APPENDIX J:
GIS ONLINE TOOL DEVELOPMENT & TRANSFER

J.1 GIS Online Tool Development

As part of the Kentucky Statewide Corridor Plan (SWCP), a web-based GIS Online Tool was developed for corridor data digestion, visualization, and dissemination. The solution used a variety of standard technologies common to the industry. In assessing the primary data exchange format, the Project Team concluded that Microsoft Excel would serve the needs of all parties involved.

All 45 Tier 2 corridor segments, of which 20 are visioned, were aggregated into an Excel spreadsheet. Each row represents an individual corridor presented as a corridor profile within the web-based interface. Columns map to a specific field within the corridor profile. For instance, the column "Overview" maps to the corridor overview text when presented. Corridor fields were grouped into the following tab names:

- Overview
- Traffic & Growth
- Issues & Concerns
- Other Modes
- Improvement Concepts
- Stakeholder Input
- Scoping Report

A popular mapping solution, Google Maps, was leveraged to visualize the corridor data within the state of Kentucky. Based on available GIS files, corridors are drawn and users click on highlighted lines to show an individual corridor. Functionality exists to zoom to a specific county and toggle visibility of 28 interactive data layers.

In the data evaluation process, it was determined that a combination of text, images, and charting would communicate the most appealing interface within each profile. Numerical data is specifically visualized as either interactive charts or gauges to allow a user to quickly glance at information and quickly discern the value.

The following critical tenets were followed during the development of the GIS Online Tool:

- **User Interface (UI) Design.** A compelling and streamlined design that builds upon KYTC's brand is critical to creating a user's first impression and ultimate "experience".
- **Responsive Design.** User interface design and layout that delivers a user-friendly, appealing interface across all device displays and modern browsers addresses how consumers receive information is essential. All web-based contents seamlessly support multi-device, multi-browser and multi-platform display.
- **System Architecture.** The system architecture/framework is critical to a sustainable, scalable map application that can meet both current and future needs. Modular coding practices aligned with the most current industry standards were deployed to support application longevity.
- **Usability.** The user interface and navigation functions were reviewed for organization logic, naming conventions, intuitive visual and text cues, and overall user-friendliness.
- **Accessibility.** Design and coding practices that support improved usability and broaden website access to stakeholders requiring assistive technologies are essential to online applications.

The programming of the GIS Online Tool was based on some key technologies:

- **ASP.NET MVC Web API –** Framework used to transport corridor data to client web browser. Excel data is converted to JSON and retrieved from spreadsheet by a corridor identifier field.

- **Google Maps Javascript API –** Version 3 of mapping platform was used to display base map and visualize segments.
- **GeoJSON –** Open standard format storing geometry data which displays natively in Google Maps. Shape files were exported to GeoJSON using standard tools.
- **Kendo UI –** 3rd party component library used for data visualization and Model View ViewModel (MVVM).
- **AMCharts –** 3rd party charting software used in many of the data visualizations.

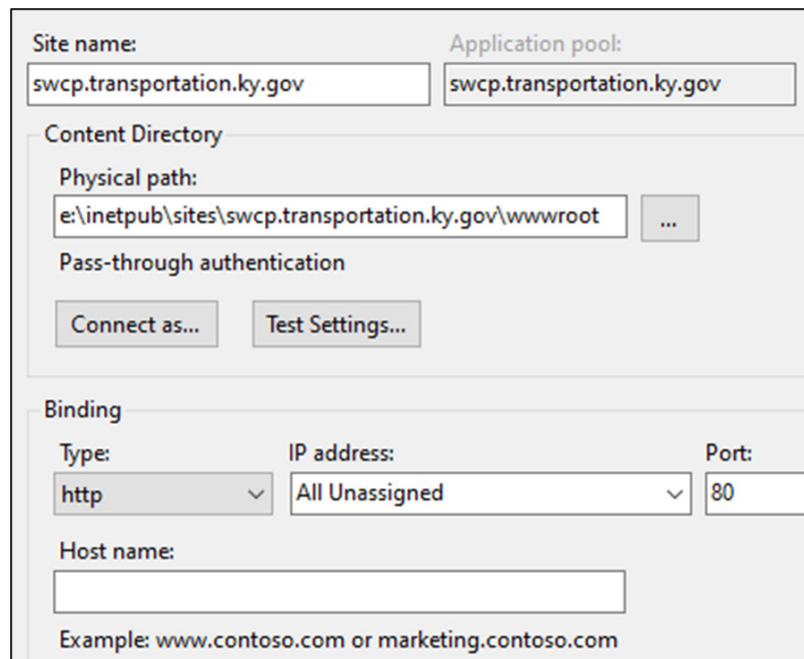## J.2 GIS ONLINE TOOL TRANSFER

This section outlines the website setup for the SWCP GIS Online Tool to facilitate transferring the tool to KYTC.

J.2.1 ASSUMPTIONS

- IIS 7.x is available in hosting environment.
- Asp.Net 4.5 is available and configured correctly.
- Tool will be installed as a standalone website. If installed as application, additional steps will be required to configure data API.
  - o /default.aspx – Line 1115. Update apiRoot path
  - o Inherited web.config settings may need to be removed

J.2.2 INSTALLATION STEPS

1. Extract the delivered file archive.
2. Create a new directory on web server to host application files (e.g., e:\inetpub\sites\swcp.transportation.ky.gov\wwwroot\).
3. Copy files from Website\ to this directory.
4. Create a new website in IIS with settings similar to the figure below.

Note: Update bindings accordingly.

5. Extract the delivered file archive to the swcp.transportation.ky.gov website document root (e.g. e:\inetpub\sites\swcp.transportation.ky.gov\wwwroot).
6. In Application Pool settings, update swcp.transportation.ky.gov app pool to run v4.0.30319 of .NET CLR and pipeline mode of "Integrated".
7. Finished.

J.2.3 FILE STRUCTURE

After completing the installation by following the instruction described in Section K.2.2, the package should be properly set up on user's server with all files organized in a similar structure as below:

- "Source" folder
  - o "Framework" folder. Framework library containing REST API's and application logic.
  - o "Web" folder. Application content stored in this folder.
  - o "Kytc.Swcp.sln" file. Visual Studio solution file. Requires VS.NET 2019.
- "Website" folder
  - o "bin" folder. Website binary folder.
  - o "files" folder.
    - "segments" folder. This folder contains all maps and tables (in .PDF or .PNG format) of study corridors that are being used by the online tool. Files in this folder should be updated whenever changes are made to study corridors or corresponding data.
    - "segment_data.xlsx". This file stores a corridor profile for each study corridor segment and corresponds to the web-based interface. This file also calls corresponding maps and/or tables from the "segments" folder as needed. This file should be updated whenever changes are made to study corridors or corresponding data.
  - o "default.aspx" file. Main index page for web application.
  - o "global.asax" file. Main application events file.

J.2.4 SEGMENT DATA REFRESH

To update segment data in Excel format, name the new file "segment_data.xlsx" and overwrite file in directory /files/.

To update supporting corridor maps or tables, name the new file in a similar fashion as existing file, and overwrite file in directory/files/segments/. Note that key maps and bike/ped/transit maps require both .PDF and .PNG files. PNG files should be generated from PDF.