

CHAPTER 6

DATA MANAGEMENT

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6.1 OVERVIEW

This chapter describes the data management procedures used to provide consistent, high quality information for supporting the Efficient Transportation Decision Making (ETDM) process through the Environmental Screening Tool (EST). These procedures define data collection, preparation, and maintenance responsibilities and techniques.

As illustrated in **Figure 6-1**, the flow of information during the ETDM process begins when the Florida Department of Transportation (FDOT) or Metropolitan Planning Organization (MPO)/Transportation Planning Organization (TPO) ETDM Coordinator enters project and community information into the EST. While this is occurring, Environmental Technical Advisory Team (ETAT) members are confirming the accuracy and currentness of the resource data they have provided to the Florida Geographic Data Library (FGDL) and updating it as necessary. The University of Florida GeoPlan Center houses both the FGDL and EST and is responsible for system administration and data maintenance.

Once project information is entered into the EST, standard Geographic Information System (GIS) analyses, as prescribed by the ETAT, are automatically performed to identify potential environmental resources within proximity of a project. These analyses identify and quantify various natural, physical, cultural, and community resources within set buffer distances of the project centerline, ranging from 100 feet to 5,280 feet (one mile). Study areas, such as those established for projects undergoing the Alternative Corridor Evaluation (ACE) process, are not buffered. Rather, the analysis results are based on what is within the study area. The EST stores all the results, along with any other project information. The ETAT uses the EST to review the project and environmental information, and to provide comments relative to their jurisdiction and authority. They supplement their review with additional information such as agency studies, site visits, and local area knowledge. The public is able to review project and environmental information through the ETDM Public Access Site.¹ The public provides input directly to the MPOs/TPOs and FDOT through public involvement activities like workshops and surveys. After a project review period, the project's ETDM Coordinator publishes a summary report, which is available to the public and remains as part of the project record.

Section 6.1 provides an overview of how information flows through the ETDM process, identifying data sources, processing, and output. **Section 6.2** describes the major data components of the EST. **Section 6.3** discusses data collection techniques and **Section 6.4** describes Quality Control/Quality Assurance measures for processing the data. **Section 6.5** describes the data archival standards of the EST. Detailed data specifications and formats are included in the ***Environmental Screening Tool Handbook***.

¹ By statute, locations of archaeological sites and threatened and endangered species can remain confidential.

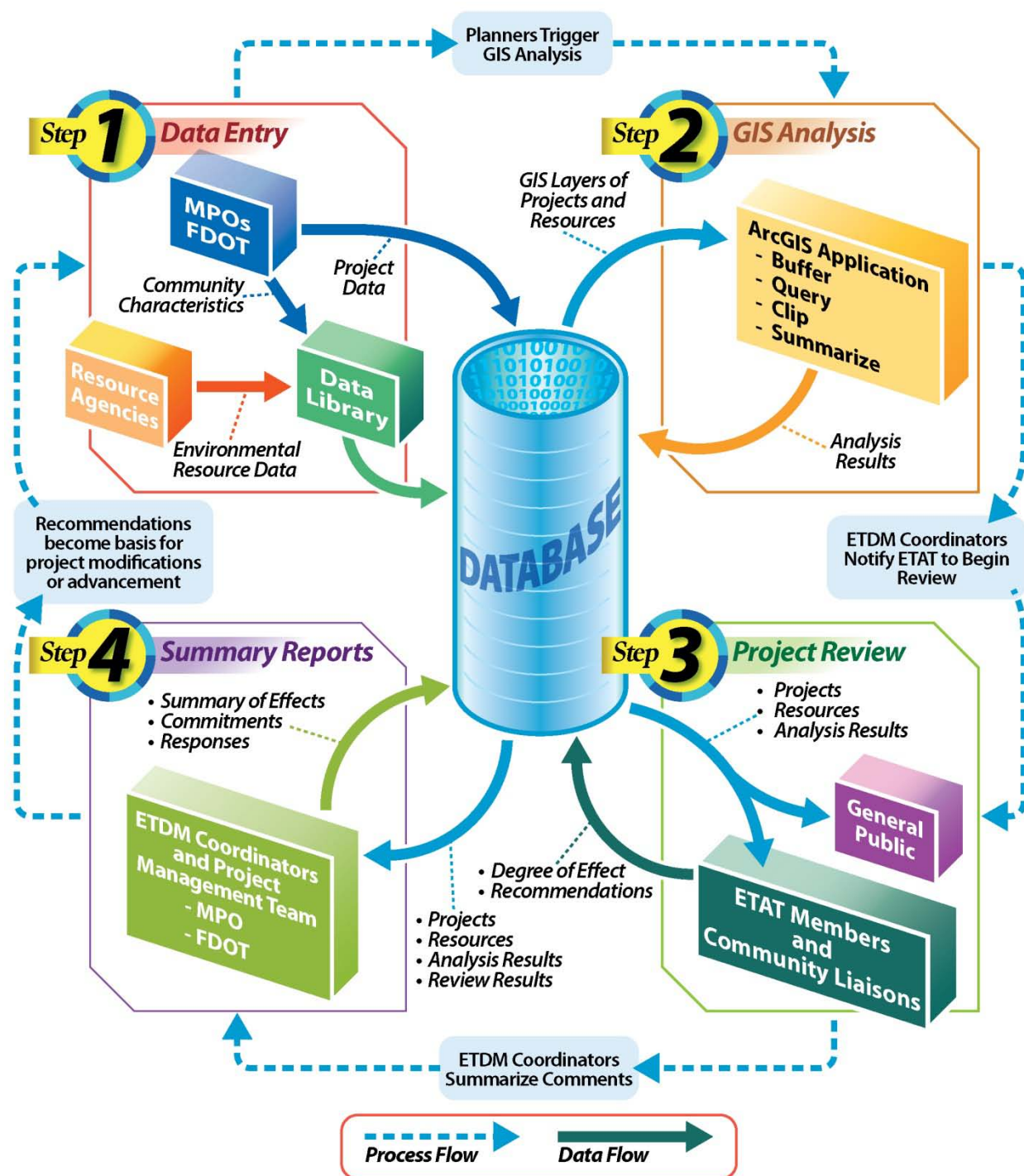


Figure 6-1: Environmental Screening Tool Process and Data Flow Diagram

6.2 DATA COMPONENTS

Prior to each screening event, FDOT and MPO/TPO representatives use the EST to input or update project, resource, and community information. The ETAT members continually review their own resource data in the EST to ensure it reflects the most recent accurate data sets and best available data. **Table 6-1** identifies data component entry/update responsibilities.

Table 6-1: Data Component Entry/Update Responsibilities

Data Component	Responsible Entity	What	Geographic Responsibility
Transportation Project Data	FDOT ETDM Coordinator & Project Team	Qualifying projects	MPO/TPO and non-MPO/TPO areas
	MPO/TPO ETDM Coordinator	Qualifying projects that are candidates for inclusion in the Cost Feasible Element of the Long Range Transportation Plan (LRTP), excluding Strategic Intermodal System (SIS) projects	MPO/TPO areas
Community Data	FDOT Community Liaison Coordinator (CLC) & Project Team	Communities surrounding qualifying projects	MPO/TPO and non-MPO/TPO areas
	MPO/TPO ETDM Coordinator and CLC	Communities surrounding qualifying projects that are candidates for inclusion in the Cost Feasible Element of the LRTP (excluding SIS projects)	MPO/TPO areas
Resource Data	ETAT Member	New or updated agency data	Agency Jurisdiction

NOTE: Qualifying projects are defined in **Chapter 2** of this *Manual* and with additional criteria identified in Chapters **3** and **4** of this *Manual*.

6.2.1 Transportation Project Data

FDOT ETDM Coordinators and PD&E Project Managers screen qualifying transportation projects in their jurisdiction. MPO/TPO ETDM Coordinators may screen qualifying projects within their jurisdiction except for projects on the SIS and Bridge Replacement Program projects, which the respective FDOT District screens. Information inputs for qualifying ETDM projects include:

1. Consistency information pursuant to “Planning Requirements for Environmental Document Approvals” and local government comprehensive plans. Refer to **Project Development and Environment (PD&E) Manual, Part 2, Chapter 4, Project Description and Purpose and Need**.
2. Project description with information regarding project mode, termini, project length, estimated cost, and any other known supporting information including the roadway functional classification and Annual Average Daily Traffic (AADT) for existing and future conditions, and whether or not the project is within an Urban Service Area. If

the project involves widening an existing facility, describe the existing right-of-way considerations and whether the project sponsor intends to widen within the existing right-of-way (if known). All project alternatives should be described. The alternative descriptions should highlight anything unique to the alternative. Detailed descriptions and specifications for these data elements are available in the ***Environmental Screening Tool Handbook***.

3. Purpose and need based on considerations for items such as emergency evacuation, community-expressed needs, and transportation demand. Refer to the ***PD&E Manual, Part 2, Chapter 4, Project Description and Purpose and Need*** for guidance.
4. Visual representation of the project location (project geometry/mapping) for GIS analysis and review.

See **Chapters 3 and 4** of this **Manual** for a more detailed discussion of the required project information.

6.2.2 Community Data

In addition to project information and environmental resource data, the ETDM process relies on socioeconomic information to make informed decisions about affected communities. This includes data that define community boundaries; identify community focal points; and document community histories, goals, and values (see **Figure 6-2**). Combined with the information above, the Community Characteristics Inventory (CCI) report provides results on a number of economic, demographic, and social variables from the three most recent United States Census (Census) events, the American Community Survey (ACS), and Florida county property appraiser data.

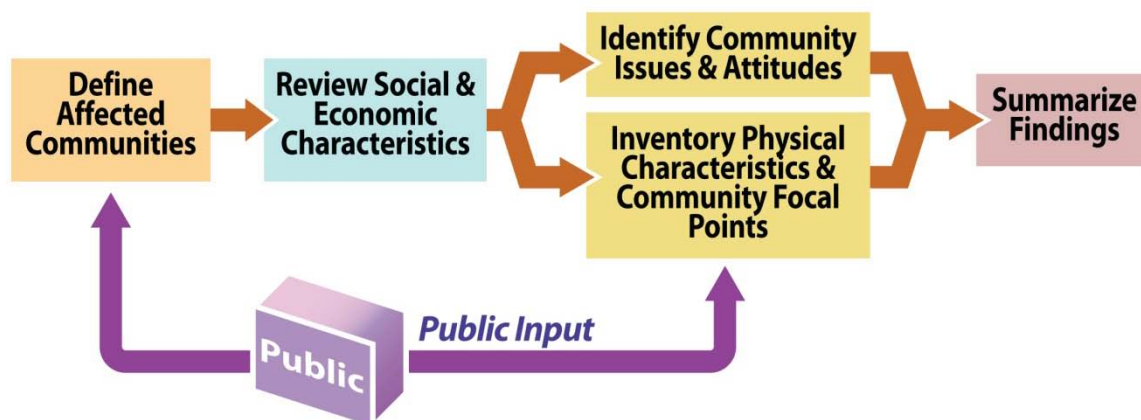


Figure 6-2: Process for Developing a Community Characteristics Inventory

Table 6-2 shows some of the information automatically calculated for each CCI report or manually added by a FDOT or MPO/TPO CLC. The EST GIS Analysis Report also provides additional community characteristics information.

Table 6-2: Community Characteristics Data

Population and Demographics	Employment Characteristics	Housing Characteristics	Physical Characteristics	Community Focal Points
<ul style="list-style-type: none"> Population and growth trends Age distribution Predominant ethnic/racial composition Average household income Special population groups Automobile ownership 	<ul style="list-style-type: none"> Unemployment rates and trends Employment base and type Tax base 	<ul style="list-style-type: none"> Age of structures Type of structures Condition of structures Vacancy rates Percentage of residents five years in home Type of occupancy 	<ul style="list-style-type: none"> Infrastructure Existing land use Future land use Planned and approved developments 	<ul style="list-style-type: none"> Schools Medical and health facilities Fire stations Religious facilities Intermodal facilities Cultural centers Law enforcement agencies Parks Community centers Social service facilities Civic centers/ Multi-use facilities Government buildings Cemeteries Other miscellaneous facilities

FDOT and MPO/TPO CLCs define communities through quantitative (data) and qualitative (public input) analyses. The immediate geographic vicinity of a project typically dictates the area of impact; in some cases, however, the potential for sociocultural consequences extends well beyond the immediate area. CLCs should rely on MPO/TPO, local government, and public input to define community boundaries; identify community desires and attitudes; and verify community focal points and data. The ***Sociocultural Effects Evaluation Handbook*** provides methods for identifying and defining community boundaries, as well as for collecting and organizing the community data.

The ***Environmental Screening Tool Handbook*** contains instructions for defining community boundaries using the edit map features tools in the EST; documenting community histories, goals, and values; and generating a CCI report from these efforts.

6.2.3 Resource Data

ETAT agencies provide digital information about the resource(s) they protect and manage. Each agency coordinates with the University of Florida GeoPlan Center to develop a data submission schedule to ensure that the content, currentness, and completeness of their agency's resource information are the most accurate and pertinent available.

It is the ETAT member's responsibility to identify GIS data within their organization that are available to use in determining the potential effects of transportation projects on agency goals and regulated resources. Examples include datasets developed from environmental studies and established agency plans, programs, and initiatives. This information could include locations and descriptions of the natural, physical, cultural, and community resources that identify priority resources.

The GeoPlan Center also coordinates at least annually with non-ETAT agencies that produce data needed for project evaluations.

The Frequently Asked Questions (FAQs) page of the ETDM Public Access Site at <https://etdmpub.flu-etat.org/est/> lists the datasets available in the EST and their sources.

6.3 DATA COLLECTION METHODOLOGIES

This section describes techniques for gathering and providing information for use in the EST. Unless otherwise indicated, these methodologies include transportation, resource, and community data. In general, Task Work Groups led by FDOT Central Environmental Management Office (CEMO) and made up of practitioners in each area of concern define data requirements. The GeoPlan Center locates data sources to satisfy the information needs developed by the Task Work Groups. The GeoPlan Center then standardizes and loads the data into the EST. Data may be entered into the EST through direct upload to the GeoPlan Center, online data entry using the EST mapping tools, or from handheld applications.

6.3.1 Transfer of Existing Digital Information

A rich diversity of information exists in the state of Florida. Rather than recreate the data, the ETDM process partners with data source authors to directly transfer information into the EST. Existing digital data transfers should include the following components:

- Spatial features that represent the geographic locations of real world objects
- Attribute data describing the objects, including a unique identifier linking each spatial feature to a record in its corresponding attribute table
- Projection and geographic coordinate information describing the parameters used to determine the geographic coordinates of the spatial features

- A metadata file containing information about the source, attribute information, and accuracy of the data
- Contact information for the data source to use regarding any questions or problems with the data

Data transfer protocols and formats vary by data type. Project data are transferred through a utility provided in the EST. The ***Environmental Screening Tool Handbook*** provides instructions for this transfer utility. Methodologies for transferring resource and community data depend on the capabilities of the source organization, and the size and format of the data. Support staff of the GeoPlan Center and the information technology staff at the source organization determine specific transfer protocols.

6.3.2 Online Data Entry

Online data entry utilities exist in the EST for project and community data that do not already exist in digital format. These utilities allow users to draw features on a map window available through their Internet browser and enter descriptive information on customized forms. When the users complete the data entry, the EST automatically updates the information. The ***Environmental Screening Tool Handbook*** provides instructions for using these utilities.

6.3.3 Field Data Collection

Applications for collecting field data using handheld data collection devices for specific resources are continually being developed or improved. These applications benefit ETDM data collection efforts by:

- Providing data formats compatible with the EST
- Customizing the data collection interface for ease of use
- Aiding locational accuracy

User documentation describing system requirements, application instructions, and data transfer mechanisms accompany completed applications. For information about the status and availability of these applications, contact help@fla-etat.org.

Source agencies may use other field data collection techniques at their own discretion. Metadata should document these alternative techniques. Coordinate data requirements and formats for documentation with the GeoPlan Center and FDOT CEMO in order to optimize data standardization.

6.4 QUALITY CONTROL/QUALITY ASSURANCE

This section establishes the data management Quality Control/Quality Assurance procedures used in the ETDM process. Standards and specifications established prior to

data collection, followed by data processing protocols, and continual review and improvement ensure data quality.

6.4.1 Locational Accuracy

The goal for all EST data in terms of locational accuracy is 12 meters or better. This enables the data to be overlaid with relative accuracy over United States Geological Survey (USGS) 1:24,000-scale map series data and to be consistent with the FDOT roadway base map. Since this accuracy is not always available, dataset documentation must include an estimate of locational accuracy. Metadata for datasets used within the EST must meet the minimum Federal Geographic Data Committee (FGDC) standards. The FDOT CEMO Project Manager overseeing the EST may exempt some project, resource, or community data from this requirement if FDOT determines the data adds enough value to justify its inclusion. In these instances, the GeoPlan Center will work with the data provider to complete the metadata documentation. The responsibility for understanding the limitations of any dataset lies with the user.

6.4.2 Data Currentness and Completeness

The effectiveness of ETAT commentary largely depends on current and complete data.

1. Through the Agency Operating Agreements (AOAs), or protocols developed with the GeoPlan Center, ETAT agencies specify dataset update/revision schedules. ETAT members ensure the EST contains their agency's current environmental data and mapping. Once uploaded to the EST, ETAT members should review the data again to ensure nothing was corrupted in the upload process.
2. FDOT and MPO/TPO ETDM Coordinators ensure the currentness and completeness of transportation data prior to each screening event, as further discussed in **Section 6.4.5**.
3. FDOT and MPO/TPO CLCs update community data.
4. The GeoPlan Center helps coordinate and manage data from each of the above participants, as well as works with non-ETAT agencies to obtain data that would also benefit the ETDM process.

6.4.3 Data Documentation Standard

Metadata provides information about a dataset, including when and how it was developed, and recommendations for its intended use. The ***Environmental Screening Tool Handbook*** defines the format of metadata for GIS datasets in the EST. EST Help documentation for transferring GIS data provides a sample of the required format. Documentation core components include:

- Name and phone number for an agency contact person knowledgeable about the dataset
- Source

- Time period (year collected)
- Attribute definitions (table fields)
- File format (for example, shapefile)
- Coordinate system and projection parameters, if applicable (for example, latitude/longitude decimal degrees)
- Datum (for example, North American Datum 1927 or 1983)
- Data collection methods (for example, scanned, surveyed or digitized)
- Estimate of locational accuracy (for example, +/- 10 meters, survey quality, or developed from 1:24,000-scale source material)

For FDOT and MPO/TPO staff gathering GIS data from other sources, obtain a copy of the metadata, if possible. The GeoPlan Center will coordinate with the source agency to complete the metadata. The GeoPlan Center will also reformat metadata into the standard EST format, if needed.

6.4.4 Data Processing Procedures

The following outline describes data processing by the GeoPlan Center:

1. The GeoPlan Center secures data from ETAT participants.
2. The dataset is processed on local working directories. A text file is maintained in the subdirectory to describe the files that are in the directory. Minimally, it includes information about the data source, a description of the data contents, and the coordinate system for the dataset.
3. GIS data are re-projected as necessary into the standard FGDL projection. For projection specifications see <http://www.fgdl.org/metadataexplorer/fgdlfaq.html>.
4. Data are adjusted to the appropriate FDOT District or statewide extent.
5. Spatial indexes are created for all files. Additional indexes are created for frequently used fields to increase the speed of map queries.
6. The applicable agency reviews the dataset. A comparison of source data and newly processed data occurs to ensure errors were not introduced.
7. Metadata is modified, as necessary, to describe the lineage, accuracy, and usage of the data. A peer review process exists at the GeoPlan Center to confirm all metadata files.
8. The dataset is then loaded into the EST. The GeoPlan Center and ETAT member review the geometry again for any anomalies.

9. The EST analysis routines, maps, and reports are updated to assess the new information.

6.4.5 Quality Review of Information

The EST provides a number of tools for performing a quality review on information in the system.

6.4.5.1 Transportation Project Data

Accurate reviews and commentary by the ETAT and the public require a clear representation of a project's extent and location. When submitting project geometry to the EST, consider the following list to help identify and correct errors before initiating a formal review:

1. Verify that the project and any associated alternatives have unique names. This will prevent confusing one project or alternative for another within the EST.
2. Verify that the number of mapped alternatives equals the number of alternatives described in the project description.
3. Compare EST project geometry with the original source data.
4. For linear features, confirm consistency between mapped alternative endpoints and the "from" and "to" locations described in the project description.
5. Check the relationships among map features representing the project geometry (also known as "topology"):
 - a) Lines – alternative segments are adjoined at their respective endpoints unless otherwise intended and there are no duplicate lines representing the same feature.
 - b) Polygons – coincident borders do not overlap, nor contain gaps unless intended.
 - c) Points – one point per feature.
6. Compare the location of project features to other features represented on the map:
 - a) Zoom to a scale of 1:5,000 or less at the endpoint of an alternative. This scale range allows you to view the most detailed aerials available in the EST – one-foot Resolution Digital Orthophoto Imagery (DOI).
 - b) Turn on additional map layers that will help confirm locational accuracy, such as:
 - i. Navteq Roads or railroads.
 - ii. Layers showing resources to avoid (schools, hospitals, parks, etc.).

- c) Using the pan tool, move along each project feature to see if it is in the right place relative to other features on the map and consistent with the project description. For example:
 - i. If a project is supposed to avoid a sensitive resource in the area, confirm that the project does not intersect the resource.
 - ii. If an alternative is intended to be within an existing road right-of-way, confirm that it is in fact within a few feet of a road.
7. Compare the value of the length field for a project alternative against the total length value entered in the Add/Update Alternative Description form.
8. Check that the geometry type best portrays the current status of the project. The EST allows point, polygon, and linear features.
9. Confirm that project geometry does not already exist by zooming to the proposed project area and turning on all subfolders within the project folder in the EST Map Viewer Table of Contents. For example, project geometry may exist at the time of a Planning Screen because it was uploaded at an earlier time as part of a MPO/TPO Needs Plan batch upload. Alternatively, institutional turnover at a MPO/TPO or FDOT may create a disjunction between existing and new geometry. When unclear whether to edit existing geometry or enter new geometry, coordinate with FDOT CEMO.

Before initiating a project screening event, ETDM Coordinators can adjust project geometry and information as needed to respond to their findings from the above checklist and their review of the preliminary GIS analysis results. When satisfied, the ETDM Coordinator may update the status of the project to inform the ETAT that it is ready to be screened. The ***Environmental Screening Tool Handbook*** provides instructions for updating the project status.

6.4.5.2 Resource and Community Information

Several mapping and query tools in the EST exist to help ETDM participants review resource datasets from their agency before they are uploaded into the FGDL. For each dataset, ETAT members review the metadata, line work, and database information for accuracy, completeness, and currentness. ETAT members compare this information with the data currently available from their agency to ensure the EST contains the most current and accurate data.

Consider the following during this review:

- Confirm that this is the most current version of the data available.
- Ensure the source contact information is listed in the metadata.

- Identify whether another dataset exists that more accurately reflects the current condition of the resource. If so, provide the GeoPlan Center with the data source contact information in order to obtain a copy for the FGDL.
- Review the dataset for errors (see suggested error checking items provided above for transportation information).
- Confirm the metadata is up-to-date and reflective of the constraints associated with using the data.

Contact data@fla-etat.org to provide information about any updates or required changes.

6.5 DATA AVAILABILITY AND RETENTION

The EST is an Internet application accessed via a web browser. A public access site or restricted user accounts authorized on the secure version of the site provide read-only access. CEMO grants write access to specific named users through the secure website based on access approval by ETDM Coordinators. System administrators create the appropriate account access credentials. Users can access the EST 24 hours per day, seven days a week. CEMO announces, in advance, downtime needed for system maintenance.

ETDM project data are extracted nightly and made available for download on the EST. This includes all reviewed projects or those currently in review. The file may be downloaded from ftp://ftp.geoplan.ufl.edu/pub/etdm/ETDM_file_GDBs/. Refer to the **Environmental Screening Tool Handbook** for more information.

The FDOT Records Retention and Disposal Schedule dictate record retention schedules for information stored in the EST. The FDOT System Manager for the ETDM database implements the following Standard Operating Procedures:

1. Transportation project information, associated records, and documents shall be retained in the EST for at least five years following completion of construction of the last project segment, including storing a recoverable snapshot at each project status and/or phase change during the project life cycle. Upon deletion from the ETDM database, these records shall be archived on electronic storage media.
2. For projects not constructed, records shall be retained on the EST for at least five years following the last action. Upon deletion from the ETDM database, these records shall be archived on electronic storage media.
3. Information associated with draft projects (not reviewed by the ETAT) shall be retained until obsolete, superseded, or administrative value is lost as determined by the ETDM Coordinator. These records shall not be archived upon deletion from the EST.
4. GIS data included in the EST to describe the natural, physical, cultural, and community resources are duplicate copies of the original source records. These

records are retained until obsolete, superseded or administrative value is lost. They are archived upon deletion from the EST.

6.6 REFERENCES

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6.7 HISTORY

03/2006: Original Publication

07/2013: Edits to update and clarify data management procedures