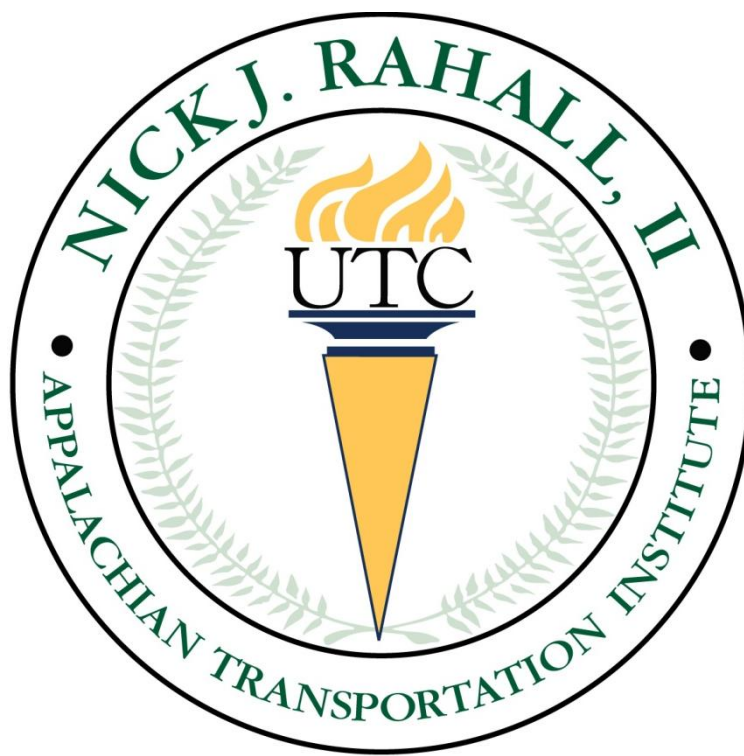# Enhanced Appalachian Development Highway System
GIS Portal Phase II

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16. Abstract

Rahall Transportation Institute (RTI) has been working on Appalachian Development Highway System (ADHS) GIS Project to facilitate numerous tasks and needs for State DOTs and FHWA Division offices since 2002. With continuous efforts to improve the ADHS GIS system, RTI and ARC ADHS Program management team identified new tasks and works were not in the previous project implementation have been added to the project as a result of emerging needs by the ARC. Other tasks/works were being recommended to add to the phase II project to enhance the system towards better and effective way to provide information to ARC users and public. As we approach to the next stage of the Cost to Complete Estimate effort, the project will ensure new and improved functions to the system that will improve efficiency and quality for producing the next ADHS Cost to Complete Estimate products as well as to provide new utility functions towards immediate application to ADHS routine operations.

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Enhanced Appalachian Development Highway System GIS Portal Phase II

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Project Background

Rahall Transportation Institute (RTI) has been working on Appalachian Development Highway System (ADHS) GIS Projects to facilitate numerous tasks and needs for State DOTs, Federal Highway Administration (FHWA), and Appalachian Regional Commission (ARC) since 2002.

With continuous efforts to improve the ADHS GIS system, RTI and ARC ADHS Program management team recommend following tasks/works. Some tasks and works were not in the originally identified scope of work throughout the previous project implementation have been added to the project as a result of emerging needs by the ARC. Other tasks/works were being recommended to add to the phase II project to enhance the system towards better and effective way to provide information to ARC users and public.

As we approach to the next stage of the Cost to Complete Estimate effort, the project will ensure improved and new functions to the system that will improve efficiency and quality for producing the next ADHS Cost to Complete Estimate products as well as to provide new utility functions towards immediate application to ADHS routine operations.

Project Objectives

The proposed project will achieved the following objectives:

1. Implement ADHS Linear Referencing System & Dynamic Segmentation
2. Accommodate major changes approved by ARC and FHWA and provide continuous ADHS GIS supports to ARC, FHWA, and State DOTs as needed.
3. Facilitate ADHS Annual Status Change and related project tracking update
4. Upgrade ADHS Map site from ArcGIS Server 9.1 to 9.3
5. Develop and deploy new ArcGIS Server and Google Map mashup website and research implementation of Google Earth/Google Earth plugin.
6. Conduct feasibility study of using Google Map as base layer of 2012 Cost to Complete Strip Map.
7. Explore and Integrate Appalachian Regional Transportation & Economic Data
8. EADHS website redesigning

9. Redesign and improve Annual Status and Project Tracking and facilitate 2010 Annual Update & Project Tracking

10. Provide continuous ADHS GIS supports to ARC, FHWA, and State DOTs

11. Current Cost to Complete Estimate system procedure review and technology assessment

Task Descriptions

Task 1: Implement Dynamic Segmentation using ADHS Linear Referencing System (LRS)

LRS was first implemented during the 1997 ADHS Cost to Complete Estimate to make the ADHS estimates sections compatible with LRS used in the Highway Performance Monitoring System (HPMS). The LRS is a key data element in the GIS that will geographically identify locations of ADHS cost estimate sections as well as any roadway features and related information that are linked to the ADHS.

Dynamic Segmentation (DynSeg) is the GIS process to compute and generate point or linear features of database records referenced by their position along a linear feature. Using DynSeg, information stored in the ADHS database tables can be visualized on a map and displayed, queried and analyzed. This task will develop and implement ADHS DynSeg.

Implementation of these will provide better framework to accommodate State DOT's major changes by eliminate/streamline work flow.

1) Develop LRS key and routing system
2) Create point and linear feature event tables along the ADHS
3) Implement ADHS DynSeg and troubleshooting

Task 2: Accommodate major changes approved by ARC and FHWA and provide continuous ADHS GIS supports to ARC, FHWA, and State DOTs as needed.

This task will develop procedures and tools to accommodate major change approved by ARC/FHWA ADHS program management team. It will also include GIS support and

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mapping development for ad hoc corridor analysis or related work as required by ARC/FHWA.

Task 3: Facilitate ADHS Annual Status Change and related project tracking update

RTI had facilitated ADHS Annual State Change and the task was not included in any previous projects. RTI will continuously prepare and facilitate future ADHS Status Change.

Task 4: Upgrade ADHS Map site from ArcGIS Server 9.1 to 9.3

This task will upgrade ADHS Map site from ArcGIS Server version 9.1 to 9.3 to take full advantage of new capabilities.
1) ArcGIS Server 9.3 upgrade
2) ArcSDE 9.3 upgrade
3) MSSQL 2008 upgrade

Task 5: Develop and deploy new ArcGIS Server and Google Map mashup website

As a result of successful pilot study from previous project, the task will design and deploy a new ARC mashup website using ArcGIS Server and Google map. In addition, this task will research implementation of Google Earth/Google Earth Plugin which allow users to see terrain and 3D model.
1) Design layout, features, and functions
   a. Design user interface and layout
   b. Create integrated online map
   c. Design data feed mechanism from different online sources
2) Development

Task 6: Conduct feasibility study of using Google Map as base layer of 2012 Cost to Complete Strip Map.

This task will review requirements of ADHS cost to complete strip map guidelines and Google Map and make a recommendation.

Task 7. Explore and Integrate Appalachian Regional Transportation & Economic Data

This task will explore and integrate Appalachian region economic data into Appalachian Development Highway System GIS website.

1) Compile data and create map objects
2) Design and develop customized tools and functions
3) Different map views based on user
4) Explore Google street view integration
5) Develop layer/theme transparency & visibility function

Task 8. EADHS website redesign

This task will redesign www.eadhs.org website.

1) Compare and exam different web content management platform
2) Design and develop

Task 9. Redesign and improve Annual Status and Project Tracking and facilitate 2010 Annual Update & Project Tracking

The task will make improvements on current system and prepare and facilitate ADHS Annual State Change and project tracking update.

1) Redesign and improve user input interface
2) Verify user input
3) Update Notification
4) Design and develop report interface for better status and mileage tracking from year to year and Status to Status
5) Facilitate 2010 Annual update and Project tracking

Task 10. Provide continuous ADHS GIS supports to ARC, FHWA, and State DOTs

This task will provide continuous GIS support and mapping development for ad hoc corridor analysis or related work as required by ARC/FHWA. It will also accommodate any major changes approved by ARC/FHWA ADHS program management team as needed.

Task 11. Current Cost to Complete Estimate system procedure review and technology

assessment for upcoming 2012 Cost Estimate

This task will review and assess current procedure, user interface, data management, and implemented technology of Cost to Complete Estimate System and produce recommendation to improve user experience and system performance.

Conclusion

ARC and RTI have been collaborating ADHS GIS Projects and accomplished many successes and were recognized as a good example of regional data management and integration. This project was not only to enhance EADHS GIS Portal to integrate and disseminate ARC related transportation and non-transportation data that will serve ARC needs to its larger user base but also to improve user experience with latest technologies and data enhancement.