NEW ALBANY, INDIANA
DOWNTOWN STREET NETWORK PROPOSAL

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SPECK & ASSOCIATES LLC
Jeff Speck, AICP CNU-A LEED-AP Hon. ASLA

with

NELSON/NYGAARD
PAUL Moore, P.E.

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DISCLAIMER: The report that follows is a planning document, not an engineering document. While many street layouts are suggested herein, all are schematic, and none are adequate for design or construction. Before being implemented, any design must be considered and redrawn by a licensed engineer who will bear all responsibility for its efficacy and safety.

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EXECUTIVE SUMMARY

Two Futures

Literally and figuratively, New Albany is at a crossroads. Significant changes, likely positive and negative, are underway. On the positive side, demographic shifts are powering a national resurgence of downtowns nationwide, and smaller historic centers like New Albany's are demonstrating a newfound capacity to attract new residents and businesses. On the negative side, a new Indiana DOT pricing regime for Ohio River crossings, in which the Sherman Minton Bridge remains the region's only un-tolled interstate path across the river, threatens to blight the downtown with a dramatic upsurge in what is already a burdensome amount of pass-through traffic.

Historically, traffic has been good for American downtowns. Indeed, many downtowns came into being because of it. However, a century of automobility has taught us that the form that traffic takes—the way it is shaped by local streets and roads—is the principal determinant of the fortune of the cities through which it passes. To illustrate with two extreme examples: plowing an elevated interstate through a city center, with no off-ramps, can be expected to have a catastrophic impact on local property value, while welcoming vehicles along a tree-lined main street has been the very foundation of many a community's success.

These two examples bookend a continuum of choices that cities can make about how their streets are designed and organized. While a relatively convenient flow of traffic is essential to a community's vitality, allowing one or many downtown streets to hold traffic of inordinately high volume or speed is certain to undermine that vitality. For this reason, the more effectively a city is able to distribute its traffic through a robust network of thoroughfares, and the more each of these thoroughfares resembles a main street rather than a highway, the more auspicious that city's future is likely to be.

Along that continuum from main street to highway, a key threshold is the transition from two-way to one-way flow. Because one-way streets provide passing lanes and eliminate opposing traffic, they encourage higher-speed driving and create a more highway-like environment for properties along them. They also undermine the robustness of the street network, by providing drivers fewer choices regarding their paths of travel. It is principally for these reasons that the introduction of one-way street networks to many urban centers in the mid-20th century has been associated with the precipitous decline of those centers, and explains why many American downtowns have been reverted back to two-way traffic, with celebrated results.

A second important threshold is the transition between two-lane and four-lane travel, for the similar reason that it introduces passing lanes, encouraging driver behavior that is not compatible with downtown pedestrian activity. Especially where traffic volumes do not demand the presence of additional lanes, their presence—and the additional road width that they create—push urban thoroughfares well down the continuum from main street to highway, with unsurprising results.

For this reason, it is essential that downtown street networks be designed based upon the amount of traffic that they experience rather than in anticipation of larger volumes. This is particularly the case when a community is threatened by an onslaught of new traffic as is feared from the new INDOT tolling regime. A street system that is designed around higher-volume and higher-speed traffic can be expected to quickly receive this traffic—especially trucks, whose drivers are keenly sensitive to the time and cost of travel. In contrast, a street system that is designed to accept reasonable volumes at reasonable speeds is likely a city's only defense against the noxious impacts of pass-through traffic.

This premise is not always an easy one to accept; nobody likes congestion or wants more of it. Therefore, it is important to lay out New Albany's choices honestly. Decades of experience in other communities suggests that the City must choose between two futures: one with somewhat more peak-hour congestion at reasonable speeds, and one with considerably more car and truck traffic at high speeds. If the principal purpose of the City's downtown street network is the vitality of New Albany, then the choice is clear.

Social Impacts of Street Design

This discussion takes place in a larger context, in which the reshaping of the American built environment around the automobile has been associated with a marked decline in the health of our population, especially children. As will be discussed ahead, the elimination of the "useful walk" from the lives of our youth has helped to create the first generation of children who are expected to live shorter lives than their parents. Almost nowhere is this more worrisome than in the Louisville region, which was recently ranked 49^{th} out of the US's 50^{th} largest US metros in the ACSM (American College of Sports Medicine) American Fitness Index.

In New Albany, this status is only being further undermined by a County-wide school system that is closing walkable neighborhood schools in pursuit of a suburban model of fewer, larger facilities, mostly unreachable on foot. This effort is characterized by the recent shuttering of Silver Street Elementary, an older school that was walkable, diverse, and highly regarded; President Bush had visited there and called it a shining example of his no-child-left-behind agenda.

Against this backdrop, New Albany has the opportunity to encourage more healthy lifestyles by embracing national trends towards downtown living, walkability, and cycling. In pursuing those objectives, nothing is more significant that the design of downtown streets. When sized and oriented to welcome traffic of the proper volume and speed, thoroughfares encourage "active transportation" on foot and bicycle, while naturally providing more room for it. Excess driving lanes become available for other use, such as on-street parking and cycle lanes—the former essential to local businesses, and the latter much in demand by would-be downtown residents. Indeed, bike lanes, while a benefit in their own right, are often recommended to serve a different purpose: narrowing oversized driving lanes to a normal width to limit dangerous speeding.

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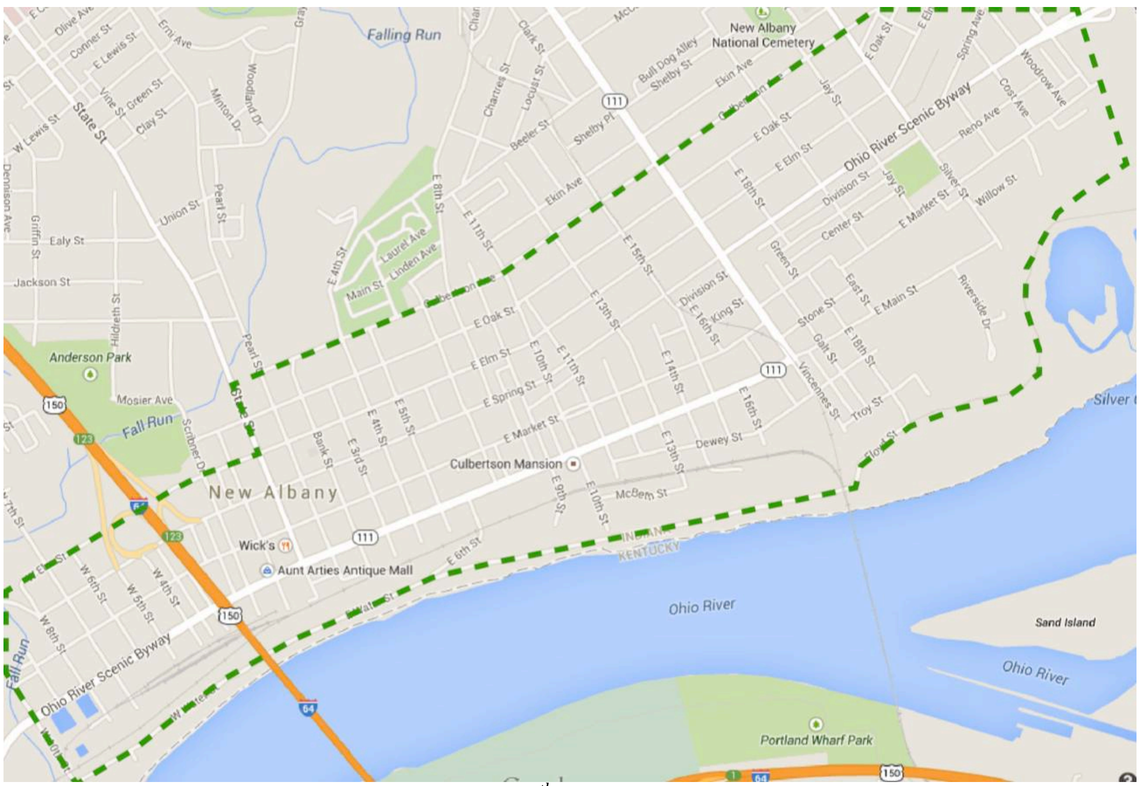
What This Report Is and Isn't

With an understanding that proper streets are key to New Albany's future, this Proposal has been commissioned to consider the organization of the downtown street network and the design of all downtown streets. It focuses on the City's historic core, roughly from W. 10th Street to Vincennes Avenue and from Culbertson Avenue to the River, but also extends eastward to Silver Creek along its principal East-West corridors, as well as northward along State Street to Floyd Memorial Hospital. With a focus on national best practices in network planning and street design, it proposes an almost comprehensive reintroduction of two-way travel, modifications to the current regime of traffic signals, and new curb-to-curb configurations for every street for which improvement is possible. In the interest of economy, almost every recommendation pertains to striping and signalization rather than reconstruction.



The principal study area is bounded by W. 10th Street to the west, Silver Creek to the East, Culbertson Avenue to the north, and the Ohio River to the south.

This Proposal is a planning document and not an engineering document. It does not provide technical drawings or cost estimates. Nor does it specify priorities, though it can be said that the modified Ohio River bridge tolling regime, due in 2016, will make east-west transformations a high priority. Determining a proper schedule for the recommended changes will constitute a larger project determined by the availability of federal, state, and local funds. Finally, this report does not try to address traffic safety comprehensively; such an effort has recently been initiated citywide as an independent effort.

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Instead, this Proposal, after reviewing some of the most compelling reasons for making New Albany more walkable, lays out ten criteria that are understood to have the greatest influence on the safety of downtown street networks. As each criteria is discussed, and best practices described, specific recommendations for New Albany that arise from them are enumerated. A final section, the longest, describes redesigns recommended for every street within the study area for which change makes sense. Where a significant reconfiguration is recommended, illustrations are provided as well. In some cases, where more than one good solution exists, multiple alternatives are provided.

In every section, this Proposal attempts to explain fully the reasoning behind its recommendations. However, because each section builds from the ones prior, those attempting to implement this Proposal are advised to read it in its entirety. It is submitted with confidence that downtown New Albany, by welcoming traffic on its own terms, can redirect current developments and challenges to its own long-term advantage.

A Mandate for Action

New Albany has good bones to become a more walkable place: an efficient street network of small blocks, a healthy balance of land uses, and an improving downtown retail district surrounded by neighborhoods of character. The national website *walkscore.org* awards some close-in areas a rating of nearly 80 (out of 100). But New Albany can cultivate a truly excellent, walkable environment with limited, strategic changes and reasonable investments while still fully accommodating automobiles.

By metropolitan standards, the downtown grid system has almost no congestion, but it is in danger of receiving much more. The planned bridge tolling scheme threatens to undermine the downtown and its surrounding neighborhoods' potential by injecting significantly more speeding traffic through the city. Prior to the construction of I-265 and the I-64 riverfront expressways, Spring Street was a state highway that carried more than 40,000 cars daily at its eastern segment. It now carries only 23,000 vehicles per day.

The new tolling scheme, scheduled to begin in 2016, threatens to re-convert Spring Street and other east-west thoroughfares into highways again, with a huge influx of car and truck traffic. This traffic can be expected to have a destructive impact on the downtown retail district, as well as its surrounding neighborhoods, unless the street network is modified to encourage less noxious driver behavior than is currently the norm. This report lays out a simple, limited-cost, and comprehensive proposal for this modification. It will be considerably easier to accomplish prior to the 2016 tolling changes.

Central to this proposal is the reversion of the downtown one-way grid back to two-way traffic, and the right-sizing of its component driving lanes (in number and width) to encourage the appropriate amount of traffic at the appropriate speed. These changes create the byproduct of increased opportunities for bicycling and on-street parking downtown, both beneficial to local businesses and residents. But these benefits must be understood as secondary to a primary goal: to allow New Albany to thrive in the face of an extraordinarily burdensome traffic regime.

I: THREE ARGUMENTS FOR A MORE WALKABLE CITY

The section that follows is a synopsis of the first three chapters of the book *Walkable City: How Downtown Can Save America, One Step at a Time*, (Jeff Speck, NY: Farrar Straus & Giroux, 2012). Full footnotes for all data and quotations can be found in the book. The book's full test is recommended as background reading for those who wish to better understand the theory and experience behind the recommendations in this report.

After several decades arguing for more walkable cities as a designer, this city planner has found that it is more useful to do so as an economist, an epidemiologist, and an environmentalist. What follows is a discussion of why these three groups are all independently fighting for the same thing, which is to redesign our cities in a way that, while still functional for automobiles, encourages and rewards walking.

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The Economic Argument

Many cities ask the same question: How can we attract corporations, citizens, and especially young, entrepreneurial talent? In some cities, they ask it differently: "How can we keep our children from leaving?"

The obvious answer is that cities need to provide the sort of environment that these people want. Surveys—as if we needed them—show how creative class citizens, especially millennials, vastly favor communities with *street life*, the pedestrian culture that can only come from walkability.

The number of 19-year-olds who have opted out of earning driver's licenses has almost tripled since the late seventies, from 1 in 12 to 1 in 4. This driving trend is only a small part of a larger picture that has less to do with cars and more to do with cities, and specifically with how young professionals today view themselves in relation to the city, especially in comparison to previous generations.

The economist Christopher Leinberger compares the experience of today's young professionals with the previous generation. He notes that most 50-year-olds grew up watching *The Brady Bunch, The Partridge Family, and Happy Days,* shows that idealized the late-mid-20th-century suburban standard of low-slung houses on leafy lots, surrounded by more of the same. The millennials in contrast, grew up watching *Seinfeld, Friends,* and, eventually, *Sex and the City.* They matured in a mass culture—of which TV was only one part—that has predisposed them to look favorably upon cities, indeed, to aspire to live in them.

This group represent the biggest population bubble in fifty years. 64 percent of college-educated millennials choose first where they want to live, and only then do they look for a job. According to surveys, fully 77 percent of them plan to live in America's urban cores.

Meanwhile, the generation raised on *Friends* is not the only major cohort looking for new places to live. There's a larger one: the millennials' parents, the front-end boomers. They are citizens that every city wants—significant personal savings, no schoolkids.

And according to Christopher Leinberger, empty nesters want walkability:

> "This group is finding that their suburban houses are too big. . . All those empty rooms have to be heated, cooled, and cleaned, and the unused backyard maintained. Suburban houses can be socially isolating, especially as aging eyes and slower reflexes make driving everywhere less comfortable."

In the 1980s, city planners began hearing from sociologists about something called a NORC: a Naturally Occurring Retirement Community. Over the past decade, a growing number of retires have been abandoning their large-lot houses to resettle in mixed-use urban centers. For many of them, that increased walkability means all the difference between an essentially housebound existence and several decades of continued independence.

Of the 100 million new households expected to take shape between now and 2025, fully 88 million are projected to be childless. This is a dramatic change from 1970, when almost half of all households included children. These new adults-only households won't be concerned about the quality of local schools or the size of their backyards. This fact will favor cities over suburbs, but only those cities that can offer the true urbanism and true walkability that these groups desire.

This growing demand for pedestrian-friendly places is reflected in the runaway success of Walk Score, the website that calculates neighborhood walkability. In this website, which gets millions of hits a day, addresses are ranked in five categories, with a score of 50 needed to cross the *Somewhat Walkable* threshold. 70 points earns a *Very Walkable* ranking, and anything above 90 qualifies as a *Walker's Paradise.* San Francisco's Chinatown earns a 100, while Los Angeles' Mulholland Drive ranks a 9.

If Walk Score is so helpful in helping people decide where to live, then it can also help us determine how much they value walkability. Now that it has been around for a few years, some resourceful economists have had the opportunity to study the relationship between Walk Score and real estate value, and they have put a price on it: $500 to $3000 *per point.* In a very typical city, Charlotte, North Carolina, the economist Joe Cortright. found that each Walk Score point was worth $2000—that's $200,000 across the full scale.

That is the value that houses get for being walkable. But what about cities themselves? Does being more walkable make a whole city worth more?

In 2007, Joe Cortright, the economist responsible for the Walk Score value study cited above, published a report called "Portland's Green Dividend," in which he asked the question: what does Portland get for being walkable?

To set the stage, it is useful to describe what makes Portland different. Beginning in the 1970s, Portland made a series of decisions that fundamentally altered the way the city was to grow. While most American cities were building more highways, Portland invested in transit and biking. While most cities were reaming out their roadways to speed traffic, Portland implemented a Skinny Streets program. While most American cities were amassing a spare tire of undifferentiated sprawl, Portland instituted an urban growth boundary. These efforts and others like them, over several decades—a blink of the eye in planner time—have changed the way that Portlanders live.

This change is not dramatic—were it not for the roving hordes of bicyclists, it might be invisible—but it is significant. While almost every other American city saw its residents drive farther and farther every year, and spend more and more of their time stuck in traffic, Portland's vehicle miles traveled per person peaked in 1996. Now, compared to other major metropolitan areas, Portlanders on average drive 20 percent less.

According to Cortright, this 20 percent (4 miles per citizen per day) adds up to $1.1 billion of savings each year, which equals fully 1.5 percent of all personal income earned in the region. And that number ignores time not wasted in traffic: peak travel times have actually dropped 11 minutes per day. Cortright calculates this improvement at another $1.5 billion.

What happens to these savings? Portland is reputed to have the most independent bookstores per capita and the most roof racks per capita. These claims are slight exaggerations, but they reflect a documented above-average consumption of recreation of all kinds. Portland has more restaurants per capita than all other large cities except Seattle and San Francisco.

More significantly, whatever they are used for, these savings are considerably more likely to stay local than if spent on driving. Almost 85 percent of money expended on cars and gas leaves the local economy—much of it, of course, bound for the Middle-East. A significant amount of the money saved probably goes into housing, since that is a national tendency: families that spend less on transportation spend more on their homes, which is as local as investments get.

That's the good new about Portland. Meanwhile, what's happened to the rest of the country? While transportation used to absorb only one tenth of a typical family's budget (1960), it now consumes more than one in five dollars spent. The typical "working-class" family, remarkably, pays more for transportation than for housing.

This circumstance exists because the typical American working family now lives in suburbia, where the practice of "drive-'til-you-qualify" reigns supreme. Families of limited means move further and further away from city centers in order to find housing that is cheap enough to meet bank lending requirements. Unfortunately, in so doing, they often find that driving costs outweigh any savings, and their total household expenses escalate.

No surprise, then, that as gasoline broke $4.00 per gallon and the housing bubble burst, the epicenter of foreclosures occurred at the urban periphery, places that required families to have a fleet of cars in order to participate in society, draining their mortgage carrying capacity. These are the neighborhoods that were not hurt by the housing bubble bursting; they were ruined by it.

This is bad news for Orlando and Phoenix, but it's good news for New York, Chicago, and Portland. But the real Portland story is perhaps not its transportation but something else: young, smart people are moving to Portland in droves. Over the decade of the 1990s, the number of college-educated 25 to 34 year-olds increased 50 percent in the Portland metropolitan area—five times faster than in the nation as a whole.

There is another kind of walkability dividend, aside from resources saved and resources reinvested: resources attracted by being a place where people want to live. The conventional wisdom used to be that creating a strong economy came first, and that increased population and a higher quality of life would follow. The converse now seems more likely: creating a higher quality of life is the first step to attracting new residents and jobs. This is why Chris Leinberger believes that “all the fancy economic development strategies, such as developing a biomedical cluster, an aerospace cluster, or whatever the current economic development ‘flavor of the month’ might be, do not hold a candle to the power of a great walkable urban place.”

The Epidemiological Argument

On July 9, 2004, three epidemiologists published a book called *Urban Sprawl and Public Health.* Until that day, the main arguments for building walkable cities were principally aesthetic and social. More significantly, almost nobody but the planners was making them. But it turns out that while the planners were shouting into the wilderness about the frustrations, anomie, and sheer waste of suburban sprawl, a small platoon of physicians were quietly doing something much more useful: they were documenting how our built environment was killing us, in at least three different ways: obesity, asthma, and car crashes.

The numbers are compelling. According to the U.S. Centers for Disease Control, fully one-third of American children born after 2000 will become diabetics. For the first time in history, the current generation of youth are expected to live shorter lives than their parents. This is due partly to diet, but partly to planning: the methodical eradication from our communities of *the useful walk* has helped to create the least-active generation in American history.

In any discussion about American health, obesity has to be front and center. In the mid-1970s, only about one in ten Americans was obese, which put us where much of Europe is right now. What has happened in the intervening thirty years is astonishing: by 2007, that rate had risen to one in three, with a second third of the population "clearly overweight." According to the rules of the U.S. military, twenty-five percent of young men and forty percent of young women are too fat to enlist.

Much has been written about the absurdity of the American corn-based diet and its contribution to our national girth. But our body weight is a function of calories in and calories out, and the latest data suggests that diet is actually the smaller factor. One recent study, published in the *British Medical Journal*, called "Gluttony or Sloth?" found that obesity correlated much more strongly with inactivity than with diet. Meanwhile, at the Mayo Clinic, Dr. James Levine put test subjects in motion-detecting underwear, placed them all on the same diet, and then began to stuff them with additional calories. As anticipated, some subjects gained weight while others didn't. Expecting to find a metabolic factor at work, he learned instead that the outcome was entirely attributable to physical activity. The people who got fatter made fewer unconscious motions and, indeed, spent on average two more hours per day sitting down.

Over the past decade, there has been a series of studies that attribute obesity to the automotive lifestyle and, better yet, to the automotive landscape. One study, in San Diego, reported that 60 percent of residents in a "low-walkable" neighborhood were overweight, compared to only 35 percent in a "high-walkable" neighborhood. Another, a six-year analysis of 100,000 Massachusetts residents found that the lowest Body Mass Index averages were located in Boston and its inner ring suburbs, while the highest could be found in the "car-dependent" outer ring surrounding Interstate 495.

Now, let's turn to asthma. About fourteen Americans die each day from asthma attacks. That number does not seem particularly high, but it is three times the rate of 1990. Now, 7 percent of American's suffer from Asthma in some form.

Pollution isn't what it used to be. American smog now comes principally from tailpipes, not factories. It is considerably worse than it was a generation ago, and it is unsurprisingly worst in our most auto-dependent cities, like Los Angeles and Houston. In 2007, Phoenix recorded three full months of days in which it was deemed unhealthy for the general public to leave their homes.

Finally, for most healthy Americans, the greatest threat to that health is car crashes. Most people take the risks of driving for granted, as if they were some inevitable natural phenomenon—but they aren't. While the U.S. suffers 12 traffic fatalities annually per 100,000 population, Germany, with its no-speed-limit Autobahn, has only 7, and Japan rates a 4. New York City beats them all, with a rate of 3. If our entire country shared New York City's traffic statistics, we would prevent more than 24,000 deaths a year.

San Francisco and Portland both compete with New York, with rates below 3 deaths per 100,000 population, respectively. Meanwhile, Tulsa comes in at 14 and Orlando at 20. Clearly, it's not just how much you drive, but where you drive, and more accurately how those places were designed. Older, denser cities have much lower automobile fatality rates than newer, sprawling ones. Ironically, it is the places shaped around automobiles that seem most effective at smashing them into each other.

In search of some good news, we can turn to Dan Buettner, the National Geographic host and bestselling author responsible for *The Blue Zones: Lessons for Living Longer from the People Who've Lived the Longest.* After a tour of the world's longevity hot spots, Buettner takes his readers through the "*Power Nine:* the lessons from the Blue Zones, a cross cultural distillation of the world's best practices in health and longevity." Lesson One is "Move Naturally":

"Longevity all-stars don't run marathons or compete in triathlons; they don't transform themselves into weekend warriors on Saturday morning. Instead, they engage in regular, low-intensity physical activity, often as a part of a daily work routine. Rather than exercising for the sake of exercising, try to make changes to your lifestyle. Ride a bicycle instead of driving. Walk to the store instead of driving. . ."

Like most writers on the subject, Buettner and his sources neglect to discuss how these "lifestyle" choices are inevitably a function of the design of the built environment. They may be powerfully linked to place—the Blue Zones are zones, after all—but there is scant admission that walking to the store is more possible, more enjoyable, and more likely to become habit in some places than in others. It is those places that hold the most promise for the physical and social health of our society.

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The Environmental Argument

In 2001, Scott Bernstein, at the Center for Neighborhood Technology in inner-city Chicago, produced a set of maps that are still changing the way Americans think about their country. In these maps, remarkably, the red and the green switched places. This reversal, perhaps even more than the health discussion, threatens to make walkability relevant again.

On typical carbon maps, areas with the greatest amounts of carbon output are shown in bright red, and those with the least are shown in green, with areas in between shown in orange and yellow. The hotter the color, the greater the contribution to climate change.

Historically, these maps looked like the night-sky satellite photos of the United States: hot around the cities, cooler in the suburbs, and coolest in the country. Wherever there are lots of people, there is lots of pollution. A typical carbon map, such as that produced in 2002 by the Vulcan Project at Purdue University, sends a very clear signal: countryside good, cities bad.

These maps are well in keeping with the history of the environmental movement in the United States, which has traditionally been anti-city, as has so much American thought. This strain traces its roots back to Thomas Jefferson, who described large cities as "pestilential to the morals, the health, and the liberties of man." Not without a sense of humor, he went on: "When we get piled up upon one another in large cities, as in Europe, we shall become as corrupt as in Europe, and go to eating one another as they do there."

For a long time, these were the only type of carbon map, and there is certainly a logic in looking at pollution from a location-by-location perspective. But this logic was based on an unconsidered assumption, which is that the most meaningful way to measure carbon is by the square mile.

This assumption is false. The best way to measure carbon is per person. Places should be judged not by how much carbon they emit, but by how much carbon they cause us to emit. There are only so many people in the United States at any given time, and they can be encouraged to live where they have the smallest environmental footprint. That place turns out to be the city—the denser the better.

Or, as the economist Ed Glaser puts it: "We are a destructive species, and if you love nature, stay away from it. The best means of protecting the environment is to live in the heart of a city."

No American city performs quite like New York. The average New Yorker consumes roughly one third the electricity of the average Dallas resident, and ultimately generates less than one third the greenhouse gases of the average American. The average resident of Manhattan consumes gasoline "at a rate that the country as whole hasn't matched since the mid-1920s."

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New York is America's densest big city and, not coincidentally, the greenest. But why stop there?: New York consumes half the gasoline of Atlanta. But Toronto cuts that number in half, as does Sydney—and most European cities use only half as much as those places.

This condition exists not because our buildings or cars are less efficient, or our buildings are less green, but because our cities are not as well organized around walking. This point was made clear in a recent EPA study, "Location Efficiency and Building Type—Boiling it Down to BTUs," that compared four factors: drivable vs. walkable ("transit-oriented") location; conventional construction vs. green building; single-family vs. multifamily housing; and conventional vs. hybrid automobiles. The study demonstrated that, while every factor counts, none counts nearly as much as walkability. Specifically, it showed how, in drivable locations, transportation energy use consistently tops household energy use, in some cases by more than 2.4 to 1. As a result, the most green home (with Prius) in sprawl still loses out to the least green home in a walkable neighborhood.

It turns out that trading all of your incandescent light bulbs for energy-savers conserves as much carbon per year as living in a walkable neighborhood does each week. Why, then, is the vast majority of our national conversation on sustainability about the former and not the latter? Witold Rybczynski puts it this way:

> Rather than trying to change behavior to reduce carbon emissions, politicians and entrepreneurs have sold greening to the public as a kind of accessorizing. "Keep doing what you're doing," is the message, just add another solar panel, a wind turbine, a bamboo floor, whatever. But a solar-heated house in the suburbs is still a house in the suburbs, and if you have to drive to it—even in a Prius—it's hardly green.

This accessorizing message has been an easy sell in America, where it is considered politically unwise to ask consumers to *sacrifice*, to alter their quality of life in service of some larger national goal, such as keeping a dozen of our largest cities above sea level. But what if there were a more positive quality-of-life discussion, one that allowed us to satisfy consumer demands that have not been met by a real estate industry centered on suburban sprawl.

The gold standard of quality-of-life rankings is the Mercer Survey, which carefully compares global cities in the ten categories including political stability, economics, social quality, health, education, recreation, housing, and even climate. Its rankings shift slightly from year to year, but the top ten cities always seem to include a number of places where they speak German (Vienna, Zurich, Dusseldorf, etc.) along with Vancouver, Auckland, and Sydney. These are all places with compact settlement patterns, good transit, and principally walkable neighborhoods. Indeed, there isn't a single auto-oriented city in the top 50. The highest rated American cities in 2010, which don't appear until number 31, are Honolulu, San Francisco, Boston, Chicago, Washington, New York, and Seattle.

Looking at this ranking, the message is clear. America's cities, which are twice as efficient as its suburbs, burn twice the fuel of European, Canadian, and Aussie/Kiwi places. Yet the quality of life in these foreign cities deemed considerably higher. This is not to say that quality of life is inversely related to sustainability, but merely that many Americans, by striving for a better life, might find themselves moving to places that are more like the winners. . . or better yet, might try transforming their cities to resemble the winners. This sort of transformation could include many things, but one of them would certainly be walkability.

Vancouver, always a top contender, proves a useful model. By the mid-20th century, it was fairly indistinguishable from a typical U.S. city. Then, beginning in the late 50s, when most American cities were building highways, planners in Vancouver began advocating for high-rise housing downtown. This strategy, which included stringent measures for green space and transit, really hit its stride in the 1990s, and the change has been profound. Over the past fifteen years, the amount of walking and biking citywide has doubled, from fifteen percent to thirty percent of all trips. Vancouver is not ranked #1 for livability because it is so sustainable; the things that make it sustainable also make it livable.

Quality of life—which includes both health and wealth—may not be a function of our ecological footprint, but the two are deeply interrelated. To wit, if we pollute so much because we are throwing away time, money, and lives on the highway, then both problems would seem to share a single solution, and that solution is to make our cities more walkable.

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II: WHAT MAKES A SAFE WALK?

The principal way to make a street feel safe is to keep automobiles at reasonable speeds and to protect pedestrians from them. This is achieved by meeting the following ten criteria:

- The proper number of driving lanes;
- Lanes of proper width;
- Avoiding one-way streets;
- Limited use and length of turn lanes;
- Including bike lanes;
- Continuous on-street parking;
- Continuous shade trees;
- Replacing unwarranted signals with principally all-way stop signs
- Pedestrian-friendly signals where signals are warranted; and
- Pedestrian-Friendly details.

These criteria are addressed individually below in terms of how they apply to downtown New Albany, and are used as an organizational framework for a series of specific recommendations.

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The Proper Number of Driving Lanes

The more lanes a street has, the faster traffic tends to go, and the further pedestrians have to cross. Many of New Albany's downtown streets clearly have more lanes than they need to satisfy the demand upon them, as will be demonstrated ahead. Here the City is faced with a choice: should these streets be kept in their oversized state, in order to meet a potential future demand, or should they be limited to a size that is closer to (but still above) the current demand?

In most American communities, this question is moot, because driving is no longer on the rise. National Vehicle Miles Travelled (VMT) peaked in 2006, and has been flat since. Cultural shifts, such as a decline in car ownership among young adults, suggest that this condition is not temporary. However, New Albany is in a unique position, and a precarious one. The planned tolling regime for the new bridges across the Ohio River, beginning in 2016, is expected to redirect a substantial number of vehicles, including many trucks, over the only remaining free interstate route: the Sherman Minton Bridge. The path to that bridge is New Albany. Unless something happens to change the economics of the situation, downtown New Albany is in danger of being overwhelmed by new unwanted traffic.

It is not too late to address the root of this problem. The tolling regime—in which vehicles will be penalized between $2.00 and $12.00 for *not* driving through New Albany—must be contested. Other measures, such as the City imposing its own tolls, should be fully investigated. But, barring a new economic landscape, New Albany is likely to be faced with an onslaught of new vehicles moving through its downtown. The question is not how the City can avoid rush-hour congestion, but rather how many lanes of congestion the city wants to hold. This can be said with some certainty, thanks to our understanding of the phenomenon of Induced Demand.

Induced Demand

While entire books now explain and document the phenomenon, few public works agencies make daily decisions as if they understand Induced Demand. As explained by the First Law of Traffic Congestion, efforts to combat traffic congestion by increasing roadway capacity almost always fail, because, in congested systems, the principal constraint to driving is the very congestion that road-builders hope to eliminate. Studies nationwide document how "metro areas that invested heavily in road capacity expansion fared no better in easing congestion than those that did not. . . areas that exhibited greater growth in lane capacity. . . ended up with slightly higher congestion costs per person, wasted fuel, and travel delay" despite paying considerably more to relieve it (Surface Transportation Policy Project, Washington, DC).

In the case of New Albany, new traffic is being induced by an additional factor, a significant cash reward. This incentive will direct greater and greater numbers of vehicles through downtown until a countervailing force can push demand downward. Absent an unlikely new local toll, that countervailing force will be rush-hour congestion.

When slower-moving traffic inflicts a significant time penalty on drivers who detour through New Albany to avoid the toll, drivers will begin to avoid the detour. Indeed, the severity of that time penalty will determine the size of the catchment area from which drivers are being drawn through New Albany.

In light of these circumstances, New Albany's considerable excess road capacity can be seen not as an asset but as a liability. The extent of that liability is illustrated in the analysis ahead. The more lanes in its streets, the more vehicles will be drawn through the City, from a greater distance. So, while the City has yet to find a way to remove the powerful incentive to drive through it, it can at least limit the volume of new traffic by limiting the number of lanes through which it can flow. This is particularly the case for the Spring Street Corridor between Silver Creek and the I-64 interchange.

What Traffic Means

Before analyzing traffic flows further, it is worth stepping back to address the consequences of increased traffic in American downtowns, because all is not negative. Downtowns need traffic to survive. Indeed, cars, moving slowly, are the lifeblood of the American City. If given a chance, each driver is a potential shopper or diner. However, the rush hour driver is not an ideal shopper. The impression among local merchants interviewed is that most customers are either locals or people who have come to New Albany as a destination, and that most commuters are simply using New Albany as a conduit, without stopping.

This sort of behavior, is of course influenced by the nature of the streets that the commuters are on. The more that a street feels like a highway, with multiple lanes in a single direction and timed traffic lights enabling non-stop flow, the less likely a driver is to stop and shop or dine. This factor presents an additional incentive to modify New Albany's roadways so that they better resemble downtown streets.

Two other aspects of traffic also deserve our attention: pollution and property value. In terms of air pollution, the more cars that New Albany invites into its downtown, the lower its downtown air quality will be. This is a concern for many reasons, but the most compelling is probably asthma. Right now, Louisville is one of the 100 worst cities in the U.S. for people with Asthma (ranking: 53). The single greatest contributor to localized air pollution in cities is cars, and Asthma in cities is unsurprisingly highest near major roadways. The greater the capacity of New Albany's roadways, the more its residents and workers will suffer from air-quality related illnesses.

In terms of property value, we must remain mindful of the clear inverse correlation that has been shown to exist in North American cities between an inner city's land values and that city's investment in roadways. Generally, the more highways a city builds through its downtown, the less valuable that downtown's real estate becomes. (A longer discussion of this history can be found in Speck, *Walkable City*.) While this correlation applies principally to the construction of elevated highways, it is likely to be relevant to the construction of surface streets as well, to the degree that those streets invite multiple lanes of brisk travel. Cars speeding past properties make them less attractive, as does large quantities of traffic. And, as documented by Donald Appleyard in 1981 in *Livable Streets*, the wider and more trafficked a person's street, the less sense of community they are likely to report.

In sum, traffic can be a boon to a downtown and, indeed, most downtowns need significant traffic to survive. But the traffic will only benefit the city if it is does not overwhelm the city with its speed or its volume. Many of New Albany's downtown streets already invite speeds which are not beneficial to the city, and many also are capable of handling volumes far in excess of the current flow, a circumstance that must be modified if a future of much greater traffic is to be avoided.

How Much Traffic?

The analysis that follows demonstrates the street networks excess capacity by comparing current road capacity (lane Supply) to current traffic volumes (lane Demand). Wherever Supply exceeds Demand, it can be anticipated that a future increase in Demand (due to the upcoming bridge tolling regime) will result in additional traffic, for the reasons discussed above.

The first diagrams to consider list the current traffic volumes in the study area. The first diagram places all available traffic counts on the map. In some cases these are peak hourly counts (marked in yellow), and in others they are daily counts (marked in green). Peak-hourly counts are more trustworthy for determining road capacity.

For legibility, this diagram is split between the next two pages.

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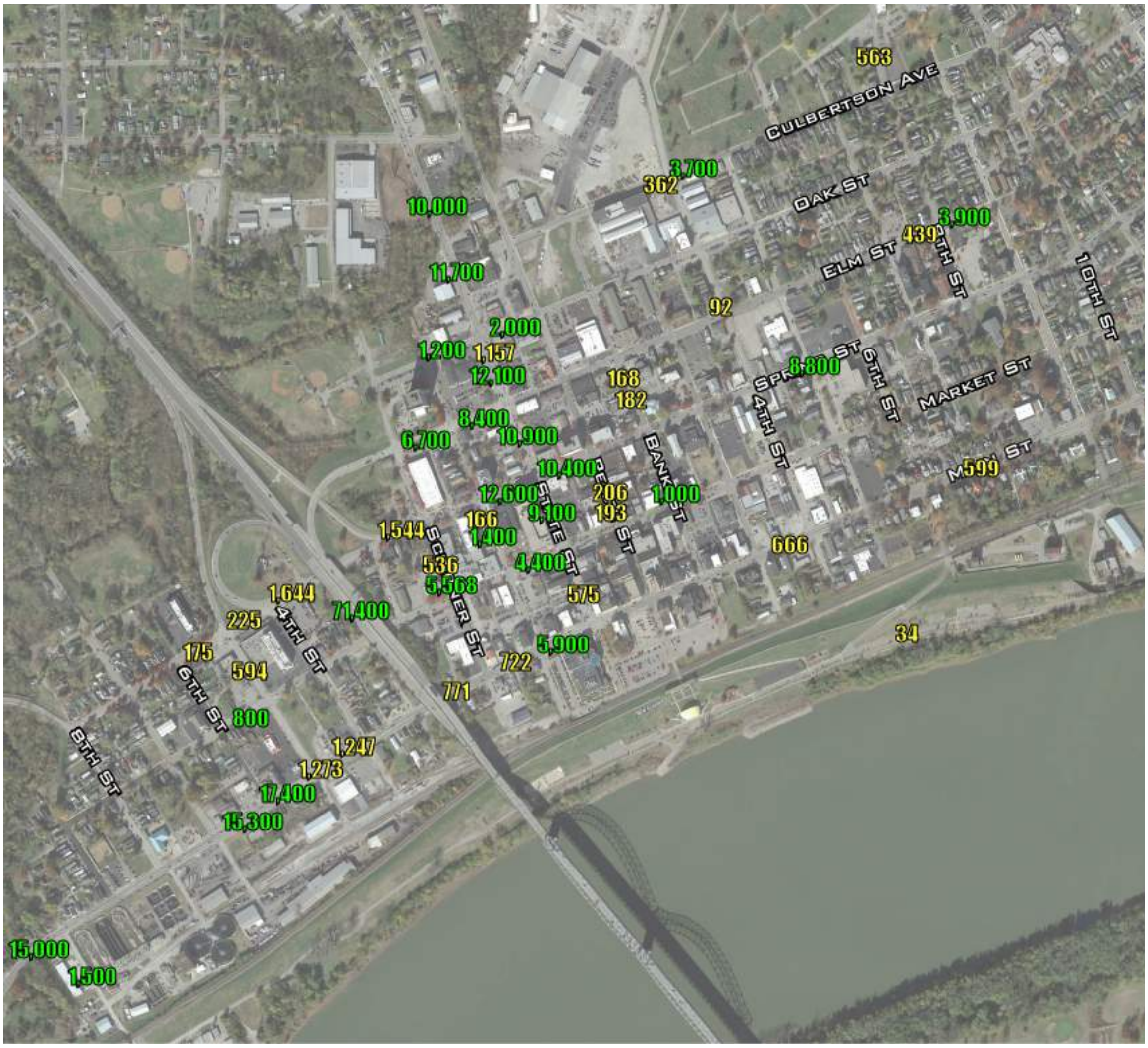
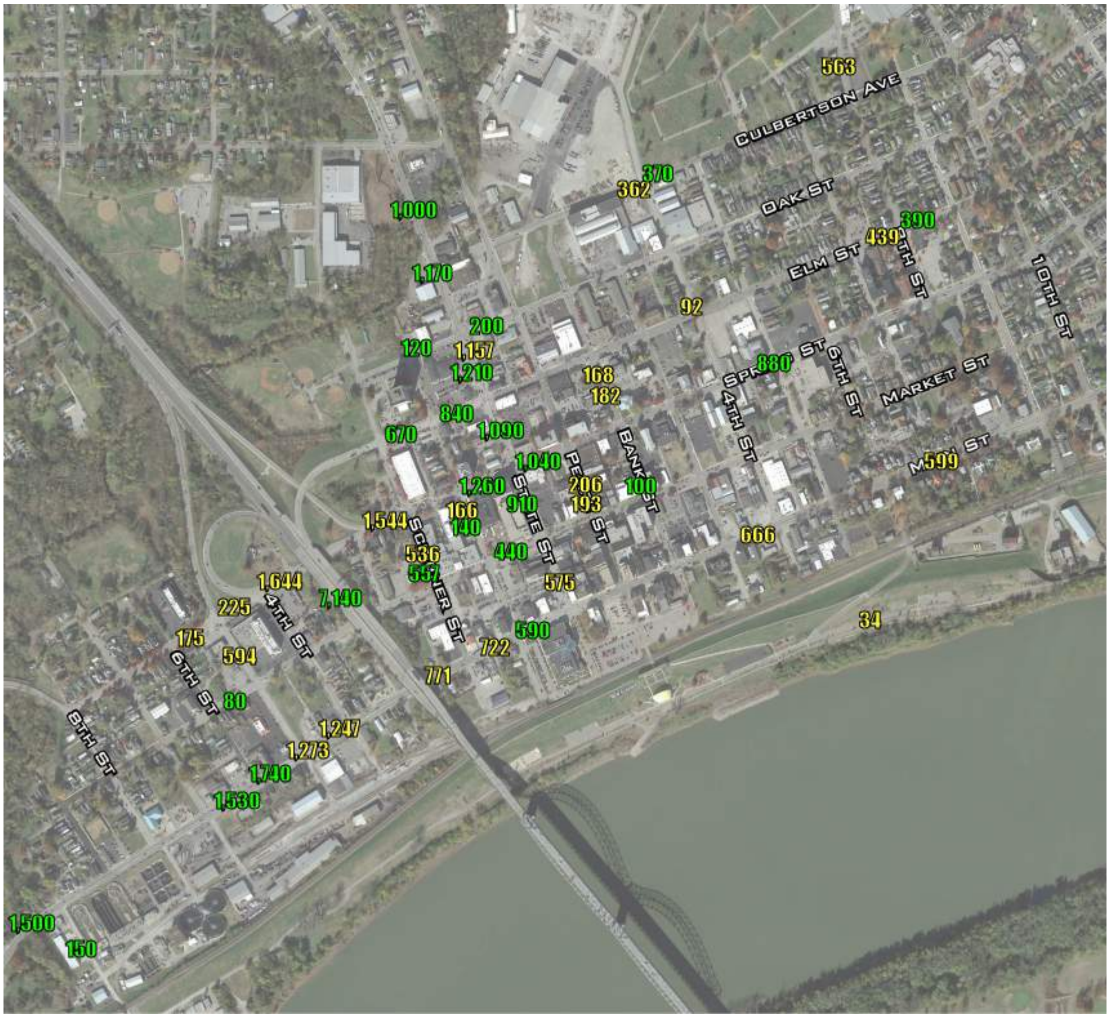


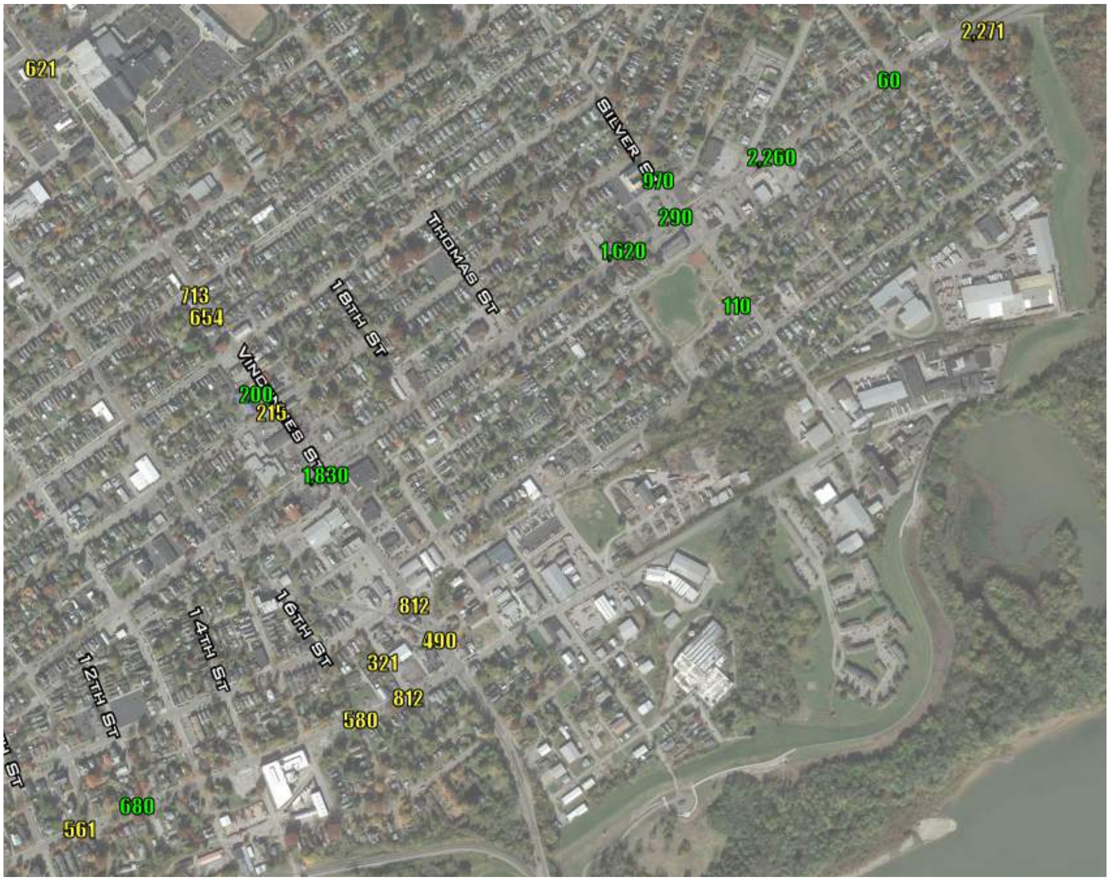
Available traffic counts downtown. Counts in yellow are peak hourly, while counts in green are daily.

Available traffic counts east of downtown. Counts in yellow are peak hourly, while counts in green are daily.

The second diagram, in order to compare apples to apples, converts all daily counts to peak hourly counts by dividing them by 10. This divisor is an industry standard, and it is confirmed as generally applicable in New Albany by comparing those segments for which both daily and hourly counts have been taken. If anything, it seems conservative, perhaps predicting peak hourly counts that are a bit high. Peak-hourly counts remain in yellow, while daily counts that have been converted are marked in green.



Available traffic counts downtown, revised. Counts in yellow are peak hourly, while counts in green are estimated peak hourly based upon daily.



Available traffic counts east of downtown, revised. Counts in yellow are peak hourly, while counts in green are estimated peak hourly based upon daily.

The next step is to convert these counts into lanes of travel demanded. This Demand is calculated based on best-practices assumptions about how many peak-hour trips a single lane of traffic is able to accommodate. The assumptions derived by the traffic engineers at Nelson/Nygaard Associates are as follows:

- A single well-networked lane within a two-way street can comfortably handle 650 peak hour trips.
- A single well-networked lane within a one-way street can comfortably handle 800 peak hour trips.

(These values are rules of thumb based on measurement of networked urban street systems. Local values will of course vary based on a variety of factors.) Translating the peak-hour counts into lanes results in a diagram that shows how many driving lanes are appropriate if only a limited increase in downtown traffic volumes is desired:

This diagram shows how many lanes are needed to handle current traffic volumes. 3-laned two ways, such as West Main Street, are so designated because they hold more traffic than a 2-lane street can typically handle.

Next, we simply count the number of lanes in downtown streets to determine the Supply. This diagram suggests how much traffic New Albany's downtown streets can hold:

This diagram shows how many lanes of traffic the current system could potentially hold.

Finally, we compare the two last diagrams, subtracting Demand from Supply to determine the Excess Supply. Given the anticipated burden to be placed on New Albany by the future tolling regime, this Excess Supply could also be thought of as Invited New Traffic.

This diagram shows the number of lanes of unused capacity that could potentially be filled as the new tolling regime attracts more drivers through New Albany.

A Limited Mandate

The conclusions from this exercise are clear: downtown New Albany has the potential to become much more crowded with vehicles than it currently is, and the best way to protect against this overcrowding would be to reduce the Supply of downtown lanes to a number that is no greater than the current Demand. However, as dramatic as this recommendation would sound, it actually has a very limited impact, since so few of New Albany's streets are more than two lanes wide.

As will be discussed ahead, two-way traffic is superior to one-way traffic for both safety and city vitality, and a conversion of many streets back to two-way traffic will be recommended. This means that only those streets of more than two lanes are candidates for reduction. Within the study area, that condition applies to significant stretches of only the following streets: Vincennes, Market, and Spring.

<u>Vincennes Street</u>
Within the study area, Vincennes is the easiest street to discuss, because it contains a strange extra northbound lane, creating a 3-lane capacity on a road carrying only slightly

more than one lane's worth of traffic. It also has a massive 5-lane cross-section at its intersection with Main Street, despite its low car counts. Eliminating the extra northbound lane and the unnecessary right-hand turn lane at the Main Street intersection will result in a safer street that is still sized well beyond its current volume would demand.

Market Street

Market, like Vincennes, simply has a segment that is strangely much larger than its current traffic load would suggest. Because it was once a broad two-way Avenue from W. 1st to Pearl, Market is split in half by a central median. From W. 1st to State, the median separates two 2-lane pairs, and from State to Pearl, it separates a 2-lane roadway from a 1-lane roadway. This 3- to 4-lane section is much larger than demanded by the roughly 1-lane's-worth of traffic the street receives. This section can be easily reduced to two lanes without fearing any increased congestion.

Spring Street

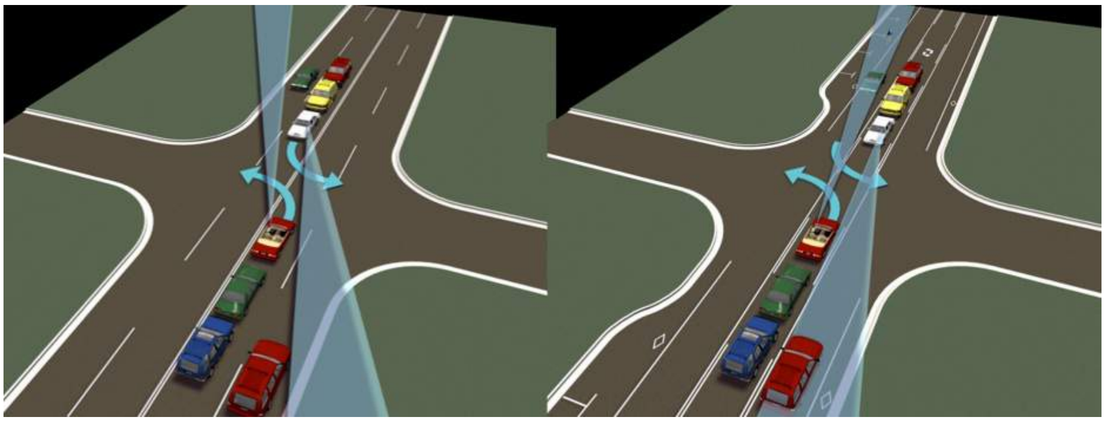
Spring Street is the corridor that is most instrumental in determining how much traffic passes through downtown New Albany. From E. 3rd Street to Vincennes, it is two lanes wide, but it expands east and west of these points to interface with highways.

- To the west, it broadens to three and eventually four lanes to access I-64. Here, the car counts are not out of keeping with a two-lane road, but the congestion often present is principally storage: cars waiting to get onto the highway. This storage would be less of an issue if it were distributed better among the other streets in the downtown grid. Reverting Spring and Market to two-way, as is discussed ahead, will help encourage that distribution, and should allow Spring Street to eliminate one of its westbound lanes by shifting that lane's westbound traffic to Market and Elm Streets.

- To the east, Spring Street travels from its highway-style bridge across the Silver Creek all the way to Vincennes Street in a broad 4-lane section. Traffic on this section seems to peak at 2271 cars per hour, or about 22,700 cars per day (based on the 10% rule). Using 650 cars per lane as the measure, it can be seen that this street is nearing capacity (4 lanes * 650 cars/lane/hour = 2600 cars per hour), but that there is still room for perhaps 80 more cars per hour. As discussed above, these are trips that New Albany, fearing toll-driven detours, should not want to encourage. This four-lane section of Spring Street also feels very much like a highway, and experiences a large amount of speeding while creating an environment that is dangerous to walk along or live near. The ideal solution for this street would be to calm the traffic and create an environment of greater safety, without significantly changing its capacity, beyond perhaps a slight lowering of volume to match current demand.

The Classic American Road Diet

Fortunately, there exists a solution for Spring Street that is likely to accomplish exactly the desired outcome. It has been well tested all over North America and produced consistently positive results. It is called the "Four-to-Three Road Diet." In it, a standard 4-lane street is replaced by a 3-lane street: one lane in each direction and a center lane reserved for left turns.



The "Classic American Road Diet swaps four lanes for three, resulting in a safer street with no loss in capacity, and room for additional uses like bikes or parking. (Drawing by Glatting Jackson)

Road diets save lives, and make their neighborhoods much more livable. In a typical road diet conversion in Orlando, the number of crashes fell by 34 percent and, because the crashes were slower, the number of injuries fell by 68 percent: from one per nine days to one per month.

While few people are surprised by the improved safety of road diets, they do not expect the impressive traffic results: on average, road dieted streets lose none of their carrying capacity.

4-lane streets are as inefficient as they are dangerous, because the fast lane is also the left-hand turn lane, and maintaining speed often means jockeying from lane to lane. Eliminating this jockeying improves efficiency. Comparison of seventeen different road diets conducted by the engineering firm Glatting Jackson found that only two streets lost capacity, while five stayed the same, and ten actually handled more cars per day after the conversion. Traffic volumes on these streets ranged from 14,000 to 26,000 cars per day, a range which includes the volumes currently experienced on Spring Street.

This data is important, because most road-diet opponents are fearful of increased congestion. In the 1980s, 95 percent of the residents of Lewistown, PA came out against a road diet proposed by engineers at PennDOT, citing concerns over increased travel times. PennDOT built the conversion anyway, and travel times remained unchanged as crashes dropped to nearly zero.

Lanes of Proper Width

Different-width traffic lanes correspond to different travel speeds. A typical American urban lane is 10 feet wide, which comfortably supports speeds of 35 mph. A typical American highway lane is 12 feet wide, which comfortably supports speeds of 70 mph. Drivers instinctively understand the connection between lane width and driving speed, and speed up when presented with wider lanes, even in urban locations. For this reason, any urban lane width in excess of 10 feet encourages speeds that can increase risk to pedestrians.

Many streets in downtown New Albany contain lanes that are 12 feet wide or more, and drivers can be observed approaching highway speeds when using them. Indeed, some downtown lanes on Spring, State, and Main Street are 13, 15, or even 17 feet wide

The Data

Having a fully informed discussion comparing 10-foot driving lanes to 12-foot driving lanes will be central to achieving safer streets in New Albany, as 12 feet is the lane width preferred by the State DOT. A review of all available literature on the topic produces the following findings:

- While hardly beyond questioning, the AASHTO *Policy on Geometric Design of Highways and Streets* is considered the Bible of conventional traffic engineering, and is useful in protecting engineers against lawsuits. Theodore Petrisch P.E. PTOE, an expert on lane widths, summarizes the Green Book as follows: “For rural and urban arterials, lane widths may vary from 10 to 12 feet. 12-foot lanes should be used where practical on higher-speed, free-flowing, principal arterials. However, under interrupted-flow [signalized] conditions operating at lower speeds [35 MPH or less], narrower lane widths are normally quite adequate and have some advantages.”

- According to the conservative Midwest Research Institute’s NCHRP Project 3-72, *Relationship of Lane Width to Safety for Urban and Suburban Arterials*, “A safety evaluation of lane widths for arterial roadway segments found no indication, except in limited cases, that the use of narrower lanes [10 to 11 feet rather than 12] increases crash frequencies. The lane widths in the analyses conducted were generally either not statistically significant or indicated that narrower lanes were associated with lower rather than higher crash frequencies.”

- According to NCHRP 330, *Effective Utilization of Street Width on Urban Arterials*, “…all projects evaluated during the course of the study that consisted of lane widths exclusively of 10 feet of more [vs. 12 feet] resulted in accident rates that were either reduced or unchanged.”

- According to the conservative Texas Transportation Institute, “On suburban arterial straight sections away from a traffic signal, higher speeds should be expected with greater lane widths." (This is the only available study that seems to have tested what most engineers (and drivers) believe, which is that wider lanes invite higher speeds.)

- According to a collection of studies, a pedestrian hit by a car traveling 30 MPH at the time of impact is between seven and nine times as likely to be killed as one hit by a car travelling 20 MPH. (UK Dept. of Transportation, *Killing Speed and Saving Lives;* and Australian Federal Office of Road Safety, *Vehicle Speeds and the Incidence of Fatal Pedestrian Collisions.*)

Taken cumulatively, these findings could be summarized as follows: 12-foot lanes generally experience no more crashes than 10-foot lanes, and may experience fewer; crashes in 10-foot lanes are likely to occur at a lower speed than crashes in 12-foot lanes; and, therefore, 10-foot lanes can be expected to experience fewer injuries and deaths than 12-foot lanes. Given that 10-foot lanes handle no less traffic than 12-foot lanes (FDOT *Conserve by Bike Program Study,* 2007), there is no justification for 12-foot lanes in urban locations.

In terms of discussing the downtown's many extra-wide lanes, it is difficult to know where to begin. It is clear that they were laid out without any concern that such wide lanes might encourage speeding; this is understandable, as the research discussed above has only slowly come to light. While non-traffic-engineers might find it surprising, traffic engineers have until recently been trained that wider lanes are safer, because they provide broader recovery zones. Only in the past decade have mainstream engineers begun to concur with the public that broader streets encourage faster speeds and thus experience more deadly crashes.

Applying this newfound understanding to downtown New Albany results in a compelling mandate for change. Like removing extra lanes, replacing the 12-foot (and up) lanes with a 10- to 11-foot lanes creates a tremendous opportunity to reallocate pavement to better use.

Shared and Consolidated Lanes

Finally, it must be noted that principally-residential streets handling considerably less traffic may make use of a standard that is yet smaller. Across America, many historic neighborhoods contain narrow streets that contain two-way traffic in *shared* lanes as narrow as 12 feet wide. Generally, 16 – 20 feet is considered "slow flow," while 12 – 16 feet is considered "yield flow," or a "queuing street." Slow-flow geometry is appropriate for low volume, non-regional streets, and yield-flow geometry is used only on local streets serving principally freestanding houses. These streets are found in some of America's wealthiest historic neighborhoods, where the need for drivers to slow down as another car approaches—or even pull slightly into a parking lane—results in an extremely safe environment.

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WHAT ARE SKINNY STREETS?

The City of Portland requires most newly constructed residential streets to be 20 or 26 feet wide, depending on neighborhood on-street parking needs. In the past, residential streets were required to be as wide as 32 feet. To achieve the benefits described below, the City reduced residential street widths.

Why create skinny streets in neighborhoods?

Allowing newly-paved residential streets to be narrower provides many benefits to area residents. Skinny streets help preserve neighborhood livability, while improving access to homes. Some benefits are:

Maintain neighborhood character.

Construction of a wide paved street to replace a narrow unimproved road can change a neighborhood's atmosphere. Skinny streets reduce the impact on slopes and contours, on yards and on neighborhood self-image.

Lower construction costs.

Construction of narrower streets costs less. This means that residents who want to improve existing streets are able to do so for less money and developers can create new neighborhood streets less expensively.

Save vegetation & trees.

In existing neighborhoods, narrower paving widths reduce the need to cut trees and shrubs along the street.

20 feet

26 feet

Reduce stormwater runoff.

Paved streets are a major source of stormwater runoff. Pollutants from autos, as well as fertilizer, pesticides and other contaminants, are collected in stormwater, which flows into storm sewers. Eventually, this dirty water reaches area streams and rivers. Reducing pavement reduces stormwater runoff and allows more water to soak directly into the ground.

Encourage traffic safety.

Narrower streets discourages non-neighborhood traffic and force drivers to slow down.

Encourage better land-use.

As stewards of our natural resources, we know that streets aren't the best use of existing undeveloped land. With skinny streets, in new developments we have more room to house our growing population while reducing the amount of land reserved for traffic use.

Who decides on a street's width?

If you live on an unimproved street, you may be considering forming a Local Improvement District (LID) to complete your street. With an LID, you and the other property owners on your street would pay for improvements, and the City would be responsible for future maintenance.

In that case, you and other participating property owners can help design what your street will look like. Collectively, you can decide if you want parking on one or both sides of the street. This will determine how wide the street will be.

In new neighborhoods, developers will select the street width they believe to be most appropriate within the city guidelines.

Can emergency vehicles reach my home?

The Fire Bureau participated in exercises in older neighborhoods with narrow streets. The Bureau found that street widths based on skinny street guidelines will provide adequate access for emergency vehicles.

How Can I Learn More About SKINNY STREETS?

The City of Portland's Office of Transportation has set up the Local Streets Outreach Program. If you would like more information, or if you're interested in a presentation about skinny streets, please contact

(503) 823-7046

Portland, Oregon's Skinny Streets program makes explicit that city's support of 12-foot-wide lanes handling two directions of travel on low-volume residential streets.

As noted, these streets share a lane, with no centerline. The absence of a centerline on wider streets has produced positive results as well. On streets with standard-width lanes, one recent study found that a removed centerline effectively lowered driving speeds by 7 MPH. This solution, too, is most appropriate to streets with limited traffic, and not principal thoroughfares. Many smaller streets in New Albany already demonstrate this condition.

Avoiding One-Ways

Like many American cities, New Albany many years ago converted a number of its two-way streets to one-way traffic, most notably Spring & Market, Oak & Elm, and Pearl & Bank. This transformation, by eliminating left turns across traffic and by allowing for synchronized signals, helped to speed the motion of cars through downtown. Unfortunately, it did so at the expense of pedestrian comfort and business vitality. Learning from the damage wrought by the one-way conversion, dozens of American cities are reverting these streets back to two-way. A similar reversion is recommended here for New Albany, both to revitalize downtown and to create a less highway-like driving experience.

How One-Ways Work

Drivers tend to speed on multiple-lane one-way streets, because there is less friction from opposing traffic, and due to the temptation to jockey from lane to lane. In contrast, when two-way traffic makes passing impossible, the driver is less likely to slip into the “road racer” frame of mind. One-ways also have a history of damaging downtown retail districts, principally because they distribute vitality unevenly, and often in unexpected ways. They have been known to harm stores consigned to the morning path to work, since people do most of their shopping on the evening path home. They can also intimidate out-of-towners, who are afraid of becoming lost, and they frustrate locals, who are annoyed by all the circular motions and additional traffic lights they must pass through to reach their destinations.

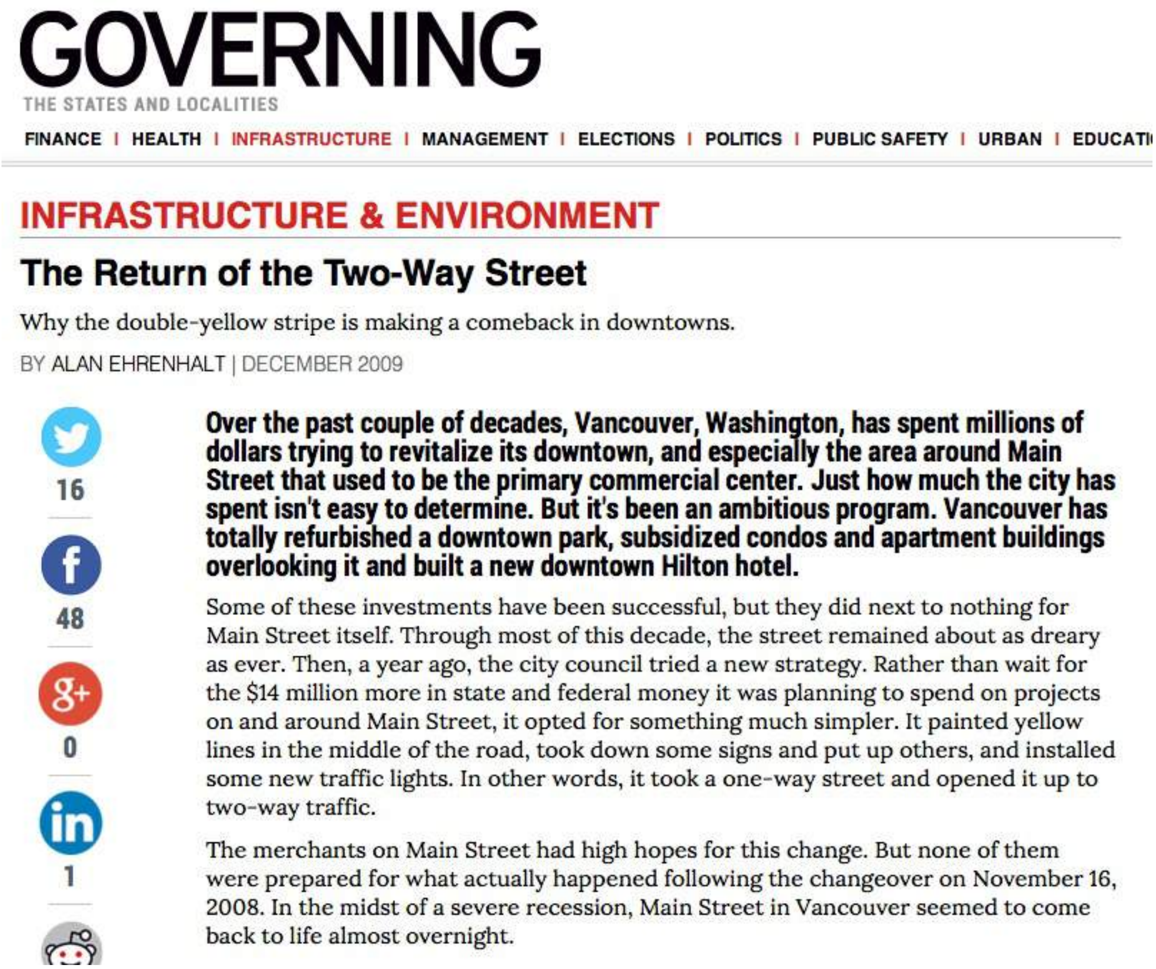
The current one-way configuration provides the advantage of allowing drivers to ride a wave of green lights through downtown and to take left turns unimpeded by oncoming traffic. It provides the disadvantages of increasing danger to pedestrians and cyclists, undermining retail viability, lengthening trips, and confusing visitors. Each of these advantages and disadvantages effects different populations, so the choice between solutions is a political one, and will ultimately be made by weighing the interests of drivers passing through downtown against the interests of downtown residents, workers, business owners, and customers.

Potential Outcomes

To be intelligent, this political discussion must be informed by two other discussions. The first concerns urban vitality, while the second concerns relative impacts.

Urban Vitality: Few people will argue that, in the heart of a city, the desires of commuters just passing through should trump the safety of pedestrians and the success of businesses. However, there are many people who reasonably fear that slowing down traffic might create such congestion that the city fails to function properly, and that all residents and businesses will suffer as a result. While this fear is reasonable, it is not based in fact. The experience of many dozens of cities all across America has been consistent: there is not a single record in the extensive annals of urban planning of a city's vitality suffering in any way from a one-way to two-way conversion. To the contrary: there are many reports of business success and a rebirth of street life, but never has the additional traffic friction presented by two-way streets caused a city to perform less well socially or economically.

One such success story, Vancouver, Washington, was famously covered in *Governing* magazine in 2009. Merchants credit a two-way reversion of their one-way main street with the revitalization of a struggling downtown. A similar experience was documented in Savannah, Georgia, where a conversion to one-way traffic on East Broad Street in 1968 resulted in a loss of almost two-thirds of all businesses. When the street was reverted to two-way in 1990, the number of businesses quickly rose by 50 percent.



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The Return of the Two-Way Street

Why the double-yellow stripe is making a comeback in downtowns.

BY ALAN EHRENHALT | DECEMBER 2009

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Over the past couple of decades, Vancouver, Washington, has spent millions of dollars trying to revitalize its downtown, and especially the area around Main Street that used to be the primary commercial center. Just how much the city has spent isn't easy to determine. But it's been an ambitious program. Vancouver has totally refurbished a downtown park, subsidized condos and apartment buildings overlooking it and built a new downtown Hilton hotel.

Some of these investments have been successful, but they did next to nothing for Main Street itself. Through most of this decade, the street remained about as dreary as ever. Then, a year ago, the city council tried a new strategy. Rather than wait for the $14 million more in state and federal money it was planning to spend on projects on and around Main Street, it opted for something much simpler. It painted yellow lines in the middle of the road, took down some signs and put up others, and installed some new traffic lights. In other words, it took a one-way street and opened it up to two-way traffic.

The merchants on Main Street had high hopes for this change. But none of them were prepared for what actually happened following the changeover on November 16, 2008. In the midst of a severe recession, Main Street in Vancouver seemed to come back to life almost overnight.

In 2009, Governing Magazine documented some of the benefits of two-way reversion.

Relative Impacts: For the above reasons, this discussion becomes a simple argument between those who want to get through the downtown as quickly as possible, and those who want a downtown worth arriving at. While only those who prioritize speed over vitality can argue for the former, it is worth considering what the true speed impacts are likely to be.

Here we must revisit our earlier discussion about the Proper Number of Lanes. As noted, unless the planned tolling regime for Ohio River bridges is changed, New Albany can expect to have a considerable increase in traffic downtown. That traffic will fill the space allotted, and behave according to the cues that it receives from its environment. If this traffic continues to be funneled down multi-lane one-way streets, drivers will continue to think of downtown New Albany as a highway, and use it as such. More drivers will be drawn to these downtown streets. They will not think about stopping to shop or eat, and their principal impacts to downtown will be more pollution and increased danger to pedestrians, cyclists, and other drivers.

If instead, downtown is reverted back to its original two-way grid, a few things will happen differently. First, a less expedited path through downtown will cause fewer drivers to take the New Albany detour. Second, the distribution of these drivers among two-way streets, with fewer opportunities for lane-jockeying, will result in a safer environment for all. And, finally, the more comforting “main street” experience offered to these drivers, and the time spent lingering at intersections, will make them more likely to shop or dine. Experiencing New Albany as a place, and not just a conduit, they will be more inclined to spend a little time and money there.

To be sure, there are some issues to be resolved. The first is the fact that trucks sometimes load and unload on these streets—especially Pearl Street—and the removal of the second lane will make this act more difficult. Before a two-way conversion, the City must work with business owners to identify alternative loading zones within a reasonable distance, such as nearby alleys and parking lots. One hopes that merchants will be incited to support this effort by the data surrounding two-way conversion and retail success.

A similar challenge was faced by the City of Lowell, Massachusetts, population 108,000, when the two-way reversion of its downtown streets was proposed four years ago. At that time, it was said that the main retail corridor, Merrimack Street, could not accept eastbound traffic because its second westbound lane was needed for truck deliveries. Eventually, a servicing plan was completed, and just this past summer the full downtown two-way reversion took place—including Merrimack Street. Deliveries now occur in certain designated locations, and the entire transformation came off without a hitch.

Nearby Experience

By fortunate coincidence, the Louisville region happens to offer a treasure trove of data on the impacts of one-way conversion and reversion to two-way traffic, thanks to research completed at the University of Louisville. Some of this is recorded in a paper titled “One Way to Fix Louisville’s Declining Neighborhoods,” by Professor John Gilderbloom. This paper covers the experience of two Louisville Streets, Brook and First, that were reverted to two-way traffic a few years ago, and compares them to nearby streets (Second and Third) that remain one-way.

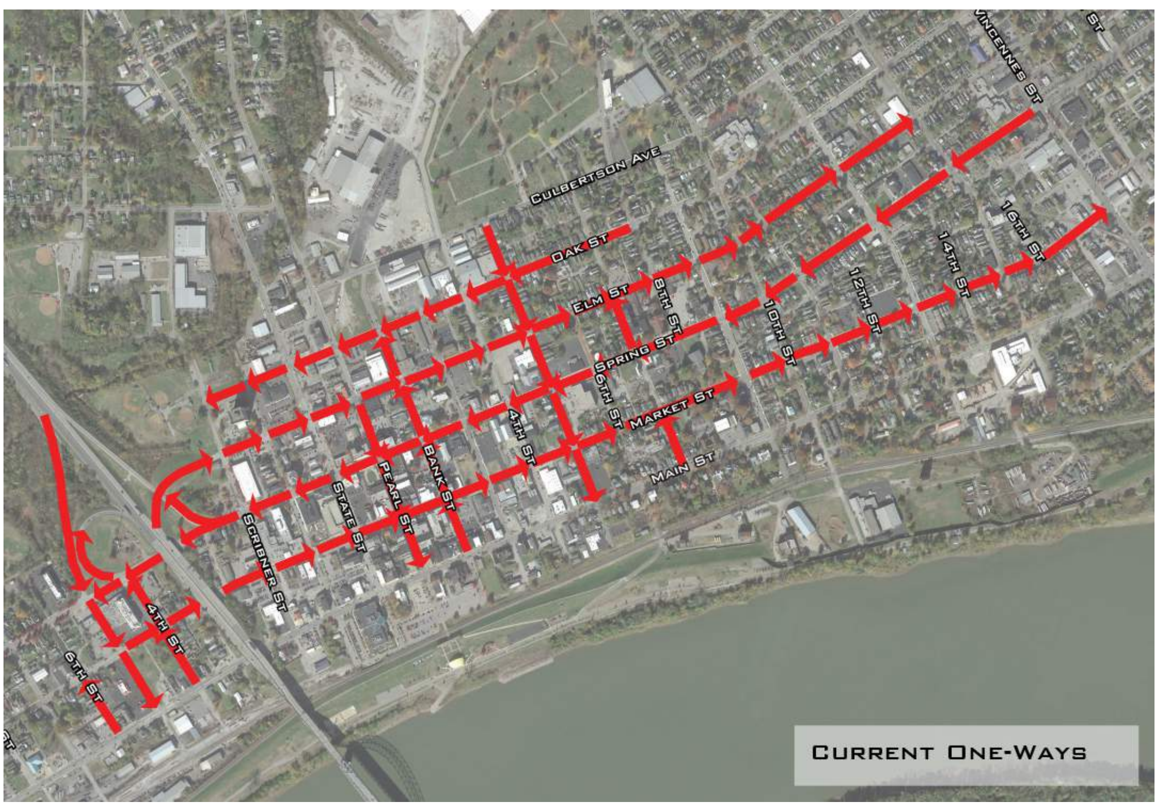
Here are some of the findings: along the reverted streets, a "significant reduction in crime, accidents, and an increase in property values, business profits, and bike and pedestrian traffic." Specifically, Brook Street saw a 36 percent reduction in car crashes and a 39 percent increase in property value. Car crashes on First Street dropped 60 percent. Meanwhile, on one-way Second and Third Streets, car crashes increased an average of 15 percent. And while crime increased 36 percent on Second and Third Streets, it dropped 23 percent on Brook and First.

Revenues to businesses on the converted streets have also risen significantly, with one restaurant doubling its table space. Meanwhile, in New Albany, several national brands have already walked away from development deals downtown for the stated reason of not wanting to be located on or near a one-way street.

It is hopeful that the merchants of downtown New Albany, when presented with this information, will consider it worthwhile to relocate their deliveries.

Application to New Albany

The current one-way network in downtown is shown below. The principal one-way pairs are Spring & Market, Oak & Elm, and Pearl & Bank. Worth noting is that, since Oak Street handles limited traffic, the westbound traffic on Spring Street is balanced by westbound traffic on both Market and Elm.



The majority of downtown streets are one-way.

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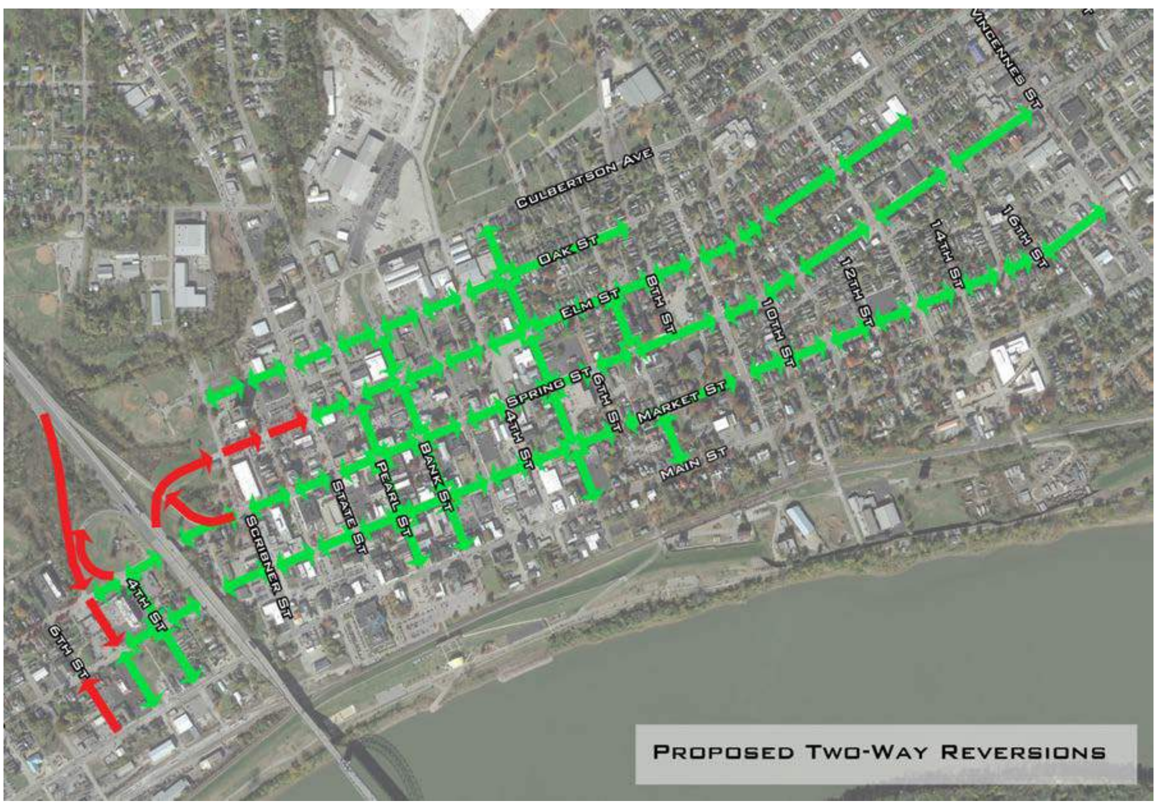
The other one-way streets are W. 6th, W. 4th & W. 5th, and E. 5th, E. 6th, and E.7th. Of these, only W. 6th and E. 6th have segments that are simply too narrow to support two-way traffic, and should remain as a one-way.

The configuration of W. 4th and W. 5th respond to the presence of highway on- and off-ramps. As noted ahead in part III, these can be safely reverted back to two-way except for the northern block of W. 5th, where such conversion may tempt drivers to enter the highway off-ramp. Such a reversion is not necessary, but will produce an outcome in which drivers are less likely to speed, pedestrians are less intimidated, and retail use is more viable. Already the downtown has lost one significant restaurant in this location due to the prospective tenant's understanding of the negative impacts of one-way streets.

In contrast, E. 5th and E. 7th both carry limited traffic, do not really constitute a pair, and are principally one-way due to their narrow roadways, which do not support two full lanes of high-speed traffic. However, these streets are local, principally residential, and not of the type that require dedicated travel lanes of significant width. For that reason, their current roadways comfortably support slow- and yield-flow traffic of the nature described in the *Street Width* section above.



Only the segments remaining in red above are not recommended for two-way reversion.

Based on current conditions, the application of current downtown-street-network best practices to the New Albany grid would suggest the reversions shown here. Of these streets, only the Spring & Market/Elm pair carry enough *traffic* to mandate simultaneous reversion; the rest may be completed piecemeal. However, given the cost of reconfiguring signals, such an approach is not recommended. Rather, since most of these streets intersect with signals, every street but W. 4th, W. 5th, and E. 5th, which lack signals, should be converted at once. This simultaneous conversion avoids an outcome in which certain signals need to be modified multiple times, an expensive prospect. As part of this effort, and to improve the functioning of the downtown, it is also recommended that all one-way alleys are also reverted to two-way, as can be found in most city centers.

Of course, there is no functional or practical reason why E. 5th should not be converted with the rest. However, W. 4th and W. 5th, being under the sway of INDOT, will likely take longer to change. There is no reason why the remainder of the recommended reversions should be delayed by an inability to revert these two quickly.

We have done our best to present above the conclusive evidence supporting the contention that a nearly universal reversion to two-way traffic is essential to the future viability of downtown New Albany as a vibrant commercial center. It is hoped that City leadership and INDOT will both embrace this approach as an important component of the regional transportation modifications currently underway.

Further information about each individual street reversion can be found ahead in Part III.

Limited Use and Length of Turn Lanes

Many of the busier streets in downtown New Albany contain left-hand turn lanes, and some of these are needed to keep traffic flowing smoothly. But left-hand turn lanes are by no means the standard approach to intersection design. They should be used only at intersections where congestion is caused by cars turning left.

Unlike left-hand turn lanes, exclusive right-hand turn lanes are almost never justified, and only make occasional sense where heavy pedestrian activity causes queuing right-hand turners to dramatically impede through-traffic—something that almost never happens in New Albany. When unnecessary turn lanes are provided, the extra pavement width encourages speeding, lengthens crossing distances, and takes up roadway that could otherwise be used for on-street parking or bike lanes.

When justified, turn lanes should be just long enough to hold the number of cars that stack in them in standard rush-hour conditions, and no longer, for the same reasons. Many turn lanes in downtown New Albany seem to have been inserted in an attempt to forestall anticipated congestion rather than to solve a specific challenge, and many are longer than their queues of cars mandate.

When one-way systems are reverted back to two-way, there is often a compulsion to insert many new left-hand turn lanes in fear of the congestion that may result from drivers having to turn across newly-opposing traffic. There will be certain intersections, where many drivers turn left, where such turn lanes are mandated. Many other intersections, however, present an uncertain scenario, and will have to be studied. The way to study these intersections is to stripe them *without* turn lanes and observe their performance; they can always be restriped to include turn lanes later if undue congestion arises.

And again, since the amount of traffic in downtown New Albany is likely to be a function of how quickly that traffic flows—since more toll-evaders will flock to a less congested route—there is actually a logic in allowing a little extra friction at intersections.

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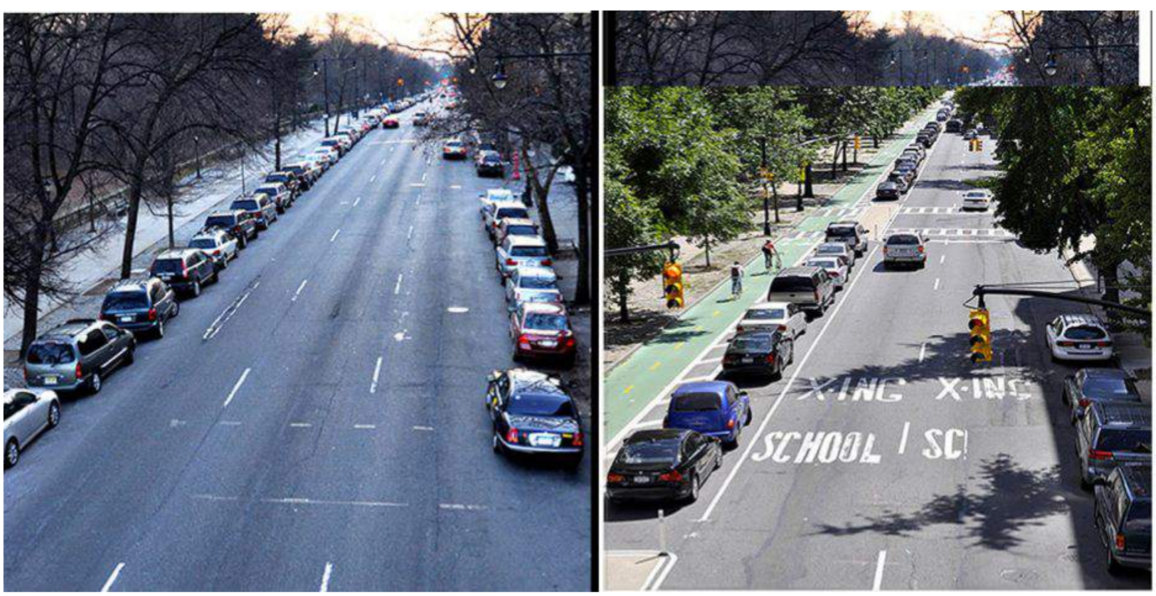
Including Bike Lanes

Cycling is the largest planning revolution currently underway. . . in only some American cities. The news is full of American cities that have created significant cycling populations by investing in downtown bike networks. Among the reasons to institute such a network is pedestrian safety: bikes help to slow cars down, and new bike lanes are a great way to use up excess road width currently dedicated to oversized driving lanes. When properly designed, bike lanes make streets safer for drivers, cyclists, and pedestrians alike.

Safety—for All

This was the experience when a cycle track (protected two-way bike lane) was introduced on Prospect Park West in Brooklyn, NY. A 3-lane one-way street was converted to 2-lanes, parked cars were pulled 12 feet off the curb, and a cycle track was inserted in the space created. As a result, the number of weekday cyclists tripled, and the percentage of speeders dropped from about 75 percent of all cars to less than 17 percent. Injury crashes to all road users went down by 63 percent from prior years. Interestingly, car volume and travel times stayed almost exactly the same—the typical southbound trip became 5 seconds faster—and there were no negative impacts on streets nearby.



The insertion of a cycle track on this Brooklyn street dramatically improved safety for all road users without reducing daily car through-put.

Experience in a large number of cities is making it clear that the key to bicycle safety is the establishment of a large biking population—so that drivers expect to see them—and, in turn, the key to establishing a large biking population is the provision of buffered lanes, broad lanes separated from traffic, ideally by a lane of parked cars. In one study, the insertion of buffered bike lanes in city streets was found generally to reduce injuries to all users (not just bicyclists) by 40 percent. Of course, buffered lanes need not be inserted everywhere. Often, in smaller cities, the insertion of just one prominent buffered facility can have a tremendous impact on cycling population.

Economic Impacts

Additionally, bike lanes are good for business. A study in Portland, OR, found that customers arriving by bike buy 24 percent more at local businesses than those who drive. And merchants along 9th Avenue in New York City showed a 49 percent increase in retail sales after buffered bike lanes were inserted.

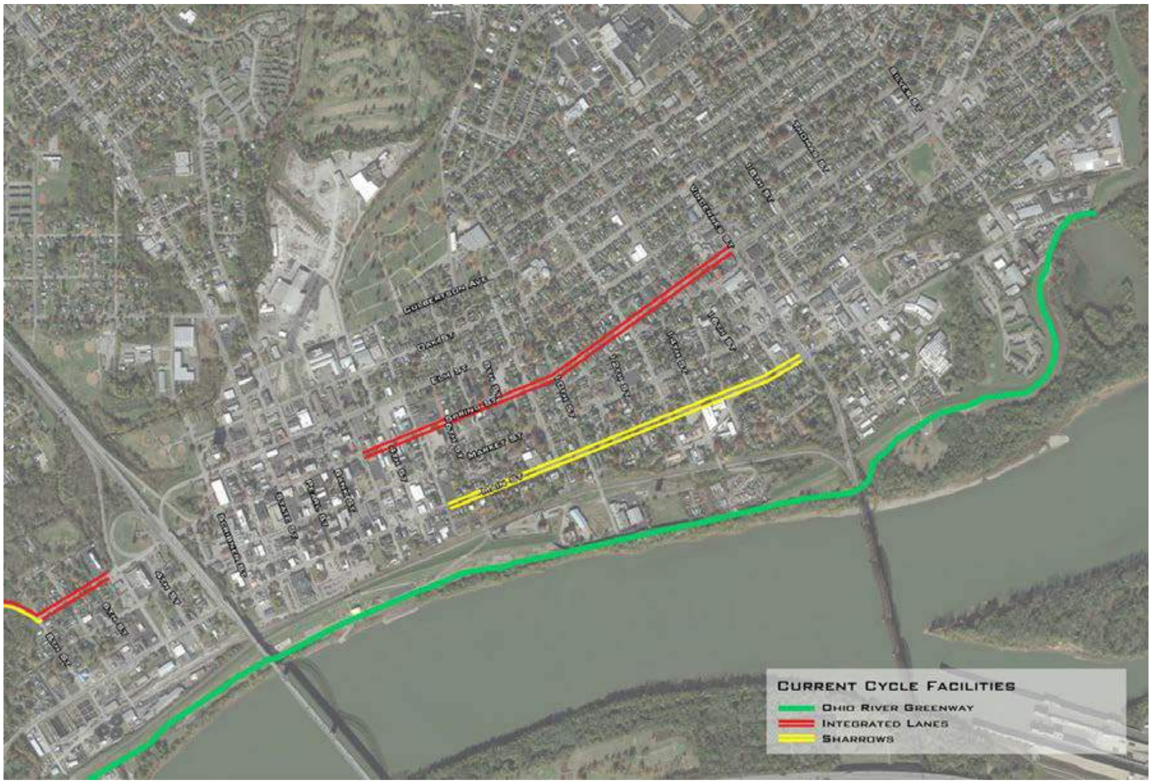
New York has dominated the biking headlines in recent years because of their recent investment under Mayor Bloomberg in a tremendous amount of cycle infrastructure. But many smaller and less "progressive" cities are making significant cycling investments, with the goals of reducing car dependence, achieving higher mobility at lower cost, and especially attracting young entrepreneurial talent. More than half of the states in the US, including Indiana and Kentucky, already have buffered bike lanes as part of larger downtown networks.

A Strategy for New Albany

There can be little doubt that New Albany will develop a more significant cycling population once it creates a truly useful bike network downtown. However, the greatest short-term justification for bike lanes in the study area is simply to take up space—excess asphalt currently serving no purpose but to induce speeding. So many streets in downtown New Albany have too much pavement; once the proper lanes of the proper width are dedicated to driving, turning, and parking, there is often still somewhere between 5 and 20 feet of pavement left over. Striping this pavement for cycle facilities is the best way to encourage legal driving speeds among the motorists using these corridors.

For that reason, the bike facilities proposal ahead is different than the one that would result from a purely functional analysis of where bike lanes are needed. It provides significant east-west redundancy, because Spring, Market, and Main Streets all contain excess pavement. Meanwhile, it struggles to provide a strong north-south corridor, because only State Street has the extra room for lanes—and barely.

The drawing below shows current marked cycle facilities in New Albany. It is far from a useful bike network. Aside from the Ohio River Greenway atop the levee, the only striped bike lanes are on Spring Street, wisely placed on both sides of the street in an earlier "road diet," but oddly both heading in the same direction. Additional lanes can be found further north on Silver Street and Charlestown Road, but these do not integrate with a downtown network. East Main Street is being rebuilt with "sharrows": wide lanes that accept bicycles, but these are hardly a preferred facility for non-aggressive riders. No north-south paths are striped, although it is worth noting (and in the upcoming revised plan as well) that many small streets allow safe north-south cycling within the downtown—but not beyond it.



Current cycle facilities in downtown New Albany are extremely limited.

The Plan

The drawing on the next page, is the proposed bike network for New Albany. Again, it is principally a result of making the best use of each individual street's pavement, but pains have been taken to make it connective and truly useful to cyclists. As such, its key corridors are Spring Street, which is recommended for a cycle track heading east, and State Street, which is recommended for two integrated lanes heading north.

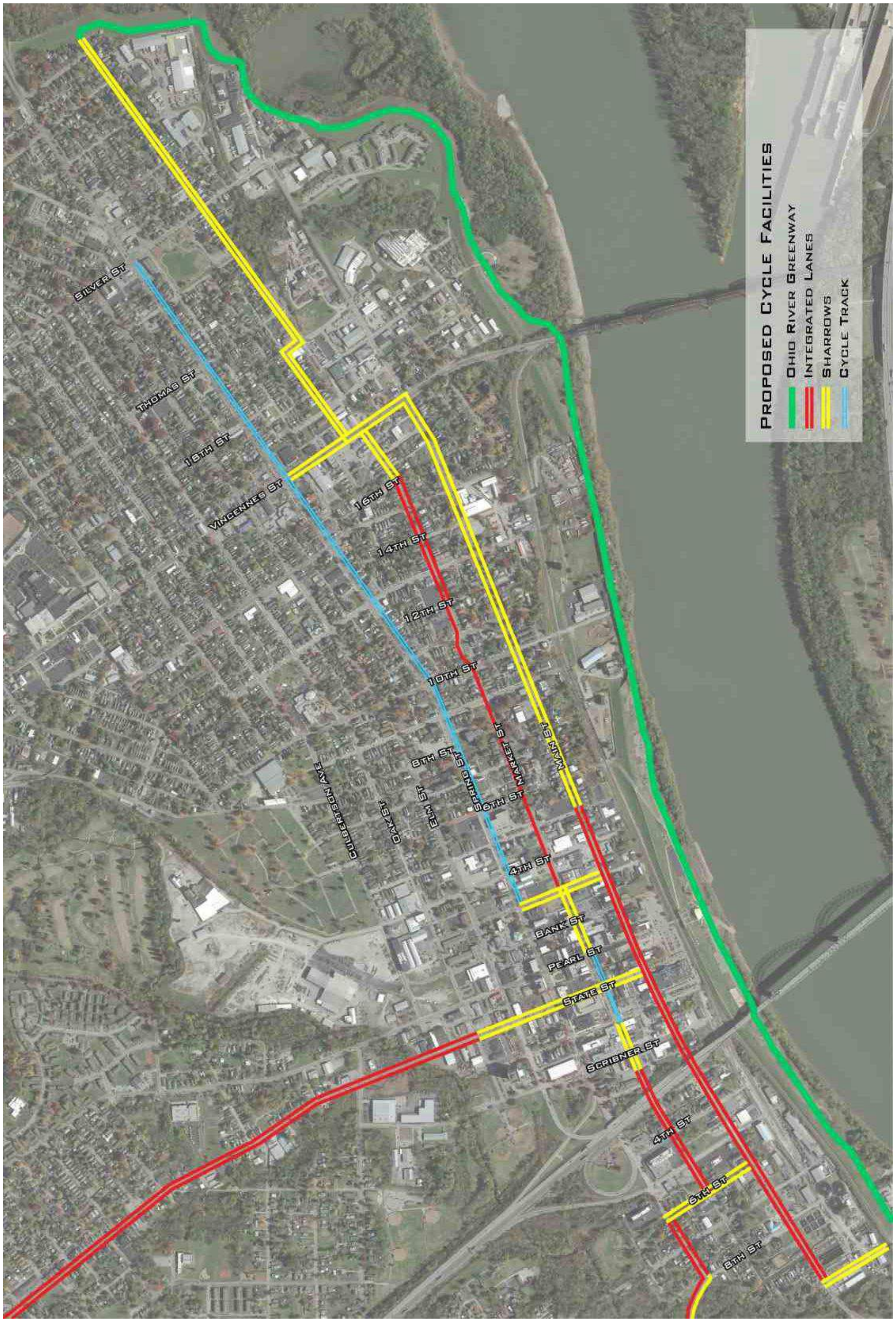
The plan below can be summarized as follows:

- Spring Street, already a cycling corridor, is identified as the principal access reaching into downtown from the east, and receives a protected cycle track all the way to E. 3rd Street, where the street must widen for interstate stacking, and cyclists are shifted southward on 3rd Street. This cycle track reaches as far east as Silver Street, beyond which it is not considered likely to attract many riders. (A less aggressive proposal with bike lanes instead of cycle tracks is described ahead.)

- West of W. 6th Street, Spring Street begins again (connected by W. 6th Street to other axes), and connects to Spring Street Hill to the northwest.

- Market Street receives bike lanes where it has additional room in the roadway that can be put to this use, and is designated as a shared way where no room exists.

This creates an odd condition from E. 3rd to E. 12th Street, where an extra 6 feet of pavement is placed into service as a one-way bike lane headed west. Because this



lane is redundant to the Spring Street facility, its asymmetry is not an issue. From W. 1st to Pearl Street, Market Street takes advantage of the central median to place a cycle track in the center of the roadway.

- East of Silver Street, Market Street connects to the extended end of the Ohio River Greenway, which it also connects to at W. 10th Street.

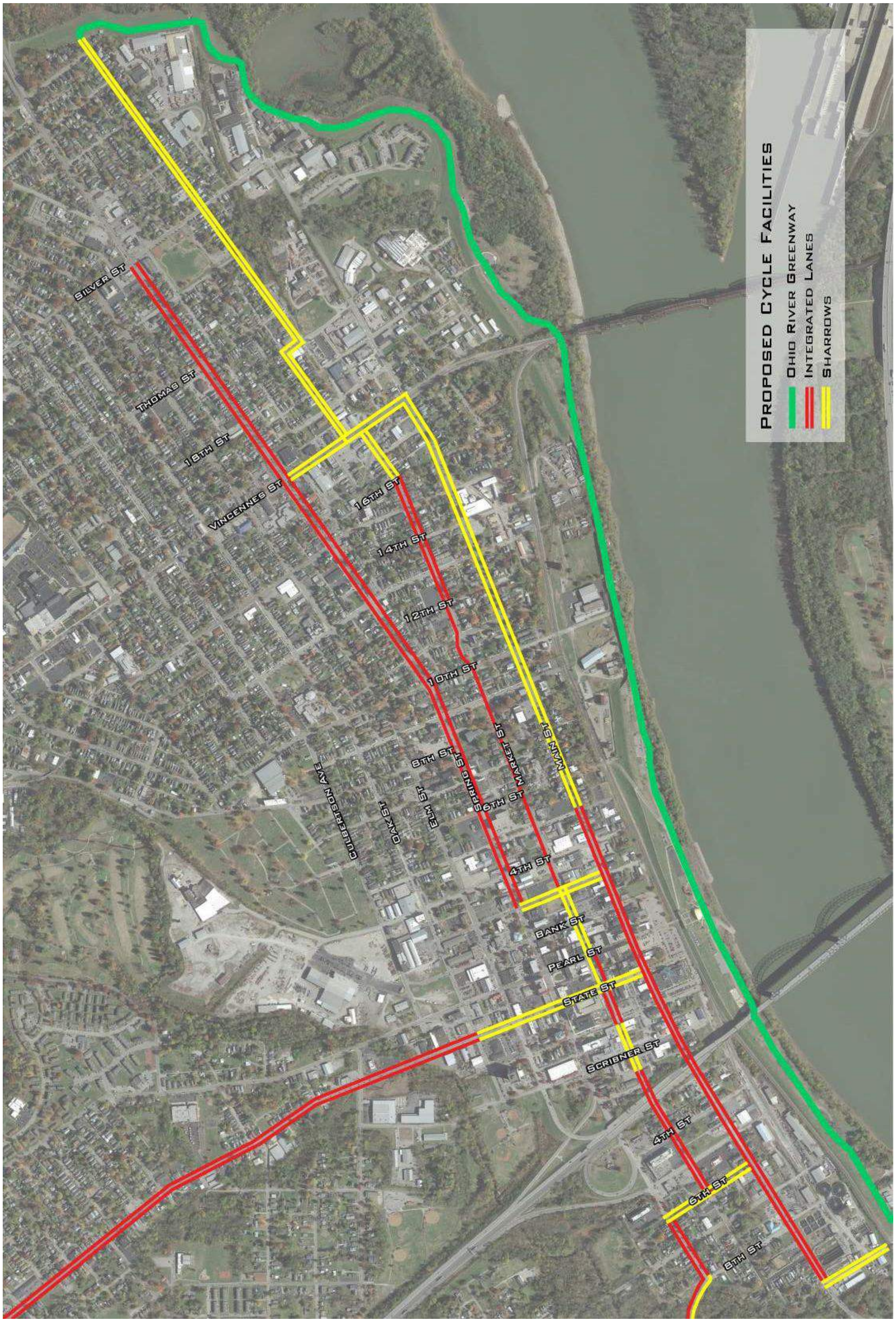
- Main Street is being rebuilt as a shared way from Vincennes to E. 5th Street. West from there, the roadway contains ample room to receive two bike lanes all the way to W. 10th Street. In some cases, due to the extreme street width and the lack of demand for curb parking, these lanes can be striped with ample buffers.

- North-south connectivity is provided throughout this system by many low-volume streets. However, due to their significance in shifting bike traffic on and off of Spring Street, W. 6th Street and E. 3rd Street are marked with sharrows. Vincennes, another likely path for cyclists, also receives sharrows.

- Northward connectivity to the Hospital is provided by striping bike lanes on State Street, beginning at Oak. This is accomplished by removing the west flank of parallel parking; most of these spaces can be regained by restriping the east curb more efficiently. South of Oak, sharrows are placed in the roadway to alert drivers to the likely presence of cyclists.

The decision about which cycle facilities to insert in which streets is discussed in detail in the individual street redesigns that follow in the next section. As can be seen, several options are offered in certain locations. For example, if there is reluctance to place a cycle track in Spring Street at this time, an alternative is offered: two integrated lanes. A similar compromise is offered for Market street. As here, the language of the recommendations makes clear which solution corresponds more closely to national best practices.

The final drawing below shows the same cycle plan, but with the Spring and Market street cycle tracks eliminated. While such a compromise runs counter to the objectives of this study and likely represents a sacrifice in traffic safety, it is certainly a vast improvement over New Albany's current cycling infrastructure. Such a proposal could be considered a good first step towards introducing cycle tracks in the near future.


Proposed Cycle Facilities
Ohio River Greenway
Integrated Lanes
Sharrows
Silver St
Thomas St
18th St
Vincennes St
16th St
14th St
12th St
10th St
8th St
Spring St
Market St
Main St
6th St
Culbertson Ave
Oak St
Elm St
4th St
Bank St
Pearl St
State St
Scribner St
4th St
6th St
8th St

Continuous On-Street Parking

Whether parallel or angled, on-street parking provides a barrier of steel between the roadway and the sidewalk that is necessary if pedestrians are to feel fully at ease while walking. It also causes drivers to slow down out of concern for possible conflicts with cars parking or pulling out. On-street parking also provides much-needed life to city sidewalks, which are occupied in large part by people walking to and from cars that have been parked a short distance from their destinations.

On-street parking is also essential to successful shopping districts. According to the consultant Robert Gibbs, author of *Urban Retail,* each on-street parking space in a vital shopping area produces between $150,000 and $200,000 in sales.

Missed Opportunity

Several key streets in downtown New Albany have lost a significant amount of their parallel parking due to driving lanes that are either too wide or too many in number. Some of these streets have no parallel parking at all. On other streets, parking spaces are severely restricted because of aggressive rules protecting sight triangles (clear views around corners) at driveways. Bringing this parking back will contribute markedly to the success of downtown.

The individual street redesigns that follow discuss the locations where parking should be returned or modified in the downtown. These are also indicated in the diagram ahead, and can be summarized as follows:

- The road diet proposed for E. Spring Street from Beharrel to Silver creates ample room to return parallel parking to both curbs. Doing so will help calm traffic, protect the sidewalk, improve residential convenience, and raise property values.

- The removal of Vincennes' redundant north-bound lane allows the parallel parking on its east flank to be converted to angle parking, which is recommended to be back-in for the protection of cyclists.

- Culbertson Street, Oak Street and Elm Street are missing parking on many curbs where there is room for it.

- W. 4th Street and W. 5th Street have lost their parking with the goal of speeding freeway access. The resulting over-wide lanes only encourage unsafe driving, while doing nothing to increase the number of vehicles processed.

- Finally, State Street has seen most of its parallel parking striped away based upon the two highway-design objectives of unimpeded flow and broad sight triangles. The former goal has inserted right-hand turn lanes in places downtown where they are not justified by congestion, while the latter has kept parking far away from any curb cuts, of which there are many. Further north as well, parking is kept at a great distance from all driveways, dramatically reducing that street's parking capacity.

In the drawing above, green lines represent curbs where parallel parking should be reintroduced, while the red line on Vincennes Street represents an area where a flank of parallel parking should be converted to angle parking.

Moving forward in the restriping of New Albany streets, it may be necessary to override the standards that have led to the elimination of parallel parking in places where it properly belongs. Specifically:

- At intersections, the parking zone should be allowed to encroach to within about ten feet from the edge of the intersecting right of way. This distance is shorter than allowed by some sight-triangle requirements, but some cities are overriding such requirements with an understanding that increased visibility at corners encourages speeding through intersections.

- At driveways, the parking zone should be allowed to encroach within 3 feet of the curb cut. Again, using the same logic: negotiating a curb cut is more difficult when visibility is lower, which increases driver caution and lowers speeds.

The Back-In Phenomenon

Many cities across America are now beginning to convert their head-in angled parking to back-in. The recent tradition has been for angled parking to be nose-to-the-curb although, historically, many Main Streets did it the other way around. Recently, it has been determined that back-in parking is considerably safer than head-in. As a result, dozens of Main Streets nationwide have reintroduced back-in parking—including Charlotte, Honolulu, Indianapolis, New York, Seattle, Tuscon, and Washington—and accidents are down, especially those involving bikes. Tuscon, for example, averaged about one bicycle/car crash per week before converting from head-in to rear-in parking. Four years into implementation, no such crashes had been reported

The additional safety comes from the fact that, with back-in parking, the reverse motion is into the curb, while head-in parking requires drivers to back into moving traffic. Back-in parking is also more convenient for loading and unloading, and safer for getting ones children to the curb. The only major problem with back-in parking is that people don't like it, mostly because they are not used to it. To be fair, it does require more skill to back into a tight parking space than into a wide-open street—but it's easier than parallel parking.

This "road dieted" state highway in Pottstown, PA, contains a flank of back-in angle parking against a bike lane.

Given the challenge of selling residents on back-in parking, it is worth acknowledging that, in slow-moving downtowns, the greatest risk that front-in parking poses is to cyclists. Rather than reversing all angle parking everywhere, it makes sense to limit the reversion to designated cycle routes. In New Albany, this pertains to Vincennes Street, which is likely to attract cyclists, and Market Street.

Market Street provides a unique opportunity. With the reversal of traffic flow along its northern lanes, that flank's angle parking will be automatically reversed from head-in to back-in for the four-and-a-half block stretch west of Bank Street. Successfully rolling out this conversion will require a concerted public education campaign.

Continuous Shade Trees

In the context of pedestrian safety, street trees are similar to parked cars in the way that they protect the sidewalks from the moving cars beyond them. They also create a perceptual narrowing of the street that lowers driving speeds. But they only perform this role when they are sturdy, and planted tightly enough to register in drivers' vision.

Recent studies show that, far from posing a hazard to motorists, trees along streets can actually result in fewer injury crashes. One such study, of Orlando's Colonial Drive, found that a section without trees and other vertical objects near the roadway experienced 12 percent more midblock crashes, 45 percent more injurious crashes, and a dramatically higher number of fatal crashes: six vs. zero.

While much of New Albany has good canopy, many downtown streets lack adequate tree cover. This is not surprising given the cost of planting and maintaining them. These costs are easier to justify when one enumerates the many hidden benefits of shade trees, which include the absorption of storm-water, tailpipe emissions, and UV rays; the lowering of urban heat islands and air-conditioning costs; increased income streams to businesses; and dramatically higher real-estate values (and property tax revenue) on tree-lined streets.

This final item could perhaps provide the motivation necessary for a greater investment in tree planting and maintenance, as the data is compelling. A comprehensive study of the east side of Portland, OR found that an adjacent tree added 3.0 percent to the median sale price of a house, an increase of $8,870. Since there are more houses than street trees, each individual tree was deemed responsible for almost $20,000 in increased real estate value. Extrapolating to the city as a whole, the study's authors found that the presence of healthy street trees likely adds $15.3 million to annual property tax revenues. Meanwhile, the City pays $1.28 million each year for tree planting and maintenance, resulting in a payoff of twelve to one.

This twelve-to-one return on investment ignores all the other benefits provided by street trees including their contribution to pedestrian safety. It is hoped that a similar analysis conducted in New Albany might be used to mandate an enlarged commitment to street trees.

When locating trees along New Albany Streets, the City should approach the sight triangle requirement with the same skepticism already encouraged in the prior section on curb parking. First, it can be argued that reduced visibility around corners at intersections, far from increasing safety, can instead increase driver confidence and vehicle speeds. Second, it should be noted that tree trunks, especially young ones, are narrow and do not obstruct views in a meaningful way. If obstruction remains a concern, then corner trees should be planted with their understory trimmed to a height of 5 feet, so that branches are above drivers' eyes. Meeting this objective may require that corner trees be planted at a slightly greater maturity than is the standard.

Replacing Unwarranted Signals with Mostly-All-Way Stop Signs

For many years, cities inserted traffic signals at their intersections as a matter of pride, with the understanding that a larger number of signals meant that a place was more modern and cosmopolitan. Recently, that dynamic has begun to change, as concerns about road safety have caused many to question whether signals are the appropriate solution for intersections experiencing moderate traffic. Research now suggests that four-way stop signs, which require motorists to approach each intersection as a negotiation, turn out to be much safer than signals. Unlike at signalized intersections, there is considerable eye-contact among users. Drivers slow down, but never have to wait for more than a few seconds, and pedestrians and bicyclists are generally waved through first.

The Data

While it would be useful to have more research, the one study on this subject is compelling. It is described in Persaud *et. al.:* "Crash Reductions related to Traffic Signal Removal in Philadelphia" (1997). This study recounts the 1978 removal of 462 traffic signals due to a 1977 state ruling stating that signals were not warranted on intersections with an annual average daily traffic of less than 9000 on the major street or less than 2500 on the minor street. 199 of these signals had adequate data to make it into the study, and 71 non-converted intersections were identified as a control group.

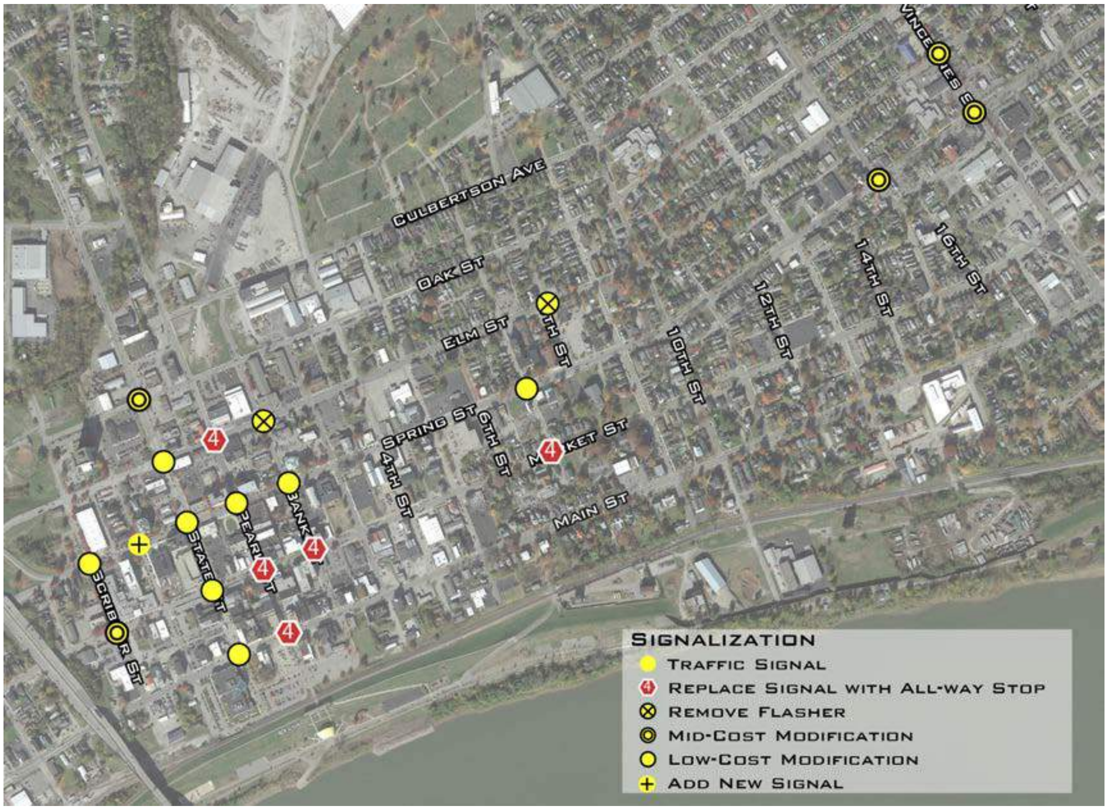
In almost all cases, the signals were replaced by all-way stop signs. The overall reduction in crashes was 24 percent. Severe injury crashes were reduced 62.5 percent overall. Severe pedestrian injury crashes were reduced by 68 percent.

While some pedestrians and drivers prefer signalized intersections, this data is too conclusive to ignore. Until a contradicting study is completed, cities should be compelled to conduct an audit of current signalization regimes to determine which signals may be eliminated.

Limited Changes

In New Albany, special opportunities are provided by the one-way to two-way reversion. All-way stop signs are generally not recommended for intersections which contain more than a single lane of traffic in any one direction, since that can create confusion about which driver is next in the rotation. But when multi-lane one-way streets are reverted to two-way, this condition goes away, and all-way stop signs become ideal. Also worth noting is how all-way stops remove the need for left-hand turn lanes, since each driver simply wait his or her turn, regardless of direction.

For this reason, the reversion of Pearl, Bank, and Market Streets to two way traffic allows for the replacement of traffic signals with all-way stop signs at five intersections: Pearl Street at Elm, Market and Main; and Market Street at Bank and E. 7th. The removal of these devices will help pay, in the long run, for the other signalization changes that the two-way reversion mandates.



Changes recommended to signalization in downtown in conjunction with two-way reversion.

The diagram above documents all of the signalization changes that are needed to optimize the network reversion. In addition to the 5 intersections described above, these are as follows:

- Moderate-cost signal modifications at State & Oak, Market & Scribner, Vincennes & Elm, and on Spring Street at Vincennes and 15th. This final intersection is likely the most expensive, as it involves a railroad crossing.

- Low-cost signal modifications on Spring Street at Scribner, State, Pearl, Bank, and E. 7th; and on State Street at Elm, Market and Main.

- The removal of the flashing signals on Elm Street at Bank and 8th. When Elm becomes two-way, calmer traffic will make these warnings unnecessary.

Additionally, one intersection—Spring and W. 1st Street—would benefit from the insertion of a new signal where one is missing. Pedestrians do not feel safe crossing the many lanes of Spring Street at that location. Having previously rejected the proposal, INDOT must be convinced of the safety mandate for this new signal.

Pedestrian-Friendly Signals Where Signals Are Warranted

A survey of the most and least walkable cities in America reveals a clear correlation: walkable cities rarely have pushbutton signal request buttons in their downtowns. Called "beg buttons" by pedestrian advocates, these signals are alternately annoying and confusing to pedestrians, most of whom do not understand how they are supposed to work—and many of whom end up jaywalking out of sheer frustration.

While it may be standard for Indiana, the pushbutton regime in New Albany is well inferior to national best practices. Most cities with pushbuttons still give pedestrians walk signals when it is safe for them to cross—the purpose of the button is to lengthen the crossing time. In certain New Albany intersections, one must actually push the button in order to receive the light at all. If your hands are full or otherwise disabled, you're stranded.

While pushbuttons can make sense on surface highways with high-speed traffic, no street in downtown New Albany should be of that character. In its current configuration, State Street does attract higher speeds than are appropriate to an urban downtown. When it is restriped to a more context-sensitive configuration, the pushbuttons will seem especially out of place. In the meantime, they are still deterring pedestrian activity and also encouraging jaywalking with the frustration that they cause.

To create a system in which jaywalking is reduced and pedestrian activity enhanced, we should look to other places where cars and pedestrians interact with a much lower incidence of injury, such as Boston, Washington DC, Chicago, San Francisco, and the smaller towns that surround these cities. What we find in these places is an almost complete absence of pushbutton signals, short cycles of 60 seconds or less (total), and "concurrent" crossing regimes, in which pedestrians move with parallel traffic, and turning cars must wait for the crosswalks to clear.

Concurrent signalization is the norm in most cities where cars do not dominate. They are essential to pedestrian convenience because each intersection always allows pedestrians to cross in at least one direction. Since most pedestrian routes through cities are diagonal, concurrent signalization means that pedestrians rarely have to stop and wait for a light. This convenience is a great contributor to street life.

Such concurrent signals can be made more effective by a technology called the Leading Pedestrian Interval (LPI), in which pedestrians receive a 3-second head start to enter (and "claim") the intersection before cars receive a green light. These should be considered for the most important signalized intersections in the downtown: State Street at Spring and at Market.

In terms of encouraging safe pedestrian behavior, the length of the signal cycle is of great significance. When traffic congestion is the dominant concern, traffic engineers prefer longer signal cycles, as they have the advantage of moving large "platoons" of vehicles on each approach. These longer periods of vehicle movement mean longer waits for

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pedestrians trying to cross a street. This is more than just an inconvenience, because it causes jaywalking. For this reason, the long-cycle signalization regimes that make sense in suburban Floyd County are ill suited to pedestrian-heavy areas like Downtown New Albany. As downtown signals are modified, it will be essential to keep cycles short, typically no more than 60 seconds for the entire cycle.

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Pedestrian-Friendly Details

Every detail of a street space communicates that an urban environment is either pedestrian-oriented or vehicular-oriented. Pedestrian-centric environments can be characterized by their rectilinear and angled geometries and tight corner curb radii. Wherever swooping geometries and broader curves are introduced, cars speed up, and pedestrians feel unsafe.

The same is true for signage, striping, and all other street features. While sometimes necessary for wayfinding and for providing a proper transition from street to interstate, highway style signage and striping send a clear signal to both drivers and pedestrians that *they are on a highway*. The more a street looks like the interstate, the more it will induce speeding. Safety-conscious DOT representatives must consider this fact when specifying striping and signage for DOT-controlled streets in downtown.

One Difficult Location

The approach to the freeway ramp along W. 4th Street is confusing to drivers.

Perhaps the most problematic intersection in downtown New Albany is where W. 4th Avenue crosses Spring Street at an odd angle and becomes an interstate on-ramp. Already recommended for two-way traffic along Spring Street, this intersection's swooping geometries, highway-style striping, and other confusing design features make even its current condition particularly unpleasant for drivers and pedestrians alike. A few simple fixes will make this intersection safer and easier to use.

The current configuration suffers from poor alignment, high-speed geometrics, and flawed striping and signage.

A limited reconstruction would improve its function and safety.

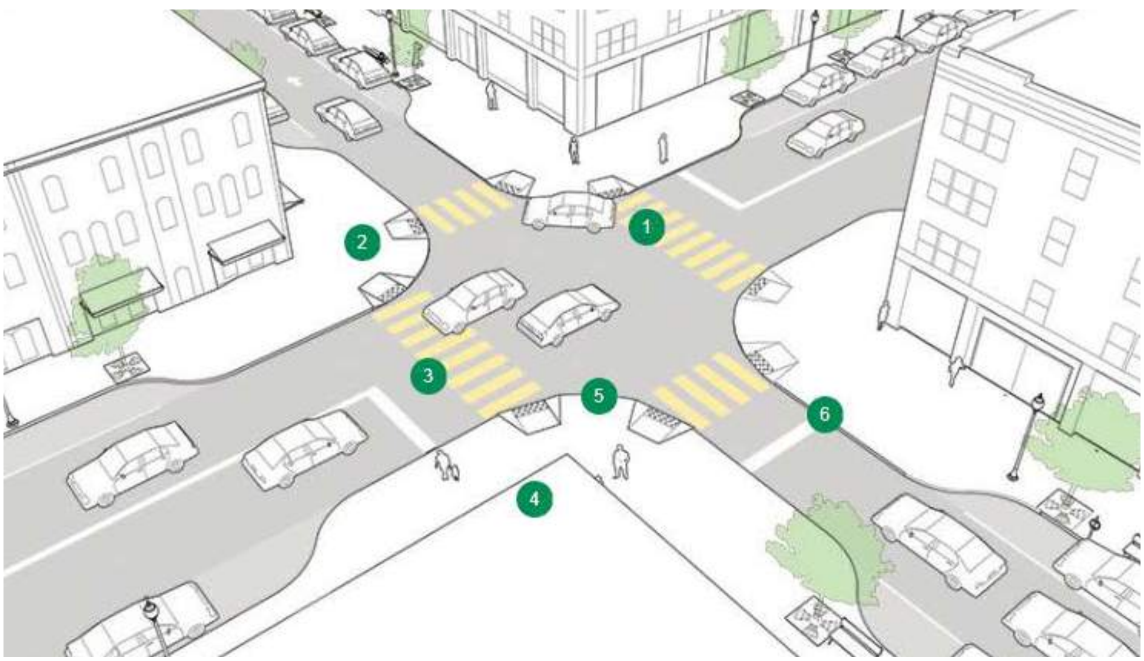
Currently, the intersection has the following problems:

- The all-way stop is not marked as such, confusing drivers.
- The northward crossing motion is poorly aligned.
- The northward stop bar is too far back from the intersection.
- The westbound Spring Street median is short, allowing dangerous merges.
- The concrete median and lack of parallel parking on W. 4th Avenue communicate and encourage a high-speed environment.
- The striped shoulder on the north side of Spring Street communicates and encourage a high-speed environment.

The modifications proposed in the before-and-after images above are recommended whether or not Spring street is reverted to two-way traffic. They require very limited new construction. INDOT should make these changes a priority.

Crosswalks in General

Designing a proper crosswalk is not rocket science. A national standard has been established by the National Association of County Transportation Officials, recommending the following (Source: *NACTO Urban Street Design Manual):*



The numbers above correspond to the recommendations below.

1. Stripe all signalized crossings to reinforce yielding of vehicles turning during a green signal phase. The majority of vehicle--pedestrian incidents involve a driver who is turning.
2. Stripe the crosswalk as wide as or wider than the walkway it connects to. This will ensure that when two groups of people meet in the crosswalk, they can

comfortably pass one another. Crosswalks should be aligned as closely as possible with the pedestrian through zone. Inconvenient deviations create an unfriendly pedestrian environment.

3. High-visibility ladder, zebra, and continental crosswalk markings are preferable to standard parallel or dashed pavement markings. These are more visible to approaching vehicles and have been shown to improve yielding behavior.
4. Accessible curb ramps are required by the Americans with Disabilities Act (ADA) at all crosswalks.
5. Keep crossing distances as short as possible using tight corner radii, curb extensions, and medians. Interim curb extensions may be incorporated using flexible posts and epoxied gravel.
6. An advanced stop bar should be located at least 8 feet in advance of the crosswalk to reinforce yielding to pedestrians. In cases where bicycles frequently queue in the crosswalk or may benefit from an advanced queue, a bike box should be utilized in place of or in addition to an advanced stop bar. Stop bars should be perpendicular to the travel lane, not parallel to the adjacent street or crosswalk.

Street lighting should be provided at all intersections, with additional care and emphasis taken at and near crosswalks.

OPTIONAL: Right-turn-on-red restrictions may be applied citywide or in special city districts and zones where vehicle pedestrian conflicts are frequent. Right-turn-on-red restrictions reduce conflicts between vehicles and pedestrians.

Also worth noting is that, to the degree certain downtown streets remain one-way, the street sign system at intersections must reflect that street names are relevant to pedestrians as well as drivers. Currently, pedestrians walking "the wrong way" along one-way streets are kept in the dark by street-name signs that face only oncoming traffic. Whatever the future of street direction downtown, all intersections must receive street-name signs that face in both directions.

Bike Lanes in General

NACTO also provides specific instruction on the design of a variety of cycling facilities, too lengthy to repeat here, and worthy of direct consultation. One question cities often raise, given the cost, is to what degree the lane needs to be fully "painted" rather than merely striped. Given that less-expensive bike lanes allow a city to install a greater number of bike lanes, there is no one right answer to that question. However, a good compromise selected by many cities is to only color the full bike lanes in locations where conflict is likely, or where drivers need a reminder about the presence of the facility. Such a mandate results in bike lanes being fully colored as they approach intersections and in other areas where they are likely to encounter cross-traffic, such as alley openings.

Selection of the proper bike lane materials has a major impact on installation cost, maintenance cost, and longevity, and the technology is evolving constantly. While a more comprehensive investigation is recommended, one material worth considering is methacrylate, a new generation resin. It provides high durability on both asphalt and concrete, is skid-resistant with good traction, low VOC, highly reflective with high chromaticity

Methacrylate can be sourced from several companies. The bike lanes created by the City of Syracuse, which have lasted two winters without significant damage, were made of *Color-Safe TM Color Pavement Marking*, manufactured by Transpo inductries of New Rochelle, NY. (Neither Speck & Associates nor Nelson/Nygaard have any relationship with this company.)

This methacrylate cycle track in Syracuse, NY, has held up well to weather.

A Future Streetcar?

Streetcars are making a comeback across the U.S. At one time, every American city with a population above 10,000—including New Albany—had its own streetcar system. Almost all of these were torn out in the mid-20th Century. Now, dozens of new systems have been completed or are under construction in America's downtown cores.

Such an effort is under consideration for New Albany, and is to be encouraged. Given its limited traffic volumes, and the desire to not widen streets to invite speeding, it is recommended that any new streetcar rail in New Albany be laid in the street, to share travel lanes with vehicles, rather than receiving dedicated right of way. This approach has the additional advantage of allowing all efforts at restriping downtown streets to move forward while the streetcar's future remains an uncertainty. All of the individual street redesigns discussed ahead will function properly with or without streetcars running in them.

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III: PROPOSED CHANGES TO INDIVIDUAL THOROUGHFARES

Spring Street

E. Spring Street, from Beharrel to Silver

Four wide lanes invite speeding on the eastern segment of Spring Street.

Current Condition

The two-way eastern segment of Spring Street consists of four lanes in a roadway that is over 50 feet wide. This segment carries significant traffic volumes, with daily counts just below 23,000 cars between Silver and Beharrel. Transitioning to highway conditions to and from the Ohio River Scenic Byway, cars often travel at excessive speeds along this segment's wide driving lanes, and crossing the street feels treacherous. In this four-block stretch, only one crosswalk is present, at Beharrel Avenue.

Analysis

In this configuration, Spring Street corresponds exactly with the "before" image of what has become known as the "Classic 4-to-3 Road Diet." Already described under The Proper Number of Driving Lanes, the road diet replaces two driving lanes with one center turn lane, dramatically improving safety while having no negative impact on traffic volume.

Eliminating a driving lane and narrowing the remaining lanes allows for 8-foot parking lanes to be striped on both sides of the street. Whether or not the enfronting houses make regular use of this parking, the introduction of a 3-lane configuration will result in a street that is considerably safer, with no sacrifice in capacity. Left-hand turns into businesses will be able to be made without the fear of being hit from behind in the fast lane.

On a street section such as this, where the on-street parking may be little used during parts of the day, the actual striping (rather than simply signing) of the parking spaces becomes an important delineator of the appropriate travel lane.

The transition from four lanes to three can be accomplished by having the right-hand westbound lane become right-only approaching Woodrow Avenue. Additional danger can be removed by eliminating the intersection of Providence Way and Spring Street, instead requiring westbound traffic on Providence to turn north onto Beharrel.

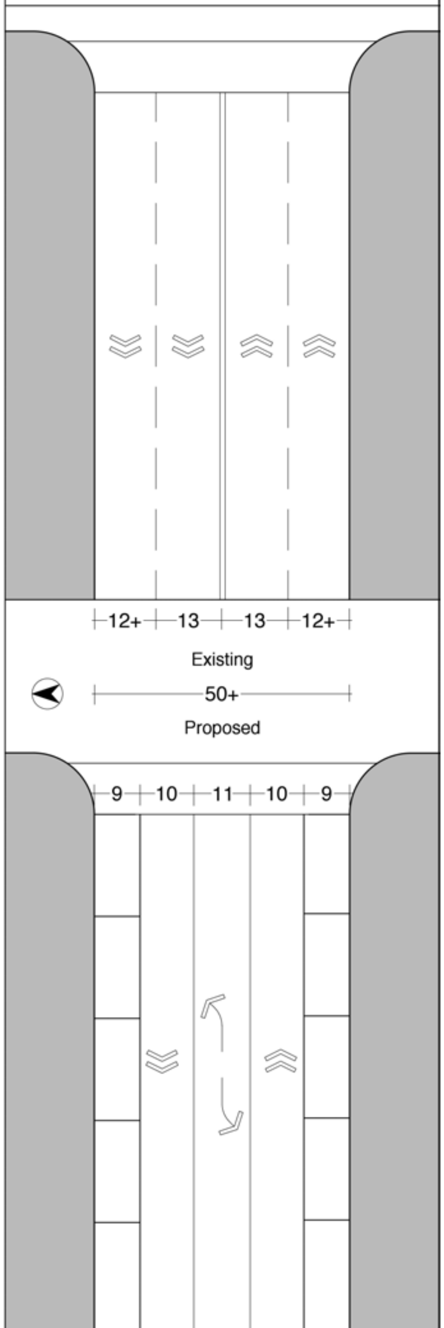
While the introduction of a crosswalk in this segment, without a corresponding signal, might encourage unsafe behavior, pedestrian safety can be enhanced by inserting a refuge island in the center lane about midway between Beharrel and Silver, at Cost Avenue. (Incidentally, and not addressed elsewhere in this report, the short segment of Cost Avenue north of Spring Street should be considered for two-way reversion once Spring Street is calmed by the road diet recommended here.)

Please see the Appendix for an analysis of the Spring/Silver intersection. While a right-hand turn lane is not encouraged at the westbound approach to Silver—and produces only marginal improvement to flow—such a facility can be introduced by slightly narrowing the driving lanes and eliminating the north-flank parking lane. If introduced, this turn lane should be limited in length, since it encourages speeding.

<u>Recommendation</u>

From Beharrel to Silver, restripe Spring Street to two 10-foot driving lanes surrounding a 12-foot center turn lane and flanked by two striped 9-foot parking lanes. (Require the northern westbound lane to turn right onto Woodrow.) If right-hand turns cause congestion at Silver Street, insert a short westbound right-hand turn lane by eliminating the northern flank of parking and restriping the driving lanes slightly narrower, while maintaining the parking on the south flank. (The resulting street section will approximate: 11 turn – 10 drive – 11 turn – 10 drive – 9 park.) Insert a pedestrian refuge in the center lane at Cost Avenue.

SPRING STREET
WOODROW TO SILVER



NOTES

- Righ-hand turn lane not encouraged at Silver, but can be provided in an 9 - 10+ - 11 - 10+ - 11 section.
- Insert refuge median in center lane at Cost Ave.

East Spring Street, from Silver to Vincennes

The same section of four wide lanes continues from Silver Creek to Vincennes.

Current Condition

This next segment of Spring Street also consists of four lanes in a roadway that is over 50 feet wide. This segment carries considerably less traffic, with daily counts in the 16,000 to 18,000 range. It also presents less motivation for left-hand turns, with only Thomas Street serving a significant network (grid) function. Cars often travel at excessive speeds along this segment's wide driving lanes.

Analysis

The same 3-lane road-diet section can be provided here, but the small demand for left-hand turn motions suggests that the center lane need only be provided at Silver, Thomas, and Vincennes Streets, and can be eliminated elsewhere. Eliminating this facility where it is not needed provides additional space in the roadway that can be dedicated to other use, and here it makes sense to introduce a cycle facility that reaches into downtown.

The roadway's 50-foot width can amply hold two travel lanes, two parking lanes, and a two-way cycle facility. At the intersections noted above, one parking lane would drop away in order to provide space for a center turn lane. It is essential that this turn lane not be any longer than needed. It is anticipated that a combined storage area and lane chamfer of 80 feet will be sufficient.

The cycle facility could take two different forms. As already discussed, protected cycle tracks have been demonstrated to provide the greatest safety and encouragement to cyclists while also improving the driving experience. Because of their success and popularity in the dozens of states in which they have been tested, it is recommended that one significant-length cycle track be introduced to New Albany, and Spring Street provides the ideal corridor.

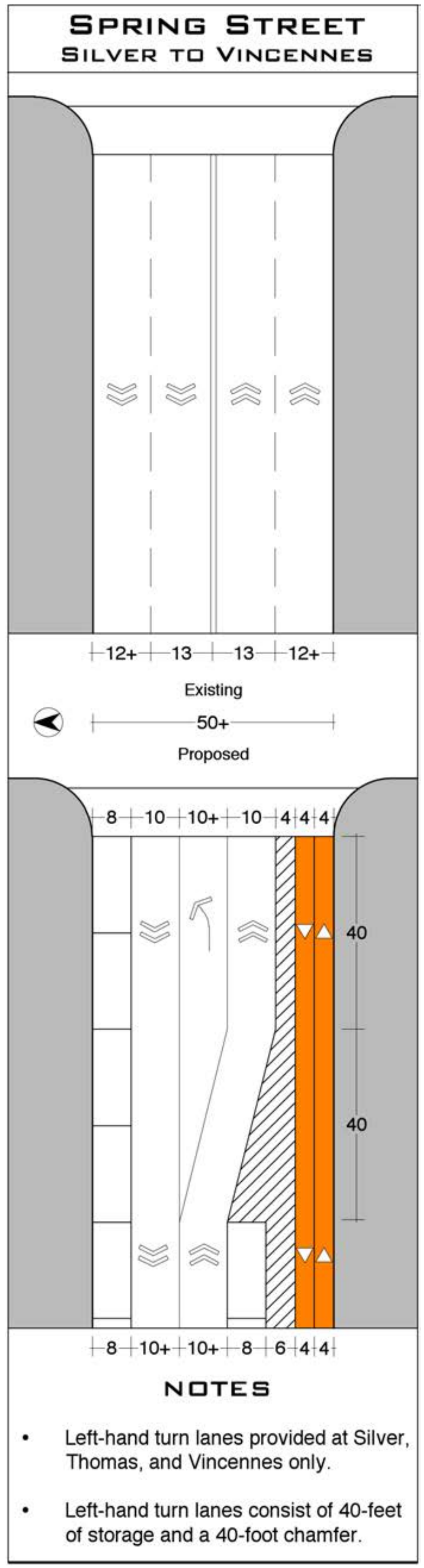
Such a cycle track earns its "protected status by being located principally between the curb and parked cars. One flank of curb parking is pulled off the curb, in order to create this corridor, and a small striped buffer separates bicyclists from opening car doors. At corners, the parked cars drop away in order to improve cyclists' visibility.

However, if there is community resistance to this facility, a more conventional solution of two integrated cycle lanes, similar to the current condition west of Vincennes, could be applied instead to this two-way segment. To welcome bikes and encourage slower driving speeds, driving lanes should be 10 feet wide rather than 12, so that bike lanes may be 6 feet wide rather than 5. This extra foot is important to cyclists, who are squeezed between moving traffic on one side and car doors on the other.

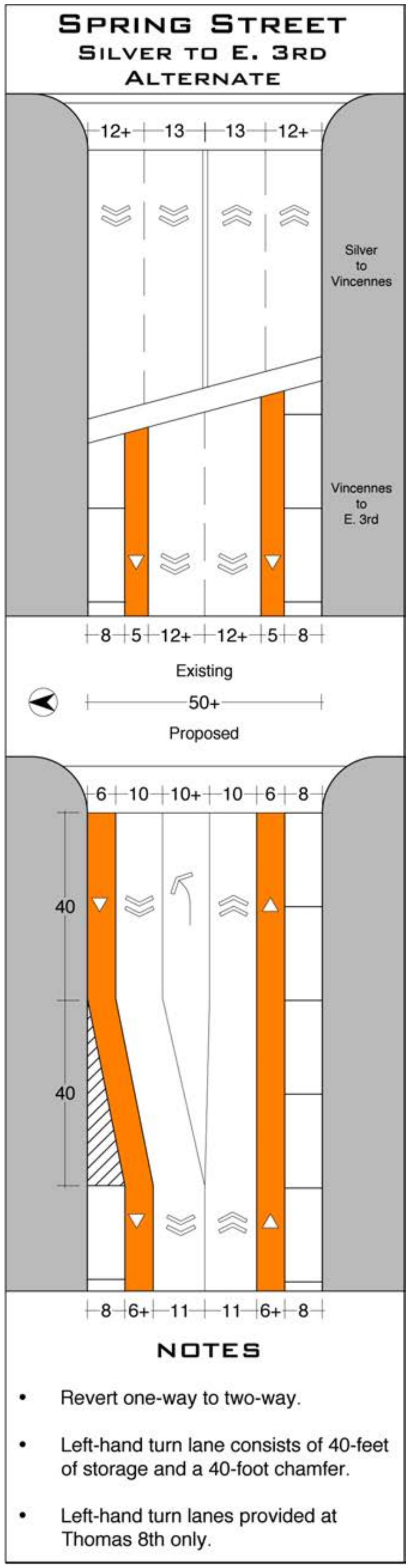
Recommendation

From Silver to Vincennes, restripe Spring Street to one of the following configurations:

Cycle Track Solution: Place an 8-foot two-way cycle track against the south curb, with a 6-foot striped buffer separating it from a 36-foot roadway containing two 10-foot travel lanes flanked by two 8-foot parking lanes (striped). At Silver, Thomas, and Vincennes, provide 10-foot left-hand turn lanes by eliminating one flank of parallel parking and narrowing the buffer to 4 feet. The left-hand turn lane facility should be no longer than needed, ideally 80 feet or less total, including chamfer.



Integrated Lane Solution: Reconfigure the roadway to include two 11-foot driving lanes flanked by two 6-foot cycle lanes and two 8-foot parking lanes. At Silver, Thomas, and Vincennes, provide 10-foot left-hand turn lanes by eliminating one flank of parallel parking and narrowing the travel lanes to 10 feet. The left-hand turn lane facility should be no longer than needed, ideally 80 feet or less total, including chamfer.



E. Spring Street, from Vincennes to E. 3rd

Here, Spring contains two wide driving lanes and two bike lanes, all westbound.

<u>Current Condition</u>

At Vincennes Street, Spring Street becomes one-way, and contains two 12-foot travel lanes flanked by two 5-foot bike lanes (in the same direction) and two 8-foot parking lanes. This configuration continues unchanged to E. 3rd Street.

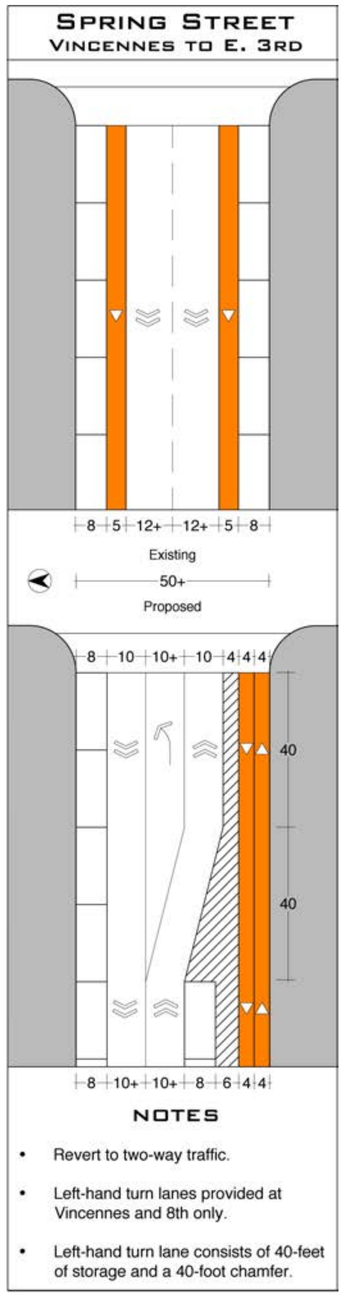
<u>Analysis</u>

For the reasons already discussed, reverting the Spring/Market one-way pair back to two-way will be instrumental to the vitality of downtown New Albany. This segment, therefore, is recommended for the same solutions as the segment to its west. While additional left-hand turn lanes can be provided if undue congestion occurs, it is anticipated that such lanes are only needed at Vincennes and E. 8th Street.

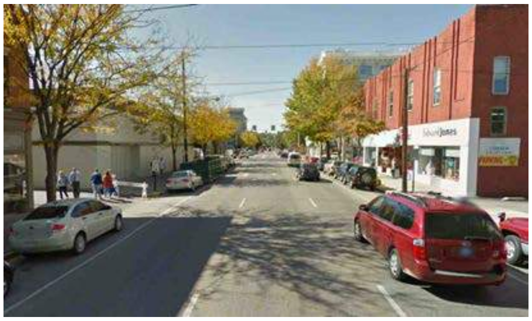
<u>Recommendation</u>

See above recommendation for E. Spring Street from Silver to Vincennes, with a left-hand turn lane inserted at E. 8th Street only. Note that, in the short term and temporarily, Spring Street can be reverted to two-way without restriping, simply by converting the southern driving and bike lanes to eastbound. The left-hand turn lane facility should be no longer than needed, ideally 80 feet or less total, including chamfer.

For the non-cycle-track version of this proposal, see the alternate proposal already provided.



Spring Street, from E. 3rd to W. 4th



At E. 3rd, Spring trades its bike lanes for a third westbound lane, for highway queues.

<u>Current Condition</u>

From E. 3rd to the interstate, E. Spring street backs up with highway-bound vehicles during rush hour. For that reason, the street receives a third westbound lane at E. 3rd, and a fourth as it passes under the interstate. In certain locations along this segment, lanes are inordinately wide, with curb parking disallowed in places where it easily fits. Pedestrians are intimidated at the intersection of Spring Street and W. 1st, where there is no traffic signal. From State Street to W. 5th, Spring Street is controlled by the Indiana Department of Transportation (INDOT).

<u>Analysis</u>

With the reversion of Market and Elm Streets to two-way, the network will naturally take some of the rush-hour trips off of Spring Street. But as before, it makes sense to add lanes for car storage beginning at E. 3rd Street. For this reason, the cycle facility must end at that point, where it can be prominently turned south to join Market Street via E. 3rd.

Here, continuing Spring Street's two-way trajectory under the highway requires only the reversion of one driving lane from westbound to eastbound. Speeding traffic can be calmed somewhat by inserting parallel parking where it is missing: this parking should reach as far as Scribner on the north curb, and as far as Washington on the south curb. A pedestrian crossing signal at W. 1st Street is clearly mandated for safety.

<u>Recommendation</u>

Revert southern driving lane from westbound to eastbound. Stripe on-street parking on the north curb from Scribner east, and on the south curb from Washington east. Insert a new traffic light or a pedestrian crossing signal at the intersection of Spring Street and W. 1st. Place sign at E. 3rd directing westbound bikers south.

W. Spring Street, from W. 4^{th} to W. 6^{th}

As Spring passes the highway ramps, it becomes a hybrid of a city street and a rural highway.

Current Condition

As already discussed, the intersection of Spring and W. 4^{th} Streets feels very dangerous. Wide lanes and swooping curves create a confusing environment that invites high speeds. Drivers heading north from W. 4^{th} Street onto the interstate must angle across intimidating westbound traffic on Spring.

At W. 5^{th} Street, Spring Street once again becomes two-way, flanked by bike lanes that end unceremoniously at W. 5^{th} Street, without an obvious place for cyclists to go.

Analysis

Continuing a two-way trajectory through this segment will calm traffic somewhat, but the W. 4^{th} Street / on-ramp configuration calls out for a redesign that gently reshapes the intersection to welcome slower speeds, as already proposed in Part II. Given that it does not continue eastward, the cycle facility should end at W. 6^{th} Street, where it can be prominently turned south to join Market and Main Streets.

Recommendation

Reconfigure intersection with W. 4^{th} as shown in Part II, extending the curb and grass into the striped shoulder on north side of Spring Street. Place sign at W. 6^{th} directing eastbound cyclists south. Between E. 5^{th} and E. 6^{th} streets, stripe the bike lanes as off-limits shoulders. Eventually, if funds become available, the street can be narrowed to 36 feet and these shoulders eliminated.

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Market Street

W. Market Street, from W. 6th to W. 1st

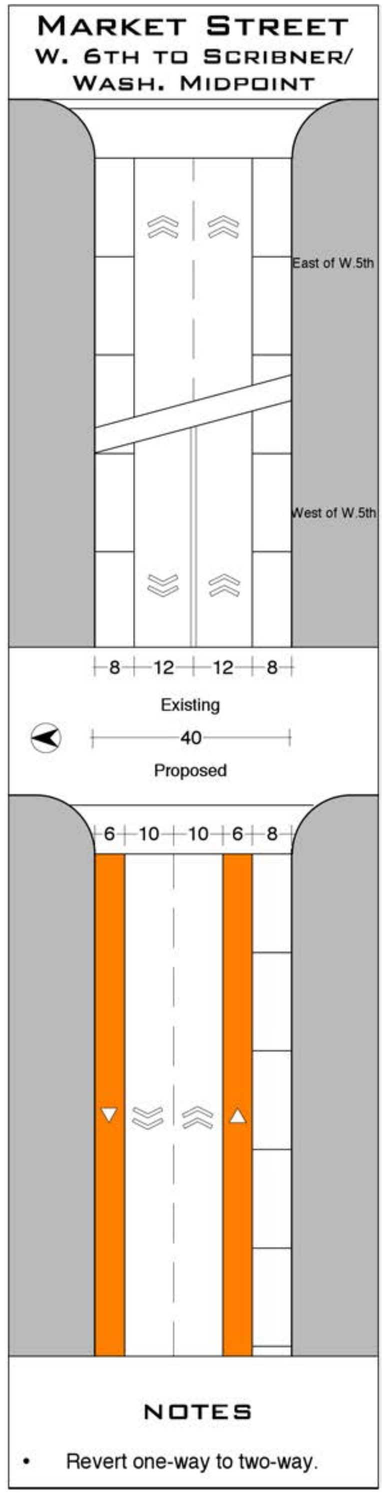
This segment of Market Street experiences limited parking load, effectively widening the driving lanes.

Current Condition

Market Street is two-way west of W. 5th, and one-way from there to Vincennes. It handles very light traffic west of the interstate—fewer than 1000 trips per day. East of W. 5th Street it experiences limited demand for on-street parking, so its 40 feet of pavement are underutilized. In its one-way segment, it provides two eastbound driving lanes for traffic flows that are a fraction of what could be handled by a single lane, inviting speeding.

Analysis

For the reasons already discussed, reverting the Spring/Market one-way pair back to two-way will be instrumental to the vitality of downtown New Albany, and will also reduce the amount of speeding drivers. To keep speeds down, it is important to not have excess unutilized pavement, which gives the impression of over-wide travel lanes. For this reason, it makes sense to insert bike lanes in Market as far west as W. 6th Street. (Beyond this location, there is a greater parking demand.) Placing two bike lanes in the road leaves room for parking on one side, which is ample for most days.



Recommendation

Revert Market Street to two-way. For the segment west of the News and Tribune building (midway between Washington and Scribner), restripe to contain two 10-foot driving lanes flanked by two 6-foot bike lanes and one 8-foot parking lane. From that location to W. 1st Street, where there is no room for bike lanes, simply mark the roadway with sharrows near each intersection. When the roadway is reverted to two-way, the head-in parking by the News and Tribune will become back-in parking, which is safer for passing cyclists as well as motorists.

Market Street, from W. 1st to Pearl

As a legacy of its original two-way configuration, Markey contains a median in this location.

Current Condition

From W. 1st to Pearl, Market Street exhibits the strange condition of two one-way segments traveling in the same direction on either flank of a median, a legacy of its original two-way configuration. In this segment, it caries about 4400 cars per day.

From W. 1st to State, the median separates two lanes on each side, flanked by angle parking. From State to Pearl, the median separates one northern lane and two southern lane, also flanked by angle parking.

Analysis

In this segment, Market Street carries in four lanes a volume of traffic that can often be handled in a single lane. Reversion to two-way will allow Market to take many westbound trips off of Spring, better balancing motion through the downtown grid. With the addition of a left-hand turn lane at the key State Street intersection, a single lane in each direction will be ample. This results in extra pavement that should be converted

to different use in order to not invite speeding.
The segment from W. 1st to State contains four lanes. To the south of the median, some of the left eastbound lane should be preserved as the left-hand turn lane, but this facility need not stretch more than half the block. The western half is therefore available to hold a lane of parallel parking. On the street's north flank, the extra lane against the median is available to hold bikes, and is ideally situated to contain a cycle track: a two way facility located between the median and a striped buffer.

On the segment from State to Pearl, a different roadway condition calls for a different solution. Since there is only one lane north of the median, they cycle track would angle slightly across State Street as it heads east, to end up on the south side of the median for this block. For both blocks, the reversion to two-way traffic will automatically convert the head-in parking on the north flank to back-in.

A cycle track, as discussed above, presents the safest and most convenient condition for both cyclists and drivers. However, if there is community resistance to this facility, a more conventional solution of two integrated bike lanes could be applied instead. (Integrated lanes fit on both sides of the median except for the north roadway from State to Pearl, which would need to be marked with a sharrow instead.) This approach would free up the area occupied by the cycle track for additional parallel parking, but it would require the existing angle parking on the southern flank to be reverted to back-in, to avoid a hazard for cyclists. Given that the curbs are currently angled to support head-in parking, this change would require either a reconstruction of the curbs or a loss of several parking spaces.

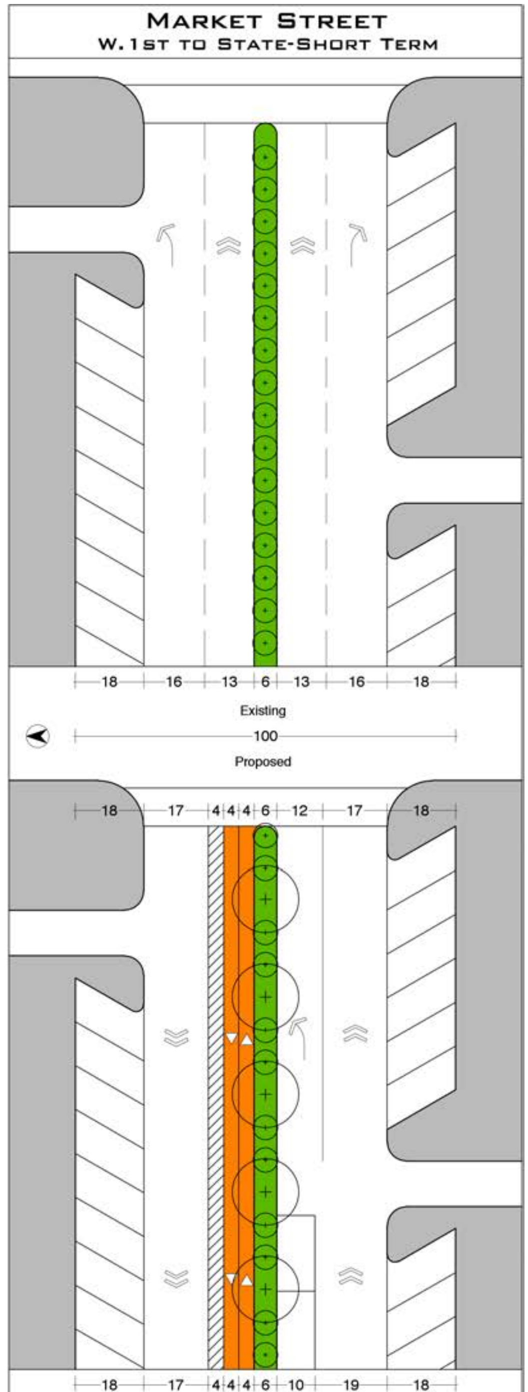
Worth noting in all the above cases is that the median seems capable of supporting true street trees in addition to its current decorative bushes. These would contribute to the character, comfort, and safety of the street.

One final idea deserves discussion as a long-term opportunity to the block between W. 1st and State. Here, the street is blighted by a surface parking lot and a parking structure that give it an uninviting northern edge. By consolidating all travel onto the southern half of the street, the area from the median north could be transformed from City right-of-way into a developable piece of property.

In this case, the median would be removed and the southern half of the street would be widened slightly to hold a 3 lane section against the current angled parking, which would have to be reversed (to back-in) to make the roadway safe for bikes. (Lanes would be marked with sharrows.) As it approached State Street, this section would include a half-block-long center turn lane, but the western half of the block would contain two travel lanes against a northern flank of parking. If a new sidewalk of 15 feet depth were constructed against this roadway, space would remain for a developable property about 50 feet deep, hiding the parking lots from view. The current southern entrance to the parking garage could be kept, and simply extended through the a new building to meet the narrowed street.

Recommendation

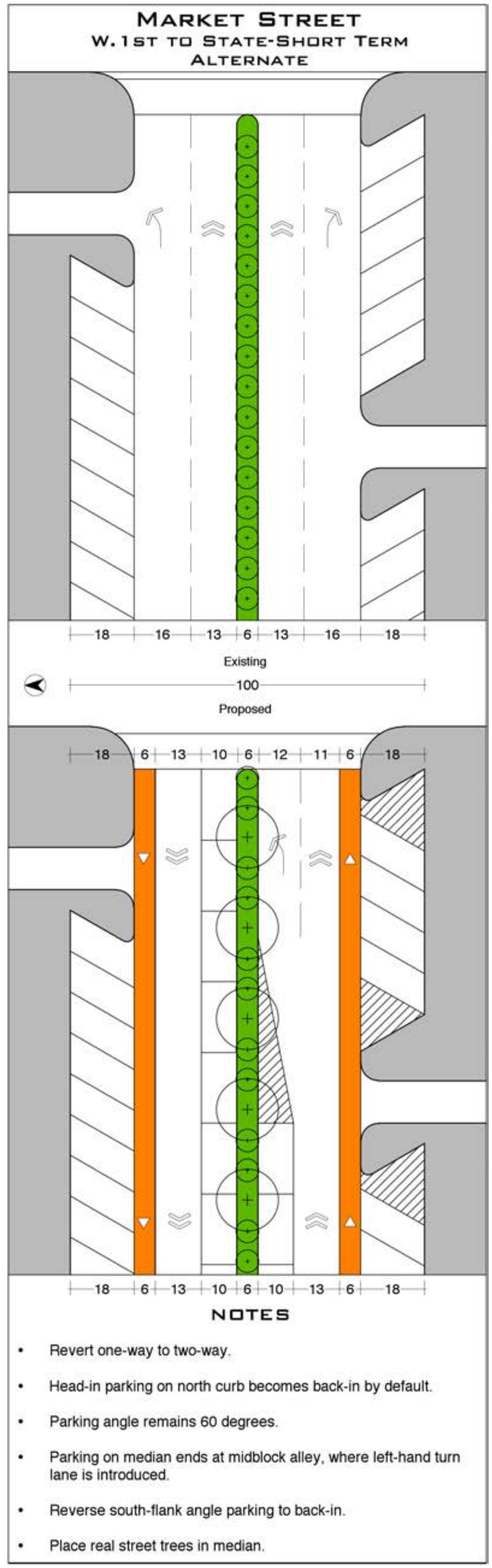
From W. 1st to State, Short-Term: Revert to two way traffic. Convert the lane just north of the median to an 8-foot two-way cycle track with a 4-foot buffer to its north. Place striped parking in the western half of the lane just south of the median. This lane should be 10 feet wide to allow room for drivers to exit against the median. When the roadway is reverted to two-way, the head-in parking on the north flank will become back-in. Plant larger street trees in the median.



NOTES

- Revert one-way to two-way.
- Head-in parking on north curb becomes back-in by default.
- Parking angle remains 60 degrees.
- Parking on median ends at midblock alley, where left-hand turn lane is introduced.
- Place bollards at cycle-track entrance at each intersection.
- Place real street trees in median.

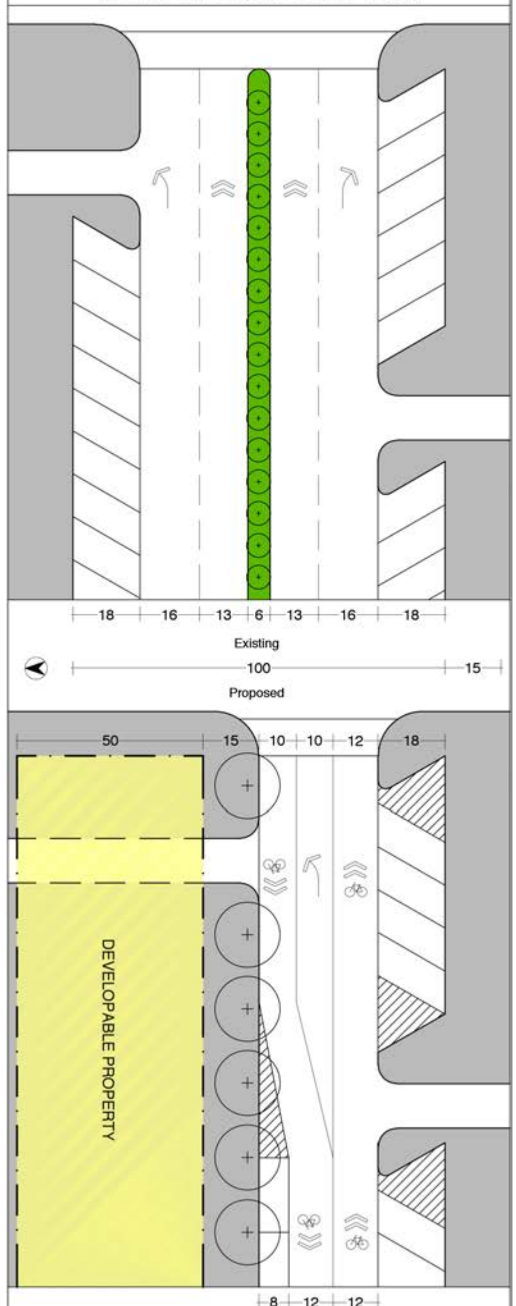
From W. 1st to State, Short-Term, Compromise: Revert to two way traffic. Convert both of the lanes flanking the median into striped parking lanes (10 feet wide), but eliminate parking at midblock on the eastbound lane to allow a left-hand turn lane onto State. Place 6-foot bike lanes alongside both flanks of angled parking. Convert the head-in parking to the south into back-in. When the roadway is reverted to two-way, the head-in parking on the north flank will become back-in.) Plant larger street trees in the median.



From W. 1st to State, Long-Term: Revert to two way traffic. Remove the median and convert the southern half of the roadway to a 12-foot lane-against the existing angle parking, a 10-foot center turn lane, and a 10-foot southbound lane. For the western half of the block, eliminate the center lane and insert a flank of parallel parking to the north of the westbound lane. Insert sharrow markings in roadway near each intersection. Convert the south angle parking to back-in. In place of the median and the northern half of the roadway, insert a 15-foot deep sidewalk with street trees in planters. Convert the remainder of the right-of-way into a building site, to hold a structure that places doors and windows on the new sidewalk. Pass the southern entry to the parking garage through this new structure, to access Market Street as before.

Eliminating Market's northern segment provides room for a building that would hide these parking lots.

MARKET STREET
W. 1ST TO STATE-LONG TERM

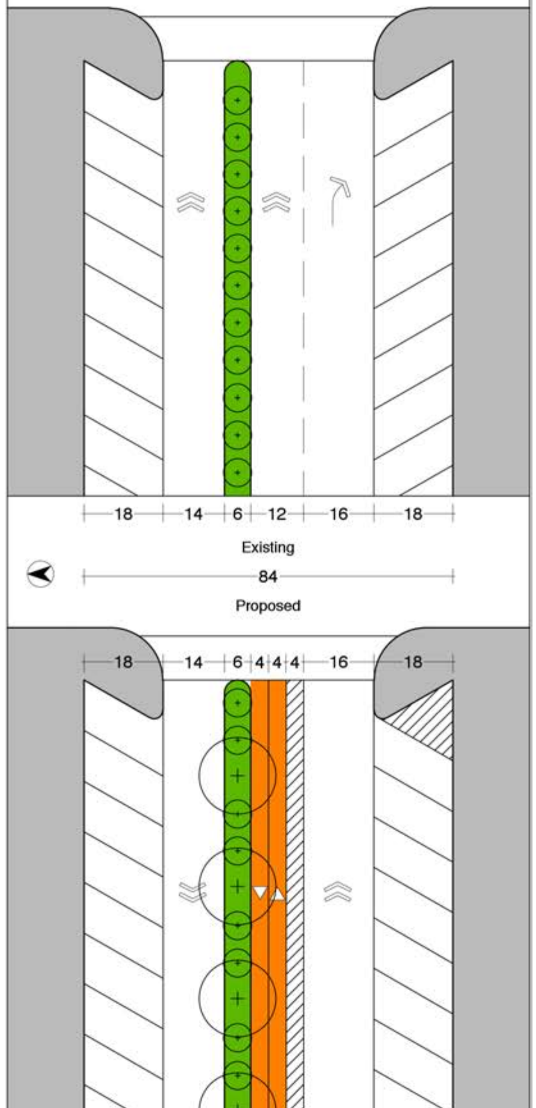


NOTES

- Revert one-way to two-way.
- Northern carpath is abandoned to create a development parcel that hides parking lots behind.
- Parking on north curb ends at midblock alley, where left-hand turn lane is introduced.
- Bikes mix with traffic; sharrows placed in roadway.
- Reverse angle parking to back-in.
- New north sidewalk is 15 feet deep with consistent shade trees.

From State to Pearl: Revert to two-way traffic. Convert the lane just south of the median to an 8-foot two-way cycle track with a 4-foot buffer to its south. (When the roadway is reverted to two-way, the head-in parking on the north flank will become back-in.) Plant larger street trees in the median.

MARKET STREET
STATE TO PEARL

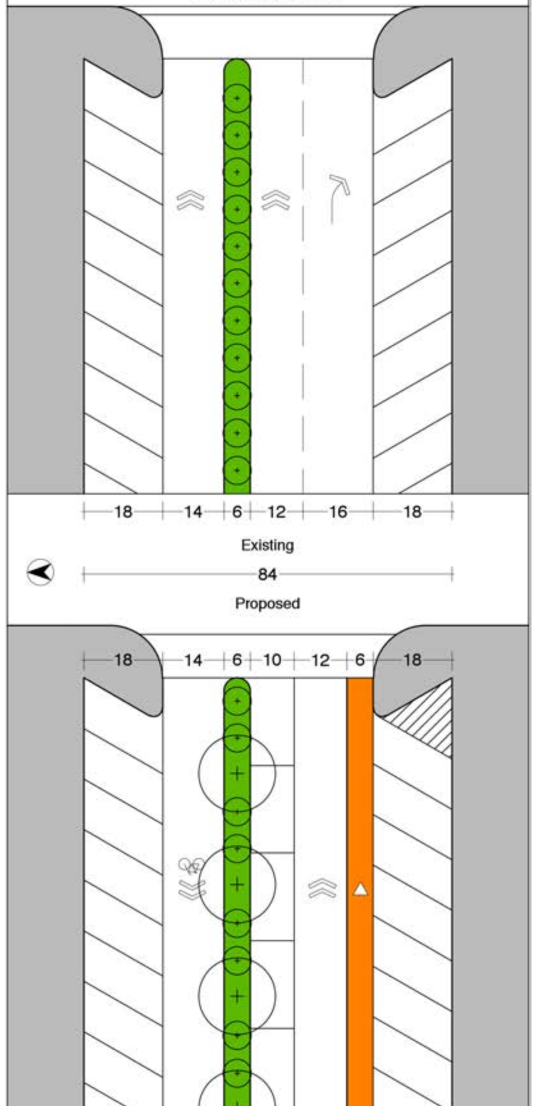


NOTES

- Revert one-way to two-way.
- Head-in parking on north curb becomes back-in by default.
- Parking angle remains 60 degrees.
- Place bollards at cycle track entrance at each intersection.
- Cycle track crosses State street diagonally with prominent markings.
- Place real street trees in median.

From State to Pearl, Compromise: Revert to two way traffic. Convert the lane south of the median into a striped parking lane (10 feet wide). Place sharrow in the north roadway. Place a 6-foot bike lane alongside the south flank of angled parking. Convert the south angle parking into back-in. (When the roadway is reverted to two-way, the head-in parking on the north flank will become back-in.) Plant larger street trees in the median.

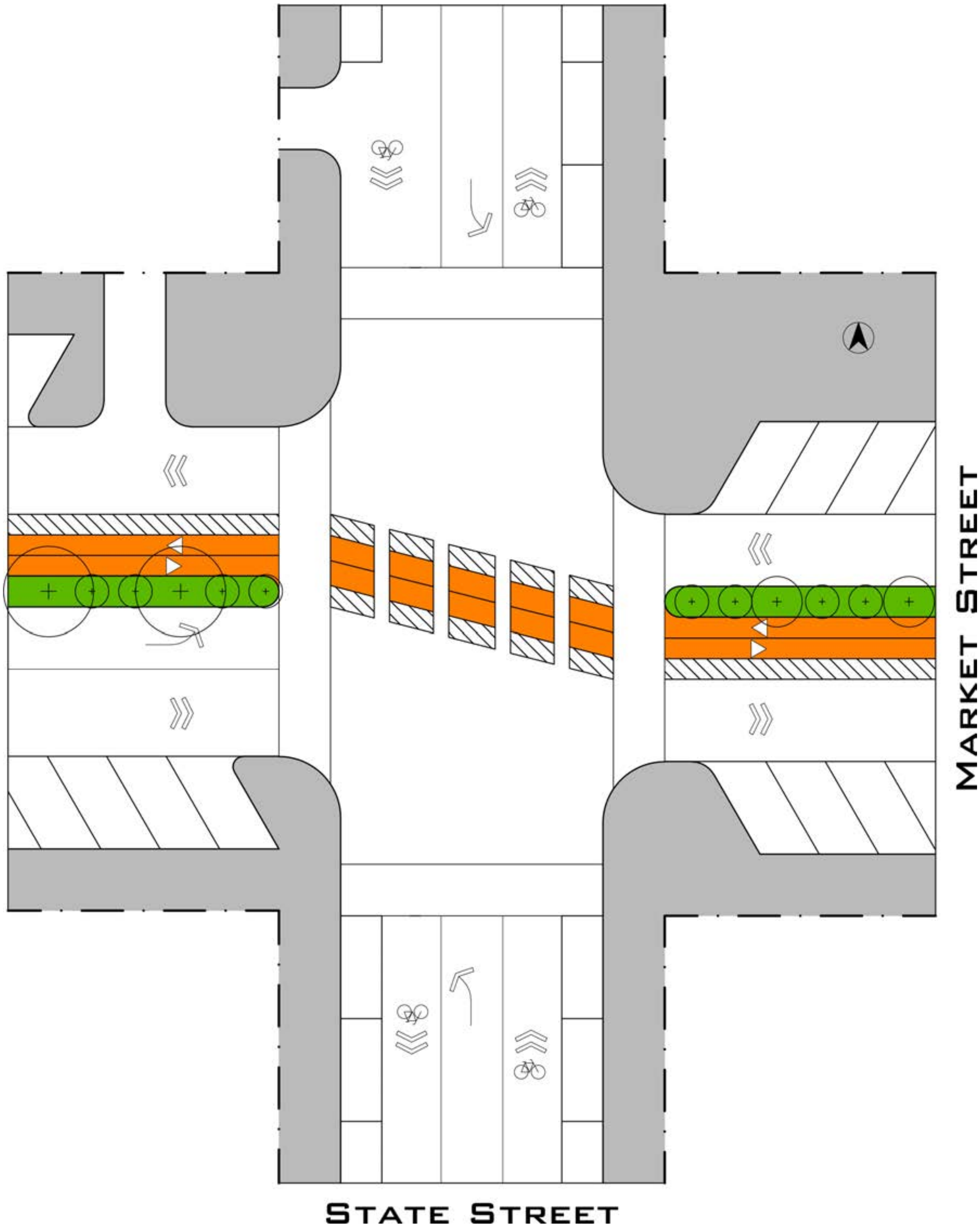
MARKET STREET
STATE TO PEARL
ALTERNATE



NOTES

- Revert one-way to two-way.
- Head-in parking on north curb becomes back-in by default.
- Parking angle remains 60 degrees.
- Reverse south-flank angle parking to back-in.
- Place real street trees in median.

Market Street / State Street Intersection: As the proposed cycle track on Market Street crosses State Street, it also shifts from one side of the median to the other. This diagram illustrates how this slight shift can be accommodated by bold markings in the roadway.



E. Market Street, from Pearl to E. 3rd

This narrower segment of Market is properly sized for its use.

Current Condition

These two blocks of Market Street contain two eastbound lanes of traffic flanked by angle parking to the north and parallel parking to the south.

Analysis

Here, it makes sense to continue the two-way reversion, with bikes mixing with traffic.

Recommendation

Revert to two-way traffic. Insert sharrow markings in roadway near each intersection. (When the roadway is reverted to two-way, the head-in parking on the north flank will become back-in.)

E. Market Street, from E. 3rd to E. 13th

East of E. 3rd Street, Market is about 5 feet wider than it needs to be.

Current Condition

Two lanes of eastbound traffic are flanked by two lanes of parallel parking in a roadway of approximately 40 feet. Traffic volumes on this segment of Market Street are considered too low to merit counting. Between E. 12th and E. 13th Street, the north-flank tree zone has been replaced by a broadened parking zone that widens the roadway for two thirds of the block.

Analysis

This street is easily reverted to two way traffic, but contains an extra 5-feet of roadway, inviting speeding. In order to right-size the driving lanes, it makes sense to insert just one bike lane. Since this lane is extra, it should be westbound, in order to prioritize trips downtown. Eastbound bike traffic can shift north to Spring Street on E. 3rd. For the widened 2/3 block east of E. 12th, the tree zone should be reconstituted and planted.

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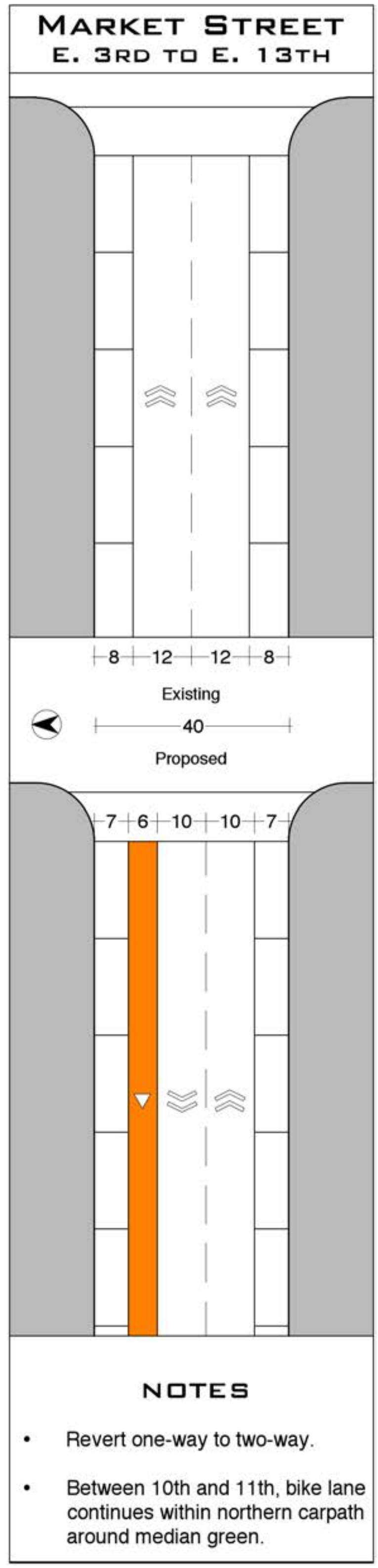
<u>Recommendation</u>

Revert to two-way traffic. Insert a 6-foot westbound bike lane 7 feet from the north curb. Eliminate unnecessary curb cuts on the north side between E. 3rd and E. 4th. Replace and plant the tree zone that has been removed east of E. 12th.



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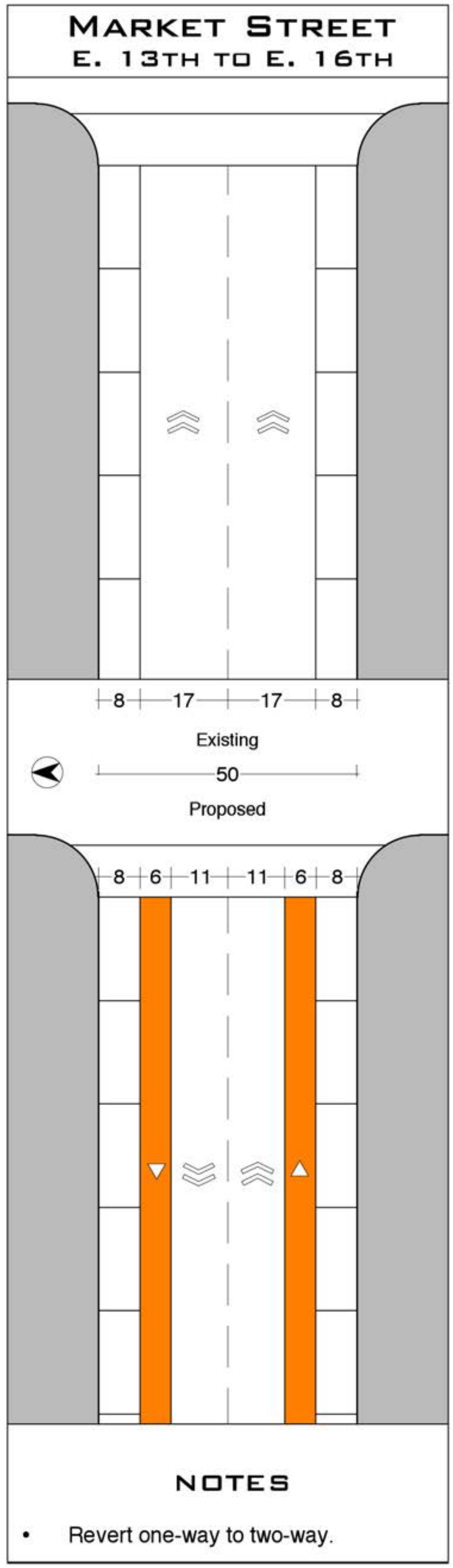
E. Market Street, from E. 13th to E. 16th

At 13th, Market widens even more, to contain an excess of 15 feet.



<u>Current Condition</u>

Here, the roadway widens to approximately 50 feet, further encouraging illegal driving speeds.

<u>Analysis</u>

The extra space in the roadway allows bike lanes to be inserted in both directions.

<u>Recommendation</u>

Revert to two-way traffic. Insert a 6-foot westbound bike lane 8 feet from each curb.

E. Market Street, from E. 16th to Vincennes

Current Condition

For this one block of E. Market, the roadway expands to contain angle parking on the north curb.

Analysis

There is not room for bike lanes in this roadway if the angle parking is to be maintained. Keeping that parking will lend viability to the adjacent struggling shops, so the use of sharrows is recommended.

Recommendation

Revert to two-way traffic. Insert sharrow markings in roadway near each intersection. (When the roadway is reverted to two-way, the head-in parking on the north flank will become back-in.)

E. Market Street, from Vincennes to Beharrel

This low-traffic segment of Market is the proper cycle connector to the Ohio River Greenway.

Current Condition

Here, E. market welcomes two way travel, with parking on both flanks.

Analysis

This eastern stretch of Market is poised to connect nicely to the Ohio River Greenway bike path at its eastern end. There is not ample room in the roadway for bike lanes, but the roadway can be marked with sharrows to encourage biking and calm traffic. According to safety studies, allowing the remaining centerlines to disappear over time should result in less speeding.

Recommendation

Insert sharrow markings in roadway near each intersection. Allow centerline to fade. Do not restripe.

Main Street

Main Street is being rebuilt east of E. 5th Street. The following recommendations head west from there.

Main Street from E. 5th to State

Over-wide lanes on Man Street provide an opportunity for bike lanes or angle parking.

Current Condition

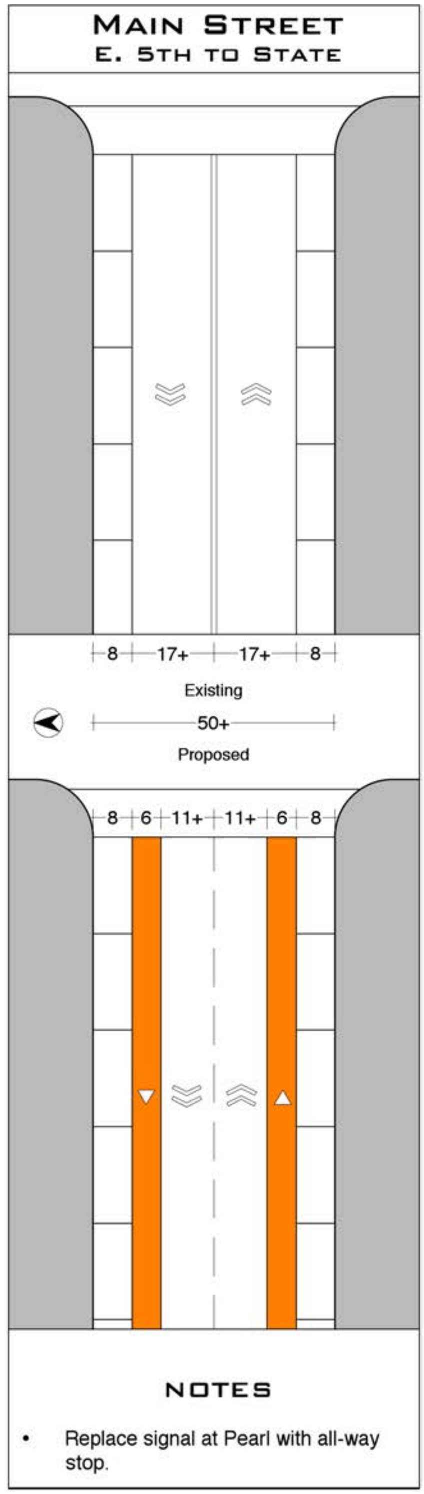
Main Street is currently being rebuilt east of E. 5th Street, but a plan is not yet completed for segments further west. This important segment contains two driving lanes flanked by two parking lanes in a roadway that is about 50 feet wide.

Analysis

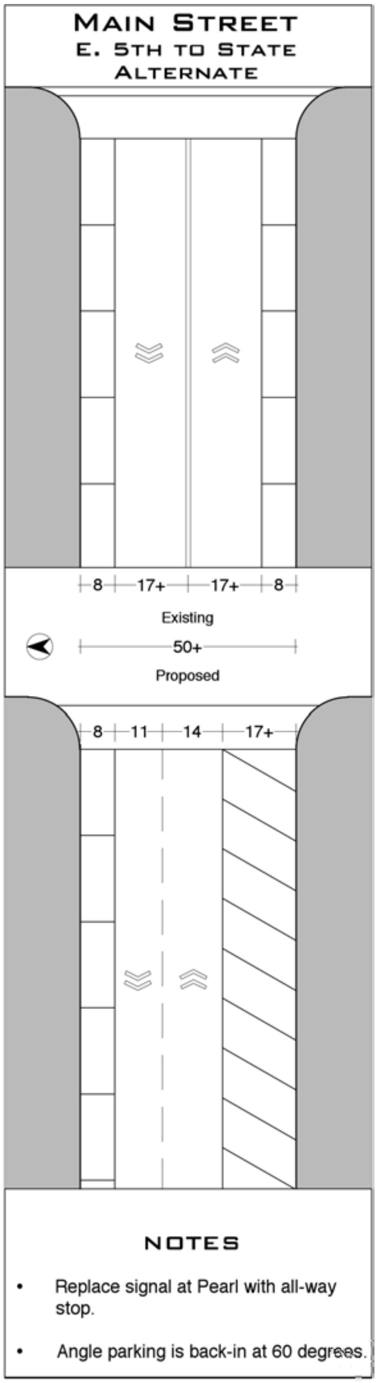
The extra roadway width results in travel lanes that are about 17 feet wide, inviting speeding. This extra space should be taken up by bike lanes or, if desired, by angle parking to assist local businesses. If that angle parking is back-in, it will not harm Main Street as a cycling corridor.

Recommendation

Bike Lane Alternative: Insert 6-foot bike lanes 8 feet from both curbs.



Angle Parking Alternative: Convert the south flank of parking to back-in parking angled at 60 degrees. Place this parking in a 17-foot lane alongside a 14-foot travel lane. The westbound travel lane should be approximately 11 feet wide alongside an 8-foot striped parking lane.



Main Street from State to Lafayette

West of State street, an overlong left-hand turn lane removes a full flank of parallel parking from Main Street.

<u>Current Condition</u>

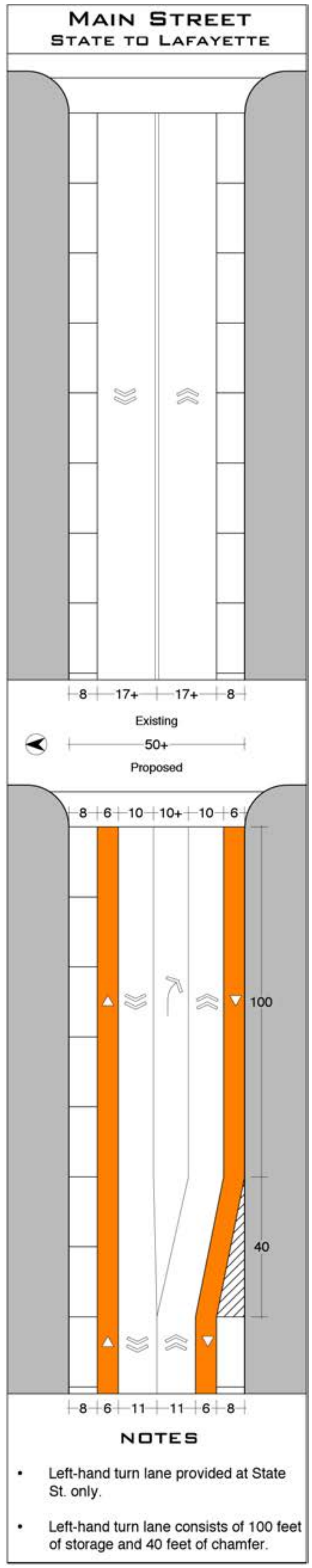
From State to W. 1st, Main Street contains three lanes of travel (including an eastbound left-hand turn lane onto State) and parking along the north curb. From W. 1st to Lafayette, Main Street contains two travel lanes flanked by two parking lanes, In all cases, the roadway is about 50 feet wide. W. Main Street is controlled by INDOT (S.R. 111)

<u>Analysis</u>

From State to W. 1st, the block-long left-hand turn lane can be shortened to half its length, allowing a half block of curb parking on the northern flank and continuous parking to the south (against the YMCA). From State to Lafayette, extra roadway width results in travel lanes that reach up to 17 feet wide, inviting speeding. This extra space should be taken up by bike lanes.

Recommendation

Restripe the block from State to W. 1st with a 8-foot parking lanes along the entire south curb and along the western half of the north curb. Limit the center turn lane (and its chamfer) to the eastern half of the block. Stripe 6-foot bike lanes outside of the eastbound and westbound driving lanes. Limit driving lanes to 10 feet wide in the three-lane section, and to 11 feet wide in the two-lane section.



Main Street from Lafayette to W. 8th

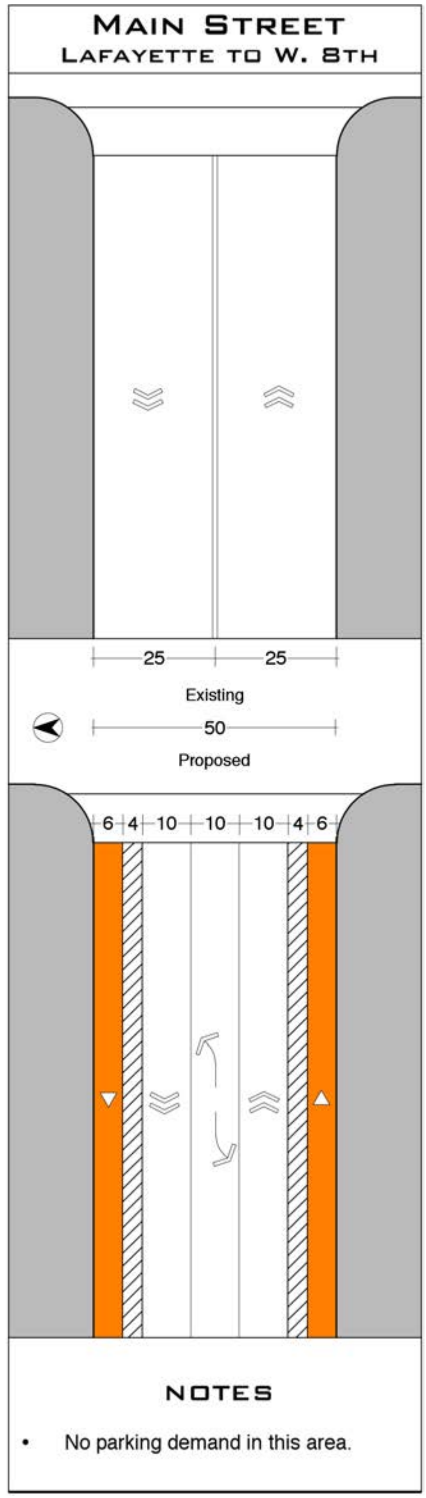
An absence of parking demand Main Street results in a roadway with exceptionally wide lanes.

Current Condition

In this section, where there is no demand for curb parking, Main Street effectively consists of two 25-foot driving lanes, inviting highway speeds. Around W. 4th and W. 5th Streets, these lanes narrow slightly to include left-hand turn lanes. Car counts in this area surpass 17,000 per day. West Main Street is controlled by INDOT (west of State Street).

Analysis

Here the objective is to fill the roadway with a configuration that corresponds to the desired travel speeds. Ample bike lanes with buffers can use up a lot of space, but the additional remaining width suggests that the center turn lane at W. 4th and W. 5th should be extended for the full length of this segment. Since wider lanes have been demonstrated to increase injurious accidents, 10-foot driving lanes are recommended. Since these lanes are narrower than Indiana DOT standards, the City will have to negotiate their dimensions with the State, making use of the evidence contained in this report. While it is hoped that narrow dimensions will prevail, wider lanes can be secured by narrowing the bike lane buffers.



Recommendation

Restripe the roadway to include three 10-foot driving lanes (including a continuous center turn lane) flanked by two 10-foot cycle facilities, each consisting of a six-foot riding zone and a four-foot buffer zone. If the Indiana DOT insists on wider driving lanes, then narrow the buffer zone correspondingly.

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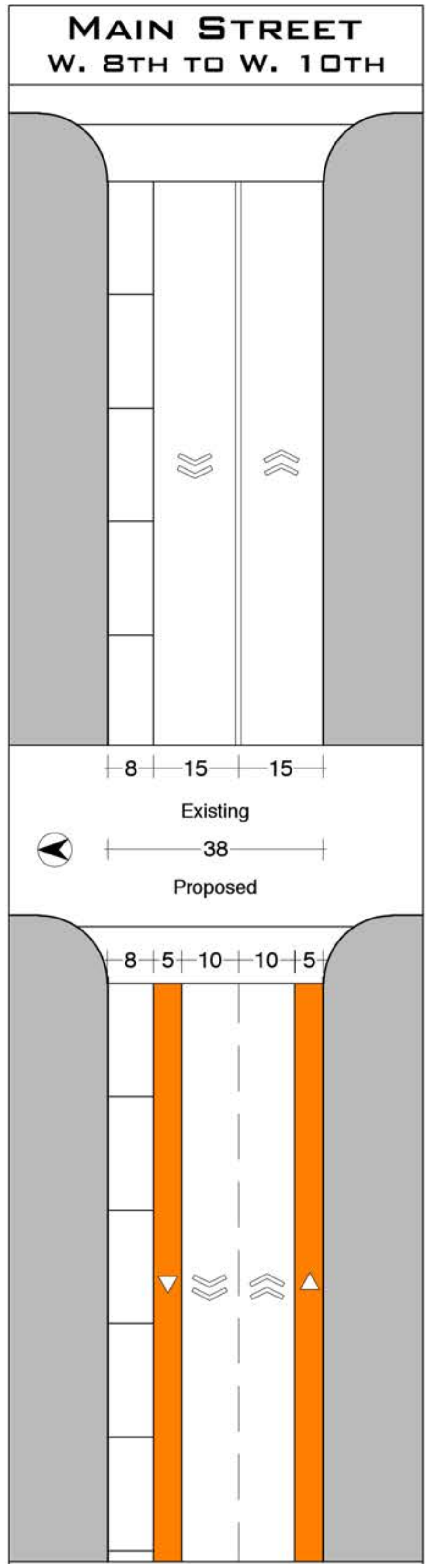
Main Street from W. 8th to W. 10th

Though slightly narrower, these two blocks of Main street are still far too wide.



Current Condition

Here the roadway narrows to approximately 38 feet, containing two very wide travel lanes, inviting speeding. Parking is unmarked but allowed along the north curb.

Analysis

This narrower segment of Main Street does not contain or need a center turn lane. Inserting bike lanes into this segment makes the north-flank parking lane more explicit, and encourages slower speeds while not impeding flow.

Recommendation

Restripe the roadway to include two 10-foot driving lanes flanked by two 5-foot cycle lanes plus an 8-foot parking lane on the north curb.

State Street

State Street, from Main to Oak

Through the heart of downtown, State Street loses much of its parking (and retail viability) due to right-hand turn lanes and other no-park zones.

<u>Current Condition</u>

For its downtown segment, State Street is about 51 feet wide, and contains a variety of configurations, all of which maintain minimum of three travel lanes. In certain locations, right-hand turn lanes are also present. Parking is provided along certain curbs, but inconsistently, and it is prohibited in many places where there is room for it. As a result, travel lanes are often effectively much wider than the standard. Car counts on State street peak at about 12,000 cars per day. State Street is controlled by INDOT south of Elm Street.

<u>Analysis</u>

12,000 cars per day is a low count for a three-lane facility, so State Street has ample excess capacity even without its occasional right-hand turn lanes. These are dangerous to pedestrians, improve flow only marginally, and should be eliminated. Right-sizing the three-lane section within the 51-foot roadway leaves ample room for two flanks of parallel parking, so important to sidewalk safety and retail success. Acknowledging that a three-lane street is more that sufficient, the State DOT should accept a solution that makes this section consistent, framed between two continuous lanes of parking. Since State Street is potentially an important bike corridor, the northbound and southbound travel lanes should be marked with sharrows to invite bicycles and help calm traffic.

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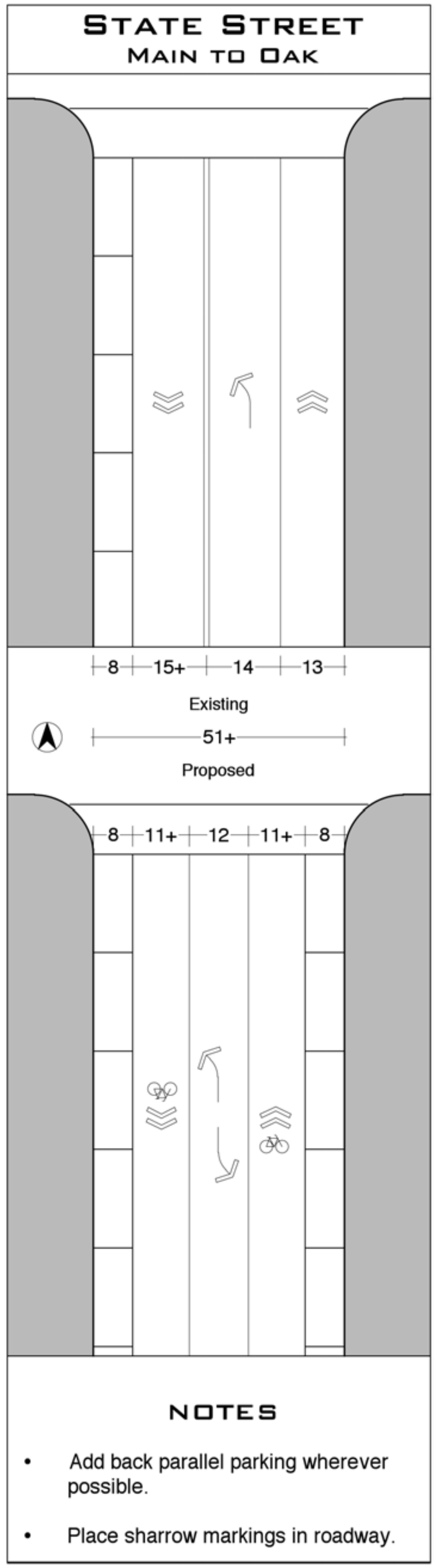
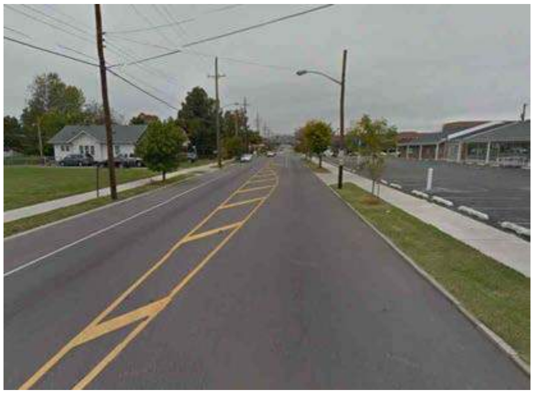
Recommendation

Restripe State Street from Main to Oak with three 11-foot driving lanes (including a continuous center turn lane) and two eight-foot parking lanes. Insert sharrow markings in roadway near each intersection.



State Street from Oak to Hospital



State Street's left-hand turn lane at Cottom Avenue is striped in a highway fashion, with an unnecessary "swoop zone" approach.

Current Condition

As State Street heads north, it becomes a two-lane road, broadened by left-hand turn lanes at Cherry Street and Cottom Avenue. The latter of these is a highway-style turn lane, in which traffic sweeps right before shifting left to turn—a high-speed configuration rarely found in urban areas. While there is room in the roughly-40-foot roadway for parking lanes on both flanks for most of its trajectory, this parking is often missing or marked as illegal in many places where it could easily fit. State Street is also a promising north-south corridor for cycling, and few other similar opportunities exist in this area.

Analysis

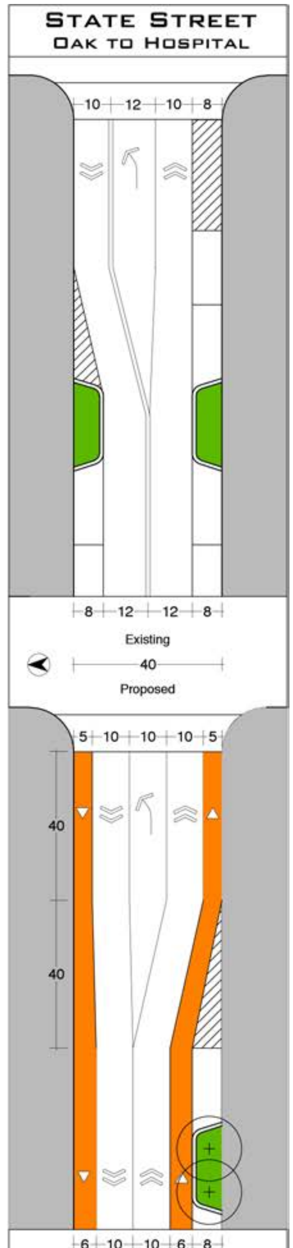
At the very least, State Street can be restriped so that it encourages less speeding. This would be accomplished by: shortening left-hand turn lanes to a reasonable length; transforming the left-hand turn lane south of Cottom Avenue from its current highway configuration to a conventional urban configuration that has no rightward swoop before the turn lane; and also by minimizing the amount of curb where parking is not allowed. Currently, many areas are striped as no-parking where there is ample room for cars, both approaching corners and near driveway curb cuts. This striping currently improves sight triangles, but in so doing encourages speeding; cities have begun reducing or eliminating their sight triangle requirements in acknowledgement of this condition.

However, beyond removing encouragements to speeding, State Street could and should be transformed in a more instrumental way. It is the only promising north-south corridor for cycling in this part of downtown, as it contains ample roadway to support bike lanes, with little impact on parking capacity. Its 40-foot cross section contains room for two driving lanes, two bike lanes, and a parking lane on one side. The parking would drop away briefly at left-hand turn lanes, but, if properly striped, could provide about as many parking spaces as are currently present in the roadway.

The only impediment to introducing these bike lanes are the small "bulb-out" curb extensions now present in six locations, three of which would have to be removed. This small construction project would be a small price to pay for the introduction of a robust north-south biking corridor, particularly a pro-health "active living" corridor linking Floyd Memorial Hospital to the Downtown YMCA Aquatic Center.

<u>Recommendation</u>

Remove three curb extensions on the west curb and restripe with two 10-foot driving lanes flanked by two 6-foot bike lanes and one 8-foot parking lane on the east flank. Where left-hand turn lanes are present, restripe with three 10-foot driving lanes and two 5-foot bike lanes. The left-hand turn lane facility should be no longer than needed, ideally 80 feet or less total, including chamfer.



NOTES

- Adding bike lanes requires removal of one flank of parking and one half of the curb extensions.
- Return parking wherever possible, including as close as 3 feet from driveways.
- When parking is returned to those curbs where it has been removed unnecessarily, there is little net parking loss.
- Left-hand turn lane consists of 40-feet of storage and a 40-foot chamfer.
- Place large trees in curb extensions zones.

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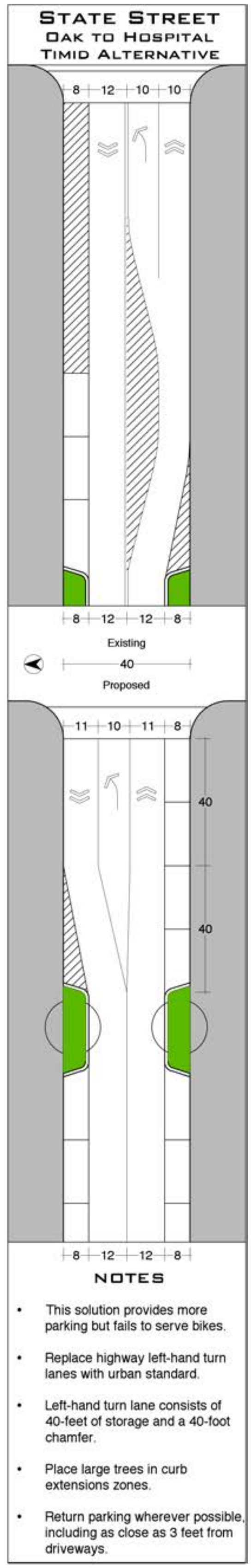
However, if there is community resistance to these bike lanes, a minimal improvement to this northern segment of State Street would involve replacing the current left-hand turn lane south of Cottom Avenue with a standard urban turn lane, and keeping all left-hand turn facilities as short as practical, ideally 80 feet or less total, including chamfer.

Finally, the above recommendations are made based on an expectation that a cycle track is not a viable solution in this location. However, it is clear that a cycle track—in which the parking lane sits between the roadway and a 10- to 12-foot facility including two bike lanes and buffer—is a superior solution, and should be pursued if possible. (Please see the preferred solution for Spring Street from Vincennes to E. 3rd for an example of how such a facility is laid out.)



Vincennes Street

Vincennes Street's asymmetrical section contains an additional northbound lane that is not justified by traffic demand.

Current Condition

From half a block north of Spring Street to Main Street, Vincennes Street consists principally of a three-lane section, with additional right-hand turn lanes inserted at Spring Street and Main Street, and an additional southbound lane added at Main. This 3-lane section is striped with two lanes northbound and one lane southbound, as if the northbound flow were dominant, but it is not. Hourly traffic counts on Vincennes peak at 490 north of Main, 812 north of Market, and 654 north of Oak.

Analysis

Vincennes Street is clearly oversized for its traffic. At no point do car accounts approach the number that would require a third lane. This condition is supported by the fact that the third lane, rather then being striped for left turns, merely provides northbound redundancy with no southbound counterpart.

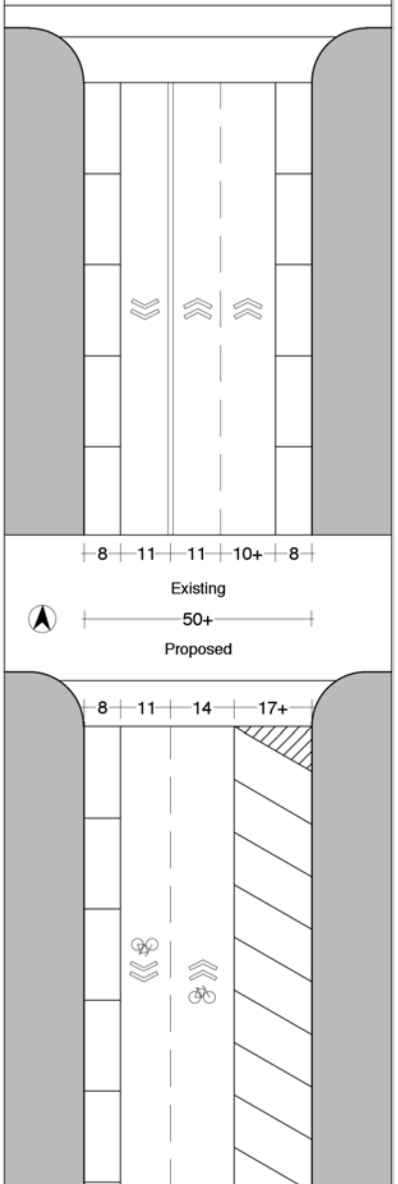
Acknowledging that a two-lane section is ample south of the busy Spring Street intersection allows the extra northbound lane to be replaced by a wider parking aisle on that side, holding angled parking instead of parallel. Given that Vincennes is a desired bike route, this parking should be back-in, and sharrows should be placed in the roadway.

As it approaches Main Street, the tapered cross section gains additional width that should be put to used as a center turn lane, with other lanes (including the parking lane) widening slightly in order to use up the extra asphalt.

Recommendation

From Division to Stone, restripe Vincennes to include 8-foot parallel parking on its western curb and 17-foot back-in angle parking (at 60 degrees) on its eastern curb. South of Stone, as the street widens, insert a 12-foot left-hand turn lane, and broaden the parking bays to 10 feet and 18 feet respectively. Insert sharrow markings in roadway near each intersection.

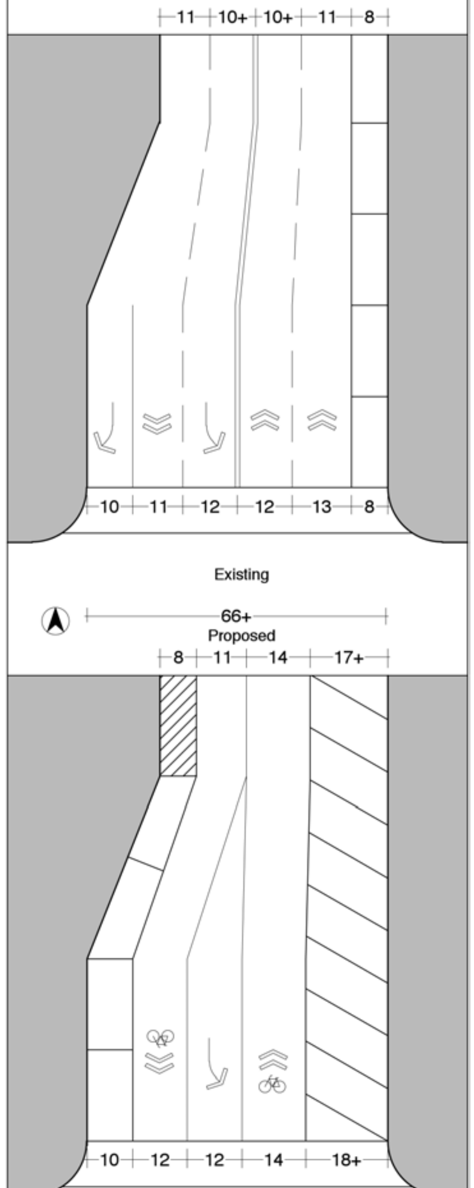
Vincennes Street
Division to Stone



Notes

- Rear angle parking placed on east curb at 60 degrees.
- Curb cuts limited to one 20-foot-wide drive per address.
- Place sharrow markings in roadway between Main and Market.

Vincennes Street
Stone to Main



Notes

- Excess lanes in each direction eliminated, as well as right-hand turn lane.
- Rear angle parking placed on east curb at 60 degrees.
- Parallel parking placed on west curb except on train tracks.
- Curb cuts limited to one 20-foot-wide drive per address.
- Place sharrow markings in roadway between Main and Market.

Other Streets: East-West

Culbertson Avenue

Near State Street, Culbertson Avenue is missing a south flank of parallel parking.

Current Condition

West of E. 7th Street, Culbertson Avenue is about 28 feet wide, with parking allowed on the south flank in some places but not in others. From E. 7th Street to Vincennes Street, Culbertson is about 35 feet wide and wider, with parking allowed on both flanks in some places but not others. Measured traffic counts on Culbertson peak at 362 cars per hour, a light flow.

Analysis

Culbertson handles low levels of traffic, about one car per ten seconds at rush hour. Where driving lane widths of at least 9 feet can be maintained, parallel parking should be inserted so that speeding is not encouraged by lanes that are too wide. By this logic, understanding that cars and trucks are typically 6 to 7 feet wide, the entirety of the narrower segment can welcome one flank of parking, and the entirety of the wider segment can welcome two flanks of parking.

Much of the street has a centerline that is faded or missing. According to recent safety studies, allowing the remaining centerlines to disappear over time should result in less speeding.

Recommendation

From Pearl to E. 8th, sign allowed parking on the entire south flank. From E. 8th to Vincennes, sign allowed parking on both flanks. (This action is only necessary where parking is now either not legal or not happening.) Allow striping to fade from street. When repaving, eliminate all stripes.

E. Oak Street

Oak Street is one way where it contains ample room for calm two-way travel.

Current Condition

West of E. 3rd Street, Oak Street is one-way and about 26 feet wide, with parking disallowed. (Just east of State street, Oak widens to approx. 30 feet for half a block.) From E. 3rd Street to E. 7th Street, Oak is one-way and about 25 feet wide, with parking allowed on both flanks. From E. 7th Street to E. 8th Street, Oak is one-way and about 35 feet wide, with parking allowed on both flanks. East of E. 8th Street, Oak is 35 feet wide and wider, with parking allowed on both flanks. Measured traffic counts on Oak peak at 92 cars per hour at E. 4th Street, an extremely light flow.

Analysis

There is no justification for a one-way Oak Street, since it contains ample width for two-way traffic, which will provide greater utility and safety than the current condition.

Oak handles extremely low levels of traffic, less than two cars per minute at rush hour. Such a low flow justifies the use of a "queuing street," in which a single driving lane handles traffic in both directions. The standard width for a queuing street with parking on both flanks is 26 feet, which Oak approximates for the blocks west of E. 7th Street. (This configuration is currently already in place on E. 7th Street north of Elm.) However, queuing streets are only appropriate for principally residential areas, so this solution is only recommended for the two blocks between E. 5th and E. 7th Streets.

West of 5th Street, parking should be restricted to one-side-only where industrial use exists. Given the large number of curb cuts in this area, two-sided parking is impractical in any case; parking should be allowed on the flank with the fewest curb cuts. West of E. 3rd, this represents a double change, from one-way to two-way, and from no-parking to one-side parking. There is ample room for this change, as full-width travel lanes are not needed here. Given the very light traffic, a slow-flow geometry of 8-foot lanes is ideal.

East of E. 7th Street, Oak is wide enough for two full lanes of travel, which it initiates east of E. 8th. According to safety studies, allowing the remaining centerlines to disappear over time should result in less speeding.

Recommendation

Revert the entirety of Oak Street to two-way. This requires no restriping or centerline, since it will be a slow-speed street. Allow parking on one side of the street west of E. 5th, and on both sides further east. Allow striping to fade from street. When repaving, eliminate all stripes.

E. Elm Street

Along with Market, Elm Street functions an eastbound partner to westbound Spring Street, and should be reverted to two-way when Spring is reverted.

<u>Current Condition</u>

Elm Street is about 40 feet wide through the entire study area, and runs one-way east from the interstate to Vincennes. From Scribner to State, Elm Street functions principally as a highway off-ramp, carrying a moderate volume of traffic, 8400 cars per day, in three wide lanes. East of State Street, traffic drops significantly, with 3900 cars per day measured at E. 8^{th} Street. In this segment, two lanes of traffic are flanked by two lanes of parking. Elm St. is controlled by INDOT west of State Street.

<u>Analysis</u>

There is no justification for a one-way Elm Street east of State Street, since it contains ample width for two-way traffic, which will provide greater utility and safety than the current condition. West of State, the one-way condition should be maintained, but reducing its more-than-13-foot driving lanes to a proper width will discourage speeding, as will the presence of parallel parking; placing striped parking on the north curb will reduce driving lanes to about 11 feet.

In its one-way segment east of State, Elm Street contains dashed lines between two lanes of travel. Unless safety laws demand otherwise, this line need not be replaced with a yellow dash, and should be allowed to fade over time, since safety studies suggest that this should result in less speeding.

<u>Recommendation</u>

From Scribner to State, restripe Elm Street to include three eastbound lanes and a striped 8-foot parking lane on the north side. From State to Vincennes, revert one-way to two-way travel, with parking still allowed on both sides (unstriped).

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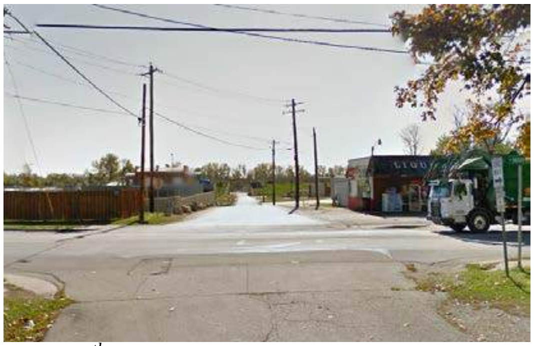
Other Streets: North-South

W. 10th Street



West 10th Street provides a rare connection to the Ohio Rover Greenway.

Current Condition

W. 10th Street handles almost no traffic, but is the only street west of the interstate that connects downtown to the Ohio River Greenway.

Analysis

W. 10th Street presents an excellent corridor for connecting the City's in-street cycling system to the Greenway. While there is not room in the street for dedicated bike lanes, they are also not needed, given the street's minimal traffic.

Recommendation

Mark the roadway with sharrows just south of the Main Street intersection.

W. 6th Street

West 6th Street is the ideal western axis for shifting bikes off of Spring Street as it approaches its highway interface.

Current Condition

W. 6th Street is about 35 feet wide and two-way from Spring to Market, and about 20 feet wide and one-way north from Main to Market. The street handles very little traffic.

Analysis

W. 6th Street provides the ideal connector between the bike lanes on Spring, Main, and Market, and a necessary one, since the west-side bike facility on Spring Street should end in a location where a safe north-south transition to Market and Main is possible. While there is not room in the street for dedicated bike lanes, they are also not needed, given the street's minimal traffic.

Recommendation

Mark the roadway with sharrows near each intersection. Include a counterflow sharrow in the one-way segment between Market and Main. Place prominent signage at the west end of the Spring Street cycle facility directing bikes south on W. 6th.

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W. 5th Street

Allowing parallel parking on W. 5th Street would reduce vehicle speeds.

Current Condition

W. 5th Street is one-way south, about 35 feet wide, and striped in a way that discourages curb parking, resulting in two driving lanes more than 17 feet wide. Measured traffic counts peak at 594 cars per hour, a moderate flow. W. 5th St. is controlled by INDOT.

Analysis

A route taken by people exiting the interstate, W. 5th Street's highway-style geometrics—super-wide lanes, no parking, and one-way flow—encourage drivers to continue their highway behavior within the City of New Albany. While high-volume is desired on this street, the flow is only moderate, and less than the 650 cars per peak hour that a single lane in a two-way street can be expected to handle. Moreover, high volume should not be confused with high speed; the former is often found in cities, while the latter, when it occurs in cities, is destructive to urban vitality and dangerous to all street users.

The two-way flow on W. 5th Street makes sense for its northern block, to ensure that no drivers are mistakenly directed up the interstate off-ramp. But for the southern block, where calmer driving is desired, a reversion to two-way traffic is well justified. In any case, the best way to bring traffic on this street within range of the posted speed limit is to narrow the driving lanes from above 17 feet to closer to 10 feet in width. This can be accomplished by striping 7-foot parking lanes on either side of the street. Whether or not they are frequently used, these lanes will perceptively narrow the driving lanes, reducing the compulsion to speed.

As discussed, the highway design philosophy that wider lanes are faster makes no sense in urban conditions, and especially not on a street like this one, in which drivers are being asked to transition from highway speed to urban speed.

Recommendation

Stripe 7-foot parking lanes onto both flanks. Revert from one-way to two-way for the single block from Main to Market.

W. 4th Street

In addition to allowing parking, a reversion to two-way travel would reduce speeding on W. 4th Street.

<u>Current Condition</u>

W. 4th Street is one-way north and about 40 feet wide. Curb parking is allowed on its southern block, but not allowed on the northern one, from Market to Spring. As a result, driving lanes vary from a wide 12 feet to an almost unprecedented 20 feet. For its northernmost 110 feet, a median curb splits the road into two sections, one of which is directed to the interstate on-ramp, while the other is directed westward onto Spring street. The presence of a stop-sign at this intersection creates a challenging condition where the left lane of traffic must look over the right line of traffic to judge whether it is safe to enter Spring Street. As already discussed, the odd configuration of this intersection feels very unsafe to users. W. 4th St. is controlled by INDOT.

<u>Analysis</u>

As with W. 5th Street, the wide lanes on this street encourage speeding, especially the northern block, which asks drivers to slip into a highway driving frame of mind well before entering the interstate. For the southern block, striping the parking lanes will perceptually narrow the driving lanes to a still wide, but acceptable, 12 feet. For the southern block, parking lanes must be introduced and striped as well.

The principal way to control speeds on this street, however, as well as to rationalize the traffic patterns at Spring Street, is to introduce 2-way traffic to both blocks of W. 5th. With only one lane of traffic heading north at Spring Street, the stop sign will not require one line of cars to look past another. While redesigning the full intersection, as already discussed, will make it safer, we should still prohibit southbound left-turns onto W. 4th Street from Spring, since the angle of the intersection makes those problematic.

<u>Recommendation</u>

Stripe 8-foot parking lanes onto both flanks all the way to Spring. Revert from one-way traffic to two-way. Remove the center mini-median near Spring. Rebuild the Spring Street intersection as discussed. Maintain the prohibition against left-hand turns onto W. 4th from Spring.

Pearl Street

With the exception of its one-way travel Pearl is an ideal street for retail

Current Condition

Pearl street consists of two southbound lanes flanked by two parking lanes. Measured traffic counts on Pearl peak at 206 cars per hour, a light flow.

Analysis

As discussed, the introduction of one-way travel to main shopping streets in America has contributed markedly to the decline of these streets, and reintroducing two-way travel has helped to bring them back to life. While this reversion brings with it some inconvenience, experience in other cities suggests that this effort pays off in spades. In this light, it can be said that the current one-way configuration provides New Albany's merchants an extremely convenient framework for making limited profit. Indeed, it should only be reverted to one-way if they are willing to sacrifice a small amount of convenience in order to become wealthier.

Striping the parking lanes consistently will reinforce its character as a shopping street. Given its light traffic, removing the centerline will further encourage slower driving speeds. In one location, by Elm Street, a double-width curb extension has been built that must be trimmed if the street is to fit parking on both sides of the street.

Recommendation

Complete a servicing plan, ensuring that merchants have a proper location and process for receiving deliveries, and then revert Pearl Street to two-way traffic. Reinstitute 8-foot striped parking lanes on both flanks from Spring to Culbertson. Allow the centerline to fade and do not restripe. Eventually trim the curb extension at Elm to be no deeper than its tree-box, so that parking can still fit on both sides of the street in this location.

Bank Street

Bank is Pearl Street's one-way partner, and both streets should be reverted to two-way at the same time.

Current Condition

South of Oak, Bank Street runs one way north as the partner to southbound Pearl. It's hourly traffic counts peak at a very low 182.

Analysis

Bank Street's two northbound lanes provide a traffic capacity that is about eight times as large as current demand, and it's one-way nature only limits the utility of the downtown grid. Because it carries so little traffic, its reversion to two-way can be completed in conjunction with Pearl Street or independently, but the former makes more sense in terms of simplifying the process of driver accustomization. Given the low volume of traffic, no centerline is needed.

Recommendation

Revert Bank Street to two-way travel simultaneous with the Pearl Street reversion. Allow the centerline to fade. When repaving, eliminate all stripes.

E. 3rd Street

East 6th Street is the ideal eastern axis for shifting bikes off of Spring Street as it approaches its highway interface.

Current Condition

Traffic volumes on E. 3rd Street are considered too low to merit counting. The two-way street contains two driving lanes and two parking lanes with no striping.

Analysis

E. 3rd street is the ideal location for transferring the Spring Street cycle facility, which ends at E. 3rd, south to Market and Main Streets. Traffic is so light and slow on this street that no dedicated cycle lanes are warranted.

Recommendation

Between Spring and Main, mark the roadway with sharrows near each intersection. Do not stripe a centerline. Place prominent signage at the west end of the Spring Street cycle facility directing bikes south on E. 3rd.

E. 5th Street

East 5th Street is one way where it contains ample room for slow two-way travel in a "yield flow" configuration.

Current Condition

Traffic volumes on E. 5th Street are considered too low to merit counting. The one-way street contains one southbound driving lane and two parking lanes with no striping.

Analysis

At approximately 26 feet wide, E. 5th Street corresponds with the standard width for a two-way queuing street, in which a single driving lane handles traffic in both directions. (This configuration is currently already in place on E. 7th Street north of Elm. **CHECK**) Allowing two-way traffic on E. 5th's one-way lane will result in a safer environment that poses a minor inconvenience for drivers, who will have to pull over slightly when meeting oncoming traffic. However, the current one-way traffic imposes its own inconvenience to access as well. The two-way, two-flank-parking solution makes sense in residential areas, where the queuing configuration is ideal. However, in commercial areas, one flank of parking should be removed to allow freer vehicle flow.

Recommendation

Revert E. 5th Street to two-way, with no striping. Allow parking on both sides in along residential frontages, on one side only along commercial frontages.

E. 7th Street

East 7th Street is one way where it contains ample room for calm two-way travel.

Current Condition

Traffic volumes on E. 7thth Street are considered too low to merit counting. North of Elm, E. 7th street is a classic queuing street, with two-way traffic and two flanks of parking contained in a roadway about 26 feet wide. South of Elm, the same width roadway is limited to one-way northbound traffic for one block, before reverting to two-way traffic (with a centerline) from Spring Street south to Market, in a roadway of about 28 feet. From Market to Main, the roadway is once again one-way north, holding one flank of parking in a width of about 20 feet.

Analysis

At approximately 26 feet wide, E. 7th Street corresponds with the standard width for a two-way queuing street, the configuration that is already present north of Elm. **CHECK** Given the low traffic volumes, there is no reason why that section should not be continued all the way south to Market Street. At approximately 20 feet wide, the segment from Market to Main corresponds with the standard width for a two-way queuing street with parking on only one side.

Allowing two-way traffic on E. 7th's one-way segments will result in a safer environment that poses a minor inconvenience for drivers, who will have to pull over slightly when meeting oncoming traffic. However, the current one-way traffic imposes its own inconvenience to access as well.

Recommendation

Revert the entirety of E. 7th Street to two-way, with no striping. Allow the centerline between Spring and Market to fade.

MEMORANDUM

To: Jeff Speck

From: Paul Moore, Nelson\Nygaard

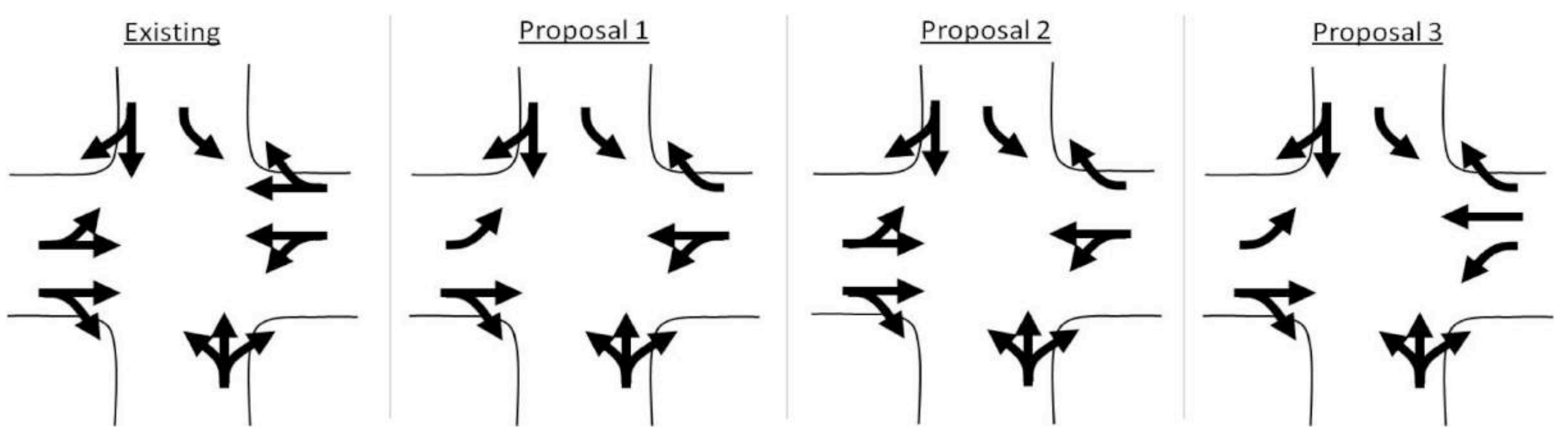
Subject: Traffic Assesment

The following material is an update of an assessment of Spring Street traffic developed for the City:

As a part of the consideration of potential lane reductions along Spring Street in New Albany, IN, Nelson\Nygaard tested several lane configurations to better understand the effects the changes may cause to vehicular traffic. The intersection of Spring and Silver was tested for three reasons:

1. Traffic volumes on this eastern end of Spring are higher – representing a likely worst-case scenario for automobile performance
2. Turning movements at Silver are higher than at most intersections along the corridor – also testing the worst case
3. Traffic data was already available for this intersection

The following three alternative intersection configurations were tested using Synchro traffic analysis software:



Results

In the end, the changes to the cross-section appear to have very little impact on the operations of vehicles at the intersection. All of the tested configurations add an average delay of between 5 and 7 seconds per vehicle during the busiest hour of the day. Some additional queuing (between 70' and 120' in the eastbound direction and 130'-300' westbound) may occur if the diet carries through east of the intersection. If the diet starts/ends at the intersection, the eastbound queue increases go away. These queue buildups are likely to be short in duration, but should be considered as part of the overall project assessment.

The basic assumed configuration has been Proposal 3. In short, it appears that the negative tradeoffs of making the changes are minor – a bit more queuing for an hour of the day but no perceptible change in delay. Given the delays and queuing reported, virtually all vehicles approaching this intersection should expect to clear the intersection of the first signal cycles. In some limited instances during the peak hour, a vehicle may not clear on the first cycle but would clear on the next. It is recommended that the positive benefits in terms of safety, modal travel options and community character far outweigh the minor negative aspects of this proposal

Technical Analysis Results

Below is a comparison of the three “build” scenarios tested:

Street	Approach/ Movement	Proposed 1 – E Spring St w/ EB dedicated left and WB dedicated right Pretimed at 75secs WBL and SBL lead phase				Proposed 2 – E Spring St w/ WB dedicated right Pretimed at 75secs WBL and SBL lead phase				Proposed 3 – E Spring St w/ EB dedicated left and WB dedicated right & left Pretimed at 75secs WBL and SBL lead phase			
		LOS	Delay (s)	Queue ($50^{th}/95^{th}$) (ft)	V/C	LOS	Delay (s)	Queue ($50^{th}/95^{th}$) (ft)	V/C	LOS	Delay (s)	Queue ($50^{th}/95^{th}$) (ft)	V/C
Intersection		***C***	***25.3***			***C***	***23.6***			***C***	***24.3***		
E Spring St	**EB**	**C**	**22.3**			**B**	**15.2**			**C**	**23.8**		
	EBL	B	17.2	4/18	0.16					B	17.8	4/19	0.16
	EBT	C	22.4	214/333	0.71	B	15.2	97/138	0.44	C	24.0	220/343	0.74
	WB	**C**	**22.0**			**C**	**22.1**			**C**	**21.1**		
	WBL									A	8.6	4/13	0.08
	WBT	C	28.1	340/614	0.89	C	28.2	340/615	0.89	C	27.3	336/596	0.88
	WBR	A	1.9	0/30	0.28	A	1.9	0/30	0.28	A	2.0	0/31	0.28
Silver St	**SB**	**D**	**35.9**			**D**	**35.9**			**C**	**31.1**		
	SBL	D	44.6	124/262	0.85	D	44.6	124/262	0.85	D	37.8	121/242	0.80
	SBT	C	20.8	65/118	0.33	C	20.8	65/118	0.33	B	19.9	64/114	0.32
	NB	**C**	**28.0**			**C**	**28.0**			**C**	**28.0**		
	NBL	C	25.3	11/32	0.11	C	25.3	11/32	0.11	C	25.3	11/32	0.11
	NBT	C	28.6	46/91	0.35	C	28.6	46/91	0.35	C	28.6	46/91	0.35

- 95^{th} percentile volume exceeds capacity, queue may be longer

Summary of Findings

Proposal 1

- Additional 6.1 s of delay at intersection over existing conditions
- Most significant changes over existing include:
  - The SBL movement from Silver St onto E Spring St – additional 18.8 s of delay and change in LOS from B to D
  - The WBT movement on E Spring St – additional 11.3 s of delay and change in LOS from B to C
- Overall, an initial assessment of the road diet shows minimal impact, and further improvements may be possible with changes to the control type, timing, and/or phasing

Proposal 2

- Additional 5.3 s of delay at intersection over existing conditions
- Most significant changes over existing include:
  - The SBL movement from Silver St onto E Spring St – additional 18.8 s of delay and change in LOS from B to D
  - The WBT movement on E Spring St – additional 11.4 s of delay and change in LOS from B to C
- Overall, an initial assessment of the road diet shows minimal impact, and further improvements may be possible with changes to the control type, timing, and/or phasing

Proposal 3: E Spring St with EB dedicated left and WB dedicated right and left

- Additional 5.5 s of delay at intersection over existing conditions
- Most significant changes over existing include:
  - The SBL movement from Silver St onto E Spring St – additional 15.8 s of delay and change in LOS from C to D due cycle length increase and time added to E-W movement.
  - The WBT movement on E Spring St – additional 9.4 s of delay and change in LOS from B to C due to single WBT lane
  - The EBT movement on E Spring St - additional 3.5s of delay and change in LOS from C to B due to single EBT lane.
- Overall, an initial assessment of the road diet shows minimal impact

Proposal 1 vs. Proposal 2 vs. Proposal 3

- The three proposals are nearly identical overall
- With proposal 2, there are two through lanes headed EB on E Spring St, so cars would have to merge in the intersection if the road diet is to be maintained
- Proposal 3 provides the best LO S for the predominant WB movements and the SBL movement due to the additional dedicated turn lanes.

Below is a comparison of Proposal 3 to existing conditions:

		LOS	Delay (s)	Queue ($50^{th}/95^{th}$) (ft)	V/C		LOS	Delay (s)	Queue ($50^{th}/95^{th}$) (ft)	V/C
Intersection		**B**	**18.8**				*C*	***24.3***		
E Spring St	**EB**	**C**	**20.3**			EB	**C**	**23.8**		
	EBL					EBL	B	17.8	19-Apr	0.16
	EBT	C	20.3	96/144	0.61	EBT	C	24	220/343	0.74
	WB	**B**	**17.9**			**WB**	**C**	**21.1**		
	WBT	B	17.9	165/237	0.79	WBL	A	8.6	13-Apr	0.08
	WBR					WBT	C	27.3	336/596	0.88
Silver St	**SB**	**B**	**19.2**			WBR	A	2	0/31	0.28
	SBL	C	22.8	81/154	0.69	**SB**	**C**	**31.1**		
	SBT	B	12.8	43/82	0.27	SBL	D	37.8	121/242	0.8
	NB	**B**	**18.3**			SBT	B	19.9	64/114	0.32
	NBL	B	16.7	24-Aug	0.09	**NB**	**C**	**28**		
	NBT	B	18.7	32/68	0.26	NBL	C	25.3	Nov-32	0.11
						NBT	C	28.6	46/91	0.35

The changes involved in Proposal 3 add only an additional 5.5 s of delay at the intersection during the peak hour over existing conditions. This average delay change will barely be perceptibly. The individual movements that could change the most include the SBL movement from Silver St onto E Spring St, which shows an additional 15.8 s of delay and change in LOS from C to D. All other movements will incur less than 10 seconds of additional delay over existing conditions in the busiest hour of the day.

Assumptions and Settings

- PM peak hour
- Adjusted heavy vehicles based on latest traffic counts (some movements have a high percentage of heavy trucks, so turning lanes must accommodate these)
- Ignored curb cuts
- No pedestrian volumes, no pedestrian analysis
- 0% growth rate in traffic volumes
- Optimized splits and cycle length for each scenario (using built in Synchro function)
- No adjustment to control type, timing, or phasing (default is pretimed control and standard phasing)