Strategic Highway Investment Formula for Tomorrow

KYTC District Transportation Plan

2017

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Section 1 – Introduction

SHIFT – Strategic Highway Investment Formula for Tomorrow – is a prioritization model that will bring balance and dependability to Kentucky's over-programmed highway plan. Through SHIFT, The Kentucky Transportation Cabinet (KYTC) has developed a more data-driven, objective and collaborative approach to determine the state's transportation funding priorities.

Need

Kentucky's most recent highway plan (2016) promises more than $6 billion in unfunded transportation projects. The cost of our project "wish list" is TEN TIMES greater than the state funds available. As a result, citizens cannot depend on the plan as a reliable guide for investments.

The situation gets worse. To receive federal funding, Kentucky must provide a match (typically 80/20 or 90/10). For 15 years, Kentucky has met the required state match for federal dollars by using earned credits, dollars invested decades ago in the state's parkway system. Because Kentucky built national highway system roads with state-generated dollars, it earned credits. In 2020, however, Kentucky will run out of those earned credits. That will require the use of 100 million dollars in state funds annually to meet the federal match, drastically reducing the dollars and numbers of state-funded projects.

Without program reforms, the combination of overpromising and the end of earned credits will further widen the gap. Unless Kentucky acts, 95 percent of state-funded projects in the 2018 Highway Plan will not have any state dollars to pay for them (Figure 1).

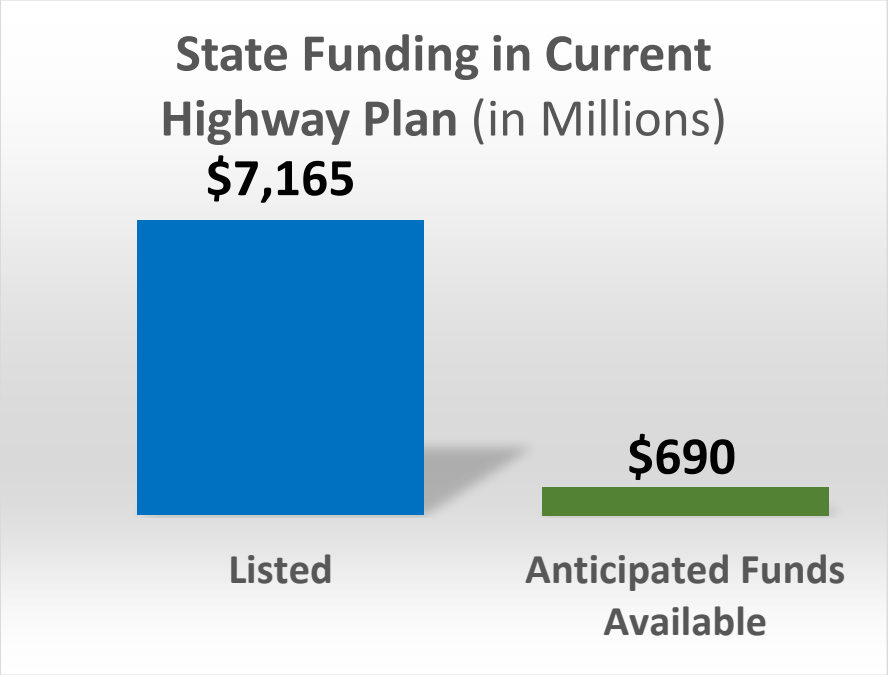


Figure 1 - State Funding in Current Highway Plan

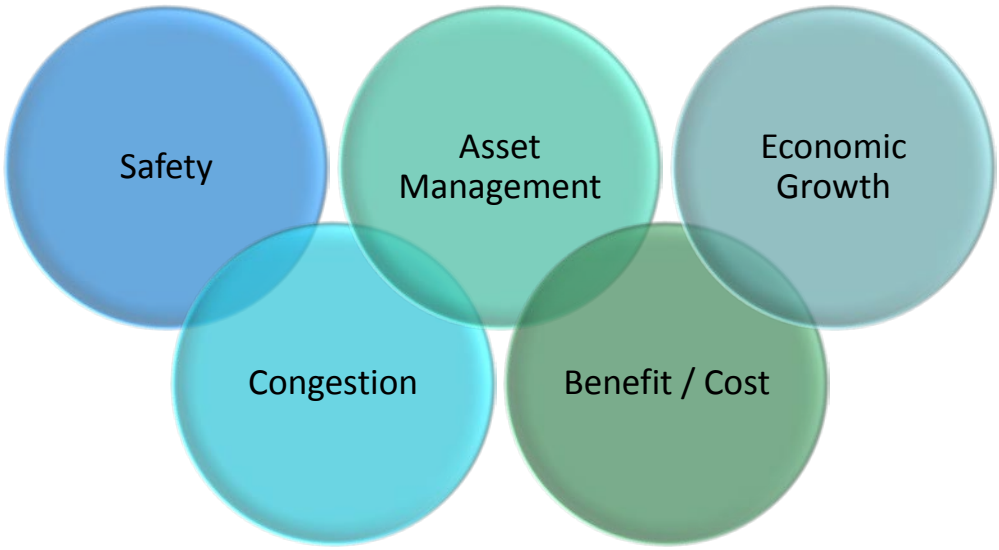
Approach

It's time to change the way Kentucky conducts the business of transportation funding. Governor Bevin charged KYTC to develop a data driven process to prioritize and program federal and state funded highway improvement projects. A 22-member, multidisciplinary work group was formed. This group met regularly over the summer of 2016 to brainstorm possibilities and evaluate potential criteria. Periodic progress and results were reported to the Secretary and State Highway Engineer's office. They examined processes used in other states and collaborated with planning partners, holding meetings with Area Development District (ADD) and Metropolitan Planning Organization (MPO) personnel. A mix of quantitative and qualitative criteria were identified and evaluated considering the availability of data statewide. Projects to be scored were identified through sponsorship by each KYTC highway district, ADD and MPO.

Scoring Components

The KYTC work group evaluated many different factors and made adjustments for aspects unique to Kentucky's transportation system considering data availability, Kentucky-specific processes and accepted local economic indices. As a result, five components (Figure 2) were ultimately identified for use in formula scoring:

Figure 2 - Formula Components



Project Sponsorship

Projects that were to be considered for scoring came from the current highway plan (approximately 1,400 projects) and the unscheduled needs list database (approximately 2,500 projects). At nearly 4,000 projects, the number was too large for all to be scored given the need for economic analysis on a project by project basis. For this reason, in order to be considered for scoring, a project had to be sponsored by either KYTC, an Area Development District (ADD) or a Metropolitan Planning Organization (MPO). The number of sponsorships per organization was limited based on number of counties, population and lane miles according to the following formula: Sponsorship # = 2*Number of Counties + Population/25000 + Lane Miles/1000. A breakdown of the number of allowable sponsorships by group is shown in Table 1. 1,152 total projects were sponsored.

Table 1 - Project Sponsorship per Organization

District	# to Sponsor
1	51
2	55
3	47
4	52
5	71
6	52
7	65
8	45
9	40
10	35
11	37
12	32

ADD	# to Sponsor
BARREN RIVER	40
BIG SANDY	23
BLUEGRASS	66
BUFFALO TRACE	16
CUMBERLAND VALLEY	38
FIVCO	16
GATEWAY	18
GREEN RIVER	23
KENTUCKY RIVER	30
KIPDA	21
LAKE CUMBERLAND	43
LINCOLN TRAIL	29
NORTHERN KENTUCKY	23
PENNYRILE	41
PURCHASE	36

MPO	# to Sponsor
BOWLING GREEN	10
EVANSVILLE	6
LOUISVILLE	51
KYOVA	10
LEXINGTON	22
OKI	26
OWENSBORO	8
RADCLIFF	13
CLARKSVILLE	3

Project types considered for the SHIFT process included safety improvements, road widening, reconstruction, new routes and interchanges. Projects outside of SHIFT included Rural and Municipal Aid, maintenance and federally dedicated projects such as MPO and bike/ped.

Implementation Timeline

The following 2017 timeline (Table 2) was adopted to identify projects and implement the new scoring process.

Table 2 - 2017 SHIFT Timeline

Project Sponsorship	Jan. thru Feb.
Data Verification	Mar. thru May
Statewide Prioritization	Jun. 5 thru 16
Regional Prioritization	Jun. 19 thru Jul. 28
Finalize Project Selection	Jul. 31 thru Sep. 1

The SHIFT process will help inform the Recommended Highway Plan. In addition to the final SHIFT scores, current investment, regional significance and program balance will be used to develop the Recommended Highway Plan. Governor Bevin will present the Recommended Highway Plan to the 2018 General Assembly which will meet in January and run through April. The General Assembly will consider and ultimately pass the 2018 Highway Plan. Upon enactment, KYTC will reconcile the draft plan with the enacted plan and begin revising the scoring process for the next SHIFT cycle.

Section 2 - Statewide Project Scoring

Statewide Project Scoring methods were developed for sponsored projects on the National Highway System (NHS). Statewide criteria were identified during the workgroup sessions previously mentioned and weights applied as shown in Figure 3:

Proposed Statewide Funding Formula

Priority	Score
Improve Safety	**25%**
Reduce Congestion	**20%**
Fuel Economic Growth	**20%**
Spend Tax Dollars Wisely (Benefit /Cost)	**20%**
Preserve Infrastructure (Asset Management)	**15%**
TOTAL	**100%**

Figure 3 - Proposed Statewide Funding Formula

Statewide Safety scores are primarily driven by crash history but also by roadway geometry. Congestion scores are based on hourly volume as well as volume to capacity ratio. The Economic Growth score for Statewide projects consists of an Economic Competitiveness component and a Freight component. Economic Competitiveness is based on the potential for jobs to be created over a ten year period. The Freight component looks at percent trucks, ADT, Freight Network Tier and the maximum truck volume within that tier. The Benefit-Cost ratio uses benefits derived from travel-time and crash reduction savings divided by the project cost. The Asset Management component considers bridge and pavement needs within the project limits that could be addressed by the proposed project resulting in an added benefit. Statewide project selection is 100 percent data driven. Detailed Statewide project formulas can be found in Appendix C of this document.

Section 3 – Regional Project Scoring

Section 3A. Regional Scoring Methods, Criteria and Formulas

Regional Project Scoring methods were developed for sponsored non-NHS projects and for NHS projects that did not advance in the Statewide scoring. Regional criteria and their weights are shown in Figure 4.

Proposed Regional Funding Formula

Priority	Score
Improve Safety	20%
Reduce Congestion	10%
Fuel Economic Growth	15%
Spend Tax Dollars Wisely (Benefit/Cost)	15%
Preserve Infrastructure (Asset Management)	10%
SUBTOTAL	70%
District Priorities (KYTC)	15%
Local Priorities (ADD/MPOs)	15%
TOTAL	100%

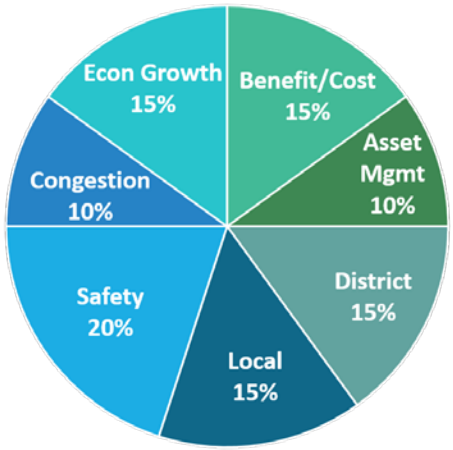


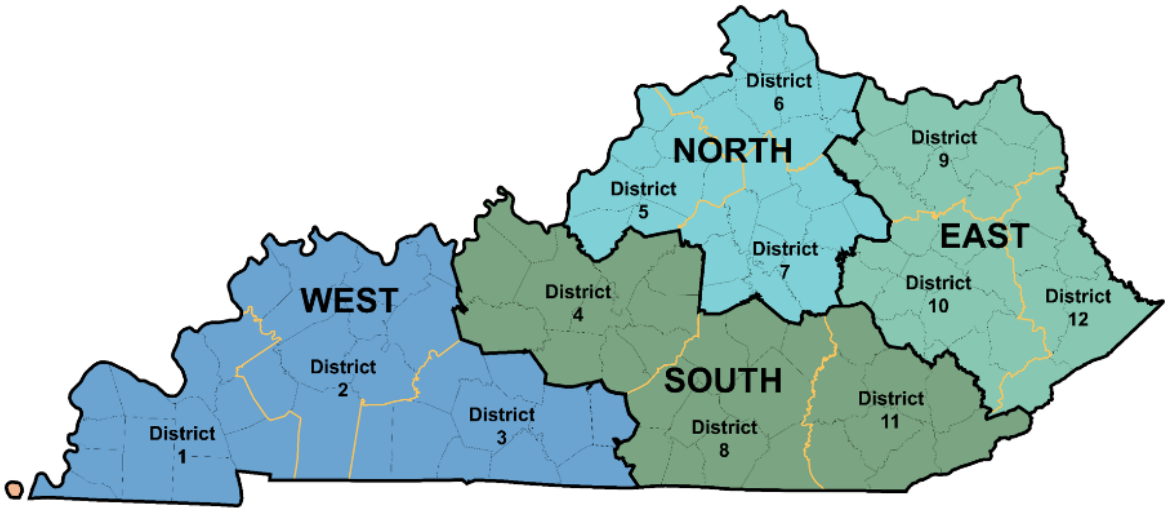
Figure 4 - Proposed Regional Funding Formula

Regional scoring and project selection is 70 percent data driven and 30 percent subjective based on District and Local priorities. Highway Districts coordinated with MPOs, ADDs and local and state officials to ensure their priorities were understood and given fair consideration. Regional criteria weighting varies from Statewide to account for the more rural nature of the projects. Safety scores are primarily driven by Crash History but also by Roadway Characteristics. The Regional Crash History component is weighted the same as for Statewide, while the Roadway Characteristics weighting is half that of the Statewide weighting. Congestion scores are based on hourly volume as well as volume to capacity ratio. The Regional Congestion score receives half the weight of the Statewide score. The Economic Growth score for Regional projects differs from the Statewide score in that it is “needs” based. Instead of jobs created, it looks at Accessibility and Connectivity needs based on improvement type, county economic indicators and ADT. The Regional Economic Score also includes a Freight component weighted half that of the Statewide Freight component. The Benefit-Cost ratio uses benefits derived from travel-time and

crash reduction savings divided by the project cost. The Regional Benefit-Cost component is three quarters the weight of the Statewide component. The Asset Management component considers bridge and pavement needs within the project limits that could be addressed by the proposed project resulting in an added benefit. The Regional Asset Management component is weighted fifty percent heavier than the Statewide component. Detailed formulas for scoring Regional projects can be found in Appendix C of this document.

Four Regions, each made up of three Highway Districts, were grouped for regional scoring and are shown on the map in Figure 5. Larger regions allow for a greater pool of resources to fund larger projects. District boundaries are maintained within the regions. The regions combine contiguous districts with similar challenges including mountainous terrain, urban areas, highway mileage, population, etc. Each region receives equal funding. The districts compete within their respective region for this funding. Each district receives a minimum 25% of the funding.

Figure 5 - Kentucky Regions



See Figure 6 for a flowchart depicting the Statewide and Regional processes. Regional Scoring offers an opportunity to apply a 15 point boost to 25 percent of the Regional projects for each KYTC District (District Priorities) and for each ADD or MPO (Local Priorities). That gives an opportunity for a total of 30 additional points if both the District and Local boost is applied to the same project.

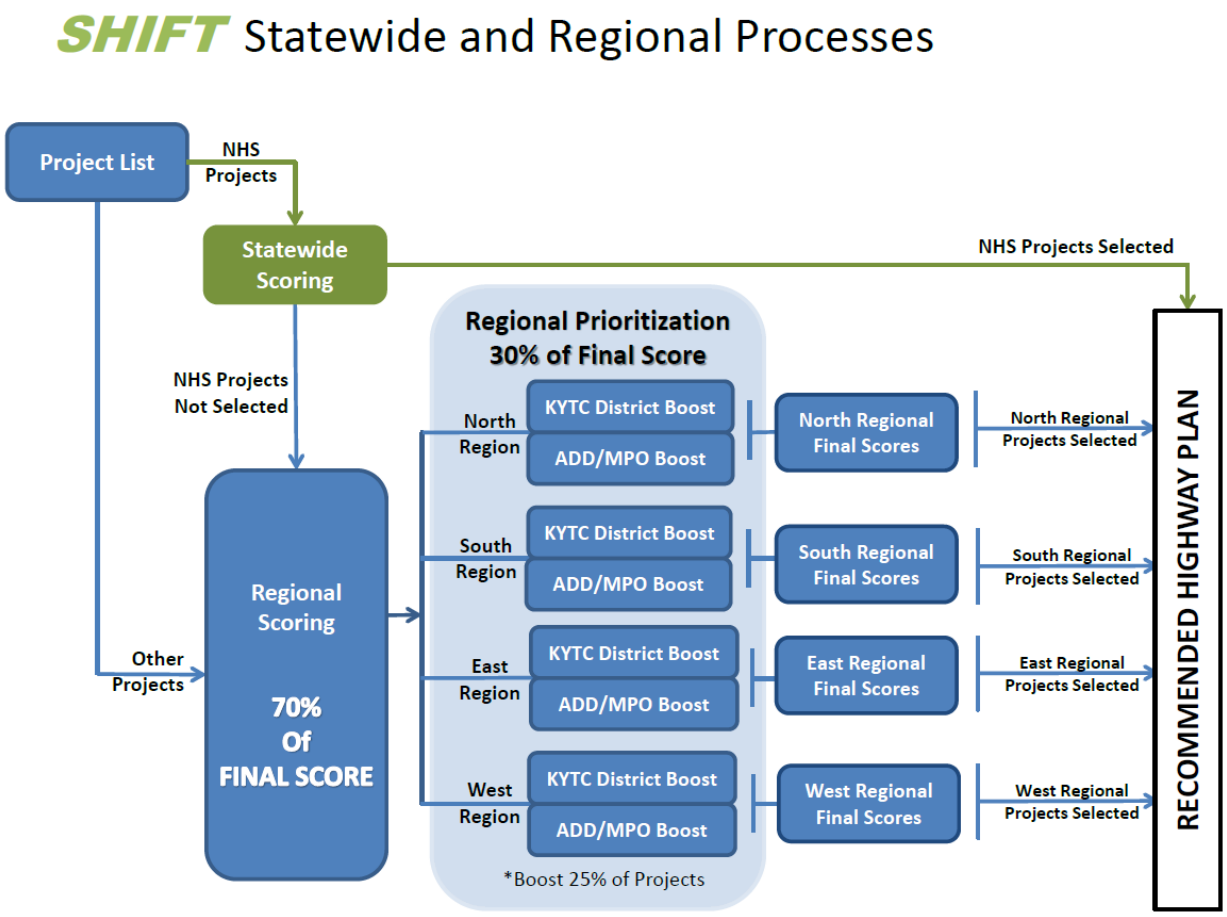


Figure 6 - Statewide and Regional Processes Flowchart

Each Region receives an equal amount of budgeted Regional funding. The Regional amount is divided equally with each District receiving a quarter. Since there are only three Districts per Region, one quarter of each Region's funding is left over for regionally significant projects that qualify through scoring but need additional funding.

The boost for Regional scoring gives an opportunity to apply more points to those projects that have needs that cannot be identified through scoring algorithms, such as for local economic development and associated traffic increases not captured by the rest of the scoring process. The process is transparent and encourages collaboration and coordination between the state and local officials. Local knowledge is gained during the process that can be applied for a better informed prioritization.

Section 3B – Prioritization Plans

Each KYTC Highway District Office, ADD and MPO developed a Prioritization Plan for how they would approach scoring their Regional projects, what priorities were considered, coordination between

Highway Districts, ADDs and MPOs and any other considerations for how to best identify and rank those projects with the greatest need and/or offer the most benefit to the region. A summary comparison of those priorities is included in Table 3 for the Highway Districts, Table 4 for the ADDs and Table 5 for the MPOs. Complete plans for each are included in Appendix D, Prioritization Plans.

Table 3 - Prioritization Plan Summary - Highway Districts

Factors are ranked by importance with "1" being the most important.												
	District											
Factors	**D1**	**D2**	**D3***	**D4**	**D5***	**D6***	**D7***	**D8**	**D9***	**D10***	**D11**	**D12**
Project has begun				4		1		3			6	
Regional significance		4		6		1	1	5		1	8	
Safety		3		1	1	1	1	1	1		2	
Currently in Highway Plan		2										1
Economic development		5			1	1	1		1			
District priority project listing			1				1					
Project score		1	1				1		1		1	
Sup. from mult. Loc. agencies			1	2	1			2	1		4	
Proj. ident. by planning study				3							5	
Growth anticipated				5				4			7	
Auth. in Des., R/W or Utilities					1	1	1		1			
Congestion	1				1	1	1	6	1			
Asset Management						1						
Construction ready					1	1	1		1			
Project in STIP/TIP						1	1		1			
Continuity						1			1			
Proj. in loc./reg. comp. plan						1	1		1			
Public Interest						1	1		1			
Public Infrastructure	2					1	1					
Fiscal practicability						1	1		1	1		
Multi district need						1						
Mobility							1					
Infrastructure							1		1			
Local input							1			1		
Employee knowledge										1		
District Goals & Objectives									1			
Legislative Support									1			
Connectivity	3						1		1		9	
Past project priorities					1					1	3	2
Need to const. w/other proj.	4											
Req. significant maint. work					1						10	
Geo. dispersion of projects												3

*Factors are valued equally.

Table 4 - Prioritization Plan Summary - Area Development Districts (ADDs)

Factors for each ADD are checked with a "1" and indicate no particular order for importance or weight. **Area Development District (ADD)**															
Factors	**Barren River**	**Big Sandy**	**Bluegrass**	**Buffalo Trace**	**Cumberland Valley**	**FIVCO**	**Green River**	**Gateway**	**Kentucky River**	**KIPDA**	**Lake Cumberland**	**Lincoln Trail**	**Northern KY**	**Pennyrile**	**Purchase**
Consistent with district	1				1	1								1	
County distribution	1							1		1				1	
Population	1													1	
Economic development		1					1	1					1		
Access management		1										1			
Congestion/Mobility		1						1							
Safety/Security		1					1	1			1	1	1		
Local Input			1			1				1	1				
Regional significance			1		1		1	1	1		1	1	1		1
Connectivity			1		1							1			1
Project score			1			1								1	
Construction ready					1								1		
Cost					1										1
Individual critical data components					1				1						1
Currently in 6YP			1				1		1				1		1
Project underway											1	1			
Tourism											1	1			
Past project priorities			1												
Committee priorities						1									
Primary routes								1							
Project identified in a study												1			
Address growth												1			
Multimodal												1			

Table 5 - Prioritization Plan Summary - Metropolitan Planning Organizations (MPOs)

Factors are ranked by importance with "1" being the most important.									
	Metropolitan Planning Organization (MPO)								
Factors	**Bowling Green**	**Clarksville***	**Henderson-Evansville***	**KYOVA***	**Lexington***	**Louisville***	**OKI***	**Owensboro**	**Radcliff-Elizabethtown***
Commitment	1							1	
D-phase or beyond	1				1			1	
Additional funding sources	1							1	
Local/Public support	1				1	1	1	1	
District support	1					1		1	
Identified in a study	1		1					1	1
Supports local land use planning	1							1	
Economic development	2			1	1		1	2	1
Freight/Multimodal connections	2							2	1
Future growth expected	2							2	1
Tourism	2							2	1
Congestion	3		1	1			1	3	
Mobility	3							3	
Access	3							3	1
Bike/Ped connections	3							3	
Project score		1	1		1				
Safety			1	1	1		1		1
System Preservation				1			1		
Consistent with MTP		1	1	1	1	1	1		1
Consistent with comprehensive plans		1	1	1			1		
Transit and non-motorized traffic		1	1	1	1				1
Cost effective			1						
Connectivity					1				1
Maintenance					1				
System efficiency/reliability					1				
Community character					1				
Environment					1				
Health/Wellness					1				
Project history					1				
Constructability							1		
Regionally significant									1
Project underway									1

*Factors are valued equally.

Section 4 – Summary/Conclusion

SHIFT acknowledges current highway funding shortfalls and offers a balanced approach and dependability to project prioritization and selection. It provides a transparent process that encourages collaboration between planning partners. SHIFT is data driven, using quantitative measures such as crashes, traffic volumes, delays and employment to assess the benefits of planned projects and compare them to one other. Scoring formula components include Safety, Congestion, Asset Management, Economic Growth and Benefit-Cost analysis, addressing the needs in Kentucky's rural and urban areas. SHIFT will inform the next Recommended Highway Plan giving the Governor and General Assembly a solid foundation and realistic approach to project selection based on available funding. This is just the beginning. SHIFT is a process that will continue to improve as technological developments and new data sources become available.

Appendices

Appendix A – Statewide Projects Scores

Appendix B – Regional Projects Scores

Appendix C – Project Scoring Formulas – Statewide and Regional

Appendix D – Prioritization Plans