



27th ST.

27TH STREET CORRIDOR PLAN



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Created By: Trey Maevers
December 19, 2014



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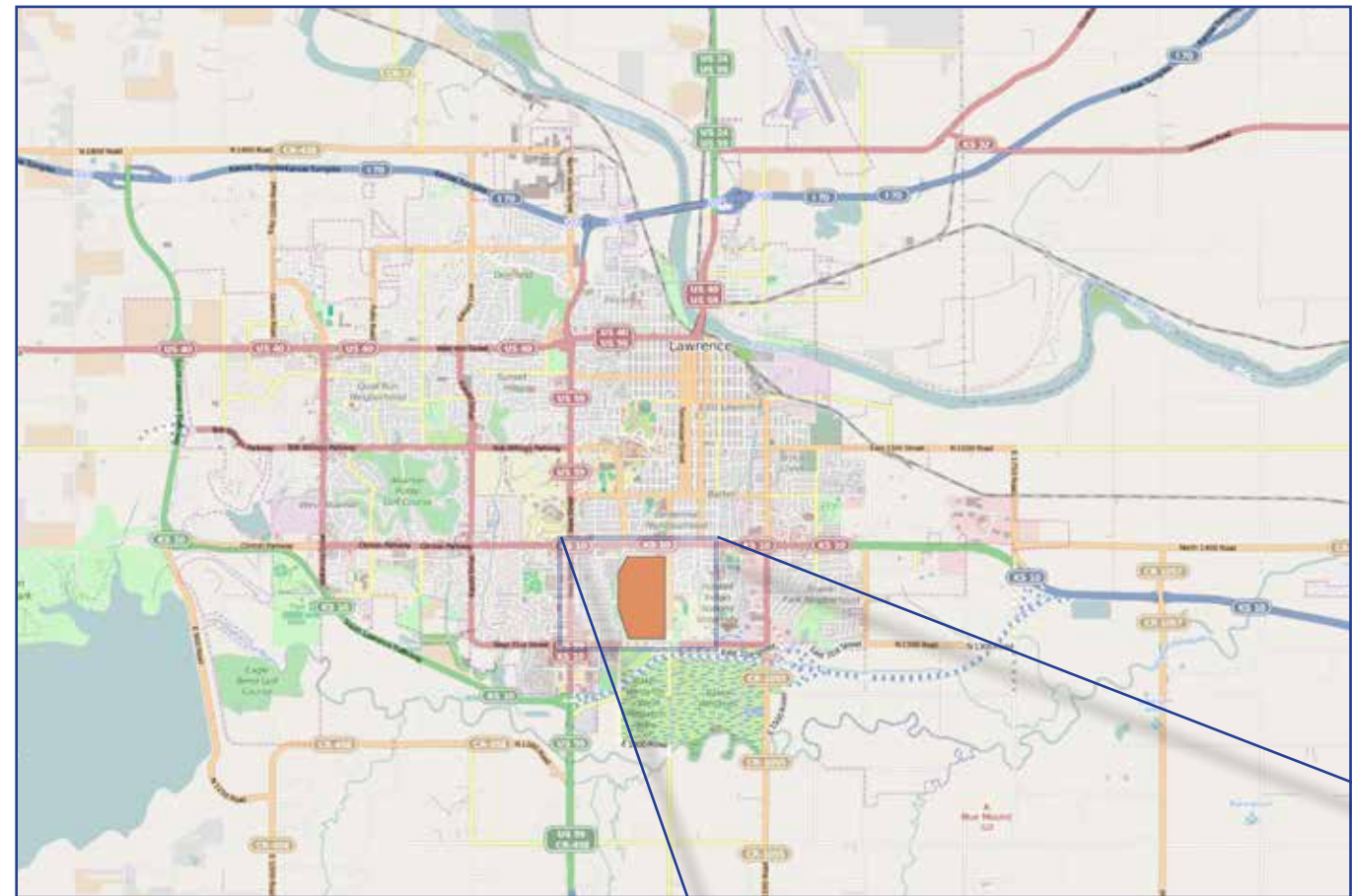
Section 1: Introduction

EXECUTIVE SUMMARY

The Indian Hills 27th St. Corridor Plan is intended to continue the vision of 27th St. as a sustainable, safe community road. For this vision to become real, the public needs to continue and complete the planning process by deciding on final traffic-calming plans to be presented to the City of Lawrence. This Corridor Plan initiates the discussion on the engineering, enhancement, education and enforcement techniques for traffic calming along 27th street in the Indian Hills Neighborhood in Lawrence, KS. 27th street is a collector road that connects the Indian Hills residential area to Louisiana and Iowa streets which are minor and major arterials, respectively.

Furthermore, this Plan will recommend some traffic devices and how their function, form and use for volume and speed management will benefit the community. This Plan will also be integral in maintaining safety for drivers, pedestrians, bicyclists and motorists along this stretch of road.

This Plan considered multiple studies that were performed by the ITE for traffic calming on collector streets. ITE is the international educational and scientific association of transportation engineers who are responsible for meeting mobility and safety needs (ITE.org). The Institute of Transportation Engineers (ITE) defines traffic calming as “the combination of mainly physical measures that accomplish the goal to reduce the negative effects of motor vehicle use, alter driver behavior and improve conditions for non-motorized street users” (Lockwood, 1997). Many organizations and governments facilitate traffic calming with the three “E’s”, engineering, education and enforcement. The main objective of traffic calming is not solely creating stopping actions, but steady, moderate, predictable, and safe speeds. With the combination of these 3 E’s and the Goals set forth in this Plan, the community and the City of Lawrence can develop the best Course of Action to develop a safe and sustainable 27th Street in the Indian Hills Neighborhood.



Source: openstreetsmap.org

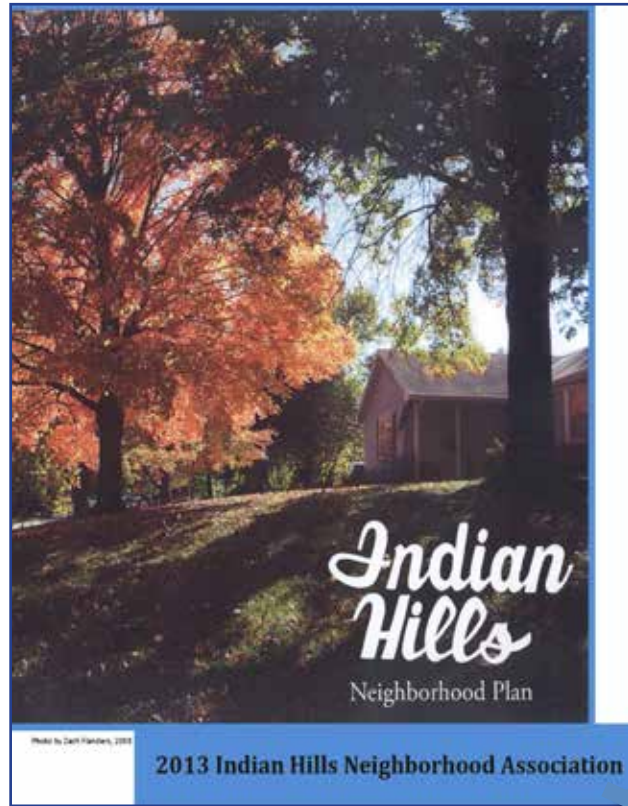


Source: GoogleEarth



COMMUNITY INPUT

In 2013 the Indian Hills Neighborhood Association (IHNA) created a Neighborhood Plan. In this Plan, the neighborhood residents were asked to rate the neighborhood facilities and services on a scale of 1 to 5, 1 being “poor” and 5 “excellent”. The result for "Traffic Controls" was 2.74 or "Fair". This demonstrates that traffic control is not rated as an outstanding service. It is quite the contrary as it rated the third lowest in this survey. Section 3.1 of the Plan outlines the “top 20 list” for the vision of the neighborhood and the traffic speed and noise along 27th St. is a principal issue to be addressed. This was a result of multiple negative comments for traffic control in general and issues specific to 27th St. Section 4.1.C of the Plan outlines five strategies to mitigate this issue. Another portion of the input gave an opportunity for residents to voice their opinion on many items, including traffic control. On this lists, there is an apparent trend of heavy volume and speed on 27th, sometimes late at night which brings unwanted noise. Also, another common theme is the intersection of 27th St. and Louisiana which denotes that this intersection should be a high priority in any future plans.



Source: IHNA Neighborhood Plan, 2013

How would you rate neighborhood facilities & services:

	No Opinion	Poor	Fair	Adequate	Good	Excellent
	--	1	2	3	4	5
Trash service	3.98	Good				
Fire protection	3.94	Good				
Police protection	3.70	Good				
Water	3.55	Good				
Park conditions	3.53	Good				
Bus Service	3.50	Good				
Sanitary sewers	3.03	Adequate				
Animal control	3.03	Adequate				
Street pavement	2.99	Adequate				
Street lighting	2.86	Adequate				
Code enforcement	2.79	Adequate				
Snow removal	2.75	Adequate				
Traffic controls	2.74	Adequate				
Storm drainage	2.71	Adequate				
Sidewalks	2.67	Adequate				

How many did you rate any of the above as “poor”?

C. Traffic speed and noise on neighborhood streets (particularly 27th and Louisiana Streets) are monitored and mitigated.

Strategy	Who will do it?
1. When any problems occur, City is notified.	IHNA Residents
2. Street repairs are coordinated with any plans for traffic calming on 27 th Street and/or Louisiana Street.	Public Works
3. 27 th Street and options for traffic calming, particularly street trees, sidewalks on both sides, bulb-outs narrowing Missouri Street, and dealing with the blindspot at Arkansas and 27 th Streets are explored.	Public Works, Planning Department, and IHNA residents
4. Completing traffic calming plans on Louisiana Street are explored.	Public Works, Planning Department, and IHNA residents
5. Questions on speed and noise on neighborhood streets (particularly 27 th and Louisiana Streets) are included in survey to update plan.	IHNA Officers/ Steering Committee

- More stop signs would help a lot of “near-misses” experienced and observed.
- Traffic on 27th St. is too heavy and too fast.
- Way too much commercial on 31st and Iowa causing lines of cars on both 27th St. and Louisiana.
- 27th Street traffic is too heavy and noisy.
- There are a few streets that are busy (27th).
- People speed greater than 40 mph on 27th between 12 – 2 a.m.
- There are blind corners (@ Arkansas) when trying to turn out onto 27th. It’s just a matter of time before there is a major accident.
- Just try to get out onto Louisiana!
- No parking signs are incorrect (should be no parking on this side of street – signs say no parking here to corner).
- Need to interrupt swift traffic on Louisiana.
- We need to control for traffic on Louisiana. The wait to enter LA from 27th is often too-oo long.
- Too many cars and trucks speeding on Louisiana and running “stop sign” at 27th Terr. and Louisiana.

ACTIVITY SINCE PLAN IN 2013?

After all of the community input in the Neighborhood Plan, 27th St. traffic calming was addressed by the City of Lawrence. The City conducted a preliminary study to see if 27th St. met the criteria per the the Traffic Calming Policy. This study had to determine if 27th St. met any one of the following conditions: the 85th percentile speed of traffic is 5 mph or greater over the speed limit, or the 24-hour two-way traffic volume is greater than 3,000, or cut-through traffic comprises more than 50% of the traffic during the peak hour of the day, or more than 50% of the frontage of the roadway consists of residential lots with the houses facing the roadway in question, or where no single condition is satisfied, but where any two of A, B, C or D above are satisfied to the extent of 80 percent or more of the stated values. (City of Lawrence, 2014)

It was determined that the speed and volume criteria were met (See Appendix “C” and “D”). After the study, the issue came before the City and later approved by Lawrence’s Traffic Safety Commission on December 23, 2012 and the City Commission on January 22, 2013. The 27th St. traffic calming project was put on a compiled list of other streets to be ranked for receiving traffic calming devices. Lawrence’s Traffic Calming Project Priority Ranking System was adopted along with the Traffic Calming Policy on August 23, 2005.

After the initial submission for traffic calming measures, 27th St. was within the top ten streets to receive funding for the implementation of traffic devices. During late 2013 and early 2014, 27th St. was declared at the top of the list.



TRAFFIC CALMING POLICY

Resolution No. 6602, August 23, 2005

1. TRAFFIC-CALMING DEVICES may include but are not limited to Traffic-Calming Circles, Speed Humps and Speed Cushions, Speed Tables, Partial Diverters, Full Diverters, Center Island Narrowing, Chokers, and Road Closures; however, roundabouts are traffic management devices and are not subject to this policy.
2. TRAFFIC-CALMING DEVICES may be permitted on “local” streets as designated by the City’s Major Thoroughfares Map, and under any one of the following conditions:
 - A. The 85th percentile speed of traffic is 5 mph or greater over the speed limit, or
 - B. The 24-hour two-way traffic volume is greater than 1000, or
 - C. Cut-through traffic comprises more than 50% of the traffic during the peak hour of the day, or
 - D. Where no single condition is satisfied, but where any two of A, B or C above are satisfied to the extent of 80 percent or more of the stated values.
3. TRAFFIC-CALMING DEVICES (except SPEED HUMPS) may be permitted on “collector” streets as designated by the City’s Major Thoroughfares Map, under any one of the following conditions:
 - A. The 85th percentile speed of traffic is 5 mph or greater over the speed limit, or
 - B. The 24-hour two-way traffic volume is greater than 3000, or
 - C. Cut-through traffic comprises more than 50% of the traffic during the peak hour of the day, or
 - D. More than 50% of the frontage of the roadway consists of residential lots with the houses facing the roadway in question, or
 - E. Where no single condition is satisfied, but where any two of A, B, C or D above are satisfied to the extent of 80 percent or more of the stated values.
4. Traffic data will be collected with city personnel using city equipment only. In the event that a requested location does not meet the minimum requirements as stated in 2 or 3 above, subsequent requests will not be considered for a minimum of one year.
5. The Lawrence-Douglas County Fire & Medical Department, the Police Department, the Public Works Department and the Traffic Safety Commission must review all requests for TRAFFIC-CALMING DEVICES before being presented to the City Commission.
 6. If a project is approved by the City Commission, the City Commission will determine financing of the construction. The City Commission may require 0-100% of the costs to be paid by the group or neighborhood making the request.
 7. After a project is approved and funded by the City Commission, TRAFFIC-CALMING DEVICES will only be constructed at a location if 70% or more of the property owners within 300 feet measured along the centerline of the street in each direction approve of the installation or if directed by the City Commission. The individual, group or neighborhood making the request shall be responsible for obtaining the property owners’ and residents’ approval in writing and submitting it to the city.
 8. Once installed, TRAFFIC-CALMING DEVICES may only be removed at a location if more than 70% of the property owners and residents within 300 feet measured along the centerline of the street in each direction approve of the removal or if directed by the City Commission. The individual, group or neighborhood making the request shall be responsible for obtaining the property owners’ and residents’ approval in writing and submitting it to the city.
 9. TRAFFIC CALMING DEVICES may initially be landscaped (if appropriate) by the city, provided that the group or neighborhood making the request agrees in writing to maintain the landscaping or pursuant to the payment of a landscape maintenance fee. No privately installed landscaping is permitted unless approved by the city in writing.

Source: lawrenceks.org/public_works/traffic





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Source: lawrenceks.org/public_works/traffic

MOVING FOWARD

The Traffic Calming Policy states, "After a project is approved and funded by the City Commission, traffic calming devices will only be constructed at a location if 70% or more of the property owners within 300 feet measured along the centerline of the street in each direction approve of the installation or if directed by the City Commission. The individual, group or neighborhood making the request shall be responsible for obtaining the property owners' and residents' approval in writing and submitting it to the city." This is important to keep in mind when the decision is made of which devices are being used and where they are being installed. The Traffic Engineering Department will suggest the device based on a traffic study and the expert knowledge of all the aforementioned devices and techniques in this review. Traffic Engineering will not rely on pre-set community approval ratings, but rather will strive to help the impacted community reach general agreement on the nature of the problem and the proposed solution. This Corridor Plan is a document that will help the Community and the City to progress from the "Planning" stage to the "Decision-Making" stage.

Problem solving matrix



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Section 2: Sustainability Goals

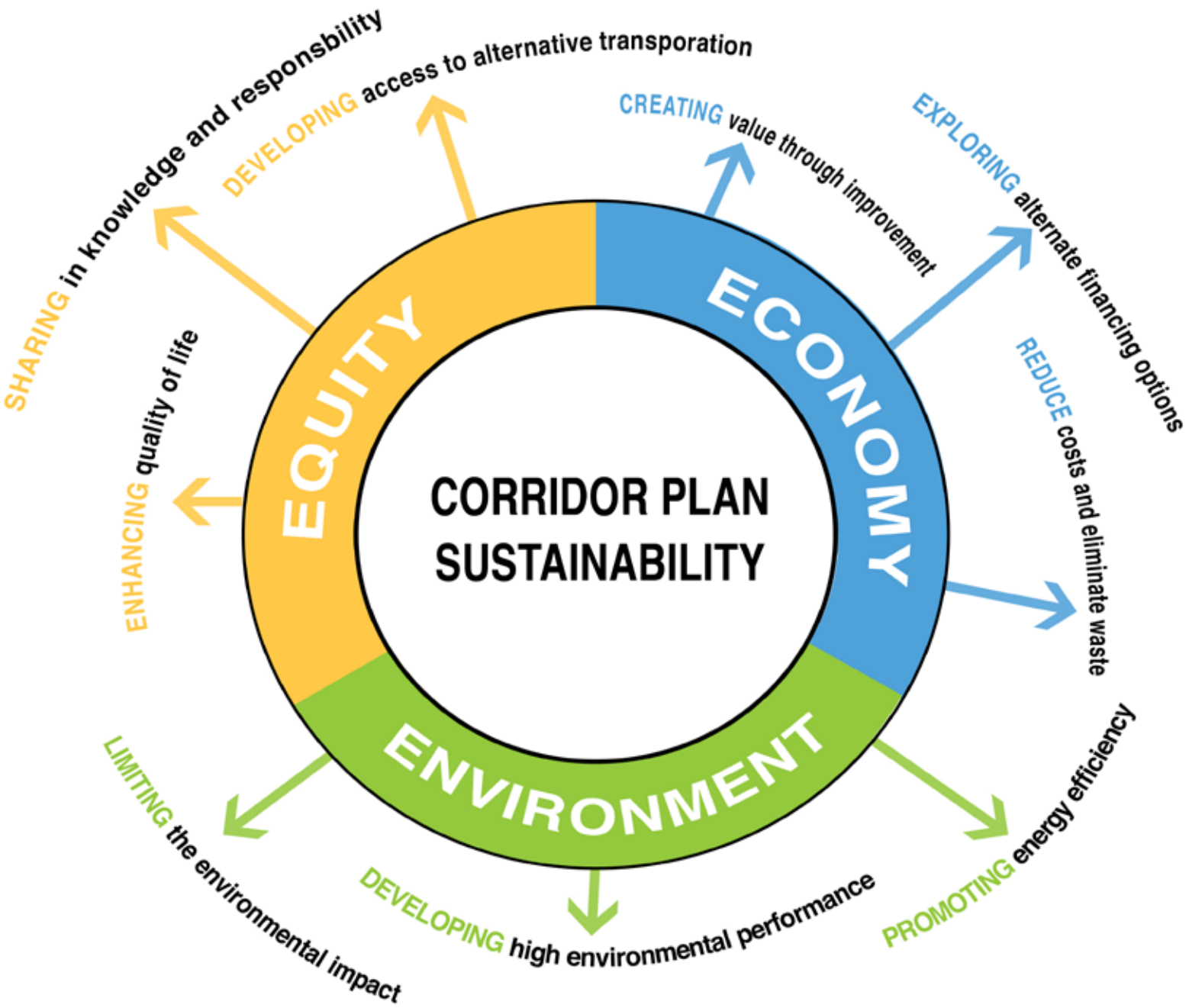
VISION STATEMENT

We, the residents of Indian Hills envision 27th St to be a street:

- Where people feel safe and comfortable walking, riding a bicycle, driving a vehicle and where the street is a pleasant public place;*
- That exemplifies responsible neighborhood stewardship that results in an enjoyable street for all;*
- That preserves qualities that people value most about living in a neighborhood for families and to raise those families in a clean, attractive community with ageless appeal.*

This vision exemplifies the importance of healthy neighborhood action and the value of safety and a high quality of life. This vision is the guide for this Plan to enhance the quality of the neighborhood as a place to live, work and play through the actions taken on 27th St. The core goal is to have a safe, attractive and sustainable 27th St. corridor in the Indian Hills community that is meaningful over the long-term for neighbors and travelers.

Sustainability is the overarching goal for this Plan and it is considered to be at the intersection of these Core Values: Equity, Economy, and Environment. Equity in this context is the state of complete physical, mental and social well-being of residents and people who enjoy this community. A key theme is the degree to which the neighborhood provides for all groups- young and old, rich and poor. The ecological footprint of cities worldwide has increased and continues to grow, so it is up to local neighborhoods to advocate responsibility for the health of the global climate and ecosystem. Finally, local neighborhoods should see this corridor as an economic opportunity. The revitalization as a healthy and sustainable neighborhood can only be achieved if there is a local will and energy. Part of that energy comes from the vitality of the local economy, investing in people and places, as well as effective partnerships between community, voluntary, public and private sector organizations.



Below are the sustainable goals and how the 3 E's of traffic calming can facilitate the success of the 27th Street Corridor Plan. They provide short and long-term visions and serve as the foundation of the plan.

SUSTAINABILITY AND THE 3E's

ENGINEERING

EDUCATION

ENFORCEMENT

ECONOMY

Require appropriate and attractive design standards for traffic calming devices which will increase property values throughout the neighborhood.

Explore and recruit volunteers in the community and other organizations to help with less intensive work to reduce costs and increase the speed of project delivery. Use this opportunity to educate the volunteers about the value of safe and sustainable roads for the community.

Explore enforcement-type financing options to facilitate the funding for the project (e.g. vehicle mileage road user fees, user fees, fuel taxes, etc.)

ENVIRONMENT

Design traffic calming devices considering environmental impacts including but not limited to, storm-water drainage, underground utilities, sanitation and other features that impact the ecological system.

Promote and market the importance of environmentally-friendly elements in the devices (e.g. the use of bioswales and rain gardens to enhance stormwater quality)

Plant street trees, shrubs and open space to help enforce slower traffic speeds.

EQUITY

Implement the concept of a complete, functional and interconnected public alternative transportation network that is accessible for all people of all abilities, including equal considerations for the disabled and elderly.

Collaborate with the Safe Routes to School Program at Broken Arrow Elementary School about the changes along 27th St. Also, promote safety to the driver's along 27th St. with the use of creative, community-centered signage.

Work closely with the Police Department to ensure all traffic laws are enforced and propose an increased awareness of crashes in the area.



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Section 3: Corridor Action Plan



EXISTING CONDITIONS



Problem areas by Priority according to IHNA Neighborhood Plan:

- 1** 27th St. and Louisiana Intersection: This intersection is infamous for automobile accidents of cars pulling onto Louisiana from 27th St, see Appendix “A” of a diagram from the Lawrence Police Department.
- 2** Naismith Trail Crossing: Naismith Park/Creek runs along the western edge of Indian Hills. There is a bike/pedestrian trail that runs throughout the park and crosses 27th St on the western edge of the corridor study area. Currently, there is a marked crosswalk cutting across 27th through existing curb-cuts. This is a highly-dangerous crossing for this trail.
- 3** 27th St. and Missouri Intersection: The unique, oval shape and location of this intersection creates a dangerous situation for all. This intersection's shape contributes to strange traffic maneuvers and behaviors.
- 4** 27th St. and Alabama Intersection: A traditional 4-way stop, but with the amount of traffic along both roads this intersection becomes cumbersome to get through, especially during high-volume hours.



Phase 2: Engineering devices



Source: humpal.org



Source: 3.bp.blogspot.com

Phase 3: Signs, Public Art, Neighborhood Speed Watch



Source: vral.com



Source: giacalonephotos.files.wordpress.com

Phase 1: Striping/Bike Lanes



Source: alexandriava.gov

PROJECT OVERVIEW

This Plan's recommendation is divided into three (3) phases. The first phase focuses on installing a device that is quick and doesn't interrupt the following phases. The second phase addresses the obvious problem areas. Lastly, the third phase will focus on the sustainment of traffic calming along this portion of 27th St.

PHASE 1: In current economic times and local budgets, the most economical way is the best way. The first suggestion to address speeding is to consider traffic-calming striping. Striping is a viable, low-cost alternative to traditional traffic calming techniques.

PHASE 2: The second phase addresses the main problem areas along this portion of 27th St. and without interrupting the intention of the bike-lane striping. The second phase consists of traffic circles in the intersections of Missouri and Alabama streets, a raised crosswalk for the Naismith Trail crossing and roundabout at the intersection of Louisiana and 27th St. This intersection is infamous for automobile accidents of cars pulling onto Louisiana from 27th St, see Appendix "A" of a diagram from the Lawrence Police Department. These methods have proven successful on another project similar to 27th St. (See Appendix "E" for the Harvard Rd. traffic calming project)

PHASE 3: The third phase will consist more of the education and enhancement features. This will effectively help with sustaining calm traffic along this portion of 27th. This method consist of signs to promote the community, neighborhood speed watch and public art on the road.

*All average costs and speed reductions: See Appendix "F"



PHASE 1: Striping/Bike Lane

27th St. from Iowa to Louisiana

Before



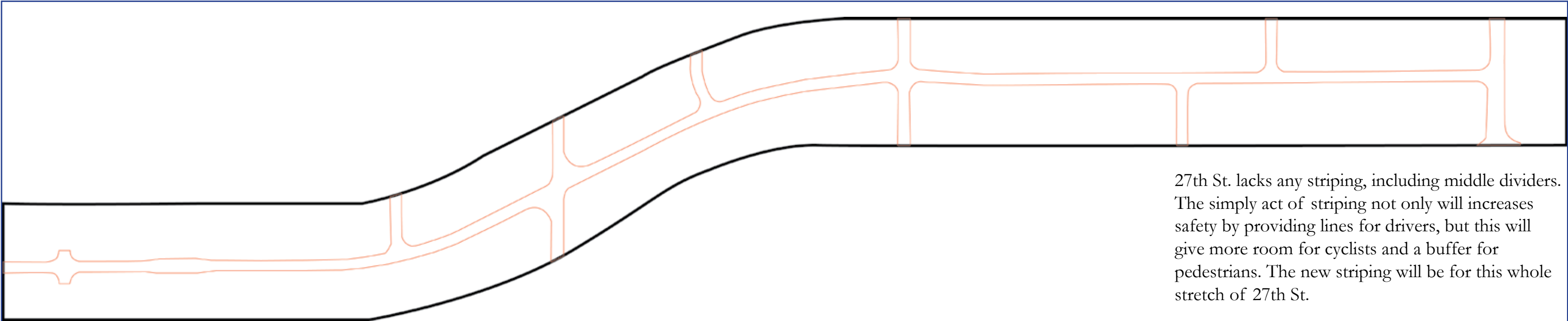
After



The best application for striping is when there is a long, wide residential street where speeding is a problem. It works by creating an impression of a narrow roadway.

- Pros: may reduce speeds; may increase pedestrian and bicyclist safety; less costly option to install; easy to implement and change if required in the future;
- Cons: relies on self-enforcing behavior; some limitations in speed reduction; less effective when speeds are already low.

Average Speed Reduction: 1-7mph
Average Costs: \$500-\$1,000 per 500 feet



27th St. lacks any striping, including middle dividers. The simply act of striping not only will increases safety by providing lines for drivers, but this will give more room for cyclists and a buffer for pedestrians. The new striping will be for this whole stretch of 27th St.



PHASE 2: Engineering Measures

Naismith Raised Crosswalk and Signage

The installation of a raised crosswalk will drastically improve this crossing for the safety of anybody enjoying the trail. This area also has potential to become a central point for park-goers to rest and relax while on the trail.

Pros: Moderate costs considerations; effective at slowing vehicles; easy for pedestrians and bicyclists to navigate; and can cause some diversion of excess traffic volumes

Cons: improper driving can cause vehicle damage; difficult to remove; can impede large vehicles including emergency vehicles; and may have questionable aesthetics.

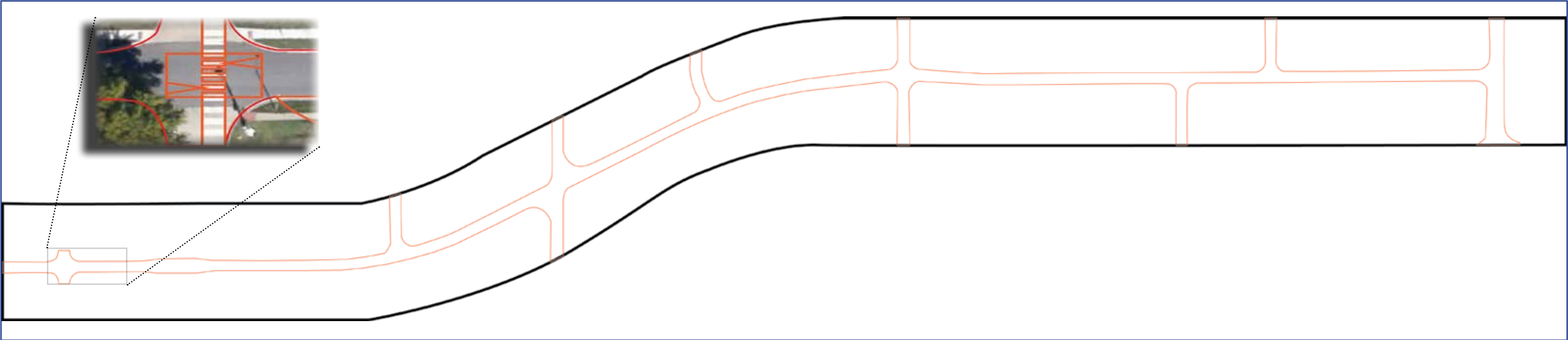
Average Speed Reduction: 6-8mph

Average Costs: \$2,500

Before



After



PHASE 2: Engineering Measures

27th/Missouri Traffic Circle and Curb Extension

Before



After



This is a prime place to apply a traffic circle, due to many factors meeting traffic circle criteria:

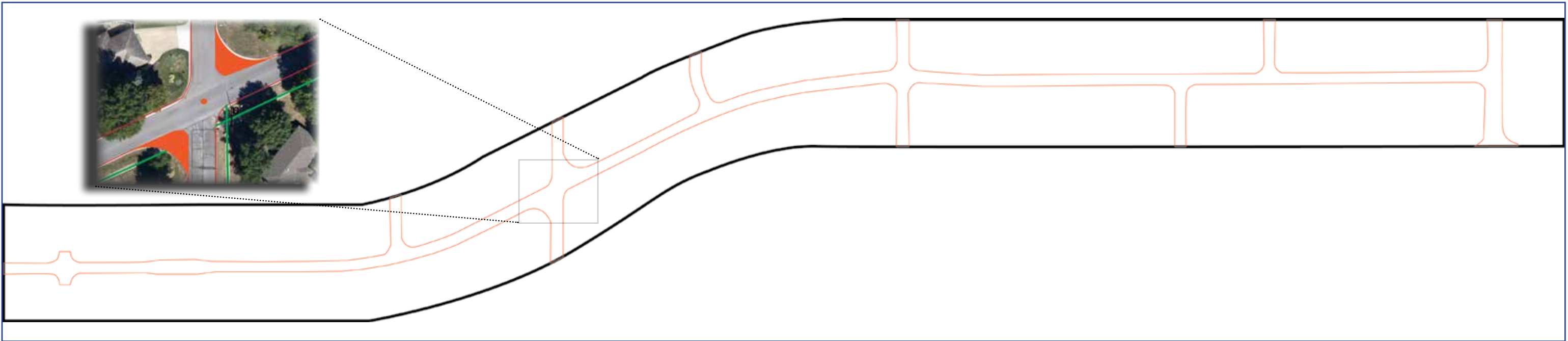
- Location with a history of accidents;
- Intersection where queues need to be minimized;
- Intersection with irregular geometry;
- Place where lower cost traffic control is desired

Pros: reduces speeds up to 4-6mph; improves safety; improves aesthetics; can calm two streets at once; minimizes traffic stacking; breaks up sight lines on long roadways

Cons: can be more difficult for large vehicles to navigate, especially emergency vehicles; requires greater amount of right-of-way; must be maintained; costly to implement; may affect pedestrians and bicyclists; and can confuse drivers

Average Speed Reduction: 4-6 mph

Average Costs: \$10,000-\$50,000



PHASE 2: Engineering Measures

Raised Crosswalk and Sidewalks

The installation of a raised crosswalk at this location will again slow traffic down before and after Louisiana. This location is important for pedestrians due to the close vicinity of Broken Arrow Elementary School.

Pros: Moderate costs considerations; effective at slowing vehicles; easy for pedestrians and bicycles to navigate; and can cause some diversion of excess traffic volumes

Cons: improper driving can cause vehicle damage; difficult to remove; can impede large vehicles including emergency vehicles; and may have questionable aesthetics.

Average Speed Reduction: 6-8mph

Average Costs: \$2,500

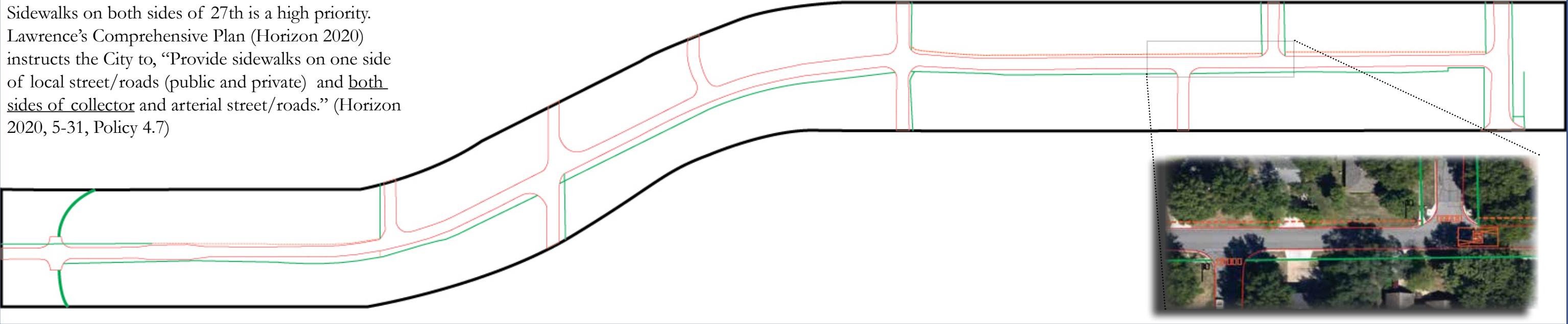
Before



After



Sidewalks on both sides of 27th is a high priority. Lawrence’s Comprehensive Plan (Horizon 2020) instructs the City to, “Provide sidewalks on one side of local street/roads (public and private) and both sides of collector and arterial street/roads.” (Horizon 2020, 5-31, Policy 4.7)



PHASE 2: Engineering Measures

27th/Louisiana Roundabout

Before



After

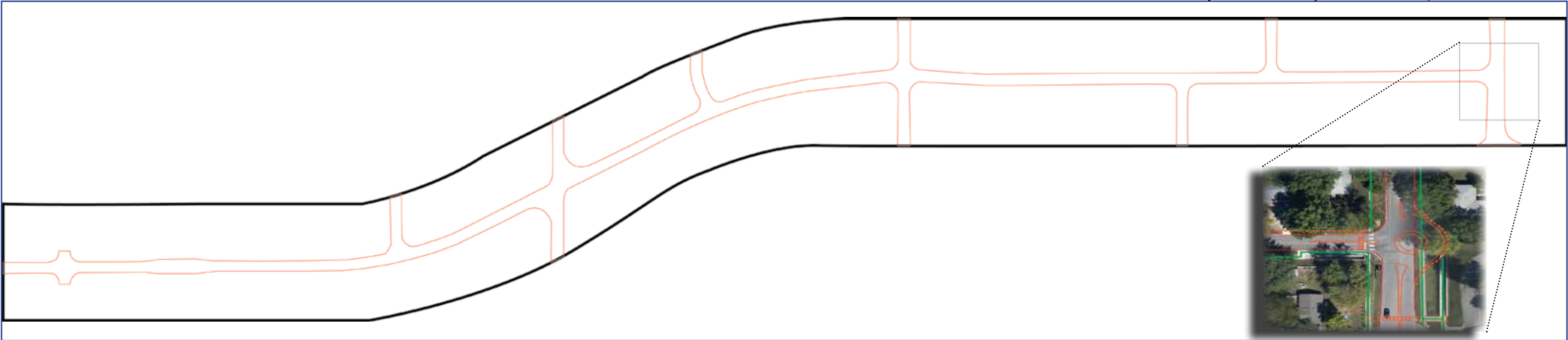


The importance of this roundabout is not just about the community’s complaints about traffic on and off of Louisiana, but this will actually help the flow of traffic for Broken Arrow during peak hours, when cars get backed up from dropping and picking up kids at school. This roundabout will also compliment the existing tunnel and crossing guards.

•Pros: Improves safety; improves aesthetics; can calm two streets at once; minimizes traffic stacking; breaks up sight lines on long roadways

•Cons: can be more difficult for large vehicles to navigate, especially emergency vehicles; require greater amount of right-of-way; must be maintained; costly to implement; may affect pedestrians and bicyclists; and can confuse drivers.

Average Speed Reduction: 4-6mph
Average Costs: 20,000-100,000+ (depends on right-of-way costs, development fees, etc.)



PHASE 3: Signs and Community Art

Multiple locations

In recent years it has become increasingly clear that effective traffic calming must also incorporate enhancement of the streetscape. This includes design and landscaping features that not only improve the aesthetics and livability of a neighborhood but increase the effectiveness of many of the previous engineering devices. This is accomplished by creating visual breaks in the streetscape and reducing the “raceway” appearance of wide, residential streets. (Congress for New Urbanism, 2014)

Enhancements can include planting shrubs or trees along the roadway, installing public art or banners, constructing decorative pavement markers or materials, installing lighting, introducing or altering on-street parking, etc.

Neighborhood Signs

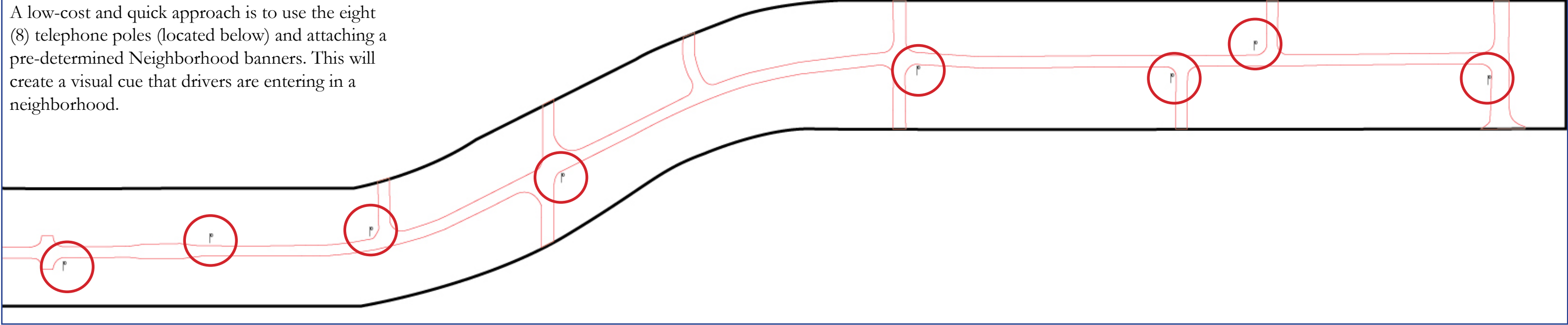


Community Street Art



Source: streetfilms.org

A low-cost and quick approach is to use the eight (8) telephone poles (located below) and attaching a pre-determined Neighborhood banners. This will create a visual cue that drivers are entering in a neighborhood.





Source: informationliberation.com

PHASE 3: Neighborhood Speed Watch

Multiple locations

Targeted police enforcement in areas where traffic volumes are great, where speeds are high, where the probability for serious accidents is present, or where complaints have been made can lead to dramatic, but often short-term reductions in speeds or volumes. In response some communities implemented a speed watch program that would lend residents radar guns and have them record the speeds, makes, models, and license plate numbers of all vehicles clocked speeding through their neighborhood. The police department then sends warning letters to the owners of offending vehicles, reminding them of the posted speed limit and the neighborhood's concern for safety. (Ewing, 1999,117) The best application for this is when residents' interest is high and they are willing to take time and energy to follow the procedures given to them by local law enforcement.

•**Pros:** low cost; easy to manage and perform the activity; better relationship with local law enforcement agencies; opportunity to education kids about safe driving and why there is a need for traffic calming

•**Cons:** time-consuming activity; lack of volunteers during hours when speeding is at its worst; lack of resident interest

Average Costs: Varies among rates and duration of usage for radar and other signage and/or equipment used.



Source: <http://mytowncrier.ca/>

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Section 4: Implementation

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IMPLEMENTATION

C. Traffic speed and noise on neighborhood streets (particularly 27th and Louisiana Streets) are monitored and mitigated.

Strategy	Who will do it?
1. When any problems occur, City is notified.	IHNA Residents
2. Street repairs are coordinated with any plans for traffic calming on 27 th Street and/or Louisiana Street.	Public Works
3. 27 th Street and options for traffic calming, particularly street trees, sidewalks on both sides, bulb-outs narrowing Missouri Street, and dealing with the blindspot at Arkansas and 27 th Streets are explored.	Public Works, Planning Department, and IHNA residents
4. Completing traffic calming plans on Louisiana Street are explored.	Public Works, Planning Department, and IHNA residents
5. Questions on speed and noise on neighborhood streets (particularly 27 th and Louisiana Streets) are included in survey to update plan.	IHNA Officers/ Steering Committee

Source: IHNA Neighborhood Plan, 2013

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This is important to keep in mind when the decision is made of which devices are being suggested and where. The Traffic Engineering Department will suggest the devices based on the traffic study and their expert knowledge of all the aforementioned devices and techniques in this Plan.

Ultimately, Traffic Engineering and the City of Lawrence wants the best for the neighborhoods in these scenarios. The Policy allows a partial democratic process with the people directly impacted within the 300 feet. This facilitates the general agreement among neighbors on the nature of the problem and the proposed solution.

If the residents along this corridor agree that: there is a problem; the proposed solutions in this Plan are the most appropriate; and their concerns have been addressed and mitigated as well as possible by everyone “in charge” on the list above, the City will then take this suggestion to the Neighborhood Association. From then if 70% of those residents within that boundary approve the device will be installed (if funded). The main purpose of this Plan is to show how and why the community should request these changes for the corridor and, ultimately, the neighborhood.

6. If a project is approved by the City Commission, the City Commission will determine financing of the construction. The City Commission may require 0-100% of the costs to be paid by the group or neighborhood making the request.

7. After a project is approved and funded by the City Commission, TRAFFIC-CALMING DEVICES will only be constructed at a location if 70% or more of the property owners within 300 feet measured along the centerline of the street in each direction approve of the installation or if directed by the City Commission. The individual, group or neighborhood making the request shall be responsible for obtaining the property owners’ and residents’ approval in writing and submitting it to the city.

8. Once installed, TRAFFIC-CALMING DEVICES may only be removed at a location if more than 70% of the property owners and residents within 300 feet measured along the centerline of the street in each direction approve of the removal or if directed by the City Commission. The individual, group or neighborhood making the request shall be responsible for obtaining the property owners’ and residents’ approval in writing and submitting it to the city.

9. TRAFFIC CALMING DEVICES may initially be landscaped (if appropriate) by the city, provided that the group or neighborhood making the request agrees in writing to maintain the landscaping or pursuant to the payment of a landscape maintenance fee. No privately installed landscaping is permitted unless approved by the city in writing.

Source: lawrenceks.org/public_works/traffic

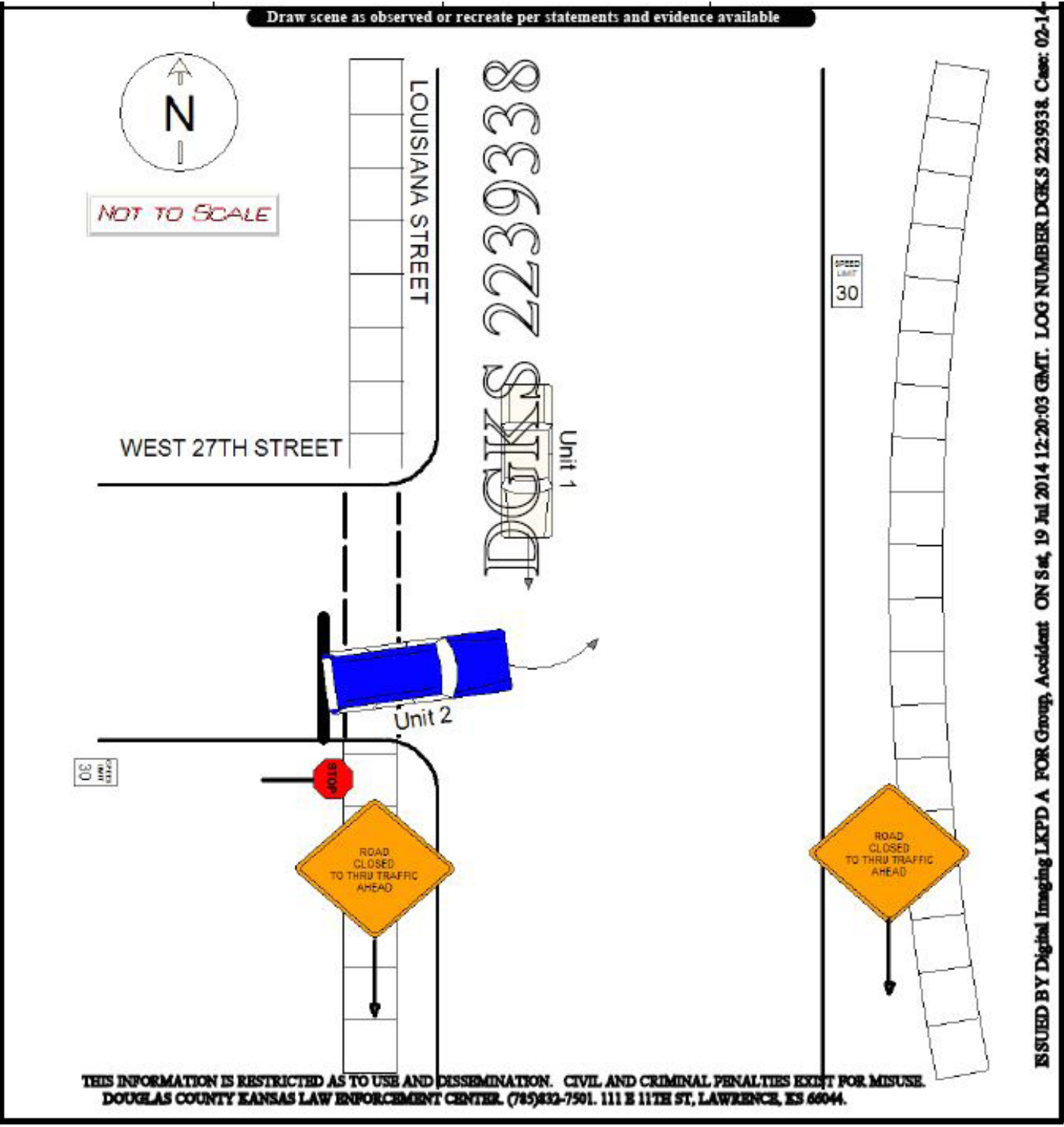


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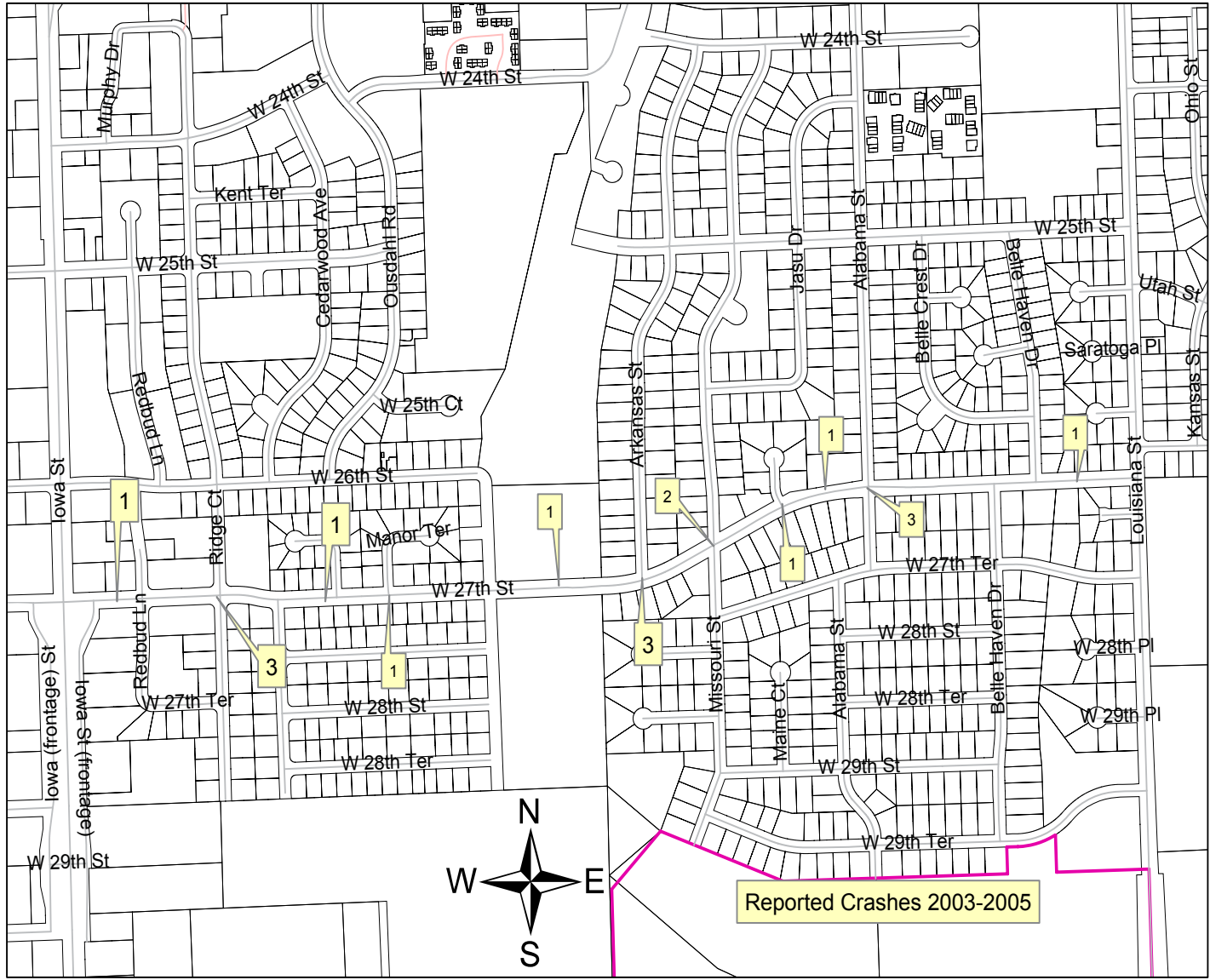


Section 5: Appendix

APPENDIX “A”



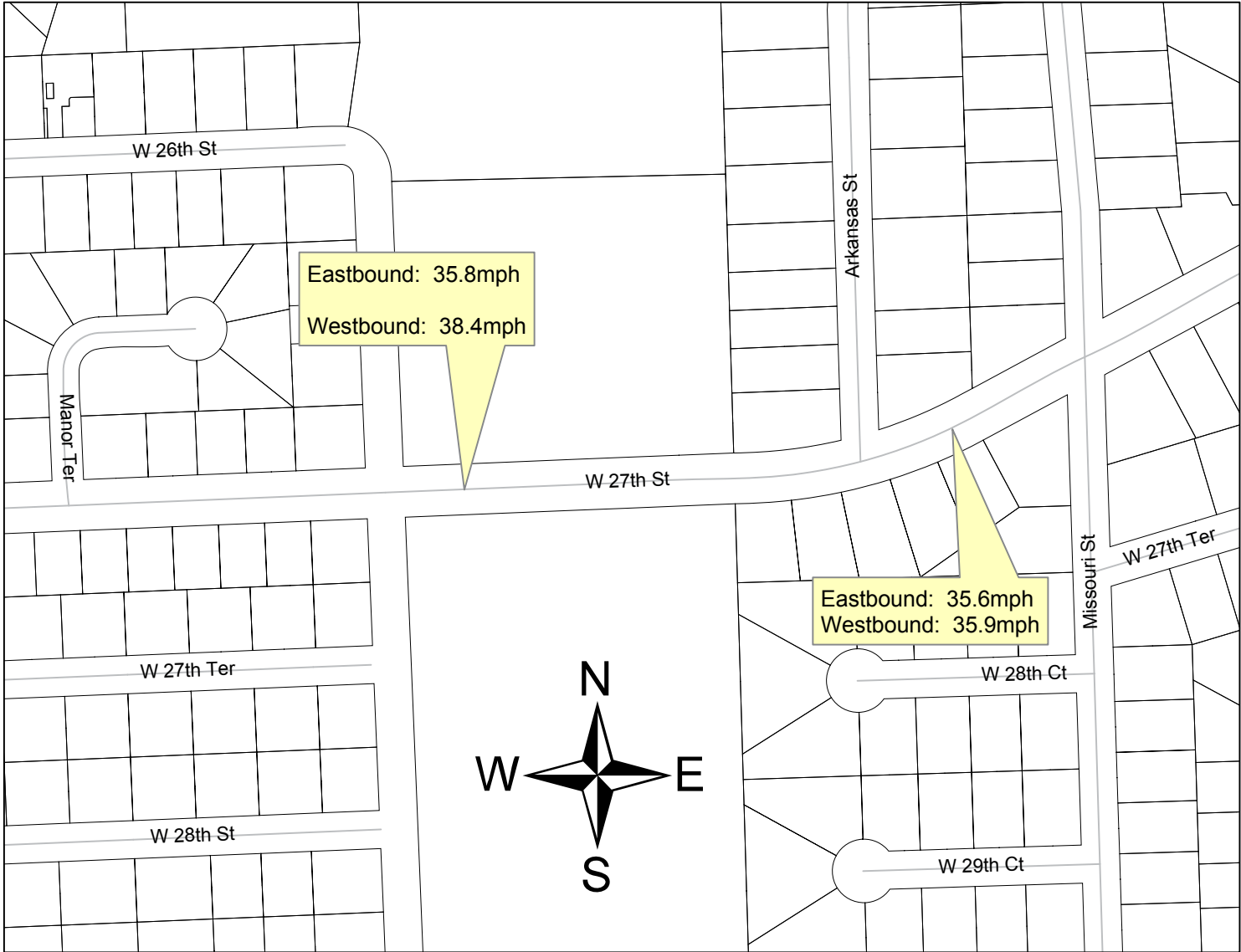
APPENDIX “B”



Source: City of Lawrence, KS, Police Department, police.lawrenceks.org

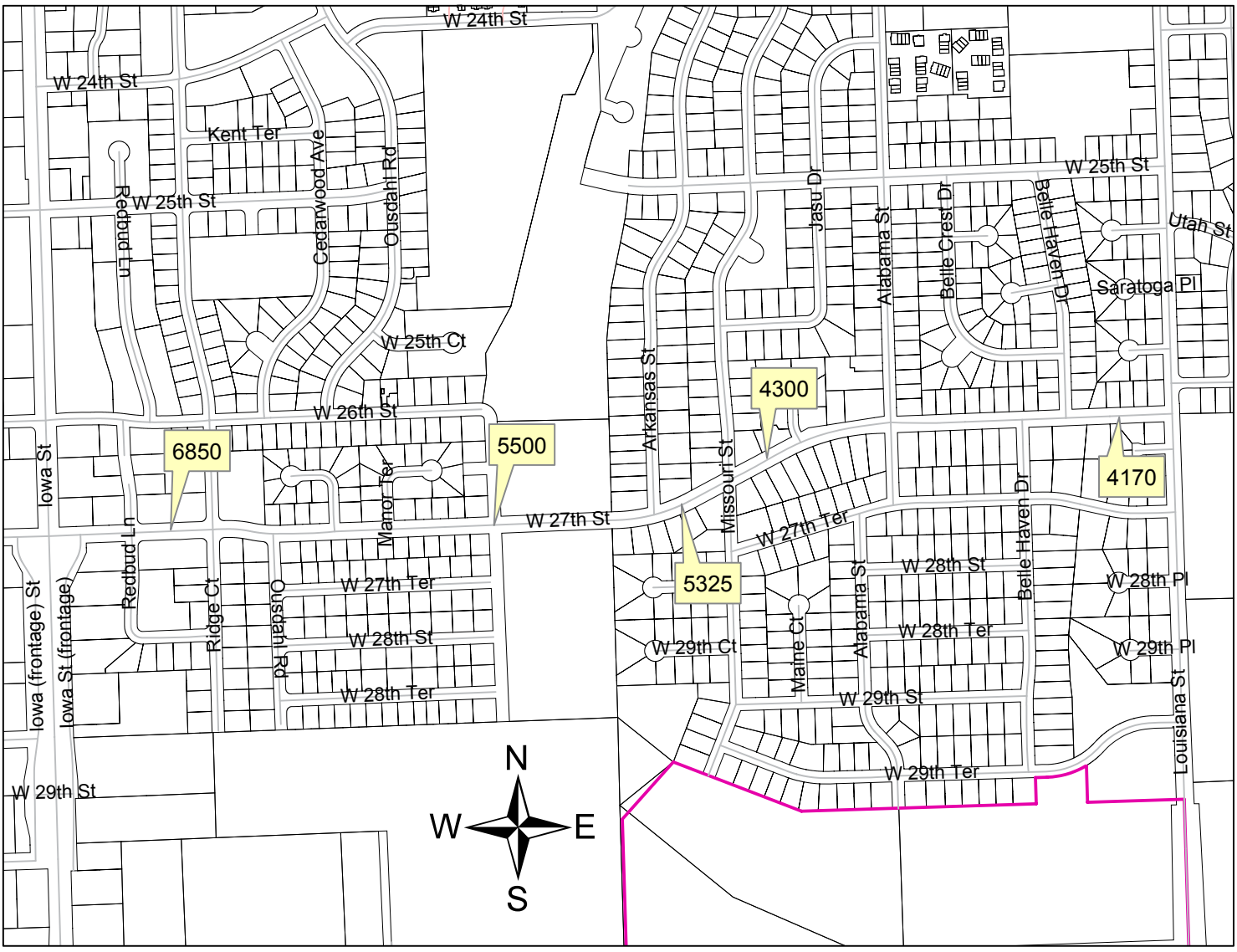


APPENDIX “C”



Source: City of Lawrence, KS, Traffic Engineering

APPENDIX “D”



Source: ksdot.org



Traffic Circle at the intersection of Harvard Rd. and Manchester



Roundabout at Harvard Rd. and Mulberry



APPENDIX “E”

Roundabout of Harvard Rd and Monterey Way, Lawrence, Kansas (ALL IMAGES ARE FROM GOOGLE EARTH)



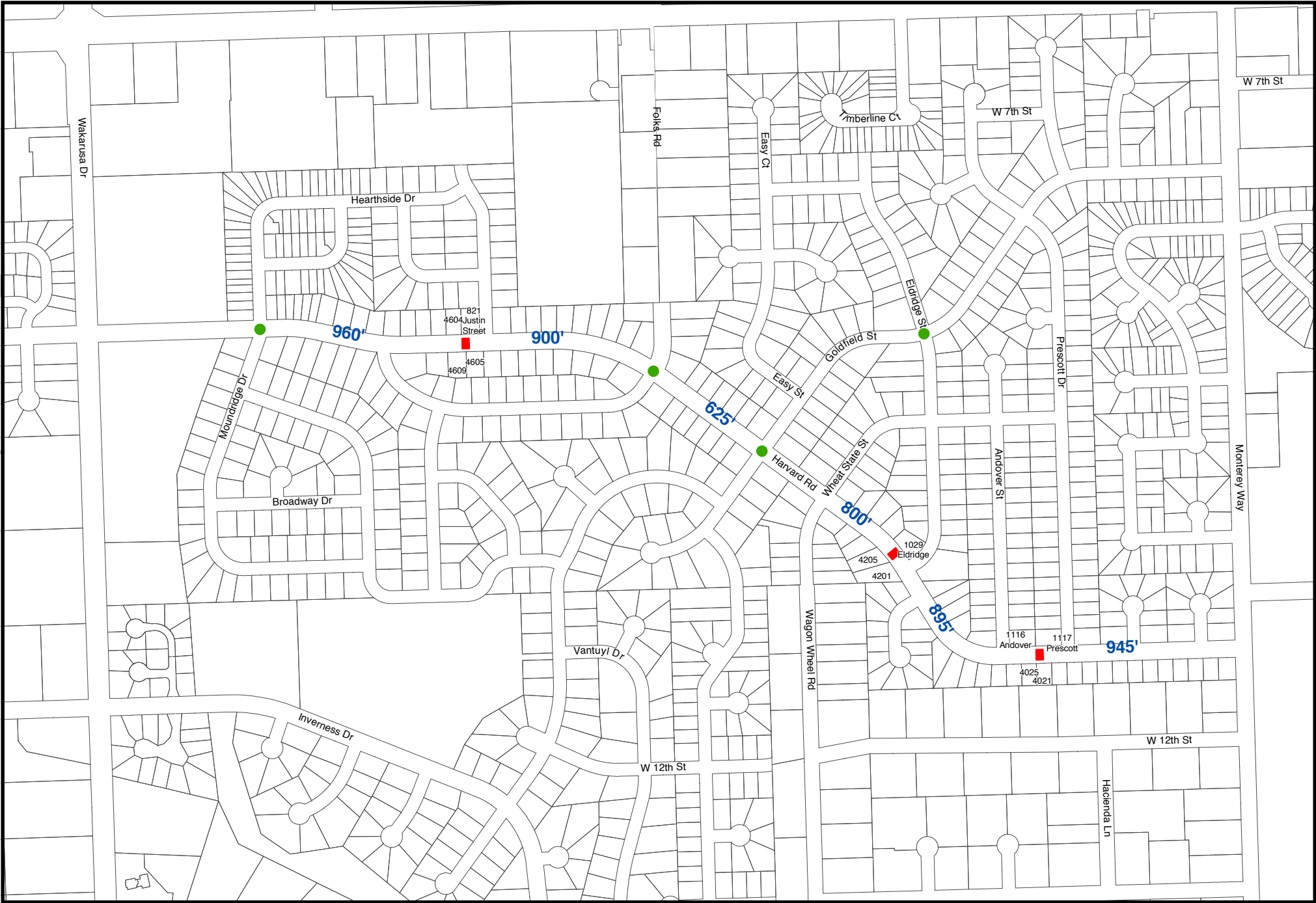
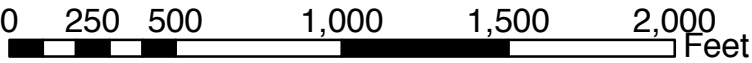
Speed cushion just west of the intersection of Harvard Rd and Eldridge St.



APPENDIX “E” cont’d

Harvard Road Traffic Calming Plan

- Traffic Calming Circle
- Speed Cushion



Source: City of Lawrence, KS, Traffic Engineering



APPENDIX “F”

Traffic Calming Technique	Pros	Cons	Speed Reduction (mph)	Cost2
Speed Hump	- Effectively reduces speed by approximately 8 mph. - Can cause some diversion of excess traffic volumes.	- Not accepted by many local jurisdictions and emergency service agencies. - Improper driving can cause vehicle damage and can cause vehicles to go out of control. - Moderate cost considerations. - Can impact bicycles/motorcycles. - Difficult to remove.	8	\$1,500 to \$3,000
Speed Cushion	- Effective in reducing speeds up to 5 miles per hour. - More acceptable to public agencies / emergency service agencies, because can slow normal size vehicles but allows larger emergency vehicles to pass without speed reductions.	- Some agencies and emergency service agencies do not support these devices. - Cost for construction is moderate. - Difficult to remove. - May impact bicycles/motorcycles.	5	\$2,500 to \$3,500
Chokers and Chicanes	- Effectively reduces traffic speeds approximately 3 miles per hour. - Can reduce roadway width to reduce walking distance for pedestrian (which is a safety benefit). - Can be enhanced with landscaping to improve aesthetics.	- Expensive to implement. - Can cause drainage issues. - Difficult to remove in the future if not effective. - Some loss of parking. - Can impact bicycles.	3–5 Up to 6	\$7,000–\$15,000 per pair \$10,000–\$15,000
Medians	- Can reduce speeds to some degree. - Can provide aesthetic benefits to the community.	- Costly to implement. - Difficult to remove if not successful. - Can cause additional maintenance costs. - Water overall on pavement. - May lose parking.	2–3	\$5,000–\$15,000
Pavement Texture	- Can cause minor reduction in speed. - Can be aesthetically pleasing. - Can be tied into crosswalks or intersections to define channelized areas for pedestrians.	- Costly to implement. - Difficult to remove. - Can effect some types of pedestrians crossing the street. - Can cause noise impacts.	Limited data	\$5–\$16 per sq. ft.
Mini Traffic Circles	- Minor reduction in speed. - Improves aesthetics. - Slows traffic through the intersection.	- Costly to implement. - Can confuse drivers regarding which way to travel through an intersection. - May affect bicycles and pedestrians. - Can impact left turns for large vehicles. - Can slow emergency service vehicles.	4–6	\$10,000–\$60,000
Traffic Calming Striping	- Effective in reducing speeds from 1 to 7+ miles per hour. - Accepted by many public agencies and emergency service agencies because they are standard traffic control. - Easy to change if required in the future. - Less costly option to install - Installation can be implemented quickly. - Can be removed more easily than other options (sand blast).	- Some limitations in speed reduction. - Less effective when speeds are already low.	1–7 +	\$500–\$1,000 per 500-feet

Source: Kahn, 2011



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Pictures Cited:

All aerial photographs: GoogleEarth and OpenStreetMaps.org

PAGE 6: Indian Hills: <http://www.remax-midstates.com/lawrence/realestatehomesforsale/indian-hills-lawrence-ks>

PAGE 7: Indian Hills Neighborhood Association Neighborhood Plan, 2013

PAGE 8-9: City of Lawrence Traffic Calming Policy, lawrenceks.org/public_works/traffic

PAGE 18:
Speed Hump: http://www.humpal.org/sites/humpal.org/files/files/images/SR2S/DolbeerST_after_640x480.jpg
Traffic Circle: <http://3.bp.blogspot.com/-klpO675W1nA/T5c6pmXxWbI/AAAAAAAAABRE/JVcHbvrzB1Q/s1600/Figure+10.png>
Striping: <http://alexandriava.gov/uploadedImages/localmotion/info/Stulz%20Rd%20Concept.jpg>
Sign (1): <http://www.wral.com/news/local/story/5814998/>
Sign (2) <http://giacalonephotos.files.wordpress.com/2011/10/welcomebanner-schurch.jpg>

PAGE 24: Intersection: <http://www.streetfilms.org/wp-content/uploads/2007/05/interesection-repair-3.jpg>

PAGE 25: Neighborhood Speed Watch: <http://www.informationliberation.com/files/bild121212121212e.jpg>

