Safety Project Implementation Approaches

Implementation approaches vary based on the location's complexity, volume of traffic, and type of crash risk identified earlier in the Safety Scoping process. Field review is critical for describing specific safety problems and identifying the feasibility of implementing specific countermeasures. Additional analysis may be necessary to evaluate the impacts of potential countermeasures on traffic operations, pedestrian / bicycle mobility, constructability, and implementation costs. For more information about countermeasures described, review the Countermeasure Library

Site-Specific Engineering Strategies

Each of the following represents engineering approaches to improve the design of a specific corridor or intersection(s) to reduce risk for future crashes or to manage the severity of a potential crashes:

Implementation Approach (Site Specific)	Corridor Analysis	Intersection Improvement	Modernization Study	Road Safety Assessment (RSA)
Applicable Project Type	Long-Term, Linear Projects	Long-Term Intersection Projects	Modernization Projects	Maintenance Activity or other Near-Term Project
Applicable Conditions and Crash Risk Types	High Volume and High Risk for Bicycle or Pedestrian Crashes	High Volume and High Risk for Intersection Crashes	High Risk for Lane Departure Crashes	Low Volume and High Risk for All Crash Types
Countermeasure Types	Access Management Bikeways Sidewalks Road Diet	Interchange Alternative Intersection New Signal Bicycle Intersection Treatment Technology / ITS* Roundabout	Barrier Pavement Edge Treatments Rumble Strips* Widen Shoulder Lighting*	All Way Stop* Two Way Stop* Crossing Improvements* Pedestrian Intersection Treatment* Animal Crossing Speed Management Traffic Calming Signal Modification* Signage / Markings / Flashers*

** These may also be considered for Systemic Application.*

Corridor Analysis

This type of review typically applies to a series of intersections with notable crash patterns, when traffic analysis is required for determining feasibility of countermeasures, or if the safety improvements are likely to change the cross section of the roadway. A Corridor Analysis should be performed when a longer-term or proposed project is being scoped or evaluated for feasibility, such as an unfunded STIP project, a SPOT project proposal, or an application for a locally administered project funded through competitive grant or federal programs.

Intersection Improvement

This type of review is considered for specific intersections with skewed alignments or poor sight distance, where the traffic volumes or crash patterns at an intersection require traffic analysis to assess countermeasure alternatives, or where the safety improvements are likely to require additional right-of-way to implement. Intersection Review should be conducted for near-term capital projects being developed for delivery, such as a STIP projects, SPOT project proposals, or an application for a locally administered project funded through competitive grant or federal programs. This type of study is best suited for more rural sections or intersections with lane departure, motorcycle, or speed safety risk or crash history. Site investigations are effective to incorporate low-cost or systemic safety improvements into a roadway maintenance project, such as an unfunded STIP project.

Modernization Study

This type of project is typically considered for more rural sections, where risk or history of lane departure crashes is high, or where there is an opportunity to coordinate low cost safety improvements with a roadway maintenance project. Costly Modernization projects may require supplemental capital funding or be considered as SPOT project proposals. Roads scheduled for resurfacing in the near-term should be prioritized for Modernization Studies. Site investigations are effective to incorporate low-cost or systemic safety improvements into a roadway maintenance project.

Road Safety Assessment (RSA)

An RSA or other form of robust field review can be quickly implemented along specific sections or along a series of intersections where crash risk is moderate, where anticipated countermeasures do not require additional right-of-way, or where changes to the typical section are not expected to construct new curbing. The lower-cost treatments or countermeasures identified are considered for implementation as a dedicated safety improvement or as part of a near-term capital project, such as a STIP project. RSAs are most helpful for identifying low-cost improvements that may be eligible for the NCDOT HSIP.

Other Implementation Strategies

Systemic Application

Systemic safety treatments that can be applied across the system, at all or most high-risk locations, where conditions meet warrants or demonstrate a need for the improvement. These treatments are typically low cost improvements that do not require additional right-of way or alter the configuration of the roadway. Implementation can be part of other project strategies or delivered as a part of a “bundled” (multi-site) safety program.

Speed Management and Traffic Calming

Speed management is an overall approach to slowing vehicle speeds to more closely fit target speeds selected based on local development context and the mix of roadway users. Improvements for managing speeds can be identified as part of other safety project implementation strategies, such as an RSA, or developed through a separate process including speed studies and public engagement. Strategies such as signal coordination for slower progression, roundabouts, and roadside streetscape elements may be considered for higher-speed roads carrying higher volumes of traffic.

Traffic calming treatments or devices are typically applied to local or lower-volume streets with target speeds less than 35 mph. Traffic calming devices typically change the horizontal or vertical alignment of the roadway- using geometric features like raised islands, curb extensions, and speed humps. Enhanced posted speed limit signage, pavement markings that narrow the width of the travel lane, or speed feedback signs can also be considered for roads of all design speeds.

Education and Enforcement

Crash types and safety problems associated with human factors such as impairment, distraction, excessive speeding, improper use of seat belts and car seats, and aggressive driving are corrected with extensive community outreach and sustained, targeted enforcement. Education and outreach strategies should be developed in partnership with community organizations and be tailored to population groups that are over-represented in crash types. Enforcement actions should be implemented in coordination with community outreach strategies, focus on the highest risk roadways or intersections, and be sustained over extended periods of time (weeks or months) to have the most impact on human behavior. These strategies should be piloted by local agencies by including nominal funding in annual operating budgets. More costly strategies or sustained campaigns may be eligible for GHSP grants or funding by non-profit organizations committed to underserved populations.

Policy

Policy – including the development of roadway design guidelines, standard procedures for reviewing transportation or development projects for safety needs, and criteria for prioritizing safety projects and programs – is a core implementation approach. An assessment of current policies and legal frameworks at the state, regional and local scale may reveal gaps in policy or barriers to the use of proven safety countermeasures. Model policies or guidelines created by a state or regional organization can increase consistency in the application of safety projects across the area, while allowing local agencies to adapt the guidelines to local conditions and goals. These strategies should be incorporated in the scope of all future transportation plans and project development procedures.

Implementation Study Scope Details

Corridor Study – Scope Elements

A corridor study is anticipated to take 6 to 9 months to complete, from initiation to final report. Corridor Studies are best suited for a longer segment or a series of intersections with significant crash patterns, when safety improvements are expected to impact Right of Way or change the cross section/move the curb, and where traffic analysis is required to determine countermeasure feasibility and impact. Corridor studies should include public involvement. Corridor studies are effective tool for identifying high-cost countermeasures or large construction projects and are most effective to identify safety improvements that can be included in long-term implementation and project development.

Step 1: A corridor study begins with an announcement of the study to local stakeholders, which includes a summary of the process and project study area, a schedule for the study, and a request for local data and stakeholder contacts. This step should include a kickoff meeting with a small project team to confirm schedule, public involvement goals and outcomes, and other critical tasks

Step 2: Corridor Studies should review plans should review plans and data relevant to the study area, which can include:

- Adopted and approved plans
- Active, proposed, or upcoming plans, studies, or projects
- Traffic Engineering Analysis System (TEAAS) analysis of crashes for the study area
- Speed studies
- Traffic ordinances
- Traffic volumes
- Road classification and route characteristics
- Transit boarding/alighting
- Signal timing
- Traffic counts and turning movements
- Pedestrian and bicycle count or estimate

Summarize findings from relevant plans, data collected, and other conditions analyzed.

Step 3: The project team should conduct a field visit to create an inventory of existing conditions, which can include:

- Formal pedestrian and bicycle facilities (crosswalks, sidewalks, signalized/unsignalized crossings, bike lanes, greenways, trail crossings)
- Informal pedestrian and bicycle facilities (“goat paths”, midblock crossing locations, paved shoulders, bicycles on sidewalks)
- Transit facilities
- Travel lanes and turning movements
- Traffic speeds
- Signal phasing
- Intersection behavior (red light running, yield compliance)

- Key destinations and activity generators
- Driveways/curb cuts

Summarize findings from field visit, safety problems, and preliminary countermeasures for consideration.

Step 4: The project team should conduct traffic analysis to determine the impact of proposed countermeasure packages and safety improvement concepts. This analysis can include:

- Capacity analysis for a determined planning horizon (e.g. 10-year)
- Future year analysis
- Conceptual recommendations for operational and infrastructure safety improvements
- Implementation timelines within the future year analysis

Step 5 Conduct public involvement strategies to receive input on safety concerns and concepts.

Step 6: Refine preliminary recommendations based on public involvement and stakeholder review into a summary report. Report should include implementation timelines and cost estimates.

Road Safety Assessment (RSA) – Scope Elements

Road Safety Audits: $20,000~$25,000

An RSA is anticipated to take 3 to 4 months to complete, from initiation to final report. RSAs can be quickly implemented along specific segments or a series of intersections with documented safety concerns and are effective tools for low cost or systemic countermeasures for implementation. RSAs can also identify needs for higher cost countermeasures (required Right of Way, large scale construction), but are most effective to deliver efficient safety improvements that can be included in near-term implementation.

Step 1: An RSA begins with an announcement of the study to local stakeholders, which includes a summary of the process and project study area, a schedule for the study, and a request for local data and stakeholder contacts.

Step 2: RSAs should review plans and data relevant to the study area, which can include:

- adopted and approved plans
- active plans, studies, or projects
- Traffic Engineering Analysis System (TEAAS) analysis of crashes for the study area
- Speed studies
- Traffic ordinances
- Traffic volumes
- Road classification and route characteristics
- Transit boarding/alighting
- Signal timing
- Traffic counts and turning movements
- Pedestrian and bicycle count or estimate

Summarize findings from relevant plans, data collected, and other conditions analyzed.

Step 3: Establish a multidisciplinary team to visit the study area to review existing facilities, identify safety problems, and develop preliminary recommendations for improvements. Create a packet of summary materials for the RSA field visit, which can include:

- Summary TEAAS analysis
- Current conditions assessment
- Preliminary site assessments
- Field visits note sheet and prompts

Depending on the size of the study area, an RSA field visit should take no shorter than 1 hour, and as much as 6. Depending on site and safety analysis, and RSA can include a dusk/dawn/nighttime field visit to evaluate low-light conditions.

Step 4: The team should conclude the field visit with a meeting to document observed conditions and brainstorm potential recommendations for improvements.

Step 5: Refine preliminary recommendations using available data, countermeasure guidance, and additional resources into a summary report