



## II. THE TRAFFIC DESIGN PROCESS

This chapter of the DeIDOT Traffic Design Manual describes the recommended process for performing traffic design, from the initial request through the installation of the device in the field.

### A. Request

The traffic design process begins with a request to install or modify a traffic signal or other traffic device at an existing or proposed location. The request should include information regarding how the proposed traffic device would be expected to improve safety and/or operations at an intersection or along a corridor. The requests may come from a variety of sources, and in general, the source of the request determines which project type will be performed.

<u>Requester</u>	<u>Typical Project Type</u>
DeIDOT Planning, Traffic, Project Development, Bridge Design	Project Type 1 – Capital Projects
DeIDOT Pavement Management	Project Type 2 – Pave & Rehab Projects
Elected Officials, Citizen, Traffic Representative, Fire Companies, Studies	Project Type 3 – Traffic Section Projects
Developer	Project Type 4 – Developer / Subdivision Projects

### B. Establish Need for Traffic System Design Elements

Once the request is received, the DeIDOT Traffic Section must establish the need for the traffic device before the design process can begin. Need is typically established by conducting a study of current conditions and assessing the potential benefits of the traffic device. For example, to establish the need for a new, modified, or removed traffic control signal, a signal study is required (see Chapter IV-A).

Approval from the Chief of Traffic Engineering is required before a project involving a new traffic control signal, modification of a traffic control signal, or the removal of an existing traffic control signal can advance to the design stage. If it is determined that the traffic device is not needed, the findings should be documented and filed in the case history for future reference.



### **New Signal or Modification to an Existing Signal for Type 1 (Capital Projects), Type 2 (Pave & Rehab Projects), and Type 4 (Developer / Subdivision Projects):**

DelDOT's Traffic Systems Design Group (Design) will coordinate a meeting with the DelDOT Project Process Group, including the Project Consultant (if not in-house design) and others with a specific interest in the project. The purpose of the meeting is to discuss communications, facilities, and signal design. Data about the proposed or modified signals should be obtained and provided at the meeting. An agreement will have to be reached on recommendations for the changes, lane assignments, and other elements such as phasing, system detection, integration, etc. Upon concurrence by the Project Process Group that a new signal is justified, a signal resolution will be drafted for signature by the Chief of Traffic Engineering. A signal agreement may also be required in which the Developer and DelDOT will agree on private funding requirements and/or right-of-way access (For additional information on signal agreements, see **Appendix B**). The project will subsequently be "handed off" to the Design Group or to a Consultant to begin the development of base plans.

### **New Signal or Modification to an Existing Signal for Type 3 (Traffic Section Projects):**

DelDOT's Traffic Studies Group (Studies) Design Resource/HSIP Group will conduct a traffic signal warrant analysis or other traffic engineering study of the location, as outlined in Part III of this manual. If a new signal is justified or if modifications to an existing signal are being recommended, the recommending group will meet with the Chief of Traffic Engineering to review the study, if necessary. If approved by the Chief of Traffic Engineering, a resolution will be drafted and signed, authorizing the new signal. Studies will then meet with the DelDOT Project Process Group. The Studies Group will provide copies of the study and other pertinent data for discussion. Agreements will be reached on the recommended change(s) and other required design elements. The project will be subsequently "handed off" to the Design Group so that they can begin the base plan preparation. Additionally, modifications to existing signals may be initiated by DelDOT's Design Group and/or Signal Maintenance Group. These requests are typically associated with routine traffic equipment life cycle replacement and upgrades.

## **C. Notify DelDOT Community Relations**

Once the need for the new or modified traffic signal, traffic control device (all-way stops), or other traffic systems device has been established, the group initiating the signal project should notify DelDOT Community Relations and Chief Legislative Relations along with the area legislators



that need to be notified of the intended design effort of the intent to commence design. Information that should be provided to Community Relations and the Chief Legislative Relations along with the area legislators that need to be notified of the intended design effort includes project location, scope, proposed baseline schedule, and the potential for MOT impacts. Continued coordination between the DelDOT Traffic Section and DelDOT Community Relations and Chief Legislative Relations along with the area legislators that need to be notified of the intended design effort is important throughout the design process, particularly if there are any changes to the project scope or schedule. Prior to design completion, the Traffic Section Representative should inform Community Relations and Chief Legislative Relations along with the area legislators that need to be notified of the intended design effort of the pending improvement, handoff, and anticipated installation or construction. During the construction phase, DelDOT's Construction Group should keep Community Relations and Chief Legislative Relations along with the area legislators that need to be notified of the intended design effort informed of all lane closures, operational changes, and new activations.

## **D. Design Process Checklist**

At this point in the traffic design process, the designer should begin preparing the design checklist. The checklist is a working document that records the completed project tasks and follows the project from the beginning of design through handoff to Construction or Maintenance. A sample signal design checklist form is provided with this Manual in **Appendix J**.

## **E. Plan Preparation**

The next step in the traffic design process is plan preparation. Prior to beginning plan preparation, the Designer should obtain from the Department all existing data on record pertaining to the proposed location. A thorough on-site inventory/assessment should be conducted, at which time construction and operational constraints should be identified. If the project is located near an airport, port facility, or an at-grade rail crossing, additional coordination with the appropriate agencies (FAA, CSX, etc.) will likely be required. If an existing traffic signal is present, the designer should verify the existing equipment and operation of the signal. If any field issues/irregularities are discovered, the designer should report them to the appropriate group or section in the Department. If utility, right-of-way, geometric, or other required information is indeterminable, a survey of the intersection may be required.

Base plans should be developed at 30-scale and include/identify existing and proposed roadway geometrics, utilities, right-of-way, and clear zone/lateral offset, as well as any physical features that could affect the design of the signal. All existing and proposed signal equipment should be



shown, and the proposed phasing, lane use, intersection/system detection, and system communication requirements should be shown and identified. Further details of base plan preparation are presented in Chapter III of this manual.

## **F. Design Review**

Upon completion of the preliminary design, the Designer should continue coordination with DelDOT Traffic Representative, Signal Construction, or Maintenance throughout the design process to evaluate the design progress. At the semi-final milestone, the Designer is required to attend the DelDOT Project Process Group review. The Designer typically will receive minor additional comments based on the level of prior coordination. Under some circumstances and based on the level of comments received, additional meetings may be required with the Designer and DelDOT's Project Process Group to flush out design issues.

Once all parties have reached a final agreement on the traffic design plan, the Designer will finalize the design and sign and seal the plan. For signal design projects, the Designer should concurrently be working to develop the draft timesheet and provide this information to the TMC Operation Manager for development and approval of the final timing sheet. Once the signed timing sheet is obtained, the Designer should provide the Chief of Traffic Engineering with the final (signed and sealed) signal plan(s), TMC-approved Timesheet, and any additional support documents for signature. While some Capital Projects may not have a completed Timesheet ready for signature at the time of PS&E, the process described above is preferred.

## **G. Cost Estimate**

During the design process, the Designer should generate a cost estimate (i.e., a traffic statement) for the required work for the traffic device installation and/or modification. The cost estimate should include all items to be furnished and installed by the contractor and/or DelDOT to make the traffic device fully operational. The cost estimate should also include a contingency factor (usually 10%) and a maintenance fee (5%) for developer projects. The cost estimate should show the breakdown of cost contribution by any developers, local government, and DelDOT, as determined by the project type.

## **H. Handoff Package**

Upon approval of funding or concurrence of the construction schedule, DelDOT's Traffic Systems Design representative will develop the construction handoff package. The representative will fill



out the handoff form and submit it to construction along with the signed signal plan(s), signed timesheet(s) or timesheet status, traffic statement, a brief summary of the project defining the roles, actions, and responsibilities of each party, quotes or any other project-specific information, MOT checklist self-clearance form, draft press release and any additional documentation. For Type 3 projects (Traffic Section Projects), Traffic Construction controls the schedule. Therefore, priority should be designated as “ASAP,” “High,” or “Normal” on the handoff form, as previously agreed upon during the design process. For other project types, priority should be designated as “Support” on the handoff form, and the anticipated construction start date or anticipated FY spend of the project should also be denoted. Projects that will not proceed to construction immediately or within the same FY may not be handed off until the notification of the preconstruction meeting occurs. Upon submission of the traffic statement, the traffic representative should have all documentation within the project folder ready to send construction. A sample handoff form is provided in **Appendix C**.

## **I. Construction**

Once the handoff package is provided by DeIDOT’s Traffic Systems Design Group and funding is verified, DeIDOT Signal Construction will issue a Notice to Proceed to the selected Signal Contractor to begin work on the project. The Contractor is responsible for coordinating all assigned construction activities with other projects administered by DeIDOT Signal Construction. The Contractor is responsible for notifying MISS UTILITY prior to beginning construction. DeIDOT Signal Construction will notify the Power Company at least 30 days in advance of a "turn-on" date.

Generally, a traffic signal project requires 30 to 90 calendar days to complete construction upon NTP. For other types of projects such as signal enhancements and capital projects, the construction of signals is treated as an integral part of the total project and, therefore, may require a longer time to complete. The timetable to complete construction of other traffic systems devices varies by device type and scope of the project.

## **J. Activation**

An important time of the traffic design process is the day the device is activated and put into service. For major projects, one representative of each DeIDOT Section should attend the field activation. Typically, a new traffic control signal is operated on “flash” for a minimum of 72 hours prior to converting to stop and go operation. Similarly, portable changeable message signs (PCMS) or static signs if field conditions are limited, are used to provide information to motorists about the pending signal activation approximately 1 week prior to signal activation. Prior to



activation, the construction manager should notify DelDOT Community Relations and Office of the Secretary regarding the “turn-on” date. Community Relations and Office of the Secretary will then inform the public of any changes to traffic patterns in the area.

## **K. As-Built Plans**

Once the project is constructed, completed, inspected and accepted by DelDOT Construction and Maintenance, the construction inspector may provide an "as-built" plan. The "as-built" plan will represent any minor field adjustments that may occur. Any major field change that may be required during the construction phase shall be addressed under standard redline plan revision format. The construction manager will submit the red lined “as-built” plan to the designated Traffic Systems design representative. The Designer will be responsible for updating the record drawings. Additional information on the preparation of “as-built” plans is included in Chapter III of this Manual.