

**Guidelines and Software Instruction Manual
for Preparation and Submission
of the
Appalachian Development Highway System
2007 Cost to Complete Estimate**

April 2006

It is strongly encouraged that State DOTs contact their FHWA Division ADHS Coordinator (Appendix A) regarding any **policy or procedural** questions. If the FHWA Division ADHS Coordinator cannot answer the question then he or she can contact:

FHWA (Washington)

Ms. Claretta Duren, (202) 366-4636 or E-Mail: Claretta.Duren@fhwa.dot.gov

Questions regarding the ADHS GIS Program are to be directed to the Rahall Appalachian Transportation Institute.

Rahall Appalachian Transportation Institute

Mr. Sang Yoo, (304) 696-3376 or E-Mail: sang.yoo@marshall.edu

Key Dates:

- April 26, 27, 2006** - **2007 ADHS Cost to Complete Estimate Kick-off Meeting**
- June 1, 2006** - **State DOTs Projected Budget to Prepare 2007 ADHS Cost to Complete Estimate due FHWA, Washington**
 - **RTI to provide prints of strip maps to States for revision and update.**
- June 7, 2006** - **FHWA, Washington and ARC to have State DOTs Projected Budget to Prepare 2007 ADHS Cost to Complete Estimate review completed.**
- September 30, 2006** - **Eligible ADHS Sections, NOT AUTHORIZED OR FULLY FINANCED as of this date, must have 2007 estimates prepared/updated.**
- November 1, 2006** - **State DOTs to submit revised and updated strip maps to RTI.**
- January 1, 2007** - **States must have their final 2007 ADHS Cost to Complete Estimates to their respective FHWA Division Office no later than January 1, 2007.**
 - **This gives the States 8 months to prepare/update their 2007 ADHS Cost to Complete Estimate.**
 - **Given that the 2007 ADHS Cost to Complete Estimate will be accessible via the web, notification via E-Mail as to its completion along**

with the State NARRATIVE is all that is required.

- March 1, 2007**
- **FHWA Division Offices must complete their review of their State's 2007 ADHS Cost to Complete Estimate and submit to Washington FHWA, no later than March 1, 2007.**
 - **This gives FHWA Division Offices 2 months to review and verify their State DOT's 2007 ADHS to Cost to Complete Estimate.**
 - **Given that the 2007 ADHS Cost to Complete Estimate will be accessible via the web, notification via E-Mail as to the FHWA Division Office review and verification along with the State DOTs NARRATIVE is all that is required.**
- May 1, 2007**
- **FHWA Washington must complete appropriate reviews and notify FHWA Division Offices no later than May 1, 2007 as to its concurrence via E-Mail.**
- May 15, 2007**
- **State DOTs must complete any final changes to the 2007 ADHS Cost to Complete Estimate no later than May 15, 2007. RTI will print the State DOTs 2007 ADHS Cost to Complete Estimate Report as described in Chapter 6.**
- July 1, 2007**
- **RTI will mail the State DOTs 2007 ADHS Cost to Complete Estimate Report to the State DOTs for appropriate signatures no later than July 1, 2007.**
- July 15, 2007**
- **The State DOT 2007 ADHS Cost to Complete Estimate Reports must be signed by the State DOT Executive Officer and the FHWA Division Administrator and submitted to FHWA Washington no later than July 15, 2007.**
- September 1, 2007**
- **Final 2007 ADHS Cost to Complete Estimate Report will be issued by September 1, 2007.**
- October 1, 2008**
- **State ADHS apportionments will be based on the 2007 ADHS Cost to Complete Estimate starting October 1, 2008.**

Disclaimer

Although these Guidelines make references to certain Federal laws and regulations, Federal-aid policies, highway standards, specifications and guides, there is no warranty, expressed or implied as to their accuracy and completeness, and all such warranties are hereby disclaimed.

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Introduction

The Appalachian Regional Commission (ARC) is responsible for providing the Federal Highway Administration (FHWA) annual apportionment factors to use in apportioning Appalachian Development Highway System (ADHS) funds to the thirteen Appalachian States. The thirteen Appalachian States include: Alabama, Georgia, Kentucky, Maryland, Mississippi, New York, North Carolina, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia, and West Virginia. Under the current Transportation Re-Authorization, SAFETEA-LU, Congress has authorized \$470,000,000 for each of the fiscal years 2005 through 2009. ADHS funds remain available to the ARC States until expended.

According to Commission policy, ADHS funds are to be apportioned based on each ARC State's remaining estimated need to complete eligible sections of the ADHS. To this end, annual State allocations are determined from the State apportionment factors established from the latest Commission approved ADHS Cost to Complete Estimate. The most recent ADHS Cost to Complete Estimate is as of 2002.

It is ARC's policy to prepare an ADHS Cost to Complete Estimate approximately every 5 years. Given that last estimate was prepared as of 2002, a 2007 ADHS Cost to Complete Estimate should be prepared. The factors established from the 2007 ADHS Cost to Complete Estimate will be implemented October 1, 2008.

Given the purpose of the ADHS Cost to Complete Estimate and its potential impact, it is imperative that ARC, FHWA and the thirteen ARC States work together in order to prepare an accurate and defensible 2007 estimate in the most efficient manner. In addition it is important that all thirteen States follow a process that provides consistency.

The purpose of this manual is to provide guidelines in preparing an ADHS Cost to Complete Estimate. Every attempt has been made to furnish information, in an easy to use format, for all parties to carry out their role in preparing an accurate and defensible estimate in an efficient manner. However, in order to improve current as well as future efforts, questions/comments/suggestions are encouraged and should be directed to Ms. Claretta Duren with Washington FHWA Office.

At a minimum, State DOT's must provide the following deliverables:

- *2007 ADHS Cost to Complete Estimate*
- *Narrative explaining differences between their 2007 ADHS Cost to Complete Estimate and their 2002 ADHS Cost to Complete Estimate*
- *Actual Costs for Preparing their 2007 ADHS Cost to Complete Estimate*

Chapter 1

State ADHS Corridor(s) Description

Eligible ADHS Miles

The ADHS consists of 31 highway corridors totaling 3,571.1 miles. As of December 31, 2005, a total of 3,090.1 miles had been authorized by Congress as eligible for ADHS funding with 481 miles ineligible for ADHS funding. Ineligible ADHS miles consist of those miles planned to be constructed or have been constructed with other than ADHS funds.

Eligible ADHS miles are also identified as Participating Miles while ineligible miles are identified as Non-Participating Miles.

ADHS Corridor(s) Description (Table A/State Map)

State Departments of Transportation (DOTs), utilizing **Table A**, must describe their ADHS Corridors according to the following parameters:

1. Corridor Letter (Designated by ARC)
2. Principal Existing Route Numbers
3. Segment Description
4. Miles Eligible for ADHS funding
5. Miles Ineligible for ADHS funding

Segment descriptions must be established utilizing the following control points - State lines, ADHS Corridor approved termini (either Interstate or another ADHS Corridor) or the transition between eligible and ineligible ADHS miles. Table A-1 provides a listing of ARC approved ADHS Corridors and Termini.

The total of eligible and ineligible miles for each of the State's ADHS Corridors must reconcile to their annual ADHS status of development reported to ARC as of September 30, 2006.

State DOT's must provide the Rahall Appalachian Transportation Institute (RTI) the following geographical attributes to be shown on their State Map:

1. General ADHS corridor location and respective corridor designation
2. Established control points from Table A
3. Urban areas and/or city names
4. Interstate and National Highway System route locations and associated route numbers
5. Appalachian Regional Commission designated counties

A sample Table A for the State of Kentucky as well as a sample State Map (Figure 1) is provided for your reference.

Table A – State Appalachian Corridor Segment Descriptions

5:53:03 PM		TABLE A		3/13/2006	
Page 2 of 2		Appalachian Corridor Segment Descriptions		State/Commonwealth of: Kentucky	
Corridor Letter	Principal Existing Route Numbers	Segment Descriptions	Eligible (miles)	Ineligible (miles)	
F	US 119	Jct. 119 to near Calloway	57.8		
F	US 119	Near Calloway to Jct. Corridor I East of Whitesburg	8.8		
F	US 119	Jct. Corridor I to 3.6 Mi. West of Jenkins 3.6 Mi. West of Jenkins to Jct. Corridor B		1.7	
G	US 119	Jct. Corridor B at Pikeville to W.V. Line in S. Williamson	27.7		
I	KY 15, 7	Jct. Corridor F East of Whitesburg to KY 80 at Hazard	33.9		
I	KY 80	Hazard to Combs		0.6	
I	KY 28, 276, 15	Combs to Quicksand	26.0		
I	KY 15	Quicksand to Jct. Corridor R at Campton		23.1	
I	KY 9000	Jct. Corridor R to I-64 near Winchester		42.6	
J	KY 61, 90, US 127	Tennessee Line to 1.7 Mi. Southwest of Touristville	52.6		
J	KY 90	1.7 Mi. Southwest of Touristville		1.7	
J	KY 90	Touristville to Lake Cumberland Bridge	8.8		
J	KY 90	Lake Cumberland Bridge		0.3	
J	KY 90	Lake Cumberland Bridge to US 27 at Burnside	0.8		
J	US 27	Burnside to Somerset		7.0	
J	KY 80	Somerset to Jct. I-75 near London	31.5		
Q	KY 80	Jct. Corridor B near Shelbiana to Virginia Line So. of Elkhorn City	19.1	0.3	
R	KY 9009, US 460, KY 114	Jct. Corridor I near Campton to Jct. Corridor B near Prestonsburg		50.7	
		Total	431.7	148.2	

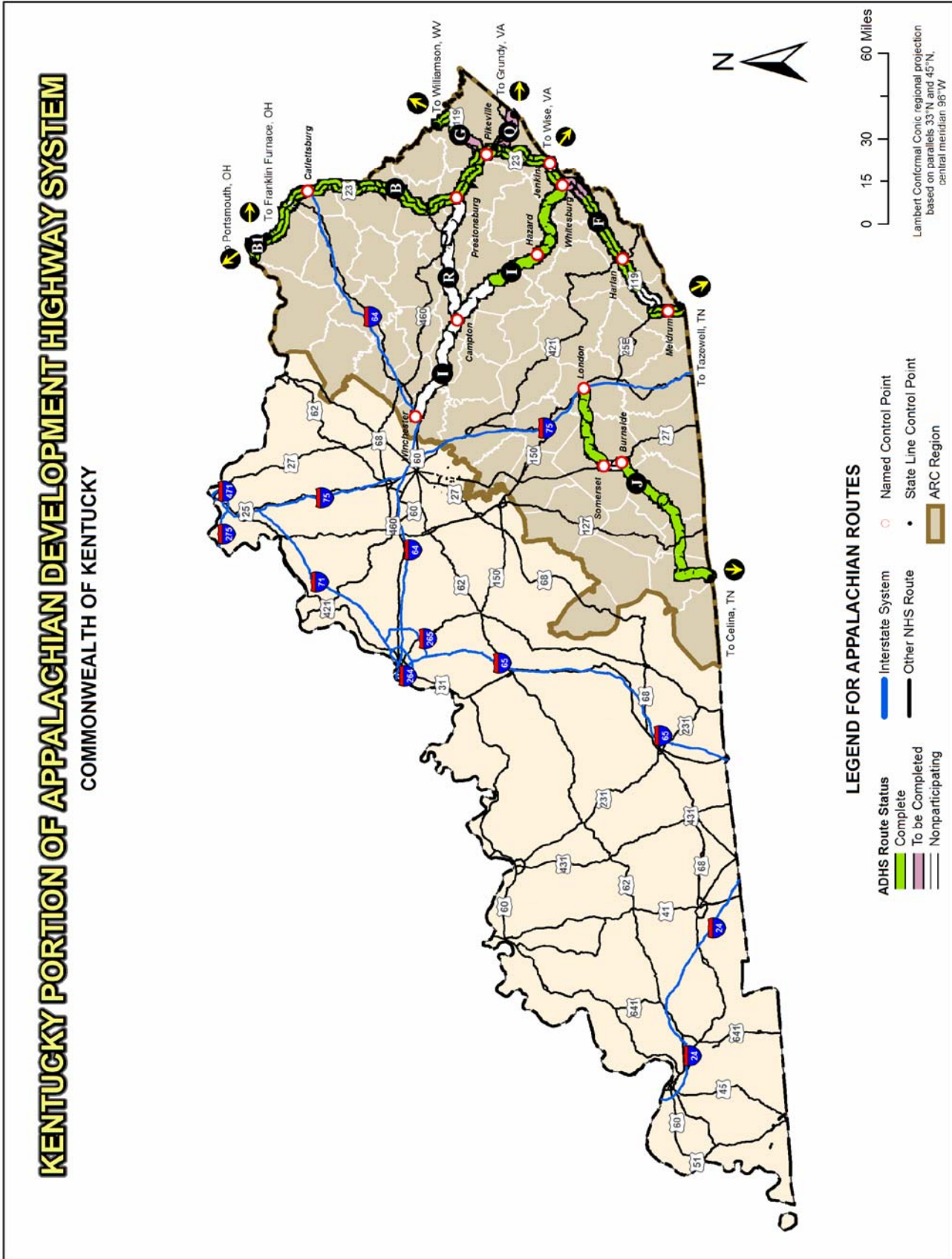
Table A – State Appalachian Corridor Segment Descriptions (continued)

2:49:44 PM		TABLE A		3/30/2006	
Page 2 of 2		Appalachian Corridor Segment Description		State/Commonwealth of: Kentucky	
Corridor Letter	Principal Existing Route Numbers	Segment Descriptions	Eligible (miles)	Ineligible (miles)	
F	US 119	Middlesboro to Jct. US 119 at Pineville		12.4	
F	US 119	Jct. 119 to near Calloway	57.8		
F	US 119	Near Calloway to Jct. Corridor I East of Whitesburg	8.8		
F	US 119	Jct. Corridor I to 3.6 Mi. West of Jenkins 3.6 Mi. West of Jenkins to Jct. Corridor B		1.7	
G	US 119	Jct. Corridor B at Pikeville to W.V. Line in S. Williamson	27.7		
I	KY 15, 7	Jct. Corridor F East of Whitesburg to KY 80 at Hazard	33.9		
I	KY 80	Hazard to Combs		0.6	
I	KY 28, 276, 15	Combs to Quicksand	26.0		
I	KY 15	Quicksand to Jct. Corridor R at Campton		23.1	
I	KY 9000	Jct. Corridor R to I-64 near Winchester		42.6	
J	KY 61, 90, US 127	Tennessee Line to 1.7 Mi. Southwest of Touristville	52.6		
J	KY 90	1.7 Mi. Southwest of Touristville		1.7	
J	KY 90	Touristville to Lake Cumberland Bridge	8.8		
J	KY 90	Lake Cumberland Bridge		0.3	
J	KY 90	Lake Cumberland Bridge to US 27 at Burnside	0.8		
J	US 27	Burnside to Somerset		7.0	
J	KY 80	Somerset to Jct. I-75 near London	31.5		
Q	KY 80	Jct. Corridor B near Shelbiana to Virginia Line So. of Elkhorn City	19.1	0.3	
R	KY 9009, US 460, KY 114	Jct. Corridor I near Campton to Jct. Corridor B near Prestonsburg		50.7	
B1	US 23	From S. Portsmouth to Ohio State Line at Portsmouth, Ohio		0.3	
		Total	431.7	148.5	

Table A-1 – Appalachian Development Highway System Approved Corridors and Termini

Corridor	State	TERMINI		Existing Route
		From	To	
A	Georgia North Carolina	I-285 north of Atlanta, Georgia	I-40 near Clyde, North Carolina	US 19, SR 5 US 64, US 19A
A1	Georgia	Corridor A south of Cumming, Georgia	Intersection SR 53 north of Dawson and Forsyth County line	US 19
B	North Carolina Tennessee Virginia Kentucky Ohio	Intersection of I-26 and I-40 Asheville, North Carolina	Corridor C north of Portsmouth, Ohio	US 23 US 52 SR 348 SR 73
B1	Kentucky Ohio	Corridor B near Greenup Dam, Kentucky	Corridor B north of Portsmouth, Ohio	US 23
C	Ohio	Corridor B north of Portsmouth, Ohio	I-270 south of Columbus, Ohio	US 23
C-1	Ohio	Corridor D near Jackson, Ohio	Corridor C at Chillicothe Ohio	US 35
D	Ohio West Virginia	I-275 east of Cincinnati, Ohio	I-79 near Bridgeport, West Virginia	SR 32 SR 124, US 50
E	West Virginia Maryland	I-79 near Morgantown, West Virginia	I-70 near Hancock, Maryland	SR 73 US 40
F	Tennessee Kentucky	I-75 near Caryville, Tennessee	Corridor B near Jenkins, Kentucky	US 25W, SR 63 US 25E, US 119
G	Kentucky West Virginia	Corridor B near Pikesville, Kentucky	I-64 near Charleston, West Virginia	US 119
H	West Virginia Virginia	I-79 near Weston, West Virginia	I-81 near Strasburg, Virginia	US 23 US 220, SR 55
I	Kentucky	Corridor F near Whitesburg, Kentucky	I-64 near Winchester, Kentucky	SR 15
J	Tennessee Kentucky	I-124 near Chattanooga, Tennessee	I-75 near London, Kentucky	SR 8, SR111, SR52 SR 61, SR90 SR80
J-1	Tennessee	Intersection of SR290 and SR56	Intersection of SR53 and SR 52	SR56, SR53
K	Tennessee North Carolina	I-75 near Cleveland, Tennessee	Corridor A near Dillsboro, North Carolina	US 64 US 19, US 19A
L	West Virginia	I-77 near Beckley, West Virginia	I-79 near Sutton, West Virginia	US 19
M	Pennsylvania	I-70 / I-76 at New Stanton, Pennsylvania	I-81 near Harrisburg, Pennsylvania	US 22
N	Maryland Pennsylvania	Corridor E near Grantsville, Maryland	Corridor M at Ebensburg, Pennsylvania	US 219
O	Maryland Pennsylvania	Corridor E near Cumberland, Maryland	I-80 near Belfonte, Pennsylvania	US 220
O-1	Pennsylvania	Corridor O at Port Matilda, Pennsylvania	I-80 near Clearfield, Pennsylvania	US 322
P	Pennsylvania	I-80 near Mackeyville, Pennsylvania	I-80 near Milton, Pennsylvania	SR 147 US 220
Q	Kentucky Virginia West Virginia	Corridor B near Shelbiana, Kentucky	I-81 near Christiansburg, Virginia	SR 80 SR 609 US 460
R	Kentucky	Corridor I near Campton, Kentucky	Corridor B at Prestonburg, Kentucky	KY Mt. Pkwy.
S	Tennessee	I-81 north of White Pine, Tennessee	Corridor F south of Harrogate, Tennessee	US 25E
T	Pennsylvania New York	I-90 east of Erie, Pennsylvania	I-81 near Binghamton, New York	SR 430 SR 17 US 15
U	Pennsylvania New York	Corridor P near Williamsport, Pennsylvania	Corridor T near Elmira, New York	SR15 SR 328
U-1	Pennsylvania New York	Intersection of US15 and SR328	Corridor T near Horseheads, New York	US15
V	Mississippi Alabama Tennessee	I-55 near Batesville, Mississippi	I-24 west of Chattanooga, Tennessee	SR 6 SR 24 I-565 US 72
W	South Carolina North Carolina	I-85 near Greenville, South Carolina	I-26 near Hendersonville, North Carolina	US 25 By Pass US 25
X	Mississippi Alabama	Corridor V near Fulton, Mississippi	I-59 near Birmingham, Alabama	US 78
X-1	Alabama	I-20/59 southwest of Birmingham, Alabama	I-20 east of Birmingham, Alabama	Birmingham Northern Beltline

Figure 1 – Sample State Map



Chapter 2

ADHS Cost Estimate Parameters

ADHS to be Estimated

State DOTs must include only the cost to complete unbuilt sections and any remaining stage construction work on sections classified as open to traffic. These sections must be classified as eligible for ADHS funding and not authorized and fully financed as of September 30, 2006. The only exception will be Pre-financed ADHS Projects (AC-APD).

Note: All work in authorized and fully financed status, as denoted in FHWA's Financial Management Information System (FMIS) as of September 30, 2006, including over-runs and under-runs, are assumed completed.

Location and Design Concepts to be Estimated

State DOTs must prepare estimates for ADHS sections having location approval using location and design concepts developed as of September 30, 2006. For ADHS sections not having location approval, State DOTs must use the location and design concept used in their 2002 Cost to Complete Estimate.

Major changes to the location and design concepts used in the 2002 ADHS Cost to Complete Estimate can only be used in the 2007 ADHS Cost to Complete Estimate if submitted prior to February 1, 2006 and subsequently approved by ARC. Major changes include: revised general corridor locations, final route locations, State line crossings, transfer of eligible miles, inclusion of additional eligible and ineligible miles, additional Interchanges, travel lanes and auxiliary lanes.

Prior to estimating costs, State DOTs should request their FHWA Division Office review and concur with the ADHS Sections determined to require an estimate.

Eligible Activities to be Estimated

The following activities are eligible for ADHS funding on all eligible ADHS Corridors:

1. Route planning-location studies to determine general/detailed locations and cost estimates.
2. Preliminary engineering, design, right-of-way and construction.
3. Social, safety, economic and environmental impact mitigation measures.

THE ABOVE ELIGIBLE ACTIVITIES MUST BE CARRIED OUT WITHIN PREVAILING FEDERAL-AID POLICIES, HIGHWAY STANDARDS, SPECIFICATIONS AND GUIDES USED FOR TYPICAL FEDERAL AID HIGHWAYS.

Ineligible Activities

ADHS FUNDS CANNOT BE USED TO UPGRADE ANY COMPLETED ADHS SECTION.

Estimated Costs/Unit Prices

All estimated costs must be reported in **2005** dollars. Therefore, State DOTs must use unit prices developed from comparable items and influences and based on or representative of Federal-aid contracts awarded during calendar year 2005.

All unit prices used for developing the States ADHS Cost to Complete Estimate must be reviewed and concurred in by their respective FHWA Division Office.

Chapter 3

Design Criteria for the ADHS

STATE DOTs MUST DESIGN THE ADHS IN ACCORDANCE WITH PREVAILING FEDERAL-AID POLICIES, HIGHWAY STANDARDS, SPECIFICATIONS AND GUIDES.

ARC Criteria for the ADHS

1. The design and construction of the ADHS shall be coordinated with the objective of achieving continuity and reasonable uniformity throughout the system.
2. The ADHS shall be built to provide the maximum number of miles of highway that can be constructed, considering impacts of required federal environmental reviews/outcomes and the available federal funds.
3. **DESIGN SPEED**
 - a. A minimum design speed of 60 mph should be used for rural areas. Where terrain is mountainous, a design speed between 50 to 60 mph may be used. In urban areas, the design speed shall be at least 50 mph.
4. **DESIGN TRAFFIC**
 - a. The ADHS should be designed to accommodate the types (passenger vehicles, buses, trucks, including tractor trailers and semi-trailer combinations and corresponding military equipment) and volumes of traffic anticipated 20 years beyond the year in which the plans, specifications, and estimate for construction is approved.
 - b. The traffic volumes used for the design of the ADHS shall be the 30th highest hourly volume of the design year, usually referred to as the design hourly volume (DHV) in vehicles per hour (vph). DHV is the total traffic in both directions of travel. DDHV (vph) is the directional distribution of traffic on multi-lane facilities during the design hour.
5. **CROSS SECTION ELEMENTS**
 - Number of Lanes**
 - a. The number of lanes shall be sufficient to accommodate the DHV at an acceptable level of service for the applicable conditions. A capacity analysis using the design year traffic should be performed to determine the number of lanes required to achieve the acceptable level of service.
 - b. On ascending grades, which exceed the critical design length, a climbing lane analysis should be performed and climbing lanes added where appropriate. Likewise, on extended lengths of maximum or near maximum descending grades, emergency escape ramps should be added where an analysis indicates they are required.

Width of Traffic Lanes

- a. All traffic lanes shall be at least 12 feet wide.

Shoulders

- a. The paved width of the right shoulder shall not be less than 10 feet. Where truck traffic exceeds 250 DDHV, a paved shoulder width of 12 feet should be considered. On a four-lane section, the paved width of the left shoulder shall be at least 4 feet. On sections with six or more lanes, a 10 foot paved width for the left shoulder should be provided. Where truck traffic exceeds 250 DDHV, a paved width of 12 feet should be considered.
- b. In mountainous terrain, a reduced paved shoulder width together with a minimal median width may be used to reduce the high costs associated with providing a full width roadway cross section. In these instances, an 8 foot minimum paved right shoulder and a 4 foot minimum paved left shoulder may be used on a traveled way consisting of four or six lanes. Where eight or more lanes are provided, an 8 foot minimum paved shoulder width should be used on both sides.

6. **ACCESS CONTROL**

- a. The projected type and volume of traffic shall be considered in the determination of access control. Provision shall be made for partial or full control of access where necessary in order to preserve safety and capacity for traffic.
- b. Interchange costs are to be included in the estimate if included in the State's 2002 ADHS Cost to Complete Estimate and they have been established based on prevailing Federal aid policies, highway standards, specifications and guides.
- c. Interchanges added since the 2002 Cost to Complete Estimate must have been concurred by FHWA and approved by ARC to be eligible for ADHS funding. Justification for an additional Interchange to the ADHS that will be constructed with ADHS funds are to be developed using prevailing Federal aid policies, highway standards, specifications and guides.

7. **RIGHT-OF-WAY**

- a. The width of right-of-way shall be adequate for the construction, operation, and maintenance of the facility in the design year and for known future improvements.
- b. States, due to financial limitations, can utilize **staged construction** on their ADHS Corridors. The right-of-way limits (width) of staged construction ADHS projects must be adequate to accommodate future construction of ADHS projects to ARC approved standards.

Chapter 4

Estimate Sections and Design Data

Establishment of Estimate Sections

State DOTs must establish reasonably homogenous sections that are different from adjoining sections for estimate uniformity on each ADHS corridor. This will establish a basis of comparison between the estimated costs for engineering, right-of-way, and construction and the actual costs for these same items on any given section of the ADHS at the time each project is authorized. So that the comparison above can be made, the State DOTs should establish sections which approximate the construction contract limits to be used in the plans, specifications and estimates (PS&E).

Previously established breakpoints must be retained for reference purposes. Additional points should generally be established only as required by current conditions or as requested above. Estimate sections on completed portions of routes for which no additional work is planned should be retained. In such cases the data in the top half of Table B should be updated; the bottom half should be zero cost.

Establishing a new estimate section requires joint consideration of design classifications and the general conditions along the route. To the extent practicable, section end points should be established at the following general points along the ADHS corridor, and only at as few other points as necessary to prepare the estimate.

1. The costs for the rural and urban portions of the ADHS must be shown separately. Urban area boundaries based on the 2000 census, which have been established for urban places of 5,000 population and over, must be used as section breakpoints. All sections within the urban area must be classed as "urban." All other sections must be classed as "rural."
2. Section breakpoints must be established at those points, in both rural and urban areas, where the location of the ultimate ADHS highway changes from existing to new location as defined hereafter. Corresponding finance codes as defined in Table B-1 must be used.
3. The location must be classified as "existing" where the ultimate ADHS highway location utilizes all or a portion of the right-of-way or existing roadway of the route that was identified as the ADHS highway at the time the corridor was designated.

The location must be classed as "new" where the ADHS highway location does not utilize the right-of-way or existing roadway of a route identified as the ADHS corridor at the time the corridor was designated.

Since these classifications relate only to whether existing highway facilities have or have not been utilized for the ultimate ADHS facility, there should be no change in classification of a segment from "new" to "existing" after it has been constructed and opened to traffic.

When the ultimate ADHS highway location is principally on an existing location but contains some departures therefrom, only those departures regardless of length that constitute bypasses of cities, towns, or communities and those other departures that are of individual length of about 5 miles or more must be separately identified as sections on new location.

4. Section breakpoints must be established where there is a change in the number of through-traffic lanes, or lanes to be constructed. However, in urban areas changes in the number of through lanes can be disregarded where resultant sections would be less than about one mile in length, unless they are separate sections in the estimate.
5. Section breakpoints are to be established where there is a change in the basic typical section, as would occur where passing into another general type of topography. Usually this will indicate a different design speed and some adjustment in the character of the highway design. The use of variable median is not considered a change to the basic typical section.
6. Each tunnel longer than 500 feet, or each bridge longer than 1,000 feet, must be shown as a separate section. Any such structures that are within interchanges must not be shown as separate sections.
7. Since the total cost within each State is to be determined, where a bridge or a tunnel crosses a State line, the portion in each State shall be in a separate section. Care should be taken to coordinate this work with the adjoining State.
8. Where the construction or improvement of a section of the ADHS is expected to be financed with funds other than ADHS and matching funds, such as National Highway System, Surface Transportation Program, Bridge Program, Demonstration or other Federal-aid funds, or State or local funds, it must be shown as a separate section, (or two sections where a State line is crossed).
9. Toll facilities must be shown as separate sections.
10. A section break must be provided at each change in development status as shown in Table B-2. The status of development as of September 30, 2006, should be used as the basis for determining these breaks and for reporting the status of development on Table B.

The status of development for each segment as of September 30, 2006, must be used to determine the status of development for each section.

11. A section break must be provided at county lines, at U.S. Congressional district boundaries, and at locations where the ADHS corridor joins or leaves the NHS.
12. A section break must be provided on uncompleted sections and wherever changes are made to the type of access control.

Linear Reference System (LRS) for Estimate Sections

The 1997 ADHS Cost to Complete Estimate was the first to use LRS for each cost estimate section in addition to the letter-number designation used in previous estimates. The main purpose of using the LRS was to make the ADHS estimate sections compatible with the LRS used in the Highway Performance Monitoring System (HPMS) and, therefore, permitting access to digitized databases and mapping capabilities in States, FHWA and ARC with Geographical Information System (GIS) formats.

Since the 2002 ADHS Cost to Complete Estimate, ARC and FHWA in cooperation with the Rahall Appalachian Transportation Institute have developed an ADHS Geographical Information System (GIS). The intent was to integrate the ADHS Cost to Complete Estimate information into an accurate base-map that will make the ADHS Cost to Complete Estimate effort and program administration more efficient and effective. 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. To this end, the LRS reported to FHWA's HPMS by State DOTs is adopted as a format of the data item in order to make a uniform LRS format in which it can be integrated with all 13 State highway data and FHWA databases.

LRS Definition

It is important to clarify the definition of LRS in the context of ADHS data system. Generally, the LRS is a set of procedures for determining and retaining a record of specific points or sections along a highway. Since we mainly deal with roadway sections (i.e., Cost Estimate sections) in the ADHS, the LRS is referred here as a section reference or, in HPMS terminology, a link reference. In this case, the LRS consists of the following data elements for each ADHS sections:

- County FIPS
- Inventory Route Number
- Inventory Subroute Number
- Beginning Milepoint
- Ending Milepoint

The combination of these data elements will identify a unique section location on the State's highway system. Anything less than this could provide ambiguous results.

In the National Highway Planning Network (NHPN), the above top three data elements (County FIPS, Inventory Route, and Inventory Subroute) are combined into a single route identifier, LRS key. Specifically, it is formed under following rule:

LRS key = Inventory Route/Inventory Subroute/County FIPS

This formulation of a single route identifier will simplify the location process of any object in a highway network under the GIS environment.

The beginning and ending milepoints simply represent the beginning and ending HPMS mileage of an ADHS section in a specific route (LRS key). It is important to note that the section length in the ADHS Cost Estimate is not necessarily corresponding to the section length derived from the HPMS mileage. This is because the way the sections were set up and the long history of ADHS mileage authorized for funding. Therefore, all the ADHS mileage reporting and analysis will use the section length reported in the ADHS Cost Estimate.

Coding for ADHS LRS

Several issues have been raised in the past concerning coding for LRS data on both completed ADHS sections and unbuilt sections that ultimately will be constructed at new locations. These issues are addressed in the following sections.

LRS Milepoints on Completed ADHS Sections

In some instances the completed ADHS corridor follows more than one highway route. For example, the ADHS corridor may follow a U.S. numbered route for the first third of its length, a State highway for the next third, and another U.S. numbered route for the final third. In the example, it is presumed that the LRS milepoints would probably follow the existing U.S. and State routes, but not the ADHS corridor.

The question was raised as to how the LRS milepoint and HPMS inventory route information would be reported in the ADHS Cost Estimate in such cases. The HPMS LRS data should be reported using the U.S. and State routes and milepoints in the above example. This may require that new section breakpoints be included in the ADHS estimate at the point(s) where the HPMS inventory route changes from one route number to another. Thus, an ending LRS milepoint is important to the last section of previous route and a new beginning LRS milepoint is needed for the new breakpoint using a known LRS milepoint in the following route.

LRS Milepoints on Unbuilt ADHS Sections

This situation could involve a section of highway in a preliminary status where the new location has been approved by ARC for inclusion in the estimate for estimating purposes only.

If LRS data have already been assigned to the ultimate location by the State's HPMS group, they should be used in the ADHS cost estimate. Where LRS data have not presently been assigned to a section of highway, LRS data must be generated. The following rules should be followed:

- 1. New Inventory Routes:** Where a new alignment exists that is not part of the HPMS network, a new inventory route will be designated for that section of roadway. This is done in order to ensure that LRS for the new location are unique and are not repeated on any other portion of the corridor within the county. For clarity purposes, the new route number should be based upon the existing HPMS route from which the new alignment diverges. For example, a new route branching off of HPMS route 76 would be labeled 76APD. The current HPMS route will begin again where the two alignments converge. The length of the new route can be determined by adding up the lengths of the ADHS sections in the attribute database. The cardinal direction for this route will always be in the same direction as the original HPMS route
- 2. Coding the Database:** The coding of the inventory routes should be consistent with the format established in the HPMS Field Manual (December 2000). Inventory Route entries are in the first part of Line 4b of Table B. For example, if the Inventory Route for the ADHS Corridor is 76, the future unbuilt section might be identified as Inventory Route 76APD. Using the FHWA's HPMS Field Manual, Inventory Routes must be coded as:

Inventory Route 76

Code as "0000000076"

The beginning and ending milepoints for each data section must be derived from the length of the sections as described below.

- 3. Multiple New Segments:** If the route diverges from the existing HPMS inventory route several times within a county, special coding will be required. Several options are available for the user to follow for each subsequent new alignment within a county:

a. Begin its milepoints where the previous section ended. As an example, route 58 has two unbuilt ADHS sections. The first section is 10.2 miles in length and the second is 5.2 miles in length. The route would be recorded as follows:

	Route #	Begin/End Milepoints
1st alignment	58APD	0.00 -10.200
2nd alignment	58APD	10.200 -15.400

b. Increment the Inventory Subroute number and restart the milepoint to zero. An HPMS inventory route is comprised of a route number (length = 10) and a subroute number (length = 2). Therefore using the above example:

	Route #	Subroute	Begin/End Milepoints
1st alignment	58APD	00	0.000 -10.200
2nd alignment	58APD	01	0.000 -5.200

c. The user can combine both options by using the milepointing scheme in option *a.* and the subroute identifier in option *b.*

- 4. Implementation.** When a new alignment is encountered the following steps should be taken:

FIRST - A new alignment has been identified that is 10.2 miles in length. This new alignment will have a route established for it that will start at 0.000 and end at 10.200. If the HPMS route is 0000000076, then this new route will be labeled 0000076APD.

SECOND - At the point where this new alignment diverges from the existing HPMS in inventory route for the first time, assign to the attribute database the new route number (i.e. 0000076APD) and the beginning milepoint 0.000. Following along this new alignment, assign new milepoints at section breaks according to the length of the sections. For example if the new alignment is 10.2 miles long with breaks 3.1 and 7.5 miles from the starting point, the three assigned LRS milepoints for the 10.2 mile new location would be:

0.000 at the first beginning point.
 3.100 at the first ending and second beginning point.
 7.500 at the second ending and third beginning point.

THIRD – At the ending point of Route 76APD, the LRS milepoint assigned to the original HPMS route number 76 would resume.

State personnel working on the ADHS cost estimate are encouraged to coordinate LRS State DOT personnel, working on the 2007 ADHS Cost to Complete Estimate, should coordinate their LRS effort with those DOT personnel responsible for HPMS.

Design Classification - Table B, Top Half

State DOTs must provide design data for each section of a corridor on the top half of Table B. It is used to develop the design on which the estimate is based. It does not commit either the State DOT or the FHWA to this design for actual construction.

Average Daily Traffic (ADT) must be reported for the base year (2005), the year 2015, and for the design year. In addition, other design data must be reported for the applicable design year for the section. This traffic data is to be entered on lines 7a through 7h on the top half of Table B.

Where a single section in Table B has more than a single traffic volume, the traffic data entries in Table B should be for the highest traffic volume, since this volume will govern in determining design elements such as the number of lanes, and the extent to which desired traffic for the section is served.

TABLE B MUST BE SUBMITTED FOR ALL MILEAGE ON THE ADHS. The State name and code and the ADHS Corridor letter-number, as shown in previous estimates, and milepoints are to be shown on each Table B sheet. The mile-points to be shown must be identical the Linear Reference System mile-points used in reporting Highway Performance Monitoring System (HPMS). The mile-points system will allow the States, the FHWA, and ARC to use digitized data available through HPMS and outside sources, such as the Bureau of the Census, and relate this data to the ADHS.

Detailed description of the Table B entries (top half) are listed below:

Line 1. Finance Code (Refer to Table B-1 Finance Code definitions)

A zero cost finance code (10 or 20) should be used for any section showing a zero cost on Table B regardless of whether the section is truly zero or the costs for section are rounded down to zero or reported in another section, corridor, etc. In cases where a section may not be a true "zero cost" a reference note must be placed at the bottom of Table B.

Zero cost sections and sections constructed entirely with other than ADHS funds should carry a finance code 10 or 20.

Corridor totals on Table B shall include all mileage (both increment codes 1 and 2) and eligible costs for the corridor. There may be some sections established in the 2002 estimate where only a portion of the section length or a portion of a stage construction project was completed or in authorized status as of September 30, 2006.

New section breaks are required to permit reporting of both portions of a section length separately, each with its respective "code." In the case of the uncompleted stage construction project or uncompleted portion of a section, include an estimate of the remaining cost.

Table B – Design Classification and Cost Estimate by Estimate Sections with Corridor Totals

9:08:13 AM		2004 Appalachian Development Highway System Cost Estimate					3/16/2006				
State: KY		ADHS Corridor: B									
Table B - Design Classification and Cost Estimate by Estimate Sections with Corridor Totals		B 01.1.0		B 01.2.0		B 01.3.0		B 01.3.1		B 01.4.0	
Section ID	LRS Milepoint: Beginning/Ending	0.00/2.29	2.29/4.09	4.09/6.79	6.79/7.32	7.32/8.00	8.00/1.40	1.40/2.80			
Status		Completed	Completed	Completed	Completed	Completed	Completed	Completed			
1. Finance Code		20	20	20	20	20	20	20			
2. Section Length (Miles)		2	2	3	1	2	1	2			
3. Class/Urban Code		R/O	R/O	R/O	R/O	R/O	R/O	R/O			
4. Location:											
a. FIPS State/County/Congressional		21/133/05	21/133/05	21/133/05	21/133/05	21/133/05	21/195/05	21/195/05			
b. HPMS Route/Subroute		000000023/00	000000023/00	000000023/00	000000023/00	000000023/00	000000023/00	000000023/00			
c. HPMS Signed Route/Strip Map #		2000000023/81	2000000023/81	2000000023/81	2000000023/81	2000000023/81	2000000023/81	2000000023/81			
5. Estimate Section/NHS Designation		1.00/NHS	1.00/NHS	1.00/NHS	1.00/NHS	1.00/NHS	1.00/NHS	1.00/NHS			
6. Design Speed(mph)		60	60	60	60	60	60	60			
7. Traffic:											
a. ADT-Base Year		6,506	5,700	5,700	5,700	5,700	6,800	6,800			
b. ADT-Year 2010		8,500	7,700	7,700	7,700	7,700	9,600	9,600			
c. Design Year		2,010	2,010	2,010	2,010	2,010	2,010	2,010			
d. ADT-Design Year		8,500	11,100	11,700	11,700	11,700	11,700	11,700			
e. DHV-Design Year		920	1,230	1,290	1,290	1,290	1,290	1,290			
f. % Truck Design Year(DHV)		10	10	10	10	10	10	10			
g. % Truck Design Year(ADT)		12	15	15	15	15	15	15			
h. Directional Distribution Factor		60	60	60	60	60	60	60			
8. Number of Lanes to be Constructed this Estimate		4	4	4	4	4	4	4			
9. Ultimate Number of Through Traffic Lanes		4	4	4	4	4	4	4			
10. Typical X-Section of Reference/Access Control		R6/Full	R4/None	R4/None	R4/None	R4/None	R4/None	R4/None			
11. Right-of-Way Width(ft), prevailing		380	350	480	410	470	470	470			
12. Median Width(ft), prevailing		14	20	20	20	20	20	20			
13. Status of Development(Figure 4)		1A	1A	1A	1A	1A	1A	1A			
Estimated Cost(\$1,000) per Work Classification											
14. Preliminary Engineering:											
a. Location		0	0	0	0	0	0	0			
b. Design		0	0	0	0	0	0	0			
15. Right-of-Way:											
a. Acquisition		0	0	0	0	0	0	0			
b. Relocation		0	0	0	0	0	0	0			
16. Utility Adjustments											
17. Erosion Control/Clear/Grade/Drain/Minor Structure		0	0	0	0	0	0	0			
18. Subbase, Base, Surfacing, Shoulders		0	0	0	0	0	0	0			
19. Railroad Grade Separations		0	0	0	0	0	0	0			
20. Highway Grade Separations without Ramps		0	0	0	0	0	0	0			
21. Interchanges		0	0	0	0	0	0	0			
22. Other Bridges, Tunnels, and Walls		0	0	0	0	0	0	0			
23. Traffic Control		0	0	0	0	0	0	0			
24. Environmental Mitigation		0	0	0	0	0	0	0			
25. Roadside Improvements:		0	0	0	0	0	0	0			
a. Landscape Planting		0	0	0	0	0	0	0			
b. Rest Area, Overlooks		0	0	0	0	0	0	0			
26. All Other Items		0	0	0	0	0	0	0			
27. Subtotal(lines 17 thru 26)		0	0	0	0	0	0	0			
28. Construction Engineering(6% of line 27)		0	0	0	0	0	0	0			
29. Total Cost of Construction(lines 27 & 28)		0	0	0	0	0	0	0			
30. Total Estimated Cost(lines 14, 15, 16, 29 & 5% Contingency)		0	0	0	0	0	0	0			

Figure 2 – Sample Strip Map

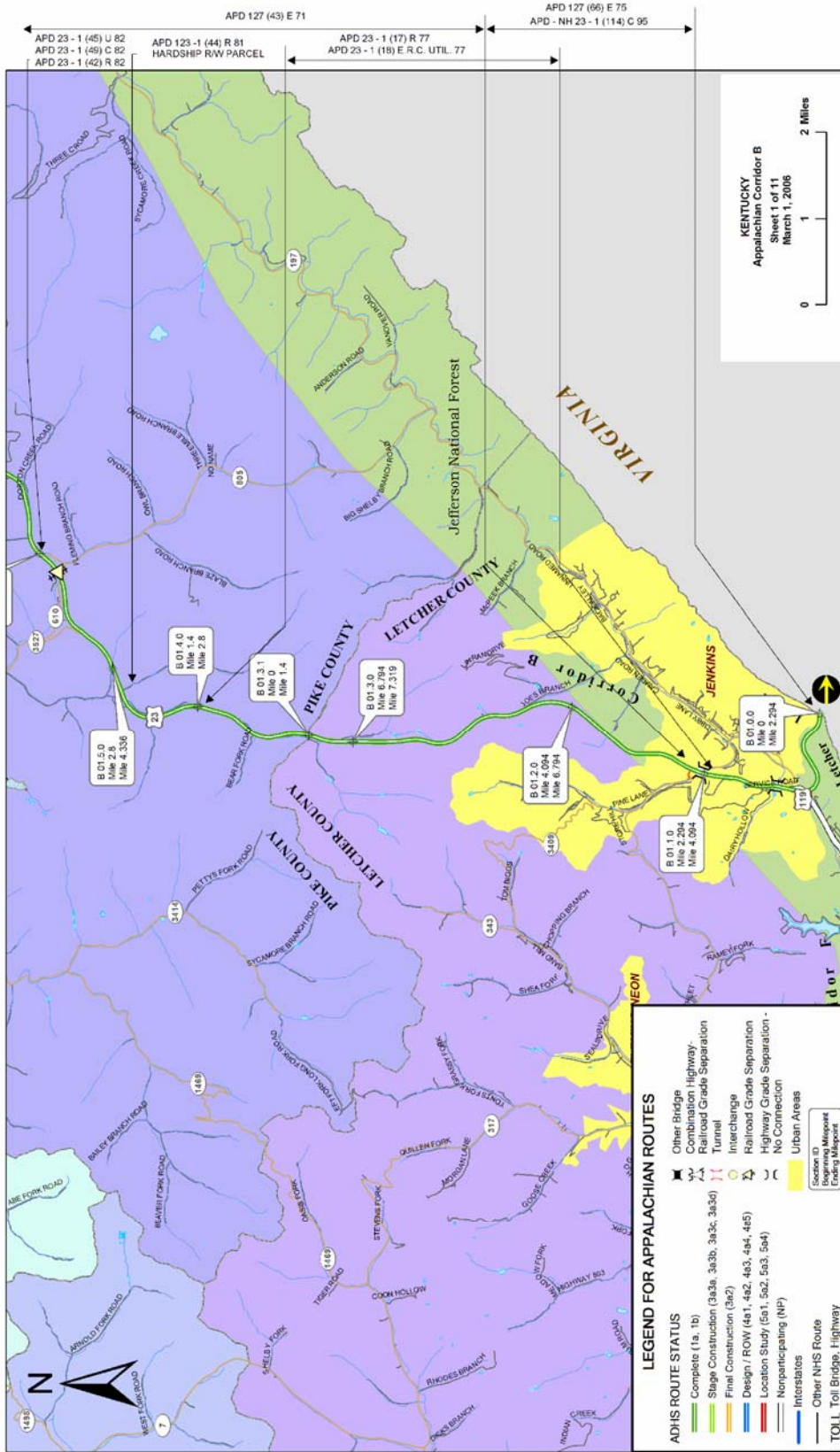


Table B-1 – Finance Codes

Code Number	Definition
10	A toll road, toll bridge, or toll tunnel in service or for which all work necessary for completion was in authorized status as of September 30, 2006, or the work will be funded from non-ADHS sources. Cost estimate to be zero for all items of work. Report miles on Table B and summarize on Table C.
20	A public highway on existing or new location in service as of September 30, 2006, or not yet in service, but for which all work necessary for completion was in authorized status as of September 30, 2006. Segment was financed with ADHS and/or non-ADHS funds. Cost estimate to be zero for all items of work. Report miles on Table B and summarize on Table C.
21	A public highway on existing or new location in service as of September 30, 2006 on which additional work has been approved and for ADHS funding as stage construction, but work was not underway or authorized as of September 30, 2006. Estimated cost for such work and miles are to be reported on Table B and summarized on Table C.
22	A public highway on existing location for which additional work necessary for completion is to be undertaken after September 30, 2006, and financed with ADHS funds plus State-matching funds. Estimated cost for such work and miles are to be reported on Table B and summarized on Table C.
23	A public highway on new location for which work necessary for completion is to be financed with ADHS funds plus State-matching funds. Estimated cost for such work and miles are to be reported on Table B and summarized on Table C.

Table B-2 - Stage of Development and Classifications for Reporting Development Status of the ADHS

All Work Complete Stage (Status Group 1)	Final Construction Stage (Status Group 3)	Stage Construction Stage (Status Group 3)	Design R/W Stage (Status Group 4)	Location Study Stage (Status Group 5)	Non-Participating (Status Group NP)
Mileage improved to AASHTO Standards	Under Construction	Stage Construction	PS&E Preparation and/or R/W acquisition underway or completed	Designated mileage	Ineligible mileage
<p>1a: Open to traffic - All work eligible for ADHS funds has been completed.</p> <p>1b: Not open to traffic - all work eligible for ADHS funding has been completed.</p>	3a2: Final construction contract underway - All work eligible for ADHS funding has been included in the contract.	<p>3a3a: Stage construction - No contract currently underway; serving traffic.</p> <p>3a3b: Same as above, except not serving traffic.</p> <p>3a3c: Stage construction contract currently underway; serving traffic.</p> <p>3a3d: Same as above; except not serving traffic.</p>	<p>4a1: Preparation of PS&E and R/W acquisition are concurrently underway or completed.</p> <p>4a2: Design is completed and R/W acquisition (only) is underway or completed on a selected construction location.</p> <p>4a3: Preparation of designs and other PS&Es (only) covering the construction upon a proper location are underway or completed.</p> <p>4a4: Design approved only</p> <p>4a5: Design public hearing held, or opportunity afforded.</p>	<p>5a1: Location approved by ARC and FHWA even though subsequent adjustments in centerline location may be necessary at a later stage.</p> <p>5a2: Location public hearing held or opportunity afforded.</p> <p>5a3: Studies to determine route locations are underway or completed.</p> <p>5a4: General corridor location has been established but route location work has not been started.</p>	NP: Integral parts of the ADHS corridors that are not to be improved with ADHS funds

- Line 2.** Report total length of the section to nearest 0.1 mile.
- Line 3.** Indicate the class by "R" or "U" (Federal-aid definition). Identify by name and FIPS code the Federal-aid urban area through which each estimate section passes. The name of the urban area may be noted on only the first and last sections of a series falling within the same urban area with the intermediate sections carrying only the urban area code. See Appendix C for a list of the urban area code. Questions regarding urban area codes can be directed to Ms. Claretta Duren with FHWA Washington.
- Line 4a.** Identify the FIPS code for the State, the county name, and the congressional district number as of September 30, 2006. See Appendix B for a list of the congressional district.
- Line 4b.** HPMS Route inventory number.
- Line 4c.** HPMS Sub-route inventory number.
- Line 5.** Indicate whether the estimate section is eligible for ADHS funding or has been designated as ineligible with the following codes:
- 1 - All mileage eligible for ADHS funding.
 - 2 - All other mileage on the ADHS considered ineligible for ADHS fu
- Indicate whether the estimate section is on the NHS by adding NHS if route is on the NHS, or None if the route is not on the NHS.
- Line 6.** Design speed in multiples of 5 or 10 miles per hour.
- Line 7a.** Two-way average daily traffic for the year 2005, including existing and attracted (diverted) traffic estimated to use the section, assuming that the entire ADHS and important connecting roads and streets have been constructed and the parallel arterial roads and other streets in the traffic corridor of the ADHS will have been further developed.
- Line 7b.** The estimated ADT for the year 2015.
- Line 7c.** Indicate the actual design year for which the traffic estimate is made, and enter traffic data for this year in lines 7d through 7h.
- Line 7d.** Two-way average daily traffic for the design year, including traffic due to the changes in the pattern and rate of growth of land development along the ADHS corridor and in adjacent areas influenced by it. The resulting total is the ADT for the design year and is entered in this item (7d). There may be some sections on which the desired traffic in the corridor assigned to the ADHS facility will exceed the possible capacity for the maximum number of lanes to be constructed on the section. When this situation occurs the volume entered in Item 7d is to be the desired traffic assigned to the facility up to the possible capacity for the number of lanes on the section.

- Line 7e.** Two-way design hourly volume (DHV) as estimated for the design year.
- Line 7f.** The percentage of trucks (T) for DHV. Pick-ups, vans, panel trucks and other two-axle four-tire vehicles are not considered to be trucks for geometric design purposes. Transit buses are to be considered as trucks.
- Line 7g.** The percentage of trucks (T) for the ADT.
- Line 7h.** The percent of vehicles (D) traveling in the direction of pre-dominate traffic flow during DHV (design year).
- Line 8.** Number of through lanes to be constructed upon which the cost estimate is based. In this item, report the number of new through lanes to be built where no lanes now exist, as well as the number of new lanes to be added on sections now having two or more lanes in existence. Existing lanes to be improved, either by stage construction, reconstruction, etc., should not be counted in this item.
- Line 9.** Ultimate (total) number of through-traffic lanes including existing lanes included in the design to accommodate DHV (design year).
- Line 10.** Indicate reference to one of the typical cross section designs included in the State's estimate that is generally representative of that section of the route (see Typical Cross Sections on page 25).
- The type of Access Control should be identified by one of the following from drop-down menu in Table B editing screen:
- Full = Full control of access - access is prohibited to adjacent property and most cross roads. Access to the ADHS route is only provided at interchanges.
- Partial = Partial control access - access is prohibited to adjacent property and minor crossroads. Access to the ADHS route is only provided at interchanges and major cross roads.
- None = No control of access - access to the ADHS is provided to adjacent properties and all crossroads.
- Line 11.** Show prevailing right-of-way width in feet on which the estimate is based.
- Line 12.** Show prevailing median width in feet on which the estimate is based.
- Line 13.** Status of improvement code (Table B-2) as of September 30, 2006. Where two or more subgroups are presently included in an estimate section, and a change in status has occurred since the 2002 Cost Estimate, a new estimate break should be established (See Table B-2 and the prior discussion regarding Section Breaks)

Summary totals of mileage for Line 2 are to be shown on the last Table B sheet for each route in the three right-hand columns for rural, urban, and combined categories. Individual sheet totals are not required.

Typical Cross Sections

Each State ADHS Cost to Complete Estimate Report must include typical geometric cross sections which are to be identified on line 10, Table B by a key or number reference. Typical geometric cross sections should be of the type generally included in the Plans, Specifications and Estimate (PS&E) showing dimensions for the principal cross section components and right-of-way of the normal section. Sections varying only in the number of through-traffic lanes need not be shown separately. Include at least one cross section showing dimensions used for estimates of ADHS bridges and overpasses, both long and short, and underpasses. A note identifying the type of access control must be provided for each cross section. Also, include typical cross sections showing dimensions for each tunnel.

It is not intended that cross sections be shown for variations in section design which do not materially affect the estimate of cost.

In order to have collect up-to-date cross section data available to the system, State DOTs are required to submit digital format cross sections to RTI. Cross section submissions should be taken place via the Web portal using the Document Management System (DMS) (See page 28 of the software manual). The Documents button seen at the bottom right on the initial web screen is the link to the DMS. In most cases, two different sizes of the drawings can be submitted. One is 11 by 17 inches and the other is 8 by 11 inches. The preferred file type for uploading the information is PDF format but other digital formats such as CAD are acceptable. In case no digital format is available, contact RTI for further assistance. The comments box in the documents screen should be utilized to notify RTI of the file being uploaded and for what it should be used.

Strip Maps

Each State DOT ADHS Cost to Complete Estimate Report must include a strip map for each ADHS corridor showing data by means of the key symbols on the sample strip map, Figure 2. Strip maps will be prepared by RTI and submitted to the applicable State DOT for approval prior to inclusion in the 2007 ADHS Cost to Complete Estimate. State DOTs must review the 2002 ADHS Cost to Complete Estimate strip maps and submit any changes, in the items listed below, to RTI by the date specified in the schedule page. RTI will send a copy of the State DOTs 2002 ADHS Cost to Complete Estimate strip maps created by GIS software to each State for review. Updated geographic feature changes, for example urban boundary, road, etc, need to be uploaded to the DMS with comments of data and use. State DOTs should utilize provided RTI 2002 ADHS Cost to Complete Estimate strip maps to delineate new project information or changes to existing project information and return them to RTI. If there is any corridor realignment or section split, the State must follow the guidelines in the software manual.

Any data submissions should be taken place via the Web portal except for returning of revised RTI 2002 ADHS Cost to Complete Estimate strip maps. Only mail submission is acceptable if digital data is not available. The Documents button seen at the bottom right on the initial web screen is the link to the Document Management Transfer System. The preferred data types for uploading information are CAD, PDF, Word documents, Excel documents, JPEG, or TIFF (if less than 5Mg). The comments box in the documents screen should be utilized to inform the Rahall Transportation Institute of the data being uploaded and what it should be used (See details on page 27 of the software manual).

1. For base maps, use county maps or equivalent topographical sheets showing all roads, assembled to form strip sheets on which the ADHS corridor approximately centers (successive sheets numbered in sequence). All markings are to be clear, in a type and size that permit reproduction. Individual map sheets of 11 by 14 to 20 inches will be acceptable.
 - a. County lines and the names of the abutting counties shall be clearly shown. Also show milepoints at section breaks at county lines.
 - b. The name of each city and county, regardless of size, should be clearly indicated on the strip map.
 - c. In addition to the major ADHS corridor, other intersecting ADHS corridors, and Interstate, U.S., and State route designations must be shown. National Highway System routes should be indicated by *NHS*.
 - d. Show north arrows on each sheet. If GIS mapping is used, the north arrows must be pointed upward on each sheet regardless of the ADHS corridor orientations. For uniformity in the States' reports to be submitted to ARC, the strip maps are to be on a scale of 1" = 1 mile. Where it is needed for clarity, the strip map, or a portion of it, should be shown to a larger scale as a supplement.
 - e. Route designations must be shown for all intersecting roads which are grade separated or an interchange is proposed.
2. Show clearly all urban area, city and county boundaries within 1 mile on each side of the ADHS route location. Care should be exercised that the city name or a portion of the name, or other pertinent features are not blocked out on these strip maps.
3. Section breakpoints are to be in sequence from west to east and from south to north, each shown, in a clear manner, by designated joint letter-number section ID and section beginning and ending mile-points to designate estimate section breakpoints.

Where a change in route location has occurred since the previous estimate, the breakpoints should be so identified by mile-point to tie into the original sequence of the route.

4. In the manner illustrated on the sample strip map (Figure 2), show the following by standard key symbols (avoid only color differentiation) at the approximate correct position on the corridor location for all rural sections.
 - a. Each railroad grade separation (Table B, Line 19).
 - b. Each highway grade separation without ramps (Table B, Line 20).
 - c. Each interchange (Table B, Line 21).
 - d. Other bridges with spans over 20-foot (Table B, Line 22).
 - e. Each tunnel (bottom half Table B, Line 22).

- f. Each toll bridge, toll tunnel, toll highway, or combination.
 - g. Each frontage road on or immediately adjacent to the ADHS right-of-way and connections to through-traffic lanes.
 - h. Each intersecting road that is terminated is to be shown with a dot as shown on Figure 3.
 - i. Each rest area along one or both sides of the travel way.
5. Within the urban area boundaries, show on the strip map only the preceding symbols for (c), (e), (f), and those bridges (d) that are longer than about 1,000 feet. It is expected that work maps in greater detail and to larger scale will be necessary on all urban sections and on nearly all rural sections in order to make the cost estimates to the desired accuracy. Such work maps are not to be included in the strip map submission, but are to be retained in the State records for review as needed.
6. Show on the strip maps the identifying numbers and the limits of each project financed with ADHS funds that were in authorized status and authorized pre-financed work as of September 30, 2006. These identifying data should be placed in the margins of the sheets with lines from each listed project to the plotted location of the ADHS highway to identify the project limits. Use a capital letter suffix with the project number to define the type or types of work authorized - "E" for preliminary engineering, "R" for right-of-way, and "C" for construction. Do not show projects financed with planning (HPS, PL, etc.) funds. A special listing of ADHS projects will be furnished to the States by the FHWA Washington office, for this purpose, showing project number, work class (PE, ROW, or CONSTR) and location.

Projects may be plotted in any of the margins; i.e., top, bottom, sides; and the State may offset the map to provide a wider margin top or bottom for this purpose. When necessary, projects may be grouped in a listing on a separate sheet with only a key number on the map to identify project location and limits.

7. The map legend should be shown on the first map sheet of each corridor, at a minimum, with the following items as illustrated on sample strip map in Figure 3:
- ADHS stage of development:
 - Complete (1a, 1b) – leaf green solid line
 - Final construction (3a2) – electron gold solid line
 - Stage construction (3a3d, 3a3b, 3a3a, 3a3c) – macaw solid line
 - Design/ROW (4a1, 4a2, 4a3, 4a4, 4a5) – blue solid line
 - Location study (5a1, 5a2, 5a3, 5a4) – red solid line
 - Non-participating (NP) – white solid line
 - Other interstate highway
 - National highway system (NHS letter and the line type)
 - Interchange
 - Railroad grade separation
 - Highway grade separation
 - Toll bridge, toll highway, toll tunnel or combination

- Tunnel
 - Other bridge
 - Urban area
 - Beginning to Ending milepoint
8. The strip map sheets must be assembled in order in sets for each ADHS corridor, which should be identified on each sheet. On each sheet (if it is larger than 11 by 14 to 20) in each set, include a key of the standard symbols used. States that use the 11 by 14 to 20 strip maps need to include the key to standard symbols only on the first sheet for each route. Each of the State's ADHS Cost to Complete Reports provided to the FHWA and ARC is to contain a complete set of strip maps.

Chapter 5

Cost Estimate for Estimate Sections

NOTE: It is acceptable to use the estimating processes that are consistent with those used by the State DOT for other projects in a similar stage of development. For example, if a State DOT uses average cost per mile of similar roadway configurations for estimating the cost of projects in the planning stage, such a process may be used for the purpose of the 2007 ADHS Cost to Complete Estimate. It is recognized that the State DOTs standard practices may result in the absence of specific unit costs for some of the items on estimates for projects in the early stages of development. In such cases, the process used (including any assumptions) must be clearly denoted on the Section worksheets. Also, a summary of the process used must be included in the Section Narrative to inform the ARC/FHWA that such a process was used for establishing the estimate.

Costs for each section of each ADHS highway must be estimated on the basis of contract plans, under preparation or final; design reports; location studies or preliminary plans; and a reasonably realistic breakdown into components on which separate dollar values can be estimated. A summary of the cost estimates for each section is to be reported on the bottom half of Table B, but compilations in much greater detail will be necessary to arrive at these estimates in the field. These detailed compilations and worksheets are not to be submitted to Washington Headquarters, but are to be reviewed by the Division Administrator and retained by the State. For purposes of uniformity in reporting, the component cost estimates must be grouped and reported in the work classifications on the bottom half of Table B as described below

Cost Estimates by Estimate Sections - Table B, Bottom Half

Cost data must be reported for each section shown on Table B and the Strip Map, using the section milepost numbering and finance code as part of the identification.

General

Every effort must be made to provide documentation and references to sources of data on which the estimate is based. Care must be exercised to prevent mathematical errors, duplications, and overstatements and understatements between columns; and to avoid any omission of costs for which expenditures are anticipated. Unidentified costs, "other", or miscellaneous uncategorized items should not be included unless the costs are specifically identified in the description for line 26.

The desired accuracy of cost estimates is that obtainable from the most recent information from final or preliminary plans and profiles from which reasonably accurate quantities may be tabulated. In addition, individual components of construction costs may be separately identified, and representative unit cost values can be applied. Where itemized quantities are available in PS&E form, or in preliminary engineering studies, they will be used. Otherwise, it is acceptable to use the estimating process used by the State DOTs on other projects in a similar stage of development.

Line 14 - Preliminary Engineering

Include all costs for preliminary engineering (except for environmental mitigation) for location studies, public hearings, studies for the analysis and evaluation of environmental impact, development of environmental documents, and in general, to the completion of the PS&E for any remaining right-of-way and construction projects including those for miscellaneous-type construction (lighting, fencing, landscape development, etc.). Generally, all field work surveys and drawing of right-of-way plats and maps are performed as part of preliminary engineering. The costs for this work should, therefore, be reported on line 14a or 14b. The separation into line 14a or 14b is discussed in the following.

Costs for preliminary appraisals made in connection with location studies and costs for surveys relative to the relocation of people should be reported on line 14a or 14b. However, when these activities are normally performed under a right-of-way project, their costs should be included on line 15a or 15b.

Preliminary engineering costs for utility adjustments should be included in line 14a or 14b, if the State (or State's consultant) performs the PE work for the adjustment. Preliminary engineering costs that are part of the utility estimate and agreement should be included in the utility line item, line 16.

Line 14a should include only the preliminary engineering costs necessary to determine detailed locations and cost estimates. Subsequent preliminary engineering costs for the development of plans, specifications, and estimates (PS&E), and detailed right-of-way or utility relocation plans, should be included under line 14b.

Engineering costs should be based on current (rather than projected) experience, and any factors or percentages used must be supportable and documented in the State's records. Where engineering costs are developed as a percentage of the construction costs reported on Table B, the amounts so developed must be reduced by engineering work already in authorized status on those sections. Engineering project overruns may be included where the State furnishes supportable evidence to the FHWA Division Administrator that total costs for a project will substantially exceed the authorized amount shown in the fiscal records as of September 30, 2006.

Line 15 - Right-of-Way and Relocation Assistance and Payments

This item should include all costs of remaining right-of-way and relocation assistance needs except as noted below.

The estimate of cost is to be made of the parcels that had not been authorized for acquisition as of September 30, 2006.

Where the State (or its agent) normally purchases right-of-way or easements for a utility adjustment, such costs should be included in this line. If the right-of-way or easement costs are included as part of the utility estimate or agreement, such costs should be included in the utility item, line 16.

Include costs of functional replacement and publicly-owned land and facilities assigned to the ADHS highway in lieu of market value, unless the probability of replacement is remote. Costs of extra right-of-way for interchanges, rest areas, scenic overlooks, and miscellaneous construction work are also to be included. The cost of land or interests in land for scenic enhancement

purposes (scenic lands) outside normal highway right-of-way limits is not eligible for ADHS participation, and the cost of such land or interest in it is not to be included in this estimate. Do not include outdoor advertising or junkyard removal costs.

The cost of easements and buffers required to fulfill the requirements contained in the environmental document are not to be included on this line but are to be included on line 24. It will be necessary to insure that these costs are not duplicated or omitted.

Costs for construction work intended to mitigate right-of-way damages are to be reported as construction items in this estimate. However, these costs should be specifically identified in the State's work papers for later use in costs comparison reporting. Costs of cattle passes, relocation of fences, and replacement in-kind construction items are to be reported as construction costs, even if they are conditions or commitments in right-of-way acquisition.

The estimate shall be based on a preliminary plan or layout showing, as a minimum, the currently approved centerline location, the right-of-way limits, the property lines, the improvements or developments with enough existing topography to permit a field examination and evaluation of the proposed land area and relocation needs.

The overall right-of-way and relocation estimates, as related to work in authorized status, may be developed in various ways depending on the individual State's accounting procedures. The following suggested 3 methods are all closely related and all provide for the inclusion of project overruns in the estimate.

1. The first method is to estimate only those sections on which no right-of-way and/or relocation work has been authorized by the FHWA as of the estimate cutoff date, September 30, 2006. In addition, on those sections where all work has been authorized, but there is supportable evidence that the final project costs will substantially exceed the dollar amounts obligated in the fiscal records as of that date, the additional costs (project overruns) may be included in the estimate. In all cases, the remaining right-of-way costs for a partially authorized project should be included in the estimate.
2. A second method would consist of estimating the total needs for a section or route, including that work which is in authorized status, then deducting the dollar value of work in authorized status as reflected in the fiscal records as of September 30, 2006.
3. The third method would be to estimate all costs which are yet to be incurred by the State after the cutoff date on a project basis, add to that estimate the costs expended by the State, and then reduce that amount by the authorized dollar value of the project, as reflected in the fiscal records as of the cutoff date.

Line 15a - Right-of-Way Acquisition Costs

The basic right-of-way elements to be included on line 15a are property estimates, incidental expenses, settlement differentials, and costs for right-of-way clearance (excluding clearing and grubbing).

Line 15b - Relocation Payments and Services

The estimated cost for relocation payments and services must be included on this line.

The estimate for providing relocation payments and services shall include the following items:

1. A parcel-by-parcel estimate of the cost of moving, and other related expenses, for residencies, businesses, farms, and nonprofit organizations to be displaced.
2. A parcel-by-parcel estimate of the cost of replacement housing payments to homeowners to be displaced. Increased interest costs and closing costs on the replacement dwelling are to be included.
3. A parcel-by-parcel estimate of the cost of replacement housing payments to tenants and certain others to be displaced, including closing costs in down payments.
4. An estimate of the cost of furnishing relocation assistance services to eligible persons, businesses, farms, and nonprofit organizations.
5. An estimate of the cost of providing (building, if necessary) replacement housing as a last resort, where it is expected that the project cannot be built until such replacement housing is made available.

Line 16 - Utility Adjustments

Include costs for relocation and adjustment of utility facilities necessitated by construction of the ADHS highway. Utilities accommodated on ADHS highway right-of-way must conform to Federal-aid policies, highway standards, specifications and guides.

Facilities of each utility company should be separately considered, and checks should be made on similar previous experience to verify estimates of the costs of adjustments. Approximation also should be made for costs of adjustments to utilities not readily apparent or not shown on available plans, such as some underground lines in urban areas.

Line 17 - Erosion Control, Clearing, Grubbing, Grading, Drainage, and Minor Structures

Include cost for temporary control of erosion and sediment during construction and for permanent erosion and sediment control measures. Also include all clearing and grubbing costs on this line. The general scope and character of this work should be used as a basis for establishing lump-sum or per-mile costs.

Demolition and clearing of improvements within the right-of-way limits are considered right-of-way items for which costs should be included under line 15a. In those instances, however, where clearance of an isolated improvement or major obstruction is to be included in the initial basic construction project, such costs may be reported on line 17.

Include costs for all items commonly covered in grade and drain construction contracts, except those outside of the ADHS highway through traffic lanes within interchange areas (line 21). Include all earthwork preparatory to roadside improvements (such as reported on line 25), channel changes, inlets, surface channels, flumes, dikes, underdrains, outfalls, and minor drainage structures, culverts as usually defined, and special fill treatment for the ADHS highway. Also include the same items for any required frontage roads. Include costs of all new major storm sewer lines and appurtenances such as pumping stations and similar equipment, along the ADHS highway.

Grading and drainage quantities, if not available from PS&E plans, may be estimated based on preliminary plans or layouts with some reference to the preliminary grade line. Channel changes and sizable culverts should be separately estimated. Minor drainage facilities such as inlets, cross drains, special fill treatments, etc., can be evaluated on a running length basis. The quantities for frontage roads should be estimated separately. Major storm sewers needed in urban areas should be estimated separately on the basis of a preliminary plan and experience with similar facilities in the general area.

Line 18 - Subbase, Base, Surfacing, and Shoulders

Include costs of all base courses and surfacing constructed subsequent to the completion of grading, except for that outside the through-traffic roadway in interchange areas or included with decks of bridges and viaducts. Include all base courses and surfacing provided on shoulders and frontage roads that are not a part of the interchanges. The separate quantities for frontage roads outside of interchange areas should also be estimated. Include the cost of all curbs except those in interchange areas. The base courses, surfacing, or pavement and shoulders of the through traffic lanes on the ADHS highway through interchange areas are to be reported as a part of this heading. Pavement items for the ramps and other interchange roadways are to be reported under line 21.

Line 19 - Railroad Grade Separations

Include all costs incidental to separation of grades at railroads, including structures. Grading and paving costs of the ADHS highway itself are to be reported in lines 17 and 18. Where a railroad grade separation is combined with a highway separation or with a river bridge, or both, the entire structure should be charged against one line, item 19, 20, 21 or 22, depending upon the dominate use which the structure serves. For instance, a long river bridge may include an extra span to serve as a railroad separation structure as well. Under these circumstances, the entire structure cost would be entered under line 22.

Conversely, a minor stream crossing might be greatly complicated by the rise in grade and change of structure length required to accommodate both the stream and a railroad separation. Under these conditions the dominant use is the railroad separation, and the structure cost should be reported under line 19. Similar reasoning can be followed for combination railroad-highway separation structures (particularly those involving minor crossroads which might often be terminated except for the railroad separation being planned), in placing structure costs under line 19 or line 20.

Line 20 - Highway Grade Separations without Ramps

Include all costs for grade separations of the ADHS highway and a crossroad where access connections are not provided. Include costs for all parts of the structure itself together with walls, curbs, railings, and all of the costs for changes to the crossroad. Costs of crossroad grading, surfacing, drainage, etc., must be reported here and not under lines 17 and 18. Grading and paving costs of the ADHS highway itself must be reported in lines 17 and 18. The cost of cattle passes and machinery passes combined with a minor road crossing must be reported here and not under line 26.

Each ADHS structure should be estimated and recorded separately on the State's work sheets. For structures of a type and size likely to be nearly the same as other structures, fairly detailed

estimates should be made to establish typical total costs. These typical cost values may be utilized, with adjustment such as for more extensive walls, length and width variations, etc., to obtain the estimate of cost for individual structures. Estimates for this line also require the determination of the type of highway and the extent of ADHS fund participation in crossroad adjustments.

The cost of crossroad construction beyond normal grade "touchdown" limits is not eligible for ADHS funding and is not to be reported in this estimate.

The costs of additional structure spans and nominal added width which are found to be cost-effective and approved to minimize impacts on wetlands, Section 4(f) properties, or other environmental impacts of a structure which has the predominant purpose of providing grade separation (railroad, highway, or stream) need not be computed separately but should be included in line 24.

Line 21- Interchanges

Include all costs of excavation, structures, walls, grading, drainage, pumping installations, ramps, curbs, slope treatment, traffic control devices, lighting, landscaping, etc. Include the costs for the entire improvement of the crossroad, unless the crossroad is another ADHS highway. Also include any incidental work that is necessitated by the interchange. Advance and post interchange signing on both mainline and crossroads should be reported on Line 21.

Exclude the costs of interchange right-of-way and utility adjustments that are to be shown on lines 15a, 15b and 16. Costs of items associated with the ADHS highway through-traffic lanes (e.g. grading, drainage, paving, etc.) should be reported on other appropriate lines, not line 21. Exclude also motorist services (logo) signs and landscaping which are to be included in lines 23 and 25a, respectively.

It should be noted that the line 21 cost estimate is for the "complete" interchange (with the exceptions noted).

In the absence of final plans, detailed estimates should be made to establish typical costs for general types and extensions of ramps and crossroad improvements, such as diamond, two quadrant, or full cloverleaf interchanges.

In urban areas, where interchanges are frequent and entail many non-typical features, small-scale layouts are necessary, since estimates to the desired accuracy cannot be made without a preliminary design layout. Directional interchanges require a preliminary design and separate estimate.

The cost of interchanges between two ADHS highways is to be reported on one route only (line 21). Costs under line items 17 and 18 and mileage are to be reported for each of the intersecting ADHS highways.

The cost for modifications or improvements to existing interchanges is not eligible for ADHS funds (unless previously approved as a future stage of construction at the time of the original basic construction project) and is not to be included in this estimate.

Line 22 - Other Bridges, Tunnels, and Walls

Include all costs for all structures other than those included in lines 19, 20 and 21. Primarily this will cover all stream bridges, tunnels, and viaducts on the ADHS highway. Include all costs in the manner indicated for line 20. The necessary channel changes that may be part of the major stream crossings should be reported under line 17. Grading and paving of the approaches are to be reported in items 17 and 18. Costs to be divided between two States are to be reported in a manner consistent with the likely proportion of the total cost to be financed by each State, even though the location at the State line breakpoint may suggest otherwise. This might apply where a State line is on one shore of a river, across which bridges are financed equally by both States.

Include costs for all retaining walls along the ADHS highway, except those reported under lines 19 to 21 as a part of other structures or in interchanges. On some sections of urban ADHS highways, and possibly also in mountains, extensive wall sections may be necessary. These entail substantial construction costs and should be estimated separately.

Eligible costs of walls to be constructed as noise abatement measures should be included in Line 24. The cost of any added wall height to provide for noise abatement need not be separately reported on line 22 or line 24, but may be reported on a single line as determined by the predominate purpose of the wall.

Line 23 - Traffic Control

Include all cost of maintaining traffic during construction, the cost of all traffic control devices, and the cost of roadside appurtenances on Line 23. The cost of all traffic devices located within, or serving interchanges must be reported on Line 21.

Eligible costs for maintaining traffic during construction include detours, temporary pavement, signing, lighting, pavement markings, and impact attenuators; motorist aid; law enforcement in work zones; and Intelligent Transportation System (ITS) Maintenance of Traffic (MOT) devices.

Eligible cost for permanent traffic control devices includes all signing costs including ADHS signs and motorist services (logo) signs; pavement markings; traffic signals; delineators; and/or other traffic control devices. States are encouraged to install ADHS signs on their ADHS Corridors.

Eligible costs for roadside appurtenances include the cost of fixed-source highway lighting; guardrail and impact attenuators; mile point markers; and new fences along or within the right-of-way. All new guardrail and impact attenuator installations are to meet current Federal-aid policies, highway standards, specifications and guides.

For consistency:

- The cost of installing guardrail and impact attenuators in conjunction with bridges and tunnels should be included on Line 23 as opposed to Lines 19, 20, 21, or 23.
- The cost of installing guardrail and impact attenuators located in or serving interchanges should be reported on Line 21.

It will be necessary to insure that these costs are not duplicated or omitted.

Line 24 - Environmental Mitigation

All of the cost of environmental mitigation that is required to fulfill the requirements contained in the environmental document is eligible for ADHS funding. This includes noise abatement measures, stream relocations, water quality monitoring, archeological recordation and salvage, planting of replacement wetlands, wildlife passages, special fencing, visual barriers, special architectural treatments, special landscaping, etc. Preliminary engineering, right of way and construction cost for environmental mitigation that is not required by environmental document is not eligible for ADHS funding.

Include all of the construction cost of environmental mitigation that will be incorporated into new ADHS highway sections on Line 24. The additional costs necessitated by shifts in alignment and grade to reduce impacts should not be included in this line, but rather in the appropriate lines involved.

Preliminary engineering costs and right-of-way costs (acquisition or easements for mitigation and / or buffer zones) to fulfill the requirements contained in the environmental document should be reported on this line and not on lines 14 and 15. The additional costs of walls, berms, and other noise barriers for environmental mitigation are to be reported on this line and should not be duplicated on lines 22 or 26.

Costs for noise abatement on completed sections (including noise insulation of public use or nonprofit institutional structures) may only be included in this estimate if the abatement is proposed along lands where development or substantial construction predated the existence of any highway, in accordance with prevailing Federal-aid policies, highway standards, specifications and guides.

On un-built ADHS highway sections, costs may be included for any of the noise abatement measures authorized via prevailing Federal-aid policies, highway standards, specifications and guides. This may include the acquisition of undeveloped or predominately unimproved land to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise. Methods for estimating such right-of-way costs are explained in line 15 of this section.

Line 25 - Roadside Improvement

Include costs for all phases and features of roadside improvement beyond that of the basic grading reported under line 17. The grading cost for interchanges should be reported on line 21.

Line 25a - Landscape Planting

Costs should be included for landscaping on through lanes and in interchange areas such as woody ground cover, shrubs and trees, and irrigation; together with turving, mulching, and other related work incidental to the completion of major planting operations. Costs of selective thinning and removal of existing plant growth will be included as landscape work where applicable. Landscaping specifically for the environmental mitigation should be included in Line 24. The cost for landscaping in interchange areas, rest areas and scenic overlooks should be reported on Lines 21 and 25, respectively.

Line 25b - Rest Areas and Scenic Overlooks

On remaining ADHS sections include the cost of speed change lanes, entrance and exit roadways, circulatory roads, parking areas, walkways, curbs, sanitary facilities, water supply, picnic tables and benches, trash receptacles, shelters, bulletin boards, lighting, incidental landscape planting,

and non-traffic control signs. Exclude costs of motorist services (logo) signs, which are to be reported in line 23, and also exclude costs of preliminary engineering and right-of-way, which are to be reported in lines 1 and 2, respectively.

Some States have combined rest areas and truck weighing stations. In such cases, construction costs for rest areas only are to be reported in this line.

Include costs of incidental landscape planting, and other layout construction of view areas and scenic overlooks. Also include cost of access provisions to serve people with disabilities. Exclude costs of preliminary engineering and right-of-way, which are to be reported in lines 14 and 15, respectively.

The costs of new or upgraded facilities at existing rest areas and scenic overlooks are not eligible for ADHS funding and are not to be included in this estimate.

Line 26 - All Other Items

Include the cost of any construction items not properly reported under the above headings (lines 17 - 22). This includes the costs for relocation of an existing highway or railroad, made in lieu of an ADHS separation. All such cost items require separate determination and an estimate, and are to be a part of the State's worksheets for future references.

Appropriate costs for training programs in accordance with prevailing Federal-aid policies, highway standards, specifications, and guides should also be included in this line item. Each State's estimate for the cost of this item should be based on their current procedures or guidelines for selecting projects and for determining the number of trainees to be assigned to each. The training costs included in this estimate should be only those costs that are eligible for ADHS funding, not including supportive service funds, and their method of development should be specifically identified and documented in the State's estimate work papers for future reference.

If mobilization costs are bid as a separate contract item, the estimated costs for such work shall be included in this line. Otherwise, the cost of this work is reflected in the various contract bid items and will, therefore, be included in any of the other items as applicable.

Line 27 - Construction Subtotal

The cost estimate software will total the cost reported in lines 15 through 26 and automatically enter the total on line 27.

Line 28 - Construction Engineering and Contingencies

The construction engineering percentage shall be based on the documented statewide cost of construction engineering as a percentage of construction costs during 2006. The FHWA Division Office must concur with the statewide percentage for construction engineering and be entered into the cost estimate software by the State DOT. However, the percentage for construction engineering may not exceed 15 percent of the entry on line 27.

Line 29 - Total Cost of Construction

The cost estimate software will total the cost reported on lines 27 and 28 and automatically enter the total on line 29.

Line 30 - Total Estimated Cost

The cost estimate software will total the cost reported on lines 14, 15, 16, and 29 and automatically enter the total on line 30.

The cost estimate software will automatically add a 5 % of total costs for contingency allowance. This allowance is the only contingency allowed in the estimate.

State Cost Estimate Totals – Table C

The cost estimate software will automatically generate Table C from the data entered on Table B. Table C includes all eligible costs to complete the system as reported on Table B. The rural and urban subtotals for each route will be taken directly from Table B and entered on Table C. The cost estimate breakdown, lines 17 to 30, is the same as those used in Table B and explained above. The total corridor cost, rural plus urban, will be shown on Line 30.

The three right columns in Table C, will show State subtotals for (1) rural, (2) urban, and (3) the total for both.

Pre-Financed and Advanced ROW Projects – Table D

Reporting Costs of Appalachian Bond Issue, Prefinanced (AC-APD) and Advanced Acquisition Projects - Table D

Each State must complete the data describing each of their prefinanced projects that had not been converted as of September 30, 2006 in Table D.

a. Appalachian Bond Issue Projects

In those States in which work on the ADHS Highway System is completed or in authorized status as of September 30, 2006 (having been financed in accordance with Section 201(h) of the Appalachian Region Development Act of 1965), and for which the State expects to claim reimbursement, the most accurate costs available for such work may be included in the estimate and reported on Table D. Projects in this category must be reported showing the corridor letter, estimate section, project number, whether they are rural or urban, work class, and total project costs, including the amount of Federal funds and State-matching money. A tabulation will be furnished by the Washington FHWA Headquarters for checking and correlation purposes.

Appalachian Bond Issue Projects must not be reported in Tables B or C.

b. Prefinanced (AC-APD) Projects

In those States where there are projects in completed or authorized status as of September 30, 2006 (having been advanced in accordance with Section 201(h) of the Appalachian Region Development Act of 1965), and for which the State expects to claim reimbursement, the most accurate costs available for such work shall be reported on Table D. Projects in this category must be reported showing corridor letter, section milepost, project number, whether they are rural or urban, work class, and total project costs including the amount of Federal funds and State-matching money. A tabulation

will be furnished by the Washington FHWA Headquarters for checking and correlation purposes.

AC-APD Projects are not to be reported in Tables B or C.

c. **Advanced Right-of-Way Acquisition Projects**

In those States in which there are advanced right-of-way acquisition revolving fund projects in authorized status as of September 30, 1998 (having been authorized in accordance with Section 201(h) of the Appalachian Region Development Act of 1965), the most accurate costs available for such projects shall be reported on Table D. These projects are to be reported in the same manner as the above Bond and AC-APD Projects. A tabulation will be furnished by the Washington FHWA Headquarters for checking and correlation purposes.

These Advanced Acquisition Projects are not to be reported on Tables B or C.

Preliminary Engineering Projects for Preparation of the 2007 ADHS Estimate

Administrative funds will be available to the States to cover 100 percent of the cost of preparing the 2007 estimate. These costs should not be reported in Table D.

Federal Funds Earmarked for the ADHS and not Obligated by 9/30/06 – Table E

Each State must complete the information describing all earmarked federal appropriations on uncompleted sections on the ADHS that have not been obligated by September 30, 2006 on Table E.

Table C – Cost Estimates by Corridors and State Total

2007 Appalachian Development Highway System Cost Estimate						
Table C State/Commonwealth of Cost Estimates By Corridors and State Total (Includes all eligible costs and associated mileages reported in Table B for Finance codes 21, 22, and 23)						
ADHS Corridor	Rural	Urban	Rural	Urban	Rural	Urban
Class: Rural or Urban						
Length in miles						
Total Mileage (Rural + Urban)						
Work Classification						
Estimated Costs (\$1,000)						
14. Preliminary Engineering:						
a. Location						
b. Design						
15. Right-of-Way:						
a. Acquisition						
b. Relocation						
16. Utility Adjustments						
17. Erosn Ctrl/Clear/Grade/Drain/Minor Structure						
18. Subbase, Base, Surfacing, Shoulders						
19. Railroad Grade Separations						
20. Highway Grade Separation without Ramps						
21. Interchanges						
22. Other Bridges, Tunnels, and Walls						
23. Traffic Control						
24. Environmental Mitigation						
25. Roadside Improvements:						
a. Landscape Planting						
b. Rest Areas, Overlooks						
26. All Other Items						
27. Subtotal (Lines 17 through 26)						
28. Construction E & C (0.00% of line 27 and 28)						
29. Total Cost of Construction (lines 27 and 28)						
30. Total Estimated Cost (lines 14, 15, 16, & 29)						
31. Total Cost (Rural + Urban)						

Chapter 6

Cost Estimate Document Requirements

1. Report Cover
2. Signature Sheet (to be signed by State DOT Chief Executive and State FHWA Division Administrator)

The Chief Executive of the State DOT and the respective FHWA Division Administrator must certify the State's ADHS Cost to Complete Estimate has been developed according to the prescribed Guidelines For Preparing the Appalachian Development Highway System Cost to Complete Estimate

3. State Map
4. Table A - Appalachian Corridor Segment Description
5. Table B – Design Classification and Cost Estimate by Estimate Sections with Corridor Totals
6. Strip Maps
7. Typical Cross Sections
8. Table C - Cost Estimate by Corridors and State Total
9. Table D - Pre-financed (AC-APD) and Advanced ROW Projects
10. Table E - Federal Funds Earmarked for the ADHS that were not Obligated as 9/30/06

RTI will be responsible for preparing the State Maps and Strip Maps for each state, as well as printing the final State 2007 ADHS Cost to Complete Estimate report. States are to submit up-to-date cross-sections and GIS data to RTI. All data to be submitted for these items is to be uploaded to the DMS via the Web Portal. The preferred data types for uploading information are CAD, PDF, Word documents, Excel documents, JPEG, or TIFF (if less than 5Mg). The comments box in the documents screen should be utilized to inform the Rahall Transportation Institute of the data being uploaded and for what it should be used. Table B, followed by the corridor strip map, will be grouped alphabetically in the final report by corridor letter.

State DOTs and FHWA Division Offices must develop and review their 2007 ADHS Cost to Complete Estimate on-line. RTI will not provide a copy of the State's 2007 ADHS Cost to Complete Estimate during the cost estimate development and review period. However, during the course of the preparation and review of the 2007 ADHS Cost to Complete Estimate by State DOTs and FHWA Division Offices, RTI will provide assistance as needed.

Copies of the State's ADHS Cost to Complete Report will be assembled in binders and furnished to the State DOTs by RTI no later than July 1, 2007 for required signatures.

For uniformity purposes, the State ADHS Cost to Complete Report will be an assembly of table sheets that are 11 inches by 17 inches in size and strip map prints folded for assembly in logical order, fastened on the left edge, and enclosed in a durable flexible cover not over 12 inches by 17 inches in size. The tables and maps are to be prepared as follows:

- State Map: Single 11" x 17" sheet.
- Tables A and D: Single or series 11" x 17" sheets.
- Tables B and C: 11" x 17" sheets, not folded, each of which would have complete identification, heading and series numbering.
- Strip Map: 11" x 17" size, each of which would have complete identification and series numbering.

Chapter 7

Preparing/Monitoring Costs to Prepare 2007 ADHS Cost To Complete Estimate

Administrative funds are being made available to the States to cover 100 percent of the cost of preparing the 2007 ADHS Cost to Complete Estimate. However, ARC has requested that actions be taken to prepare this estimate as efficiently as possible. To this end several strategies are being implemented.

1. Transitioning the ADHS GIS into a production environment and making appropriate modifications to enable it to be used for the 2007 ADHS Cost to Complete Estimate process in a web-based environment.
2. Making minor modifications to the current ADHS Cost to Complete Estimate process.
3. The third strategy involves improved oversight of the costs to prepare the estimate. ARC/FHWA is requesting each State DOT to develop a budget projecting the funds required to prepare their State's 2007 ADHS Cost to Complete Estimate.

Given the ADHS Cost to Complete Estimate is an estimate based on remaining work in each State it is safe to assume that there should be a relationship between the cost to prepare the estimate and remaining ADHS miles to be estimated.

We are providing a format (Table F) for each State to use in projecting their cost to develop their ADHS Cost Estimate. State DOT's, in concert with their respective FHWA ADHS Coordinator, should plan out their approach to completing their ADHS Cost Estimate.

Once the State DOT's have developed their respective budget it is to be submitted to their State FHWA Division Office. Upon concurrence by the State FHWA Division Office they are to submit it, no later than June 1, 2006, to Ms. Claretta Duren with FHWA in Washington. FHWA and ARC will complete their review no later than June 7, 2006 and distribute funds accordingly.

In addition we have provided via the ADHS GIS an expenditure tracking system that we are requesting the States to use as they prepare their ADHS Cost Estimate over the next 8 months. We are requesting each State ADHS Coordinator in coordination with their FHWA ADHS Coordinator to input cost on a semi-monthly basis (1st and 16th of the each month), at a minimum, via the Cost Accounting System provided via the Cost Estimate System.

We believe tracking this information will enable us to better manage the cost associated with preparing this estimate but also provide information for ARC and FHWA to consider when it comes to preparing the next ADHS estimate. Appropriate adjustments will be made based on the tracking of expenses.

Table F - Projected State DOT Costs for Preparing 2007 ADHS Cost Estimate

Category	Estimated Costs		
Personnel Time			
Personnel Travel			
1. Total Personnel Costs			
Contractor Time			
Contractor Travel			
2. Total Contractor Costs			
3. Equipment Costs			
4. Other Costs (List on separate page)			
TOTAL COSTS			
<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <hr style="width: 100%;"/> State DOT ADHS Coordinator Date: </td> <td style="width: 50%; vertical-align: top;"> <hr style="width: 100%;"/> FHWA Division ADHS Coordinator Date: </td> </tr> </table>		<hr style="width: 100%;"/> State DOT ADHS Coordinator Date:	<hr style="width: 100%;"/> FHWA Division ADHS Coordinator Date:
<hr style="width: 100%;"/> State DOT ADHS Coordinator Date:	<hr style="width: 100%;"/> FHWA Division ADHS Coordinator Date:		

Chapter 8

Roles and Responsibilities – ARC, FHWA, State DOTs

STATE DOTs

State DOTs are responsible for developing the cost estimates for those corridor sections that have not been completed and have no authorized projects as of 9/30/06. Responsibilities include:

1. Overall knowledge of their States ADHS Corridors – general alignments, status of completion, eligible miles, status of projects, status of funding – updating State map and Table A
2. Establishing Section Breaks for Corridors to be estimated according to guidelines – updating strip maps and Table B.
3. Updating appropriate inventory information with regards to their un-built ADHS corridors (eligible and in-eligible) to include: section lengths, class/urban area codes, location FIPS etc – updating strip maps and Table B.
4. Updating design information for their un-built ADHS Corridors (eligible and in-eligible) to include: design speed, traffic, lanes to be constructed, cross sections etc. – updating Table B.
5. Updating traffic information for their completed ADHS Corridors (eligible and in-eligible).
6. Developing detailed quantities by work classifications for ADHS Corridors to be estimated – backup information is to be maintained by the State DOT.
7. Developing unit costs from low-bid weighted averages for comparable items based on representative of Federal-aid contracts awarded during calendar year 2006 – backup information is to be maintained by the State DOT.
8. Completing all appropriate tables using information developed.
9. Maintain all supporting documentation in such detail that the estimated costs for preliminary engineering and design, for right-of-way and utilities, and for construction by appropriate work classification can be validated.
10. Compare the State's 2007 ADHS Cost to Complete Estimate with the State's 2002 ADHS Cost to Complete Estimate to identify increases greater than 15% and provide justification for the increase via a NARRATIVE
11. Prepare a projected budget for developing their State ADHS Cost Estimate.
12. State DOT Executive will certify the State's 2007 ADHS Cost to Complete Estimate has been developed according to the prescribed Guidelines for Preparing the Appalachian Development Highway System Cost to Complete Estimate.

FHWA

As a result of SAFETEA-LU the U.S. Secretary of Transportation is to retain full oversight responsibilities for the design and construction of all Appalachian highways under section 14501 of title 40.

FHWA DIVISION OFFICES

They are responsible for the following tasks:

1. Guide and advise State DOTs as far as this manual and all applicable Federal-aid Policies etc.
2. Maintain working knowledge of uncompleted sections on the ADHS – status

- (location, design, ROW, construction, stage construction, project activity, etc.)
3. Review and approve ADHS Sections determined by State DOT's requiring an estimate.
 4. Verify scope, termini and character of all proposed work on ADHS (Eligible Sections) are included in the latest approved ADHS Cost Estimate.
 5. Verify locations selected by State for estimating are feasible, practicable, and suitable.
 6. Designs or preliminary plans proposed for estimating purposes are in compliance with approved standards and other applicable controls.
 7. Detailed estimate of cost for work is reasonable, supportable, complete and accurate and has been developed in accordance with these instructions.
 8. Coordinate State line connections.
 9. Review State's Unit Costs to assure it can be justified and is reasonable.
 10. Review and Concur in State's list of ADHS projects (Pre-financed and Right-of-Way Projects Completed or in Authorized Status as 9/30/06)
 11. Identify Federal funds earmarked for their State ADHS not obligated as of 9/30/06 and provide to State DOTs.
 12. Review State's Construction Engineering Cost – validate process and concur in percentage used by the State DOT.
 13. Oversee and concur with State DOTs preparation of their ADHS Cost Estimate – according to ARC and FHWA policies etc. Division Administrator is to sign the Signature page of Final Copy along with State DOT Executive.
 14. Review and concur with the State's projected budget for preparing their ADHS Cost Estimate.
 15. Transfer funds as appropriate to cover State DOT cost in preparing their ADHS Cost Estimate.
 16. Participate in field/site reviews with State DOT personnel.

FHWA HEADQUARTERS

Their responsibilities are to coordinate all administrative and policy related inquiries with ARC. This is the primary contact for FHWA Divisions and State DOTs in preparing the 2007 ADHS Cost to Complete Estimate. Specific tasks include:

1. Reviewing State 2007 ADHS Cost to Complete Estimates and summarizing in Report to be submitted to ARC.
2. Review and approve each State's projected budgets for preparing their ADHS Cost Estimate.
3. Distributing funds to FHWA Division and State DOT's for preparing the State ADHS Cost to Complete Estimate
4. Provide policy and procedural guidance as needed by Division Offices and State DOT's

ARC

ARC has been charged by Congress with the overall management and administration of the ADHS. Specific responsibilities include:

1. Alignment Changes
2. Termini Changes
3. Other ADHS Changes as reflected in current State Cost to Complete Estimate
4. Allocation Formula Development – Cost to Complete Estimate
5. ARC Code Interpretation/Revisions

6. Review the State 2007 ADHS Cost to Complete Estimate Report

RAHALL TRANSPORTATION INSTITUTE (GIS/COST ESTIMATING SOFTWARE)

1. Develop software according to specifications provided by ARC and FHWA.
2. Provide training on the GIS/Cost Estimating Software.
3. Provide written instructions on the use of the GIS/Cost Estimating Software
4. Maintain ADHS GIS Database and other related files
5. Print Cost Estimate Reports as directed by ARC and FHWA.
6. Develop Utility Reports for the ADHS as requested.
7. Provide ongoing technical assistance to ARC, FHWA, State DOT's as requested.
8. Maintain database regarding all questions related to doing Cost Complete Estimate

Appendix A
ADHS Coordinators

State DOT ADHS Coordinators

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Appendix B

Congressional District

Congressional Districts by State

State	District #	Representative
Alabama	04	Robert B. Aderholt (R)
	05	Robert E. "Bud" Cramer, Jr. (D)
	06	Spencer Bachus (R)
	07	Artur Davis (D)
Georgia	04	Cynthia McKinney (D)
	05	John Lewis (D)
	06	Tom Price (R)
	07	John Linder (R)
	09	Charles Norwood (R)
	10	Nathan Deal (R)
Kentucky	01	Edward Whitfield (R)
	04	Geoff Davis (R)
	05	Harold Rogers (R)
	06	Ben Chandler (D)
Maryland	06	Roscoe G. Bartlett (R)
Mississippi	01	Roger Wicker (R)
New York	22	Maurice Hinchey (D)
	24	Sherwood Boehlert (R)
	27	Brian Higgins (D)
	29	John R. "Randy" Kuhl, Jr. (R)
North Carolina	11	Charles H. Taylor (R)
Ohio	02	Rob Portman (R)
	03	Michael Turner (R)
	06	Ted Strickland (D)
	07	David L. Hobson (R)
	18	Bob Ney (R)
Pennsylvania	03	Phil English (R)
	04	Melissa A. Hart (R)
	05	John E. Peterson (R)
	09	Bill Shuster (R)
	10	Don Sherwood (R)
	12	John P. Murtha (D)
	14	Michael Doyle (D)
	17	Tim Holden (D)
18	Tim Murphy (R)	

South Carolina	03	J. Gresham Barrett (R)
	04	Bob Inglis (R)
Tennessee	01	William L. Jenkins (R)
	02	John J. Duncan, Jr. (R)
	03	Zach Wamp (R)
	04	Lincoln Davis (R)
	06	Bart Gordon (D)
Virginia	06	Bob Goodlatte (R)
	09	Rick Boucher (D)
	10	Frank R. Wolf (R)
West Virginia	01	Alan B. Mollohan (D)
	02	Shelley Moore Capito (R)
	03	Nick J. Rahall, II (D)

Appendix C

Urban Area Code

Urban Area Codes by State

Alabama 01	
Athens	0170
Birmingham	0350
Huntsville	1730
Leeds	1850
Georgia 13	
Atlanta	0280
Dalton	1510
Rossville (Chattanooga, TN)	4780
Kentucky 21	
Ashland	0120
Hazard	1470
Lexington	1980
Middlesboro	2220
Somerset	3070
South Williamson	3140
Winchester	3610
Maryland 24	
Cumberland	0410
Mississippi 28	
Batesville	0120
Oxford	1860
Tupelo	2610
New York 36	
Bath	0420
Binghamton	0540
Corning	1360
Elmira	1850
Jamestown	2950
Olean	4460
Salamanca	5410
Waverly	6490
North Carolina 37	
Asheville	0170
Conover	1060
Hendersonville	2130
Newton	3300
Ohio 39	

	Cincinnati	1610
	Columbus	1800
	Marietta	4730
Pennsylvania 42		
	Bloomsburg	0740
	Carlisle	1100
	Charleroi	1240
	Du Bois	2070
	Erie	2640
	Harrisburg	3500
	Monessen	5390
	Pittsburgh	6600
	Somerset	7820
South Carolina 45		
	Gaffney	0930
	Greenville	1040
	Spartanburg	2460
Tennessee 47		
	Chattanooga (Rossville, GA)	0400
	Cleveland	0420
	Cookeville	0480
	Kingsport	1280
	Knoxville	1300
	Morristown	1700
Virginia 51		
	Blacksburg	0180
	Bluefield (WV)	0200
	Bristol (TN)	0300
	Christiansburg	0500
West Virginia 54		
	Beckley	0170
	Bluefield (VA)	0260
	Buckhannon	0340
	Charleston	0480
	Clarksburg	0540
	Elkins	0810
	Fairmont	0840
	Morgantown	1840
	Oak Hill	1970
	Parkersburg	2040
	Princeton	2180
	Williamson	2870

Appendix D

Definitions & Abbreviations

Definitions/Abbreviations

Definitions

Eligible Miles - Miles authorized by Congress and designated as eligible for ADHS funding. These miles can also be classified as Participating.

Ineligible Miles – As integral parts of the ADHS, consist of those miles not authorized for ADHS funds but planned to be constructed or have been constructed/completed with other than ADHS funds. These miles can also be classified as Non-Participating

Participating Miles – Miles authorized by Congress and designated as eligible for ADHS funding. These miles can also be classified as Eligible Miles

Non-Participating Miles – As integral parts of the ADHS, consist of those miles not authorized for ADHS funds but planned to be constructed or have been constructed/completed with other than ADHS funds. These miles can also be classified as Ineligible Miles.

Completed (Status) – All work eligible for ADHS funding has been completed according to prevailing Federal-aid Policies, Highway Standards, Specifications and Guides

Stage Construction – Open to Traffic - The initially constructed configuration of roadway is less than that approved by the ARC (e.g. Only two lanes are constructed for current traffic on a facility that is approved by the ARC for funding as a four-lane divided highway).

The initial configuration of “Phase Construction” roadway (see definition above) is opened to traffic.

Final Construction (Status) – Final construction contract underway where all eligible work for ADHS funding has been included in the contract.

Stage Construction – Not Open to Traffic – The initial configuration of a “Phase Construction” roadway (see definition above) is underway and not opened to traffic.

Design or R/W Acquisition – Design is underway or completed and/or R/W acquisition is underway or completed on a selected construction location.

Location Study - Studies to determine route locations are underway or completed.

Major Changes – Changes to an ADHS Corridor of a nature requiring approval of ARC. Major changes include: revised general corridor locations, final route locations, State line crossings, transfer of Eligible miles, inclusion of additional Eligible and In-Eligible miles, additional Interchanges, Travel Lanes, and Auxiliary Lanes.

Pre-financed Projects – Projects in completed or authorized status, having been advanced in accordance with Section 201(h) of the Appalachian Region Development Act of 1965 and for which the State expects to claim reimbursement.

Advance Construction – A technique that allows a State to initiate a project using non federal funds while preserving the eligibility for future Federal-aid funds.

Full-Oversight – FHWA retains the review and approval authority in the project development and construction process to assure compliance with federal regulations, policies, procedures and safety and quality standards, and that federal dollars are being spent appropriately.

Obligated Funds – Funds are considered obligated as shown in FHWA’s Fiscal Management Information System (FMIS)

Unobligated Funds – Funds are considered unobligated as shown in FHWA’s Fiscal Management Information System (FMIS)

Earmarks – Non-apportioned funding specifically designated to the ADHS. These funds could be designated to the ADHS, to the State ADHS and or by ADHS Corridor.

ADHS Corridor – A segment of the ADHS having termini at either another ADHS Corridor or an Interstate and a letter designation

Section Breaks – Points established along an ADHS Corridor, using various prescribed attributes, that distinguish adjoining homogenous sections from one another.

Abbreviations

AC	Prefix for Advanced Construction
ADT	Average Daily Traffic
ADHS	Appalachian Development Highway System
APD	Prefix for ADHS Projects
ARC	Appalachian Regional Commission
CFR	Code of Federal Regulations
DHV	Design Hourly Volume
FAPG	Federal-Aid Policy Guide
FHWA	Federal Highway Administration
FIPS	Federal Information Processing Standards
FMIS	Fiscal Management Information System
GIS	Geographic Information System
HPMS	Highway Performance Monitoring System
LRS	Linear Reference System
NHPN	National Highway Planning Network
NHS	National Highway System

PE	Preliminary Engineering
PS&E	Plans, Specifications, and Estimates
ROW	Right-of-Way
R/W	Right-of-Way