
Source: USDOT/Getty.

# Managing Traffic for Improved Access on Voting Day: Information Brief

The contents of this document do not have the force and effect of law and are not meant to bind the public in any way. This document is intended only to provide information to the public regarding existing requirements under the law or agency policies. However, compliance with applicable statutes or regulations cited in this document is required.

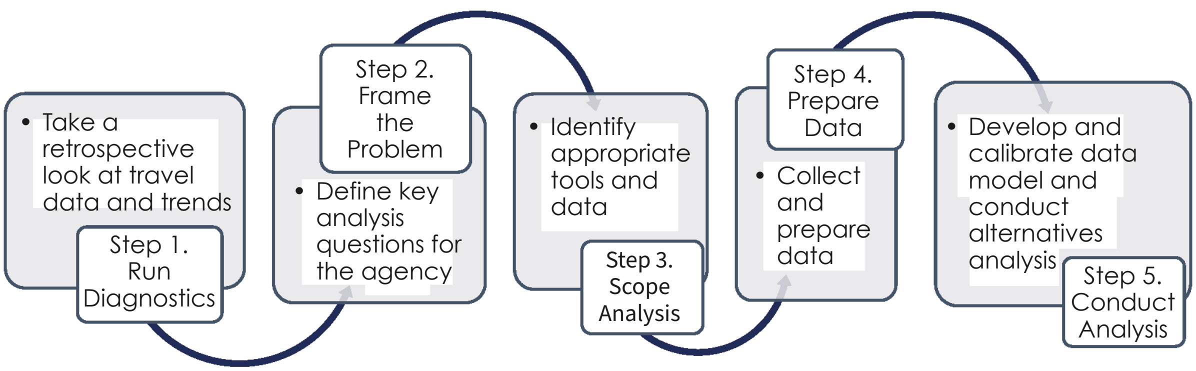
The U.S. Government does not endorse products or manufacturers. Trademarks or manufacturers' names appear in this document only because they are considered essential to the objective of the document. They are included for informational purposes only and are not intended to reflect a preference, approval, or endorsement of any one product or entity.

## Document Purpose

The Federal Highway Administration (FHWA) Office of Operations supports the use of traffic analysis and enhanced work zone management to improve access to polling places. The effort aids in the U.S. Department of Transportation's (USDOT) support for **Executive Order 14019, Promoting Access to Voting**.

Figure 1 shows a process for conducting traffic analysis in preparation for a voting day. Public agencies should approach traffic analysis in a stepwise manner to match the needs and context of the region and voting day. By following this process and taking a measured, quantitative, and data-driven approach, agencies can develop a deeper understanding of travel impacts during voting day. More detail on each step, including a description of helpful resources, is available in the information brief **Resources Related to Traffic Analysis**.

***Figure 1.*** **Process for conducting traffic analysis for voting day.**




Source: Federal Highway Administration.

## Using Traffic Analysis to Understand Impacts on Polling Locations

Using traffic analysis to understand travel delays and issues to polling locations is a new process, and there are few real-world examples. There is no prescribed approach affecting these types of analyses but, rather, a critical thinking process that goes through the steps outlined above. The following are three hypothetical situations that are examples of how agencies in three different polling location settings can work through the traffic analysis process. The hypotheticals focus on how the agencies can understand the issues, frame analysis questions, and leverage existing data sources to diagnose potential mobility problems during voting day.

### *Hypothetical No. 1 Rural County*

Rural polling locations may not have significant recurring congestion-related issues that would necessitate a traffic analysis, but rural communities should consider nonrecurring events. For example, traffic incidents, inclement weather, or construction events may significantly change the ability of a voter to access a polling location in a rural county.

In this hypothetical, a transportation official for a rural county is proactively investigating the need for traffic analysis to prepare for an upcoming voting day. A two-lane highway serves as the primary route to the largest polling location in the county: the county high school. The official knows that a crash on the route could significantly hinder drivers from accessing the high school. The official would like to prepare a detour route as a contingency plan.

## Step 1. Run Diagnostics

The official uses historical vehicle probe data from the **National Performance Management Research Data Set** to scan for potential detour routes. The official identifies two good candidate routes that have consistent travel time reliability. Each detour route includes all-way stop-controlled intersections on a local road between the highway and the polling location. The all-way stop-controlled intersections could be problematic if an influx of detoured traffic was routed through the intersections. The official determines that these intersections justify a traffic analysis to determine which has more available capacity and thus which route the official should select as the potential detour for the contingency plan.

## Step 2. Frame the Problem

The county official creates a descriptive problem statement, and in the event that an incident closes the primary route to the polling location, two possible detour routes are available for voting day traffic. Each route has potential traffic bottlenecks created by all-way stop-controlled intersections.

The county official determines that volume-to-capacity ratio will be the primary measure of effectiveness reported by the analysis, with intersection approach delays as a secondary measure.

The county transportation agency has limited resources to perform the traffic analysis. Agency personnel will perform the analysis in-house by using sketch-planning-analysis methods.

## Step 3. Scope Analysis

Even though the analysis will be performed in-house, the official knows it is good practice to develop a scope of work. The official drafts the scope, determining that the a.m. and p.m. peak periods should be analyzed for the two intersections (one on each potential detour route). The official considered using the **Capacity Analysis for Planning of Junctions (CAP-X Tool User Manual)** spreadsheet tool but is more familiar with **NCHRP Report 825: Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual (HCM)** and believes the planning-level analysis methods in the guide would be appropriate for this level of analysis.

## Step 4. Prepare Data

To complete the analysis, agency staff members perform a.m. and p.m. peak-period turning-movement counts at each intersection. While onsite, each staff member collects field data that are necessary for the analysis.

Rather than try to estimate voting day traffic, the official decides that the transportation agency will perform a sensitivity analysis of various levels of increased voting traffic to determine the best detour route and proceed to the next step.

## Step 5. Conduct Analysis

The county transportation agency staff uses the collected data and performs analysis at each of the critical intersections. The staff evaluates the available capacity and intersection approach delays by using methods in the Simplified HCM Method for All-Way Stop-Controlled Intersections, which is Section M.4 in **NCHRP Report 825: Planning and Preliminary Engineering Applications Guide to the Highway Capacity Manual (HCM)**.

The staff performs a sensitivity analysis to determine which intersection could accommodate more detoured voting traffic. The staff incrementally increases traffic along the detoured approach until it is clear that one intersection can accommodate more detoured traffic. The staff then selects the corresponding route as the detour route for contingency planning.

**Key Questions**

- Are there simplified tools we can use to perform this analysis in-house?
- Do we have historical crash data for the primary route to determine where a crash is more likely to occur?
- Do we need to estimate voting day traffic patterns, or could we use other methods to determine which detour route to select?

## Aftermath

Once the analysis is complete and the detour route has been selected, county staff coordinates with local law enforcement prior to the voting day. Local law enforcement decides to schedule additional officers for the day to help direct traffic along the detour route if necessary.

On election day, law enforcement and county staff closely monitor the primary route for any incidents and the detour route for any potential issues. No incidents occur, and the detour route is not used.

Although the detour was not used during election day, the effort to perform the traffic analysis and determine the appropriate detour route was not wasted. The county transportation agency shares the detour with other agencies that provide incident responses in the area, so if an incident does occur in the future along the two-lane highway, first responders are aware of the detour to help mitigate traffic. In addition, the transportation agency archives the detour route as part of its incident response plans for major routes throughout the county.

## *Hypothetical No. 2 Urban Central Business District*

In this hypothetical, a city traffic engineer prepares for election day by reviewing traffic signal operations within the central business district (CBD) of the city. On a typical day, the signals operate acceptably, but the engineer knows that travel patterns will likely be different on election day. Most polling locations within the CBD have limited parking, so there will be increased numbers of pedestrians and other nonmotorized modes.

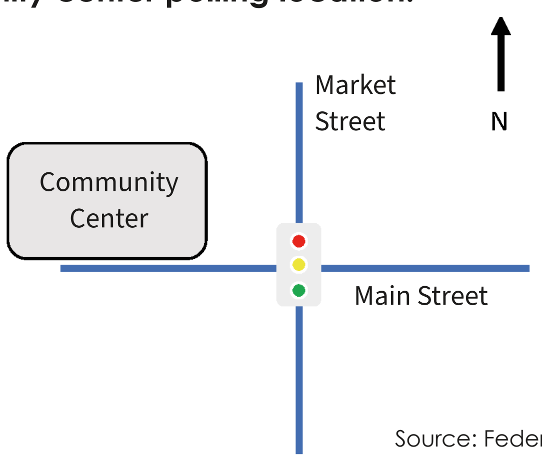
### Step 1. Run Diagnostics

The traffic engineer has set up automated traffic signal performance measures (ATSPMs) at each traffic signal in the CBD. ATSPMs are high-resolution data recordings of the state of traffic signals during each signal cycle. ATSPMs help support traffic signal operations, maintenance, management, and design.

The city has been archiving ATSPM data for the past 2 years, which includes data from the previous voting day. The traffic engineer is proactive and reviews the historical data from that previous voting day to determine whether any mobility issues arose at the signalized intersections that the engineer could address for the upcoming election day.

During their review of the historical ATSPM data, the traffic engineer notices that a mobility issue occurred at a major intersection during the previous voting day. The intersection, Market Street and Main Street, provides access to a community center that serves as the only polling location in the vicinity (figure 2). During the previous election day, the northbound protected left-turn phase maxed out several times during the p.m. peak hour. The phase maxing out indicates that the protected left-turn phase changed to red before all vehicles could turn, and motorists experienced unacceptable delays during that period. Typically, the northbound protected left-turn phase does not max out during the p.m. peak hour, so the traffic engineer is confident that it occurred due to voting day traffic. The engineer decides to perform a traffic analysis to investigate the issue and determine whether to implement countermeasures for the voting day.

***Figure 2.* Area map of community center polling location.**




Source: Federal Highway Administration.

### Step 2. Frame the Problem

The traffic engineer frames the problem statement for the traffic analysis: during the previous election day, the northbound protected left-turn phase at Market Street and Main Street maxed out several times during the p.m. peak hour, implying motorists experienced unacceptable delays. The issue seemed to occur due to vehicular voting traffic traveling northbound and turning left to access the community center polling location.

Even though the city does have external consultant resources available, the engineer decides to perform the analysis alone The primary measure for the analysis will be the delay of individual movements at the intersection, with special focus on the northbound left turn.

The engineer is also mindful of the safety of the nonmotorized modes and will ensure any changes to the signal timing or phasing will not adversely affect the safety of all modes.

## Step 3. Scope Analysis

The engineer will perform the analysis in-house by means of a software package that uses **HCM** methods to determine delay and enables a user to improve signal timings to minimize delays. The engineer will analyze the single intersection for the p.m. peak hour.

**Key Questions**

- How can we leverage existing data and tools—such as ATSPM data—to minimize data collection specific to this effort?
- Do we have the time and skills to perform this traffic analysis internally?
- Do we have traffic data from the previous voting day? If not, how will we estimate voting day traffic?

## Step 4. Prepare Data

The subject intersection has ATSPMs that are configured to collect traffic turning movement data, so the engineer has traffic volume data from the past voting day along with recent data from the past week. The engineer reviews data from a past typical workday 2 years ago, the past voting day 2 years ago, and a recent typical workday. These data will help the engineer determine how:

- Traffic has grown during the past 2 years at the intersection of interest
- Traffic patterns at the intersection have changed
- The level of additional traffic that could travel through the intersection during the p.m. peak hour on voting day

By determining answers to the above questions, the engineer develops a reasonable estimate of anticipated intersection turning movement volumes for the upcoming voting day. The engineer performs a field visit to the intersection to observe traffic during the p.m. peak hour and records field measurements to properly calibrate the traffic analysis model.

## Step 5. Conduct Analysis

The engineer uses the software package to analyze traffic conditions during voting day, determining that the left-turn movement will sustain an unacceptable delay with the current timings and phasing. The engineer does not want to change the phasing that times permitted left turns, because they would conflict with the increased nonmotorized activity. Instead, the engineer adds green time to the protected left-turn phase, thereby reducing the delay while still maintaining acceptable delays for all other movements.

## Aftermath

In addition to performing the analysis and adjusting the northbound protected left-turn green time, the engineer creates some dashboards to monitor the performance of signals by using ATSPM data during election day. The engineer instructs the traffic team to monitor the dashboards and make real-time signal timing adjustments as necessary to improve mobility, with special focus on the intersection that was analyzed.

# *Hypothetical No. 3 Suburban Neighborhood*

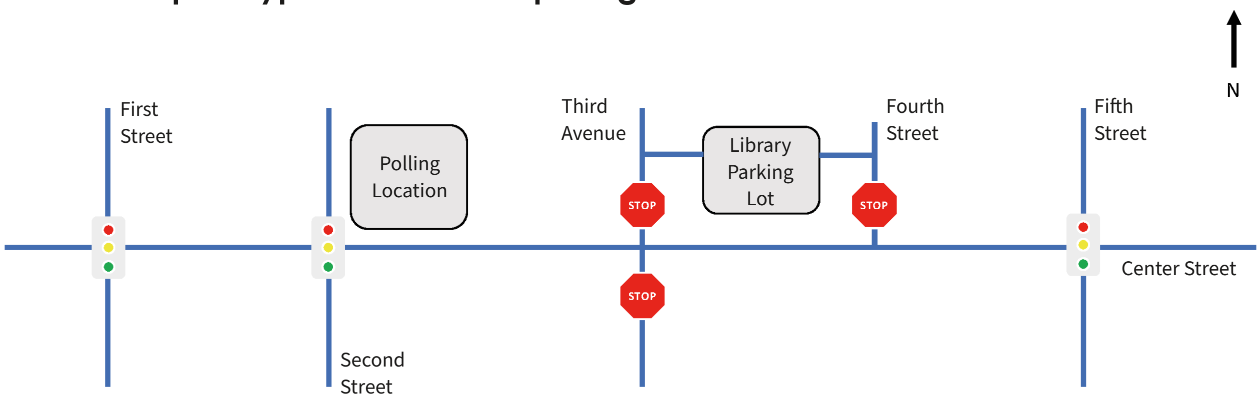
A senior transportation planner for a regional planning commission (RPC) has an assignment to address potential mobility concerns during voting day. Having worked on the latest congestion management process (CMP), the planner is familiar with mobility hotspots in the region but does not know the specific locations of polling places. The planner will need to coordinate with the board of elections.

## Step 1. Run Diagnostics

The planner meets with a contact from the local election office. In addition to obtaining the address of each polling location within the region, the planner asks the contact whether any past issues have hindered travel to polling locations. The contact recalls that during the previous voting day, congestion occurred around a polling location on an arterial roadway, Center Street. In addition, the polling location had limited parking, so the congestion may have been exacerbated by drivers' circling the area trying to find parking spaces.

After the meeting, the planner creates a map of polling locations, overlaying the map with the CMP map to determine any mobility hotspots near polling locations. The map confirms the anecdote from the local election official. Center Street has been identified as an area of congestion near the polling location and will likely cause mobility issues during election day. Figure 3 shows the area around the polling location, which is located at the corner of Center Street and Second Street, along with traffic control for the surrounding intersections.

***Figure 3.* Area map of hypothetical No. 3 polling location.**




Source: Federal Highway Administration.

Specifically, the CMP report calls out congestion at the signalized intersections of First Street and Second Street along Center Street. The planner determines that traffic analysis might potentially address the problem, which might require the implementation of certain specific changes on election day.

## Step 2. Frame the Problem

The planner uses the information from the previous step to develop a draft problem statement: The previous voting day had congestion around a polling location on an arterial roadway, Center Street, likely exacerbated by drivers' circling the area trying to find parking spaces.

## Step 3. Scope Analysis

The RPC has an on-call contract with a local engineering firm in the area. The planner decides to use the contract as a vehicle for the firm to perform the traffic analysis. Officials from the RPC and the firm meet to discuss the issues, refine the problem statement, and develop a scope of work.

The engineering firm will perform the traffic analysis by using a traffic signal optimization analysis tool. The CMP identified congestion at First Street/Center Street and Second Street/Center Street, but the analysis will also include the signalized intersection of Fifth Street/Center Street. These three signals are coordinated, and if the analysis determines that signal timing adjustments are indicated for election day, it will be best to adjust the timings for the entire coordinated system.

As part of the scope of work, the engineering firm will also consider potential strategies to mitigate the limited parking available at the polling location. To investigate potential strategies, the analysis will include Third Avenue/Center Street and Fourth Street/Center Street. Both intersections provide access to a library parking lot, which is a potential option for overflow parking.

## Step 4. Prepare Data

To forecast travel patterns during the voting day, the engineering firm and the RPC planner obtain historical voting data from the board of elections contact. The data include an hourly breakdown of the number of voters that visited the polling location during the previous voting day. The voting data show spikes in the number of voters during the a.m. and p.m. peak periods, so the firm and the planner agree to collect traffic data and analyze both peaks.

The engineering firm collects turning movement count data 2 months before election day. To adjust for election day traffic, the firm factors in the collected data by using seasonal adjustment factors obtained from the State department of transportation.

The firm applies the voting data to the factored turning movement counts to finalize the data for the analysis.

## Step 5. Conduct Analysis

The engineering firm conducts the analysis and finds that some unacceptable levels of congestion will arise during election day—specifically at Center Street and Second Street. Using the traffic signal optimization software, the firm determines that it should increase the signal cycle lengths of all three traffic signals in the coordinated system.

**Key Questions**

- How can we obtain polling location data?
- Can we use data from the local board of elections to estimate voting day traffic?
- Do we have the flexibility to revisit the scope of work in case we have to perform additional analysis with regard to supplementary parking needs?

The firm also analyzes a scenario wherein the library parking lot is used for supplementary parking and determines that the unsignalized intersections at Third Avenue/Center Street and Fourth Street/Center Street will operate acceptably. Additionally, the engineering firm evaluates pedestrian movements between the library parking lot and the polling location by assessing safety, accessibility, and compliance with the Americans with Disabilities Act (ADA). The firm identifies immediate improvements it could implement before voting day, such as updating faded crosswalk pavement markings, along with some permanent ADA ramp improvements that the RPC could program to improve pedestrian mobility along Center Street.

## Aftermath

The RPC and the board of elections meet with representatives from the nearby library, who agree to allow the library parking lot to accept overflow parking for the polling location. The planner works with the election officials to deploy signage on election day directing drivers to the overflow parking lot at the library.

The RPC then meets with the local area traffic signal technician to implement the increased signal cycle lengths for the three coordinated signals on election day.

Lastly, the RPC works with the local public works department to upgrade the faded crosswalk pavement markings, and the RPC plans to add a project to the next transportation improvement program to upgrade ADA ramps in the area.

## *For Further Consideration*

For more information, visit FHWA's website **Advancing Practices for Localized Traffic Analysis and Work Zone Management During Voting day**.