



*Office of the Chief Internal Auditor*

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***Audit Report***

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*South Carolina Department of Transportation  
Statewide Transportation Improvement Program (STIP)*

***January 21, 2016***

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**Office of the Chief Internal Auditor**  
**Statewide Transportation Improvement Plan (STIP) Audit**

January 21, 2016

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# ***Transmittal Letter***



***Office of the Chief Internal Auditor***

The Honorable Lawrence K. Grooms, Chairman  
South Carolina Senate Transportation Committee

The Honorable Hugh K. Leatherman, Sr., Chairman  
South Carolina Senate Finance Committee

The Honorable Merita A. Allison, Chairman  
South Carolina House Education and Public Works Committee

The Honorable W. Brian White, Chairman  
South Carolina House Ways and Means Committee

**RE: SCDOT Statewide Transportation Improvement Program Audit**

Dear Distinguished Legislators:

The Office of the Chief Internal Auditor has completed the Statewide Transportation Improvement Program audit. On January 21, 2016, the South Carolina Department of Transportation Commission approved the release of this report. Included with the report is the response provided by the Office of the Secretary of Transportation.

We conducted this audit in accordance with Generally Accepted Governmental Auditing Standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a responsible basis for these findings and conclusions.

We appreciate your support to our office. If you have any questions or comments regarding this report or this review process, please do not hesitate to contact me at (803)737-1151 or via email: [townespb@scdot.org](mailto:townespb@scdot.org).

Respectfully submitted,

*Paul B Townes*

Paul B. Townes, CPA  
Chief Internal Auditor  
Office of the Chief Internal Auditor

## EXECUTIVE SUMMARY

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This report provides an analysis and evaluation of the criteria which the Office of the Chief Internal Auditor (OCIA) used to select projects for inclusion into the Statewide Transportation Improvement Program (STIP). The method of analysis included citing the relevant provisions of Act 114 and federal regulations, identifying the South Carolina Department of Transportation (SCDOT) Commission's approved criteria for prioritizing projects, identifying SCDOT management's criteria for ranking projects, comparing criteria for compliance, testing to determine compliance with approved criteria, and documenting the process flow for projects into the STIP.

Results of our audit found the following:

- SCDOT Commission approved criteria were used to rank projects into the 2014-2019 STIP. SCDOT management adopted the Commission's approved criteria in the form of Engineering Directive Memorandums (EDMs) to implement the criteria.
- Historical data that are used to rank bridge projects, and safety improvement projects into the STIP are not retained. The retention of data creates accountability, provides confirmation of results, substantiates validity, and provides comparability for consistency of application.
- OCIA found that SCDOT management does not re-evaluate the ranking status of a project after a major economic development has occurred. The occurrence of such an event could impact the ranking criteria and change the ranking status of projects in the STIP.
- Our review found that an added criterion was included in the performance metric to rank an interstate interchange project.

The ranking of projects does not necessarily indicate the order in which projects are commenced. Factors such as funding (e.g., Act 98), environmental, legal, operational, and other issues may change the order in which the projects are commenced.

The focus of the audit verified the criteria for project selection as mandated by the South Carolina Legislature for the Statewide Transportation Improvement Plan. The staff made recommendations concerning the ranking processes based on the application of Act 114 criteria and associated weightings. The SCDOT Commission approved the criteria and associated weightings. The approved weightings and the ranking process were implemented by management as reflected in the Engineering Directive Memorandums. The associated weightings were not tested for this audit.

## BACKGROUND

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### Act 114

The South Carolina General Assembly passed Act 114 transportation legislation on June 21, 2007. In accordance with Section 57-1-370 (B) (8) of the Act the SCDOT Commission was given the authority to establish a priority list of transportation projects to the extent permitted by federal laws or regulations. The legislation directed the Commission to take into consideration at least the financial viability including a life cycle analysis of estimated maintenance and repair costs over the expected life of the

project, public safety, potential for economic development, traffic volume and congestion, truck traffic, the pavement quality index, environmental impact, alternative transportation solutions, and consistency with local land use plans.

The STIP is a comprehensive list of transportation improvement projects in the State of South Carolina. The projects listed on the STIP are grouped into categories which include bridge rehabilitation, bridge replacement, congestion mitigation and air quality improvement (CMAQ), interstate maintenance, interstate interchange, interstate upgrade, and safety.

The current 2014-2019 STIP covers six federal fiscal years between October 1, 2013 and September 2019. In accordance with the federal regulations promulgated under federal law in Title 23 United State Code, CFR 450.216, the STIP must cover a period of no less than four years. If the STIP covers more than four years, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) considers the projects in the additional years as informational. The STIP is a fiscally constrained document. Fiscally constrained means that the STIP reflects available funds to address a planned level of activity. It is in place to ensure that the delivery of projects placed in the STIP is realistic to achieve.

SCDOT's Office of Planning develops the STIP in cooperation with the Metropolitan Planning Organizations (MPOs) and in consultation with the Council of Governments (COGs). The STIP begins as a compilation of the SCDOT planning process, the Statewide Multimodal Transportation Plan, the MPOs' and the COGs' regional Transportation Improvement Programs (TIPs) and evolves into a comprehensive list of all highway and transit projects. The STIP is approved jointly by the SCDOT, FHWA and FTA. The most recent 2014-2019 STIP was approved on August 15, 2013.

## **OBJECTIVES**

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The audit evaluated the adequacy of conformance in which project selection and the prioritization process used to develop the Statewide Transportation Improvement Program (STIP) was completed in accordance with the South Carolina General Assembly Act 114 enacted on June 21, 2007.

## **AUDIT SCOPE, APPROACH, AND METHODOLOGY**

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The audit covered the projects identified in the 2014-2019 STIP. The projects are ranked in the STIP based upon the seven categories which include Bridge Rehabilitation, Bridge Replacement, Congestion Mitigation and Air Quality Improvement (CMAQ), Interstate Maintenance, Interstate Interchange, Interstate Upgrade, and Safety. The audit included an analysis of how the projects are identified, selected, and ranked for scheduling into the STIP in the categories.

The following approach was followed in conducting this audit:

- Obtaining and reviewing relevant documentation related to the STIP. OCIA reviewed relevant documentation in order to gain an understanding of federal regulations, state law, 2014-2019 STIP, SCDOT internal documentation such as Engineering Directive Memorandums and other documentation related to the STIP process.

- Interviewing key individuals within the SCDOT's Office of Planning, Director of Maintenance Office, Traffic Engineering and other related departments.
- Conducting walkthroughs with staff assigned to rank projects and others involved in the STIP process.
- Documenting and flowcharting how the seven STIP categories are selected for inclusion into the STIP. The **Appendix** contains process flow diagrams with narrative descriptions of the categories.
- Establishing audit criteria to review and to identify essential criteria contained within Act 114 which the SCDOT Commission must take into consideration to establish a priority list of projects to be included into the STIP.
- Obtaining documentation to support the SCDOT Commission's approved criteria for ranking STIP projects in the categories.
- Identifying SCDOT management's criteria for ranking projects into the STIP.
- Testing to compare management's criteria to the SCDOT Commission and Act 114 criteria for ranking STIP projects to determine if any discrepancies exist.
- Validating and documenting the sample results.
- Conducting research and obtaining documentation to determine if management is proposing any plan to update the Act 114 criteria for ranking STIP projects.
- Analyzing dynamic environmental economic changes which could affect the ranking of a STIP project.

## **FINDINGS, RECOMMENDATIONS, AND AUDIT COMMENTS**

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The OCIA obtained and reviewed documentation to identify the criteria the SCDOT Commission adopted to establish priority lists for bridges, congestion mitigation air quality improvement projects, interstate maintenance, interstate interchange, interstate upgrade, and safety improvement projects. Our review of the SCDOT Commission's minutes for the July 18, 2007 meeting found that the Commission adopted criteria for ranking projects consistent with Act 114. OCIA also reviewed internal SCDOT source documentation referred to as Engineering Directive Memorandum (EDM) that identifies SCDOT management's criteria for ranking projects. *Our review and comparison found that the criteria management identified to rank projects is consistent with the ranking criteria in Act 114 and the Commission's approved criteria.*

### **BRIDGES**

*Our review found that the SCDOT Commission acting in accordance with Act 114 did establish criteria to*



*be used for ranking bridge projects.* During the July 18, 2007 meeting, the Commission approved eight criteria for ranking bridges. The following criteria were approved including bridge structure, traffic status, average daily traffic (ADT), average daily truck traffic percentage, detour length, the road's location and significance to the community and local businesses, environmental impact, and current maintenance costs.

OCIA also obtained SCDOT management's criteria for ranking bridge projects as established in Engineering Directive Memorandum (EDM) Number 51, "Bridge Replacement Project Selection Process." We compared the nine established criteria for ranking STIP projects as codified in Act 114 and the SCDOT Commission approved criteria to SCDOT management's criteria as shown in the Engineering Directive Memorandum Number 51. *OCIA did not note any discrepancies from the SCDOT Commission criteria or SCDOT management's criteria.*

OCIA noted that the Bridge Maintenance Department is assigned the responsibility for ranking bridge projects into the STIP. The Department prioritizes the ranking for bridge projects based upon objective and subjective criteria. The Department inputs objective criteria such as structural condition, traffic status, average daily traffic (ADT), average daily truck traffic percentage (ADTT%), and detour length into an application based bridge management (BrM) system referred to as AASHTO Bridge Management (formerly known as Pontis). The BrM system has the capability to assign a maximum point value of 750 points based upon the objective criteria.

An additional maximum of 250 points are assigned based upon engineering judgment which SCDOT's Bridge Maintenance obtains from the District Engineers. Engineering judgment criteria is composed of the following categories and maximum point value potentials: [1] district maintenance capabilities, frequency of repairs, effectiveness of repairs, funding availability, including contracts (30 points), [2] coordination with other SCDOT projects (no points), [3] additional engineering review of rehabilitation-vs-replacement options (no points), [4] current and future economic/industrial development (45 points), [5] route continuity and river basin upgrades (30 points), [6] improved emergency services and emergency evacuation routes (20 points), [7] strategic and network planning for current and future needs (25 points), [8] environmental impacts (65 points), [9] current and future housing developments (15 points), and [10] new schools and or changes in bus routes (20 points).

### **Finding**

Our review found that the Bridge Maintenance Department does not retain the historical objective data used to rank the bridge projects into the STIP. OCIA requested, obtained, and tested engineering judgement data from Districts Three and Four. Our test did not find any exception to the criteria.

OCIA also produced a narrative process flow to describe how Bridge projects are identified and selected for inclusion into the STIP. The process flow diagram is labeled as "Bridge Projects Ranking Process Flow Diagram" in Appendix A-2.

### **Recommendation**

The Bridge Maintenance Department should retain historical data used to prioritize the ranking of bridge projects into the STIP. The data should be retained to validate ranking results, to compare rankings, and to identify relevant patterns or trends for analysis.

The engineering judgement criteria are subjective and should be evaluated rigorously to ensure

consistency of application and relevancy in a changing environment.

### **CONGESTION MITIGATION AND AIR QUALITY (CMAQ)**

The SCDOT Commission approved mandatory criteria for CMAQ projects during its July 18, 2007 meeting. The criteria require in part that CMAQ projects must be selected and approved in accordance with federal air quality selection guidelines, and the Commission must approve the recommended projects for inclusion in the STIP.

Our review also found that the SCDOT management established criteria for CMAQ projects selection in Engineering Directive Memorandum Number 61, "Congestion and Air Quality Project Selection Process." In accordance with the EDM, the following criteria is established to meet the selection guidelines: performance of an air quality benefit analysis, requirement of CMAQ projects within nonattainment or maintenance areas, and requirement of CMAQ projects from a current STIP or TIP.

OCIA also compared the SCDOT management's criteria used to rank CMAQ projects to the SCDOT Commission's criteria to note any discrepancies. *The comparison of the criteria noted consistency in the implementation in accordance with the Commission's criteria.* The OCIA selected a sample of eight out of nine CMAQ projects to test the criteria utilized to rank the projects into the 2014-2019 STIP. The projects were tested based upon the location of the project in a nonattainment (an area considered to have air quality worse than the National Ambient Air Quality Standards as defined in the Clean Air Act Amendments of 1970), the origin of the project (the project must be part of a long-range transportation improvement program or statewide transportation improvement plan), and air quality analysis (an air quality analysis is required on all projects and must result in emission reduction).

All of the eight CMAQ projects were located in York County, South Carolina a designated nonattainment area. The CMAQ projects are ranked in the 2014-2019 STIP. OCIA obtained data which show that an air quality benefit analysis was conducted. The air quality analysis discloses reductions for volatile organic compounds (VOC), carbon monoxide (CO), and nitrogen oxide (NOX). *The test results support utilization of Commission approved criteria to identify and select CMAQ projects for inclusion into the STIP.*

OCIA also produced a narrative process flow to describe how CMAQ projects are identified and selected for inclusion into the STIP. The process flow diagram is labeled as "Congestion Mitigation and Air Quality (CMAQ) Process Flow Diagram" in Appendix A-3.

### **INTERSTATE MAINTENANCE (REHABILITATION)**

Our review found that the SCDOT Commission in accordance with Act 114 established and approved criteria for ranking interstate maintenance or rehabilitation projects. It should be noted that the projects are also referred to as resurfacing projects. During the July 18, 2007 meeting, the SCDOT Commission approved six criteria for prioritizing resurfacing projects into the STIP. The following criteria were approved: pavement condition, traffic volume, truck traffic, current pavement maintenance costs, the road's location and significance to the community and local businesses, and available funding.

OCIA also reviewed and documented the process flow of the detailed procedural steps to identify and to rank the interstate maintenance projects. The process flow diagram is labeled as "Interstate Maintenance (Rehabilitation) Process Flow Diagram" in Appendix A-4.

Our review of the process flow found that the Office of Planning obtains data from various areas within SCDOT to identify and to select interstate maintenance or rehabilitation projects for the STIP. Pavement condition data such as the pavement quality index (PQI), the pavement distress index (PDI), and the international roughness index (IRI) are obtained from Pavement Management. Traffic data such as the average daily traffic (ADT) and the average daily truck traffic (ADTT) are obtained from Road Data Service. The Office of Planning identifies the pavement maintenance costs as the total maintenance costs from previous state fiscal years for the segment being evaluated. The location and significance of the project to the community and the local businesses is a measure of a road's overall functional value to the local area. The location and significant information is provided by the engineering districts. The pavement maintenance costs and the location and significant valuation are prescribed in SCDOT's Engineering Directive Memorandum Number 52, Interstate Rehabilitation Project Selection Process.

### **Finding**

Our review found that the Office of Planning does retain the data that is used to rank the Interstate Maintenance projects in the STIP. It is noted that the methodology used in 2012 to quantify the criteria for pavement maintenance costs considered all routine maintenance costs in addition to specific costs associated with roadway pavement. The use of the methodology used in the ranking of Interstate Maintenance projects in 2012 was produced from data from the Highway Maintenance Management System (HMMS). Overall routine maintenance could include activities, such as mowing, restripping and pavement markers, guardrail replacement, lighting, drainage, etc. The approach may have provided a broader assessment of overall maintenance costs, but it does not necessarily reflect which segments of interstate have pavement requiring the most maintenance and potential need for rehabilitation. It is also noted that the methodology later utilized in 2014 to quantify the criteria for pavement maintenance cost was specific to actual pavement maintenance costs.

### **Audit Comment**

To address the methodology issue the Office of Planning has implemented new data retrieval procedures to ensure pavement maintenance costs are retrieved in a consistent, accurate and reproducible manner based upon OCIA's recommendation.

### **INTERSTATE INTERCHANGE**

The SCDOT Commission approved criteria to prioritize or rank interstate interchange projects into the STIP. The criteria were approved during the October 18, 2007 meeting. The following criteria were approved: passenger vehicle travel time, truck vehicle travel time, passenger vehicle delay, truck vehicle delay, passenger vehicle distance, truck vehicle time, truck detour distance, design related fatal crashes, design related personal injury crashes, design related property damage crashes, other fatal crashes, other personal injury crashes, and other property damage crashes. *According to the Commission meeting notes two elements not included in the program formula, but considered in the overall ranking, are environmental impacts and economic developments.*

OCIA identified the SCDOT management's criteria utilized to rank interstate interchange projects as disclosed in Engineering Directive Memorandum Number 56, "Interstate Mainline Capacity and Interchange Selection Process." OCIA conducted a test to compare the Commission's criteria to the EDM's criteria to identify and to note any discrepancies. Our test results revealed that SCDOT management in EDM Number 56 adopted all of the Commission's criteria. *The test results show that*

management added an additional criterion in EDM 56, "Truck Vehicle Distance" that is not a Commission approved criteria.

### **Finding**

OCIA reviewed and tested the criteria utilized to rank the interstate interchange project in the Interactive Integrated Management System (IIMS). *Our test results found that criteria shown as performance metrics in IIMS matched the Commission's approved criteria for interstate interchange projects. Our test results also show the added criteria "Truck Miles of Travel" (shown as "Truck Vehicle Distance" on EDM Number 56) was included as a performance metric to rank the project.*

OCIA also conducted interviews with the Office of Planning staff and documented the process flow to illustrate how Interstate Interchange projects are identified and ranked in the STIP. The process flow diagram is labeled as "Interstate Interchange Process Flow Diagram" in Appendix A-5.

Our review of the process flow revealed that data are obtained from various sources and fed into the IIMS to rank the projects based upon Commission approved criteria. Data such as the AADT on interstate and crossing routes, ramp counts, number of lanes, percent of trucks and functional classification are obtained from the Roadway Inventory Management System (RIMS). Crash reports with a four year window are obtained from Traffic Engineering. Bridge characteristics such as height, width and ratings are obtained from Pontis. Signal and stop conditions at ramps and peak hour turning movements onto and off the ramps are also used.

### **Audit Comment**

There is inconsistency between the SCDOT Commission workshop held on October 18, 2007 and EDM 56. It does not appear that the inconsistency has any bearing on the prioritization of interchanges or the selection of interchanges for inclusion in the STIP. The description provided to the SCDOT Commission at the 2007 workshop of variables used in the IIMS program to rank interchanges inadvertently omitted the specific reference to "truck vehicle distance." However, EDM 56 which describes the ranking process for interchanges does include a specific reference to "truck vehicle distance." Truck vehicle distance is one of 14 variables included in IIMS since the inception of the program.

### **INTERSTATE UPGRADE**

OCIA found that the SCDOT Commission approved criteria for ranking Interstate Upgrade projects as authorized in Act 114. The projects are also referred to as "Interstate Capacity" projects. The criteria were approved at the July 18, 2007 meeting. The Commission approved nine criteria volume-to-capacity, public safety, truck traffic, pavement condition, financial viability, environmental impacts, economic development, alternative transportation solutions, and consistency with local land use plans. The last two criteria are not scored. According to the Commission's meeting notes, a "yes" or "no" is required for the non-scored criteria.

OCIA identified SCDOT management's criteria in Engineering Directive Memorandum Number 56 that were utilized to rank Interstate Upgrade projects. The EDM Number 56, "Interstate Mainline Capacity and Interchange Selection Process" identifies all of the Commission approved criteria with the exception of alternative transportation solutions and local land use plans which are not scored.

OCIA also reviewed and documented the process utilized to identify and rank the Interstate Upgrade

project. The process flow diagram is labeled as “Interstate Upgrade Process Flow Diagram” in Appendix A-6.

### **Finding**

Our review found that the Planning Office ranked the projects based upon prioritization of volume-to-capacity ratio, truck traffic, pavement quality index, safety, financial viability, environmental impact, and economic criteria. The SCDOT Environmental Office provided the score for the environmental component. The South Carolina Department of Commerce provided the score for economic development. After the prioritization process the Planning Office presented the project rankings to the SCDOT Commission for approval.

OCIA identified Interstate Upgrade projects in the counties of Charleston, Richland, and Lexington. The projects were selected to test the criteria utilized to rank the projects in the 2014-2019 STIP. We compared the Commission’s approved criteria to EDM Number 56 to identify the existence of any discrepancies. Our test results show that seven of the Commission approved criteria were used to rank the interstate upgrade projects. The test results also show that “Alternative Transportation Solutions” and “Consistent With Local Land Use Plans” were not scored.

### **Recommendation**

OCIA recommends an addendum to EDM 56 for inclusion of “Alternative Transportation Solutions,” and “Consistency With Local Land Use Plans” as non-scored criteria requiring a “yes” or “no.”

### **Safety Improvement**

OCIA found that the SCDOT Commission established and approved criteria to prioritize Safety projects for ranking into the STIP as authorized in Act 114. The Commission approved ten criteria to rank Safety projects during the July 18, 2007 meeting. The following criteria including traffic status, average daily traffic, average daily truck percentage, economic development, environmental impact, land use plans, district review and input, compliance to national rule and guidelines, public safety, and compliance to goals and objectives set in South Carolina Road Map to Safety were approved.

OCIA also met with Traffic Engineering staff to review and document how safety projects are identified for inclusion into the STIP. The process flow diagram is labeled as “Safety Improvement Process Flow Diagram” in Appendix A-7.

### **Finding**

Our review found that SCDOT Traffic Engineering obtains annual crash data from the South Carolina Department of Public Safety (SCDPS). The crash data including location, occupants, vehicles, time, weather, and other crash attributes are entered into RIMS. An output of the crash data is generated in three parts including intersections, sections and interstates from RIMS. A preliminary safety list is also identified and ranked by intersections, sections, and interstates.

Traffic Engineering will use the ranked preliminary safety project list to identify safety projects with counter measures which could be completed with economic benefit (i.e., the benefit with the cost measure exceed the cost). Traffic Engineering will develop a final project ranking in which the benefit exceeds the cost of the counter measures.

### **Recommendation**

Our review found that the crash data which Traffic Engineering uses to identify and rank the projects

into the STIP is not retained. Traffic Engineering should retain crash data used to rank Safety projects.

### **DYNAMIC ENVIRONMENTAL IMPACTS ASSESSMENT TO STIP PROJECT RANKING**

OCIA selected an interstate upgrade project for further review due to numerous complaints regarding the traffic congestion in the area in which the project is located. The project is an interstate upgrade and is ranked as "IU-07" on the current STIP 2014-2019 STIP. The project is located in the counties of Calhoun and Lexington.

Three major interstates pass through Lexington County, I-26 has eleven interchanges, I-20 has eight interchanges and I-77 has one interchange. The top ten employers in Lexington County employ over 18,000 employees. Amazon Fulfillment Center with approximately 1,000 employees began operations in mid-October 2011 in a one million-square-foot distribution facility. Amazon is located at the Saxe Gotha Industrial Park near the interchange of Interstate 26 and 77.

The results of our review substantiate the use of Commission approved criteria which was utilized to program and to schedule the interstate upgrade project "IU-07." The project was ranked before the Amazon Fulfillment Center began operations. The opening of the Amazon Center represents a major economic development for the area. The location of the facility would impact each of the ranking criteria cited for the interstate upgrade project. It is also reasonable to conclude that the economic event would increase the relative score of the project and its ranking. OCIA did not obtain any evidence from management to suggest projects are re-evaluated for ranking purposes due to major economic development changes such as a new distribution facility.

### **Recommendation**

It is the recommendation of the OCIA that the Commission should re-evaluate the ranking status of projects in areas in which major economic development has occurred after the original ranking in the STIP.

### **SCDOT Management Proposed Changes Impacting The STIP Ranking**

The Office of Planning presented a proposal to the SCDOT Commission regarding considerations for updating Act 114 ranking criteria and weighting. The proposal was presented on March 19, 2015 during the Commission's Policy Committee. During the meeting the Commission did not take any action on the proposed changes.

The Director of the Office of Planning presented the proposal which entails allocating resources in a manner that reflects performance priority networks such as the NHS, State Freight Network and the Strategic Corridor Network. The allocation process will be part of a new program structure which emphasizes performance priority networks for the current STIP funding allocation categories such as pavement and bridges.

The new program structure is an attempt to align STIP project funding allocation to the requirements of MAP-21 according the Office of Planning. MAP-21 requires a Transportation Asset Management Plan (TAMP) which defines network performance targets related to bridge and pavement condition for each highway system.

The United States Department of Transportation (USDOT) has measures for States to assess the condition of pavements on the Interstate System and the National Highway System (NHS), condition of

bridges on the NHS and the performance of Interstate System and NHS. The USDOT has prescribed minimum standards for interstate pavement and bridges and non-interstate NHS bridges. To comply with the standards States must establish performance targets and demonstrate progress towards the achievement of the targets.

States must also include in the TAMP, as a minimum:

1. A summary listing of the pavement and bridge assets on the National Highway System in the State, including a description of the condition of those assets
2. Asset management objectives and measures
3. Performance gap identification
4. Lifecycle cost and risk management analysis
5. A financial plan
6. Investment strategies.

### **Bridges**

To implement the MAP-21 requirements the Office of Planning proposal would update the ranking criteria for bridge replacements. Currently bridge replacement projects are ranked based upon a maximum of 750 points for Pontis criteria and a maximum of 250 points for engineering judgment criteria. The combined points produce a total of 1,000 points.

The new proposal would utilize AASHTOWare Bridge Management software (BrM), formerly Pontis, for a maximum point allocation of 1,000. The maximum point allocation for engineering judgment would equal 500. The combined points would produce a total of 1,500 points.

The new proposal would retain the following engineering judgment criteria to rank bridge replacement projects: district maintenance capabilities, frequency of repairs, effectiveness of repairs, funding availability including contract with a maximum of 50 points, current and future economic/industrial developments with a maximum of 100 points, route continuity and river basin upgrades with a maximum of 85 points, improved emergency services and emergency evacuation routes with a maximum of 35 points, strategic and network planning for current and future needs with a maximum of 100 points, environmental impacts with a maximum of 50 points, current and future housing developments with a maximum of 35 points, and new schools and or changes in bus routes with a maximum of 45 points.

The new proposal would also add engineering judgment criteria for priority networks to include NHS, freight, and strategic corridor networks, and critical bridges. The new proposal does not include the current engineering judgment criteria for coordination with other SCDOT projects and additional engineering review of rehabilitation versus replacement options.

### **NHS Pavement Selection Criteria**

The new proposal would retain the current criteria for ranking and selecting NHS Pavement projects. The new proposal would also update the process to include criteria for the State Freight Network and the Strategic Corridor Network.

### **Non-NHS Pavement Selection Criteria**

The new proposal would retain the current criteria for ranking and selecting Non-NHS Pavement projects. The new proposal would also update the process to include criteria for Non-NHS State Freight

Network and Non-NHS Strategic Corridor Network.

**Non-Federal Aid Pavement Selection Criteria**

Funding allocation and pavement needs would be based on county level process. County level process means that funding is distributed by county based on approved criteria. *As a result each county is assured funding to address pavement needs as determined by Act 114 ranking process.*

**Interstate Upgrade Criteria**

The new proposal would retain the current criteria for ranking and selecting Interstate Upgrade Criteria projects. The new proposal would measure volume-to-capacity based upon current traffic density and projected volume-to-capacity. The truck traffic criteria would be a measure of truck percentage per density and project density. Economic development would be an assessment of economic return based upon the REMI model. The proposal would also add port significance and border crossing/continuity.

**Interstate Interchange Criteria**

The new proposal would retain the current criteria for ranking and selecting Interstate Interchange projects. The new proposal would also base economic development on a mainline economic score. Freight significance and interstate to interstate connection would be an added criterion in the new proposal.

**Intersection Criteria**

The new proposal would retain the current criteria for ranking and selecting Intersection projects. The new proposal would also base economic development on a TDL Tool. Location on a priority network would be added criteria.

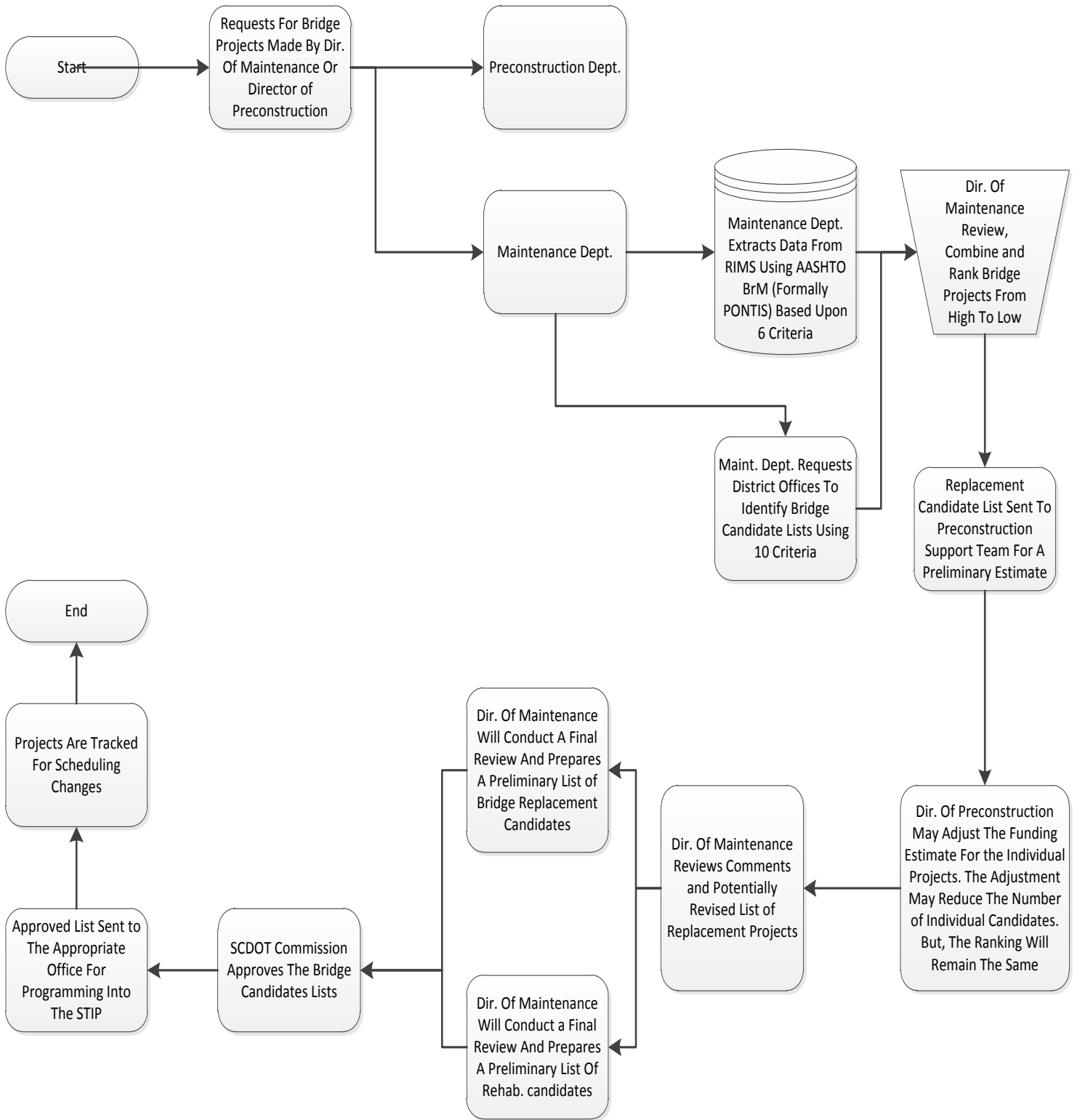


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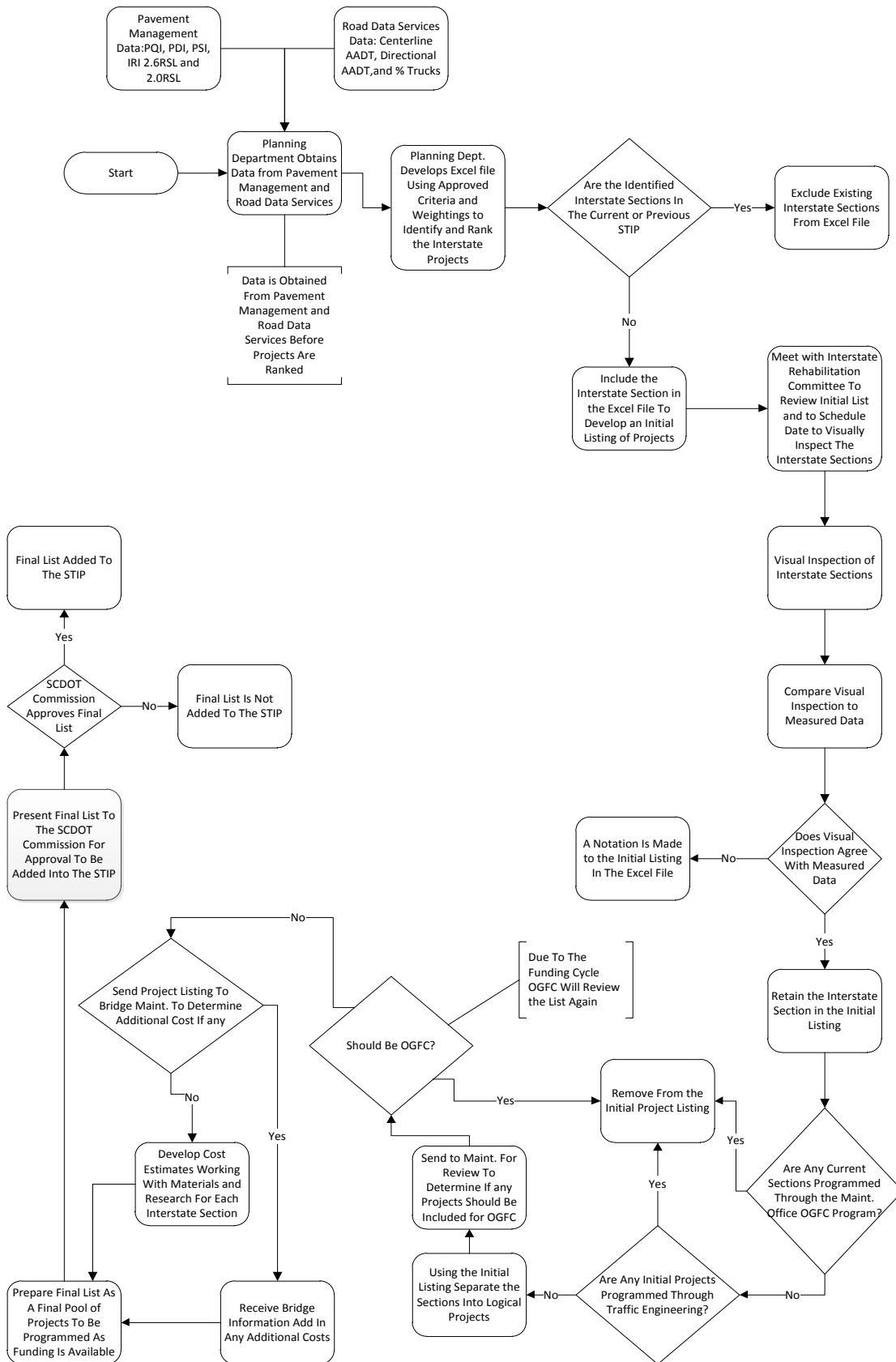
# *Appendix*

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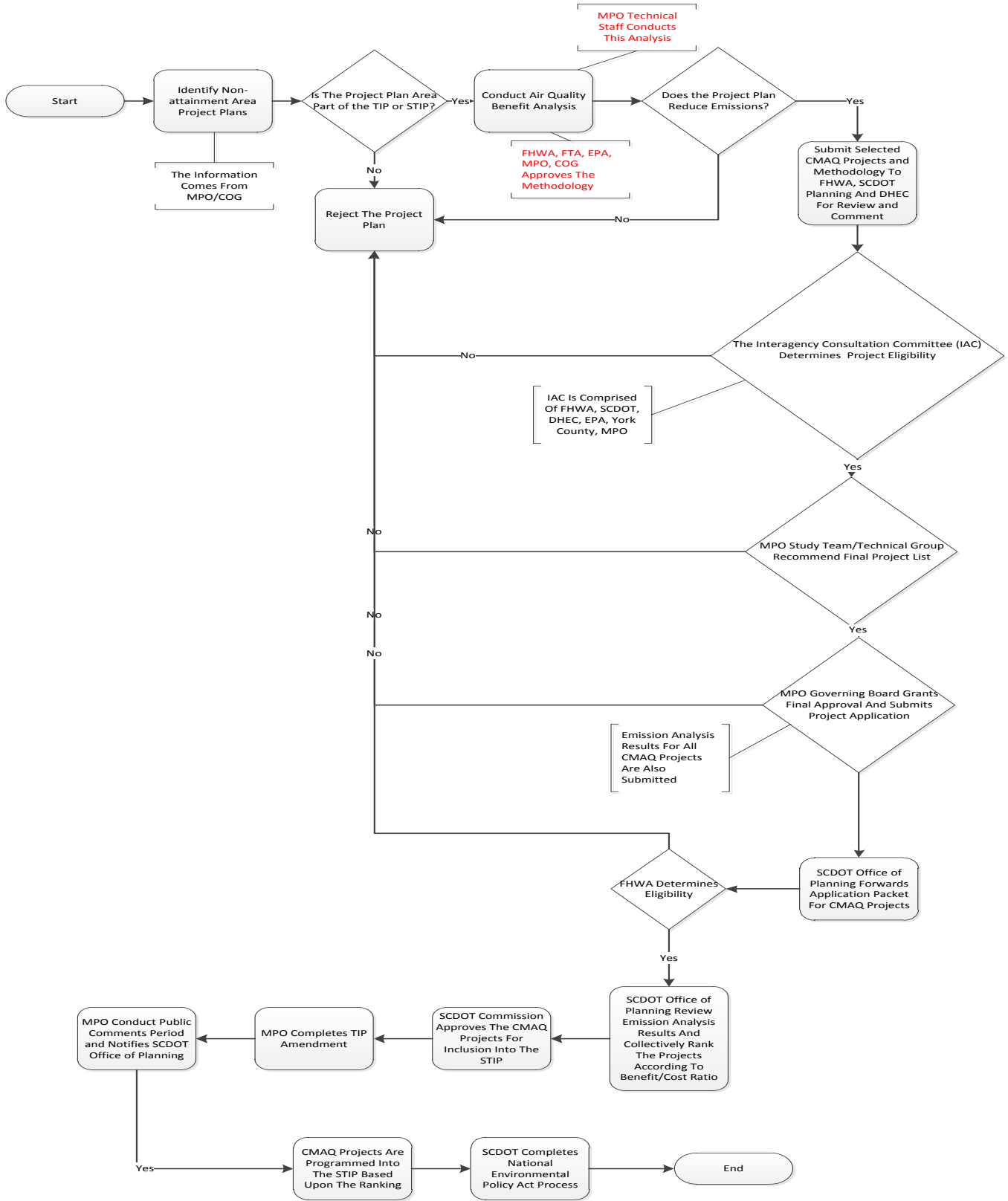
### Bridge Projects Ranking Process Flow Diagram



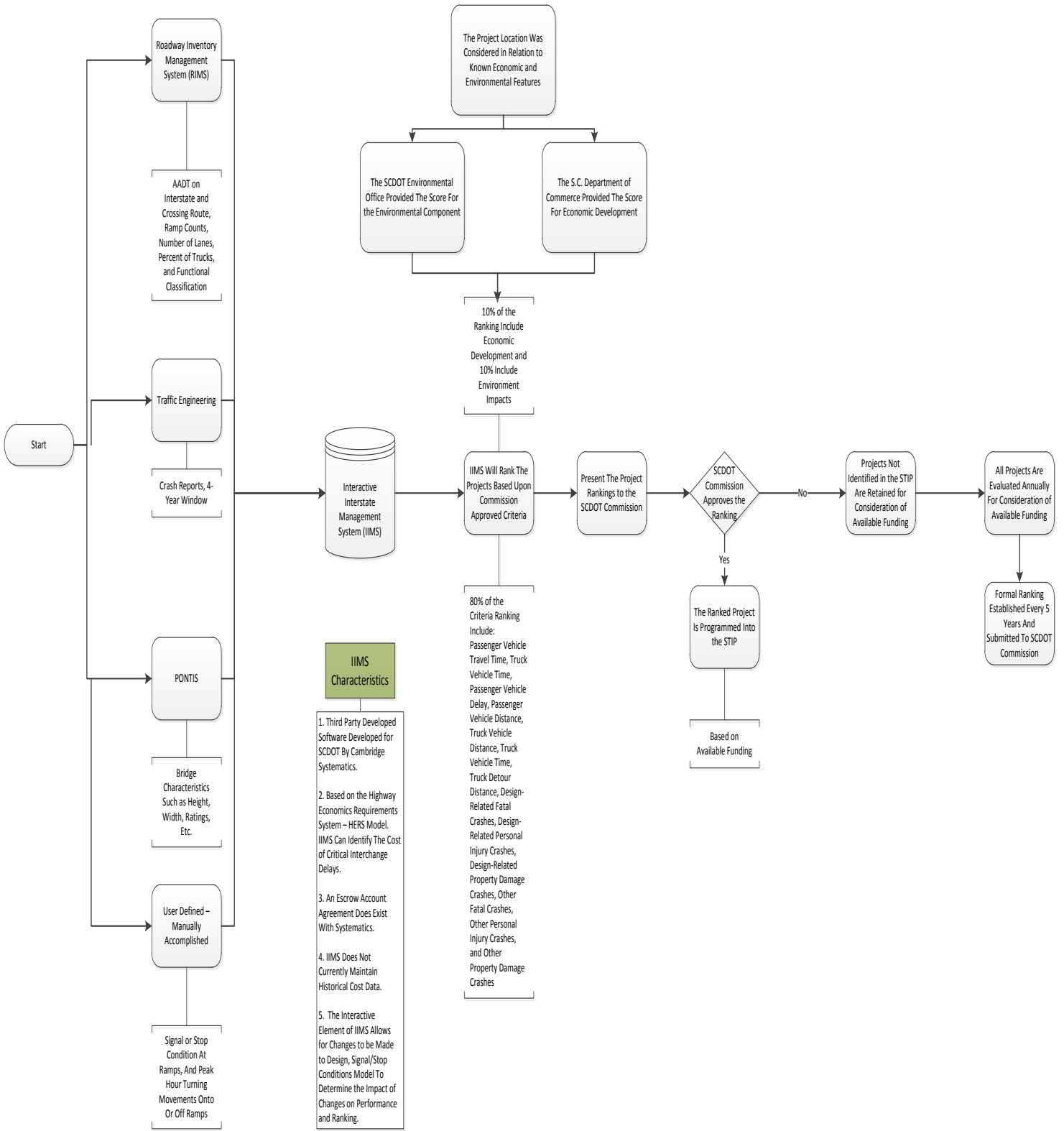
### Interstate Maintenance (Rehabilitation) Process Flow Diagram



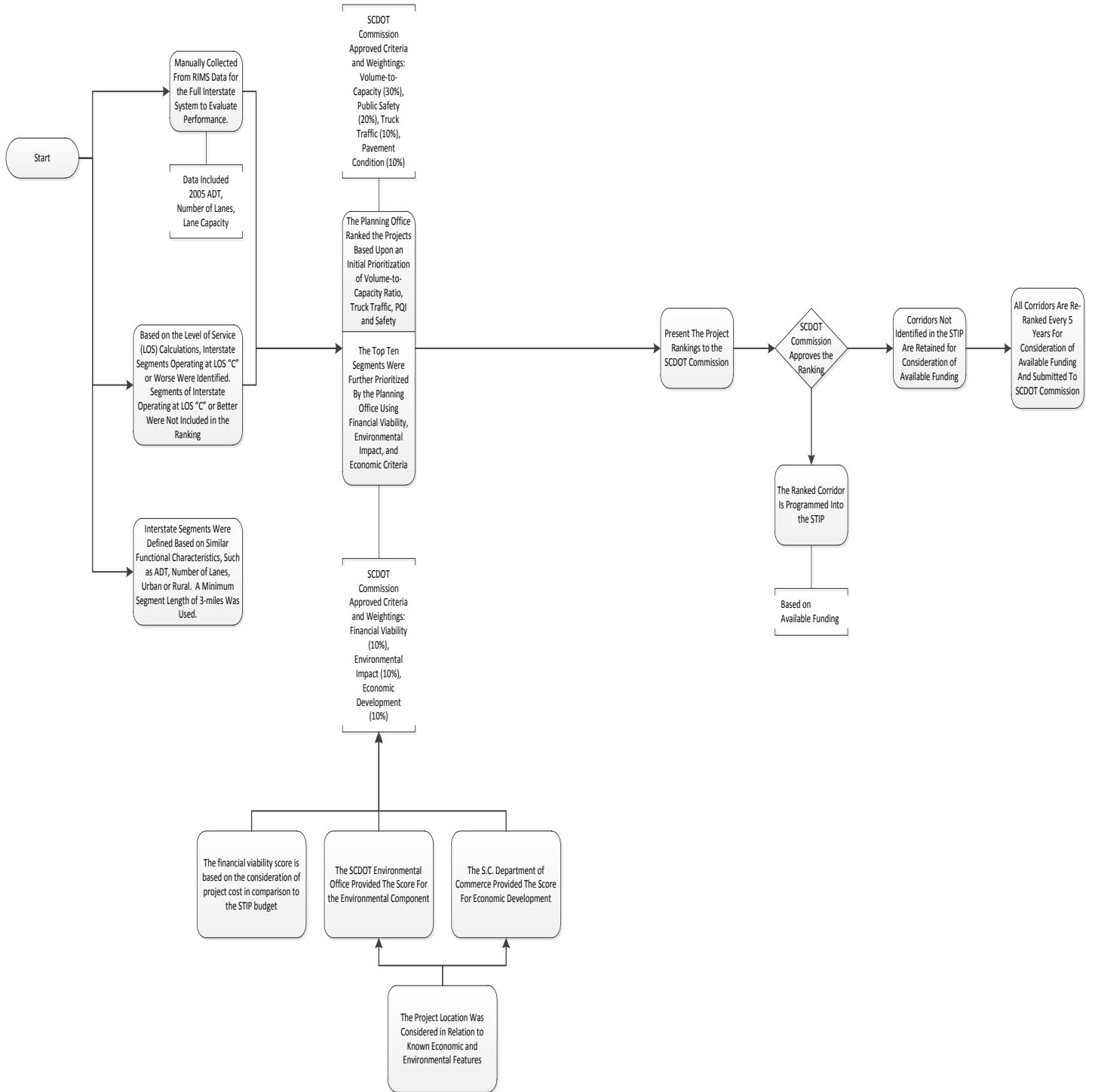
## Congestion Mitigation and Air Quality (CMAQ) Process Flow Diagram



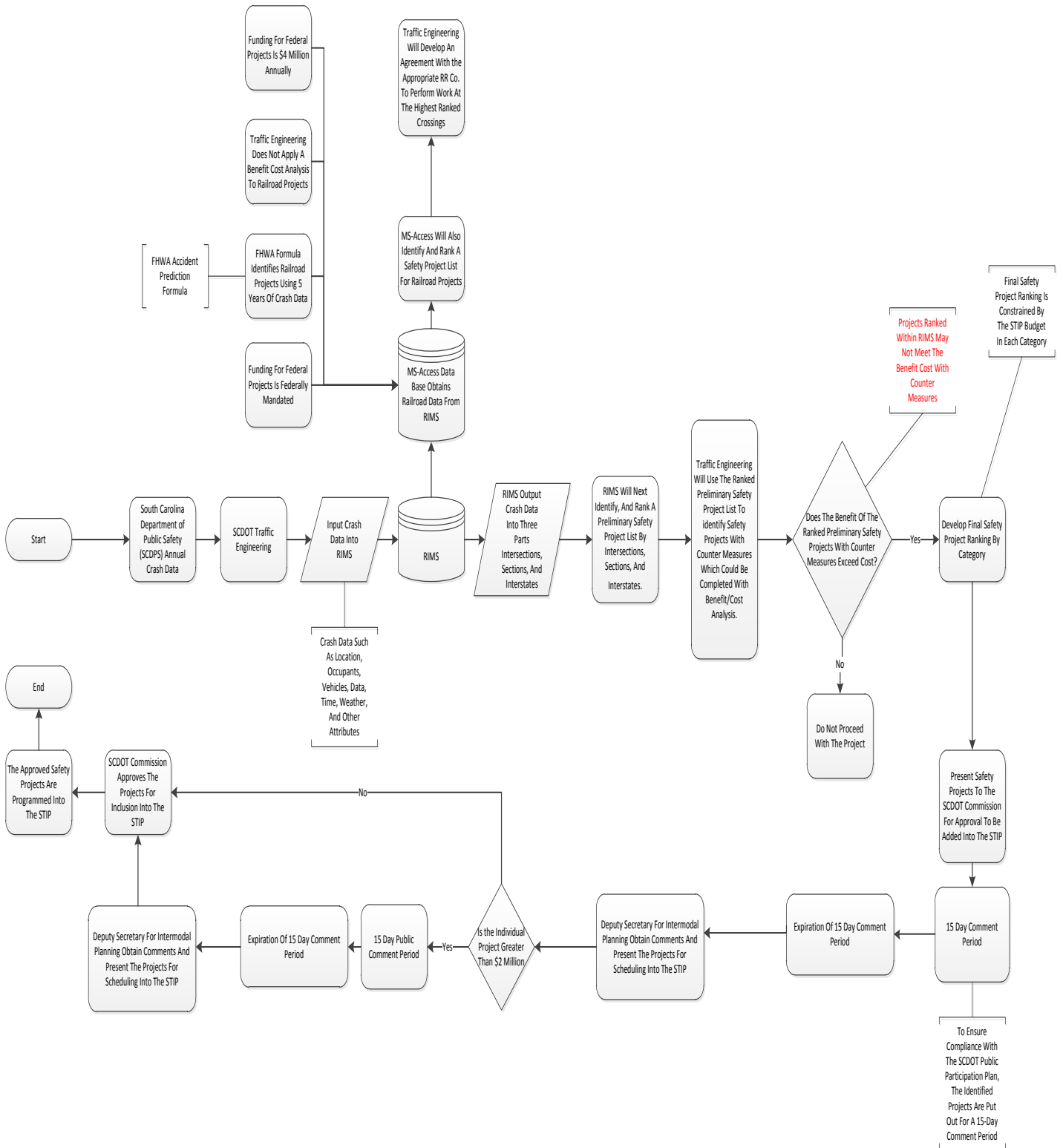
## Interstate Interchange Process Flow Diagram



# Interstate Upgrade Process Flow Diagram



# Safety Improvement Process Flow Diagram



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***Department Response***

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## MEMORANDUM

To: Paul Townes, Chief Internal Auditor

From: Christy Hall, P.E., Interim Secretary of Transportation

Date: January 12, 2016

Subject: SCDOT Response to the Statewide Transportation Improvement Program (STIP) Audit

Thank you and your staff for the opportunity to review the draft audit of the Statewide Transportation Improvement Program (STIP). The audit provides valuable feedback to SCDOT regarding current STIP administration processes, including the implementation of project prioritization requirements defined in Act 114. Listed below are our responses to each of the recommendations as outlined in your report.

**Recommendation:** The Bridge Maintenance Department should retain historical data used to prioritize the ranking of bridge projects into the STIP. The data should be retained to validate ranking results, to compare rankings, and to identify relevant patterns or trends for analysis.

**Response:** Staff concurs with the recommendation to archive historical data provided by engineering districts used in the evaluation process for bridge replacement needs. The SCDOT Maintenance Office will maintain a record of local engineering input for future reference.

**Recommendation:** Our review found that the crash data which Traffic Engineering uses to identify and rank the projects into the STIP is not retained. Traffic Engineering should retain crash data used to rank Safety projects.

**Response:** Staff concurs with the recommendation to archive historical crash data. To clarify, the SCDOT Safety Office has previously archived historical crash data associated with safety projects submitted to the Commission for approval. Any locations not recommended for Commission consideration based on crash history and cost benefit analysis are continually evaluated as new priority lists are prepared.

**Recommendation:** It is the recommendation of the OCIA that the Commission should re-evaluate the ranking status of projects in areas in which major economic development has occurred after the original ranking in the STIP.

**Response:** Staff has concerns regarding the recommendation to re-evaluate the ranking status of projects in areas which major economic growth has occurred. Each project priority list produced by the Department is updated on a regular schedule and new projects are included in the STIP based on priority and available funding. A continual reevaluation of priorities has the potential to adversely impact the project development process by stopping and starting projects in response to changes in priority. We do recognize the importance of transportation infrastructure to supporting the State's continued economic growth and have incorporated additional economic considerations in our planning efforts as well as the updated ranking processes recently approved by the Commission as referenced in the draft audit.

I regard the findings of the draft audit report as a positive indication of the Department's ongoing efforts to provide a transparent and data driven prioritization process consistent with Act 114. We look forward to the final audit report and future opportunities to improve the project ranking processes.