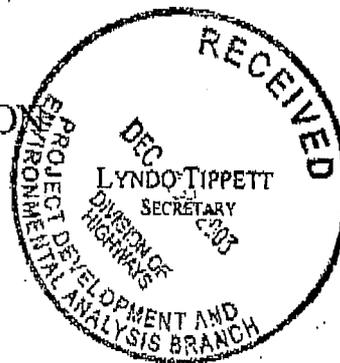




STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION



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FROM: Deborah M. Barbour, PE *Deborah Barbour*
Director of Preconstruction

DATE: December 10, 2003

SUBJECT: Revised Median Crossover Guidelines

Attached are the revised Median Crossover Guidelines that will become effective on January 1, 2004. These guidelines are to be applied for all median crossover requests that are received by the Divisions on and after January 1, 2004. The guidelines are to be applied within the planning and design phase effective January 1, 2004 for all projects that have not had a public hearing map review meeting. If median crossovers have already been shown to the public or committed to, then the crossovers will be subject to the preceding policy. For all new crossover requests received on active TIP projects after January 1, 2004, the attached guidelines will be used.

Please distribute this information to all applicable personnel within your area.

Both Preconstruction and Operations staff previously reviewed these revised guidelines. If you have any questions regarding the revised guidelines, please contact Kevin Lacy in the Traffic Engineering and Safety Systems Branch or Art McMillan in the Roadway Design Unit.

DMB/jkl

Attachment

cc w/attachment: Len Sanderson, PE
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Kevin Lacy, PE
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Median Crossover Guideline Statement

Median divided facilities provide the benefits of separating opposing travel lanes, controlling left turn conflicts, allowing a recovery area for out of control vehicles, and a space for future travel lanes. Research data also concludes that the median divided facilities improve traffic flow (travel speeds), traffic operations (reduces congestion), and traffic safety (lower crash rates), when compared to non-divided facilities. Median crossovers may be necessary on median divided facilities (that are not fully access controlled) to allow for additional turning and through movements. A median crossover is defined as any connection of the opposing travel lanes that crosses the median of a divided highway. Median crossover includes directional crossovers, U-turns or all-movement crossovers.

Placement of crossovers should be considered carefully since crossovers introduce conflict points along a divided facility and thus may reduce the safety and capacity of the median divided facility. Therefore, it is important to follow these guidelines when considering the addition of median crossovers. The following guidelines have been developed as a guide for design engineers, traffic engineers, and field personnel when considering the placement or addition of median crossovers. The median crossover guidelines shall be used for all new crossovers, even in the cases where adjacent crossovers were approved under previous guidelines.

Types of Crossover Design

When a crossover is deemed justified by the Department, then only the crossover type that meets the operational and safety needs of the location will be considered. The type of crossover design below is listed from most desirable to least desirable.

- **Use of alternative routes and access:** This level uses the existing infrastructure of streets, highways, intersections and existing crossovers to provide the mobility that a proposed crossover would serve.
- **Directional Crossovers:** A directional crossover provides for left-turns in one direction only. These crossovers are preferred because they provide for the predominant movement and are much safer for the traveling public. Typically, these crossovers only provide for left turns from the major route to the side street. No left turns or straight across movements are allowed from the side street. Where the minimum spacing requirements are not met and there is a defined need for left-turn access, then only a directional crossover will be considered. However, the general guidelines must be met for the directional crossover to be considered.
- **Median U-turn Crossovers:** Median U-turns allow a vehicle to make a U-turn and do not allow for through movement from a side street or driveway.

- **All-Movement Crossovers:** All-movement crossovers provide for all movements at the intersection or driveway. The use of all-movement crossovers is reserved for situations where there is sufficient spacing and other crossover designs cannot adequately meet the operational needs of the location. The use of this crossover design should be limited because it decreases capacity; increases delay and congestion; may increase pollutants from vehicles; and some studies indicate that they have a higher propensity for crashes.

General Guidelines for Median Crossover Installations on New and Existing Facilities:

All proposed median crossovers on existing and new facilities shall be evaluated from an operational and safety perspective. The availability of reasonable alternative routes, access points, existing crossovers, along with the desire to preserve the capacity and safety of the facility shall be considered in all proposed crossovers.

The availability of adequate spacing for a crossover shall be considered when determining if a crossover is justified. However, the availability of adequate spacing alone does not warrant a new crossover.

A median crossover shall only be considered when the Department deems it necessary to service traffic generated by existing (and proposed) roadways, businesses or other development; and this traffic cannot be adequately serviced with the existing crossovers at intersections, reasonable alternative routes or other access points.

It is the requesting party's responsibility to provide the justification, or means to acquire the information for justification, for new crossovers. If this information is not provided, the crossover will not be reviewed or approved.

When the Department has deemed a median crossover is necessary, only the crossover type that meets the operational and safety needs of the facility will be considered.

A median crossover shall not be allowed unless an adequate length left turn deceleration lane and taper can be provided and the addition of the crossover will not impede the storage requirements of adjacent intersections. Left turn lanes will be installed to serve all non-emergency crossover movements allowed on the divided facility at the time of installation.

When crossovers are considered, U-turns must be adequately accommodated or restricted. If trucks and large vehicles are expected to use the crossover, then design vehicle shall be selected to accommodate these movements.

Median Crossovers shall not be located where intersection sight distance (both vertical and horizontal) cannot meet current NCDOT design criteria.

Median crossovers shall not be placed in areas where the grade of the crossover will exceed 5 percent. Special consideration should be given to the vertical profile of any median crossover that has the potential for future signalization to ensure a smooth crossing from a present or future side street.

While it is desirable to have median widths 23 feet or greater, a median crossover shall not be provided where the median width is less than 16 feet.

Crossovers that require a signal or where there is expected potential for a future signal in an otherwise unsignalized area should be avoided.

The Department retains the authority to close or modify any crossover that it deems to be operationally unsafe to the traveling public.

Median Crossover Guidelines for North Carolina Streets and Highways

Interstate and Non-Interstate Highways with Full Control of Access:

No public-use median crossovers will be allowed.

U-turn median openings for use by authorized vehicles for the maintenance and policing of highway or emergency response can be allowed when an engineering study clearly indicates a need. The spacing of the median openings should abide by the following guidelines:

U-turn median openings can be provided if a need has been determined and they can be added in a safe location where decision sight distance is available. When adding a crossover, it should be located at least one half mile from any overhead structure and at least one mile from the terminus of a ramp acceleration lane or a deceleration lane. The median crossover should be signed appropriately.

The minimum spacing of adjacent U-turn median crossovers between interchanges is three miles. However, spacing alone is not justification for a crossover.

On urban freeways, the interchange spacing is generally close enough that openings are not warranted. Therefore, U-turn openings are not allowed. In addition, on facilities where acceptable gaps are unlikely due to high ADTs, U-turn openings are not allowed.

**Divided Highways without Full Control Access
(Posted speeds of greater than 45 mph)**

On highways with higher traveling speeds, the potential for more severe crashes is greater. Also, on high-speed facilities, development is usually not as concentrated as on lower speed facilities. In order to maximize the safety of these facilities, crossover spacing is critical.

All-movement crossovers shall not be any closer than **2000 feet** apart on divided highways. However, spacing alone is not justification for a crossover. It must be determined that a crossover addition is needed to meet the operational requirements of the facility. Where this spacing requirement is not met and there is a defined need for left-turn access, then a directional crossover will be considered. However, the general guidelines must be met in order for the directional crossover to be added.

**Divided Highways without Full Control Access
(Posted speeds of 45 mph and Less)**

There is usually more demand for median crossovers and the speed limit is lower. Because of the density of the development and lower traffic speeds, it is acceptable to provide a closer spacing of median crossovers. However, the availability of adequate spacing alone is not justification for a crossover. Crossovers must be justified to meet operational and access needs that the existing facility cannot adequately serve. Only the type of crossover that meets the operational, access and safety needs of the facility shall be added. Directional crossovers are preferred where they meet the operational and access needs of the roadway.

The spacing of crossovers will be largely dependent upon the need for adequate storage for left turning vehicles/U-turn vehicles at intersections. **A crossover shall not be placed where it interferes with the storage requirement for existing intersections.**

All-movement crossovers shall not be spaced any closer than **1200 feet** apart on divided highways with posted speed of 45 mph and less. Where this spacing requirement is not met and there is a defined need for left-turn access, then a directional crossover will be considered. However, the general guidelines must be met in order for the directional crossover to be added.

Responsibility of Locating Crossovers on Active Roadway Design Projects:

While a project is in design and during the life of the construction of the project, the Project Engineer and Project Design Engineer in the Highway Design Branch will locate the crossovers for the highway. Only crossovers at arterials, major collectors, and major traffic generators will be shown on the design public hearing map. Intermediate

crossover locations will not be specified or addressed in the environmental documents or shown on the hearing maps. The Division Office shall be consulted regarding the level of access management desired for the project.

The engineer in the Highway Design Branch will determine if the crossover is justified and then determine the appropriate crossover design type. Priority will be given to placing median crossovers at existing intersecting streets. After the crossovers are located for existing streets that justify a crossover, the engineer will examine the remainder of the highway facility, along with reasonable alternative routes and access points, to determine if there are any other major traffic generators that require consideration for a crossover. When considering the intermediate crossover locations, the minimum spacing as outlined previously in these guidelines is to be followed. The crossover design that meets the operational, access, and safety requirements will be shown.

All crossovers are subject to the review of the Traffic Engineering and Safety Systems Branch, the Division Office, and the appropriate local officials if applicable.

Some special circumstances may justify the need to deviate from these guidelines. If requests are made for crossovers that deviate from these guidelines, the Traffic Engineering and Safety Systems Branch and the Division Office will review the location of the crossover and offer recommendations. The State Design Engineer will be responsible for granting any exceptions to these guidelines on active design and construction projects. Prior to approval of any contractual agreements for crossovers, all negotiated crossovers must be reviewed and approved by the Traffic Engineering Branch, the Highway Design Branch, Division Office, and the appropriate local officials if applicable.

Responsibility of Locating New Crossovers on Existing Facilities:

The approval of median crossover requests on existing highways is the responsibility of the Traffic Engineering and Safety Systems Branch. Any request that may come to Roadway Design or Design Services shall be directed to the appropriate Division Engineer. The Division Engineer shall make a traffic engineering investigation using the criteria outlined in these guidelines. A written report with recommendations shall be prepared by the Division Engineer and forwarded to the Traffic Engineering and Safety Systems Branch for further analysis. The Traffic Engineering and Safety Systems Branch will conduct necessary investigations, this includes discussions with other branches, units, and the appropriate local officials if applicable.

Final approval or denial of the request shall be the responsibility of the State Traffic Engineer. If any aspect of the requested median crossover deviates from the guidelines, the Traffic Engineering and Safety Systems Branch and the Division Office will confer to

determine the necessary action to be taken. The State Traffic Engineer will be responsible for granting any exceptions to the guidelines on existing facilities. The State Traffic Engineer will notify the Division Engineer of the decision reached.

Crossovers Considered for Private Developments on Existing Facilities:

A private development that justifies direct access and benefits from an added median crossover will be responsible to construct or fund its installation. In addition, it is the responsibility of the requesting party to provide the justification, or means to acquire the information for justification, for new crossovers. If this information is not provided, the crossover will not be reviewed or approved. The developer will be required to submit a complete set of plans and specify the exact location, design, and construction requirements for the proposed median crossover. Only the type crossover that meets the operational and safety needs of the facility shall be added. Directional crossovers are preferred where the design meets the operational and access needs of the roadway. Approval of such a crossover is subject to a traffic engineering investigation and approval procedures as outlined in these guidelines.

Any drainage facilities required by the construction of the crossover will be installed or funded by the developer or the applicant at their expense. After the construction has been completed in accordance with the Division of Highways requirements and standards, and passes the District Engineer inspection, the Division of Highways will assume ownership and maintenance of the crossover.

Failure to comply with the location, design, or construction requirements will result in the crossover being barricaded or removed until the deficiencies have been corrected at the applicant's expense. Once the Division of Highways assumes the ownership, the median crossover will then be subject to the regulations exercised under the police power of the State.

The Department retains the authority to close or modify any crossover that it deems to be operationally unsafe to the traveling public; or causes undue delay, congestion or adversely impacts traffic operations.

Special Use Crossovers

Median crossovers for special purposes, such as fire protection, ambulance services, etc. shall be considered on an individual basis after a traffic engineering investigation. Emergency response plans and expected level of need, in addition to the geometric limitations of the facility will be used in consideration for special use crossovers. Approved special use crossovers shall be appropriately designed, delineated, and regulated. However, the availability of adequate spacing alone does not warrant a new crossover.