



2020 Kentucky Transportation Cabinet Maintenance Customer Survey

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Kentucky Transportation Center
College of Engineering, University of Kentucky, Lexington, Kentucky

in cooperation with
Kentucky Transportation Cabinet
Commonwealth of Kentucky

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Research Report
KTC-21-02/SPR20-592-2F

2020 Kentucky Transportation Cabinet Maintenance Customer Survey

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16. Abstract The Kentucky Transportation Cabinet (KYTC) periodically surveys drivers to understand their perceptions of the agency's maintenance activities. In 2020, Qualtrics in conjunction with the Kentucky Transportation Center surveyed 2,100 licensed drivers throughout the state to gauge their perceptions of highway maintenance, identify areas of strength and weakness, and discern how drivers obtain information on traffic and weather conditions. Survey participants answered questions about five areas of highway maintenance — roadside features, pavement surfaces, shoulders, drainage, and signs/markings. Drivers reported being most satisfied with the maintenance of signs, guardrail, and striping. Pavement surfaces, potholes, and overall appearance garnered the lowest ratings. When queried about investment priorities, respondents said the most important areas for KYTC to focus on are pavement surfaces, signs, and markings. A comparison of the 2010, 2016, and 2020 customer maintenance surveys found that responses and reported levels of satisfaction have remained largely consistent. Questions about traffic and weather information revealed that drivers are increasingly reliant on smartphone apps while traditional media (e.g., television, radio) have diminished in importance.			
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Executive Summary

Periodically, the Kentucky Transportation Cabinet (KYTC) surveys drivers to understand their perceptions of highway maintenance, identify areas of strength and weakness, and discern how drivers obtain information on traffic and weather conditions. In 2020, Qualtrics (in conjunction with the Kentucky Transportation Center [KTC]) conducted an online survey of 2,100 licensed drivers across the Cabinet’s 12 highway districts. For highway maintenance, the survey posed questions related to five areas — roadside features, pavement surfaces, shoulders, drainage, and signs/markings. Using a five-point Likert scale, for categories within each area participants rated the existing level of maintenance and desired level of maintenance. The lowest rating (1) denoted unacceptable performance, while the highest rating (5) indicated excellent performance. Respondents also gave feedback on future investment priorities, scoring each item from low priority (1) to high priority (5). Table E1 captures how respondents statewide rated maintenance levels for different categories in the 2010, 2016, and 2020 surveys. Boxes shaded light orange indicate a drop in rating, light-green boxes denote an increase, and light-yellow boxes represent no change. In seven of the nine categories, the mean score for perceived maintenance level dropped between 2010 and 2016, however, in 2020 slight to modest rebounds were observed in seven categories. In 2020, respondents gave signs, striping, and guardrails the highest ratings. Pavement surfaces, potholes, and overall appearance garnered the lowest ratings. Inter-district variability in scoring was nominal in most cases. With respect to spending priorities, respondents assigned the most importance to pavement surfaces and signs/markings.

Table E1 KYTC Statewide Maintenance Performance Trends (2010 – 2020)

Category	2010	2016	2020
Overall Appearance	3.39	3.42	3.51
Visual Obstructions	3.49	3.56	3.57
Fencing	3.62	3.60	3.64
Guardrail	3.91	3.83	3.83
Surfaces and Potholes	3.90	2.93	3.14
Shoulders	4.36	3.41	3.53
Drainage	4.04	3.60	3.70
Signage	4.25	4.07	4.07
Roadway Markings	3.99	3.87	3.94

Survey respondents provided a glimpse into the outsized role smartphones play in helping drivers obtain directions, acquire traffic information, and learn about conditions during inclement weather. In three of the four categories summarized in Table E2, smartphone apps are the leading source of information. Traditional media (e.g., television, radio) remain key resources during severe metrological events, however, reliance on them has declined. This trend will likely continue given that smartphones are increasingly the go-to source for traffic information.

Table E2 Trusted Sources of Traffic Information and Weather Conditions (2020)

Category	Smartphone Apps	GPS Units/ In-Car Services	Government Services	Traditional Media
Directions	45%	31%	—	—
Traffic Information	36%	6%	22%	21%
Traffic Control	71%	5%	10% (Road Signage)	12%
Road Weather Conditions	24%	3%	19%	39%

Introduction

The Kentucky Transportation Cabinet (KYTC) periodically surveys the traveling public to understand whether drivers believe the agency is successfully maintaining infrastructure assets. Previous maintenance surveys were done in 2010 and 2016 (Graves et al. 2010¹, 2016²). This report documents results from the latest internet survey conducted by Qualtrics in conjunction with the Kentucky Transportation Center in July 2020. Drivers from across the Cabinet's 12 highway districts were invited at random to participate, with a total sample size of 2,010 licensed drivers. Sample sizes in each highway district ranged from 135 to 200. The survey included questions about the following highway maintenance areas:

- Roadside Features (overall appearance, visual obstructions, fencing, guardrail)
- Pavement Surfaces
- Shoulders
- Drainage
- Signs/Markings (signs and striping)

Participants rated existing and desired levels of maintenance using a five-point Likert scale:

- 1 — Unacceptable
- 2
- 3
- 4
- 5 — Excellent

Participants also ranked investment priorities for each area using a five-point Likert scale:

- 1 — Low Priority
- 2
- 3
- 4
- 5 — High Priority

The survey's margin of error is +/- 2 percent at the 95% confidence level. The 2010 and 2016 survey margins of error were +/- 2.8 percent. For individual highway districts, the margin of error is +/- 8 percent at the 95% confidence level. Appendix A reproduces the full survey. Throughout the report, results from the 2020 survey are compared to those from the 2010 and 2016 surveys.

¹ Graves, R. Clark, and David Allen. 2010. Maintenance Customer Survey. *Kentucky Transportation Center Research Report*.

² Graves, R. Clark, and David Allen. 2016. Maintenance Customer Survey. *Kentucky Transportation Center Research Report*, KTC-16-10/SPR16-530-1F.

Roadside Features

Participants rated several items (e.g., overall appearance, visual obstructions, fencing, guardrail). Respondents across all three surveys expressed similar levels of satisfaction with each feature’s maintenance level (Figure 1). Questions about desired service level and spending priorities treated *roadside features* collectively, not individually. Differences between the 2010, 2016, and 2020 results are not significant. Eighty-eight percent of respondents said that their desired level of maintenance is a 4 or 5. In 2020, 47 percent of respondents rated the existing maintenance level of roadside features as a 4 or 5 (Figure 2). Figures 3-6 capture inter-district variability in the 2010, 2016, and 2020 surveys. Key trends include:

- Little change in the perceived level of maintenance for guardrails and fencing.
- Perceptions being relatively consistent across districts (i.e., little inter-district variability). In most districts, scores for guardrails and fencing were 3.5 and 4.
- Greater variability between districts for overall appearance and visual obstructions.

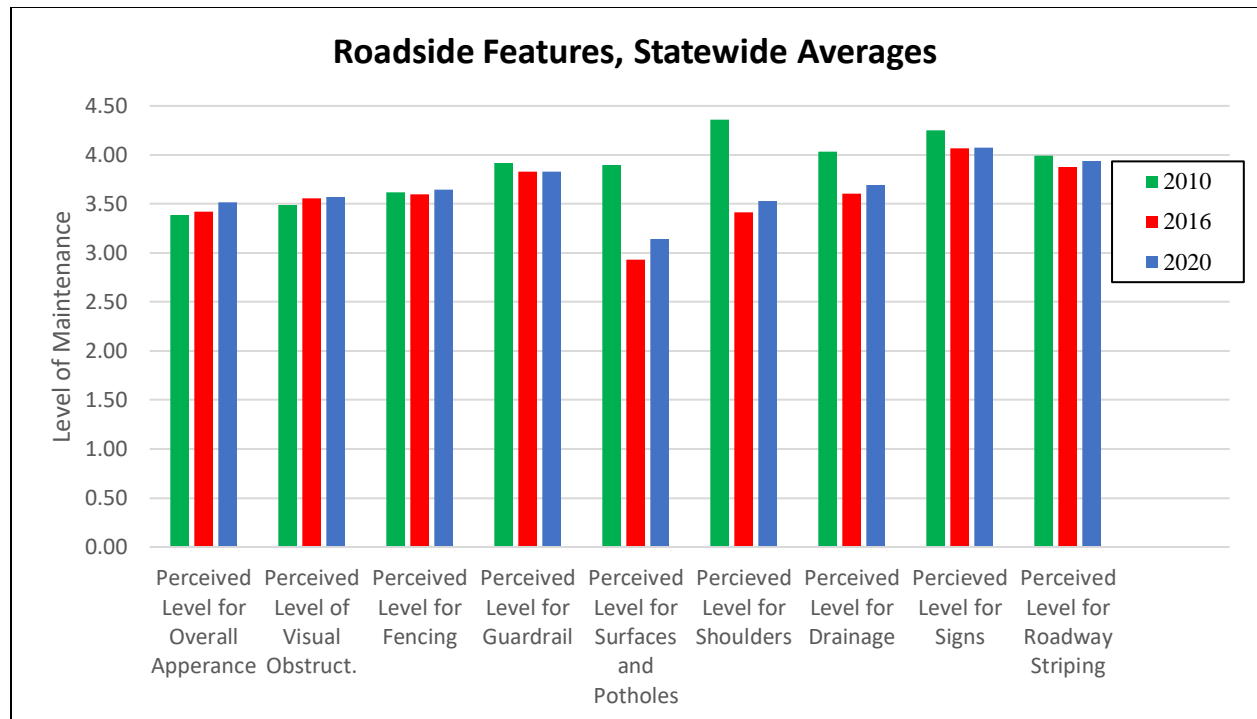


Figure 1 Summary of Statewide Roadside Features

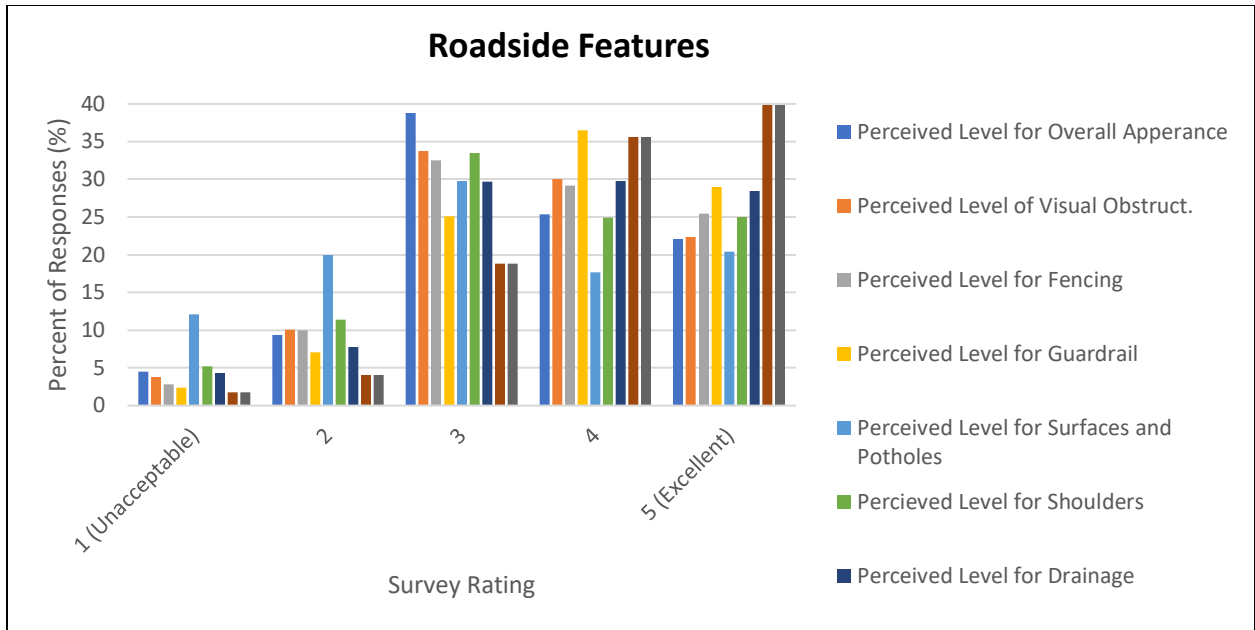


Figure 2 Statewide Distribution of Roadside Features

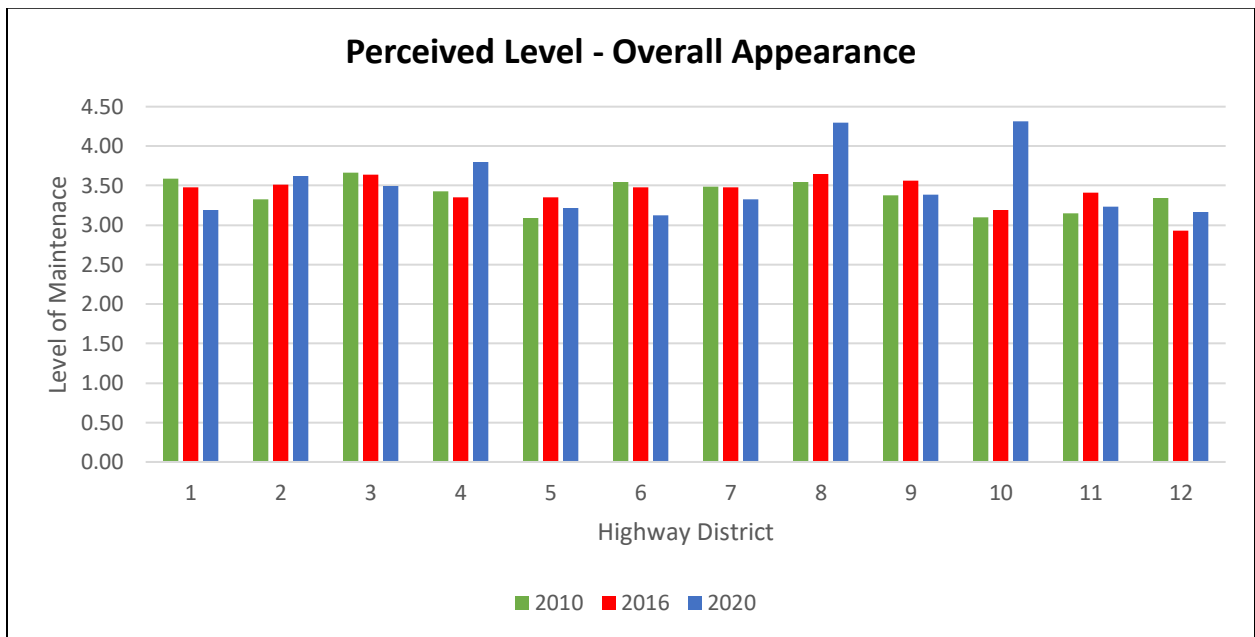


Figure 3 District Level Overall Appearance

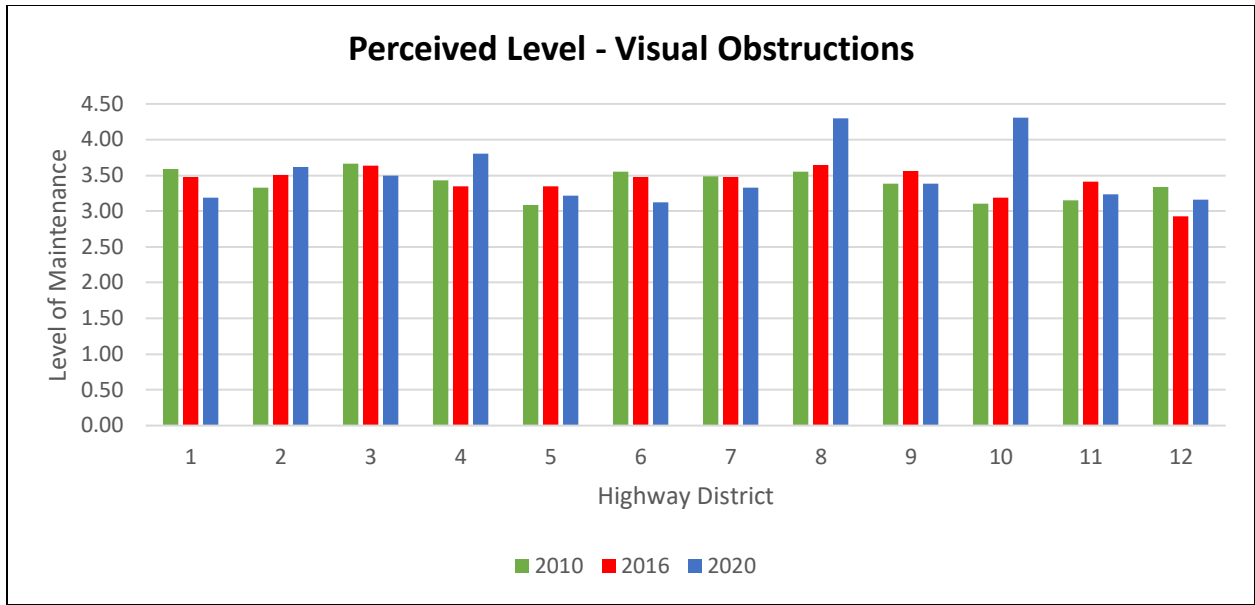


Figure 4 District Level Visual Obstruction

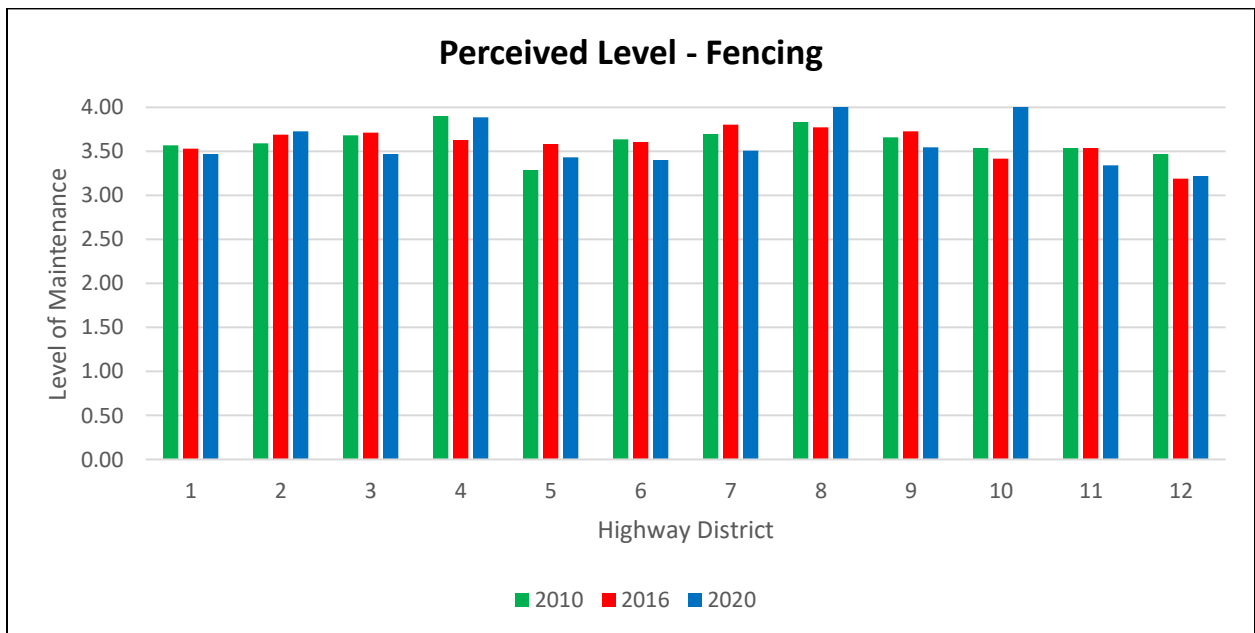


Figure 5 District Level — Fencing

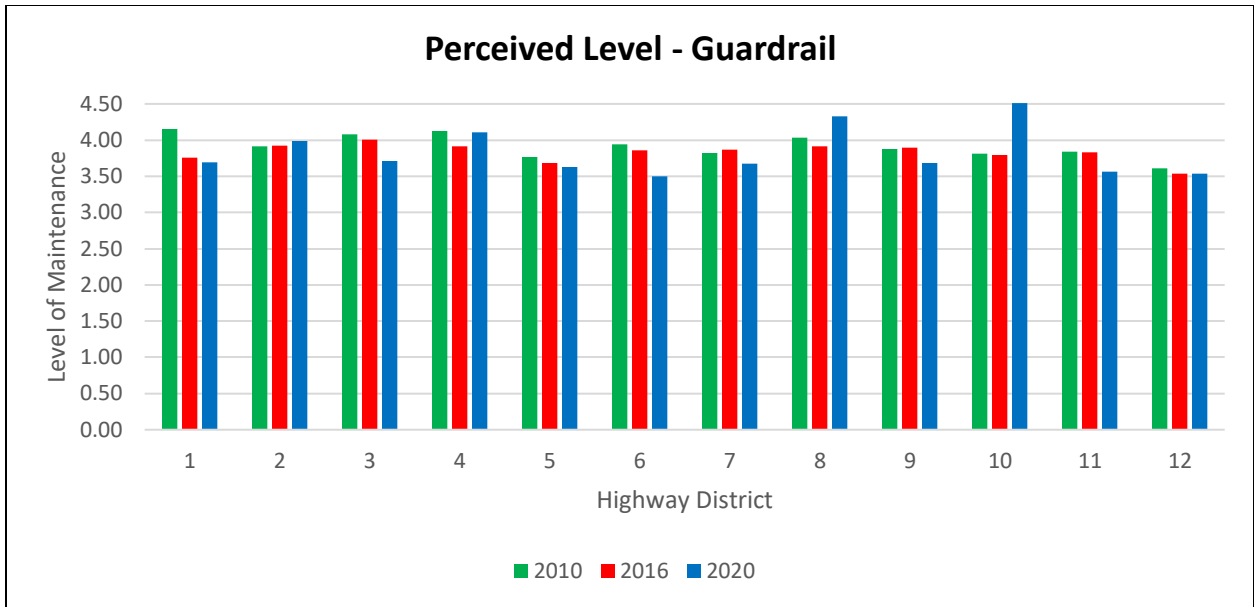


Figure 6 District Level — Guardrail

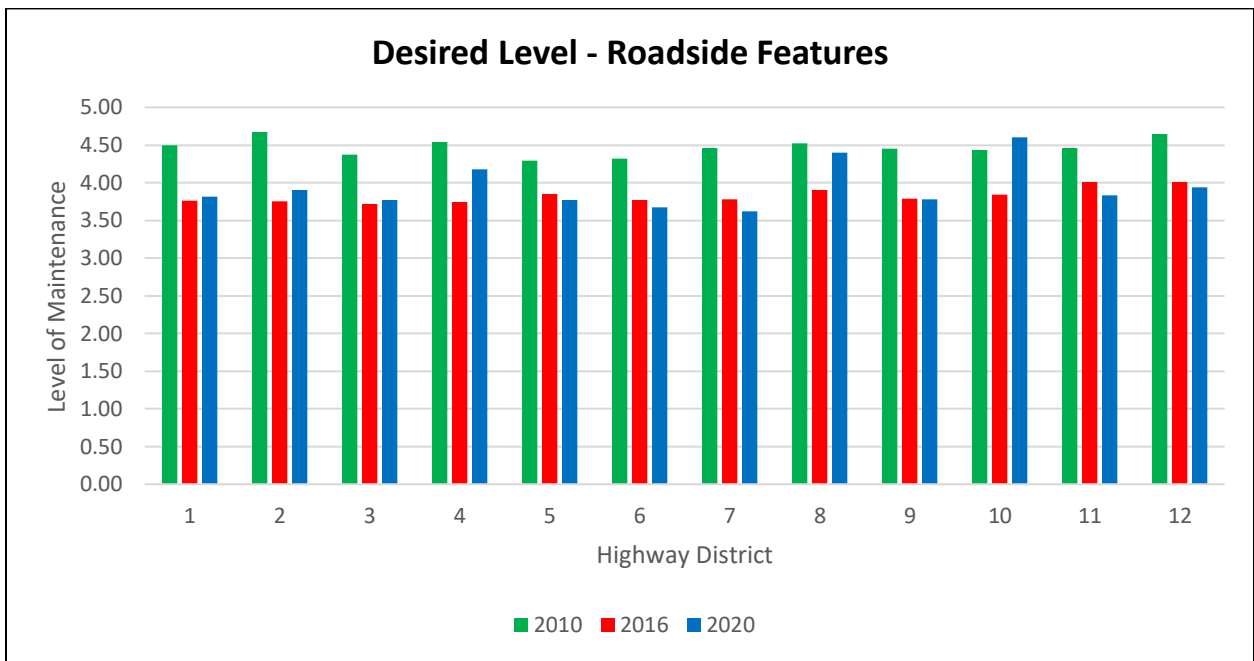


Figure 7 Desired Level for Roadside Features by District

Pavement Surface and Potholes

The mean rating for pavement surface maintenance was 3.14 — well below the mean desired rating of 4.43 (Figure 8). Perceptions changed little between 2010 and 2016 (Figure 9). Although in 2020, 38 percent of respondents rated pavement surfaces as a 4 or 5 — higher than the 33 percent in 2016 and 27 percent in 2010. Inter-district variability has remained quite low (Figure 10). Expectations for maintenance level and spending priority have exhibited similar trends.

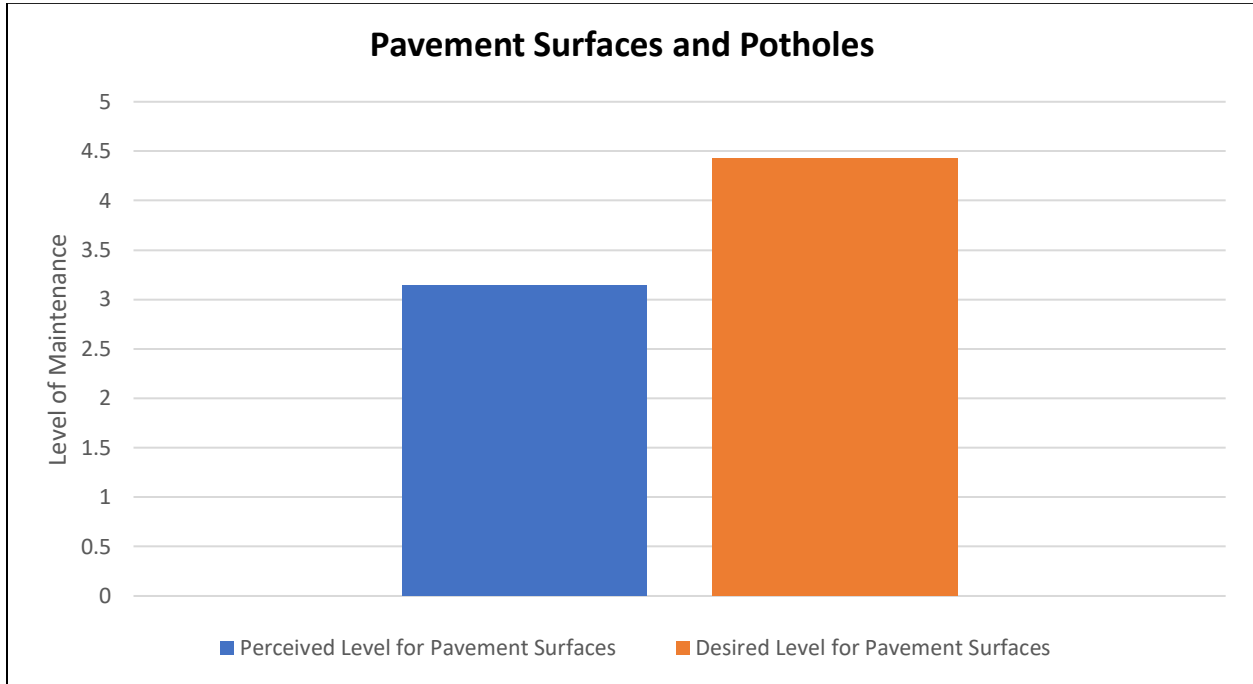


Figure 8 Summary of Statewide Maintenance of Pavement Surfaces and Potholes

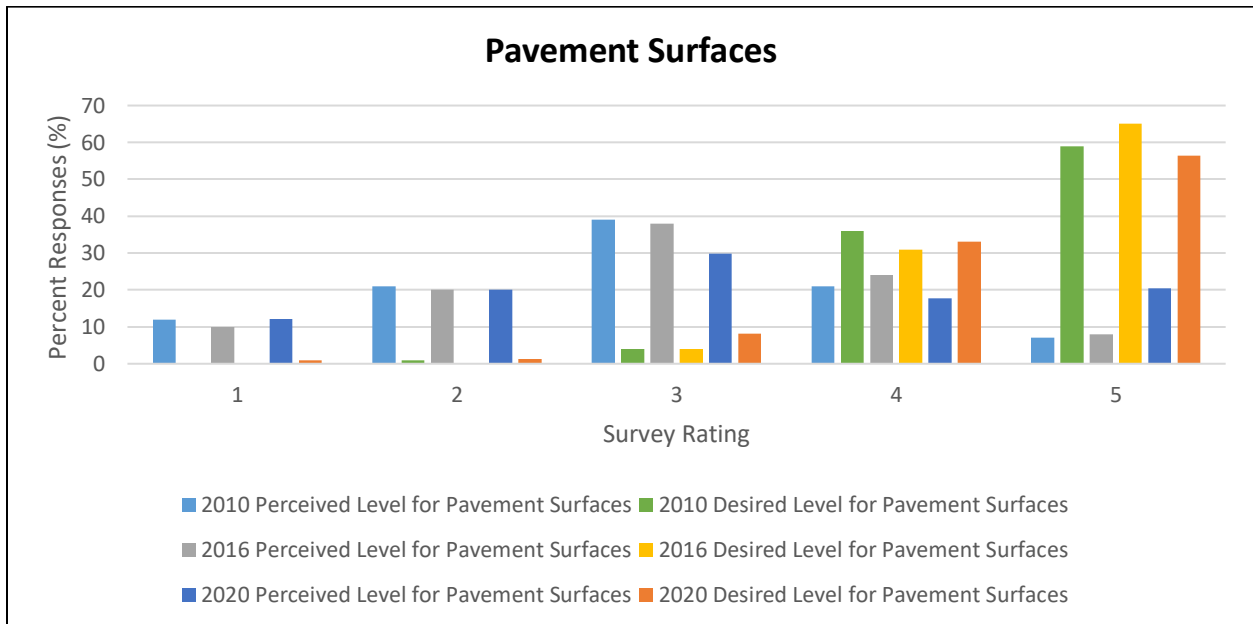


Figure 9 Statewide Distribution Maintenance of Pavement Surfaces and Potholes

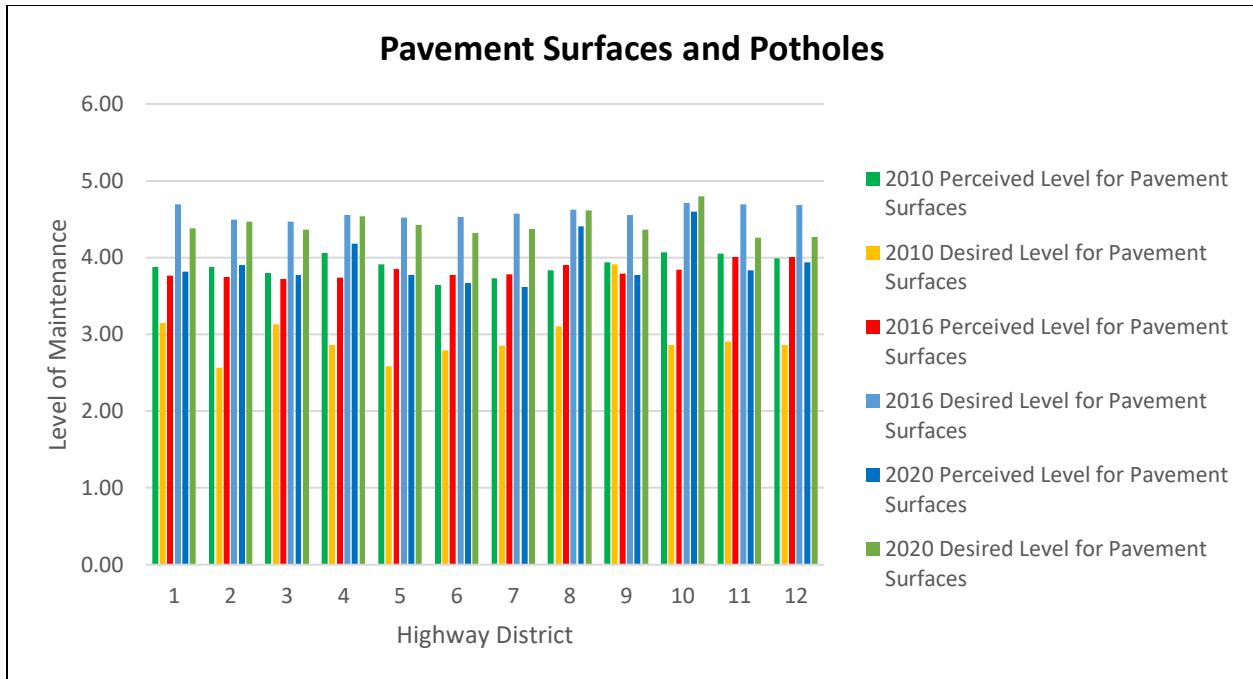


Figure 10 District Level Maintenance of Pavement Surfaces and Potholes

Highway Shoulders

The mean rating for shoulder maintenance was 3.53, considerably less than the average desired rating of 4.19 (Figure 11). Across all three surveys, the distribution of the statewide responses was quite similar. In 2020, 50 percent of respondents rated the existing maintenance as a 4 or 5, while in both 2010 and 2016, 47 percent gave a rating of 4 or 5. Eighty percent of respondents in 2020 said their desired maintenance level is a 4 or 5, which was down slightly from 2010 (88 percent) and 2016 (86 percent). Respondents throughout the state had comparable expectations for maintenance level and spending priority across all three surveys (Figure 13).

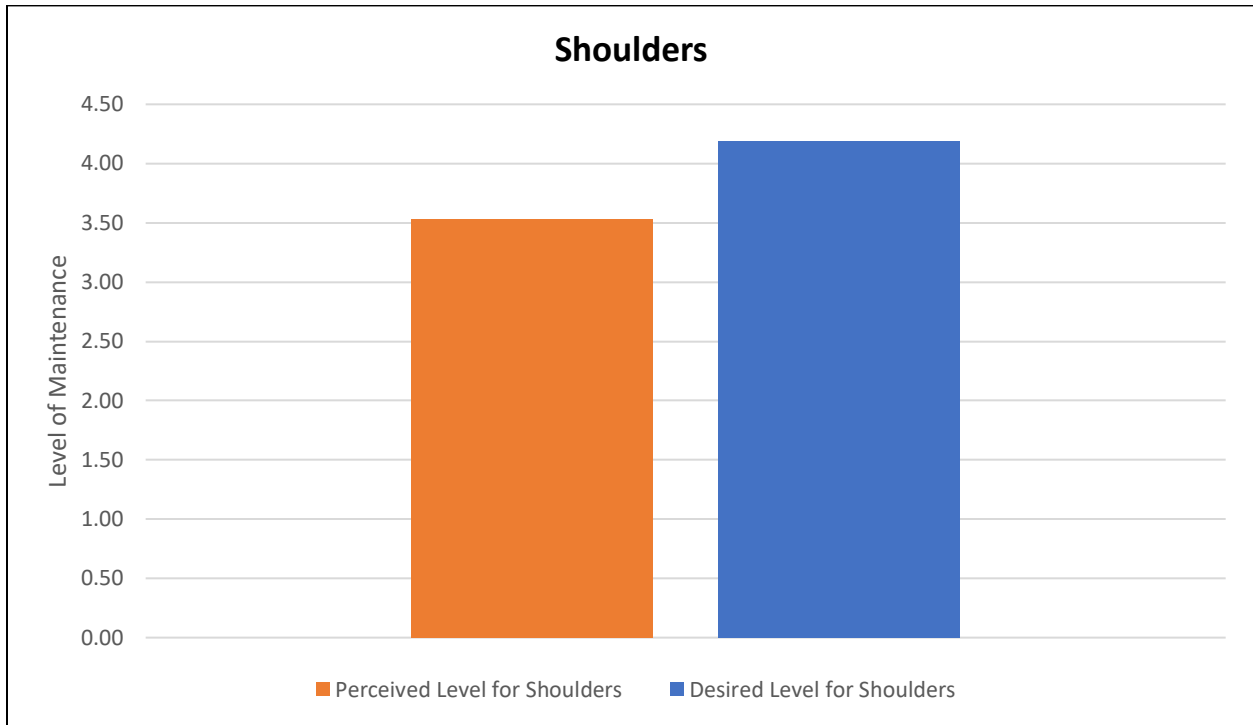


Figure 11 Summary of Statewide Shoulder Maintenance

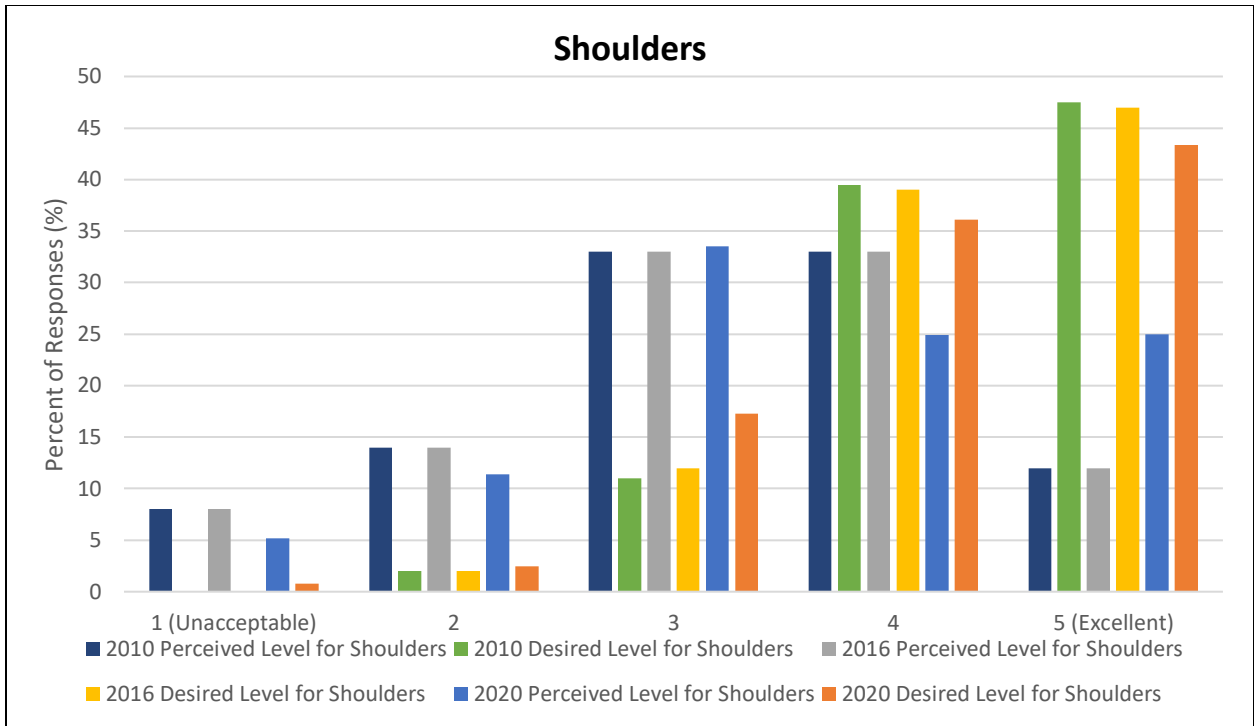


Figure 12 Statewide Distribution of Shoulder Maintenance

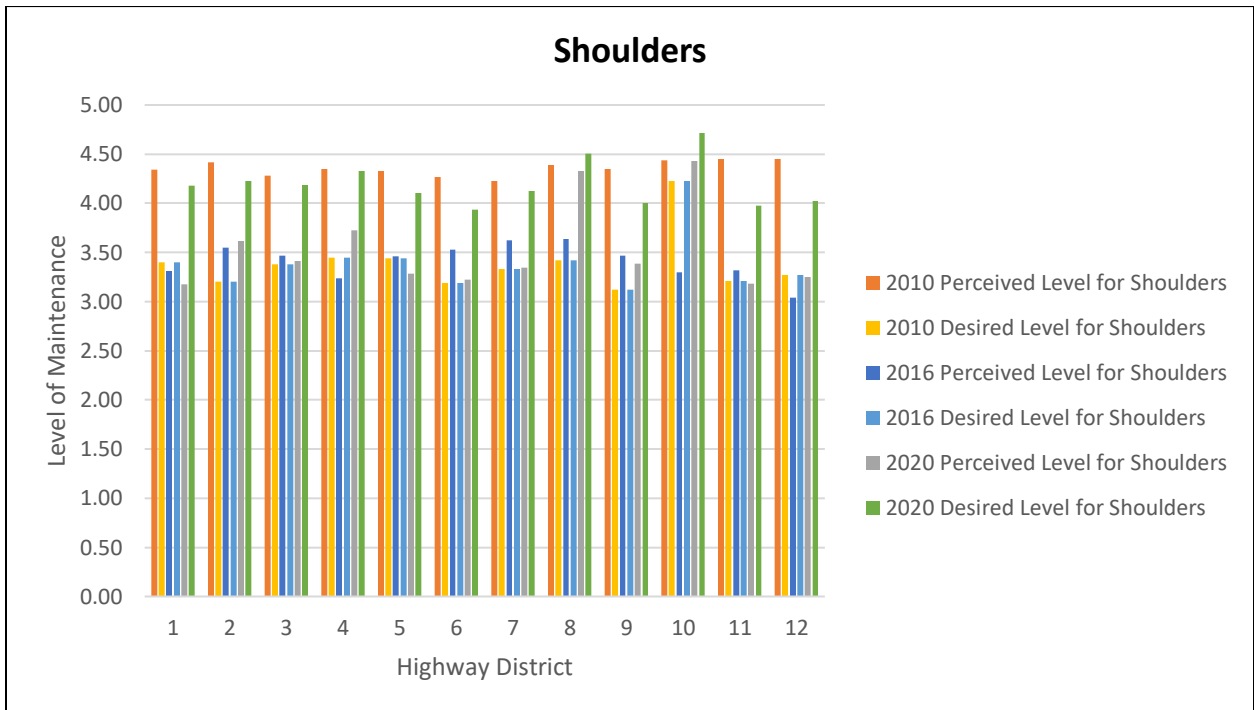


Figure 13 District Level Shoulder Maintenance

Highway Drainage

The mean rating for roadside drainage maintenance was 3.7, while the mean desired rating was 4.31 (Figure 14). In both 2016 and 2020, 58 percent of respondents said the existing maintenance of drainage rated as a 4 or 5, a slight uptick over the 50 percent who said the same in 2010. And while 91 percent said their desired maintenance level was a 4 or 5 in 2010 and 2016, this fell to 84 percent in 2020 (Figure 15). Expectations for maintenance level and spending priorities displayed little inter-district variability across all three surveys.

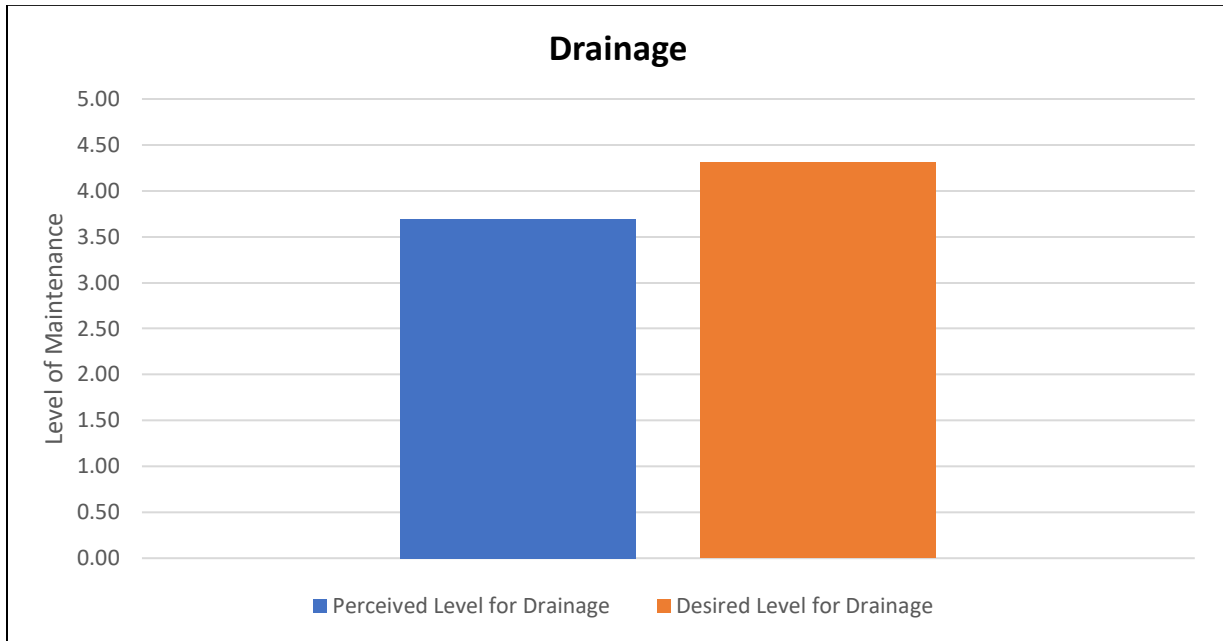


Figure 14 Summary of Statewide Drainage Maintenance

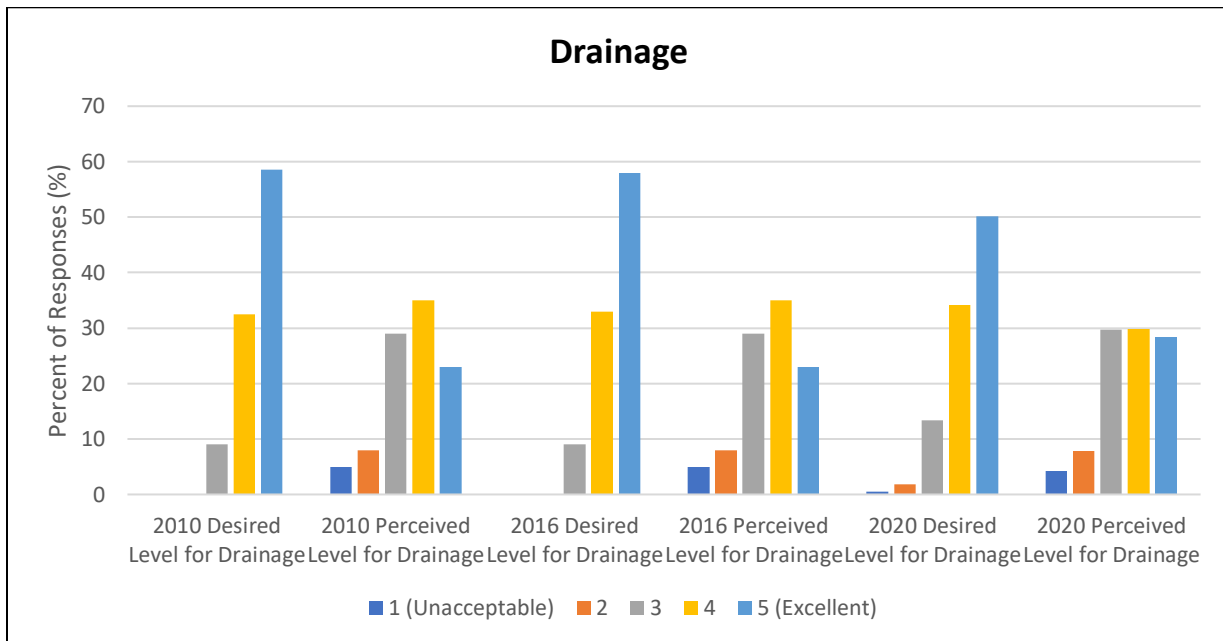


Figure 15 Distribution of Statewide Drainage Maintenance

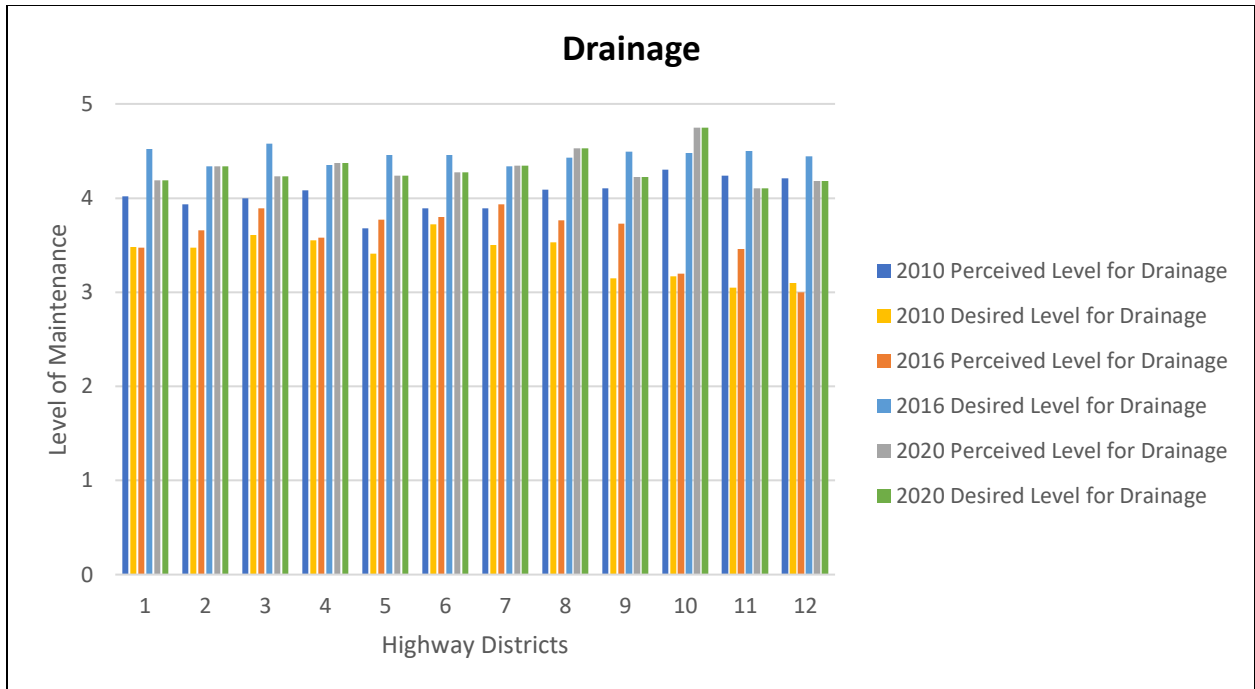


Figure 16 District Level Drainage Maintenance

Signs and Markings

The mean rating for sign maintenance was 4.07 (unchanged from 2016), while markings maintenance rated at 3.94, an increase from 3.87 in 2016. For both signs and markings, the desired maintenance level was 4.34 in 2020 (Figures 17 and 18). For signs, 76 percent of respondents scored the existing level of maintenance as either 4 or 5; 68 percent said the same for markings. These results are consistent with the 2010 and 2016 surveys (Figures 19 and 20). And for both signs and markings, slight inter-district variability in perceived and desired maintenance level was evident across all three surveys.

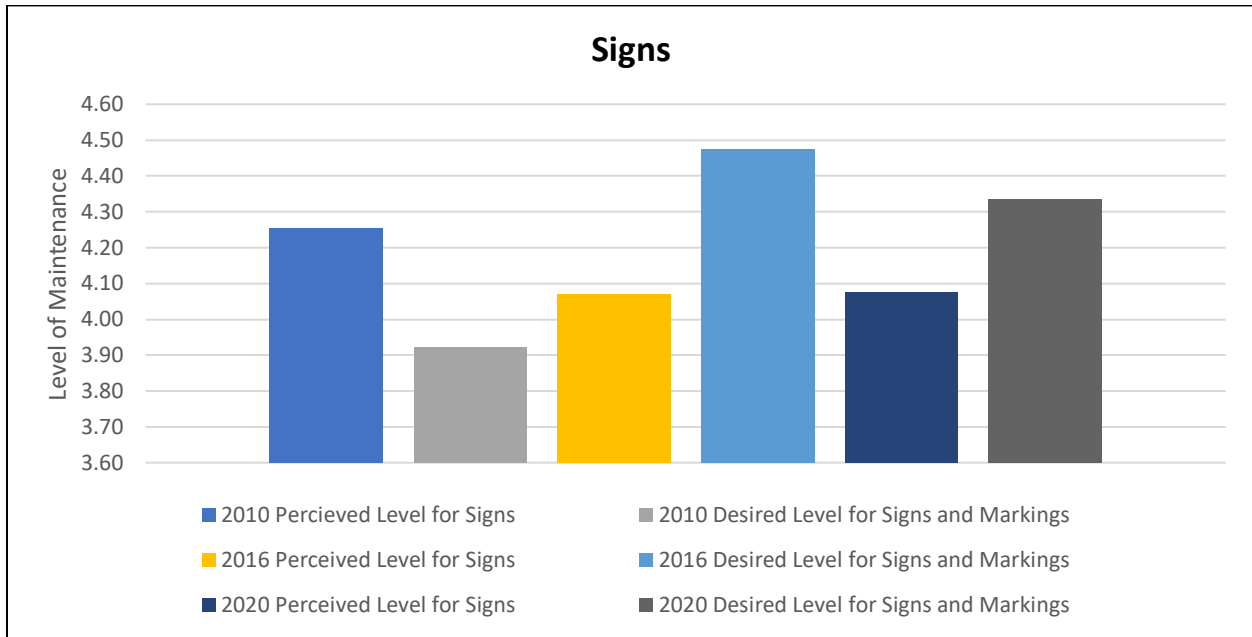


Figure 17 Statewide Summary of Maintenance for Signs

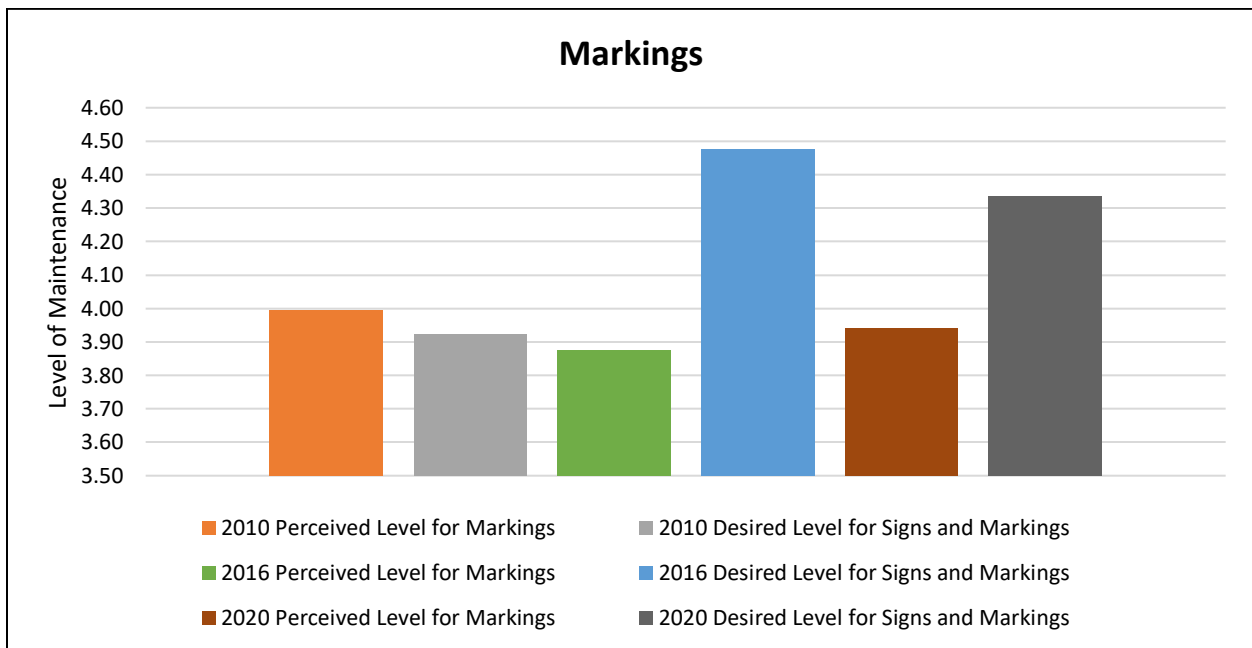


Figure 18 Statewide Summary of Maintenance for Markings

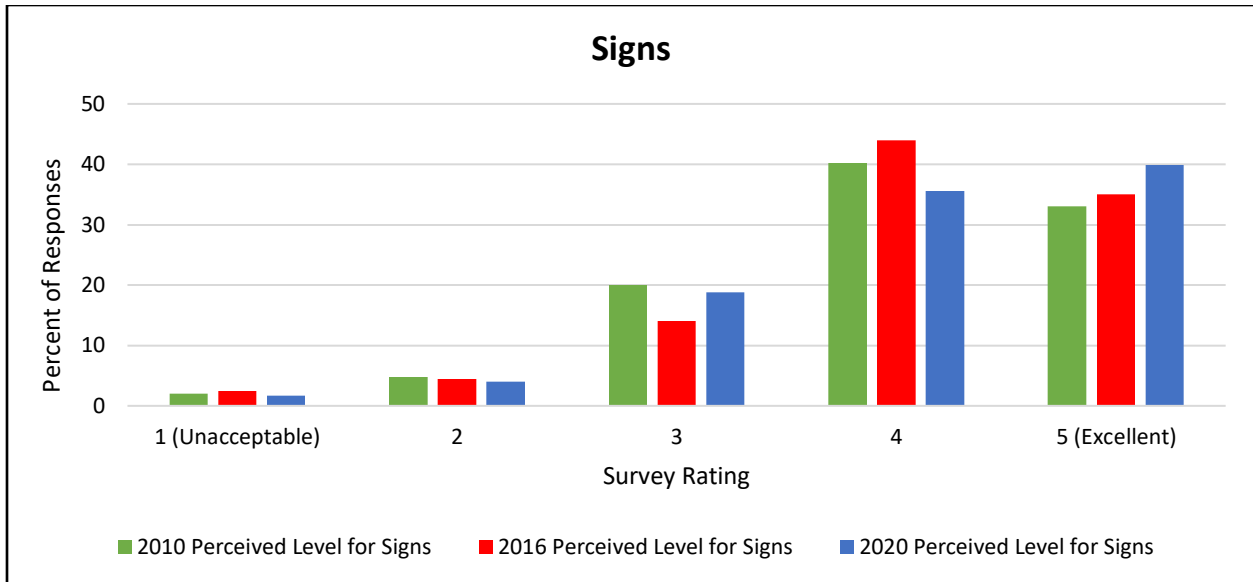


Figure 19 Distribution of Maintenance for Signs

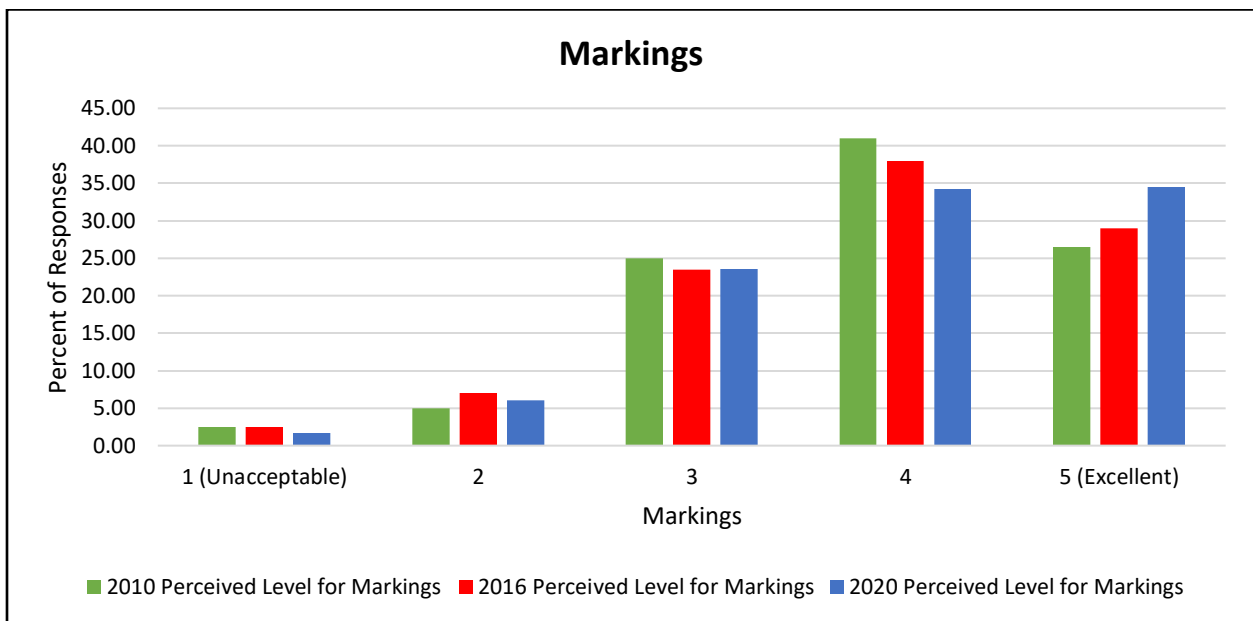


Figure 20 Distribution of Maintenance for Markings

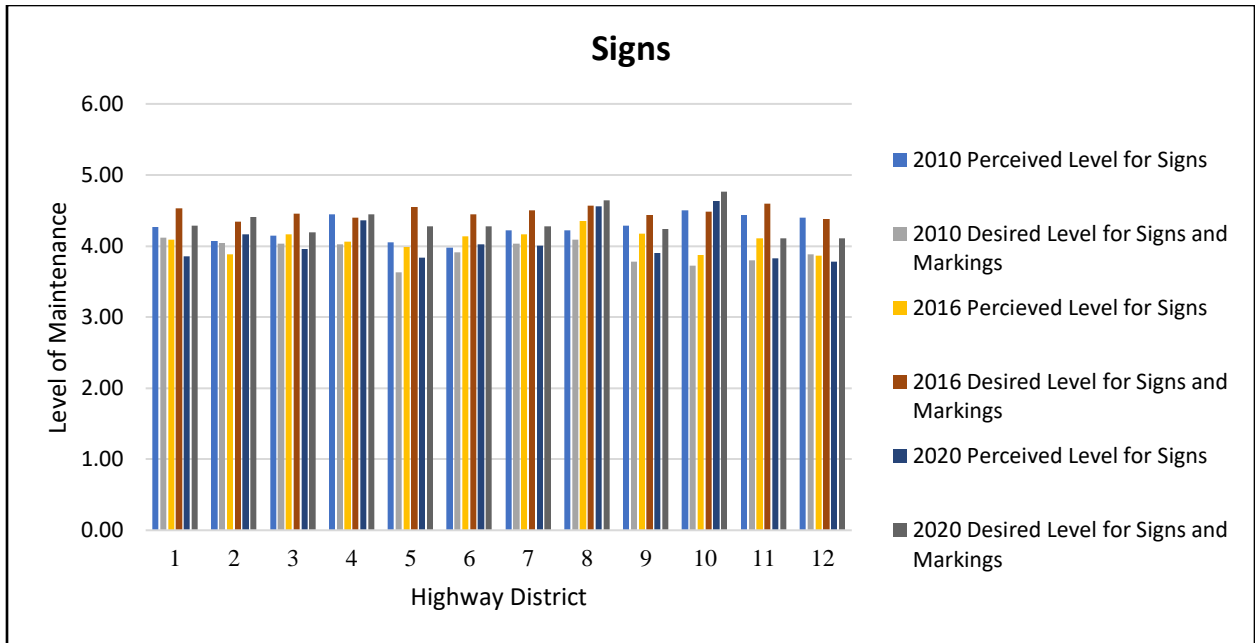


Figure 21 District Level for Signs

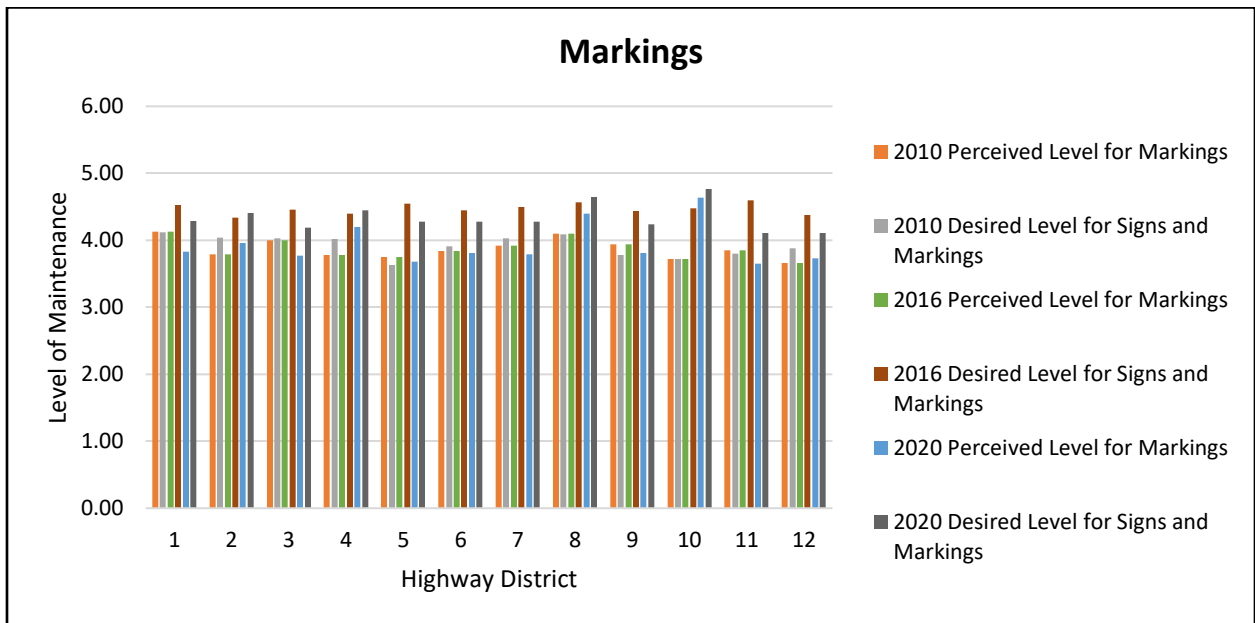


Figure 22 District Level for Signs and Markings

Overall Maintenance Summary

Customer perceptions of overall roadway maintenance have remained consistent since 2010. In all three surveys, between 55 and 60 percent of respondents rated overall road maintenance as a 4 or 5 (Figure 23). However, inter-district variability in perceptions was apparent across the three surveys (Figure 24). In 2020, Districts 8 and 10 were viewed most favorably.

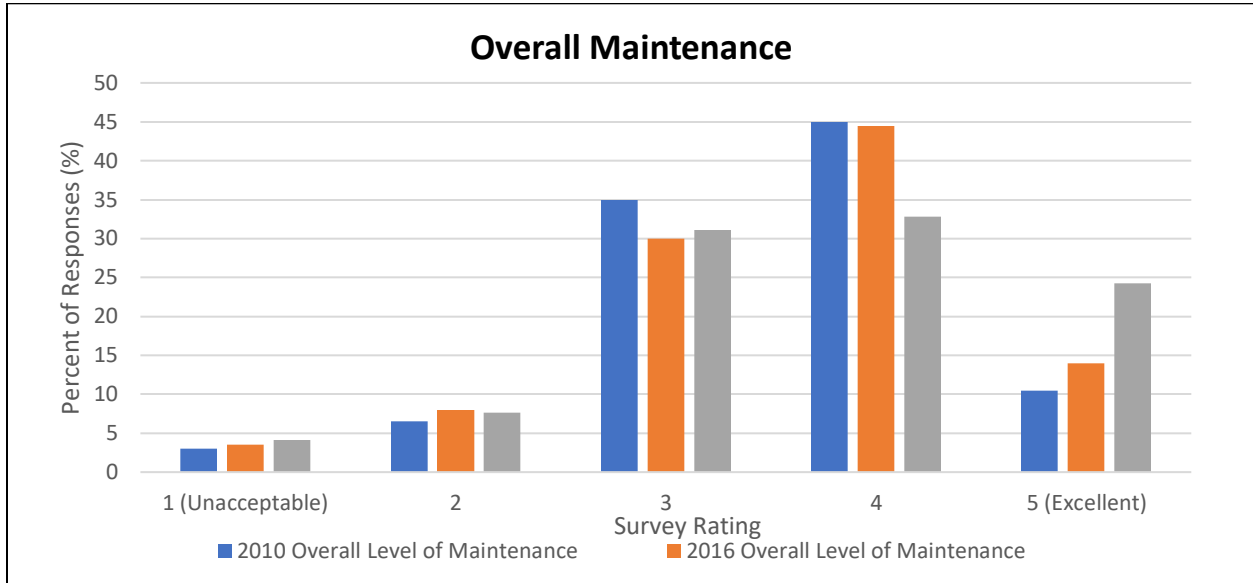


Figure 23 Distribution of Overall Maintenance

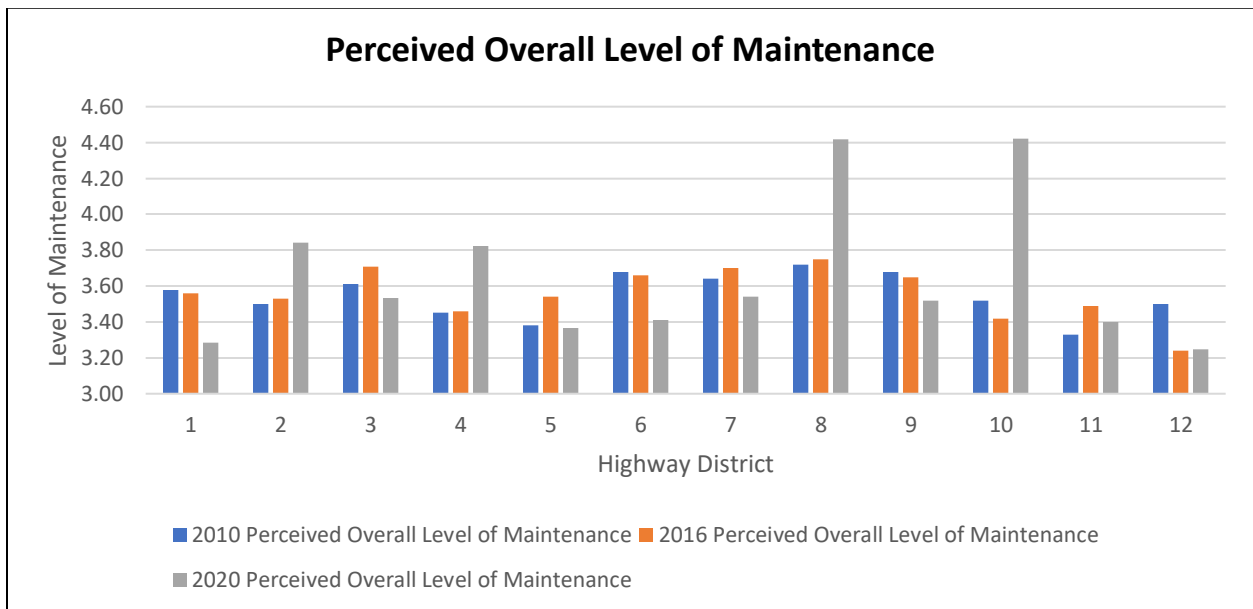


Figure 24 Summary of District Level Overall Maintenance Rating

In terms of where improvements can be made, a growing proportion of customers has identified pavements as warranting attention (Figure 25). Although 40 percent of respondents in 2010 said that surfaces and potholes were in greatest need of improvement, this grew to 53 percent in 2016 and to 67 percent in 2020. Just 7 percent of respondents in 2020 said that no specific area requires improvement. Scores in other areas were virtually unchanged across all three surveys. On the question of desired maintenance level, scores for all categories were consistent between 2010 and 2020 (Figure 26). Most respondents in 2020 pegged the desired maintenance level at 4 or 5 (Figure 27). Figures 28 and 29 capture the percentages of respondents who said that current levels of maintenance are excellent or unacceptable, respectively.

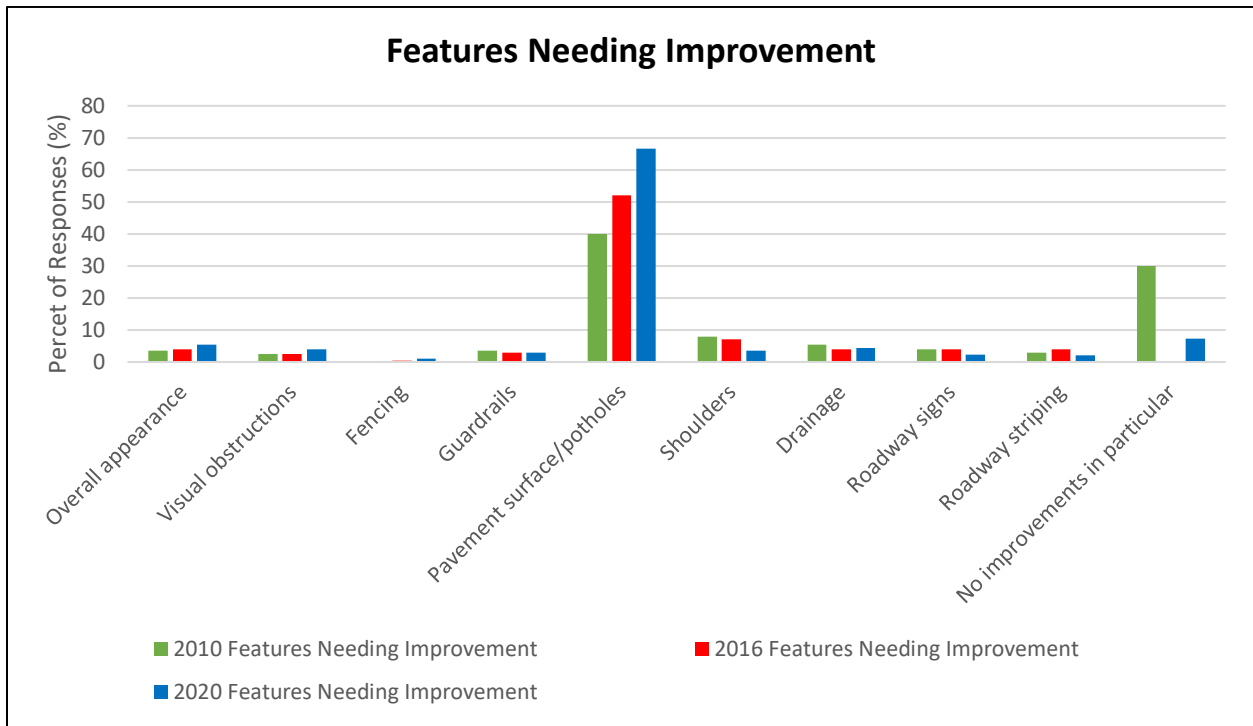


Figure 25 Summary of Features Needing Improvement

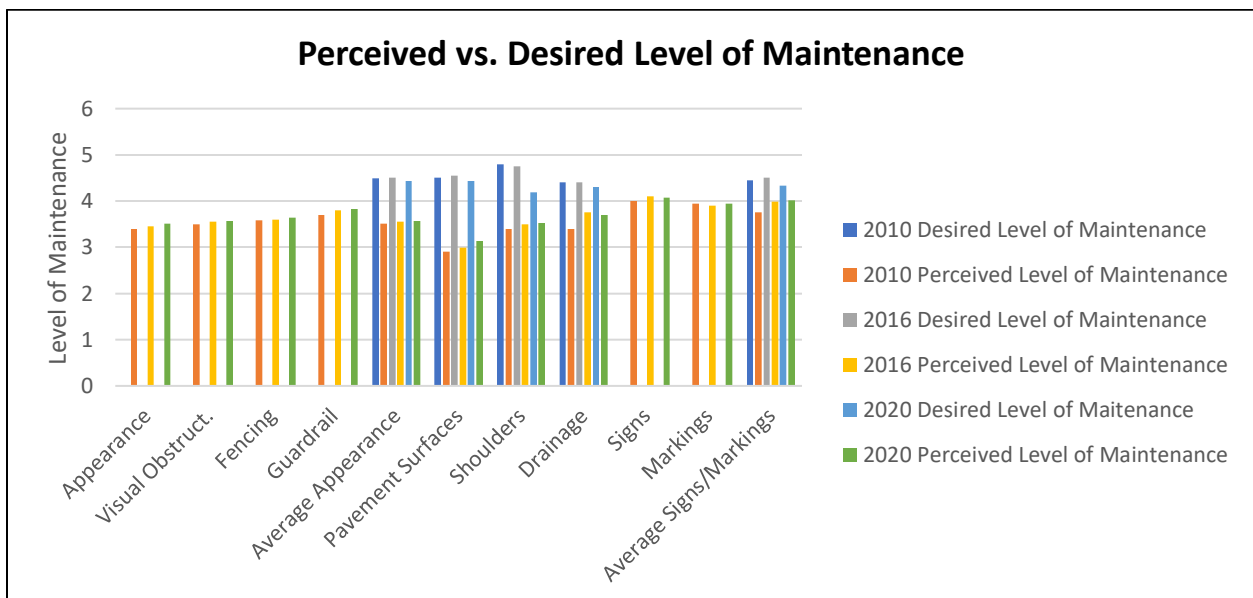


Figure 26 Comparison of Perceived and Desired Level of Maintenance

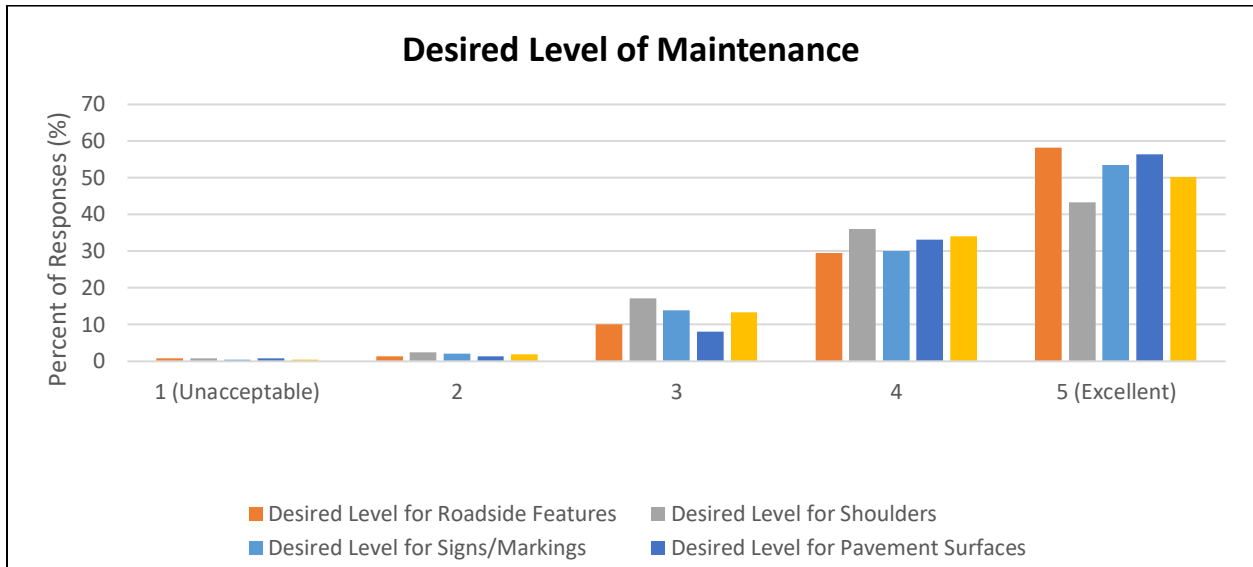


Figure 27 Distribution of Desired Level of Maintenance



Figure 28 Percentage of Responses with Excellent Rating for Existing Level of Maintenance

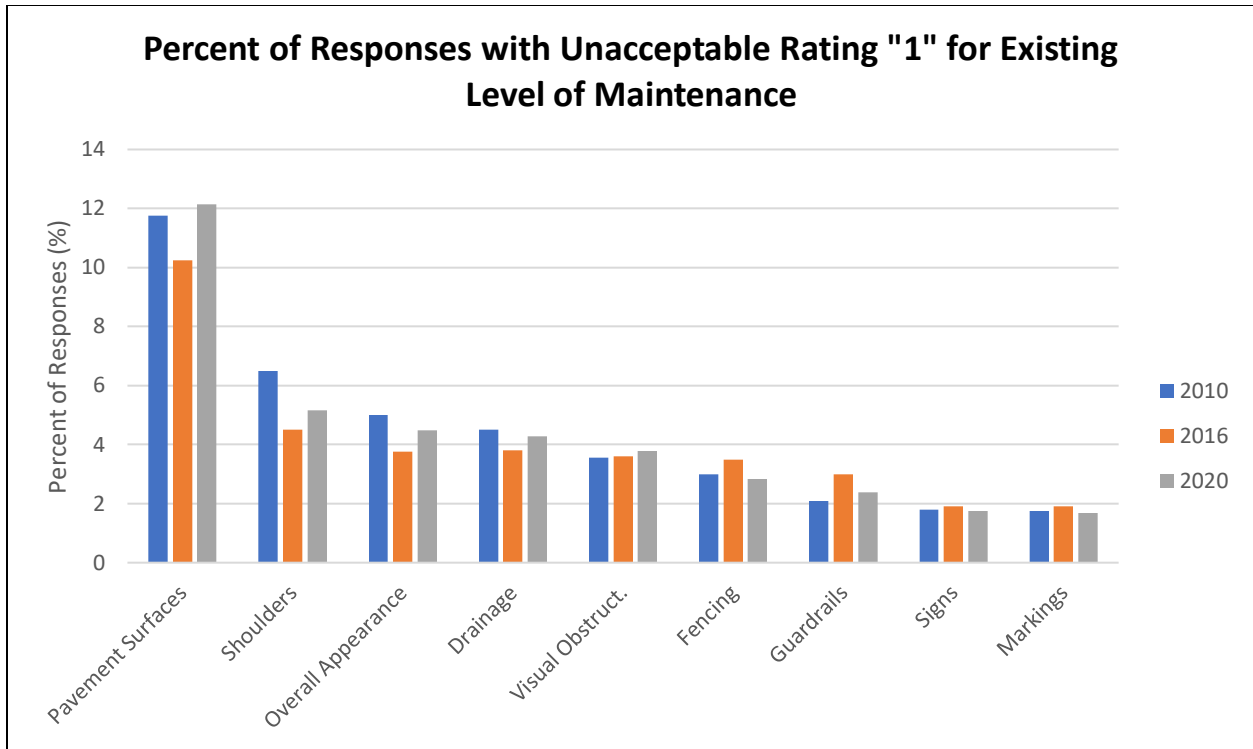


Figure 29 Percentage of Responses with an Unacceptable Rating for Existing Level of Maintenance

Spending Priorities Summary

Customer spending priorities in 2020 are summarized in Figure 30, while Figure 31 exhibits the percentages of respondents who assigned high priority (a score of 5) to different categories. Respondents generally prioritized investments in pavement surfaces, signs, markings. Overall, spending priorities changed little between 2010 and 2020. Pavements have consistently ranked highest on the priorities list.

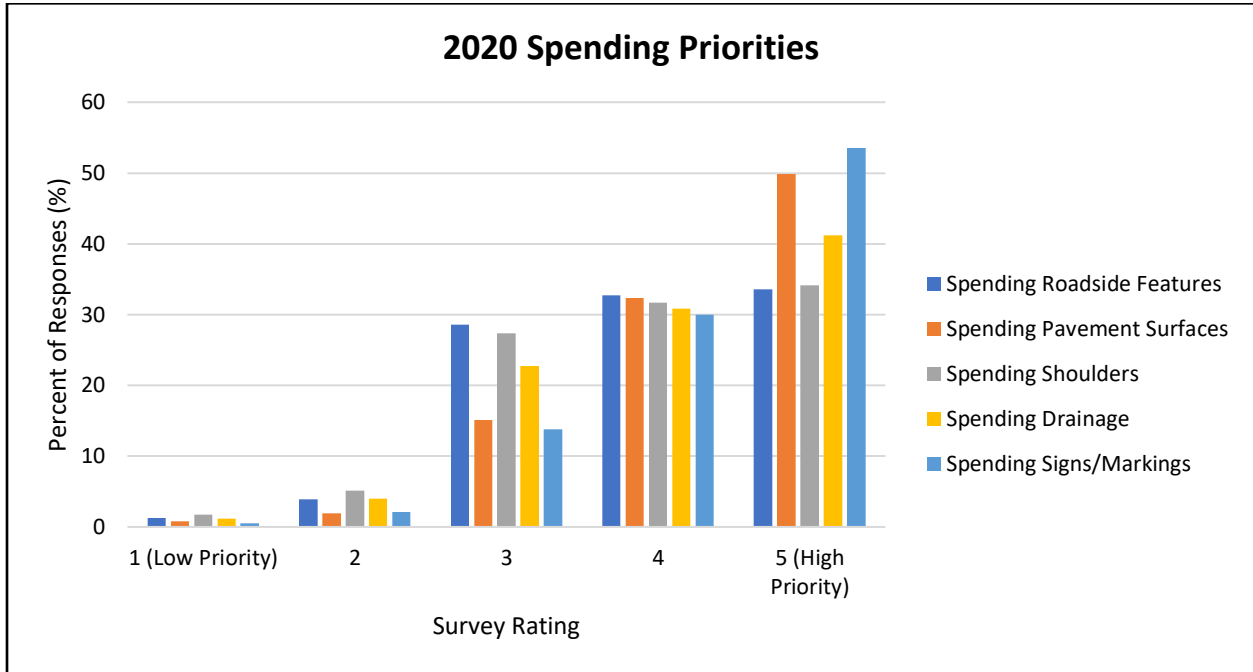


Figure 30 Distribution of Desired Level of Spending

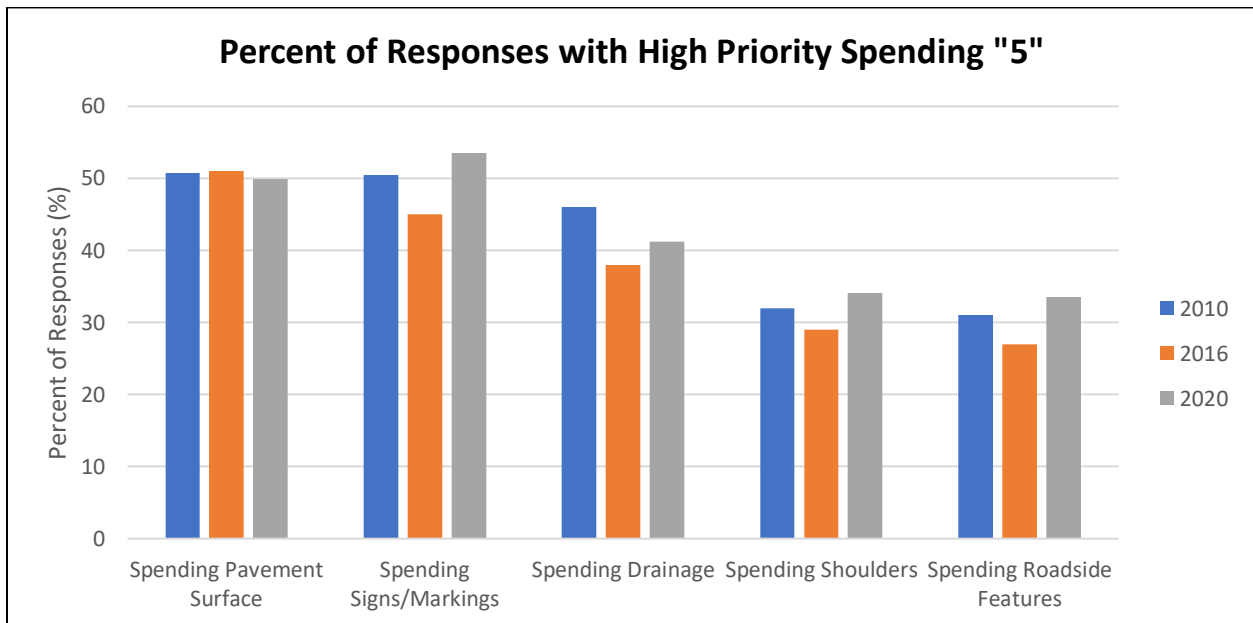


Figure 31 Summary of High Priority Spending "5"

Summary of Results on How the Public Obtains Travel Information — Statewide

Respondents answered several questions about obtaining information on travel conditions (e.g., weather, traffic congestion, traffic control situations, directions). Figures 32–37 summarize responses at the statewide level. Key findings:

- 46 percent of respondents prefer smartphone apps for travel directions, followed traditional GPS units (21 percent) and web browsers (14 percent) (Figure 32).
- 77 percent of respondents have used directions for travel conditions (Figure 33).
- 37 percent of respondents use directions from their preferred source when taking long trips. 26 percent rely on directions for everyday travel, and 16 percent use them when stuck in traffic jams (Figure 34).
- 36 percent of respondents rated online services like Google and Waze as their most trusted source of traffic information, followed 22 percent identifying government sources. Traditional media outlets (television or radio) were pinpointed by just 21 percent as their favored source (Figure 35).
- 71 percent of respondents prefer to acquire traffic control information via smartphones. They were followed by traditional media (television or radio) (12 percent) and roadside message signs (9 percent) (Figure 36).
- A plurality of respondents (39 percent) said that traditional media remains their go-to source for road weather conditions. Other popular choices were online services like Google and Waze (24 percent) and government services (19 percent) (Figure 37).

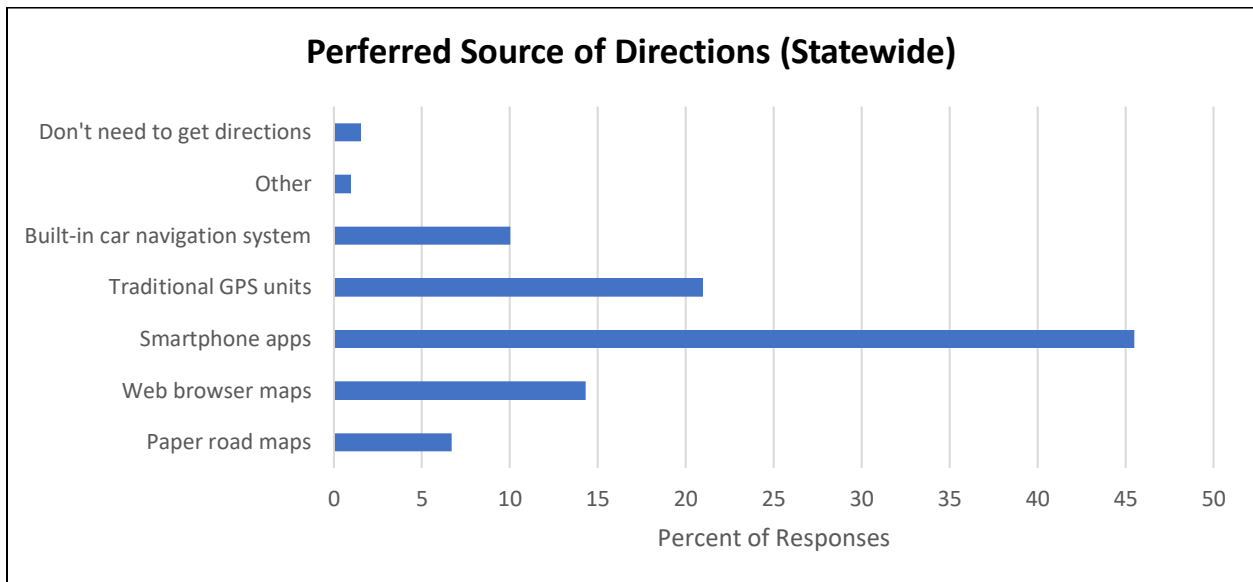


Figure 32 Summary of Preferred Sources of Directions

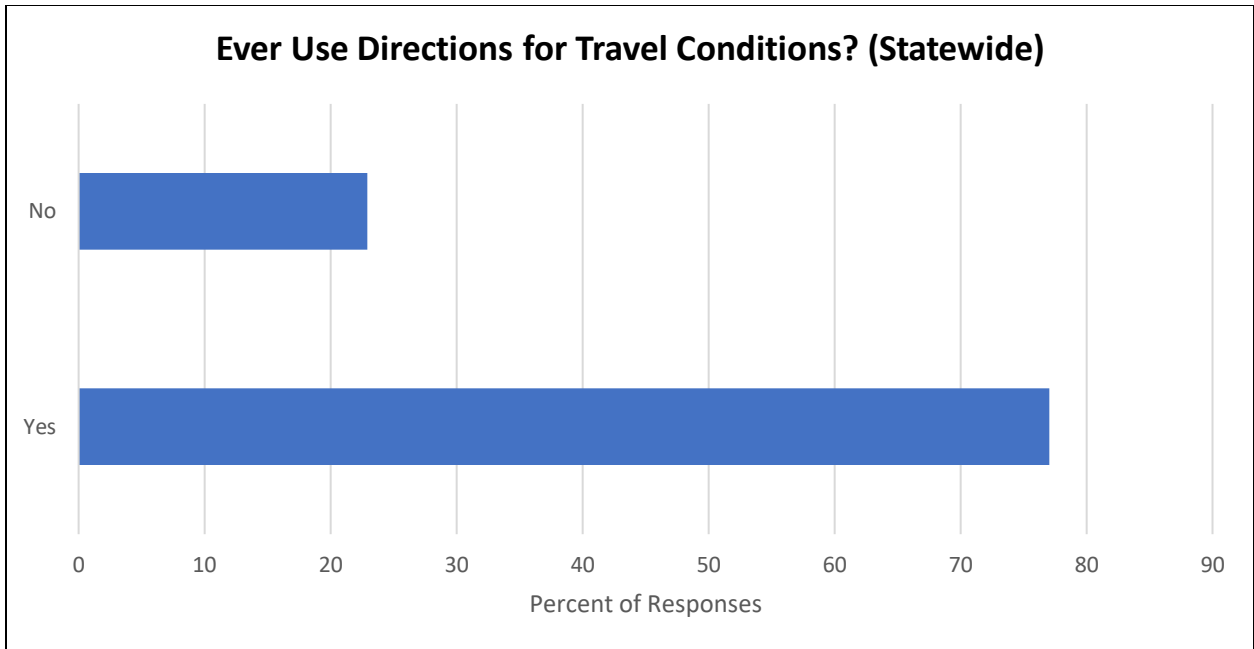


Figure 33 Summary of Questions for the Use of Directions for Travel Conditions — Statewide

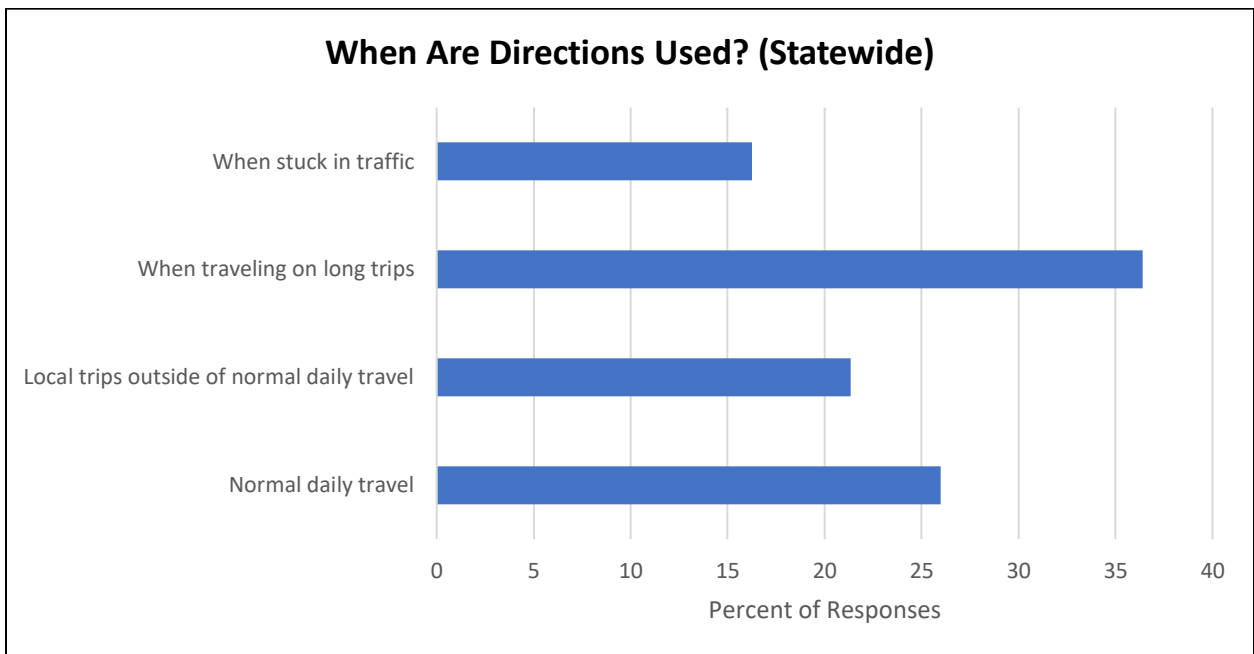


Figure 34 Summary of When travel Directions Are Used — Statewide

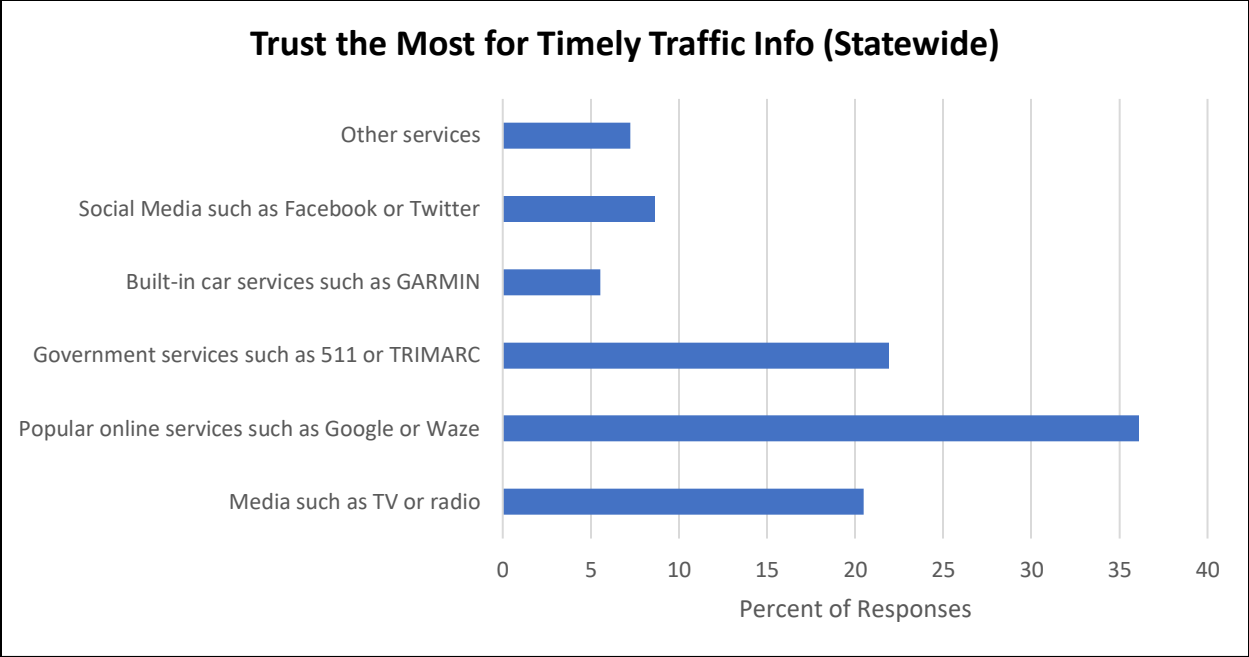


Figure 35 Summary for Most Trusted Source for Timely Traffic Information — Statewide

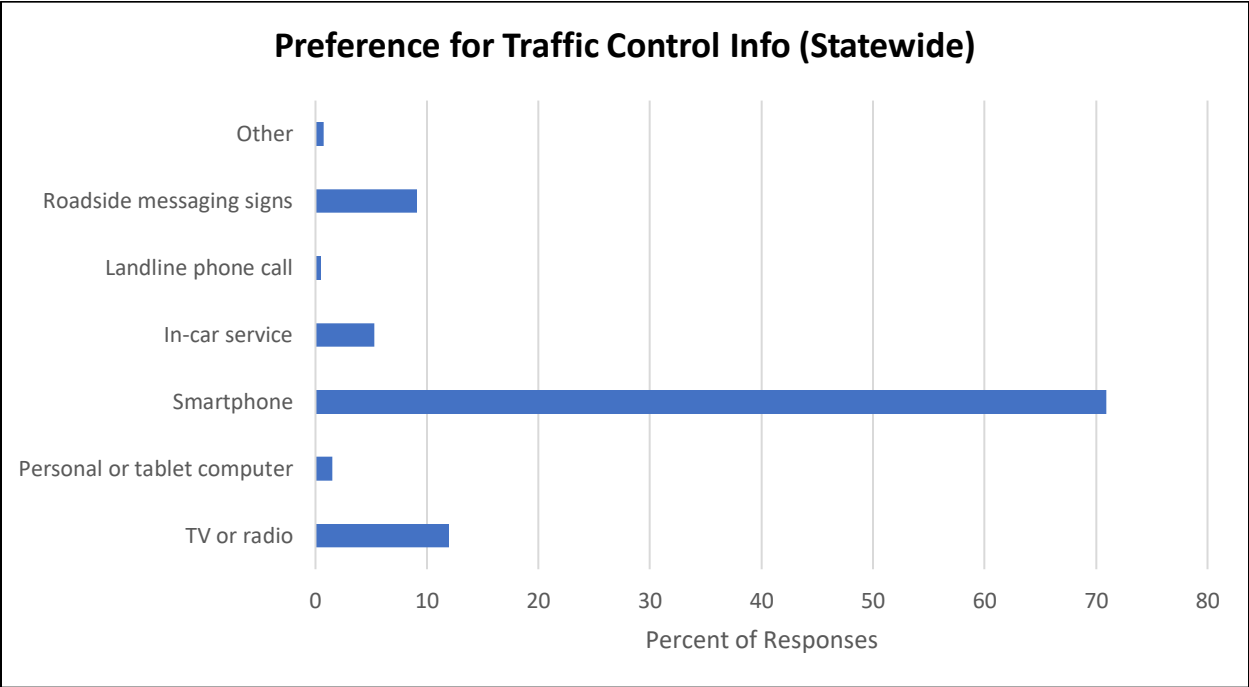


Figure 36 Summary of Preferences for Traffic Control Information — Statewide

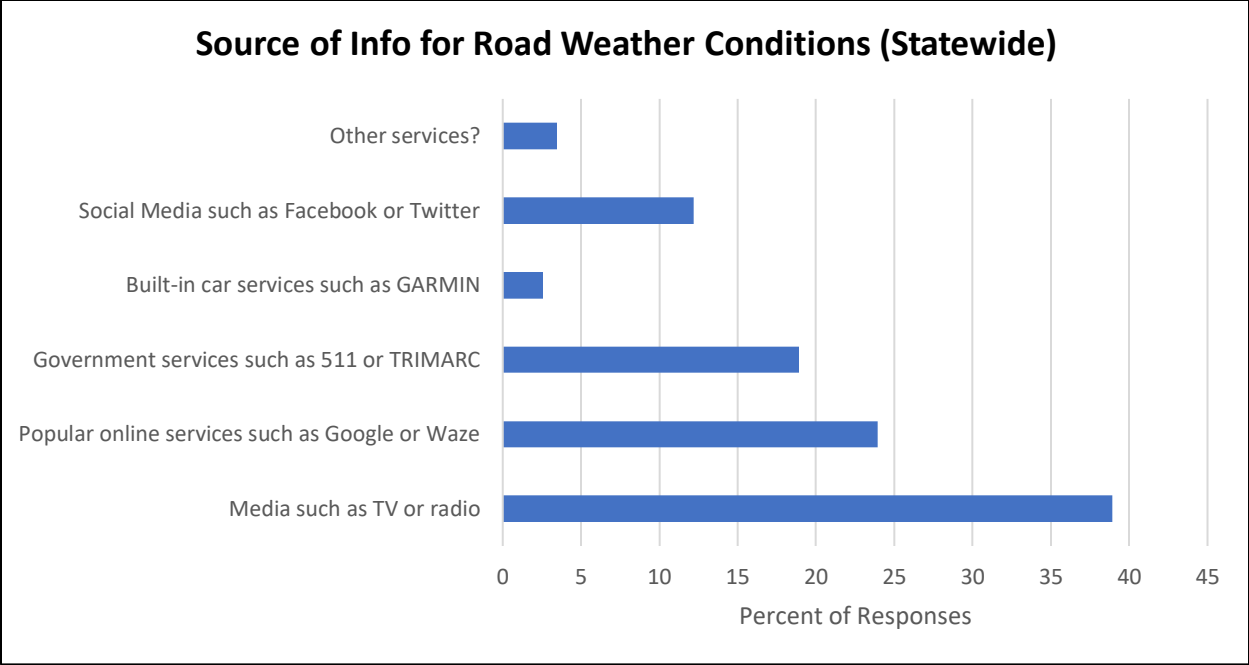


Figure 37 Summary of Preferences for Information for Road Weather Conditions — Statewide

Summary of Results on How the Public Obtains Travel Information — District Level

Responses are broken down at the district level. Answers were generally consistent across districts, but a few outliers are worth noting:

- Respondents from Districts 8 and 10 reported using traditional GPS at a slightly higher rate than those in the state’s other districts (Figure 38).
- Respondents from Districts 4, 8, and 10 rely on travel directions at a slightly higher rate than drivers in other districts (Figure 39).
- There was little inter-district variability on the question about whether respondents ever used directions for travel conditions (Figure 40).
- Greater inter-district variability was observed on most trusted sources for traffic information. Respondents from Districts 4, 8, and 10 are more likely to rely on government services, whereas drivers elsewhere opt for popular online services like Google or Waze (Figure 41).
- Across all districts, respondents prefer to use smartphone apps to obtain traffic information and acquire updates on weather impacts (Figures 42 and 43). This represents a significant change from 2106, when most people still depended on traditional media for this information.

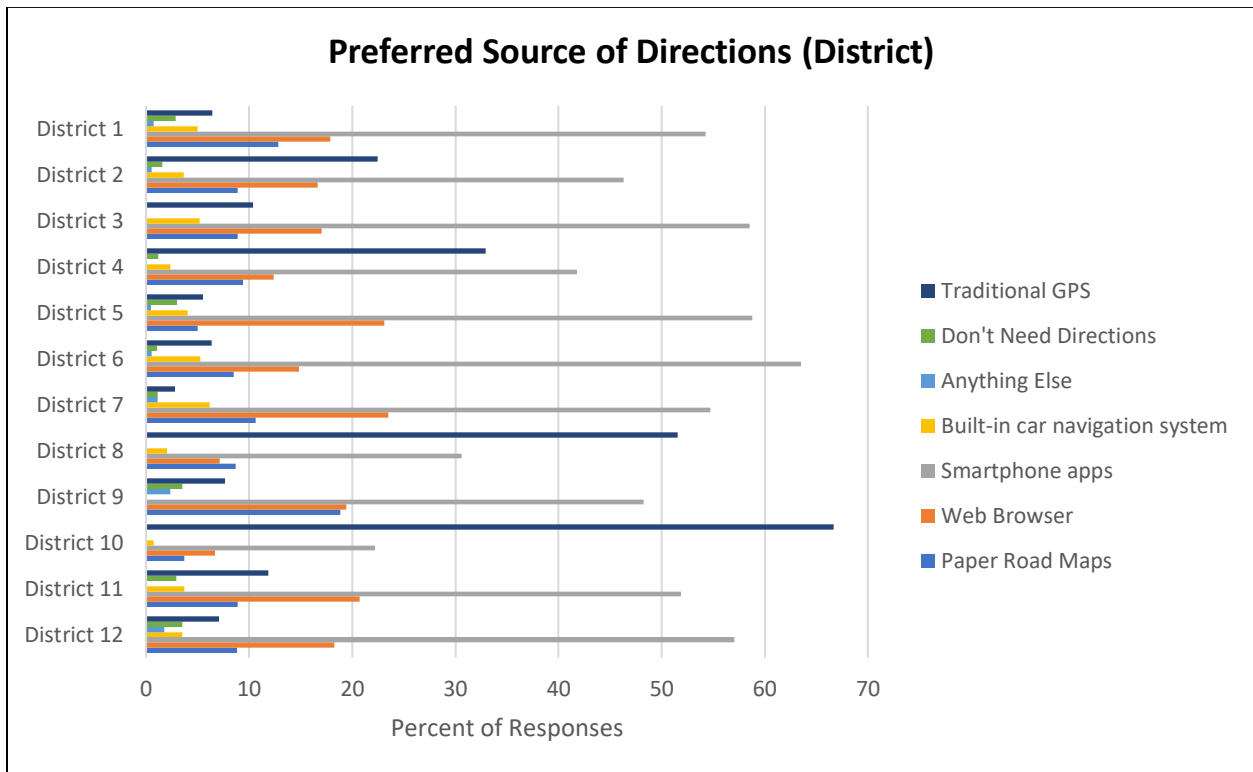


Figure 38 Summary of Preferred Sources of Directions by District

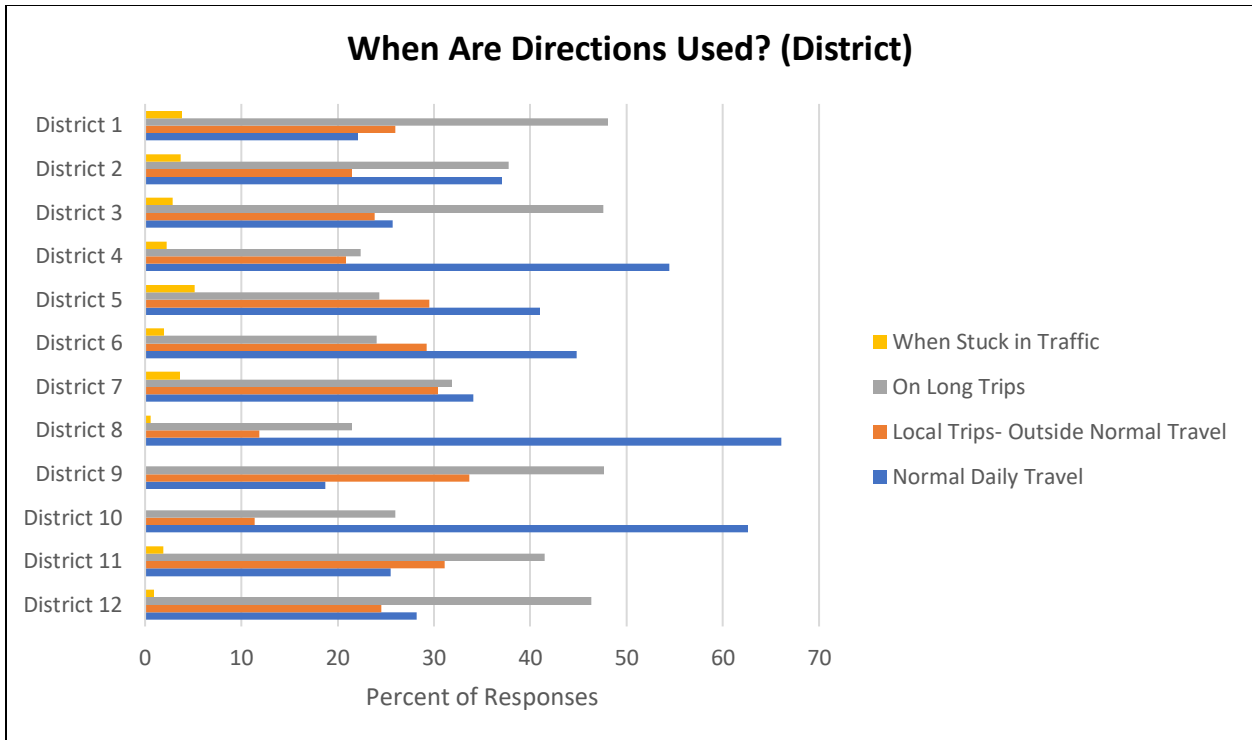


Figure 39 Summary of Preferred Sourced of Directions by District

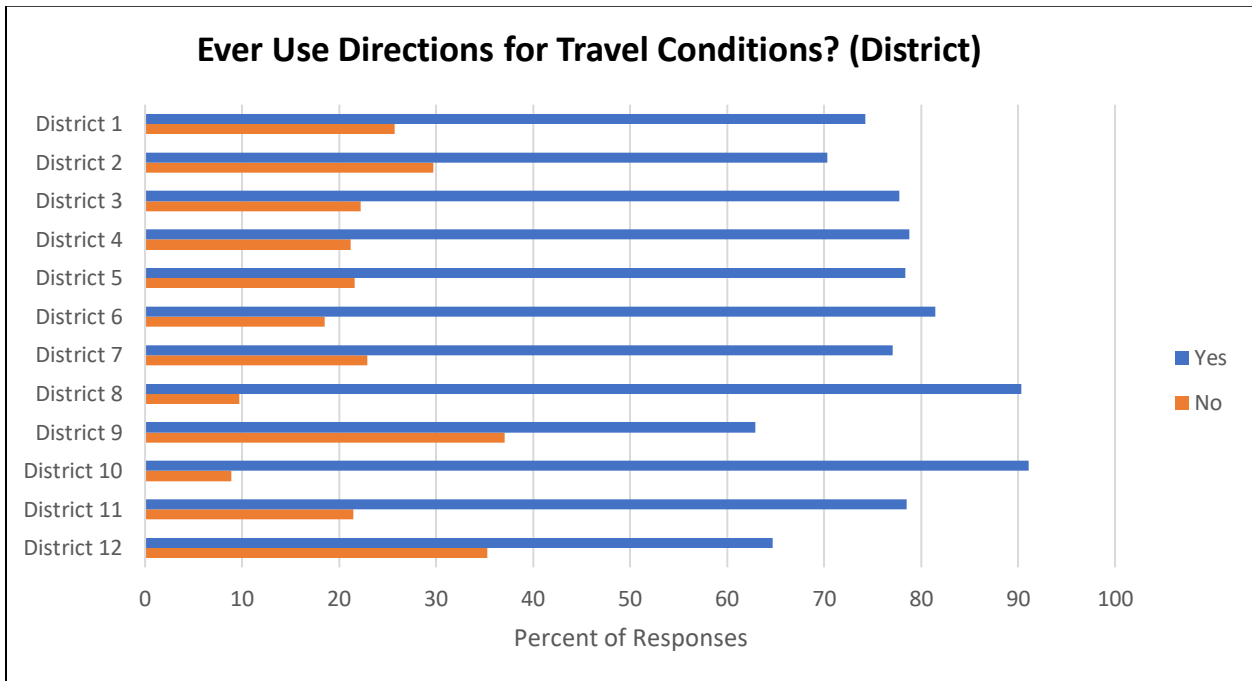


Figure 40 Summary for the Use of Directions for Travel Conditions by District

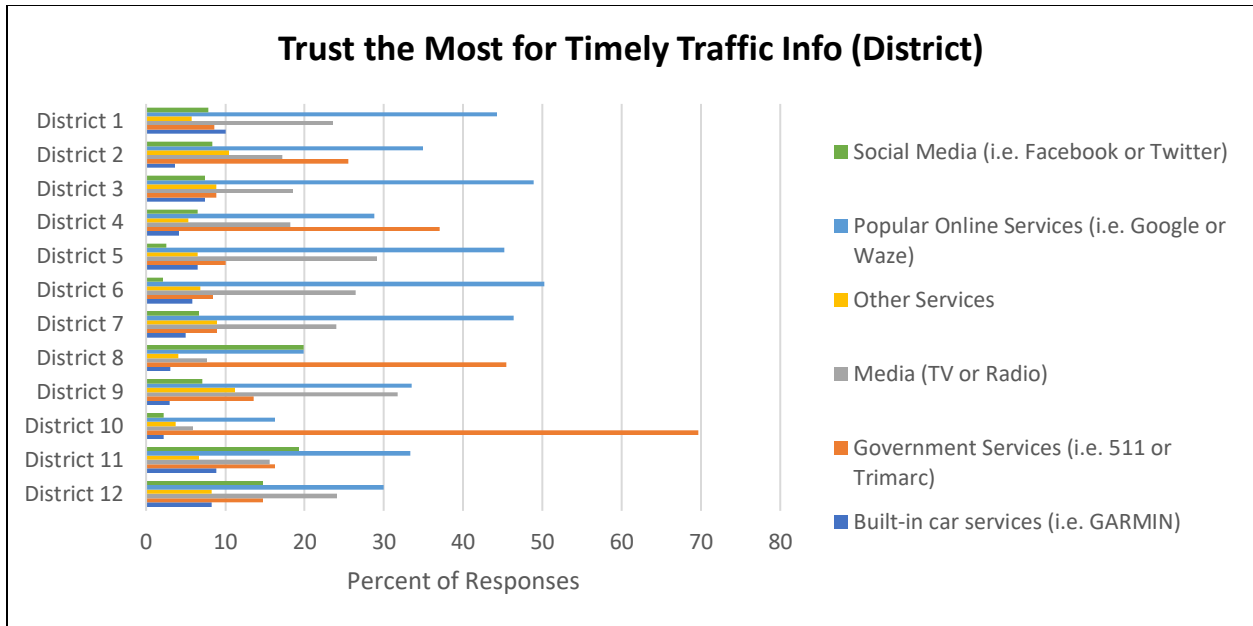


Figure 41 Summary for Most Trusted Source for Timely Traffic Information By District

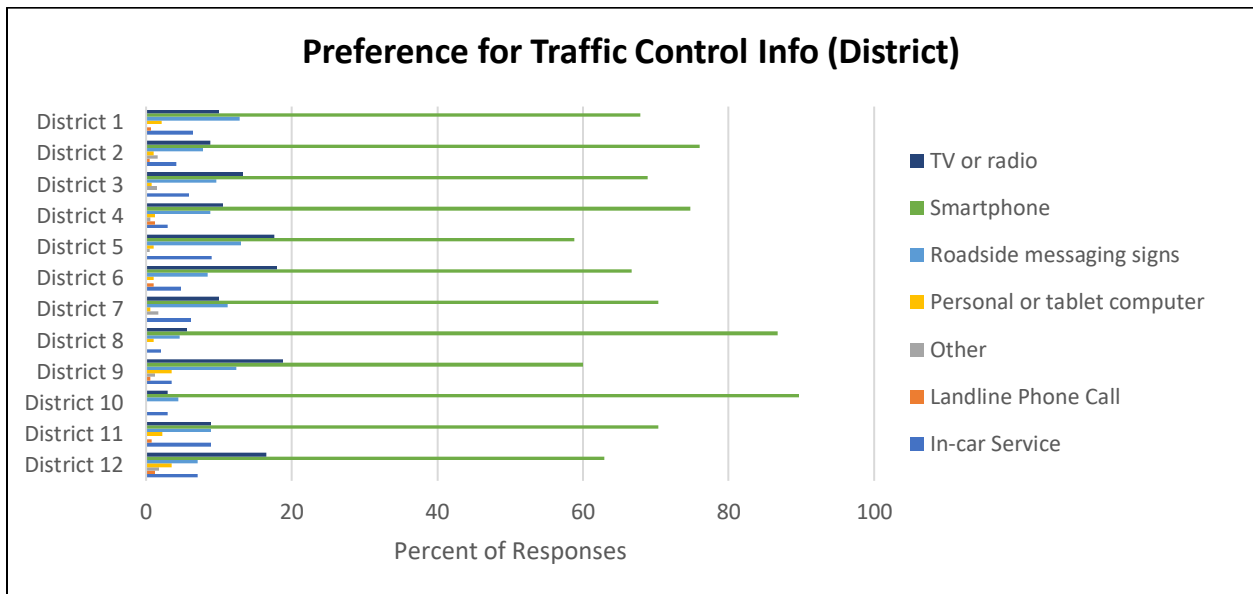


Figure 42 Summary of Preferences for Traffic Control Information by District

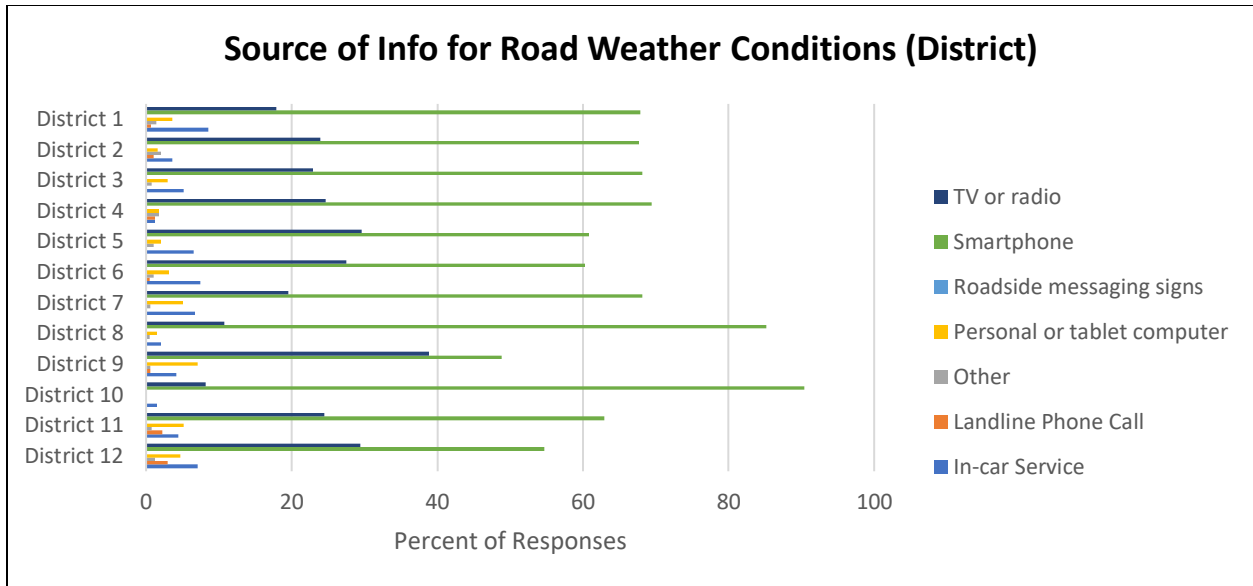


Figure 43 Summary of Preferences for Information for Road Weather Conditions by District

General Conclusions

Based on our analysis of 2010, 2016, and 2020 survey data, the following conclusions emerge:

- 2020 survey results are broadly similar to the 2016 and 2010 survey findings.
- Perceptions of maintenance level and desired level of maintenance do not vary significantly between districts.
- Drivers increasingly rely on smartphone apps and other online services to obtain traffic and weather data. Traditional media outlets are no longer remain the most critical source of information.

Appendix A — List of Survey Questions

Screening and Demographics

1. Are you a licensed driver 18 or older?
 - Yes
 - No
2. Have you driven on a Kentucky highway within the last 60 days?
 - Yes
 - No
3. Average miles driven per week
 - Less than 50
 - 50-100
 - 100-200
 - 200-300
 - 300-400
 - 400-500
 - More than 500
4. Gender
 - Male
 - Female
5. Age
 - Under 18
 - 18-24
 - 25-34
 - 35-44
 - 45-54
 - 55-64
 - 65-74
 - 75-84
 - 85 or older
6. Education
 - Less than high school
 - High school graduate
 - Some college
 - 2 year degree
 - 4 year degree
 - Professional degree
 - Doctorate
7. Please provide your county of residence:
 - Adair (1) Woodford (120)

Roadside Features

8. Now we would like to ask your opinion about the maintenance of roadside features such as general appearance, fencing, guardrails and visual obstructions along Kentucky's highways. On a scale of 1 to 5

where 1 means Unacceptable and 5 means Excellent, how would you rate the level of maintenance or upkeep for the overall appearance of Kentucky's roadways?

- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
9. How would you rate the level of maintenance for visual obstructions at intersections or curves, and vertical clearance of roadways?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
10. How would you rate the level of maintenance for fencing along the state right-of-way?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
11. Where guardrail is already installed, how would you rate the level of maintenance for guardrail assuming its effectiveness is not compromised?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
12. What do you believe the level of maintenance should be for roadside features?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
13. On a scale of 1 to 5 with 1 meaning Low Priority and 5 meaning High Priority, what do you believe the spending priorities should be for roadside features?
- 1- Low Priority
 - 2
 - 3
 - 4
 - 5- High Priority

Pavement Surfaces

14. Now thinking about pavement surface of Kentucky highways, on a scale of 1 to 5 where 1 means Unacceptable and 5 means Excellent, how would you rate the level of maintenance for pavement surfaces and potholes?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
15. What do you believe the level of maintenance should be for pavement surface?
- 1- Unacceptable
 - 2

- 3
 - 4
 - 5- Excellent
16. On a scale of 1 to 5 with 1 meaning Low Priority and 5 meaning High Priority, what do you believe the spending priority should be for pavement surface?
- 1- Low Priority
 - 2
 - 3
 - 4
 - 5- High Priority

Shoulders

17. Now thinking about shoulders on Kentucky highways, on a scale of 1 to 5 where 1 means Unacceptable and 5 means Excellent, how would you rate the level of maintenance for highway shoulders where a smooth level surface is available to pull off if desired?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
18. What do you believe the level of maintenance should be for shoulders to provide a smooth surface to pull over?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
19. On a scale of 1 to 5 with 1 meaning Low Priority and 5 meaning High Priority, what do you believe the spending priority should be for shoulders?
- 1- Low Priority
 - 2
 - 3
 - 4
 - 5- High Priority

Roadside Drainage

20. Now thinking about drainage of Kentucky highways, on a scale of 1 to 5 where 1 means Unacceptable and 5 means Excellent, how would you rate the level of maintenance for roadside drainage?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
21. What do you believe the level of maintenance should be for drainage?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
22. On a scale of 1 to 5 with 1 meaning Low Priority and 5 meaning High Priority, what do you believe the spending priority should be for roadside drainage?
- 1- Low Priority
 - 2

- 3
- 4
- 5- High Priority

Signs and Markings

23. Now thinking about signs and markings of Kentucky highways, on a scale of 1 to 5 where 1 means Unacceptable and 5 means Excellent, how would you rate the level of maintenance for roadway signs?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
24. How would you rate the level of maintenance for roadway striping?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
25. What do you believe the level of maintenance should be for signs and markings?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
26. On a scale of 1 to 5 with 1 meaning Low Priority and 5 meaning High Priority, what do you believe the spending priority should be for signs and markings?
- 1- Low Priority
 - 2
 - 3
 - 4
 - 5- High Priority

Overall Level of Maintenance

27. Finally, on a scale of 1 to 5 where 1 means Unacceptable and 5 means Excellent, how would you rate the overall level of maintenance on Kentucky Highways?
- 1- Unacceptable
 - 2
 - 3
 - 4
 - 5- Excellent
28. Of the Kentucky highway features for which I asked you to rate the level of maintenance, is there one you particularly feel needs improvement?
- Overall Appearance
 - Visual Obstructions
 - Fencing
 - Guardrails
 - Pavement Surface/Potholes
 - Shoulders
 - Drainage
 - Roadway Signs
 - Roadway Striping
 - No Improvements in Particular
29. What improvements would you suggest for the maintenance of the feature you selected?

Driving Directions and Traffic Conditions

30. When you need to find driving directions, which of the following do you use: (select all that apply)
- Paper Road Maps
 - Web Browser Maps
 - Smartphone Apps
 - Traditional GPS Units
 - Built-in Car Navigation Systems
 - Other
 - Don't Need to Get Directions
31. If you answered other, please list what you use:
-
32. Do you ever use or look for traffic condition information when traveling?
- Yes
 - No
33. During what types of travel do you use this information:
- Normal Daily Travel
 - Local Trips Outside of Normal Daily Travel
 - When Traveling on Long Trips
 - When Stuck in Traffic
34. Which of the following do you MOST trust to provide accurate and timely traffic conditions:
- Media such as TV or Radio
 - Popular Online Services such as Google or Waze
 - Government Services such as 511 or TRIMARC
 - Built-in Car Services such as GARMIN
 - Social Media such as Facebook or Twitter
 - Other Services
35. If you selected other services, please list that service or source here:
-
36. How would you PREFER to get traffic control information:
- TV or Radio
 - Personal or Tablet Computer
 - Smartphone
 - In-Car Services
 - Landline Phone Call
 - Roadside Messaging Signs
 - Other
37. If you selected other services, please list that service or source here:
-

Road Conditions

38. If you want to check on road conditions affected by weather, such as snow or flooding, where do you currently get your information?
- Media such as TV or Radio
 - Popular Online Services such as Google or Waze
 - Government Services such as 511 or TRIMARC
 - Built-in Car Services such as GARMIN
 - Social Media such as Facebook or Twitter
 - Other Services
39. If you selected other services, please list that service or source here:
-
40. How would you PREFER to get information about road conditions affected by weather?

- TV or Radio
- Personal or Tablet Computer
- Smartphone App
- In-Car Service
- Landline Phone Call
- Other

41. If you selected other, please list that service or source here:

42. The State of Kentucky operates a 511 service that lets drivers' access travel information via phone, website, or a mobile smartphone app. Over the PAST 12 MONTHS, have you gotten traffic information from any of Kentucky's 511 services?

- Yes
- No