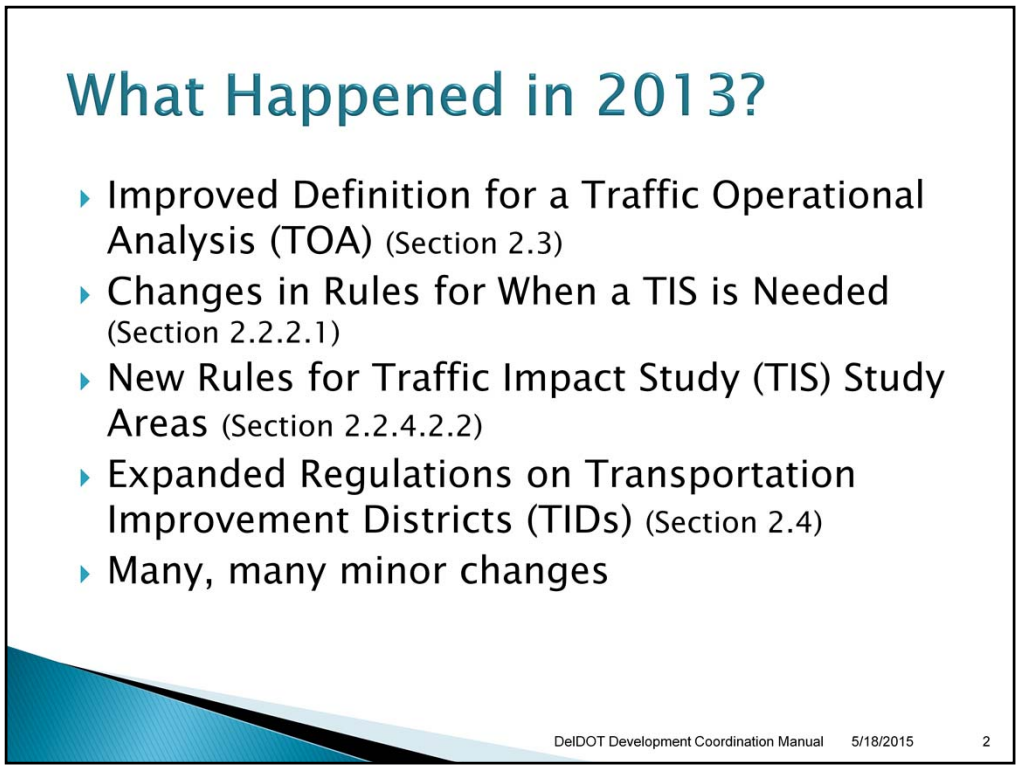
DelDOT
DC Manual

Chapter 2
Traffic Analysis and Improvements

May 18, 2015



In 2013, we made four major changes to Chapter 2 and a lot of smaller changes.

The impetus for the changes to Chapter 2 came from public dissatisfaction over a then-proposed land development. There was a perception by some people that DelDOT's Traffic Impact Study process should have stopped the project, didn't, and therefore badly needed fixing. Whether they were right can be debated, but we took the opportunity to make some changes, I think for the better.

Here's what we did:

We improved our definition for a Traffic Operational Analysis or TOA. The term TOA originally described a small study associated with an entrance plan review. Without a clear definition, however, we began using the term TOA for anything that was not exactly a TIS. Sometimes the differences were almost a matter of semantics. In 2013, we returned the TOA to its roots in entrance plan review. Most of the time, a TOA is a small study to address a specific concern about a proposed entrance. For example, an entrance might be proposed close to an existing intersection and there is a concern that queues at the intersection will block the entrance location. The TOA would look at how often and for how long the entrance would be blocked and help us to decide what to do about it.

We also made two substantive changes in our rules for when a TIS is required. First, we eliminated existing Level of Service problems as a criterion in our regulations. Kent and New Castle Counties have Adequate Public Facilities Ordinances, and we provide support for those County efforts, but we don't have criteria like that in our regulations.

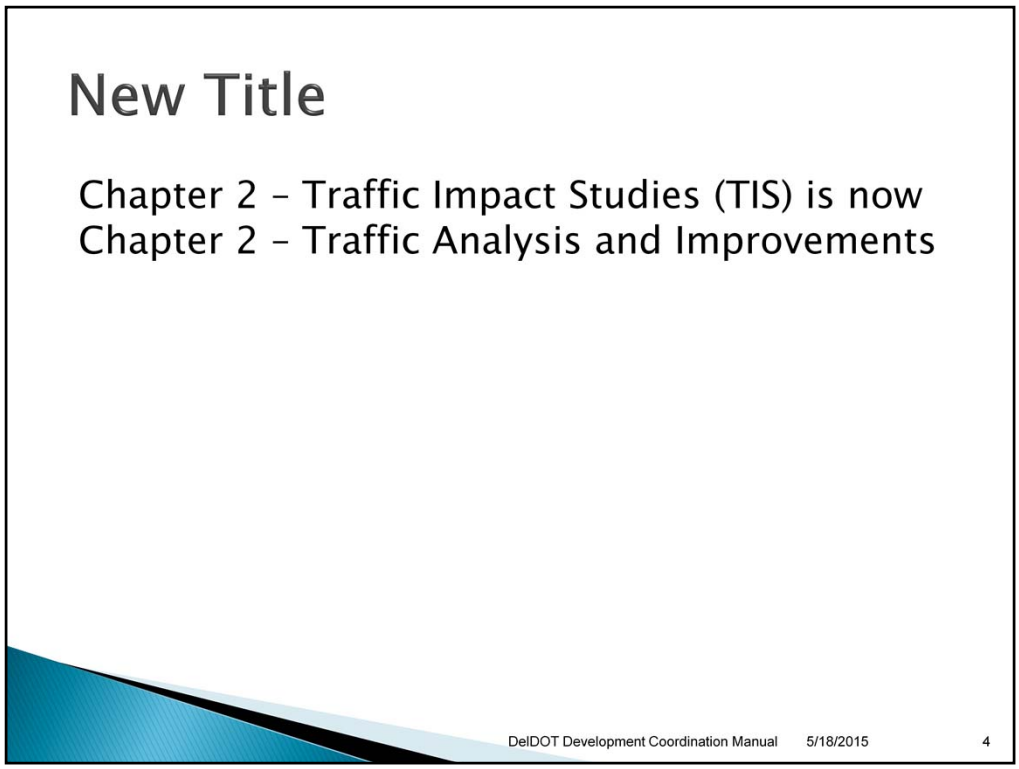
Second, we no longer require TIS for non-residential rezonings that have no land development plan. New Castle County requires that every rezoning have a subdivision or land development plan associated with it, so the County knows exactly what is proposed when they vote on a rezoning application. Elsewhere, we don't necessarily know whether a rezoning to create three acres of commercial space is for a car lot, a pharmacy or a convenience store with gasoline pumps. For that reason, we've decided we're not going to guess about the land use; we're going to postpone the TIS until we see the land development plan.

We adopted a rigorous procedure for setting TIS study areas. Where before we had relied on engineering judgment, we now have a procedure that relies on our travel demand model and a set of rules to say what intersections and road segments must be studied. I'll talk more about that later.

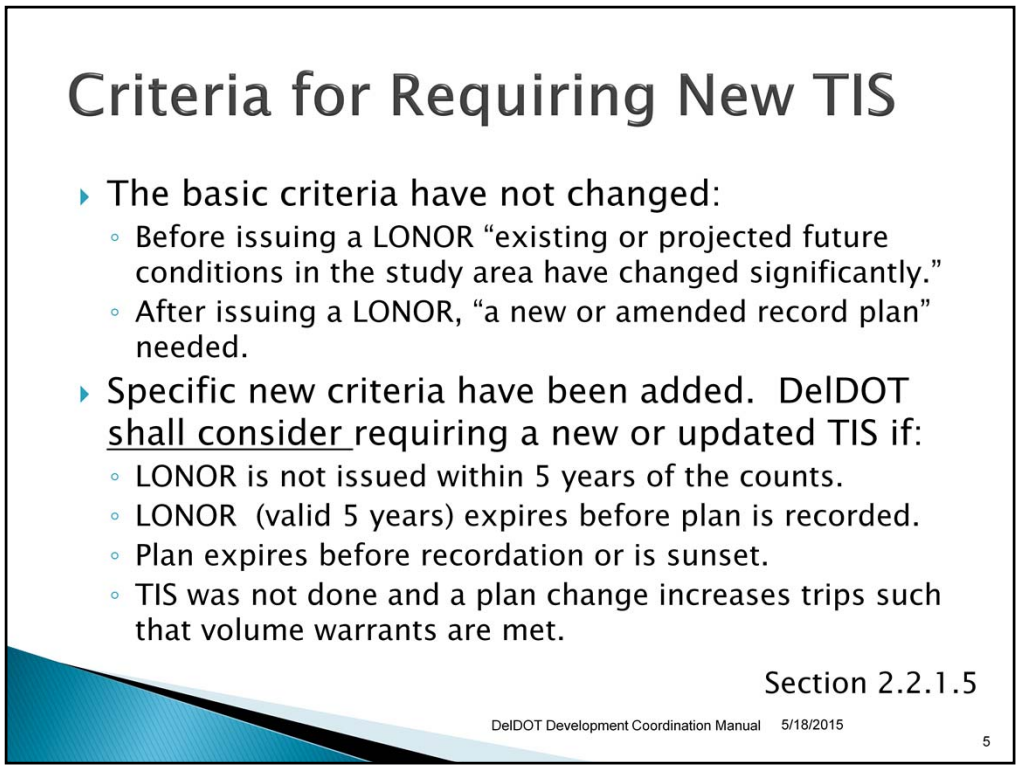
Finally, we greatly expanded our regulations regarding Transportation Improvement Districts or TIDs. As we struggled to find the best procedure for setting TIS study areas, we realized that we might never have a procedure that suited every project and we were reminded of how inefficient it can be to have multiple TIS for developments that are close together both in space and time, often looking at the same intersections a few months apart. The solution we saw was to create districts, do one comprehensive traffic study for each district and charge developers fees to cover the cost of the needed road improvements. We already had regulations that allowed us to create TIDs and to waive the TIS requirement for developments in TIDs. What we adopted in 2013 was regulations on how to create a TID.

Slide 2 Notes Continued

Now, onto what's new in 2015.



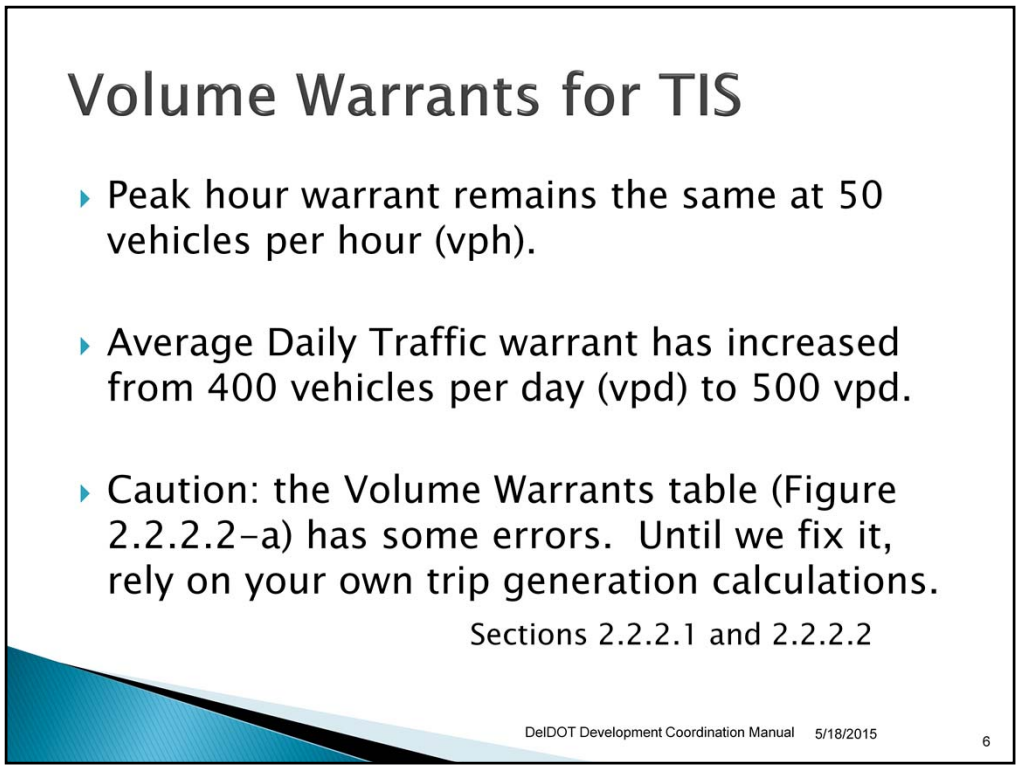
One of the first things you'll see when you go look at our new regulations is that the titles have changed. For Chapter 2, in 2013, we added the new section on Transportation Improvement Districts that I mentioned and brought over several sections from Chapter 3, so the old title was misleadingly narrow.



When times are good and the economy is strong, most developments proceed through the TIS and plan approval processes within a year, maybe two.

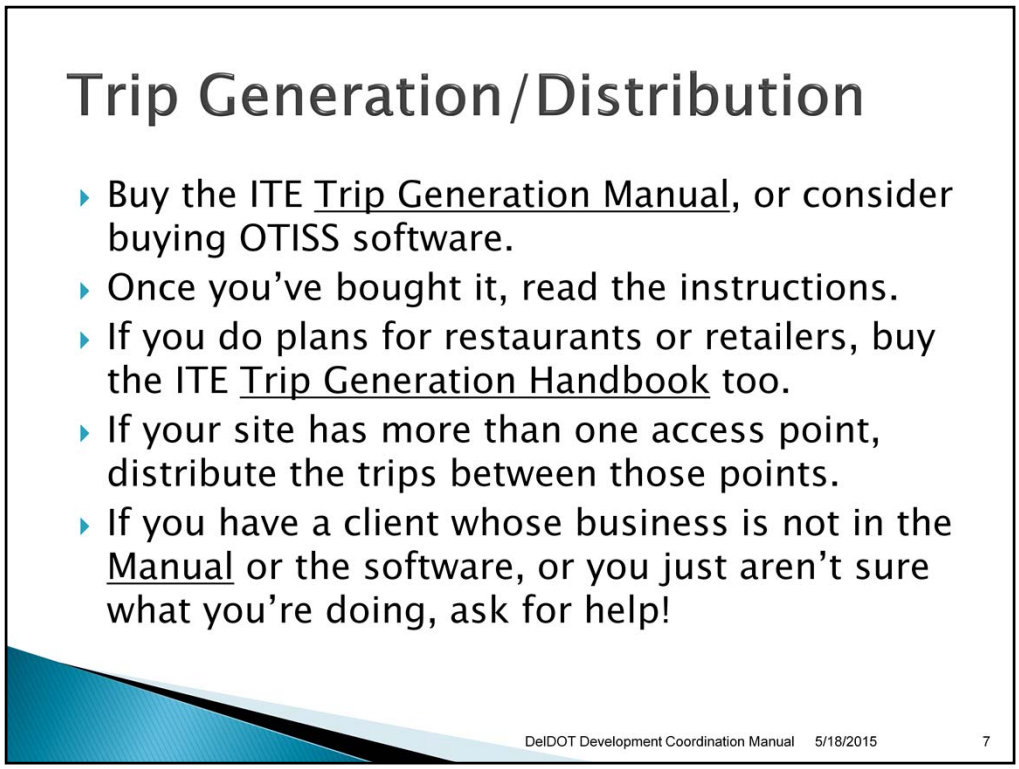
With the Great Recession, that timeline started to stretch out for many projects, particularly residential ones, and we began to realize we needed some rules for deciding when a TIS was too old to keep using.

Note the words that I've underlined here. In administering our regulations, our goal is not to impede development. In considering whether to require a new or updated study, we are going to look at what has changed since the study was done. If your client had the last piece of undeveloped land in the area, maybe their six-year-old counts are still good enough. If your client has been actively negotiating with us regarding off-site improvements and the five-year clock on their counts has expired, we're probably not going to call a halt and require a redo of the TIS. If you have a project that looks like it may trip, or have tripped, one of these rules, come in and talk to us.



Read slide.

We hope to have a corrected table up on our website later this week.



There is nothing new in the regulations about trip generation, but this is in area where a lot of engineers have trouble unnecessarily, so I'll offer some advice.:

Buy the Trip Generation Manual. It costs $500 and if all you handle are plans for single-family detached house subdivisions, maybe you don't really need it, but if your practice is at all varied, you do. Alternatively, if you prefer software over paper, consider buying OTISS software from ITE. We don't have it at DelDOT but it should produce the same results as using the Trip Generation Manual.

If you buy the Manual, read the instructions on how to use it in Volume 1. Most trip generation errors stem from a failure to read.

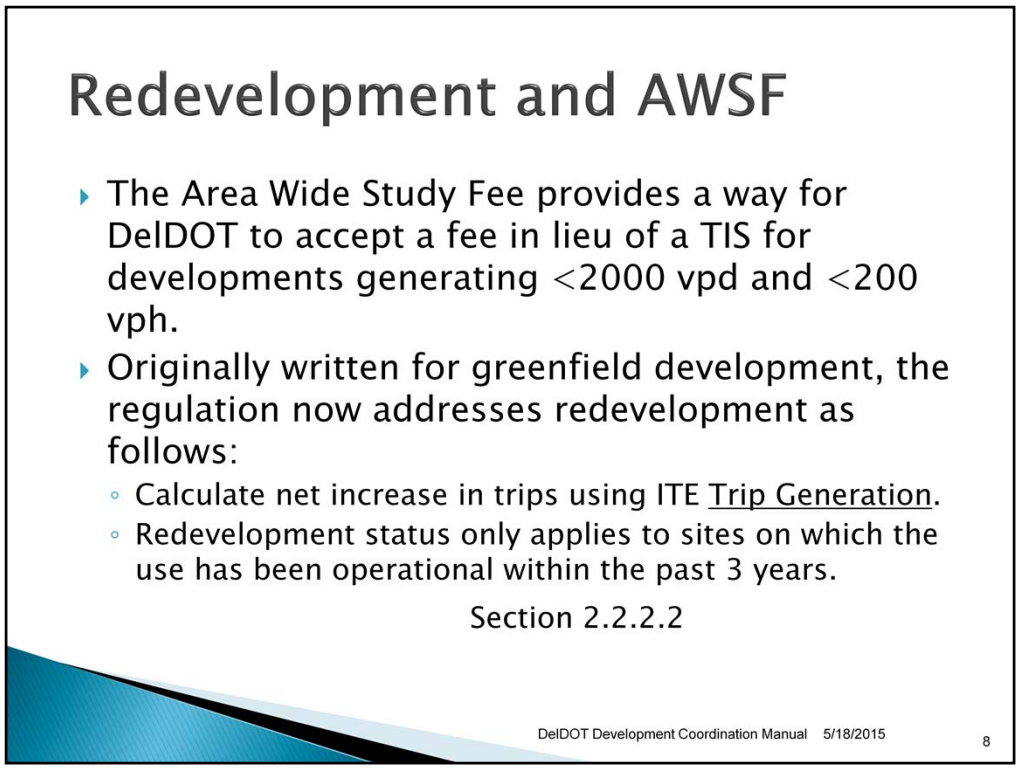
If you do plans for restaurants or retailers, buy the Trip Generation Handbook too. You'll need it to calculate pass-by traffic. Its another $93.75, but again you're going to need it. One caution: ITE is selling the third edition as a proposed recommended practice, a sort of beta version. Until the word "proposed" comes off the cover, we will be using the second edition.

If a site has more than one access point, distribute the trips between those points. This may seem obvious, but we see it. If you're designing a 40-lot subdivision, it will generate 452 trips per day, 226 in and 226 out, regardless whether it has one entrance or two. Therefore if you have two entrances and two Traffic Generation Diagrams, divide the traffic

between the diagrams. They can't both have 226 trips in and 226 trips out.

Finally on this point, if you have a client whose business is not in the Manual, or you just aren't sure what to do, ask us for help. A ten-minute phone call might save you a significant plan revision.

Slide 7 Notes Continued

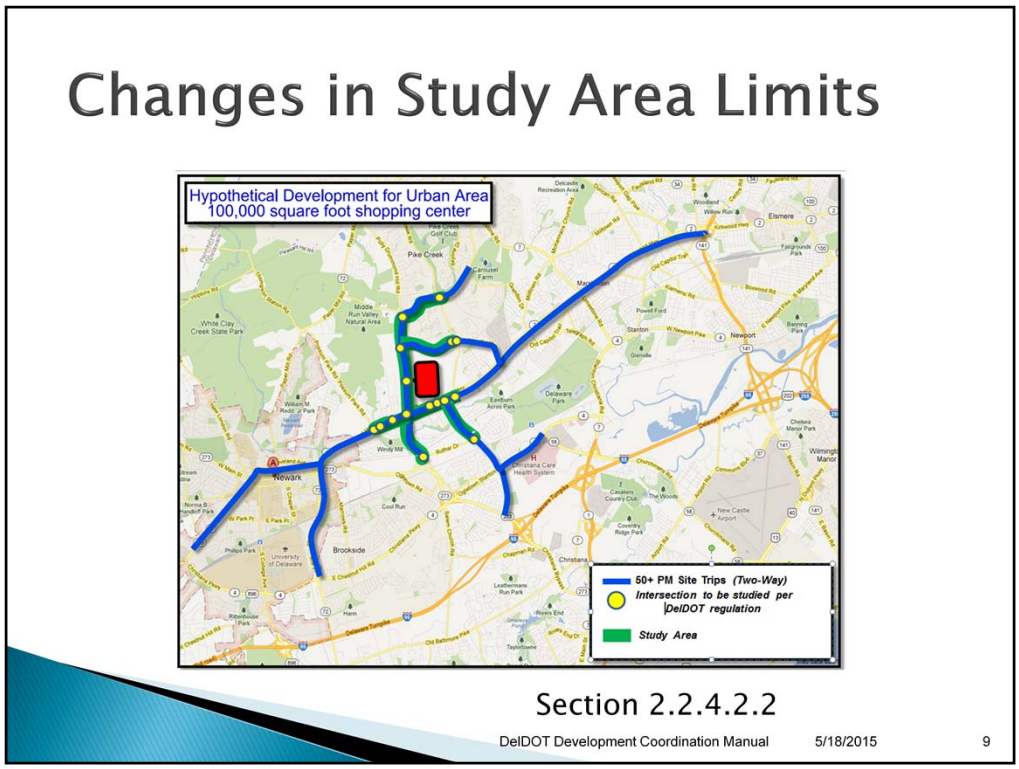


If you're unfamiliar, the Area Wide Study Fee may require some explanation. Until 2010, our volume-based warrants for TIS varied by land use but most started at about 2,000 vehicles per day, and for some of us that is still the point where we believe the effect on traffic will definitely be noticeable and there really should be a TIS.

Accordingly, we created the Area Wide Study Fee at the same time we lowered our volume warrants to 400 vehicles per day and 50 vehicles per hour. Where the local government does not require a TIS, a development that generates fewer than 2,000 vehicles per day and fewer than 200 vehicles per hour is a strong candidate to pay the fee and not do a TIS.

The fee is $10 per average daily trip and the money collected is accumulated to fund future area studies in the same county where the fee is collected. Payment does not exempt a development from participating in off-site improvements, so if your client's project would generate close to 2,000 vehicles per day they may want to look at the decision closely. However for most projects the time savings in not doing the TIS will make the decision for them.

Regarding the change, I think the reasons for it and the rules we've adopted are fairly straightforward. The three-year time limit was based on a survey of local government ordinances regarding redevelopment. Most commonly, a use was said to be discontinued if a business had been closed three years or more.



To help you understand what we changed with regard to study area limits, I thought I should walk you through an example of our current procedure, which we adopted in 2013.

The development is a 100,000 square foot shopping center and to keep the example hypothetical, we located it on a piece of State parkland east of Newark and just north of Kirkwood Highway.

We generated weekday evening peak hour trips using the ITE Trip Generation Manual and then used the DelDOT Travel Demand Model to distribute those trips to the surrounding road network.

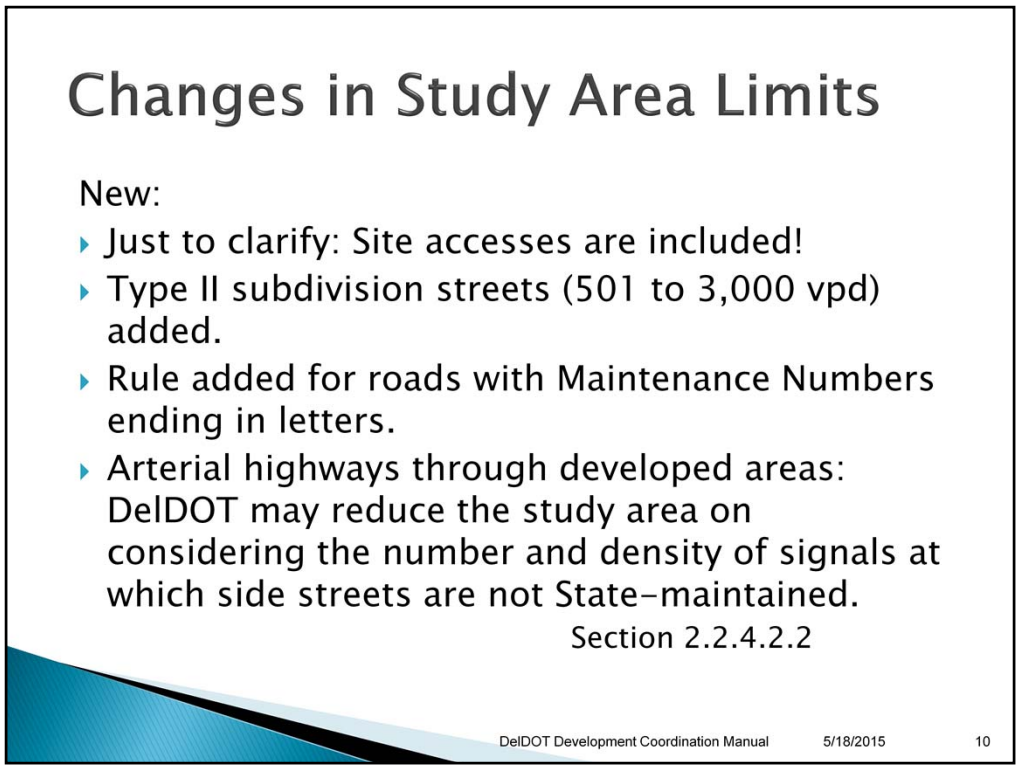
The blue lines you see there are where there would be 50 or more vehicles per generated by the shopping center.

Then we counted out along those blue lines up to three intersections of roads with three-digit State maintenance numbers. That's what most of the yellow dots are there. The green lines following the blue lines go out to the farthest yellow dots and that defines the limits of the study area.

Then we added some more yellow dots: Type III subdivision streets where they enter the State road network and signalized driveways.

As you can see it is a very rigorous procedure, which was what some elements of the public were demanding at the time, but to make it work we've had to build in a lot of extra rules and exceptions.

Slide 9 Notes Continued



So, what's new?

Because it wasn't completely clear, we're clarifying: Site accesses are included.

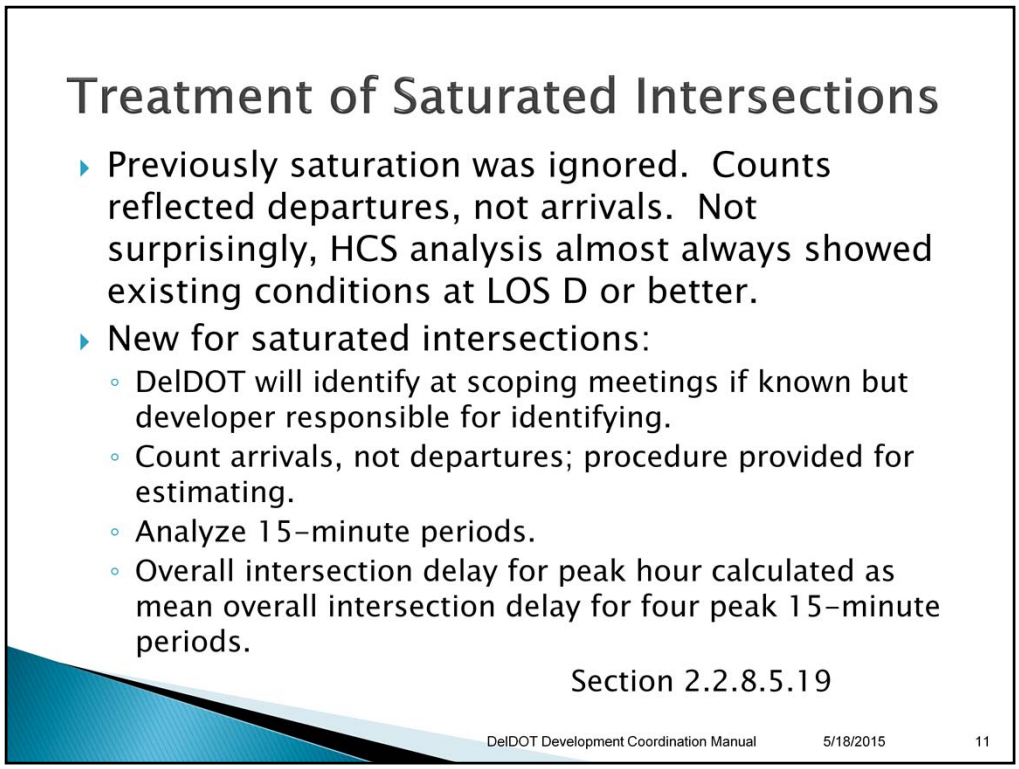
In 2013, we included Type III subdivision streets. Since then we've found that Type II subdivision streets matter too, so we've included them.

We've added a rule for roads with maintenance numbers ending in letters. These roads are generally late additions to our system. Most of them are low-volume access roads and, since we are only going out three intersections from the site, we don't want to waste any of those three on such roads. A few, however, are local roads that could draw significant traffic. So the rule is that if they draw at least 50 peak hour trips; if they are one of the blue lines in that example, they are in the study. If not, we skip over them and keep counting intersections.

Finally, we gave ourselves an out with regard to arterial highways through developed areas. If we find, for example, that a shopping center scope would include 20 intersections, half of them entrances to competing shopping centers, we can look at eliminating some of them. We aren't required to do so, but we can look at the situation in an effort to be reasonable.

This round of changes addresses the problems we know about now but we're expecting more to crop up.

Slide 10 Notes Continued

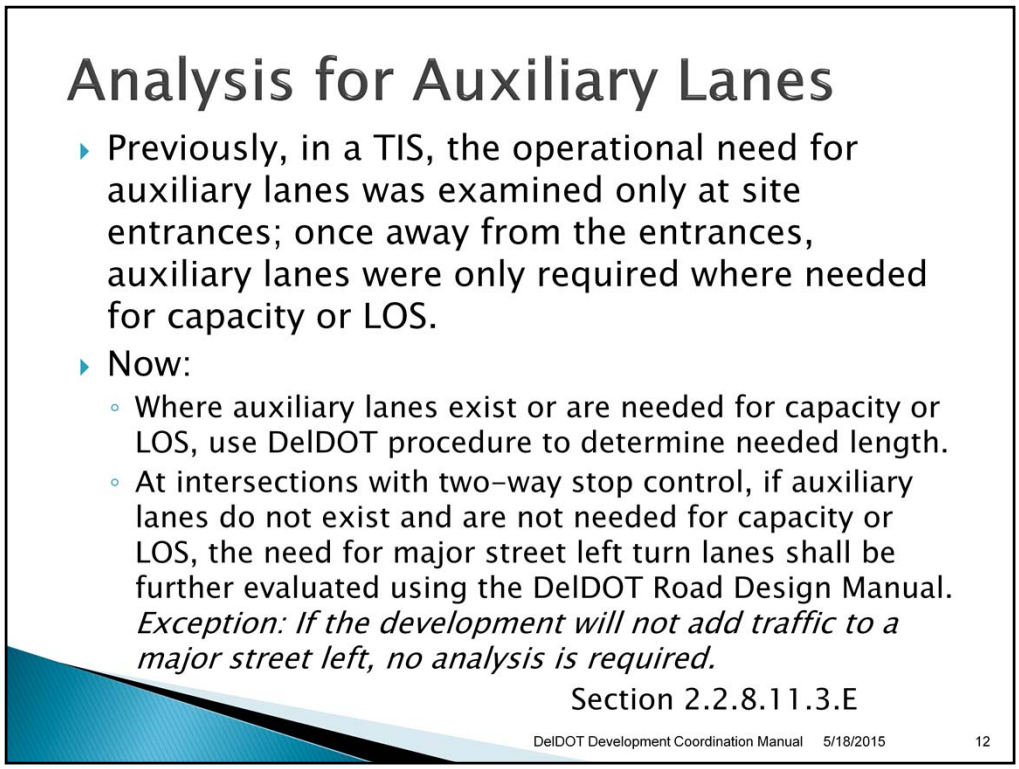


Addressing saturation in Traffic Impact Studies may be the biggest change in Chapter 2 that we've made this year.

Briefly, when an intersection is saturated, one or more of the queues does not clear; they grow with each signal cycle. The change is that rather than count the vehicles exiting the intersection, we're going to count the vehicles arriving at the intersection.

Our analyses will more accurately represent how these intersections operate, and some developments in Kent and New Castle Counties will have a more difficult time getting County plan approvals.

I'll save the details on this procedure for the question and answer period if anyone wants to know.



Previously, in a TIS, the operational need for auxiliary lanes was examined only at site entrances; once away from the entrances, auxiliary lanes were only required where needed for capacity or LOS.

Now:

Where auxiliary lanes exist or are needed for capacity or LOS, use DelDOT procedure to determine needed length.

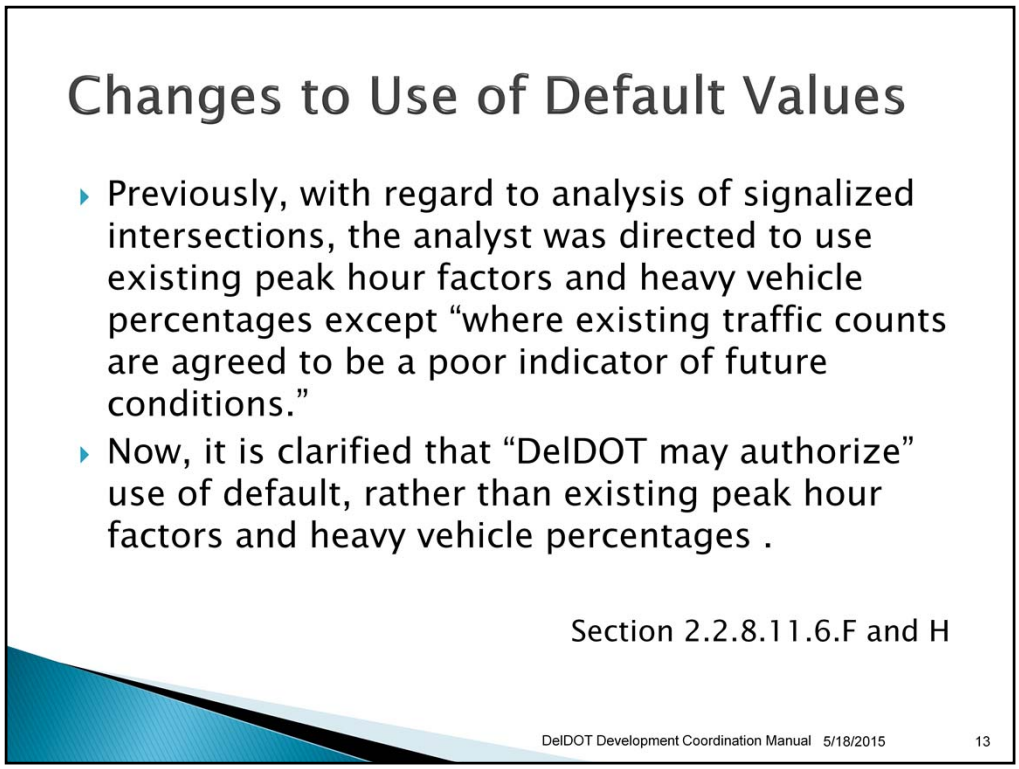
At intersections with two-way stop control, if auxiliary lanes do not exist and are not needed for capacity or LOS, the need for major street left turn lanes shall be further evaluated using the DelDOT Road Design

Manual. *Exception: If the development will not add traffic to a major street left, no analysis is required.*

Our old regulation resulted in a relatively common problem, at least in Delaware: A housing development is built in a rural area. The entrance is built on a local road. It gets left and right turn lanes and, if anything, is overdesigned. It works well. One or two blocks away, however, where the development traffic turns onto that local road from a collector road, people are slowing or stopping in the through lane to turn and are getting rear-ended.

This change is intended to prevent further occurrences of that problem.

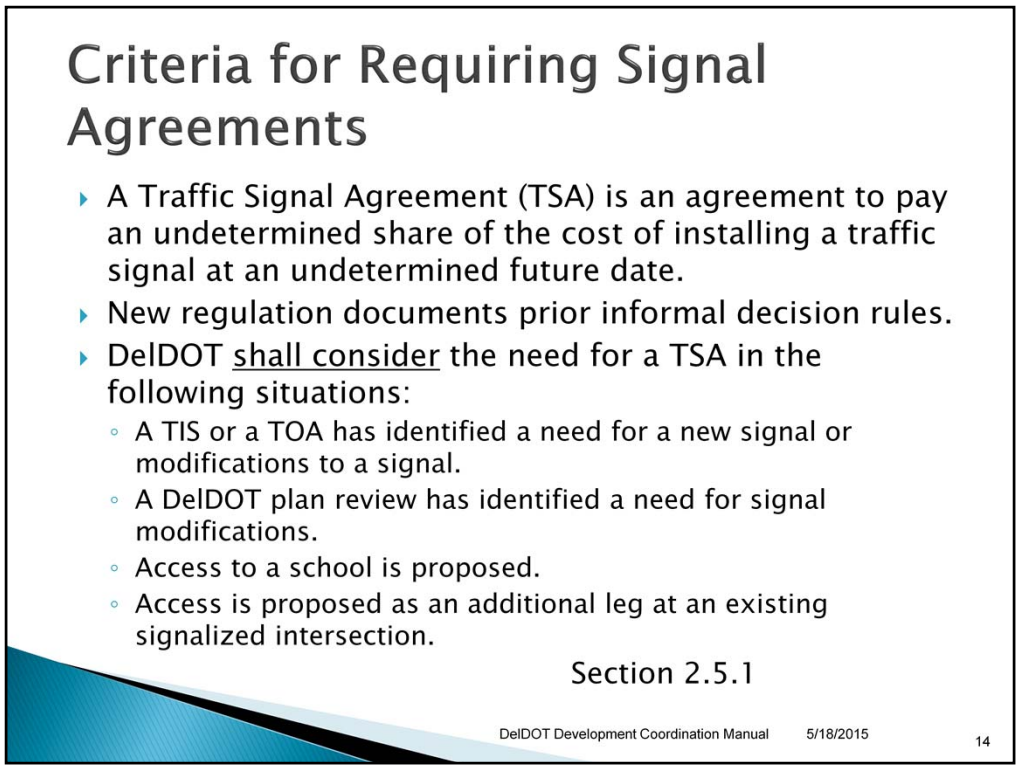
Slide 12 Notes Continued



These changes were necessary because of an apparent misunderstanding that seemed to occur universally when consultants read our regulations. As it says on the screen, the analyst was directed to use existing peak hour factors and heavy vehicle percentages except where existing traffic counts are "agreed to be a poor indicator of future conditions."

Every TIS consultant initially assumed that we thought existing counts were a poor indicator of future conditions so they could make that decision unilaterally. We had to tell them, and some firms we had to tell repeatedly, "Start with the existing, observed values. Don't use the default values without asking."

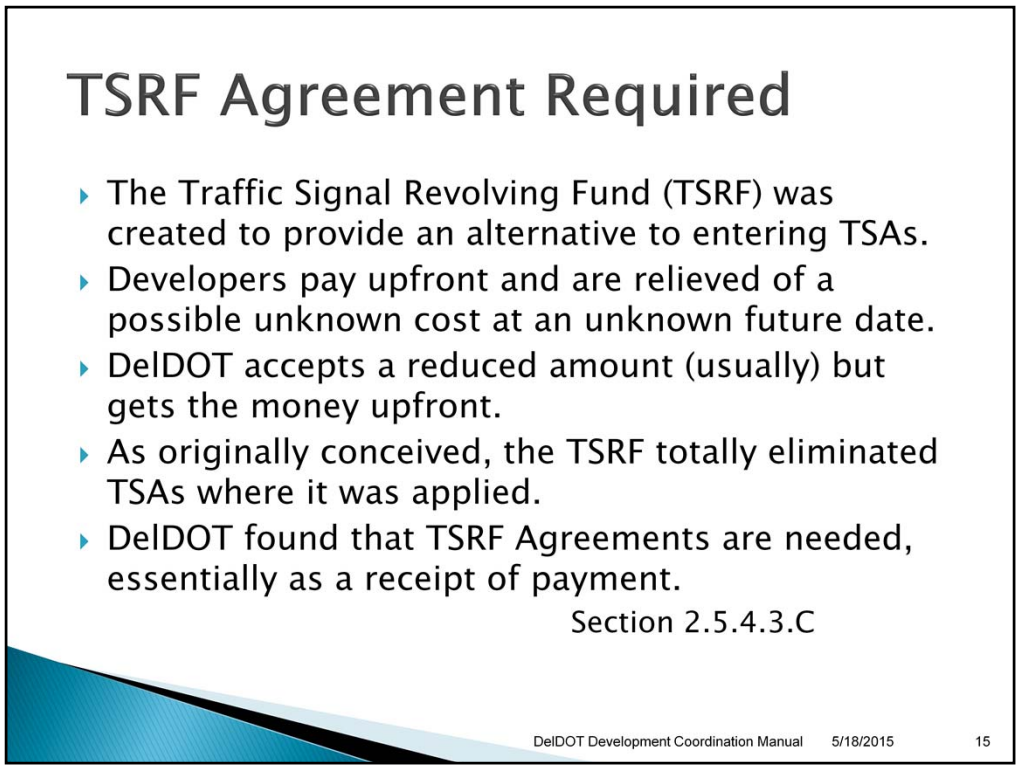
We're hopeful that we have that fixed now.



As the slide says, a Traffic Signal Agreement (TSA) is an agreement to pay an undetermined share of the cost of installing a traffic signal at an undetermined future date. As you might imagine, developers hate signal agreements and they have had their problems for us too, but for many years they have been a standard way of financing signals for us. As you'll see later, we've developed an alternative, but this slide is about signal agreements.

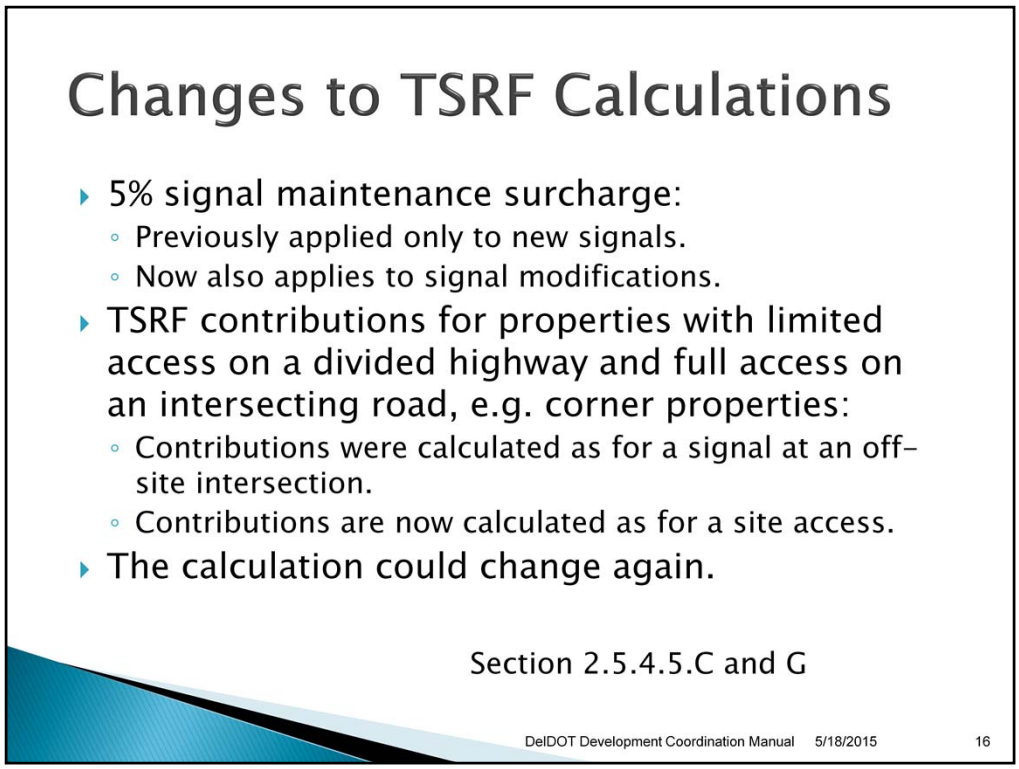
In addition to being an unknown cost at an undetermined future date, until now there were no published rules regarding when we would require one of these agreements. The rules you see here aren't new in the sense of agreements now being required when they weren't before. However, having something published will let engineers and their clients know what to expect and perhaps help us to be more consistent.

Note the underlining. If you believe your client has a special case, such that they should not have to enter a signal agreement, please tell us.



Do you remember with that last slide, I mentioned that we have an alternative to Signal Agreements? The Traffic Signal Revolving Fund is that alternative. Rather than taking on an undetermined future obligation, developers now have the option of paying upfront. It's been very popular. We only have about two years of experience with it, so it's difficult to say how it is working out financially, but almost everyone likes it.

This change is to correct an oversight. In our initial enthusiasm at creating the Fund, we didn't think enough about the administration of it. Among other things, we found that we still needed some sort of documentation that a developer had paid and that we were not going to charge them anything more. Thus, the Traffic Signal Revolving Fund Agreement was created and now it is reflected in our regulations.



Two other changes we've made to the Traffic Signal Revolving Fund regulations involve how the fee is calculated:

The basic formula for one's contribution to the fund is the cost to build the signal multiplied by one's share of the traffic passing through the intersection, but there is a five percent surcharge for signal maintenance, just as there is with a standard signal agreement. Previously, it was unclear whether that surcharge applied when the contribution was only toward signal modifications. We've now clarified that is applicable.

Perhaps more controversially, we've changed the contribution formula for some properties along divided highways. The Revolving Fund has been particularly popular with developers being asked to pay toward signals that are not at their site entrances but, say, a block away, because it recognizes the role of all the traffic in creating the need for the signal. At a site access, however, the formula does not include through traffic passing the site because that traffic does not benefit from having the signal; if anything adding a signal to their trip is a disbenefit.

With this change, we are telling developers of corner parcels, and similar parcels with frontage on two roads, that they must pay as if the signal were being installed at their entrance. The cost is still divided among all the users of the side street where they have full access, but through traffic passing the site on the main road is not included.

Finally, please note that calculation could change again. Just recently we've encountered situations where we were making expensive upgrades to signals at site entrances and asking the company whose driveway is served by the signal to contribute, even though they had had the signalized access for several years and were making only minor changes to their site plans. As with all of our regulations, this one is a work in progress.