



# Kansas LTAP Fact Sheet

A Service of Kansas University Transportation Center for Road, Street & Bridge Agencies

## Smarter, Safer Roadways: Road Diets for Rural Communities

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**A** buzz word among transportation professionals today is “diet,” specifically the “road diet.” It has become an increasingly popular strategy to increase multi-modal road use and improve safety in urban areas, and it is starting to get some traction in small and rural communities. This article addresses pros and cons of road diet projects, feasibility, and community benefits to give local governments the necessary information to determine if road diets, or the underlying concepts, have a place in their communities.

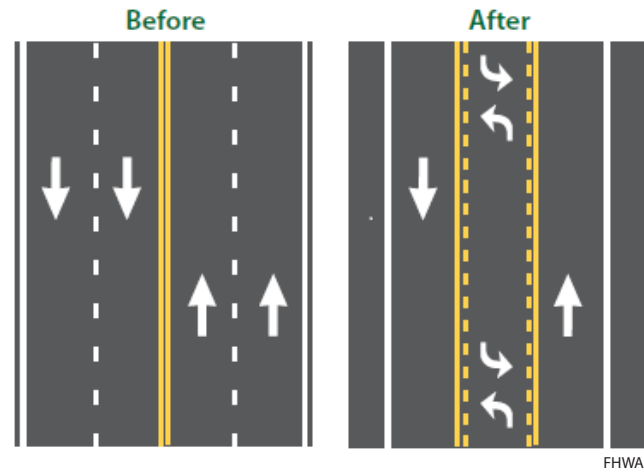
### What is a Road Diet?

Roadways without medians or other separation between opposing lanes of traffic often experience a relatively high number of crashes, especially between high-speed through-traffic, left-turning vehicles, and other road users. One safety countermeasure is the road diet, which typically involves removing or narrowing vehicle lanes and utilizing the space for other uses, such as a two-way left-turn lane, bike lanes, or parking.<sup>2</sup> Figure 1 shows the addition of a center two-way left-turn lane and wider shoulders.

### Fact or Myth: Road Diets Make Traffic Worse

There is a common misconception that reducing the number of through-lanes on a multi-lane roadway (as when implementing a road diet) will cause congestion. This is not true when road diets are utilized strategically in the proper location and with the correct application.<sup>3</sup> To determine if a road diet makes sense for a specific area, consider the following:

- Is the four-lane roadway already operating like a three-lane road (i.e. heavy left-turn movements)?
- Are the traffic volumes sufficiently low for a road diet to be implemented successfully, without lowering the Level-of-Service (LOS), or ability to move traffic?



■ ■ ■ *Figure 1. This road was reconfigured from four through-traffic lanes to two through-traffic lanes with a center two-way left-turn lane and wider shoulders.<sup>1</sup>*

(Specific traffic volume thresholds are detailed in the next section.)

- Do controlled intersections along the road determine the effective capacity of the roadway (e.g. signalized intersections or stop signs)?
- Can a road diet help overall LOS? LOS measurements should account for all road users, not just motorists (e.g. bicyclists and pedestrians). Trading off a little vehicular capacity to benefit other road users may be worth it in terms of safety and connectivity.

### When is a Road Diet Appropriate?

Several transportation agencies, along with the Federal Highway Administration (FHWA), have developed traffic volume guidelines for assessing road diet viability and minimizing traffic disruption. Traffic volume thresholds for a 4-lane undivided roadway are:



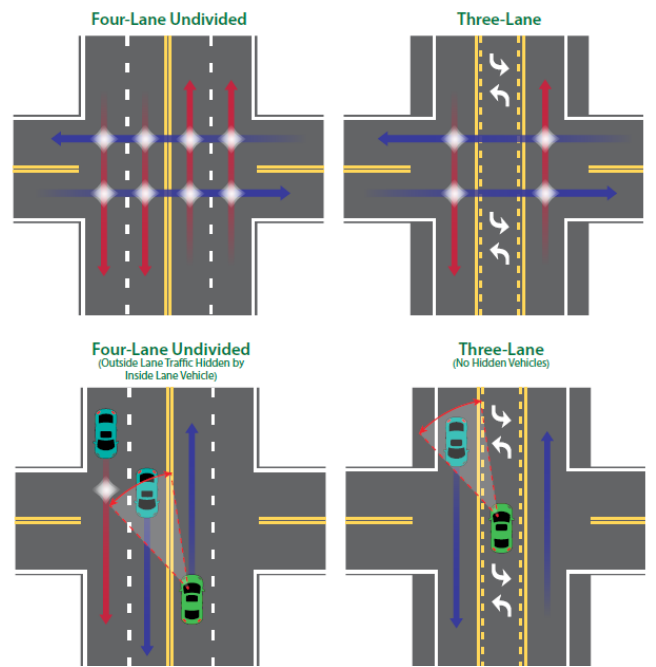
- Less than 10,000 ADT (Average Daily Traffic): Great candidate in most cases; capacity will most likely not be affected.
- 10,000 – 15,000 ADT: Good candidate in many cases. Conduct intersection analysis and consider signal retiming to determine any effect on capacity.
- 15,000 – 20,000 ADT: Good candidate in some cases. Conduct a corridor analysis. Capacity may be affected depending on the “before” condition.
- Greater than 20,000 ADT: Complete a feasibility study to determine whether this is a good candidate. There are some examples nationwide that road diets have been successful with ADTs as high as 26,000. Capacity may be affected.<sup>5</sup>

Other types of data that may be useful in a road diet feasibility study include: lane widths, speed limits, crash data, land use, number of access points, and road surface type.

### Factors to Consider

LOS is one measure of road diet suitability, but the overall considerations, as with any road project, are safety, cost efficiency, and quality of life.

*Safety* – Road diets can make the roadway environment safer for all users by reducing the number of conflict points, potentially reducing crash frequency. Figure 2 identifies conflict points before and after a road diet.



■ ■ ■ Figure 2. This road diet reduces the number of cross-traffic conflict points from eight to four (top) and improves visibility for left-hand turns (bottom).<sup>4</sup>

*Cost efficiency* – Road diets make efficient use of the existing roadway cross-section, accommodating other modes (sidewalks, bike lanes) without having to acquire additional right-of-way. They can be implemented in conjunction with planned reconstruction or overlay projects to maximize safety and operational benefits, often at only the cost of restriping.

■ ■ ■ Figure 3. Pros and Cons of Road Diets<sup>6</sup>

Road Diet Pros	Road Diet Cons
<b>Slows Traffic:</b> Road diets can eliminate speeding and merge-and-weave driving. Slower traffic in downtown areas encourages shopping/economic development and cautious driving.	<b>Slows Traffic:</b> All through-traffic in one direction must travel in one lane instead of two and is therefore limited by the speed of the slowest driver.
<b>Improves Safety:</b> Crashes due to left-turning movements from through-travel lanes are reduced because movements have been moved to center turn lane.	<b>Difficult Entry:</b> Cars may have difficulty pulling onto the roadway from driveways or side streets if traffic volumes are high (above 15,000 vehicles per day) due to lack of gaps in the travel lane, especially during peak hours.
<b>Complete Street:</b> Existing right-of-way can be utilized for other uses, such as bicycle lanes, parking or streetscape enhancements.	<b>Level-of-Service:</b> Slightly reduces roadway capacity due to loss of a through-lane in each direction.
<b>Cost-Effective:</b> Diets are an inexpensive roadway fix, especially when part of an existing repaving project.	<b>Sharing the Road:</b> If a bus runs on the road, after a road diet, all traffic will stop when bus stops for passengers because cars cannot pass bus in a second through-lane.
<b>Lane Improvement:</b> By reducing the number of lanes, lane width can be improved to standard 12 feet in areas where lanes may be too narrow and not meeting standards.	<b>Driver Expectations:</b> Motorists accustomed to 4 lanes on the road will have to adjust to the 3-lane configuration.


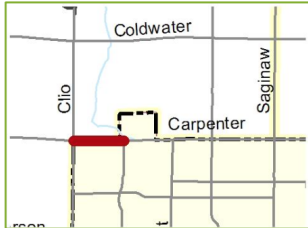


## Candidates for Road Diets in Genesee County, Michigan

- ■ ■ *Figure 4. A technical report from Genesee County, Michigan includes profiles of major corridors rated by their road diet suitability.<sup>7</sup>*

### Complete Streets 4 to 3 Lane Conversion Study

**Carpenter Road**  
 From: **Clio Rd**  
 To: **Fleming Rd**  
 Number of Signals: 1  
 Driveways and Side Streets: Some  
 Land Use: Residential, Commercial  
 Left Turn Lane: Clio  
 Speed Limit: 35  
 Width Inside Lane: 12  
 Width Outside Lane: 12  
 Total Width: 50  
 Bus Route: Yes  
 High ADT: 8713  
 Low ADT: 6752

**2008-2013 Crash Data**  
 Rear End Crashes: 5  
 Read End – Left Turn Crashes: 0  
 Head On – Left Turn Crashes: 0  
 Side-Swipe Crashes: 1  
 Total All Crash Types: 10  
 Crashes per mile per year: 3.33

**Recommendations ★★★★★**  
 This is a good candidate for a road diet. The traffic count is within the range appropriate for a road diet. Two high schools are located on this corridor, so it would benefit from traffic calming and bike lanes. The section of Carpenter Road between Dupont and Saginaw was recently converted to a three-lane road, and it would be good to convert the rest of the corridor.

Genesee County MPC

differential means fewer and less severe crashes.

Road dieting can also provide opportunities to install bike lanes within the existing cross section and allocate “leftover” roadway width for on-street parking, transit stops, or other functions.

### Road Diets in Small and Rural Communities

There are no comprehensive studies of the effectiveness of road diets in rural or small communities compared to urban ones. Jack Messer, director of planning and development for the City of Overland Park, Kansas said it is difficult to generalize road diets as particularly good or bad for smaller communities. “It’s important to understand the context of the environment and the specific issue to be resolved,” he said.

Messer went on to explain the various reasons for considering a road diet, including: addressing a perceived or real speeding issue, providing space within the right-of-way for other uses, designing roads that take pedestrians and bicyclists into consideration, enhancing road aesthetics, and developing parking.

*Quality of Life* – Road diets make wide streets more livable and easier to cross when on foot, providing a complete street environment.

### Safety Benefits of Road Diets

One of the most important benefits of a road diet is improved safety for all road users. There are safety advantages to a 4-to-3 lane road reconfiguration, as seen in Figure 2. The National Cooperative Highway Research Program (NCHRP) reported crash reduction rates of 19 to 47 percent in a study of 4-to-3 lane reconfigurations with a center two-way left-turn lane.<sup>8</sup>

The NCHRP study also reported fewer rear-end and left-turn crashes by using the two-way left-turn lane and fewer right-angle crashes with side street motorists, as they only need to cross three lanes of traffic instead of four. A reconfigured road also simplifies road scanning and gap selection for motorists making left-turns from side streets onto the mainline.

One effect of a road diet can be slower traffic, which can be both an asset and a disadvantage, as seen in the pro-con list in Figure 3. With only one through-lane each way, traffic tends to slow down. The reduced speed

“As you can see, any or all of these things are potentially relevant discussion points and would apply regardless of the size of cities,” Messer said.<sup>9</sup>

With the growing popularity of road diets, several studies have been conducted to further examine their effectiveness in general. A study in Michigan assessed crash data to pinpoint roads that would benefit from a road diet. Rural communities like Storm Lake, Iowa have also had good experiences with road dieting.

### Genesee County, Michigan

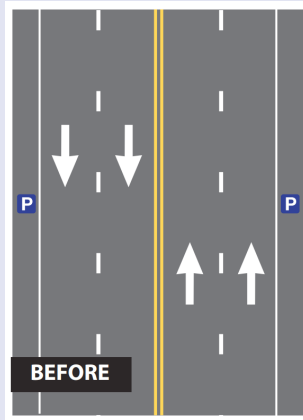
After the Michigan state legislature passed a measure to encourage the development of Complete Streets in 2010, the Michigan Department of Transportation adopted a statewide policy and many municipalities followed suit. The Genesee County Planning Commission published a technical report exploring the use of road diets to achieve Complete Street goals.

According to the report, all types of crashes have declined on roads that were narrowed in recent years. Average annual reductions after conversions from four to three lanes were 31.8 percent for head-on crashes, 35.3 percent for rear-end crashes, and 32.8 percent for same-

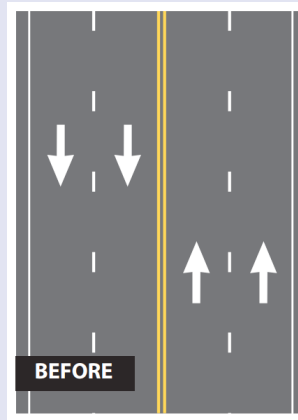
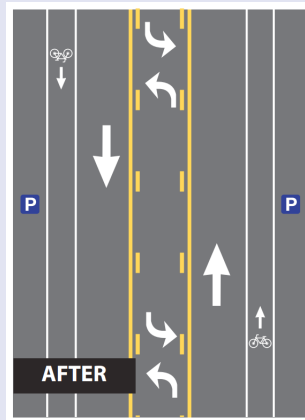


## Road Diet Options

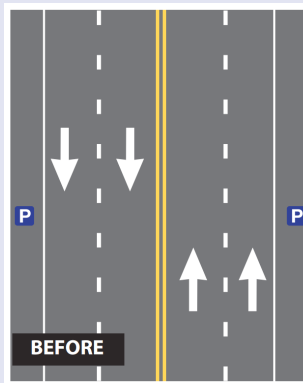
There are many options for using the space made available by removing lanes of through-traffic with a road diet. Popular uses for the space include: center two-way left-turn lane, street parking, bike lanes, and wider paved shoulders. Below are diagrams showing how space can be allocated in road diets.<sup>10</sup>



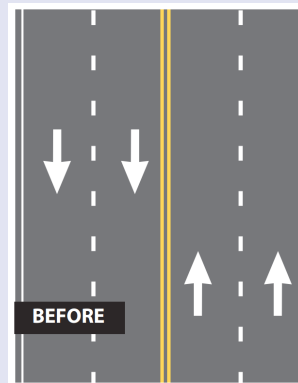
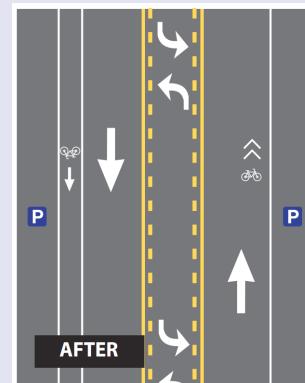
4-to-3 lane conversion with center two-way left-turn lane, bike lanes, and street parking



4-to-3 lane conversion with center two-way left-turn lane and bike lanes



4-to-3 lane conversion with center two-way left-turn lane, one designated bike lane (left) and one sharrow (shared lane marking, right), and street parking on both sides



4-to-2 lane conversion with median and buffered bike lanes

All Images: FHWA

side, side-swipe crashes.<sup>11</sup> County planners have been suggesting several existing four-lane roads as candidates for road diets because they currently carry less traffic than they were initially designed to handle.

Some roads, like King Boulevard from Fifth Avenue to Welch Boulevard in Flint, MI, have already been narrowed, with wider shoulders or parking added with the extra right-of-way space.<sup>12</sup>

### Storm Lake and Muscatine, Iowa

Two cities in Iowa have also had positive experiences with the conversion of four-lane undivided roadways to a three-lane cross section. In 1996, the city of Storm Lake, Iowa converted a portion of Flindt Drive. This

roadway was 40 feet wide and had an ADT of 8,500 VPD (Vehicles Per Day).<sup>13</sup> No formal before-and-after analysis has been done, but there was a generally positive public response to the conversion. City officials are also pleased with the traffic flow and increased safety on the roadway.

The city of Muscatine, Iowa had a similar experience with the conversion of Clay Street. City engineer Ray Childs reported a large reduction in accidents due to the conversion. In general, the Iowa Department of Transportation has started encouraging the conversion of four-lane undivided roadways to three-lane cross sections where safety is an issue.<sup>14</sup>



Road Before



Road After

FHWA

- ■ ■ Before and after photographs of a road diet of Edgewater Drive in Orlando, Florida. While this is an urban area, commercial districts in rural areas have a similar look and a similar need for parking. Street parking was retained in this reconfigured road.<sup>15</sup>

## ADDITIONAL ROAD DIET RESOURCES

Federal Highway Administration's "Road Diet Informational Guide" (Report No. FHWA-SA-14-028)

Road Diet Case Studies (Report No. FHWA SA-15-052)

FHWA Road Diet Quarterly Newsletter:

[http://safety.fhwa.dot.gov/road\\_diets/newsletter/spring/](http://safety.fhwa.dot.gov/road_diets/newsletter/spring/)

"Every Day Counts" (EDC), workshops and webinars through FHWA:

<https://www.fhwa.dot.gov/innovation/everydaycounts/>

Speeds, Travel Times, Delays on US 75 4/3 Lane Conversion Through Sioux Center, Iowa (1999). Knapp and Giese. Iowa State University Center for Transportation Research and Education.

Iowa's Experience with Road Diet Measures: Use of Bayesian Approach to Assess Impacts on Crash Frequencies and Crash Rates (2006). Pawlovich, et al. *Journal of the Transportation Research Board*, No. 1953. <http://trrjournalonline.trb.org/doi/pdf/10.3141/1953-19>

## Conclusion

Road dieting, or road reconstruction, is one of the nine proven safety countermeasures recommended by the Federal Highway Administration under the "intersection and corridor" focus area. It is also an FHWA Every Day Counts initiative. A number of communities are coming onboard to use this concept as a tool to create complete streets that are friendly and safe to all road users, including pedestrians and bicyclists. Although the concept is not yet widely used in small and rural communities, it can be viable as an effective low-cost safety countermeasure in areas where conditions are suitable.

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### References:

1. Image Source: Federal Highway Administration. "Road Diet Informational Guide." Report No: FHWA-SA-14-028. November 2014. [http://safety.fhwa.dot.gov/road\\_diets/info\\_guide/rdig.pdf](http://safety.fhwa.dot.gov/road_diets/info_guide/rdig.pdf)
2. Rosales, J. Road Diet Handbook: Setting Trends for Livable Streets, Institute of Transportation Engineers, Washington, DC, 2006. Cited in: Federal Highway Administration's "Road Diet Informational Guide." See Reference 1.
3. Federal Highway Administration. "Road Diet Mythbusters: Road Diets Make Traffic Worse Myth." Report No: FHWA-SA-16-063. March 2016. [http://safety.fhwa.dot.gov/road\\_diets/resources/pdf/roadDiet\\_MythBuster.pdf](http://safety.fhwa.dot.gov/road_diets/resources/pdf/roadDiet_MythBuster.pdf)
4. Image Source: FHWA Road Diet Informational Guide. See Reference 1.
5. FHWA Road Diet Mythbusters. See Reference 3.
6. Adapted from: Genesee County Metropolitan Planning Commission. "Complete Streets Technical Report with Appendix." 2012. [http://gcmprc.org/wp-content/uploads/pdf/Complete\\_Streets/Complete\\_Streets\\_Technical\\_Report\\_Approved\\_withAppendix.pdf](http://gcmprc.org/wp-content/uploads/pdf/Complete_Streets/Complete_Streets_Technical_Report_Approved_withAppendix.pdf)
7. Image Source: Genesee County Metropolitan Planning Commission. See Reference 6.
8. National Cooperative Highway Research Program (NCHRP). Report 617: Accident Modification Factors for Traffic Engineering and ITS Improvements. 2008. Appendix C. [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_617appendixC.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_617appendixC.pdf)
9. Email correspondence with Jack Messer, Director of Planning and Development for the City of Overland Park, KS. June 2016.
10. Image Source: Federal Highway Administration. "Road Diet Case Studies." Report No. FHWA SA-15-052. 2015. [http://safety.fhwa.dot.gov/road\\_diets/case\\_studies/roaddiet\\_cs.pdf](http://safety.fhwa.dot.gov/road_diets/case_studies/roaddiet_cs.pdf)
11. Genesee County Metropolitan Planning Commission. See Reference 6.
12. Email correspondence with Steve Shaughnessy, Manager of Safety Program Unit, Michigan DOT. June 2016.
13. Federal Highway Administration. Highway Safety Information System (HSIS) Summary Report. "Evaluation of Lane Reduction 'Road Diet' Measures on Crashes." Report No: FHWA-HRT-10-053. June 2010. <http://www.fhwa.dot.gov/publications/research/safety/10053/10053.pdf>
14. Email correspondence with Keith Knapp, Director of Iowa LTAP Center. June 2016.
15. Image Source: Federal Highway Administration. "Every Day Counts: Road Diets." Last updated July 19, 2016. <http://www.fhwa.dot.gov/innovation/everydaycounts/edc-3/roaddiets.cfm>

Note: Additional background information provided by email correspondence with Becky Crowe, Manager, FHWA Office of Safety.