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Introduction

The North Jersey Transportation Planning Authority developed an Enterprise Geographic Information System database (EGIS) project, contained in the agency's Unified Planning Work Program (UPWP) in 2009. The goal of the project was to consolidate the agency's data into a single, web-enabled platform and to improve information sharing among the project EGIS participants. With the advancement of certain Esri software and the deprecation of others, the NJTPA updated the original EGIS Quality Assurance documentation to better reflect the current IT infrastructure and GIS workflows being employed at the NJTPA. This document now summarizes the current EGIS policy, technology, and operating standards and describes its overall quality assurance and data management expected by internal staff, Subregions, TMAs, partner agencies and consultants. Please note that this document is subject to change based on changes in industry standards, availability of software, and compatibility with the NJTPA's current IT infrastructure.

Governance

The NJTPA EGIS is governed and overseen by NJTPA's Analytical and Planning Tools division's GIS staff. Staff sets and enforces policies, guides decision-making related to technology, and oversees the agencies Quality Assurance, Data Inventory, and Data Exchange programs. At its core, the EGIS is a network of people, data, and technology resources. The NJTPA GIS staff's mission is to ensure that these resources are used to best serve the transportation goals of the region.

Policy

The NJTPA GIS staff has implemented a set of comprehensive, high-level policies that serve to guide the overall administration of the NJTPA's EGIS.

- Commitment to a creating a framework for the open exchange of GIS and other digital products.
- Commitment to providing user-friendly and internet-based public access to GIS and other digital products.
- Commitment to the use of state-of-the-art data management tools to support data development and data exchange programs.
- Enforcement of a Quality Assurance program to establish trust in the data products published by NJTPA.

Technology Platforms

Implementation of the EGIS, as a data sharing network, relies on several technology components. Data exchange standards among and within NJTPA partner agencies requires a basic understanding of the hardware and software platforms used to build the EGIS. These components make up the EGIS infrastructure and are part of the overall EGIS standards.

Hardware and Software Standards

The EGIS is built, operated, and maintained using an array of IT components. These components can be divided into three groups; 1) Server-Side: Database and Application, 2) Server-Side: Application, and 3) Client-Side: Application. These components are run on the NJTPA's local area network which is connected to the internet via a 1 Gigabit per second back-bone. Figure 1 depicts the overall EGIS hardware configuration.

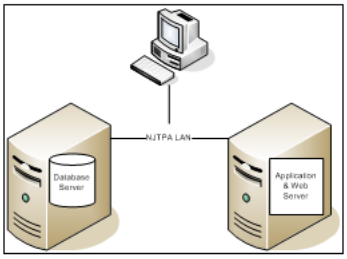

Figure 1 - EGIS Hardware

Table 1 - Server-Side: Database and Application

#	Software Element	Description
1	Operating System	Microsoft Server 2016 Datacenter
2	Database server	Relational Database Management System - Microsoft SQL Server 2016;
3	GIS Gateway	ESRI ArcSDE 10.8.2
4	Data Management Applications	Microsoft SQL Server Business Intelligence Development Studio with ASP.NET. C## is the programming language. *Note that initial EGIS data management applications are run from the database server*.
5	Web Server for Data Management Applications	Microsoft IIS

Table 2 – Server-Side: Application

#	Software Element	Description
1	Operating System	Microsoft Windows Server Standard 2012 R2
2	Server GIS	ESRI ArcGIS Server for the Microsoft .NET Framework, Version 10.8.1
3	Web Server for ArcGIS Server	Microsoft IIS

Table 3 – Client-Side: Applications

#	Software Element	Description
1	GIS connection	ESRI ArcGIS 10.8.2
2	Database connection	Microsoft SQL Server Management Studio and Access 2016

Geodatabase Standards

The EGIS is implemented through an ESRI ArcSDE geodatabase platform to support the development and distribution of quality data sets. A geodatabase is a database that has been spatially enabled through the ArcSDE software. The contents of the EGIS geodatabases are made available through other ESRI software components, such as ArcGIS and ArcGIS Server.

The geodatabase is the cornerstone of the EGIS. A series of standards have been developed to govern its use and associated data distribution. These standards serve to guide all aspects of data development, submission, storage, and distribution. These standards, in their aggregate, are one part of the overall EGIS Quality Assurance Program.

As data is developed, standards are imposed on each item to ensure quality and conformance with the underlying technology. Table 4 describes the quality assurance items for which EGIS data sets will be subject to during the data development process.

Table 4 – Quality Assurance Items

#	QA/QC Item	Description
1	Layers must have a responsible party from an NJTPA division to maintain the layer.	Each layer must have a custodian and a sponsoring department.
2	Layers must use the NAD_1983_StatePlane_New_Jersey XY Coordinate System where applicable.	Each layer must contain a proper spatial reference.
3	Layer must conform to NJTPA naming conventions	Refer to Table 6 of this document.
4	Layers must contain metadata	Metadata, to varying degrees, should be maintained for all EGIS data objects. See page 6 for a comprehensive list on what metadata elements are required.

5	Layers must be checked for quality assurance by the NJTPA GIS staff against the quality assurance items	NJTPA GIS staff will ensure all GIS data products are in compliance with the EGIS Quality Assurance documentation.

The data items themselves are stored in the GDB_PROD geodatabase according to **Framework Categories**, depicted in Table 5.

Table 5 - NJTPA Framework Categories

#	Suffix	Framework Category	Description
1	c	Cadastral	Includes legal, block and lot data sets
2	d	Design Plans	Includes CAD-type data sets
3	e	Environmental	Includes data sets that are environmentally related
4	f	Facilities	Includes data sets that are related to buildings
5	g	General	Includes data sets that do not fit into any of the formal data categories
6	p	Planning	Includes data sets that relate to the planning process
7	pb	Political Boundaries	Includes data sets that denote artificial boundaries created by humans
8	t	Transportation	Includes data sets that are transportation related
9	u	Utilities	Includes data sets that are related to utilities

Data items are also subject to a set of nomenclature standards. Table 6 provides a list of guidelines to consider when naming database tables and GIS layers.

Table 6 - Naming Conventions for table and layers

#	Convention	Example
1	Names should describe the data contained in the table or layer	• t_PopulationDensity_2021 • lt_BusRoutes_NJT_2023
2	Names should avoid the use of abbreviations.	Exceptions include: • CMS: Congestion Management System • SLD: Straight Line Diagram

		• SMS: Safety Management System • NJDOT: New Jersey Department of Transportation • NJT: NJ TRANSIT
3	Only use words like 'BOUNDARY, 'ZONE', 'LINE', 'POINT' when they are necessary to clarify the data contained by the table. Logical, non-technical descriptors are preferred.	
4	In general, the first word in the name should reflect the data content while additional words will refine the description. This makes it easier for users to find data that is most often listed alphabetically or when using search engines.	• lpb_Age_CensusTracts_ACS_20172021

Metadata

Metadata must be created for all GIS data products submitted to the NJTPA. At a minimum the following items are required and may be submitted as a separate word document or applied to the GIS layer or table in the metadata section.

- **Abstract**- A brief narrative summary of the data set.
- **Purpose** – A summary of the intentions with which the data set was developed.
- **Access constraints** – Restrictions and legal prerequisites for accessing the metadata. These include any access constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on obtaining the metadata.
- **Use constraints** – Restrictions and legal prerequisites for using the metadata after access is granted. These include any metadata use constraints applied to assure the protection of privacy or intellectual property, and any special restrictions or limitations on using the metadata.
- **Primary contact** – Including name and email address. For subregional studies, the county project manager is the primary contact. For all other studies, the NJTPA project manager is the primary contact. The consultant team should not be named as the primary contact.
- **Date** – provide the month and year (MM/YYYY) of when the data was created.
- **Process steps** – Information about the events, parameters, and source data which constructed the data set, and information about the responsible parties. An explanation of the event and related parameters or tolerances.

Data Sharing

The NJTPA no longer uses the Geoportal which was the primary mechanism for data exchange in 2009 when the original EGIS Quality Assurance document was created. The NJTPA now uses the Esri Hub platform and offers the NJTPA Open Data Portal which provides access to publicly available geospatial data. Depending on the nature of the study and dataset including but not limited to tech memos, GIS layers, images, tables etc., items may be uploaded and available to the public via the NJTPA's Open Data Portal. The inclusion of data to the Open Data Portal will be at the discretion of the of the NJTPA's GIS staff.

Data deliverables

As part of the EGIS Quality Assurance, all data deliverables must be in a format determined by the NJTPA to be in line with the NJTPA's current IT and GIS infrastructure. Therefore, all spatially derived products must be in ArcGIS (i.e., ArcMap or ArcGIS Pro). All maps should be provided via map packages. All GIS layers should be provided via a geodatabase. Other non-Esri based products used during a project are allowed only if this is agreed upon during the start of the project by the NJTPA project manager and GIS staff. However, it should be noted that any non-Esri geospatial data developed during a project or study must be converted (data, maps, and accompanying symbology) to Esri formats for compliance with the EGIS standards by the consultant or other parties involved in the project. The NJTPA is not responsible for converting data to Esri formats.