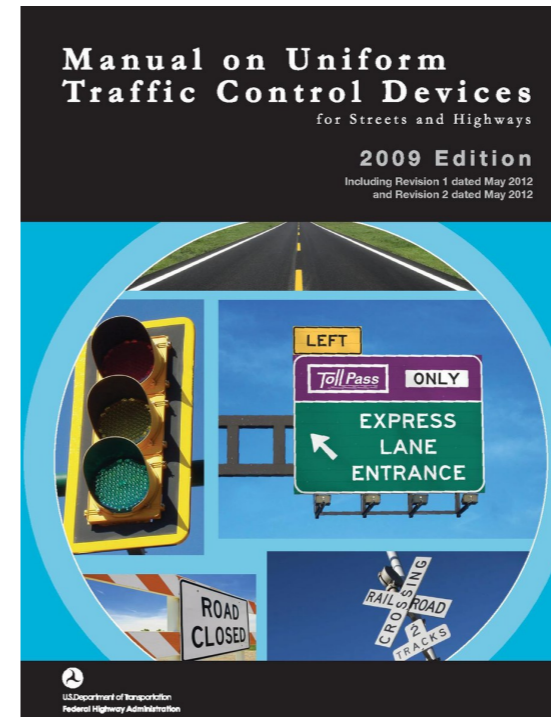# LESSONS FROM THE SIGN SHOP

Minh Nguyễn
State of the Map U.S.
April 1, 2022

Hi, I'm Minh Nguyen, and you're about to indulge my greatest passion as a sign geek.

MUTCD

USDOT
Federal Highway
Administration

Over the past year, I've been cataloguing some of the thousands of standard signs that highway departments across the U.S. post on their roads. Most of these signs are regulated by a federal technical standard with an unwieldy title that most people shorten to an unwieldy acronym: MUTCD.

Let's start with this typical Georgia intersection with a railroad crossing behind it.

© Michael Rivera, CC BY-SA 4.0

The MUTCD regulates every conventional road sign you see in the picture, no matter how insignificant. It specifies the exact layout of each sign down to an eighth of an inch, even where the bolt holes should be.

It also regulates the layouts of roads and how they're marked.

And all kinds of traffic signals.

The MUTCD pervades American road transportation infrastructure and beyond. Even those of you who don't drive, don't bike, don't take public transportation, and don't walk along roads are familiar with many aspects of this standard.

Most signs remain identifiable regardless of the context in which they're posted.

And even if you've never seen a particular MUTCD sign before, you've already picked up on enough of the MUTCD's patterns to make sense of the sign before you.

W8: Pavement and Roadway Conditions [edit | edit source]

| Sign or plaque	Designation	Name	Tags
BUMP	W8-1	Bump	traffic_calming=bump hazard=bump
DIP	W8-2	Dip	traffic_calming=dip hazard=dip
PAVEMENT ENDS	W8-3	Pavement Ends	surface=unpaved
SOFT SHOULDER	W8-4	Soft Shoulder	shoulder:surface=unpaved
(slippery symbol)	W8-5	Slippery When Wet	hazard=slippery
(slippery symbol) WHEN WET	W8-5,W8-5P	Slippery When Wet	hazard:wet=slippery
(slippery symbol) ICE	W8-5,W8-5aP	Slippery (Ice)	hazard=slippery;ice
(slippery symbol) STEEL DECK	W8-5,W8-5bP	Slippery (Steel Deck)	hazard=slippery;metal_bridge_deck surface=steel
(slippery symbol) EXCESS OIL	W8-5,W8-5cP	Slippery (Excess Oil)	hazard=slippery surface=chipseal

There are a lot of standard signs. At times, I've found it difficult to keep the corresponding tags straight in my head, especially given OSM's preference for tag names in British English. So last year, I started a series of pages on the wiki that you can use as a field guide: look up a sign by its appearance or name to find out how it should be tagged. Mappers in other countries had already created similar pages for their own countries, but we needed our own for the U.S.
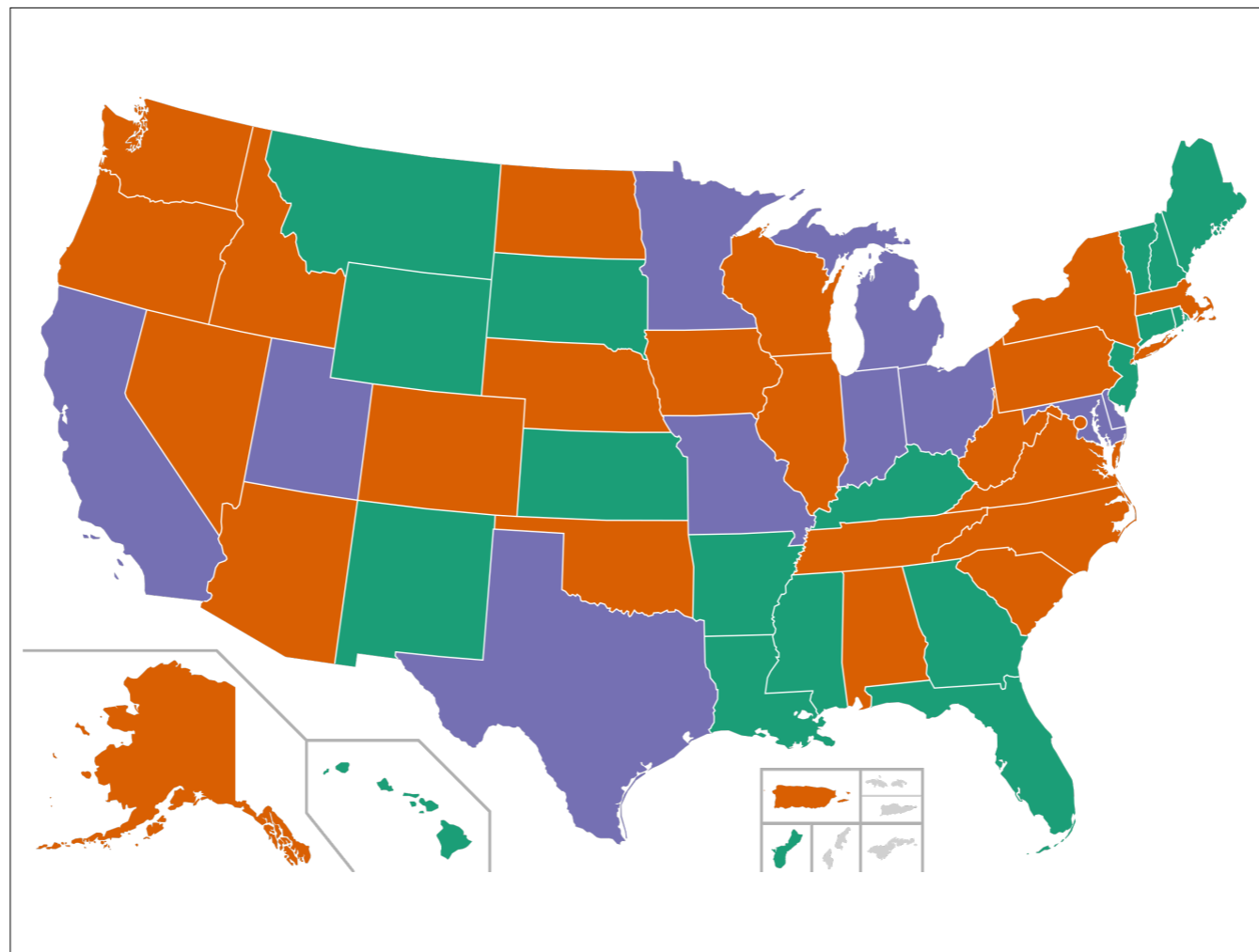
Compiling these tables is a big task. The MUTCD isn't just one standard, it's 36 or so different standards. Many states have adopted their own variations of the MUTCD in order to support state laws or address unique local conditions. Each of the states in orange has adopted a supplement to the MUTCD with some additional signs, while each of the states in purple has adopted an entire state-specific MUTCD standard.
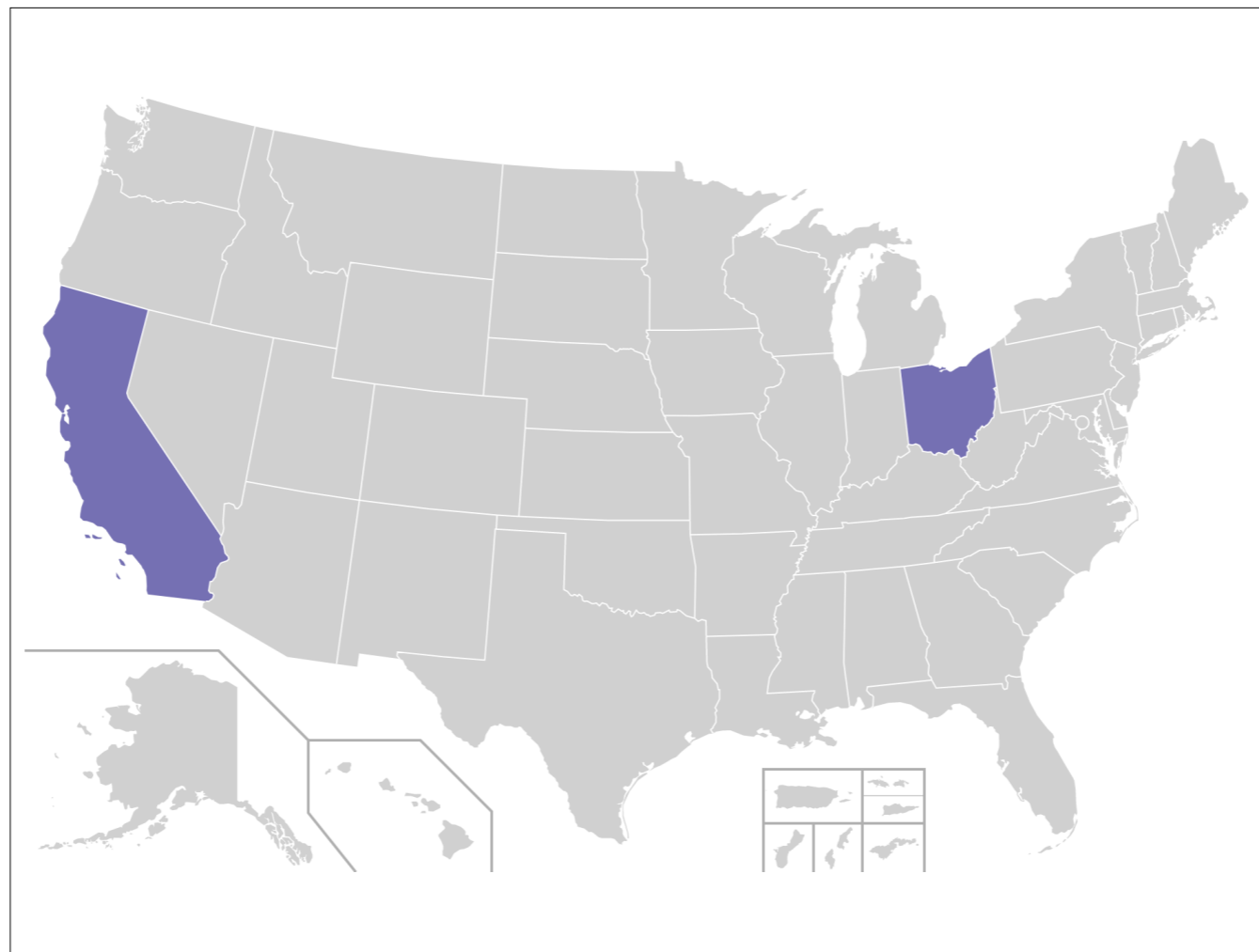
On my own, I've only gotten as far as completing a paltry two states.

There's a sign for that

- **957** signs in the national MUTCD

- **10** state editions of the MUTCD

  - **694** California-specific signs

  - **462** Ohio-specific signs

- **22** state supplements to the MUTCD

  - **1,189** signs total in Arizona

Here are some figures to give you a sense of the scale of this sign cataloguing task. See, I'm not just being lazy: there are thousands of signs. Even though Arizona has only adopted a supplement, rather than a full state MUTCD edition, as many as 1,200 standard signs are valid in this state.

Including some unique signs, such as these regulatory signs I saw on my walk here this morning.

Why?

Why go through the trouble of putting together these pages? Because documenting sign standards is an important step in shaping OSM's tagging system so it meets the needs of mappers and data consumers. And if we want OSM to rise to its potential here in the U.S., then U.S. standards need to be well-represented in our documentation.
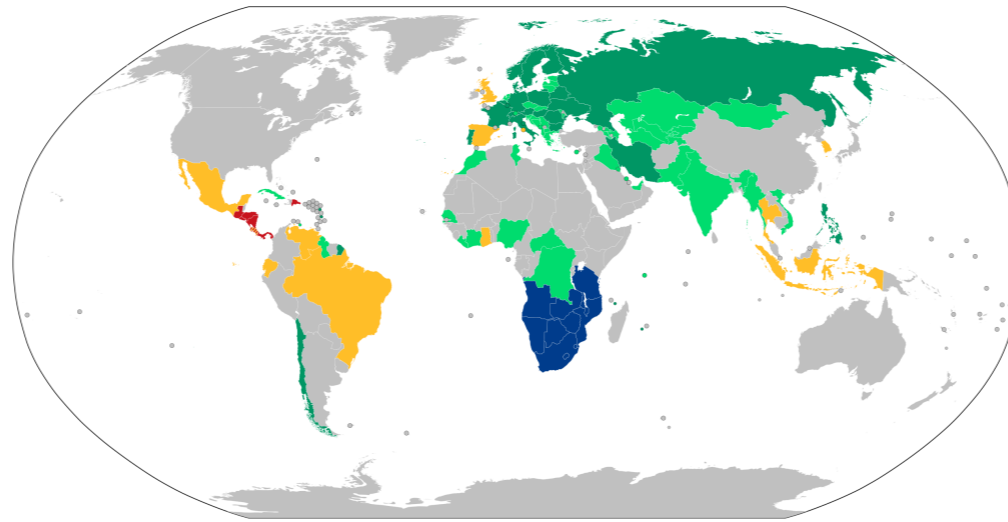
**Vienna Convention on
Road Signs and Signals**
U.N. Economic and Social Council

Outside the U.S., the MUTCD has a lot of influence in several countries like Canada and Australia. But many countries have adopted a rival standard, the Vienna Convention.

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Key:maxweight

Key:maxweight - Other languages	🔄 Purge · Help

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Other languages · Translate

Legal access restriction for vehicles or passengers that exceed the specified **actual** weight, especially useful on bridge segments (tagged with `bridge`=*). Metric tonnes are a default unit, other units must be explicitly tagged. Typical usage is to add this tag to `highway`=* lines where maxweight limit applies.

Note: for maximum gross weight see `maxweightrating`=

Contents [hide]

Vehicle weight   [edit | edit source]

A number of navigable structures that are mapped as ways or areas may be tagged with a vehicle weight restriction, such as:

- `highway`=* (especially with `bridge`=*)
- `railway`=`rail`
- `aeroway`=`helipad`
- `man_made`=`bridge`

If a unit is not specified, the value is assumed to be in tonnes (British English, 'metric tons' in American English). You

maxweight   v · d · e

Description
permissible maximum actual weight. ✏️ 🔧

Group: Restrictions

Used on these elements

Useful combination
- `highway`=*

See also
- `maxaxleload`=*
- `maxweightrating`=*
- `hgv_articulated`=*

Status: de facto

tag**info** [More...]
  3 923
  236 801

The Vienna Convention has been adopted by most European countries under the auspices of the UN, giving it a place of favor in OpenStreetMap's tagging conventions. If you look up many navigation-related tags on the wiki, the tag will be illustrated by a Vienna Convention sign and described in terms of European standards.

Even though the concept applies equally well to non-Vienna countries and there's an analogous MUTCD sign that looks completely different.

It isn't just a matter of one country posting a different sign than another. Sometimes countries don't even agree about what details should be signposted in the first place. Can anyone who hasn't been to Europe tell me what this sign means? (Hint: it doesn't mean there's a London Underground station ahead.) What if I told you a round sign with a red border means something is prohibited?

No vehicles

`vehicle=no`

It means no vehicles – no cars, no bikes, no horses, but pedestrians allowed, and I guess pets too. If you come from a country that uses these signs, it would be obvious to just tag vehicle=no and expect data consumers to figure out what counts as a vehicle, because the sign isn't saying.
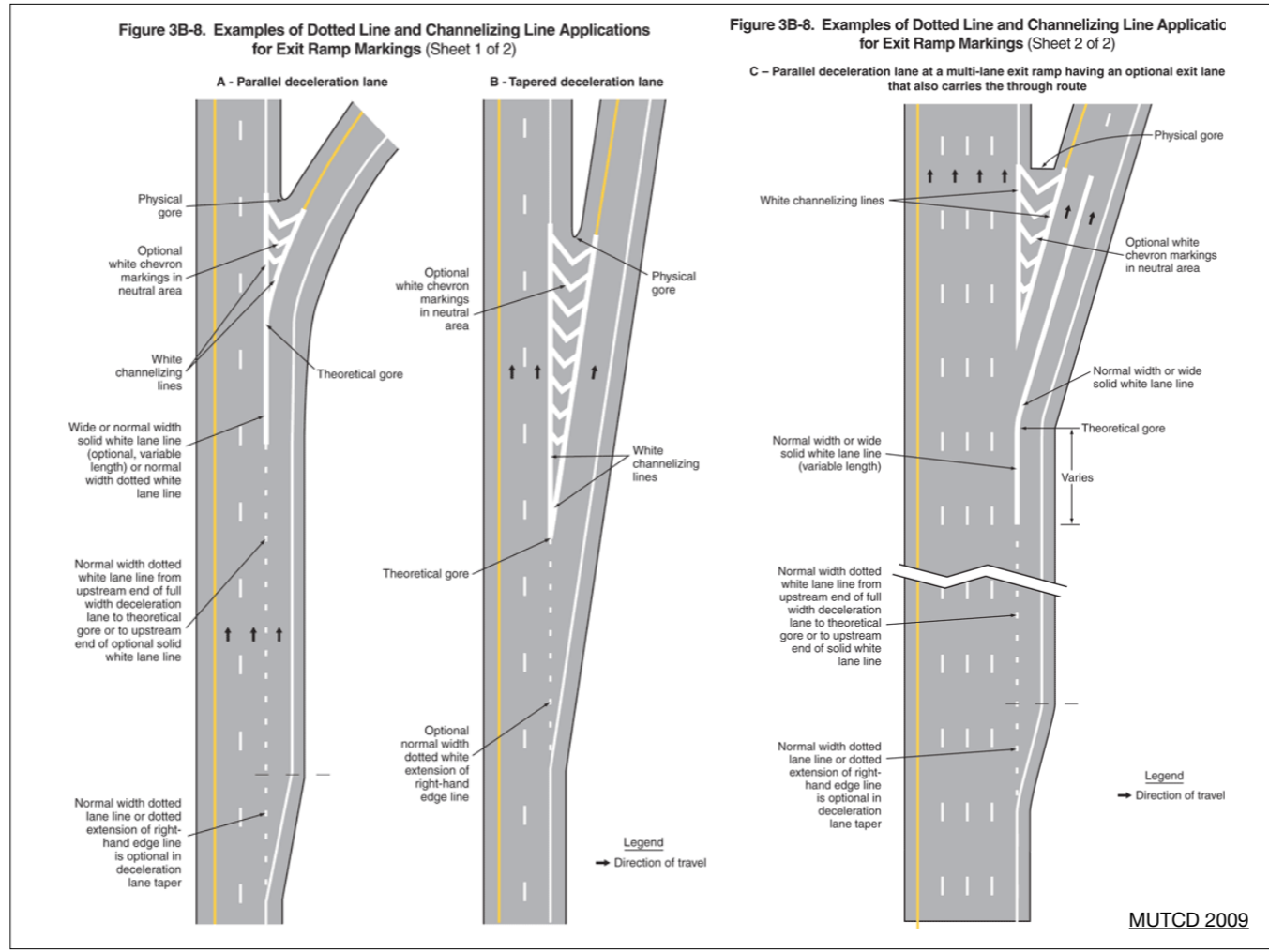
Selective exclusion

`motor_vehicle=no electric_bicycle=no`
`small_electric_vehicle=no`

That's not how we do things in the U.S. Instead, we have "selective exclusion" signs that spell out exactly what's prohibited. This requires us to use more tags in combination. Less convenient for mappers, but easier for data consumers.

Figure 3B-8. Examples of Dotted Line and Channelizing Line Applications for Exit Ramp Markings (Sheet 1 of 2) and (Sheet 2 of 2). MUTCD 2009

Beyond signs, MUTCD-compliant roads are marked with layouts that are unfamiliar in some Vienna Convention countries, presenting a unique set of challenges. For example, the MUTCD allows a freeway exit to taper right off of the freeway without a deceleration lane beforehand. This kind of exit is the norm outside cities and major interchanges. But many of OSM's navigation-related mapping conventions were optimized for roads in Germany, where a tapered exit is extremely rare.

Map data © OSM contributors, ODbL
Screenshot by Paul Johnson
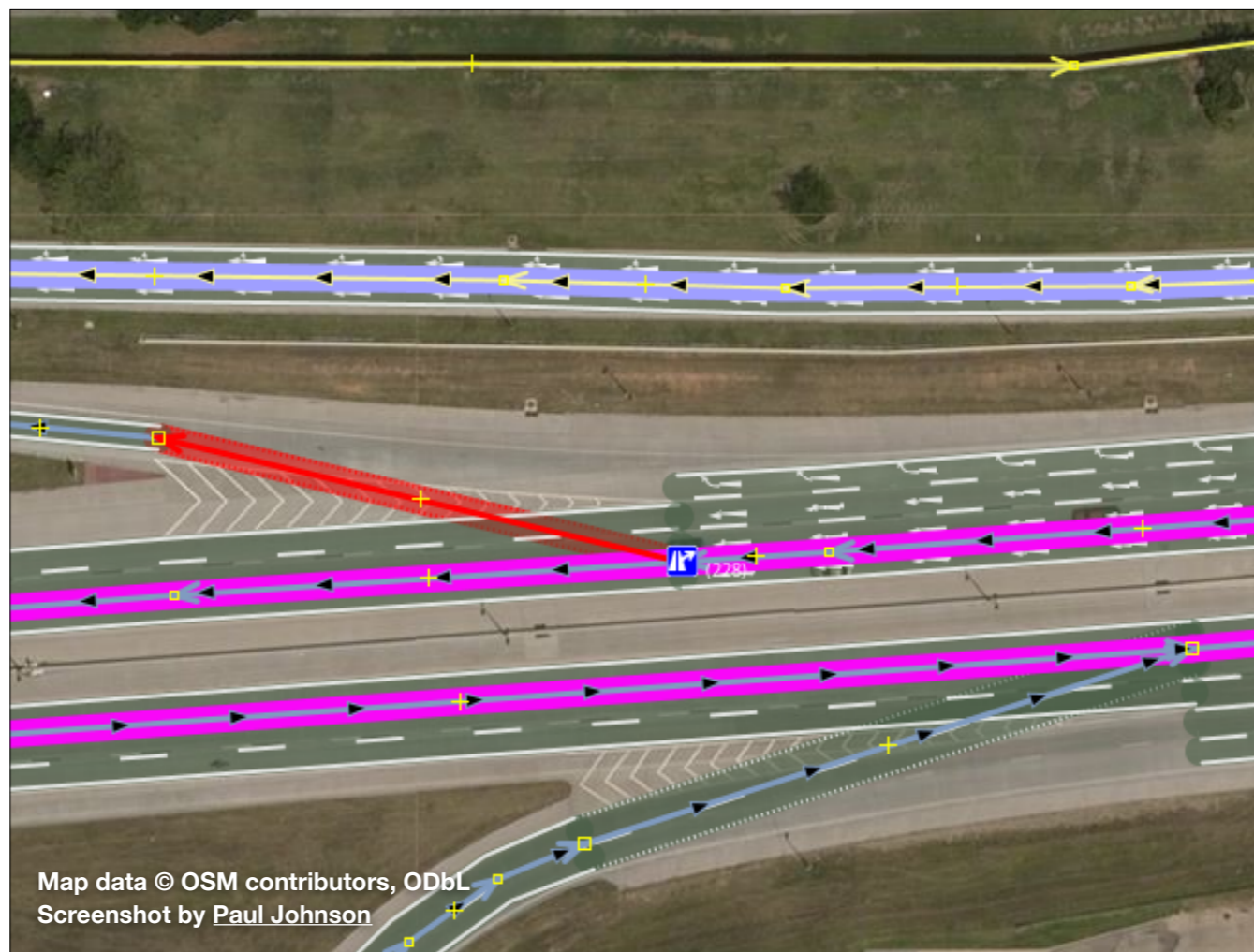
The tapered configuration affects where you'd place the motorway_junction node, and thus the timing of any guidance instruction about the impending turn.

In 2017, the Dutch and German communities adopted a convention called "Kreuz Köln-Süd" (CROITS Kerln Zoot) for handling tapered configurations, but it requires omitting information about the ramp's geometry. Had American mappers been party to the convention, there might've been a different outcome.

This intersection features standard pedestrian crossings indicated by walk signals and curb cuts with tactile paving.

Although signalized, the crossing is unmarked, which means drivers are less likely to notice and yield to pedestrians in the crosswalk. Even though this configuration is quite common in certain cities throughout the U.S., a common European-influenced tagging scheme for classifying crosswalks is unable to distinguish it from the marked variety. These discrepancies are a key source of conflict within the OSM community. Let's raise awareness of our reality so that others don't mistake our mapping practices for backwardness.

The process

1. Compile sign codes into wiki table format

2. Find or create a diagram image of each sign

3. Research appropriate tags or propose new ones

Compiling the MUTCD tables on the wiki is a three-step process. First, you need to read and digest the MUTCD standard and convert its lists of sign codes into tables in wikitext format. Then you need to find or create an idealized diagram image of each sign, preferably in SVG format and hosted by Wikimedia Commons. Finally, you need to figure out the appropriate tags or, if there isn't an established tagging scheme yet, propose one.

Texas STATE LINE	Brazos River	CURVE BLOCKS VIEW	BLOCKS VIEW		
MUTCD I-2.svg	MUTCD I-3.svg	MUTCD-TX W1-11T.svg	MUTCD-TX W1-11TP.svg	MUTCD-TX W1-7T.svg	MUTCD-TX W1-9T-L.svg
209 × 157; 7 KB	209 × 157; 7 KB	459 × 459; 10 KB	404 × 303; 10 KB	492 × 123; 6 KB	492 × 123; 5 KB
	WATCH FOR EMERGENCY VEHICLES	WATCH FOR SLOW MOVING VEHICLES			LOW CLEARANCE
MUTCD-TX W1-9T-R.svg	MUTCD-TX W11-12T.svg	MUTCD-TX W11-15cT.svg	MUTCD-TX W11-25T.svg	MUTCD-TX W11-26T.svg	MUTCD-TX W12-2TP.svg
492 × 123; 5 KB	461 × 461; 15 KB	476 × 476; 31 KB	478 × 478; 29 KB	477 × 477; 9 KB	383 × 287; 10 KB
	LOW CLEARANCE 10 MILES AHEAD LOADS OVER 12 FT HIGH DETOUR BY WAY OF AUSTIN	LOAD ZONED BRIDGE	XX MPH WHEN FLASHING	ROAD ENDS	WATCH FOR LOW FLYING AIRCRAFT
MUTCD-TX W12-3TP.svg	MUTCD-TX W12-4T.svg	MUTCD-TX W12-5T.svg	MUTCD-TX W13-8T.svg	MUTCD-TX W14-1T.svg	MUTCD-TX W17-10T.svg
404 × 538; 4 KB	472 × 283; 33 KB	459 × 459; 12 KB	479 × 128; 10 KB	462 × 462; 9 KB	478 × 478; 15 KB
ROCK SLIDES	EARTH SLIDES	WATCH FOR SMOKE ON ROAD	WATCH FOR MUD ON ROAD	RUMBLE STRIPS AHEAD	LOOSE LIVESTOCK
MUTCD-TX W17-11T.svg	MUTCD-TX W17-12T.svg	MUTCD-TX W17-14T.svg	MUTCD-TX W17-15T.svg	MUTCD-TX W17-2T.svg	MUTCD-TX W17-3T.svg
				476 × 476; 19 KB	461 × 461; 12 KB

The most time-consuming step is obtaining a suitable image to illustrate the sign. The good news is that Wikimedia Commons already has diagrams of a great many MUTCD signs in SVG format, named according to a predictable pattern.
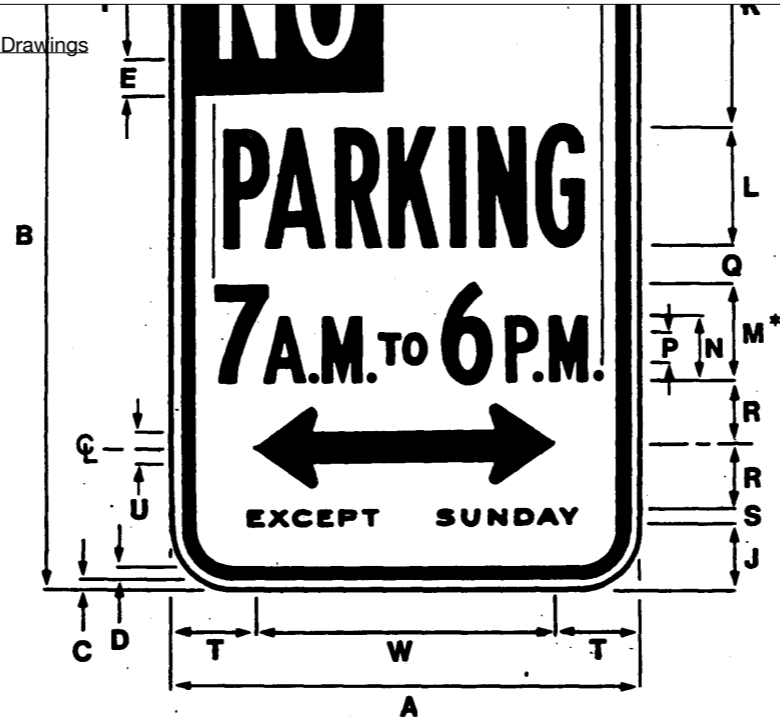
Arrow Direction: Left, right or both; specify when ordering.

* NOTE: TIMES ARE VARIABLE, SPECIFY WHEN ORDERING.
FOR ARROWHEAD DIMENSIONS, SEE APPENDIX PAGE 2 OF 11, STANDARD ARROWHEAD.

SIGN	DIMENSIONS (INCHES)																				
	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	W	X
MINIMUM	12	18	1/4	1/4	7/8	3 1/2B	1 1/8	5 1/4	1 1/2	6 3/8	3B	2 1/2C	1 3/4C	3/4D	1	1 5/8	3/8F	2 1/8	3/4	7 3/4	9 1/2

What if Commons doesn't have a diagram for the sign yet? Then you need to pull out your slide rule and craft one based on the official sign specification, which might've been drafted in the '70s like this one from California.
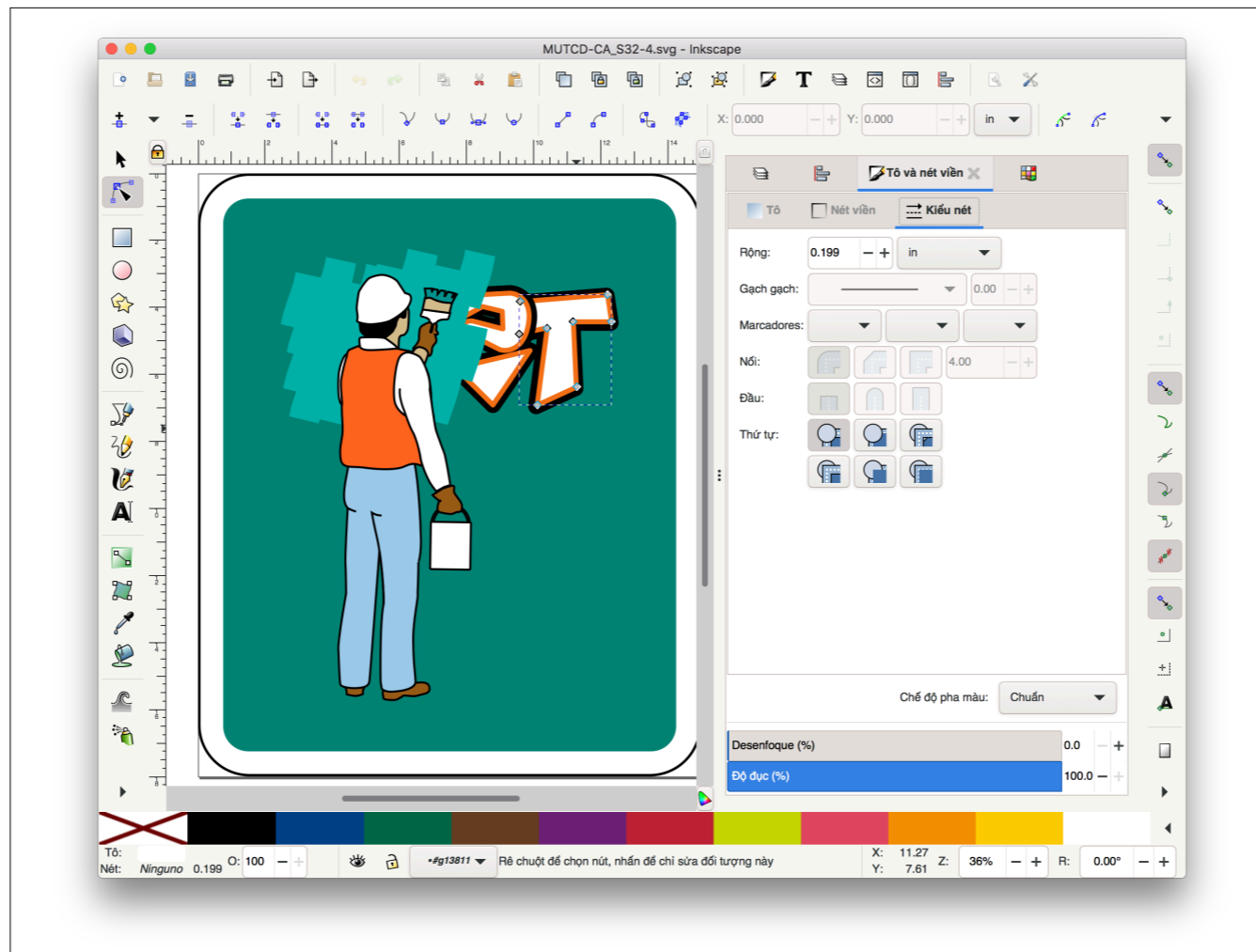
Inkscape is an ideal tool for turning the sign specification into a presentable diagram. By the way, this is the only standard sign in the U.S. – possibly the only one in the world – that comes out of the sign shop pre-graffitied.

S32: Adopt-A-Highway   [edit | edit source]

Sign or plaque ⬍	Designation ⬍	Name ⬍	Tags ⬍	Notes ⬍
	S32	Adopt-A-Highway	?	
	S32-1	Litter Removal	?	
	S32-2	Wildflower Planting	?	
	S32-3	Tree Planting	?	
	S32-4	Graffiti Removal	?	
	S32-5	Vegetation Control	?	

A lot of the signs have no corresponding tags listed yet, either because I haven't gotten around to identifying the right tags, or because I'm stumped. These are great places to dive in if you don't have graphic design skills but like to geek out about roads or tagging.

Often, when a mapper finds out that there's no established tag for something, it feels like a dead end. Formally proposing a new tag and getting editors and data consumers to support it – those are high hurdles to clear for someone who just wants to map what they see in front of them. Our community needs to be proactive in closing these gaps so that mappers don't unexpectedly find themselves on the vanguard of tag design.

Some mappers have taken it upon themselves to close some of these gaps based on their personal interests. The MUTCD tables were used as justification for a new tag for daytime headlight requirements. The proposal was a shoe-in, skipping the usual back-and-forth about verifiability and practicality.

Parking lane conditionals

Status: Approved (active)

Proposed by: Riiga

Tagging: `parking:lane:*, parking:condition:*=`

Applies to: ⚃

Definition: Introducing conditionals for parking lanes and de

Drafted on: 2021-08-24

RFC start: 2021-12-18

Vote start: 2022-01-07

Vote end: 2022-01-21

Voting closed

Voting on this proposal has been closed.

It was **approved** with 29 votes for, 0 votes against and 1 abstention.

For years, the tagging scheme for street parking had suffered from multiple flaws and was unable to represent basic parking restrictions commonly found in the U.S. The MUTCD catalog gave the community confidence that a revamped tagging scheme could support U.S. parking restrictions reasonably well.

Snow chains

Status:	Proposed (under way)
Proposed by:	Trapicki
Tagging:	snow_chains; snow_chains:conditional; snow_chains:variable; highway=chain_up_area=*
Applies to:	way
Definition:	Requirements (possibly with conditions and variable) to put snow chains on your vehicle when driving on this highway, with places reserved for putting on snow chains.
Drafted on:	2021-11-09
RFC start:	2021-11-11

We're building a pipeline of high-quality proposals that serve the needs of not only U.S. mappers but also mappers in other regions. We're introducing new concepts into OSM – like snow chain requirements – that mappers worldwide can take advantage of, and eventually data consumers too.

Get started

- MUTCD sign catalog
  wiki.osm.org/wiki/MUTCD

- Categorized by series and state, or use search bar

- Pages with many signs time out or come up blank
  github.com/openstreetmap/operations/issues/466

- Workaround: Revisit the same URL without reloading

You can check out the work-in-progress sign catalog on the wiki and use the existing pages as a model for your own documentation efforts. Each kind of sign has its own page, as does each state. Unfortunately, many of these pages are currently timing out and coming up blank because of a bug in the wiki's configuration. As a workaround, you can keep trying to visit the URL until it loads.

Thank you!

- MUTCD sign catalog
  wiki.osm.org/wiki/MUTCD

- Sign drawing workshop notes
  etherpad.wikimedia.org/p/
  wcna2021-4246

- #tagging in OSMUS Slack
  slack.openstreetmap.us

If you're interested in contributing graphics to this effort, please see the notes from a workshop I gave last fall at WikiConference North America. If you have any questions or want to coordinate your efforts, hop into OSMUS Slack's tagging channel or the channel for your state. Thank you!

Related
An American Map Style

Brian Sperlongano

In this talk, I skipped over the entire issue of route shields. Brian Sperlongano just wrapped up a dedicated talk on this subject, so I recommend watching the recording later. And yes, that sign assembly is three stories tall!

Finally, a little PSA: Did anyone notice the snow on some of the peaks around here this week? It really is unlawful to throw snowballs at vehicles or their occupants, as this sign from Mount Palomar in California says. As far as I can tell, the UN has yet to adopt an analogous sign as part of the Vienna Convention.