response to 2003 legislation

- SRVY_LEVEL (Mandatory)
  Alias: Level of Survey

The SRVY_LEVEL field is intended to allow users to describe the intensity or level of the survey conducted and represented by the point, line or polygon delineated. Because multiple surveys may have taken place within an area, it is critical to identify the intensity of each survey undertaken in each survey effort. To assist data entry, users may choose values from the domain that describes possible survey intensity levels, as defined by the National Register of Historic Places:

Domain values for the SRVY_LEVEL field:

Reconnaissance survey	Survey conducted with a minimal or reconnaissance level methodology
Intensive survey	Survey conducted with a detailed or intensive level methodology
Other	Some other level or intensity of survey conducted

- LEVEL_OTH (Mandatory if Applicable)
  Alias: Survey Level Comment

The LEVEL_OTH field is intended to provide additional information related to the Survey Level indicated in the SRVY_LEVEL field. Specifically, if users choose the Other menu value, they must enter some explanation of what level of survey, or intensity of survey, was conducted in the survey that the point, line or polygon represents. Additionally, if users wish to provide more clarification related to the SRVY_LEVEL value chosen, the LEVEL_OTH field can accommodate up to 250 characters of free text.

Example:

SRVY_LEVEL: Other

LEVEL_OTH: windshield form of reconnaissance survey conducted

- SRVY_MTHD (Mandatory)
  Alias: Survey Method

The SRVY_MTHD field is intended to allow users to describe the field methods used in the survey undertaken, regardless of intensity level. Because multiple surveys may have taken place within an area, and with differing levels of intensity, the free text SRVY_MTHD field provides a location to describe the actual field procedures related to a specific survey, adding to the detail of the intensity selected. The SRVY_MTHD field can accommodate up to 250 characters of free text.

Example:
Shovel test pits dug at 10 meter intervals on transects 15 meters apart and 50 meters long

These feature level metadata fields, for all of the various resource type data layers, are intended to document the lineage of the data and provide information necessary for the user to determine the most appropriate application of the data itself. Additionally, filling in these feature level metadata fields documents the quality and accuracy of the data being shared, avoiding misinterpretation of the data itself.

Introduction to the Implementation Model:

The cultural resource spatial data transfer standards are intended to apply to any spatial data or spatial data type, including shapefiles, feature classes, Geodatabases and others. Traditionally, SHPD has managed its cultural resource spatial data as coordinate pairs in a-spatial databases. This does not constitute spatial data, however when users generate points, lines or polygons from these sources in a GIS, creating shapefiles or feature classes in a Geodatabase, that equates to spatial data which should comply with the standards.

Certainly, different users may need different spatial data types to accomplish their goals and answer their daily questions. In some cases creating simple shapefiles may suffice. In other cases, taking advantage of the benefits of a Geodatabase may add value to the cultural resource spatial data by allowing users to link the simple points, lines and polygons to each other and to external databases more easily. Complying with the cultural resource spatial data standards requires users to include the feature level metadata fields discussed in this guidance manual but does not require users to store or exchange data in any particular format.

Shapefiles remain a data transfer standard throughout the GIS community and offer one solution to cultural resource specialists who would like to share their geographic data. In this instance, a shapefile would constitute one layer of spatial data and contains points, lines or polygons as well as the feature level metadata as attribute information related to a single feature type, such as archaeological sites or historic buildings. A shapefile could be created for each of the 25 data layers outlined by the standards, based on cultural resource type and spatial feature type. Relying on shapefiles may be effective, however they may not allow users to take full advantage of the tools available to them with more sophisticated data types, such as Geodatabases, which will make data entry easier in addition to providing users with more flexibility in using the data.

A Geodatabase is a relational database which can store multiple data layers, or feature classes, equivalent to shapefiles. Because it is a more sophisticated data type, it offers the user more tools and options. For instance, with a Geodatabase, users can create menus or valid values for specific attribute fields. Users may also create permanent relationships, or relationship classes, between data layers, tables and other spatial data contained within the same Geodatabase.

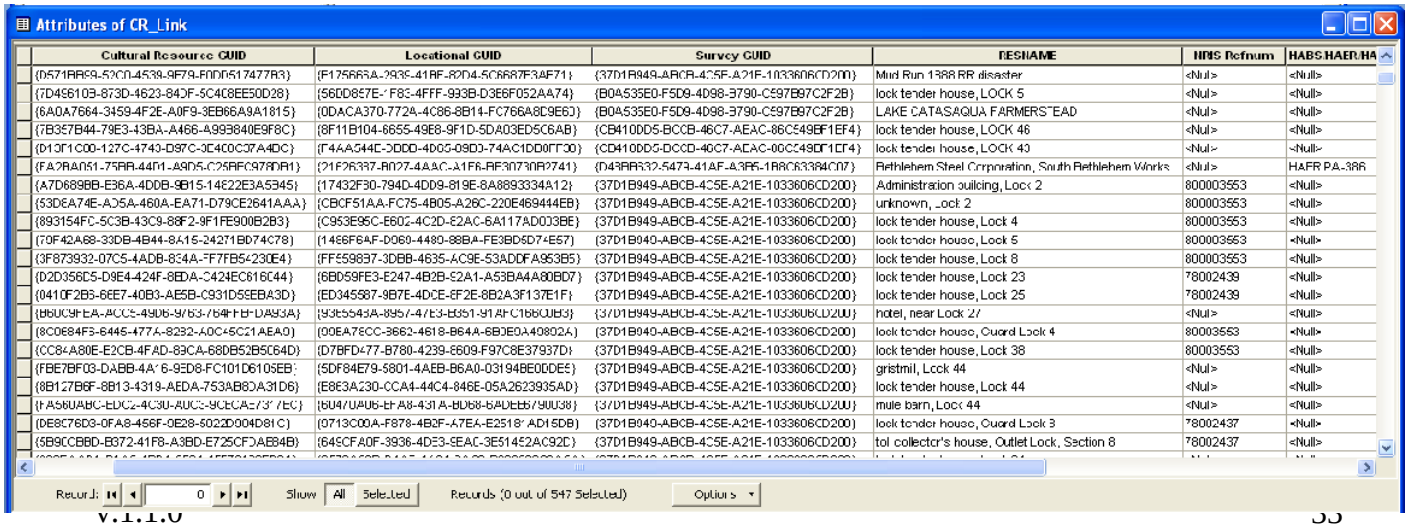
In order to assist cultural resource specialists to comply with the standards, SHPD designed and created a Geodatabase template or implementation model, based upon a format designed by the Cultural Resource Subcommittee. Within the model all of the feature level metadata fields have been created, defined and assigned menu values where appropriate. In addition, each of the 25 potential data layers outlined by the standards has been created so that users can easily load their own data into the already established feature classes. These feature classes can in turn be exported as shapefiles if preferred or necessary for exchange or specific applications. The data model is intended to be a tool for users to assist them in moving and submitting to SHPD their cultural resource spatial data in compliance with the standards and to allow for the easiest possible data entry.

General Structure of the Implementation Model:

Like any Geodatabase, the cultural resource spatial data standard implementation model contains multiple feature classes, one for each of the 25 different data layers identified by resource type and spatial entity. These feature classes are grouped into feature datasets, which act essentially as folders to help organize the feature classes. These feature datasets group the feature classes together based on resource type. For instance, the archaeological site point, line and polygon feature classes are grouped together in a feature dataset called, "Archaeology."

The feature datasets not only combine the data layers of like features into groups that make logical sense but those that share the same geographic characteristics. Because a coordinate system is the only characteristic users can define for a feature dataset, grouping data layers into feature datasets allows the user to insure geographic data loaded into the feature classes is in the correct coordinate system. Using this type of structure, with individual data layers of similar resource type grouped together provides the user with an easy way to access the specific data of interest, and using feature datasets provides a measure of quality control, making sure that all data loaded into a feature class is in the same coordinate system and can be easily shared with others.

The SHPD also included one additional a-spatial table within the Geodatabase design which plays a critical role in allowing the user to link the geographic entities to external tables of descriptive information, such as SIHP site database, library database, NRIS, and NHL. The CR_Link table contains no spatial data, but acts as a switchboard providing one place for all of the various identification numbers related to a specific cultural resource to be stored. Frequently, cultural resource specialists address the same site from different perspectives, storing different descriptive information in the various SHPD databases. However, in many cases, IDs assigned to these sites do not reference the existence of the site in any alternate database. Taking advantage of the CR_Link table in the implementation model allows the user to link all of these various databases together using the geography as a primary key. A single point, line or polygon may reference the same cultural resource described as an archaeological site, an element in a cultural landscape or in the library report database for instance.



By entering the appropriate IDs into the a-spatial CR_Link table, the user can take advantage of the various relationship classes that compose the remaining structure of the implementation model. Relationship classes within the model establish permanent connections between the geography, the CR_Link table and any external database the user chooses to access, based on the IDs contained in the CR_Link table. The relationship classes included in the implementation model establish one-to-many bi-directional relationships. This means a user could perform a query in the descriptive data table (such as SIHP site database), then utilize the relationship classes to see the geographic representation of the answer in the GIS. Conversely, the user could perform a spatial query in the GIS, then follow the path through the relationship classes to access the descriptive information related to the points, lines or polygons selected in an external database. Using this implementation model eliminates the need to try to combine databases together and preserves the autonomy of the existing SHPD databases.

The globally unique IDs required as part of the cultural resource spatial data feature level metadata play the critical role in allowing the implementation model to perform. Each cultural resource included in any of the various feature classes is assigned a globally unique ID (GUID), along with a locational GUID and an optional survey GUID. The presence of these GUIDs allows users to associate each resource to another geographic representation of the same resource in any other database. As a result, these GUIDs allow for the possibility that a single cultural resource may have more than one geographic depiction, as well as more than one description in the various SHPD databases. By associating a single cultural resource GUID with multiple locational GUIDs, users can preserve the relationship between a point and polygon representation of the same resource for instance.

The CR_Link table contains all of the GUIDs, for all of the resources in any of the feature classes contained within the Geodatabase, regardless of feature type or spatial entity. Because the CR_Link table does not contain any geography, all of this ID information can easily be combined in one table. As commonalities and matches are identified between the geography and the various descriptions of those resources in any of the SHPD databases, the appropriate unique IDs from those external databases can be entered into the CR_Link table fields.

This same type of structure can be constructed outside a Geodatabase using join or relate functions between shapefiles. These joins and relates remain with an individual GIS project file however and do not persist with the data itself. Utilizing the implementation model for the standards allows cultural resource specialists to easily load their spatial data into feature classes with fields and valid values already established. In addition, the relationships needed to show and work with the connections between resources are already established within the structure of the relationship classes, eliminating the need to rebuild them with each GIS project.

It is intended that the implementation model will serve as the primary tool allowing users to comply with the standards and serve as the best option for sharing cultural resource data. By providing an empty template with all of the appropriate fields and domain values already established, the user can simply load their existing data into the structure and be in compliance with the standards with relative ease, eliminating the need to recreate the same structure with each individual shapefile that a cultural resource specialist may create. Cultural resource specialists may continue to use their own shapefiles and data layers as they see fit however, or they may find that the Geodatabase model fits their needs (with some additional fields and modifications) for daily use. Regardless of which approach users take, the

implementation model can serve as the example to correctly comply with the cultural resource spatial data transfer standards.

Data Creation Methods:

- Digitizing New Points, Lines or Polygons

The structure of the implementation model/Geodatabase creates 25 different feature classes or data layers, based on resource type and geographic feature. For instance, archaeological sites are divided into 3 feature classes, one for archaeological points, one for archaeological lines and one for archaeological polygons. These 3 feature classes are grouped within a feature dataset, which acts like a folder to help organize the Geodatabase, but also assigns a coordinate system to those feature classes. All feature classes in the Geodatabase have a Geographic (decimal degree), WGS84 coordinate system.

Users can simply add one of the feature classes into an ArcGIS map document and begin to draw new points, lines or polygons using the standard editing tools. Keep in mind background data sets, such as aerial photographs, quadrangle maps or other cultural resource data should be incorporated into the same map document to facilitate the digitizing. After drawing the geographic features, users can complete the feature level metadata for individual features or groups of features (see the "Completing Feature Level Metadata" section). Users may then load those new feature GUIDs into the CR_Link table to establish connections to exterior databases, or they may export the features as a separate shapefile with the completed feature level metadata.

- Incorporating Data Collected with GPS

Frequently cultural resource specialists use GPS to collect locations of the resources that they monitor, steward or discover in their work. Higher end GPS receivers, such as Trimble units can export data as a shapefile. Users can load these shapefiles directly into the appropriate Geodatabase feature classes (see the "Procedures to Migrate New Data into the Implementation Model" section). Other GPS receivers export data as a series of X,Y coordinates, usually in the form of decimal degrees, but other coordinate systems, such as UTM, could be specified. Users can also convert the text files or data files produced by these receivers into shapefiles which can be loaded into the appropriate Geodatabase feature classes (see the "Creating New Data from Coordinate Pairs" section).

- Creating New Data from Internet-Based Geographic Search Engines

For many cultural resource specialists high quality GPS is not available to create locations and other alternatives may provide a means to collect a location for a resource in a more detailed way than acquiring a UTM location from a quadrangle map. One popular means of doing this is through internet-based geographic search engines, and free applications that users download. Using aerial imagery and other tools in these applications allows user to create markers that can be converted into GIS points or to gather latitude/longitude coordinate pairs.

Finding a cultural resource, particularly above ground features, through the aerial photography in internet-based geographic search engines can provide very detailed locational data. Users must understand however that different scales and resolutions of photography cover different areas of the country, making the feature level metadata in the cultural resource standard very important to complete. Most engines do not supply metadata for their aerial photography. As a result, the majority of geographic features created with these applications will have an unknown datum, an unknown level of horizontal accuracy and other spatial parameters that are part of the feature level metadata.

Once users locate the resource of interest in an internet-based geographic search engine however, placing a cursor over the feature, creating a marker or supplying an address will provide a coordinate pair in the

form of degrees/minutes/seconds of latitude and longitude or a decimal equivalent. These coordinate pairs can be stored in a table or spreadsheet and converted into a shapefile (see the "Creating New Data from Coordinate Pairs" section), however the user must convert any coordinate pairs supplied in a degrees/minutes/seconds format into decimal degrees. A variety free of internet-based applications will perform this conversion.

Placing a cursor on the image or creating a marker will often result in the display of the latitude/longitude coordinates on the screen. Depending on the application, the imagery and the zoom factor, users can very easily get detailed locational data without the use of any technology other than what is on their desktop computer.

With the coordinate pairs identified, users can select a tool on the internet that meets their needs to convert the degrees/minutes/ seconds into decimal degrees:

The user can then input the decimal degrees into a table, spreadsheet or other document to convert into a shapefile (see the "Creating New Data from Coordinate Pairs" section).

- Creating New Data from Coordinate Pairs

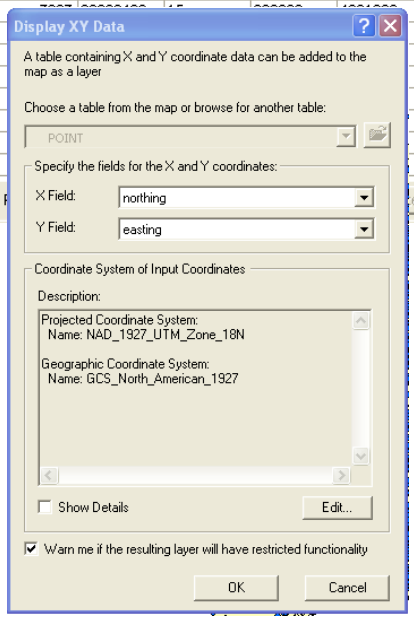
Many cultural resource specialists capture new locational data in the form of coordinate pairs, whether they are generated from a quadrangle map, through GPS, via an internet-based search engine or some other means. The coordinate pairs themselves are not GIS data. Users must convert the coordinate pairs, which most often take the form of UTM or latitude/longitude coordinates, into a shapefile or feature class which the GIS can interpret.

The process to convert coordinate pairs into GIS data takes several steps. Because the majority of cultural resource specialists use UTM, the following example shows how to create new shapefiles from UTM coordinates:

- Users should create a table with separate fields for the X coordinate and the Y coordinate. This can be accomplished through Excel, a table in a GIS project, a text file or other means. Some GPS receivers will output waypoints or features as such a table. In the case of UTM coordinates, an Easting is the X coordinate and a Northing is the Y coordinate. Once created, the table can be converted into point spatial data.
- First, because the UTM coordinate system uses zones to divide up the globe, users must first separate the individual records in the table out by UTM zone to create smaller subsets if the sites cross a zone. Resources from different UTM zones cannot be plotted together. Each coordinate pair must be plotted within its own distinct zone. See reference: http://egsc.usgs.gov/isb/pubs/factsheets/fs07701.html.

OID	REFNUM	UTMZONE	UTMEAST	UTMNRTH	easting	northing
7805	97001257	18	444600	4584050	444600	4584050
7806	97001259	18	444800	4584350	444800	4584350
7807	97001655	17	564090	4563850	564090	4563850
7808	97001654	18	483800	4434870	483800	4434870
7809	97001247	17	606380	4437400	606380	4437400
7810	98000402	17	556400	4583430	556400	4583430
7811	98000398	17	604840	4490860	604840	4490860
7812	98000401	18	491560	4428920	491560	4428920
7813	98000902	17	609240	4416980	609240	4416980
7814	98000899	18	282015	4497000	282015	4497000
7815	98000900	18	487500	4427180	487500	4427180
7816	83000418	14	744200	4099240	744200	4099240
7817	83000419	15	345270	4104230	345270	4104230
7818	83000421	14	677720	4123220	677720	4123220
7819	83000423	15	304920	4315120	304920	4315120
7820	83000424	15	308820	4293860	308820	4293860
7821	83000426	14	410450	4179080	410450	4179080
7822	83000428	14	381340	4185190	381340	4185190
7823	82000417	15	290210	4103570	290210	4103570
7824	83000430	15	351450	4222640	351450	4222640
7825	83000431	14	741300	4254470	741300	4254470
7826	82000418	14	721450	4397590	721450	4397590
					329880	4261260
					598150	4292000
					646730	4172470
					646940	4173980
					647130	4173260
					253940	4320040
					747560	4254345
					646650	4172260

Records (of 60402)

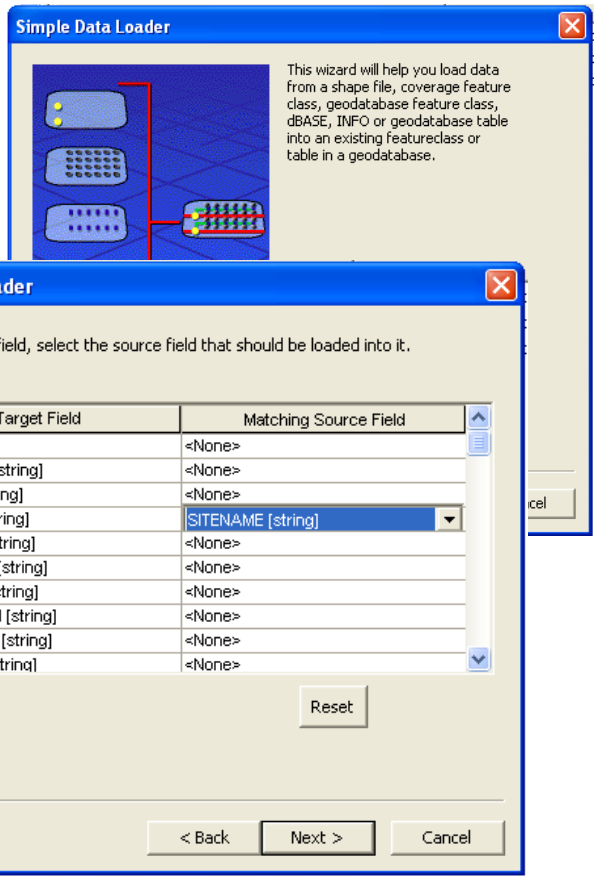


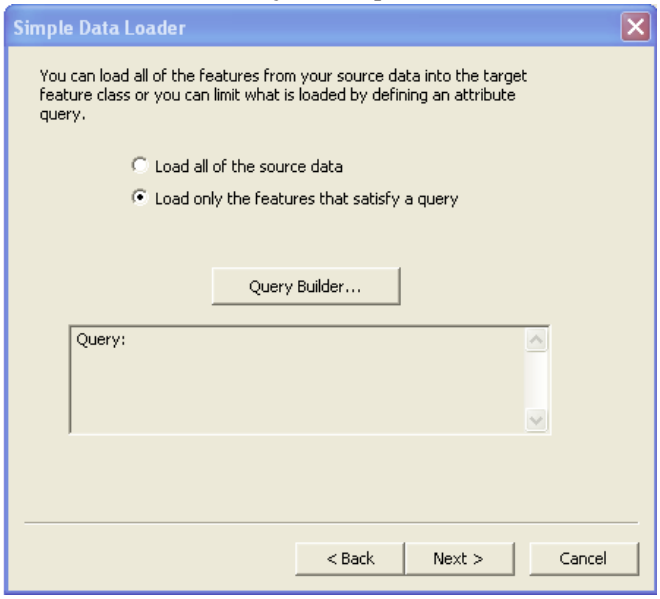
- Querying the table by UTM zone and creating subsets in a table form will provide the user with the basic first step. Once divided by UTM zone, users can add the tables of coordinates by zone into an ArcGIS project and automatically create spatial data. By specifying that the X coordinate is contained within the Easting field and the Y coordinate is contained within the Northing field, users can quickly create a series of points.
- In creating point spatial data however, users must also specify a coordinate system. This requires the user to specify the UTM coordinate system and to define the particular zone the points will lie within. In addition, users must specify a datum (NAD27 or NAD83). The datum and coordinate system information should be recorded in the feature level metadata.
- Creating multiple shapefiles of points, each in a different UTM zone will allow the user to display the data in ArcGIS, but not merge the shapefiles together into a single data set. To do so will require re-projecting the UTM shapefiles into a decimal degree (latitude/longitude) projection. The Project tool in ArcGIS will accomplish this.
- Once re-projected, the various shapefiles, which now represent a decimal degree version of the UTM zones, can be merged together using the Merge tool in ArcGIS.
- The result of this processing should be a single shapefile containing points which represent all of the coordinate pairs, regardless of UTM zone. This shapefile can then be loaded into the implementation model (see the Procedures to Migrate New Data into the Implementation Model" section).

Procedures to Migrate New Data into the Implementation Model:

Shapefiles or feature classes generated from digitizing locations, GPS, or from creating points out of coordinate pairs may represent archaeological sites, historic buildings, historic structures, historic objects, cultural landscape features or historic districts among other resource types. Loading these shapefiles containing the coordinate pairs into the Geodatabase implementation model is a simple process:

- Create a shapefile through editing in ArcGIS, exporting from GPS or generating from coordinate pairs
- Determine which resources in the shapefile belong in the various feature classes based on the cultural resource feature type. Adding your own field to a shapefile to describe which resource type a specific resource should be associated with, as digitizing takes place or when a table of coordinate pairs is created will make the loading process more efficient.
- On the Contents tab in ArcCatalog, navigate to the template Geodatabase model and find the feature class you would like to load resources into
- Right click on the feature class you want to load data into, select Load and Load Data from the context menu to launch the simple data loader
- Select the shapefile you would like to load data from
- Continue to select the defaults until you reach the window in the loading wizard where you can map the fields from your shapefile to the fields in the feature class. Note that the fields in your shapefile do not have to have the same name, and many of the feature level metadata fields will not be in the exported data from existing databases, so many of the fields will be blank. Use what data you can in the shapefile to make potential matches to the feature level metadata fields.
- When given the option, you may load all of the data in a shapefile, or only data from the shapefile that meets a particular query. If you have a field in your shapefile for instance that indicates which resources are sites versus buildings, objects, structures, etc., you can simply choose to have the wizard address only those records as opposed to the entire shapefile.
- Finish the wizard. With only those resources loaded into the feature class, all of the feature level metadata can be quickly filled out or calculated automatically.





Note: Using the simple data loader appends or adds records into the existing feature class. Unlike an import which creates a new feature class, loading data simply adds records to the existing feature

class without altering any of the fields. Users can continue to load data into the existing feature class without over writing any existing data.

***Completing Feature Level Metadata**:*

Once data has been loaded into the appropriate feature class, users can begin to fill in the feature level metadata critical for compliance with the spatial data standards, and to document the quality of legacy data, as well as to differentiate legacy data from newly created spatial data. Although the standards contain many fields of feature level metadata, most can be filled out in batch processes, taking only a few seconds to complete.

- Batch GUID generation

Creating the unique CR_ID and GEOM_ID globally unique IDs remains a key element to the standards, allowing users to identify those individual cultural resources which may appear in multiple cultural resource databases through the CR_Link table. Quickly generating these IDs in an automated fashion makes the task much easier to accomplish, and insure that no duplicate GUIDs will exist. Using the Field Calculate function and only 2 or 3 simple lines of Visual Basic or Python code allows the user to completely automate this process and control exactly which resources are assigned GUIDs each time new data is loaded into the feature class.

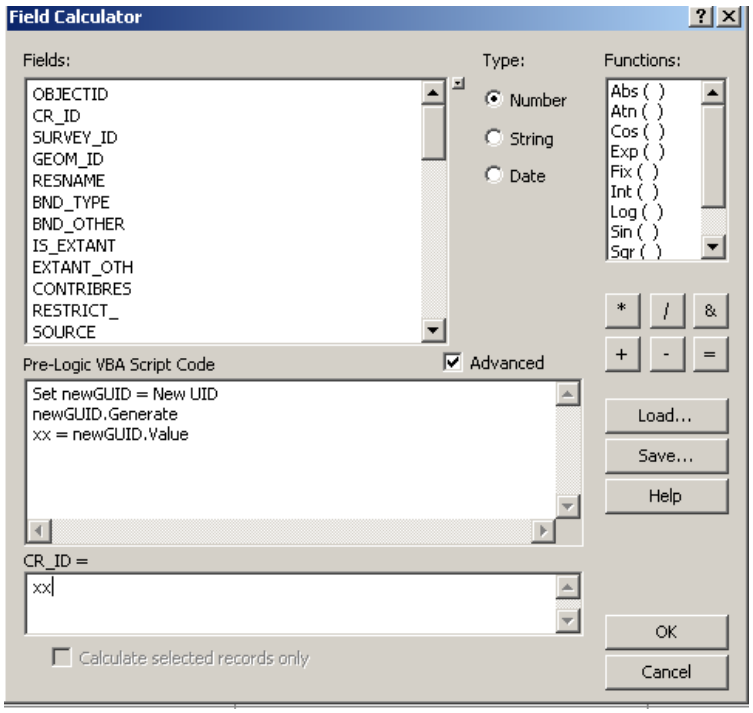
In version 9.x of the ArcGIS software the process includes:

- Right click on the field heading in the attribute table for the feature class you would like to generate the GUIDs for (i.e.: CR_ID)
- Select the Field Calculator from the context menu
- Click in the check box to get the "Advanced" option
- Copy the following code into the first text box:

  Set newGUID = New UID
  newGUID.Generate
  xx = newGUID.Value
- Type the following into the second text box:

  xx
- When the user clicks OK to finish the calculate function, new and unique GUIDs will be populated in every record for that field

NOTE: Like any field calculate operation, if the user selects any records, the calculate function will only apply to those records. If the user has NO records selected, the calculate function will apply to all of the records in the attribute table. ***Be sure that after adding new records to a feature class, only those new records are selected when calculating GUIDs, or the original GUIDs can be over written.***



In version 10.x of the ArcGIS software, changes in the programming language mean that the multiple GUID generation process remains basically the same, however the code input into the field calculator must change. The code used

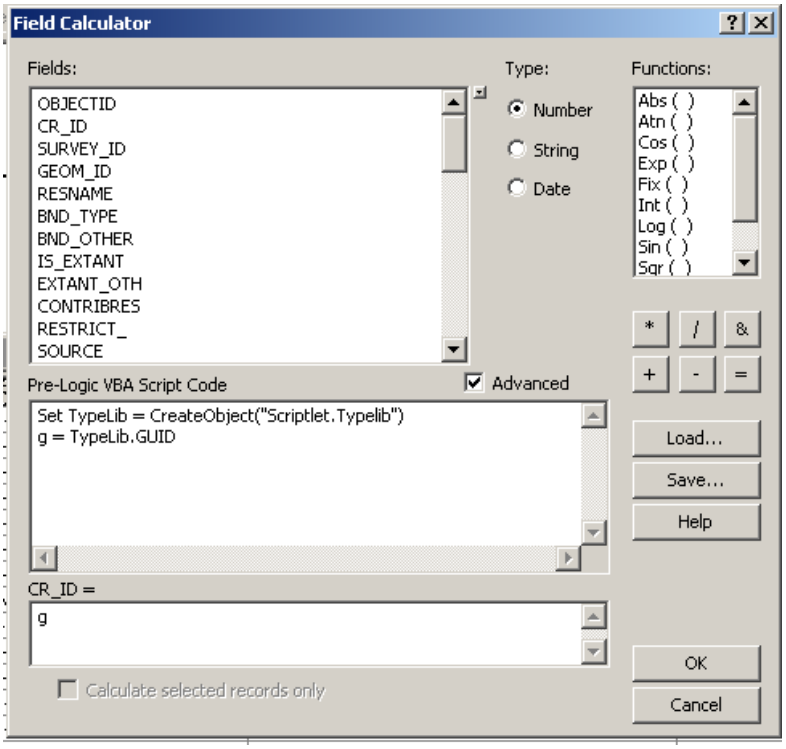
in version 10.x of the software will also work with version 9.x of the software. With version 10.x the process includes:

- Navigate to the Field Calculator for the appropriate field in the feature class, as with version 9.x above
- Click in the check box to get the "Advanced" option
- Copy the following code into the first text box:

  Set TypeLib = CreateObject("Scriptlet.Typelib")
  g = TypeLib.GUID
- Type the following into the second text box:

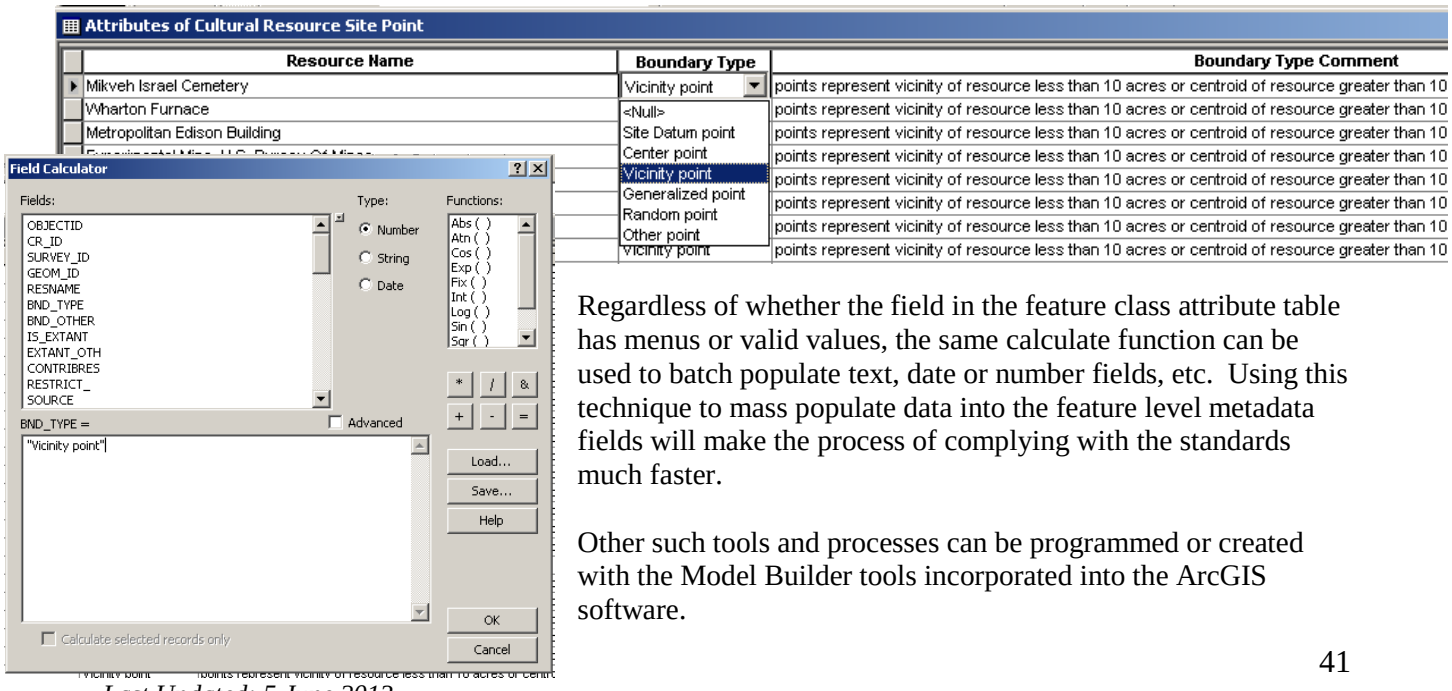
  g

NOTE: Just as with version 9.x of the software, when the user clicks OK to complete the operation, new GUIDs will be populated in every record for that field. Just as with version 9.x however, where records are selected the calculate function will apply only to those records. When NO records are selected, the calculate function will apply to all records in the attribute table.



- Using the Field Calculator to Mass Populate Data

Just like using the Field Calculator to generate multiple GUIDs, the Field Calculator can be used to mass populate data in any of the feature level metadata fields. Unlike with the GUID generation, no special code is required to take advantage of this operation. Users may select a value from the drop down menus in the feature class attribute table and simply copy and paste that value into the field calculator to fill that value in for any of the selected records.



Regardless of whether the field in the feature class attribute table has menus or valid values, the same calculate function can be used to batch populate text, date or number fields, etc. Using this technique to mass populate data into the feature level metadata fields will make the process of complying with the standards much faster.

Other such tools and processes can be programmed or created with the Model Builder tools incorporated into the ArcGIS software.