

Standard for Submitting Asset Management Data to LHTAC or iWorQ

1. Submitting Data

The purpose of this document is to establish a basic data submittal standard to increase the accuracy and consistency of the data submitted by engineering firms and government agencies. The accuracy will improve LHTAC's ability to compile and analyze costs, conditions, and shortfalls. The consistency will allow LHTAC to look at the data trends and future needs.

Agencies or consultants that record and enter pavement or sign data directly into www.iworq.net will not need to follow the recommendations and requirements listed below. The purpose of this document is to outline the data standards for agencies or consultants that are collecting data in the field as part of a transportation plan or as part of an initial data collection effort. In addition, agencies or consultants updating or maintaining GIS data need to follow these guidelines.

2. Electronic Data and Geographic Projections

Each pavement or sign data set will be submitted in a digital format that includes both the text or tabular data and the associated geographic data.

a. Submitting Text or Tabular Data

All text or tabular data needs to be imported into Microsoft Access. Microsoft Access will import many types of data including: (*.xls), (*.xlsx), (*.dbf), or (*.csv). A standard database can be downloaded at www.iworq.net/LHTAC/lhtacimport.mdb. This database contains recommended and required fields, field names, data types, and field descriptions. The database contains tables for both sign and pavement data.

In addition to standard formats, this data will have required fields. For the required sign fields see (Section 3d). For the Required Pavement fields see (Section 3a).

b. Geographic Data Files and Formats

All geographic data must be submitted in an ESRI shapefile format. According to www.insideidaho.org, "a shapefile stores non-topological geometry and attribute information for the spatial features in a data set. A shapefile consist of a set of 3

mandatory files, along with several optional files. Each file in the set shares the shapefile name with a different extension. The main file (*.shp) stores the geometry and must always have an index file (*.shx). A dBase file (*.dbf) stores all the attributes of the shapes in the main file. Additionally, a projection file (*.prj) stores the projection information.”

Submitted shapefiles must include all four files (*.shp), (*.shx), (*.dbf), and (*.prj). Additional information regarding the (*.prj) file and projections can be found in (Section 2 d).

Additional information regarding shapefiles can be found at <http://www.esri.com/library/whitepapers/pdfs/shapefile.pdf> or <http://en.wikipedia.org/wiki/Shapefile>.

c. Geographic Data Accuracy

Accuracy of geographic data should be collected and maintained with mapping grade GPS, with a relative accuracy of sub-meter. This means that the raw GPS data should be post processed or differentially corrected.

d. Geographic Projections

The submitted geographic data or specifically the (*.prj) file (see Section 2 b) needs to have the information required to identify what standard projection the data is in. There are three recommended projections or coordinate systems.

Counties in Idaho can maintain or submit their data in the Universal Transverse Mercator (UTM) projection. Idaho is split into two UTM zones: Zone 11 and Zone 12. UTM should always be submitted in meters.

Cities in Idaho can maintain or submit their data in a State Plane projection. Specific parameters for State Plane projections can be found at www.insideidaho.org/geodata/standards.htm. State Plane should always be submitted in feet and NAD83 is recommended. An example of a State Plane projection would be:

System: US State plane 1983
Zone: Idaho West 1103
Datum: NAD 83
Coordinate units: Feet

Data collected with a GPS and differentially corrected can be submitted in lat/long WGS 84. This is a standard GPS coordinate system, and additional information can be found online.

3. Data Collection

Agencies or consultants collecting pavement or signs should follow these basic guidelines to ensure that the data they are collecting is useful. It is important to consider the recommendation and data requirements outlined below.

a. Collecting Pavement Data

Pavement data needs to be collected and managed by segments. Segments should be homogeneous with a similar cross section, pavement structure, and functional class. Typically segments are defined from block to block, address to address, or mile post to mile post.

The required pavement inventory and condition assessment fields are listed below:

Table 1. Require field names, data types, and description

Field Name	Data Type	Description
Seg_ID	Number	ID Corresponding to the GIS
RoadName	Text	
FromAddress	Text	
ToAddress	Text	
Lanes	Number	Number of Lanes
Width	Number	In Feet
Length	Number	In Feet
Surface	Text	Surface Type (Gravel, Dirt, Paved)
Owner	Text	
Importance	Text	Low, Medium, High- Used For Budgeting
FunctionalClass	Text	Major Collector, Minor Collector, Commercial, Residential
SurvDate	Date/Time	
Fatigue	Number	1-9 or 0 for None
Longitudinal	Number	1-9 or 0 for None
Transverse	Number	1-9 or 0 for None
Edge	Number	1-9 or 0 for None
Patching	Number	1-9 or 0 for None
Comment	Text	

For example the data would look like this (Butte Rd, Lincoln St, Jefferson St,2, 640, 32,Paved, Blaine,High,Residential, 7/21/2010,5,4,0,0,4, patching by entrance). The length and width should be recorded in feet. The required pavement condition information can be found in (Section 3c). Agencies and consultants need to download the database at www.iworq.net/LHTAC/lhtacimport.mdb . Data needs to be imported into the (lhtacpavement) table before submitting data. This will ensure that the data meets the data submittal standards.

b. Associating Pavement Data Geographically

Pavement data needs to be collected by segment, and each segment needs to be linked by an ID (numeric) in the shapefile. For each segment there should be a unique ID in the shapefile that matches a Unique ID in the database or spreadsheet.

c. Pavement Condition Assessment

It is recommended that agencies use the Distress Identification Manual for Long-Term Performance Project published by, the Strategic Highway Research Program (SHRP). The SHRP Distress Manual is the Bible of pavement assessment, and is the standard for the industry. The SHRP Distress Manual outlines all the different types of pavement distress including how to measure the severity of each pavement distress. Tools are available to make this process simple and repeatable. The entire SHRP Distress Manual can be found online at:

<http://www.tfhr.gov/pavement/ltp/reports/03031/index.htm>

Agencies should have someone on staff that is familiar with the SHRP Distress Manual, and that can do a pavement assessment. Training will be available to local government agencies through LHTAC. Agencies can download distress forms at www.iworq.net/LHTAC/distress.pdf

The distresses need to be associated to the Segment ID (SegID), and each distress needs to have a severity/extent rating. Agencies should do a pavement condition assessment at least once every 3 years. Agencies need to associate each pavement condition assessment to a pavement management segment in order to maintain historical data.

d. Collecting Sign Data

The sign inventory should be collected with a GPS, differentially corrected, and exported as a shapefile within a standard projection as outlined in (Section 2d). Agencies can

download a standard Trimble GPS data dictionary file (*.ddf) at www.iworq.net/LHTAC/sign.ddf. The data dictionary file contains all the required sign fields.

The required sign inventory fields are listed below:

Table 2. Required sign fields, data types, and descriptions

Field Name	Data Type	Description
SignID	Number	Unique ID for the sign
SupportID	Number	Unique ID for the support ties with the GIS
MUTCDID	Number	Number from the LHTAC MUTCD Table
Roadname	Text	Road Name
FromStreet	Text	Street Behind
ToStreet	Text	Street Ahead
AddressLocationDistance	Text	This can be address, location, or distance from intersection
Orientation	Text	The orientation the sign is facing (North, South, East West)
TravelDirection	Text	The direction of travel the sign is for (North, South, East West)
Position	Text	The position of the sign relative to the intended traffic (Left, Right, Median, Overhead)
Backing	Text	The backing material of the sign (Aluminum in most cases, Wood, Other)
Sheeting	Text	The sheeting material (Engineering Grade, High Intensity, Diamond Grade)
Visibility	Text	Is the sign visible to the travelor (Obscured by Trees, Obscured by Bushes, Obscured by Building)
SizeLength	Number	Size of the Sign from top to bottom (inches)
SizeWidth	Number	Size of the Sign from left to right (inches)
Height	Number	Distance from bottom of sign to curb or asphalt edge or white line (Should be 7 to 8 feet)
Offset	Number	Distance from curb or edge of road or white line

SupportType	Text	Type of Support (4x4, U channel, 2x2 steel, 3 in Tube, etc.)
BaseMaterial	Text	Material the post is in (Soil,Concrete)
SignCondition	Text	Excellent, Good, Fair, Poor
SupportCondition	Text	Excellent, Good, Fair, Poor
DateSurv	Date/Time	Date of the inventory and inspection
Comment	Text	General Comments
BgRetRfx	Number	Background Retroreflectivity
TxRetRfx	Number	Text Retroreflectivity
Latitude	Number	
Latitude	Number	
PhotoID	Text	File name associated to this sign

Matching this data structure will ensure that the data is useable and can be imported without entering all the data by hand. Data that does NOT match this structure will be sent back. Agencies can download an MUTCD image file of all the signs and MUTCDID's in the sign database at www.iworq.net/LHTAC/MUTCDlist.pdf. Agencies can download an MUTCD image file for a typical Idaho county at www.iworq.net/LHTAC/countysigns.pdf.

Agencies and consultants need to download the database at www.iworq.net/LHTAC/lhtacimport.mdb . Data needs to be imported into the (lhtacsign) table before submitting data. This will ensure that the data meets the data submittal standards. The database also contains an (lhtacmutcd) table listing all the MUTCD Codes, Descriptions and MUTCDID.

e. Sign Condition

Local government agencies and consultants need to follow the new retroreflectivity guidelines. The Federal Highway Administration has published a new booklet entitled- Sign Retroreflectivity Manual: How to Meet the New National Standards for Small Agencies, Federal Land Management Agencies, and Tribal Governments. This manual can be acquired through the Idaho T2 Center.

Additional information regarding the new guidelines can be found at <http://www.iworq.com/retroreflectivity-standards/>

4. Data Updates

Agencies will need to update their segments and calculate their mileage regularly. Updating data is generally a different process than collecting data. Following a standard process will ensure that the existing data is not corrupted

a. Updating Pavement data

Agencies and consultants updating pavement data need to maintain the existing segments. When the pavement management segments are changed, agencies lose historical data such as pavement distress ratings and treatments.

First, get a list of the current segments and a copy of the most recent GIS map. Do not update, change or edit data without starting with the existing segments.

Second, maintain the existing Segment ID in each record. The segment ID is the link back to all the historical data. See Table 3 for an example of maintaining the segment ID.

b. Updating Pavement Map

Maps should be updated and submitted in a shapefile. Local government agencies should maintain their GIS with a standard accuracy. Most Idaho agencies have maps that were created with mapping grade GPS which means that the relative accuracy would be sub-meter.

Map updates require 5 main steps: (1) GPS the centerline of the roads that need to be added, (2) differentially correct and project the data into the same projection as the agency's existing data, (3) export the data as a shapefile, (4) split and join the file to create the management segment, and (5) identify each segment with the SegID and the other required data outlined in (Section 3 a). For example the (*.dbf) should look something like the table shown below.

Table 3. (*.dbf) example table

SegID	Roadname	Fromaddress	ToAddress	Length	Width
450	Butte Rd	Lincoln St	Jefferson St	640	32
451	Butte Rd	Jefferson St	Adams St	730	32

The (*.dbf) table in the shapefile needs to have the required segment information, and the new segments should have SegIDs that are higher than the existing SegIDs. It is very important that agencies review their existing data before editing and updating data.

Agencies that need to edit or delete segments should start with the most current shapefile, edit or delete the segments, and send the updated shapefile. When editing the shapefile be sure to maintain the SegIDs.

c. Updating Sign Data

New sign data can be added using the same process that was used to collect the data. Updates including treatments, repairs, condition assessments, and sign replacements should be tracked and recorded inside the agency's Sign Management Application.

Signs with new locations need to be submitted as a Shapefile with a unique ID for each sign and the other required data outlined in (Section 3 d).

d. Updating Sign Map

The new sign data can be appended to the old shapefile or the new sign data can be submitted following the requirements in (Section 2 b-d and Section 3 d-e). Agencies need to make sure that their Sign ID (SignID) is a higher number than the existing sign data.

5. Summary

This document outlines the requirements for collecting and submitting *sign* and *pavement* data. The list below contains the primary recommendations and requirements.

- 1- Agencies submitting pavement data need to follow the fields, data types, and descriptions outlined in (Section 3 a).
- 2- Agencies submitting sign data need to follow the fields, data types, descriptions, and MUTCD codes outlined in (Section 3 d).
- 3- Agencies submitting pavement condition data need to use the SHRP distress manual, and submit the data in the format outlined in (Section 3 c). The pavement condition assessment ratings must be associated with the standard pavement segments.

- 4- Agencies submitting GIS updates need to send a shapefile in a standard projection (section 2d). The shapefile should contain all the fields outlined in (section 4 b) and only the new information.

Following these requirements and guidelines will reduce the possibility of lost, corrupted or worthless data. Many Idaho cities and counties have already been through this process and can be a good source of information.

6. Conclusion

Pavement and sign data are used by LHTAC to determine future funding requirements, and reduce liability. Agencies and consultants need to follow some basic data submittal standards in order to ensure the data is useful. Local Government agencies that follow these recommendations and requirements will have better data and will spend less money and time maintaining their asset management programs.