

**Farmer, Chair**  
Stinnett, Vice Chair  
Kay  
Moloney  
J. Brown  
Gibbs  
Evans  
F. Brown  
Mossotti  
Lane

**A G E N D A**  
**Environmental Quality & Public Works Committee**  
**June 16, 2015**  
**1:00 P.M.**

- |             |                                                   |         |
|-------------|---------------------------------------------------|---------|
| <b>I.</b>   | Approval of Committee Summary                     | (1-8)   |
| <b>II.</b>  | Neighborhood Traffic Management Program (Moloney) | (9-63)  |
| <b>III.</b> | Traffic Signal System (Stinnett)                  | (64-92) |
| <b>IV.</b>  | Division of Water Quality Projects Report         | (93-94) |
| <b>V.</b>   | Items Referred to Committee                       | (95)    |

**“Environmental quality and public works committee to which shall be referred matters relating to the department of environmental quality and its divisions, and any related partner agencies and the department of public works and its related divisions, including capital improvement projects and any related partner agencies.”** Council Rules & Procedures, Section 2.102 (3) Effective January 1, 2015. Adopted by Urban County Council September 25, 2014

2015 Meeting Schedule

|                        |              |
|------------------------|--------------|
| January 20 (1:30 p.m.) | June 16      |
| February 24 (11 a.m.)  | August 18    |
| March 10               | September 15 |
| April 21               | October 20   |
| May 19                 | November 17  |



**Environmental Quality and Public Works Committee Meeting  
May 19, 2015  
Summary and Motions**

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Chair Farmer called the meeting to order at 1:00 p.m. Committee Members Stinnett, Kay, Moloney, J. Brown, Gibbs, Evans, F. Brown, Mossotti and Lane were in attendance. Council Members Akers, Bledsoe and Lamb were also in attendance.

**I. Approval of Committee Summary**

A motion was made by Mossotti to approve the April 21, 2015 Environmental Quality & Public Works Committee Meeting Summary, seconded by F. Brown. Motion passed without dissent.

**II. Distillery District Update**

Commissioner Paulsen presented a progress update for the efforts taking place in the Distillery District. He provided updates regarding the completion of the Town Branch Trail project, including cost estimates and timelines for Phases 4 through 6.

Commissioner Paulsen also provided information regarding the hydrology study and the potential amendment of the floodplain area. A Letter of Map Revision (LOMR) is being submitted to FEMA; the submission and approval process will require two to three years.

An update for the UK trunk line was also presented.

Farmer asked if the total cost indicated for Phase 6 of the Town Branch Trail project was actually the expenditure to date. Commissioner Paulsen responded that there is a typo in the packet.

Kay inquired if the included map encompasses the entire hydrology study area. Paulsen noted that the maps provided were intended only to reference the Distillery District. Kay inquired if the study will include delineation about other flood plain areas in the city. Paulsen replied that it would, where necessary, and where floodplain issues necessitate changes. Kay inquired if the study data would inform other areas that may be of interest throughout the city for future projects.

Mossotti expressed concern that businesses considering locating in the Distillery District would be deterred by the added cost of flood insurance. Paulsen stated that the study will likely result in lower insurance rates. Paulsen reiterated a two to three year timeline before final approval by FEMA and a subsequent insurance rate adjustment.

F. Brown requested a history of the Town Branch Trail project, and Paulsen provided an overview. F. Brown inquired about a completion date. Paulsen stated they hope to begin construction at this time next year. F. Brown inquired about the length and use of the trail. Paulsen stated he would provide that information. F. Brown further inquired about the unfunded portions of the trail, and if those funds will come from the General Fund. Paulsen gave an explanation of the process, stating the funding for phase 5 & 6 were earmarked by the Governor and that funding will be allocated following right-of-way acquisitions and utility relocations.

Moloney spoke in favor of the hydrology study and stated that it should've been completed during an earlier phase of the project. Moloney inquired when they hope to have the preliminary study completed, to which Paulsen replied that the timeline of the study is largely dependent on the quantity of data that can be collected (e.g. rain events). Moloney inquired if they can use data from previous rain events, and Paulsen replied we do not maintain field data from previous events and will need to collect additional data for rain events from this point forward.

Akers stated her agreement with Moloney that the study should have been completed when the project originally received bond funding, and inquired about deadlines for submitting the information to FEMA. Paulsen stated that the data will be submitted after the summer, dependent on a number of factors. Akers asked if the snow this winter was helpful for their data collection. Paulsen stated they were able to collect field data but stated that rain events are more relevant to floodplain data collection.

Farmer inquired if the benefit of the UK trunk line is additional capacity due to the size of the trunk line, to which Charlie Martin replied he believes a 36 inch line is proposed, which will add significant capacity.

Moloney inquired how the trunk line study affects the Distillery District Update. Paulsen replied the trunk line begins on Manchester Street which is within the Distillery District, and would impact traffic in the area during construction.

Stinnett inquired about the function of the line that will be replaced as part of the Newtown Pike extension. Stinnett asked if the new trunk line would allow for additional connections, and Martin stated it is for the provision of overflows. Martin also affirmed that there will be capacity credits given to the Distillery District by the addition of the trunk line. Stinnett inquired if there is a waiting list for the credits to which Martin answered he would get this information to him.

In response to a question from Mossotti, Paulsen stated that there is coordination between trail projects to ensure connectivity throughout the community. Paulsen stated there has been significant community outreach. Mossotti inquired if efforts and funds were being coordinated. Paulsen stated that the Town Branch ends at Oliver Lewis Way where the Distillery District begins, and there has been a coordinated planning effort to ensure connectivity.

Stinnett stated this project began in 2009 when Council bonded \$2.2 million for work in the Distillery District and they later learned that the developer didn't have a plan in place. Stinnett inquired how much is left of that money. Paulsen stated \$1.678 million remains. Stinnett inquired about the construction timeline, and when additional funding would be required. Paulsen stated there will be many utility relocation projects, which are unscheduled at this time. Paulsen stated he doesn't believe construction could begin before 2017-2018. Stinnett stated the money was originally for streetscapes, but cannot be used for that purpose until the utilities are relocated. Stinnett stated that it is wrong to continue to pay debt service on a project that cannot be completed.

Kay inquired if there are any improvements that could move forward at this time, noting the private investments that have been made. Paulsen stated they could complete improvements at this time due to further work that will be completed on Manchester Street.

F. Brown inquired about the \$2.2 million from 2009 from the General Fund. Brown inquired about the deadline for the remainder of the bonded money. Bill O'Mara replied it was bonded during the 2010 issue; due to inactivity, the 2014 bond issue reallocated these funds to the senior citizen center, which essentially reset the clock for expenditures. Brown inquired if Council would be able to move this money to the economic infrastructure fund. O'Mara stated he does not see any reason funds could not be transferred to that fund.

Akers inquired if part of the bond funds could be used for curbs in the Distillery District, noting the lack of curbs. Paulsen stated that the addition of sidewalks, curbs, and gutters are a full road project that would need to be added to the MPO road plan. Paulsen stated that they do not build sewers noting that developers build them and dedicate them to the City as part of the cost of development.

Evans stated she was not comfortable reallocating bond funds without a discussion about the best use of the funds. Farmer stated that the proposed reallocation would need to report out before the budget is passed because it has the potential to affect bonding. Farmer stated that Council would discuss the item if the Committee moves the item forward.

A motion was made by Stinnett to reallocate the remaining balance of bond proceeds set aside for the Distillery District to the Economic Infrastructure Fund and reduce the amount of bond funds appropriated in the FY 15-16 budget accordingly, seconded by Moloney. The motion passed without dissent.

### **III. Snow & Ice Control Plan Update**

Commissioner Holmes presented the Snow and Ice Control Plan, noting that streets will be identified by "rank" rather than priority in the revised Plan. He reviewed the current inventory of equipment as well as staff responsible for Plan implementation, and provided an overview of the resources that were required to address recent snow events. Areas of opportunity were

presented to the committee, which included: reevaluation of streets including in snow plowing routes; potentially adding sidewalks, bus stops, and other areas to routes; and utilizing software to provide for GPS tracking of snow removal vehicles. The draft revisions to the Plan will be completed by October 2015.

F. Brown commended the Streets & Roads for their efforts during snow events. F. Brown asked if the new ranking being implemented will encompass the same streets. Holmes stated the ranking shown on the map were current at the time of the last snow events. Holmes stated they need to see which areas have experienced growth and need to be changed. F. Brown inquired about the salt barn's inclusion in the budget. Holmes stated the funding in the Mayor's Proposed Budget is for design, stating construction will not commence until 2017 due to the work Water Quality is completing on Blue Sky Way.

Lamb inquired if this is the first year the city has used a "snow farm" for storage of snow. Miller replied that it was. Lamb inquired if there is any additional cost for the GPS tracking device and if it is included in the proposed budget. Holmes stated that partial project funding is included in both the FY15 and FY16 budgets, with equipment being included in the former and software subscription in the latter.

Lamb stated the sidewalk shoveling ordinance has been unenforceable. Lamb suggested considering entering into an MOU with the Parking Authority to cite businesses that have not cleared their sidewalks during snow events. She also suggested engaging private contractors for sidewalk clearing and stated that the ordinance needs to be amended to include ramps in accordance with ADA requirements. Lamb stated that sidewalks to be cleared by the City must be identified. Lamb recalled the large number of complaints about plowed snow that re-covered shoveled driveways. Holmes stated this will always be an issue; when streets are plowed, snow is pushed back onto driveways and curbs.

Evans stated she was disappointed there were not more answers included in the presentation and inquired if the October date will be enough time to get a plan in place, noting that constituents are asking for changes to the plan. Evans stated Council Members had already submitted input per request subsequent to the last snow event. Holmes stated that the map has been updated per the input received after the last snow event, and stated that the amended Plan is typically presented in October each year.

Farmer stated Council had anticipated that the department would come back with a more dynamic plan. Farmer stated they should try to return with plan updates in August, or September at the latest, and noted that October is too late.

Mossotti inquired if private contractors will have access to the GPS devices. Holmes replied that city staff will monitor and follow contractors in neighborhoods. Mossotti noted inefficiencies and suggested mobile devices to monitor contractors. Mossotti further noted that she received many complaints about private streets that were not plowed.

A motion was made by Mossotti to approve discussion of disallowing private streets in residential subdivisions. Motion died for the lack of a second.

A motion was made by Mossotti to place into Planning & Public Safety Committee the discussion of disallowing private streets in residential subdivisions. Motion died for the lack of a second.

Gibbs thanked the Division of Streets & Roads for their work during the heavy snows. Gibbs stated his agreement with Lamb to engage Lexpark in citing businesses that are not compliant with shoveling ordinances, with emphasis on commercial corridors.

Stinnett inquired if there is a plan in place with a chain of command for contact during weather events. Holmes stated they will bring a proposal forward in September.

Moloney inquired about the salt barn, and asked for an update regarding same when the Plan is brought back to Committee in the fall. Moloney stated he would like to ensure efforts are being coordinated effectively.

Akers stated her agreement with Evans that she had hoped to see more changes to the Plan. Akers stated that in August she would like to see maps of the streets that are used by Lextran and school bus routes included in their ranking system.

Lane suggested that neighborhood association presidents be advisors during events, and they could be provided with training to better assist during inclement weather to identify priorities and problems that arise. Lane stated that the tax for the Downtown Management District which recently passed includes snow removal provisions.

Farmer noted there was a call for partnering during several of the Committee's comments and noted that the Committee looks forward to a follow up discussion and presentation in August.

#### **IV. Neighborhood Traffic Management Program**

There was no discussion on the item due to time constraints.

#### **V. Reduction of Speed Limit on Jouett Creek Drive**

A motion by Kevin Stinnett to Approve Reduction of Speed Limit on Jouett Creek Drive, seconded by Richard Moloney, the motion passed without dissent.

Moloney thanked Dowell Hoskins-Squier and her staff for their work on this item.

#### **VI. Items Referred to Committee**

A motion was made by Akers to Adjourn, seconded by Stinnett. Motion passed without dissent.

The meeting was adjourned at 2:53 p.m.

DS 5-22-2015

RESOLUTION NO. \_\_\_\_\_-2015

A RESOLUTION DESIGNATING THE SPEED LIMIT ON JOUETT CREEK DRIVE AS 25 MILES PER HOUR AND AUTHORIZING AND DIRECTING THE DIVISION OF TRAFFIC ENGINEERING TO INSTALL PROPER AND APPROPRIATE SIGNS IN ACCORDANCE WITH THE DESIGNATION.

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WHEREAS, pursuant to Code of Ordinances Section 18-51 and other authorities, the Division of Traffic Engineering is authorized and empowered to maintain traffic-control signs, signals, and devices deemed necessary to regulate traffic; and

WHEREAS, pursuant to Section 18-66 of the Code of Ordinances, the Urban County Government may determine that certain speed regulations shall be applicable on certain streets or in certain areas; and

WHEREAS, the Urban County Council has determined that the speed limit on Jouett Creek Drive should be 25 miles per hour.

NOW, THEREFORE, BE IT RESOLVED BY THE COUNCIL OF THE LEXINGTON-FAYETTE URBAN COUNTY GOVERNMENT:

Section 1 - That the speed limit on Jouett Creek Drive be and hereby is designated as 25 miles per hour and the Division of Traffic Engineering is authorized and directed to install proper and appropriate signs in accord with that designation.

Section 2 - That this Resolution shall become effective on the date of its passage.

PASSED URBAN COUNTY COUNCIL:

\_\_\_\_\_  
MAYOR

ATTEST:

\_\_\_\_\_  
CLERK OF URBAN COUNTY COUNCIL  
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# Revisions to the Neighborhood Traffic Management Program (NTMP)

Environmental Quality &  
Public Works Committee

June 16, 2015

Department of Environmental Quality & Public Works  
Division of Traffic Engineering

# Introduction

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- The NTMP was created in 2000 to help set standards for traffic calming in neighborhood settings
  - Minor revisions and additions were made in 2012
  - Document is largely the same as it was in 2000
- The 2015 revisions are intended to refresh the program and provide for clear and consistent policies

# Traffic Calming Techniques

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- The NTMP program still has three levels of traffic calming techniques
  - Type 1 – signs, pavement markings, education, speed enforcement, etc.
  - Type 2 – speed tables, chicanes, bulb-outs, etc.
  - Type 3 – street closures, cul-de-sac conversions, etc.
- Few changes made to traffic calming options

# Revisions to the NTMP

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- Major changes include:
  - Deadlines
    - 90 days for initial petitions (all Types)
    - Three week minimum for ballot petitions (Types 2 & 3)
  - Study reevaluation
    - A similar study cannot be started within 12 months of a final NTMP report unless traffic patterns significantly change within that time frame

# Revisions to the NTMP

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- Major changes include (continued):
  - No cost sharing for Type 2 & 3 traffic calming options.
    - All costs for these traffic calming options to be covered by petitioning neighborhood or sponsor party

# Questions?

**LEXINGTON-FAYETTE  
URBAN COUNTY GOVERNMENT  
DIVISION OF TRAFFIC ENGINEERING**

**NEIGHBORHOOD TRAFFIC  
MANAGEMENT PROGRAM**



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## INTRODUCTION

As the population and traffic volumes continue to grow in Fayette County, major roadways and intersections have become more congested. As this occurs, frustrated motorists often resort to the use of local streets to bypass congested roadways or overloaded intersections. Motorists cutting through residential neighborhoods often ignore residential speed limits. Residents who live on these local streets perceive a danger to children playing outdoors, while others fear increased auto exhaust pollution, road noise, and hazards to walkers, joggers, and bicyclists. The result is an ever-increasing number of residents expressing concerns about the safety and livability of their neighborhoods.

The Lexington-Fayette Urban County Government Neighborhood Traffic Management Program (NTMP) was developed to provide a process for identifying and addressing neighborhood quality of life issues related to speeding motorists, excessive traffic volumes, and safety on local residential streets. Under the program, the NTMP staff in the Division of Traffic Engineering works with residents within neighborhoods to identify the types and severity of traffic problems. Residents help to develop and evaluate the various requirements, benefits, and trade-offs of NTMP projects within their own neighborhood and become actively involved in the decision-making process.

A NTMP project involves strategic changes to streets in order to reduce vehicle speeds and to decrease the cars' dominance in the neighborhood through traffic calming. Traffic Calming as defined by the Institute of Transportation Engineers is the combination of mainly physical measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users<sup>1</sup>. Traffic calming techniques and devices are designed and located to encourage cut-through traffic to remain on major roads by making the travel time on the residential streets greater than the travel time on the adjacent major roadways. Traffic calming also seeks to encourage and reinforce appropriate driving behavior of the local drivers.

To be effective, traffic calming devices need to be part of a strategy extending along a street. The aim is to control traffic over an area, not at an isolated site, and to be compatible with street activities and adjacent land uses. Traffic calming strategies have the common goals of improving safety for pedestrians and bicyclists, providing a greater sense of security, and increasing neighborhood livability.

It is the intention of the NTMP to address traffic problems on local residential streets and residential collector streets as defined by the current American Association of State Highway and Transportation Officials' *A Policy on Geometric Design of Highways and Streets* functional classification of roadways. Residential collector streets are defined as collector streets with a minimum of 75% of properties on the street section in question being residential. Residential collector streets will be treated differently than local residential streets in that no vertical devices (i.e. speed tables, etc.) will be installed on a residential collector street. This NTMP document provides procedures, standards, guidelines, and techniques to assist staff and residents in carrying out a project on residential streets.

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<sup>1</sup> Lockwood, Ian. *ITE Traffic Calming Definition*. ITE Journal, July 1997, pg. 22.

## GOAL, OBJECTIVES, AND POLICIES

### Goal

It is the goal of the Lexington-Fayette Urban County Government NTMP to establish procedures and techniques that will promote neighborhood livability by mitigating the negative impacts of automobile traffic on residential neighborhoods. Although livability has no precise definition, it can be thought of as encompassing the following characteristics:

- The ability of residents to feel safe and secure in their neighborhood.
- The opportunity to interact socially with neighbors without the dominance of traffic related distractions or threats.
- The ability to experience a sense of home and privacy.
- A sense of community and neighborhood identity.
- A balanced relationship between the multiple uses and needs of a neighborhood.
- To provide acceptable levels of accessibility for local traffic, discourage excessive speeds, and encourage opportunities for alternate travel modes, all in recognition of quality of life and the specific objectives of the neighborhood or area plan.

### Objectives

- To promote safe and pleasant conditions for residents, pedestrians, bicyclists, and motorists on local neighborhood and residential collector streets.
- To mitigate the impacts of traffic and speed on local neighborhood and residential collector streets.
- To preserve and enhance pedestrian and bicycle travel within neighborhoods.
- To encourage citizen involvement in the neighborhood traffic management process.
- To achieve efficient and safe movement of traffic within neighborhoods (including emergency vehicles) consistent with the intended function of the residential streets.
- To maintain acceptable levels of service on the city's arterial streets so as to avoid intrusion/diversion onto local neighborhood streets.

### Policies

- Application of this program shall be limited to local residential streets and residential collector streets in Fayette County. A local residential street and a residential collector street are defined as a street with a minimum of 75% of the properties on that street being residential.
- No vertical devices will be installed on residential collector streets.
- Through traffic should be encouraged to travel on those roadways as defined in the Functional Classification categories of collectors and above.
- Provide adequate funding levels for NTMP staff, program implementation and maintenance.
- Preserve emergency vehicle access to neighborhoods.
- Coordinate the NTMP with the existing intersection improvement program.
- In cases where safety concerns are found to be an immediate traffic hazard correctable by traffic management techniques, procedures may be modified to insure immediate attention to correct the traffic hazard.

- The cost of NTMP projects shall be borne by the LFUCG, neighborhoods, a combination of the two, or other alternative funding sources as available.

## FUNDING POLICY

For Type 1 NTMP recommended improvements, the Lexington Fayette Urban County Government will cover all costs for enhancements recommended by a NTMP report.

For Type 2 and 3 NTMP recommended improvements, the costs for materials, labor, and construction of the traffic calming devices will be the responsibility of the sponsor group or individual.

## NEIGHBORHOOD TRAFFIC MANAGEMENT OPTIONS

Neighborhood traffic management options are broken down into three separate tiers of options as follows:

### Type 1

Including but not limited to:

*Signing:*

|                                    |                                |
|------------------------------------|--------------------------------|
| A. Multi-way stop                  | F. No outlet                   |
| B. Yield                           | G. Not a through street        |
| C. Speed limits / reductions       | H. Cross traffic does not stop |
| D. No parking/parking prohibitions | I. Specialty signs             |
| E. No through trucks               |                                |

*Pavement markings:*

|                                |                                      |
|--------------------------------|--------------------------------------|
| A. Street centerline, edgeline | D. Stop bar / yield bar              |
| B. Lane line                   | E. Yellow curb / parking restriction |
| C. Crosswalks                  | F. Rumble strips                     |

*Enforcement/Education:*

|                                                      |              |
|------------------------------------------------------|--------------|
| A. Increased police presence (selective enforcement) | C. Education |
| B. Changeable message sign / radar speed trailer     |              |

### Type 2

Including but not limited to:

|                                    |                                 |
|------------------------------------|---------------------------------|
| A. Speed table                     | E. Raised crosswalk             |
| B. Chicane, angled slow point      | F. Median island/channelization |
| C. Choker, curb extension, bulbout | G. Traffic Circle               |
| D. Textured pavement/landscaping   |                                 |

### Type 3

Including but not limited to:

|               |                 |
|---------------|-----------------|
| A. Cul-de-sac | C. Road closure |
| B. Barricade  | D. Diverters    |

## TYPE 1 OPTIONS – APPLICATION PROCEDURES – SIGNING

***Additional information regarding Type 1 Options is located in Appendix 1.***

### A. Multi-way stop

1. Requests should be submitted directly to the Division of Traffic Engineering, through any Urban County Councilmember, or via the Urban County Government's Lexcall system.
2. Traffic Engineering staff will conduct a field review of the intersection and review the intersection's crash history to determine if there is sufficient evidence to conduct a study.
3. If sufficient field and/or crash evidence is discovered, staff will conduct the necessary warrant studies based on the federal criteria of the *Manual on Uniform Traffic Control Devices (MUTCD)* requirements. The MUTCD includes the following section on the warrants for multi-way stop sign installations:



#### **Taken from MUTCD Section 2B.07 Multi-Way Stop Applications**

##### **Guidance:**

The decision to install multi-way stop control should be based on an engineering study.

The following criteria should be considered in the engineering study for a multi-way STOP sign installation:

- A. Where traffic control signals are justified, the multi-way stop is an interim measure that can be installed quickly to control traffic while arrangements are being made for the installation of the traffic control signal.
- B. A crash problem, as indicated by 5 or more reported crashes in a 12-month period that are susceptible to correction by a multi-way stop installation. Such crashes include right- and left-turn collisions as well as right-angle collisions.
- C. Minimum volumes:
  1. The vehicular volume entering the intersection from the major street approaches (total of both approaches) averages at least 300 vehicles per hour for any 8 hours of an average day, and
  2. The combined vehicular, pedestrian, and bicycle volume entering the intersection from the minor street approaches (total of both approaches) averages at least 200 units per hour for the same 8 hours, with an average delay to minor-street vehicular traffic of at least 30 seconds per vehicle during the highest hour, but
  3. If the 85<sup>th</sup> percentile approach speed of the major-street traffic exceeds 40 mph, the minimum vehicular volume warrants are 70 percent of the above values.
- D. Where no single criterion is satisfied, but where Criteria B, C.1., and C.2 are all satisfied to 80 percent of the minimum values. Criterion C3 is excluded from this condition.

##### **Option:**

Other criteria that may be considered in an engineering study include:

- A. The need to control left-turn conflicts.
- B. The need to control vehicle/pedestrian conflicts near locations that generate high pedestrian volumes:
- C. Locations where a road user, after stopping, cannot see conflicting traffic and is not able to reasonably safely negotiate the intersection unless conflicting cross traffic is also required to stop: and
- D. An intersection of two residential neighborhood collector (through) streets of similar design and operating characteristics where multi-way stop control would improve traffic operational characteristics of the intersection.

Source – *Manual on Uniform Traffic Control Devices*

4. If Traffic Engineering staff does not find sufficient field or crash evidence, applicants will be required to submit a petition signed by 65% of the residents in the petition area in order to establish consensus among the residents most affected.
5. The petition area will be defined by the staff and include, at a minimum, residents within 500 feet of the intersection location.
6. The petition shall be completed within 90 calendar days. No amendments to the petition will be accepted once the petition process is closed. Once a study is completed through a determination through traffic engineering judgment or through a petition process, a new petition cannot be requested for 12 months. After 12 months, or if significant development or traffic pattern/volume changes have occurred within the study area during that time period, a new petition may be requested.
7. Upon the receipt of a successfully submitted petition, staff will submit findings of the warrant studies with approval or denial to the requesting party and/or appropriate Urban County Councilmember(s).

In the past, many neighborhoods have requested additional multi-way stop conditions for the purpose of providing traffic controls that would create logical segments of roadways where residents would have continuity in accessing other parts of their neighborhoods. For established neighborhoods multi-way stops could provide nodes where pedestrians would want to cross residential collector roadways. At the same time, these locations would need to meet drivers' expectations of a traffic control area.

The *MUTCD* states that stop signs should not be used for speed control. This indicates that over-usage of stop signs throughout a roadway corridor would not provide a speed reduction because an oversaturation of stop signs would not typically provide a traffic calming affect when compared to other traffic calming devices such as speed tables. The manual continues to state that stops signs should be installed in a manner that minimizes the number of vehicles having to stop. Section 2B.07 of the *MUTCD* states, "Safety concerns associated with multi-way stops include pedestrians, bicyclists, and all road users expecting other road users to stop." In keeping with the desires of neighborhoods to have a complete streets philosophy some manner of guidance is needed to (1) help promote neighborhood connectivity, (2) meet drivers' expectations for traffic controls, (3) apply guidelines that have direct input from Lexington Division of Police's experience of enforcement along a particular roadway, and (4) develop a relationship between unimpeded block lengths and speed. Unimpeded block lengths are the distances drivers travel along a street without being required to slow or stop. The following is an example of this relationship:

The following is a list of additional guidelines that can be considered when evaluating multi-way stops along residential collector streets:

1. Proposed multi-way stop locations should not be less than 0.25 miles (approximately 1,300 feet) away from an existing stopping or yield condition. No multi-way proposal under this condition will be considered if a new stop-segment of roadway is less than 1,000 feet.
2. Traffic volume must equal or exceed 1,000 vehicles per day for the major street approaches.
3. The number of vehicles along the non-stopping roadway should show that 25 percent of traffic volume exceeds the posted speed limit.
4. The number of vehicles along the non-stopping roadway should show that 10 percent of the vehicles exceeding the posted speed limit did so by 10 mph or more.

5. The Lexington Division of Police must approve proposed multi-way stops under these criteria.
6. Level Of Service (LOS) analysis for a proposed multi-way stop under these guidelines may be done in order to show what the traffic impact of the major roadway would be after an installation (LOS rating, delay times, stacking distances, etc.). The major roadway with a high amount of traffic volume with little interest in turning onto a minor roadway could present an unnecessary delay to motorists and possibly cause a less desirable intersection scenario than the current intersection configuration.
7. A petition with 65% of the residents and/or a neighborhood association's support must be documented showing to be in favor for a proposed multi-way stop.
8. Streets that are not residential collector streets but have a road width equal to or greater than 30 feet face-of-curb to face-of-curb for the major roadway can be considered for a multi-way stop application under these supplemental guidelines along with the addition that the 85<sup>th</sup> percentile speeds exceed the posted speed limit by 10 mph or more.

**B. Yield**

1. Requests should be submitted to the Division of Traffic Engineering, through any Urban County Councilmember, or via the Urban County Government's Lexcall system.
2. Traffic Engineering staff will conduct a field review of the intersection and review the intersection's crash history to determine if there is sufficient evidence to conduct a study.
3. If sufficient evidence is discovered, staff will conduct the necessary warrant studies based on *Manual of Uniform Traffic Control Devices (MUTCD)* requirements as shown below:

**Section 2B.09 YIELD Sign Applications****Option:**

YIELD signs may be installed:

- A. On the approaches to a through street or highway where conditions are such that a full stop is always required.
- B. At the second crossroad of a divided highway, where the median at the intersection is 30 feet or greater. In this case, a STOP or YIELD sign may be installed at the entrance to the first roadway of a divided highway, and a YIELD sign may be installed at the entrance to the second roadway.
- C. For a channelized turn lane that is separated from the adjacent travel lanes by an island, even if the adjacent lanes at the intersection are controlled by a highway traffic control signal or by a STOP sign.
- D. At an intersection where a special problem exists and where engineering judgment indicates the problem to be susceptible to correction by the use of the YIELD sign.
- E. Facing the entering roadway for a merge-type movement if engineering judgment indicates that control is needed because acceleration geometry and/or sight distance is not adequate for merging traffic operation.

**Standard:**

A YIELD sign shall be used to assign right-of-way at the entrance to a roundabout. Yield signs at roundabouts shall be used to control the approach roadways and shall not be used to control the circulatory roadway.

Other than for all of the approaches to a roundabout, YIELD signs shall not be placed on all of the approaches to an intersection.

Source – *Manual on Uniform Traffic Control Devices*

4. If sufficient field or crash evidence is not discovered, applicants will be required to submit a petition signed by 65% of the residents in the petition area in order to establish consensus among the residents most affected.
5. The petition area will be defined by the staff and will include, at a minimum, residents on each intersecting street a distance of one block from the proposed sign installation location.
6. The petition shall be completed within 90 calendar days. No amendments to the petition will be accepted once the petition process is closed. Once a study is completed through a determination through traffic engineering judgment or through a petition process, a new

petition cannot be requested for 12 months. After 12 months, or if significant development or traffic pattern/volume changes have occurred within the study area during that time period, a new petition may be requested.

7. Upon the receipt of a successfully submitted petition, staff will then submit findings of the warrant studies with approval or denial to the requesting party and/or appropriate Urban County Councilmember(s).

### C. Speed limits/reductions

1. Requests should be submitted to the Division of Traffic Engineering, through any Urban County Councilmember, or via the Urban County Government's Lexcall system.
2. Traffic Engineering staff will conduct a field and crash history review of the street and determine if there is sufficient evidence to proceed with a study.
3. If sufficient evidence is discovered, staff will conduct the necessary warrant studies based on *Manual of Uniform Traffic Control Devices (MUTCD)* requirements
4. If sufficient evidence is not discovered, applicants will be required to submit a petition signed by 65% of the residents in the petition area.
5. The petition area will be defined by the staff and will include, at a minimum, residents on the block(s) of the street on which the speed limit is to be reduced.
6. The petition shall be completed within 90 days. No amendments to the petition will be accepted once the petition process is closed. Once a study is completed through a determination through traffic engineering judgment or through a petition process, a new petition cannot be requested for 12 months. After 12 months, or if significant development or traffic pattern/volume changes have occurred within the study area within that time period, a new petition may be requested.
7. Staff will then submit findings of the study with approval or denial to the requesting party and/or appropriate Urban County Councilmember(s).



### D. No parking /parking prohibitions

1. Requests should be submitted to the Division of Traffic Engineering, through any Urban County Councilmember, or via the Urban County Government's Lexcall system.
2. Traffic Engineering may ask the Division of Fire and Emergency Services to review the street in question to see if there is a need to remove parking for safety purposes.
3. If the Division of Fire and Emergency Services does not find a need to remove parking for safety purposes, applicants will be required to submit a petition signed by 65% of the residents in the petition area.
4. The petition area will be defined by the staff and will include, at a minimum, residents on the block(s) of the street on which the no parking restriction is being requested.
5. The petition shall be completed within 90 days. No amendments to the petition will be accepted once the petition process is closed.



6. Please note that the Residential Permit Parking program is administered by the Lexington & Fayette County Parking Authority (Lexpark).

#### **E. No through trucks**

1. Requests should be submitted to the Division of Traffic Engineering, through any Urban County Councilmember, or via the Urban County Government's Lexcall system.
2. Applicants will be required to submit a petition signed by 65% of the residents in the petition area.
3. The petition area will be defined by the staff and will include, at a minimum, residents on the block(s) of the street on which the no through trucks sign is being requested.
4. The petition shall be completed within 90 days. No amendments to the petition will be accepted once the petition process is closed. Once a study is completed through the petition process, a new petition cannot be requested for 12 months. After 12 months, or if significant development or traffic pattern/volume changes have occurred within the study area within this time period, a new petition may be requested.
5. Upon the receipt of a successfully submitted petition, staff will then submit findings with approval or denial to the requesting party, the appropriate Urban County Councilmember(s), and/or the Mayor's Office.

#### **F. No outlet, and**

#### **G. Not a through street**

1. Requests for these types of signs should be submitted to the Division of Traffic Engineering, through any Urban County Councilmember, or via the Urban County Government's Lexcall system.
2. Sign(s) will be installed once verification of appropriate status for street in question is made.

#### **H. Cross traffic does not stop**

1. Requests should be submitted to the Division of Traffic Engineering, through any Urban County Councilmember, or via the Urban County Government's Lexcall system.
2. Basis of installation of this type of sign will be the existence of an identifiable accident problem due to a sight distance limitation or other circumstance.
3. Sign(s) will be installed once justification for installation is made.

#### **I. Specialty signs**

1. Requests should be submitted to the Division of Traffic Engineering, through any Urban County Councilmember, or via the Urban County Government's Lexcall system.
2. The installation of specialty signs to remind drivers of the 25mph speed limit will be based on whether 85th percentile speeds on a given street are shown to be at least 5-10mph higher than the posted 25mph speed limit. Please note that these signs are intended only for installation on streets with existing 25mph speed limits.
3. Sign(s) will be installed once justification for implementation is made.



## **TYPE 1 OPTIONS – APPLICATION PROCEDURES – PAVEMENT MARKINGS**

1. Requests should be submitted to the Division of Traffic Engineering, through any Urban County Councilmember, or via the Urban County Government's Lexcall system.
2. Options for pavement markings include, but are not limited to, double yellow centerlines, white edgelines, white lane lines (solid or skip), crosswalks, stop bars, yield bars, yellow curbs, and rumble strips. Other MUTCD compliant types of pavement markings not listed may also be considered.
3. Traffic Engineering staff will conduct a field review, gather pertinent data, and make a determination for the requested pavement markings
4. Staff may present findings, if necessary, to the requesting party, the appropriate Councilmember(s), and/or the Urban County Council Environmental Quality & Public Works Committee for approval/denial/modification.

## TYPE 1 OPTIONS – APPLICATION PROCEDURES – ENFORCEMENT/EDUCATION

### A. Increased police presence (selective enforcement)

1. Requests should be submitted to the Division of Traffic Engineering, through any Urban County Councilmember, to the Division of Police, or via the Urban County Government's Lexcall system.
2. The Division of Police can be contacted by Traffic Engineering to schedule selective enforcement for the street in question.



### B. Changeable message sign/radar speed trailer

1. Requests should be submitted through any Urban County Councilmember, to the Division of Police, or via the Urban County Government's Lexcall system.
2. The Division of Police can be contacted by Traffic Engineering to schedule the use of the radar speed trailer to inform motorists of their travel speed on the street in question.

### C. Education

1. Requests should be submitted to the Division of Traffic Engineering, through any Urban County Councilmember, to the Division of Police, or via the Urban County Government's Lexcall system.
2. Representatives from the Division of Traffic Engineering and/or Division of Police can be invited to speak to a Neighborhood Association or some other interested group of citizens or students to discuss traffic calming techniques, the Neighborhood Traffic Management Program, and/or the general activities and responsibilities of the Division of Traffic Engineering.

## TYPE 2 OPTIONS – APPLICATION PROCEDURES

### First Steps/Petition Circulation

1. Applicant should contact the Division of Traffic Engineering directly, or through their Councilmember or Lexcall to discuss the neighborhood traffic problem.
2. Traffic Engineering staff explains the program including petition process, cost sharing, and provides copy to applicant.
3. Traffic Engineering staff works with neighborhood residents to identify the petition area.
4. Applicant circulates petition within identified petition area. Applicant must obtain signatures of more than 65% of property owners in the petition area.
5. Upon obtaining the necessary signatures, applicant completes application materials and returns them to Traffic Engineering within 90 days of the date of the letter sent along with the petition. Samples of Form A (NTMP Project Application Form) and Form B (NTMP Petition Form) are included in Appendices 2 and 3.

### Procedures

1. Receipt of NTMP Application and Petition – see Form A in Appendix 2 and Form B in Appendix 3.

The Division of Traffic Engineering receives an application along with the necessary petition and signatures of more than 65% of property owners in the defined petition area within 90 days of the date on the letter included with the packet. Traffic Engineering Staff notifies appropriate councilmember of successful petition.

2. Preliminary Analysis

The Division of Traffic Engineering identifies study area, collects preliminary information, and completes traffic analysis. The criteria to be used by staff in evaluating the severity of the identified problem(s) shall include, but not be limited to:

- *Minimum Vehicular Volume*

Local residential:

- A. Daily Traffic Volumes greater than or equal to 1,000 vehicles per day or Peak Hour Volumes greater than or equal to 100 vehicles per hour.
- B. Daily Traffic Volumes greater than or equal to 750 vehicles per day with at least 25 percent of vehicles traveling at speeds in excess of the posted speed limit, and where 10 percent of the vehicles traveling at speeds in excess of the posted speed limit by 10 mph or more.
- C. Daily Traffic Volumes that show 75 percent of the number of vehicles traveling along the roadway are exceeding the posted speed limit, and where the 85<sup>th</sup> percentile speeds exceeds the posted speed limit by 10 mph or more.
- D. Local residential streets that do not have sidewalks, or any other pedestrian linkages.

Residential Collector:

Average Daily Traffic volume is greater than or equal to 3,000 vehicles per day or  
Peak Hour volume is greater than or equal to 300 vehicles per hour.

- *Crashes - Pedestrian, Bicycles, Autos*

Local Residential/Residential Collector: Crashes for which a police report can be verified and which are susceptible to correction by means of traffic calming devices.

- *Intersection Volumes*

Local Residential: Average Daily Traffic greater than 3,000 vehicles per day.

Residential Collector: Average Daily Traffic greater than 9,000 vehicles per day.

3. Neighborhood Workshop

The Division of Traffic Engineering may schedule a neighborhood workshop to form a Traffic Team, discuss the problems(s), discuss the results of the preliminary analysis, and to educate the neighborhood. The neighborhood appoints one to four representatives to work with the staff as members of the Traffic Team.

4. Development of NTMP Project

The Division of Traffic Engineering and neighborhood representatives may evaluate the problem(s) and develop one or more suitable NTMP projects using various traffic calming techniques. Landscaping treatments included in the NTMP project may be considered based upon neighborhood participation in the installation and maintenance of the desired plantings.

5. Presentation of NTMP Project to Neighborhood

The Division of Traffic Engineering may schedule a second neighborhood workshop, notifies residents in the study area and present the alternative projects. The neighborhood residents attending the workshop must reach a consensus on support for the project.

6. Petition Card Circulation by Staff

After alternate traffic management plans are presented to the neighborhood association, the division will mail petition cards to each property owner to verify agreement with the chosen alternative. Sixty-five percent (65%) of the petition cards need to be returned with positive responses for the verification to be validated. These cards will need to be returned to Traffic Engineering within three weeks (21 days) from the date on the associated letter included with the petition card.

7. Lexington-Fayette Urban County Council Presentation

Based on the findings of the Division of Traffic Engineering and neighborhood representative and the neighborhood consensus, the division prepares a report and recommendation for action by the Urban County Council's Environmental Quality & Public Works Committee.

## 8. Project Design and Implementation

With favorable action by the Urban County Council, the Division of Traffic Engineering schedules the design and implementation of NTMP within budgetary constraints. Certain techniques may be installed for a test period while others will be installed permanently. Test projects will be monitored and evaluated for effectiveness. A monitoring period, measurable objectives and performance measures should be established on a case by case basis.

## 9. Monitoring

Immediately following the installation of the project, the Division of Traffic Engineering will begin evaluation of the project, including field observations, traffic counts, speed studies and other data collection as needed. If the project has not met its objectives within the monitoring period six to twelve months following installation, the division will notify the neighborhood representatives. The division and the neighborhood representatives may then develop alternative solutions (return to steps 4 or 5).

## 10. Failure to meet criteria

If the preliminary analysis results do not warrant Type 2 or Type 3 traffic calming techniques, the petition card circulation results are less than 65% favorable, or the Urban County Council does not act favorably on a NTMP project, then a new petition cannot be requested for 12 months. After 12 months, or if significant development or traffic pattern/volume changes have occurred within the study area within that time period, a new petition may be requested.

# TYPE 2 OPTIONS – DESCRIPTIONS

***Additional information regarding Type 2 Options is located in Appendix 1.***

## **A. Speed table**

Speed tables are vertical traffic calming devices with an incline, plateau, and decline located in the street. Discomfort increases as speed over the table increases. Typically speed tables are placed in a series rather than singularly. Speed tables are gradual changes in the roadway surface usually 22-24 feet long and 3.5 inches high and differ dramatically from speed bumps that were traditionally installed on private property or speed humps which are shorter from end to end. Speed bumps and speed humps tend to jolt a vehicle and can cause damage or loss of control if taken at excessive speed. Speed tables have little effect on a vehicle driving the posted speed limit, but produce discomfort when the speed limit is exceeded. Speed tables are generally placed approximately 300 feet apart and require signage and pavement markings in each direction that warns the driver to slow down. Speed tables are effective in reducing speed while not creating hazards to emergency response, transit, or public works vehicles.

**B. Chicane, angled slow point**

Chicanes or angled slow points are deviations in the course of travel so that the street is not a straight line through the installation of offset curb extensions. These devices alter the sight lines and/or linear progression of motorists along straight neighborhood streets. This alteration can influence motorists to reduce speeds. This technique blends the physical and psychological to affect driver behavior. These are best used when staggered on opposite sides of the street at regular intervals.

**C. Choker, curb extension, bulbout**

The use of chokers, curb extensions, or bulbouts will physically narrow the street in order to expand sidewalks, landscaping, or to delineate on street parking areas. These devices narrow the pavement by widening the sidewalk area at strategic locations. They provide shorter pedestrian crossing distances and provide protection to the beginning of a parking lane. The driver also senses the roadway narrowing when approaching one of these devices which can result in speed reduction and a sense that the driver is entering a residential area.

**D. Textured pavement/landscaping and****E. Raised crosswalk**

Landscaping includes but is not limited to: street trees, median treatments, corner treatments, decorative signs, park benches, and pathways. Textured pavement is a change of the road surface from the standard asphalt that may include, but is not limited to, interlocking brick, concrete pavers, or colored or stamped asphalt. Textured pavement and landscaping can influence driver behavior and reduce speeds. These treatments could also be used in conjunction with other traffic calming techniques such as speed tables which alter the vertical alignment of the roadway, but will assist in indicating a change in the driving environment.

**F. Median island / channelization**

Small median traffic islands installed at intersections or midblock locations to channelize traffic or prohibit turning movements. These devices are designed to eliminate certain movements by constructing concrete or landscaped islands at strategic locations. Left turns are no longer possible when these items are placed down the center of a road. Installation of these devices may result in a reduction in traffic congestion as certain movements are no longer possible.

**G. Traffic circle**

Traffic circles are raised circular areas (similar to medians) placed at intersections. Drivers travel in a counterclockwise direction around the circle. Traffic circles are “yield upon entry,” meaning that cars in the circle have the right of way and cars entering the circle must wait to do so until the path is clear. When a traffic circle is placed in an intersection, vehicles may not travel in a straight line. Traffic circles are raised concrete or landscaped islands that are placed in the center of an intersection. They require that vehicles change course while proceeding through an intersection and this generally results in a speed reduction. Intersections containing traffic circles must have adequate street lighting and signage to provide advance visibility and warning for the required change of course.

## TYPE 3 OPTIONS - APPLICATION PROCEDURES

Resolution No. 339-81, adopted by the Lexington-Fayette Urban County Council on November 12, 1981, addresses the procedures for requesting to dead-end a public street.

### Procedures

#### Resolution No. 339-81

##### I. Administration Action

- A. Any request to create a dead-end street by erecting a barricade at one end of a public street shall be made to the Chief Administrative Officer. Each such request shall be in writing, shall set forth the reasons for the request and shall include the signatures and addresses of all persons making the request. The Chief Administrative Officer may require additional information if he deems it appropriate. A copy of any such request shall be sent to the Councilmember in whose district the street in question is located.
- B. Upon receipt of any such request for barricading a public street, the Chief Administrative Officer will request, through the respective Commissioners, reports concerning the request from the Division of Police, Division of Fire Protection, Division of Traffic Engineering and any other office he deems appropriate. Within a reasonable time thereafter, each of the Division Directors shall make a report to his Commissioner, for the latter's review and recommendation to the Chief Administrative Officer shall forward the same to the Vice-Mayor with his comments.

##### II. Council Committee Action

- A. Upon receipt of a request to barricade a public street from the Chief Administrative Officer, the Vice-Mayor shall place the item on the agenda of the next regular or special meeting of the appropriate committee, at which time will be available for discussion of the request. The Council Administrator shall by mail notify all of the signers of the request, as well as the Commissioners and Division Directors of the appropriate departments, of the time set for this discussion. Following discussion at the designated committee meeting, it shall by majority vote of the committee members present be decided whether to set a public meeting on the request or whether to recommend to the full Council in Work Session that the request be denied without a public meeting.
- B. If it is decided to hold a public meeting, the Council Administrator shall make arrangements for public notification of the same through the Council Clerk by newspaper publication not less than seven (7) nor more than twenty-one (21) days prior to the date of the public meeting. In addition thereto, the Council Administrator shall, insofar as he is able to determine their identity, notify all property owners and residents of the area to be affected by mail. At the time it is decided to hold a public meeting on a given request, it shall also be decided by majority vote of the Councilmembers present which properties shall receive notice letters from the Council Administrator.
- C. Any public meeting held pursuant to this procedure shall not be required to be held in conjunction with a regular or special meeting of the committee to which it was referred nor shall it be necessary for a quorum of the committee to be in attendance at the public meeting. However, the Council Administrator shall make note of the opinions expressed at the public meeting and shall make the same available to all interested Councilmembers.

- D. Following the public meeting and following receipt of the Council Administrator's notes by all interested Councilmembers, the Chairman of the committee shall place the item on the agenda of the next regular or special meeting of the committee at which time will be available for discussion of the request. At that time, the committee shall by majority vote of those present recommend to the full Council in Work Session whether or not to proceed with the proposed barricading. If a consensus cannot be reached among those present, the item shall be referred to the full Council in Work Session without a recommendation. Any favorable report from the committee shall include a draft resolution prepared by the Department of Law.
- E. At any time in the committee process, the procedure may be halted by the committee in order to secure additional information.

### III. Full Council Action

Upon receipt of the report of the committee concerning any request for barricading of a public street, the ordinary process for Council action as specified in the Rules and Procedures shall apply.

### IV. Other

- A. If at any time in the process it appears to the Commissioner of Law that any doubt exists as to the public purpose of the proposed street closing, he shall promptly so advise the administration and the Council.
- B. This procedure shall only apply to requests to create a dead-end street by erecting a barricade at one end of the street. Thus, it shall not apply to the erection of any street control devices, signs, etc., for which responsibility is already vested by law in the various departments, divisions and offices of the Urban County Government.

## TYPE 3 OPTIONS – DESCRIPTIONS

*Additional information regarding Type 3 Options is located in Appendix 1.*

- A. Cul-de-sac,**
- B. Barricade, and**
- C. Road closure**

Road closures in general, or through the use of a cul-de-sac or a barricade treatment, are used to close a street to motor vehicles through the use of planters, bollards, barriers, or some other device. The closure of a street can either be performed at a mid-block location or at an existing intersection. Such closures are intended to completely block access from one end of a local street. This will result in major reductions in vehicular speeds and volumes. However, these reductions can result in increases on adjacent parallel streets and therefore must be very carefully considered. Closing a road is likely to create problems for emergency vehicle access. Adequate turnaround should be provided where the street is closed to help with vehicle turnarounds.

### **D. Diverters**

Diverters are barriers that are used at intersections to prohibit a particular turning movement. A diagonal diverter is a barrier that is placed diagonally across a four legged intersection, which results in the elimination of through movements and turning conflicts. The resulting intersection resembles two back to back curves. This type of barrier may be used to create a maze-like effect in a neighborhood. Diagonal diverters reduce traffic volumes while still allowing access and circulation through the neighborhood. A diagonal diverter may be constructed with access points for pedestrians, bicycle traffic, and emergency vehicles.

A semi-diverter or star-diverter is the physical blockage of one or more directions of traffic on a two way-street at an intersection. The open lane of traffic is signed “one way,” and traffic from the blocked lane is not allowed to go around the barrier. These devices limit access to a street from one or more directions through the use of curbs or other vertical devices. They may also be constructed to limit certain movements at an intersection. Semi-diverters are generally effective in reducing traffic in the direction they block but are still able to allow emergency access. Star-diverters are also generally effective in reducing traffic but will block some access to emergency vehicles.

## APPENDIX 1 - TRAFFIC MANAGEMENT TECHNIQUES

Traffic management techniques can be broken down into four distinct areas which are as follows:

### **Type 1 – Education / Enforcement Techniques (Pages 21-24)**

- Education
- Speed Enforcement – Selective Enforcement
- Speed Enforcement – Speed Trailer
- Prohibitive Signage – Pavement Markings

### **Type 2 – Mid-Block Techniques (Pages 25-31)**

- Speed Table
- Chicanes, Angled Slow Points – Series
- Chicanes, Angled Slow Points – Point Locations
- Chokers, Curb Extensions, or Bulbouts
- Textured Pavement/Landscaping
- Textured Pavement/Landscaping – Raised Walkway/Mid Block
- Median Island, Channelization – Mid Block

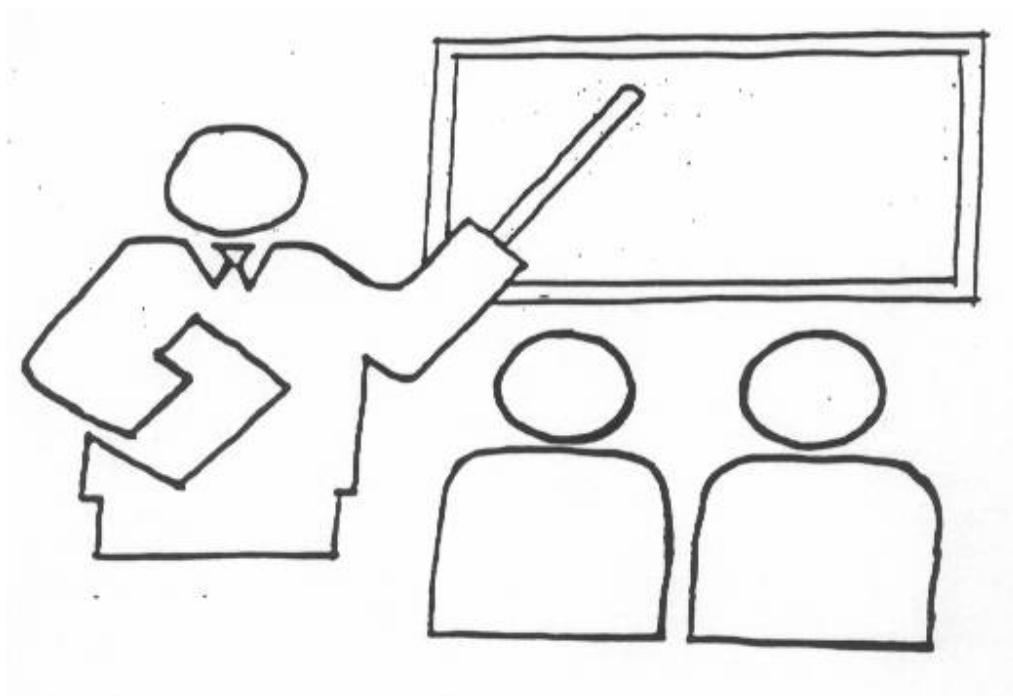
### **Type 2 – Intersection Techniques (Pages 32-38)**

- Median Island/Channelization – At Intersection
- Median Island/Channelization – T-Intersection
- Median Island/Channelization – Across Intersection
- Textured Pavement, Landscaping – Entry Treatment
- Textured Pavement, Landscaping – Raised Intersection/Speed Table
- Chokers, Curb Extensions, or Bulb-outs - Intersection
- Traffic Circle

### **Type 3 – Closures / Restriction Techniques (Pages 39-44)**

- Cul-de-sac – Mid Block
- Cul-de-sac/Barricade – Intersection
- Diagonal Diverter
- Diagonal Diverter – Emergency Access
- Semi-Diverter
- Star-Diverter

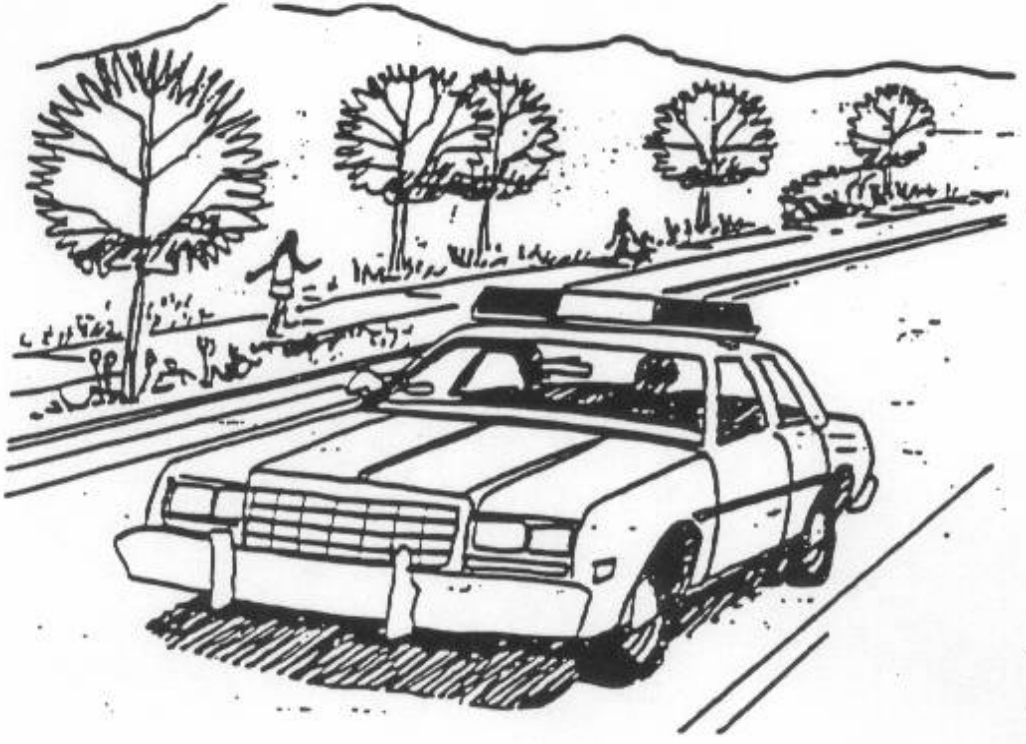
## TYPE 1 – EDUCATION/ENFORCEMENT TECHNIQUES EDUCATION



| Advantages                                                                                                                                                                                              | Disadvantages                                                                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Can be relatively effective, and relatively inexpensive</li> <li>• Involves and empowers citizens</li> <li>• Works well with other mitigation tools</li> </ul> | <ul style="list-style-type: none"> <li>• Not likely to be as effective on non-neighborhood traffic</li> <li>• May be difficult to measure effectiveness</li> <li>• Can be expensive and/or time consuming</li> <li>• May take time to be effective</li> <li>• Effectiveness may decrease over time</li> </ul> |

| Evaluation Considerations |                 |                   |                  |           |                |                    |
|---------------------------|-----------------|-------------------|------------------|-----------|----------------|--------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost | Emergency Services |
| Possible Improvements     | Possible        | N/A               | N/A              | N/A       | Low            | No Effect          |

## SPEED ENFORCEMENT – SELECTIVE ENFORCEMENT



| Advantages                                                                                                                                                                                         | Disadvantages                                                                                                           |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Good temporary public relations tool</li> <li>• Serves to inform public that speeding is undesirable behavior for which there are consequences</li> </ul> | <ul style="list-style-type: none"> <li>• Effect is not permanent</li> <li>• Enforcement is an expensive tool</li> </ul> |

| Evaluation Considerations |                   |                   |                  |           |                |                    |
|---------------------------|-------------------|-------------------|------------------|-----------|----------------|--------------------|
| Safety                    | Speed Reduction   | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost | Emergency Services |
| Improvements              | Depends on Amount | No Effect         | No Change        | No Effect | Varies         | No Effect          |

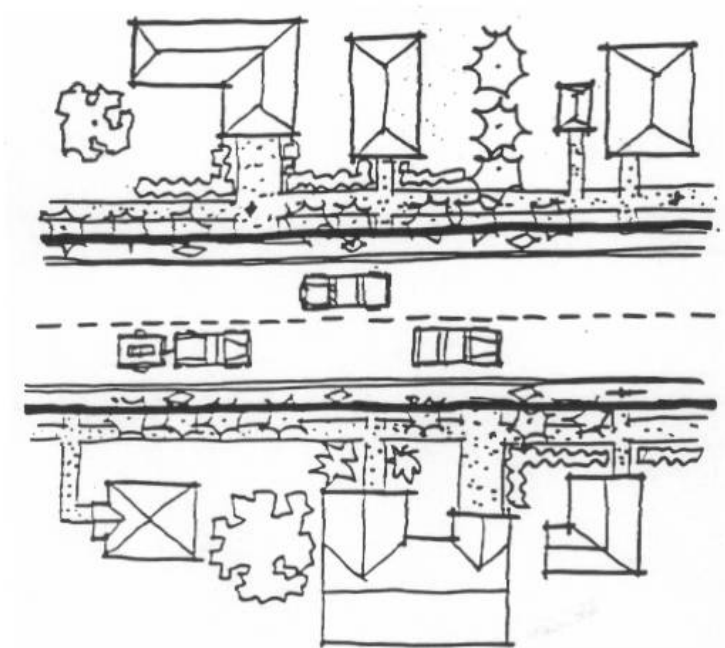
## SPEED ENFORCEMENT – SPEED TRAILER



| Advantages                                                                                                                                                                                                            | Disadvantages                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Educational tool</li> <li>• Very good public relations tool</li> <li>• Useful especially in school and construction zones where spot speed reduction is important</li> </ul> | <ul style="list-style-type: none"> <li>• Requires periodic enforcement</li> <li>• Effective for limited duration</li> <li>• Unit moves frequently which require personnel</li> </ul> |

| Evaluation Considerations |                 |                   |                  |           |                |                    |
|---------------------------|-----------------|-------------------|------------------|-----------|----------------|--------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost | Emergency Services |
| Possible Improvements     | Yes             | No Effect         | No Change        | No Effect | Low            | No Effect          |

## PROHIBITIVE SIGNAGE / PAVEMENT MARKINGS

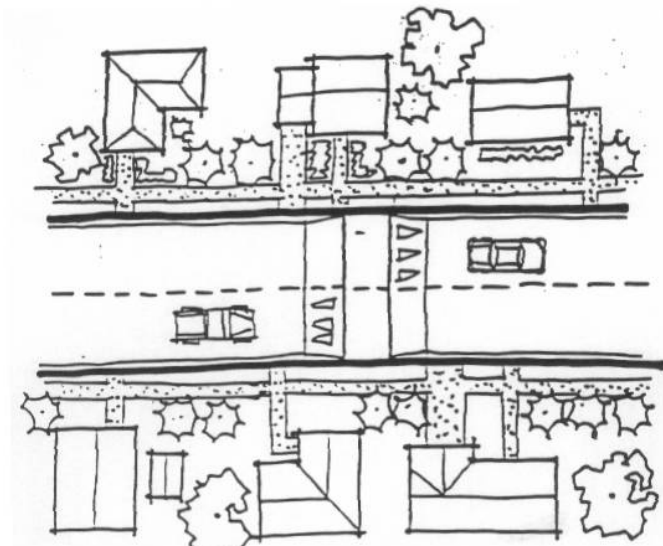


| Advantages                                                                                                                                                                                    | Disadvantages                                                                                                   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Inexpensive</li> <li>• May reduce speed</li> <li>• Edge treatment increases safety of cyclists and pedestrians</li> <li>• Low maintenance</li> </ul> | <ul style="list-style-type: none"> <li>• May not be as effective as other more structured techniques</li> </ul> |

| Evaluation Considerations |                 |                   |                  |           |                |                    |
|---------------------------|-----------------|-------------------|------------------|-----------|----------------|--------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost | Emergency Services |
| Possible Improvements     | Possible        | No                | No Effect        | No Effect | Low            | No Effect          |

## TYPE 2 – MID BLOCK TECHNIQUES

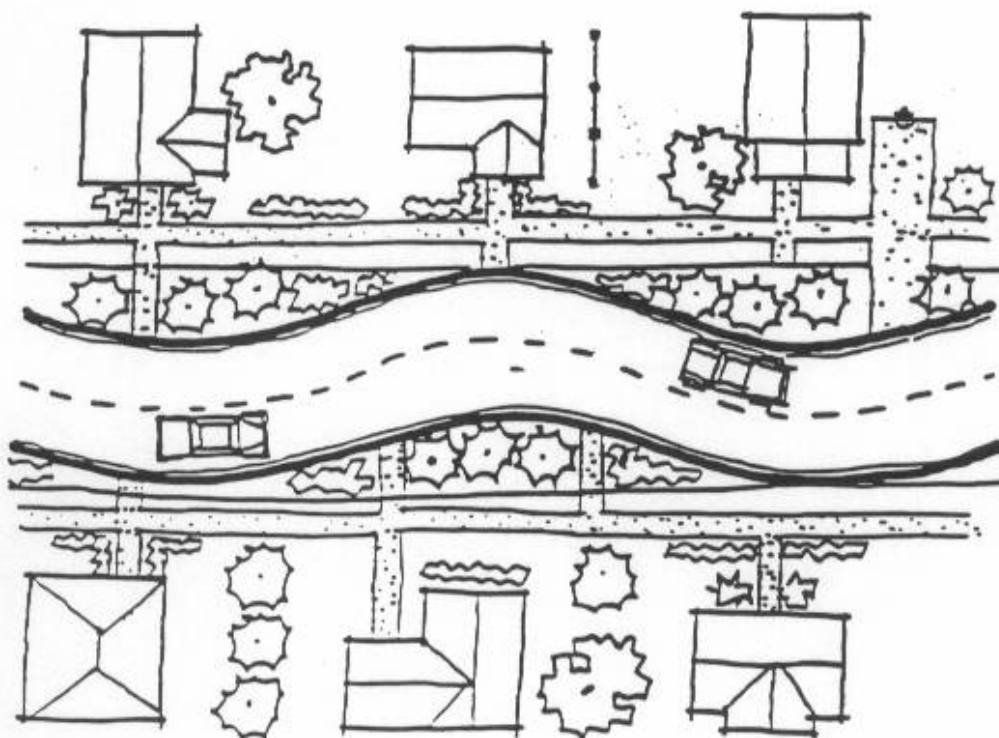
### SPEED TABLE



| Advantages                                                                                                                                                                                                        | Disadvantages                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Reduces vehicle speeds in the vicinity of the table without increasing crashes. Better is used in a series at 300' to 500' spacing.</li> <li>• Self enforcing</li> </ul> | <ul style="list-style-type: none"> <li>• May create noise particularly if there are loose items in the vehicle or trailer</li> <li>• If not properly designed, drivers may try to skirt around to avoid impact</li> <li>• May be a problem for emergency vehicles</li> <li>• May impact drainage</li> <li>• Drivers may speed up between speed tables</li> <li>• May increase volumes on other streets</li> <li>• Difficult to properly construct</li> <li>• Requires signage that may be considered unsightly</li> </ul> |

| Evaluation Considerations |                 |                   |                  |                |                              |                                 |
|---------------------------|-----------------|-------------------|------------------|----------------|------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost               | Emergency Services              |
| Possible Improvements     | Yes             | Possible          | Small Increase   | Small Increase | \$4500 - \$6000 per location | Response times may be increased |

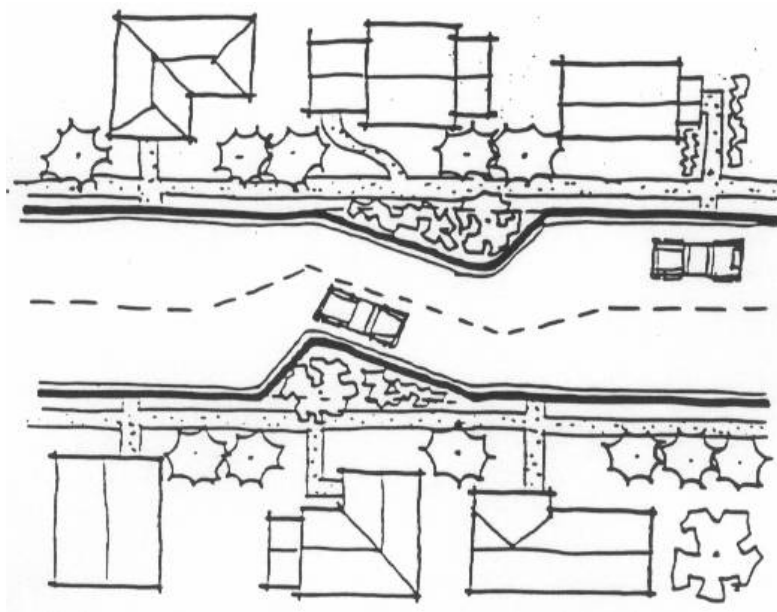
## CHICANES, ANGLED SLOW POINTS – SERIES



| Advantages                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Disadvantages                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Imposes minimal inconveniences to local traffic</li> <li>• Pedestrians have a reduced crossing distance</li> <li>• Provides large area for landscaping</li> <li>• Cost of device is limited by length</li> <li>• A very effective method of changing the initial impression of the street. If done correctly drivers will not be able to see through. Appears as a road closure yet allows through movement.</li> <li>• Accepted by public as speed control device</li> <li>• Aesthetically pleasing</li> <li>• Reduces speed without significantly impacting emergency response</li> </ul> | <ul style="list-style-type: none"> <li>• Increases the area of landscaping to be maintained by residents</li> <li>• Cost is greater than many other devices, therefore better to be installed in conjunction with street reconstruction or initial design</li> <li>• May create opportunities for head-on conflicts on narrow streets</li> </ul> |

| Evaluation Considerations |                 |                   |                  |                |                                  |                                 |
|---------------------------|-----------------|-------------------|------------------|----------------|----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                   | Emergency Services              |
| Possible Improvements     | Yes             | Possible          | Small Increase   | Small Increase | \$7,500 to \$25,000 per location | Response times may be increased |

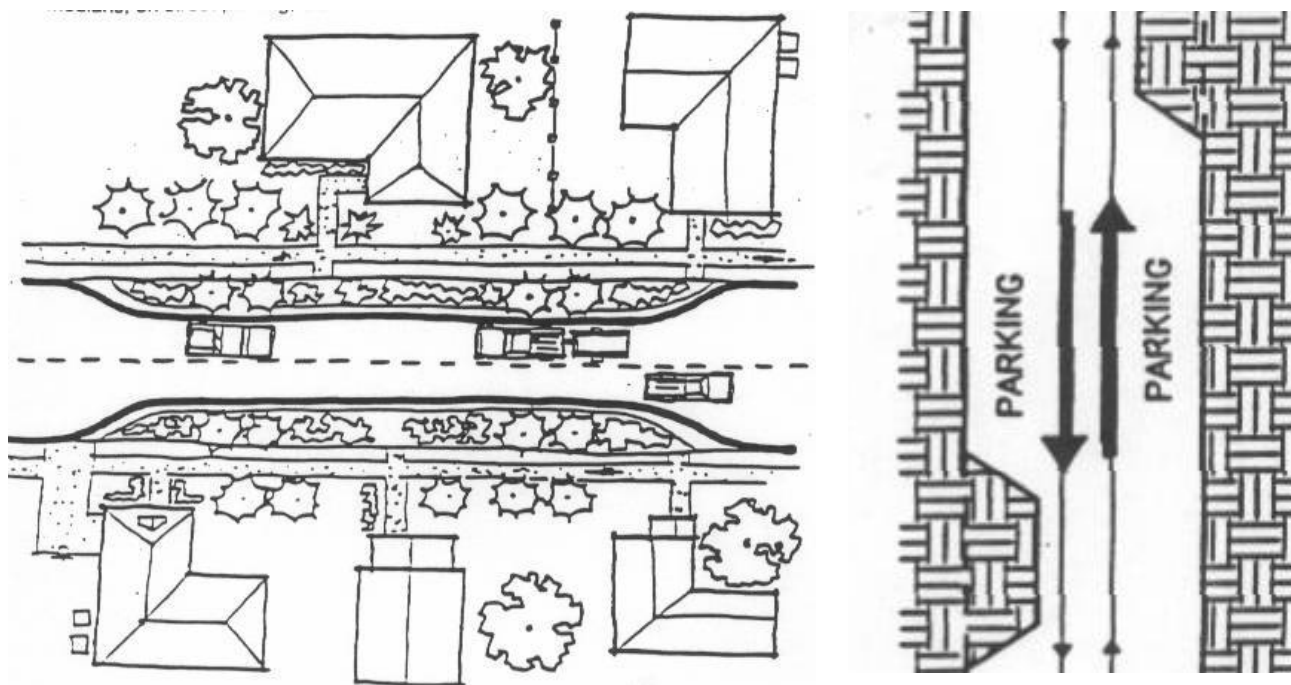
## CHICANES, ANGLED SLOW POINTS – POINT LOCATIONS



| Advantages                                                                                                                                                                                                                                                                                                                      | Disadvantages                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Reduces vehicle speed</li> <li>• More effective when used in a series</li> <li>• Imposes minimal inconveniences to local traffic</li> <li>• Pedestrians have a reduced crossing distance</li> <li>• Provides space for landscaping</li> <li>• Provides a visual obstruction</li> </ul> | <ul style="list-style-type: none"> <li>• Landscaping needs to be controlled to ensure visibility is reduced</li> <li>• Contrary to driver expectation of unobstructed flow</li> <li>• Can be hazardous for drivers and cyclists if not designed and maintained properly</li> <li>• Confrontation between opposing drivers arriving simultaneously may create problems</li> <li>• Double lane application is less effective in controlling speeds than single lane because drivers can create a straighter through movement by driving over centerlines.</li> <li>• Increases area of landscaping to be maintained by residents</li> </ul> |

| Evaluation Considerations |                 |                   |                  |                |                                  |                                 |
|---------------------------|-----------------|-------------------|------------------|----------------|----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                   | Emergency Services              |
| Possible Improvements     | Yes             | Possible          | Small Increase   | Small Increase | \$7,500 to \$25,000 per location | Response times may be increased |

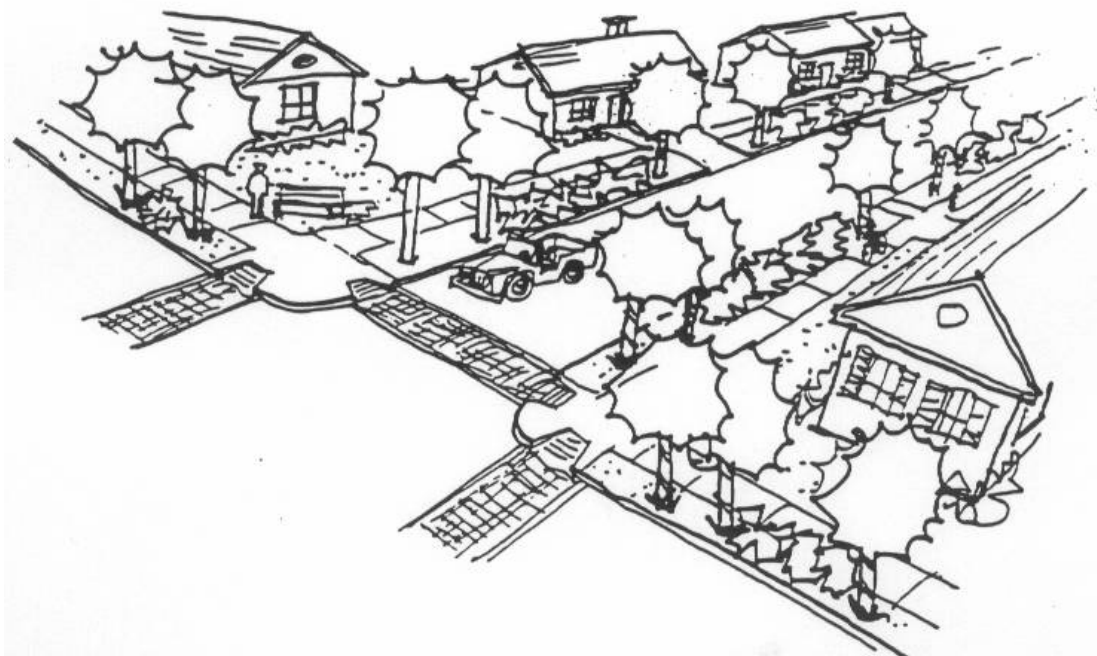
## CHOKERS, CURB EXTENSIONS, OR BULBOUTS



| Advantages                                                                                                                                                                                                                                                                                                                                                                                                                                          | Disadvantages                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Minor inconvenience to drivers</li> <li>• Minimal inconveniences to local traffic</li> <li>• Good for pedestrians due to shorter crossing distance</li> <li>• Provides space for landscaping</li> <li>• Slows traffic without seriously affecting emergency response time</li> <li>• Effective when used in a series</li> <li>• Single lane narrowing reduces vehicle speed and through traffic</li> </ul> | <ul style="list-style-type: none"> <li>• Double lane narrowing not very effective at reduced speeds or diverting through traffic</li> <li>• Only partially effective as a visual obstruction</li> <li>• Unfriendly to cyclists unless designed to accommodate them</li> <li>• Conflict between opposing drivers arriving simultaneously could create problems</li> </ul> |

| Evaluation Considerations |                 |                   |                  |                |                                   |                    |
|---------------------------|-----------------|-------------------|------------------|----------------|-----------------------------------|--------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                    | Emergency Services |
| Possible Improvements     | Yes             | Possible          | Small Increase   | Small Increase | \$10,000 to \$25,000 per location | No Effect          |

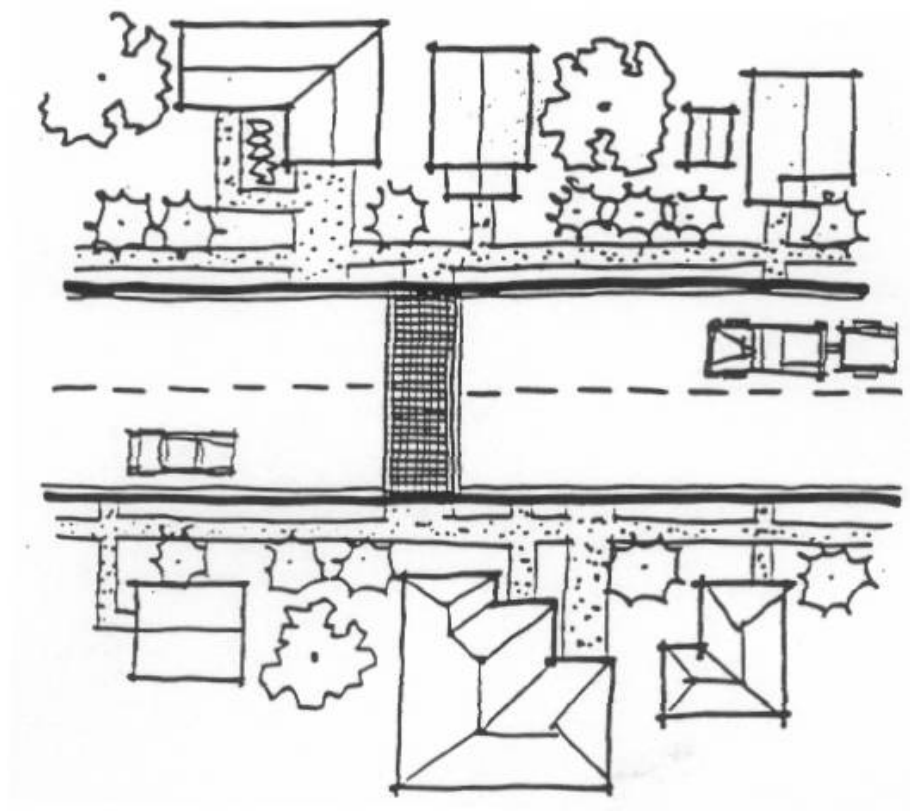
## TEXTURED PAVEMENT/LANDSCAPING



| Advantages                                                                                                                                                                                                                                                                  | Disadvantages                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Can be used to make drivers aware of speed</li> <li>• Improve aesthetics and gives neighborhood an opportunity to be creative with their response to traffic concerns</li> <li>• Alerts drivers to change in conditions</li> </ul> | <ul style="list-style-type: none"> <li>• High maintenance responsibility. This can be eliminated if the community is responsible for maintaining the landscaping</li> </ul> |

| Evaluation Considerations |                 |                   |                  |           |                                   |                    |
|---------------------------|-----------------|-------------------|------------------|-----------|-----------------------------------|--------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost                    | Emergency Services |
| Possible Improvements     | Possible        | No                | No Change        | No Effect | \$12,000 to \$50,000 per location | No Effect          |

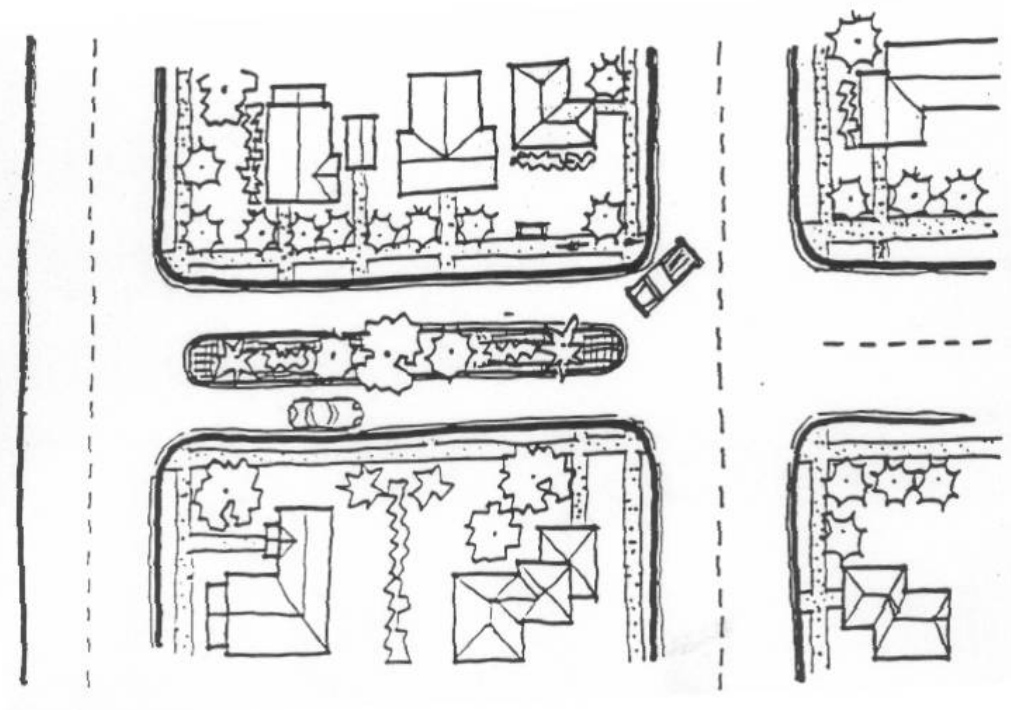
## TEXTURED PAVEMENT / LANDSCAPING – RAISED WALKWAY/MID BLOCK



| Advantages                                                                                                                             | Disadvantages                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• May be aesthetically pleasing</li> <li>• May be used to define pedestrian crossing</li> </ul> | <ul style="list-style-type: none"> <li>• Increased maintenance</li> </ul> |

| Evaluation Considerations |                 |                   |                  |           |                                  |                    |
|---------------------------|-----------------|-------------------|------------------|-----------|----------------------------------|--------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost                   | Emergency Services |
| Possible Improvements     | Possible        | No Effect         | No Change        | No Effect | \$3,000 to \$12,000 per location | Possible Problems  |

## MEDIAN ISLAND / CHANNELIZATION – MID BLOCK

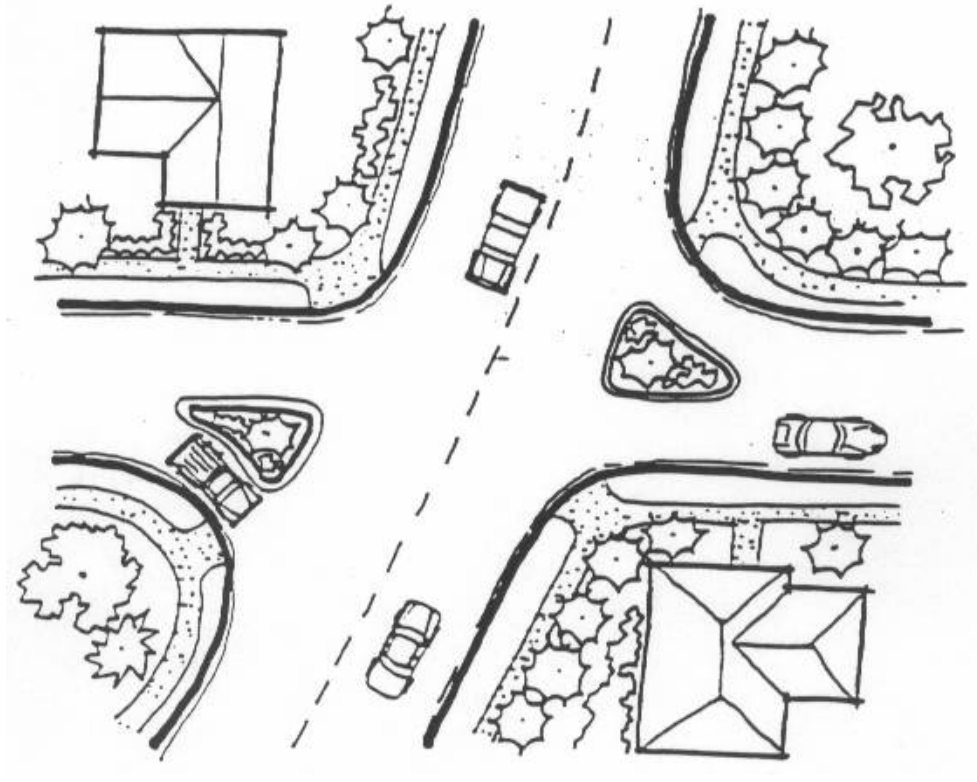


| Advantages                                                                                                                                                                                                                                                                                 | Disadvantages                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Provides a refuge for pedestrians and cyclists crossing the street</li> <li>• May improve streetscape if landscaped</li> <li>• Provides barrier between lanes of traffic</li> <li>• May produce a limited reduction in vehicles speeds</li> </ul> | <ul style="list-style-type: none"> <li>• May reduce sight lines if over landscaped</li> <li>• Increased maintenance</li> </ul> |

| Evaluation Considerations |                 |                   |                  |           |                                  |                                 |
|---------------------------|-----------------|-------------------|------------------|-----------|----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost                   | Emergency Services              |
| Possible Improvement      | No              | Possible          | No Effect        | No Effect | \$7,500 to \$30,000 per location | Response times may be increased |

## TYPE 2 – INTERSECTION TECHNIQUES

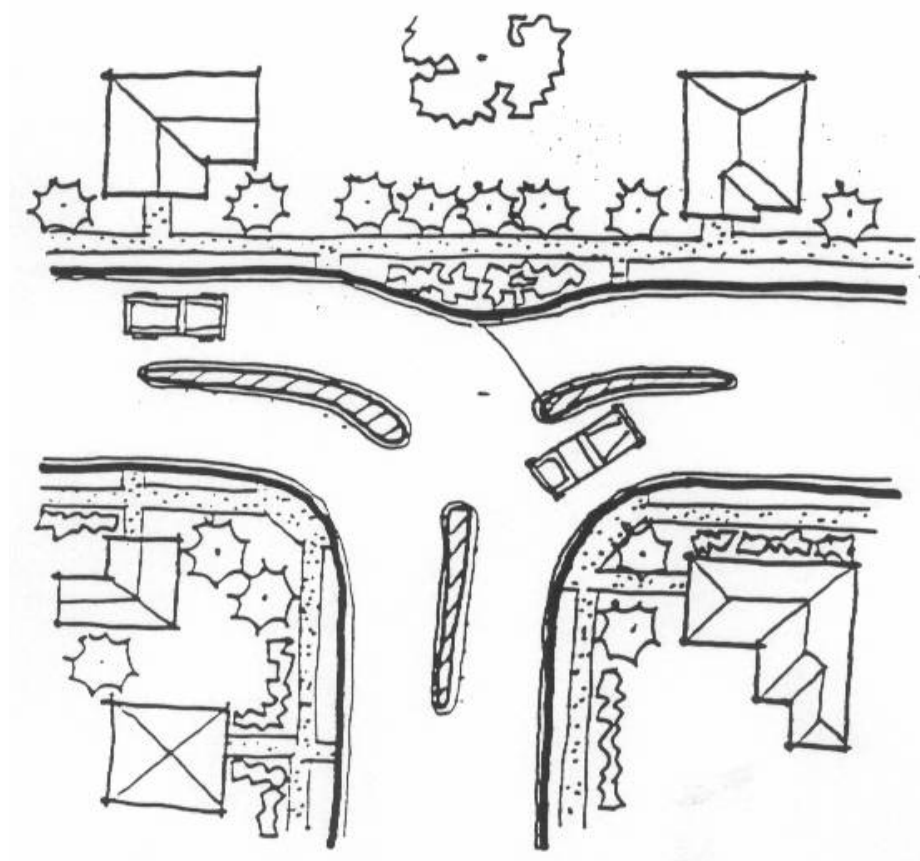
### MEDIAN ISLAND / CHANNELIZATION AT INTERSECTION



| Advantages                                                                                                                                                                                                                                                                                      | Disadvantages                                                                                                                                       |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Reduces vehicle speed</li> <li>• Reduces through traffic along top of tee</li> <li>• Necessary to enforce changes in priority from one street to another</li> <li>• May reduce traffic volumes</li> <li>• May provide space for landscaping</li> </ul> | <ul style="list-style-type: none"> <li>• Can cause confusion regarding priority movements</li> <li>• Increased maintenance if landscaped</li> </ul> |

| Evaluation Considerations |                 |                   |                  |                |                                  |                    |
|---------------------------|-----------------|-------------------|------------------|----------------|----------------------------------|--------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                   | Emergency Services |
| Possible Improvements     | Yes             | Possible          | Small Increase   | Small Increase | \$7,500 to \$25,000 per location | No Effect          |

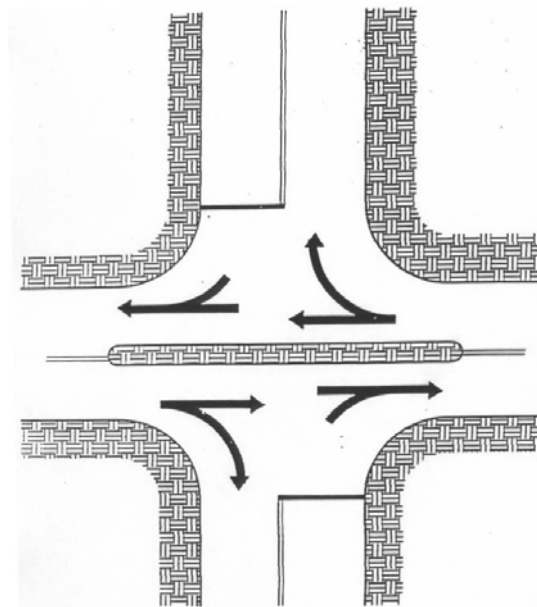
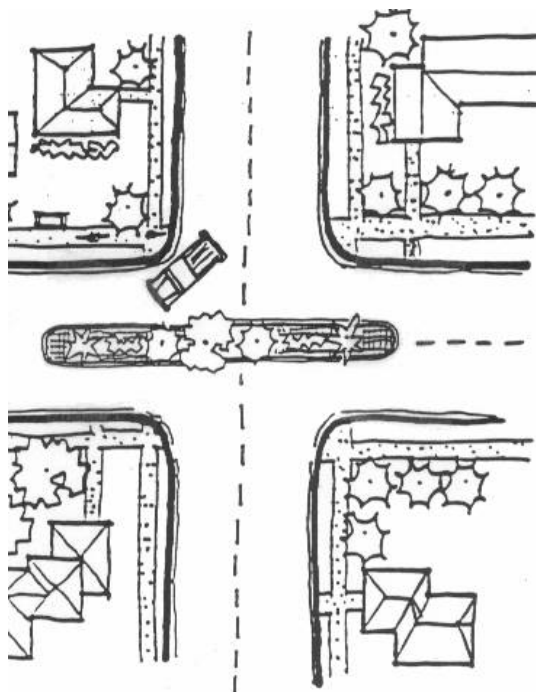
## MEDIAN ISLAND / CHANNELIZATION T-INTERSECTION



| Advantages                                                                                                                                                        | Disadvantages                                                                                                                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Changes driving patterns</li> <li>• May reduce cut-through traffic</li> <li>• May be attractive if landscaped</li> </ul> | <ul style="list-style-type: none"> <li>• May increase trip length for some drivers</li> <li>• Can be aesthetically unattractive if not landscaped</li> <li>• May increase response times for emergency vehicles</li> <li>• Maintenance responsibility if landscaped</li> </ul> |

| Evaluation Considerations |                 |                   |                  |                |                                  |                                 |
|---------------------------|-----------------|-------------------|------------------|----------------|----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                   | Emergency Services              |
| Possible Improvements     | Possible        | Yes               | Small Increase   | Small Increase | \$7,500 to \$25,000 per location | Response times may be increased |

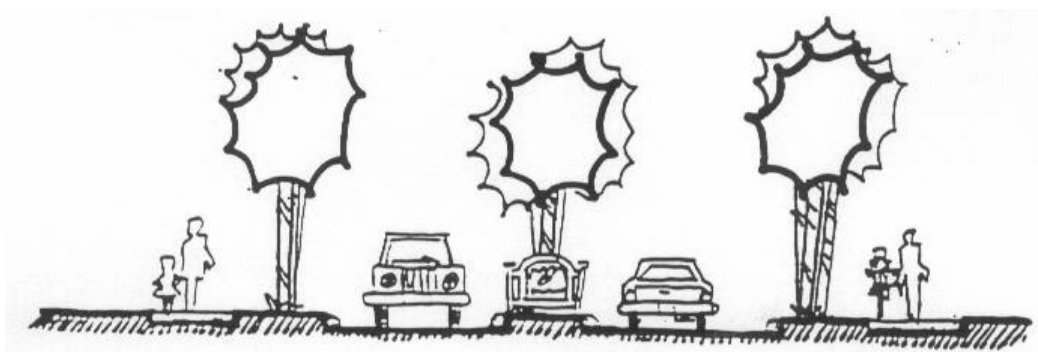
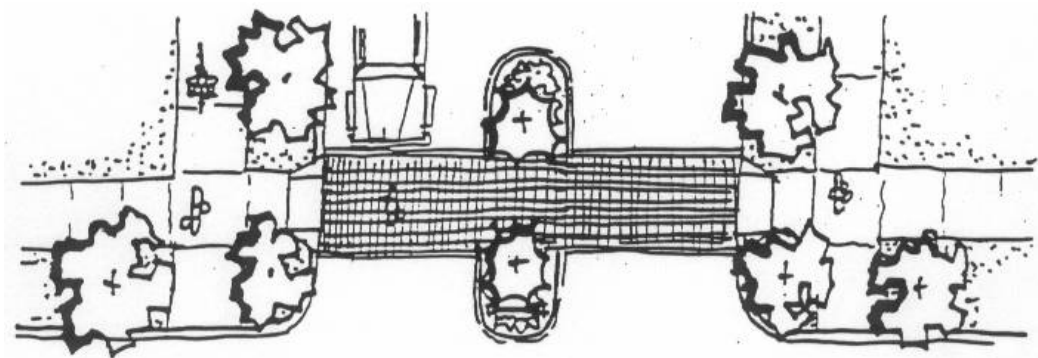
## MEDIAN ISLAND / CHANNELIZATION ACROSS INTERSECTION



| Advantages                                                                                                                                                                                                                                                                                       | Disadvantages                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Provides a refuge for pedestrians and cyclists</li> <li>May improve streetscape if landscaped</li> <li>Provides barrier between lanes of traffic</li> <li>May reduce traffic volumes</li> <li>May produce a limited reduction in vehicle speed</li> </ul> | <ul style="list-style-type: none"> <li>May reduce sight lines if over landscaped</li> <li>Increased maintenance</li> </ul> |

| Evaluation Considerations |                 |                   |                  |           |                                  |                                 |
|---------------------------|-----------------|-------------------|------------------|-----------|----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost                   | Emergency Services              |
| Possible Improvements     | No              | Possible          | No Effect        | No Effect | \$7,500 to \$30,000 per location | Response times may be increased |

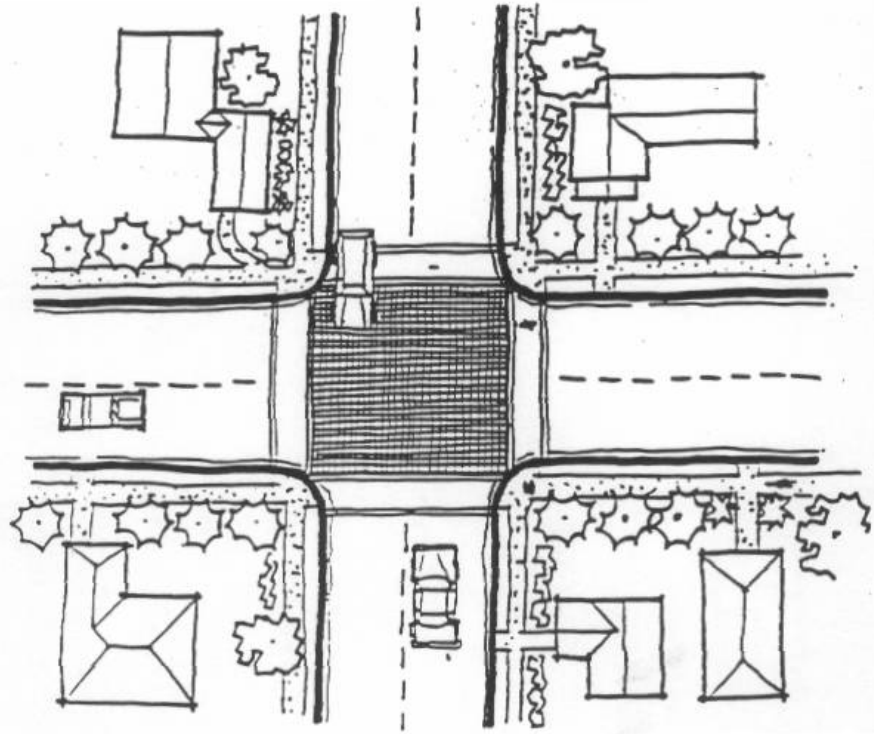
## TEXTURED PAVEMENT/LANDSCAPING ENTRY TREATMENT



| Advantages                                                                                                                                                                                                                                                                                                                                                                                                                         | Disadvantages                                                                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Positive indication of a change in environment from arterial road to residential street</li> <li>• Reduces entry speed</li> <li>• Reduces pedestrian crossing distances</li> <li>• On very wide streets provides space for landscaping the median</li> <li>• Helps give neighborhood a sense of identity</li> <li>• Allows neighborhood creativity and participation in design</li> </ul> | <ul style="list-style-type: none"> <li>• Maintenance responsibility</li> </ul> |

| Evaluation Considerations |                 |                   |                  |           |                                  |                                 |
|---------------------------|-----------------|-------------------|------------------|-----------|----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost                   | Emergency Services              |
| Possible Improvements     | Unlikely        | Mixed Results     | No Change        | No Effect | \$5,000 to \$20,000 per location | Response times may be increased |

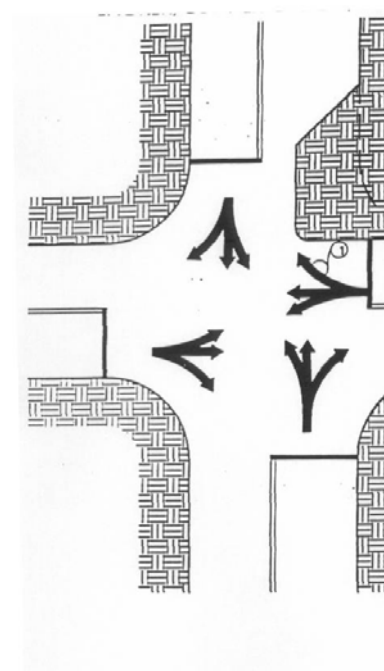
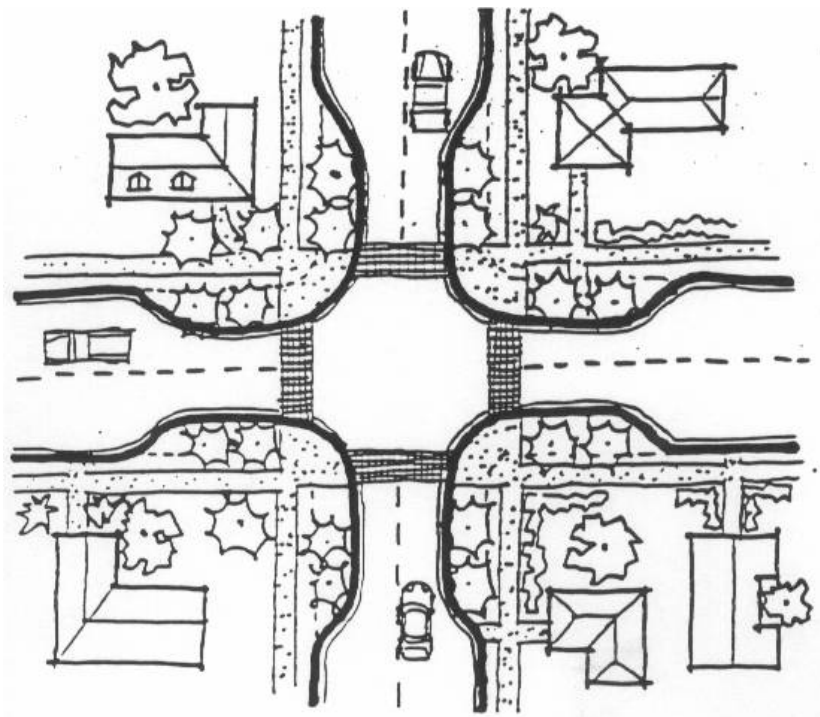
## TEXTURED PAVEMENT / LANDSCAPING RAISED INTERSECTION/SPEED TABLE



| Advantages                                                                                                                                                                                                                                                                                                                                                                              | Disadvantages                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Slows vehicle in the most critical area and therefore helps to make conflict avoidance easier</li> <li>• Highlights intersection</li> <li>• Excellent pedestrian safety treatment</li> <li>• Aesthetically pleasing if well designed</li> <li>• Effective speed reduction, better for emergency vehicles than speed humps or tables</li> </ul> | <ul style="list-style-type: none"> <li>• Increases difficulty of making a turn</li> <li>• Increased maintenance</li> <li>• Requires adequate signage and driver education</li> </ul> |

| Evaluation Considerations |                 |                   |                  |                |                                   |                                 |
|---------------------------|-----------------|-------------------|------------------|----------------|-----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                    | Emergency Services              |
| Possible                  | Yes             | Possible          | Small Increase   | Small Increase | \$25,000 to \$75,000 per location | Response times may be increased |

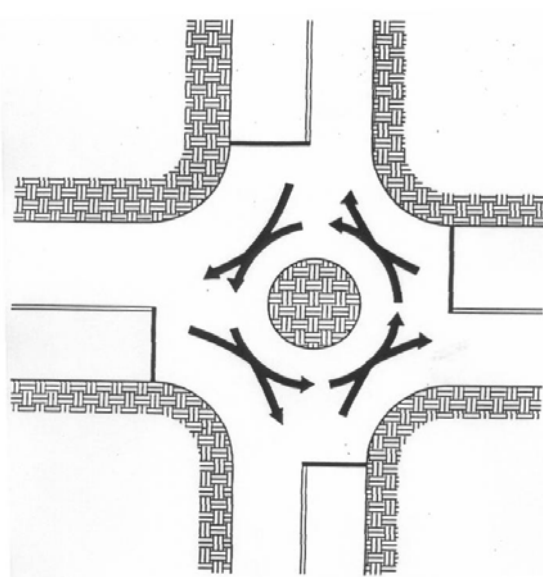
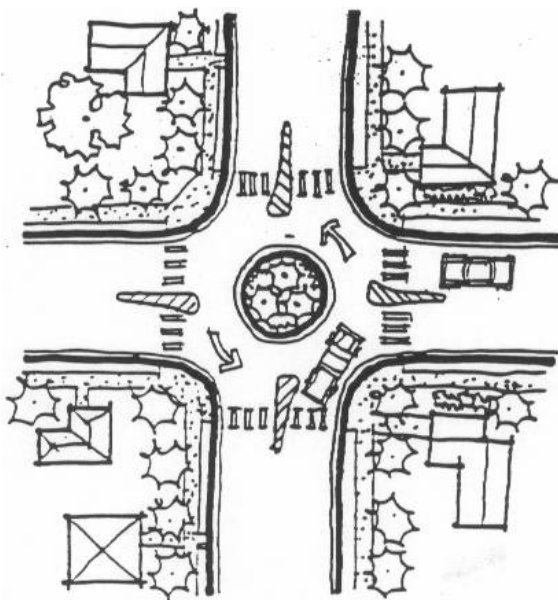
## CHOKERS, CURB EXTENSIONS, OR BULBOUTS – INTERSECTION



| Advantages                                                                                                                                                                                                                                         | Disadvantages                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• May be aesthetically pleasing if landscaped</li> <li>• Good for pedestrians due to shorter crossing distance</li> <li>• Can be used in multiple applications or on a single segment of roadway</li> </ul> | <ul style="list-style-type: none"> <li>• Unfriendly to cyclists unless designed to accommodate them</li> <li>• Landscaping may cause sight line problems</li> <li>• Increased maintenance if landscaped</li> </ul> |

| Evaluation Considerations |                 |                   |                  |                |                                       |                                 |
|---------------------------|-----------------|-------------------|------------------|----------------|---------------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                        | Emergency Services              |
| Possible Improvements     | Yes             | Possible          | Small Increase   | Small Increase | \$40,000 to \$60,000 per intersection | Response times may be increased |

## TRAFFIC CIRCLE

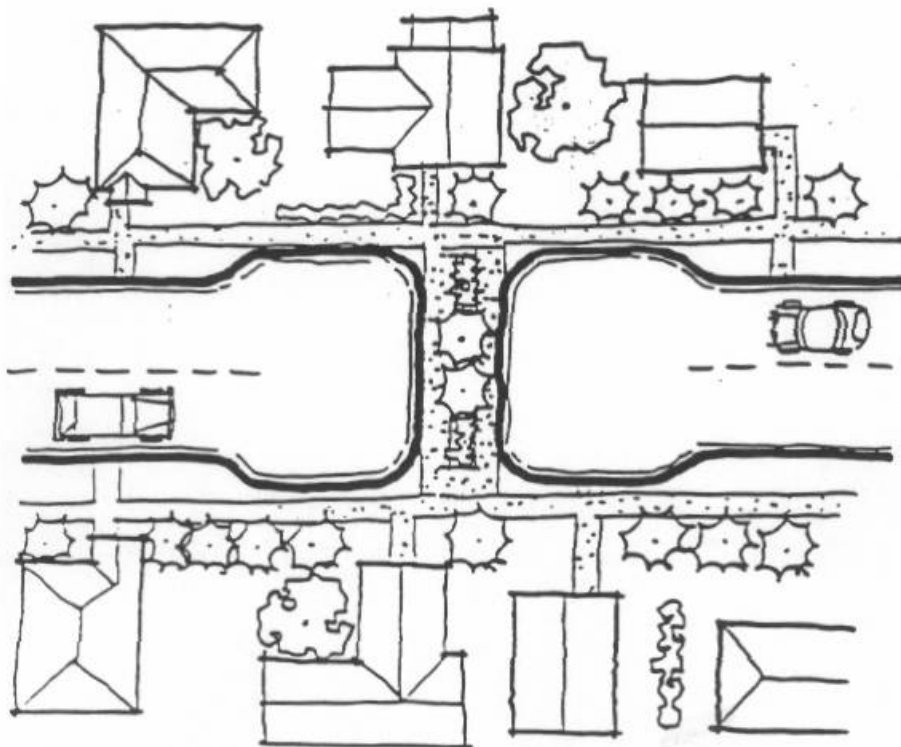


| Advantages                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Disadvantages                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• May reduce crashes by 50 to 90 percent when compared to 2-way, 4-way stop signs, and traffic signals by reducing the number of conflict points at intersections</li> <li>• Reduces speed at intersection approach</li> <li>• Longer speed reduction influence zones</li> <li>• Provides space for landscaping</li> <li>• Cheaper to maintain than a traffic signal</li> <li>• Effective at multi-leg intersections</li> <li>• Provides equal access to intersections for all drivers</li> <li>• Does not restrict movements, but makes them more difficult</li> </ul> | <ul style="list-style-type: none"> <li>• May be restrictive for larger vehicles if designed to a low speed. Providing a mountable apron minimizes limitation</li> <li>• May require additional lighting and signage</li> <li>• If left turns by large vehicles are to be accommodated then right-of-way may have to be purchased</li> <li>• Initial safety issues as drivers adjust</li> <li>• Maintenance responsibility if landscaped</li> </ul> |

| Evaluation Considerations |                     |                   |                  |           |                                  |                                 |
|---------------------------|---------------------|-------------------|------------------|-----------|----------------------------------|---------------------------------|
| Safety                    | Speed Reduction     | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost                   | Emergency Services              |
| Slightly improved         | Yes at Intersection | Possible          | No Effect        | No Change | \$6,000 to \$22,000 per location | Response times may be increased |

## TYPE 3 – CLOSURES/RESTRICTION TECHNIQUES

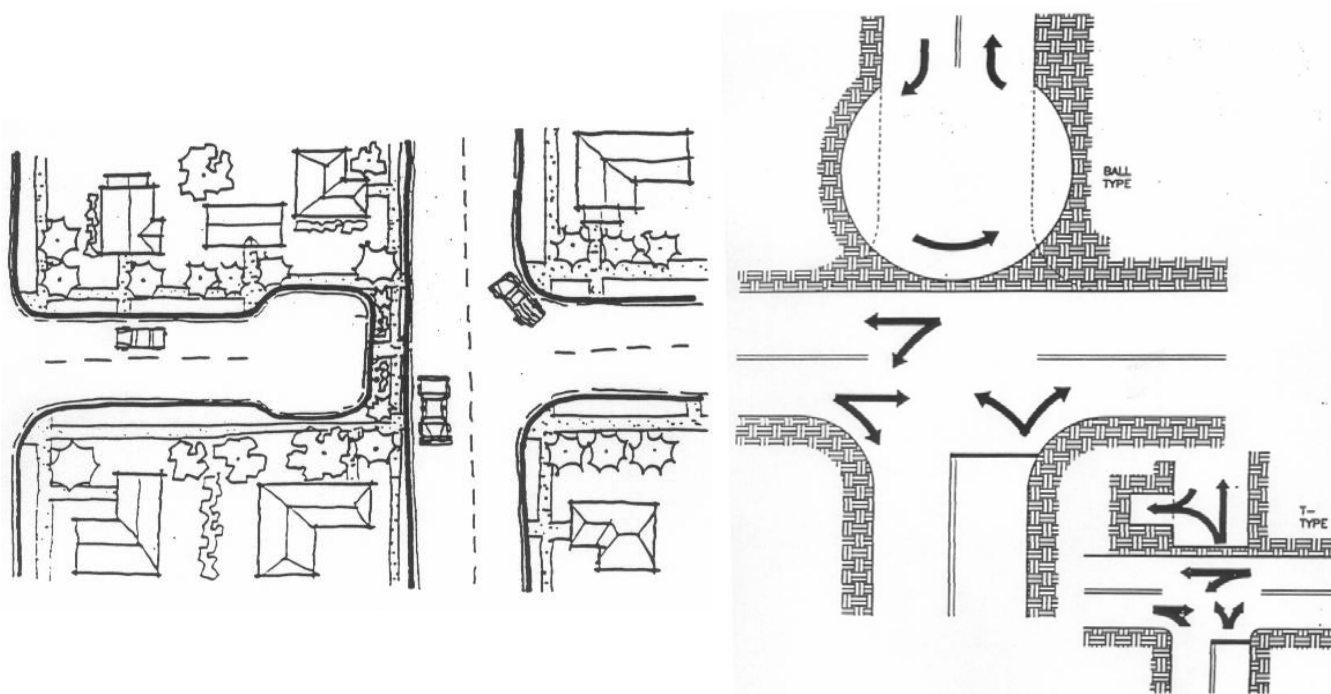
### CUL-DE-SAC – MID BLOCK



| Advantages                                                                                                                                                                                                                                  | Disadvantages                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Eliminates through traffic</li> <li>• Reduces speed of the remaining vehicles</li> <li>• Improves safety for all the street users</li> <li>• Pedestrian and bicyclist access maintained</li> </ul> | <ul style="list-style-type: none"> <li>• Reduces emergency vehicle access</li> <li>• Reduces access to properties for residents</li> <li>• May be perceived as inconvenient by some neighbors and unwarranted restriction by the general public</li> <li>• May increase trip lengths</li> <li>• May increase volumes on other streets</li> </ul> |

| Evaluation Considerations |                 |                   |                  |           |                                   |                                 |
|---------------------------|-----------------|-------------------|------------------|-----------|-----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost                    | Emergency Services              |
| Possible Improvements     | Yes             | Yes               | Slight Increase  | No Effect | \$10,000 to \$40,000 per location | Response times may be increased |

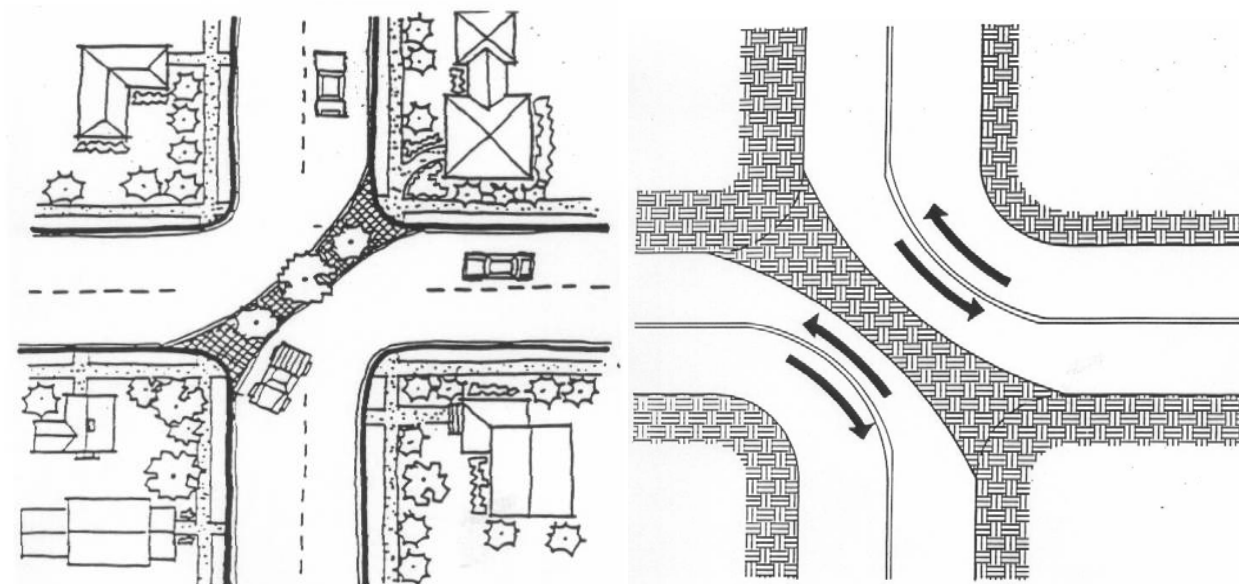
## CUL-DE-SAC/BARRICADE – INTERSECTION



| Advantages                                                                                                                                                                                                                                  | Disadvantages                                                                                                                                                                                                                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Eliminates through traffic</li> <li>• Reduces speed of the remaining vehicles</li> <li>• Improves safety for all the street users</li> <li>• Pedestrian and bicyclist access maintained</li> </ul> | <ul style="list-style-type: none"> <li>• Reduces emergency vehicle access</li> <li>• Reduces access to properties for residents</li> <li>• May be perceived as inconvenient by some neighbors and unwarranted restriction by the general public</li> <li>• May increase trip lengths</li> <li>• May increase volumes on other streets</li> </ul> |

| Evaluation Considerations |                 |                   |                  |           |                                   |                                 |
|---------------------------|-----------------|-------------------|------------------|-----------|-----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution | Estimated Cost                    | Emergency Services              |
| Possible Improvements     | Yes             | Yes               | Slight Increase  | No Effect | \$10,000 to \$60,000 per location | Response times may be increased |

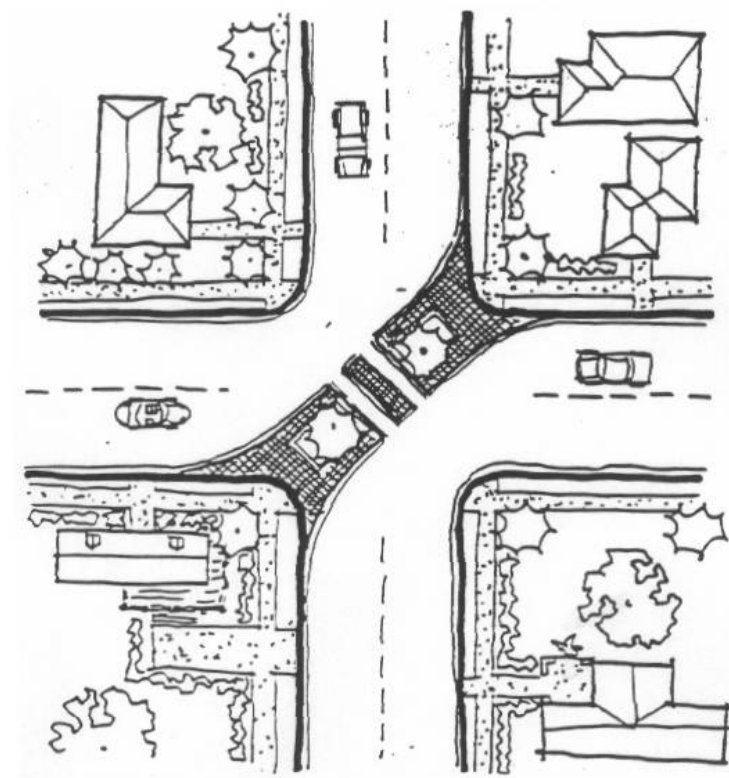
## DIAGONAL DIVERTER



| Advantages                                                                                                                                                                                                                                               | Disadvantages                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Eliminates through traffic</li> <li>• Provides area for landscaping</li> <li>• Reduces traffic conflict points</li> <li>• Increases pedestrian safety</li> <li>• Can include bicycle path connection</li> </ul> | <ul style="list-style-type: none"> <li>• May inconvenience residents gaining access to their properties</li> <li>• May inhibit access by emergency vehicles</li> <li>• May divert through traffic to other local streets</li> <li>• Altered traffic patterns may increase trip length</li> </ul> |

| Evaluation Considerations |                 |                   |                  |                |                                   |                                 |
|---------------------------|-----------------|-------------------|------------------|----------------|-----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                    | Emergency Services              |
| Possible Improvements     | Yes             | Yes               | Slight Increase  | Small Increase | \$10,000 to \$60,000 per location | Response times may be increased |

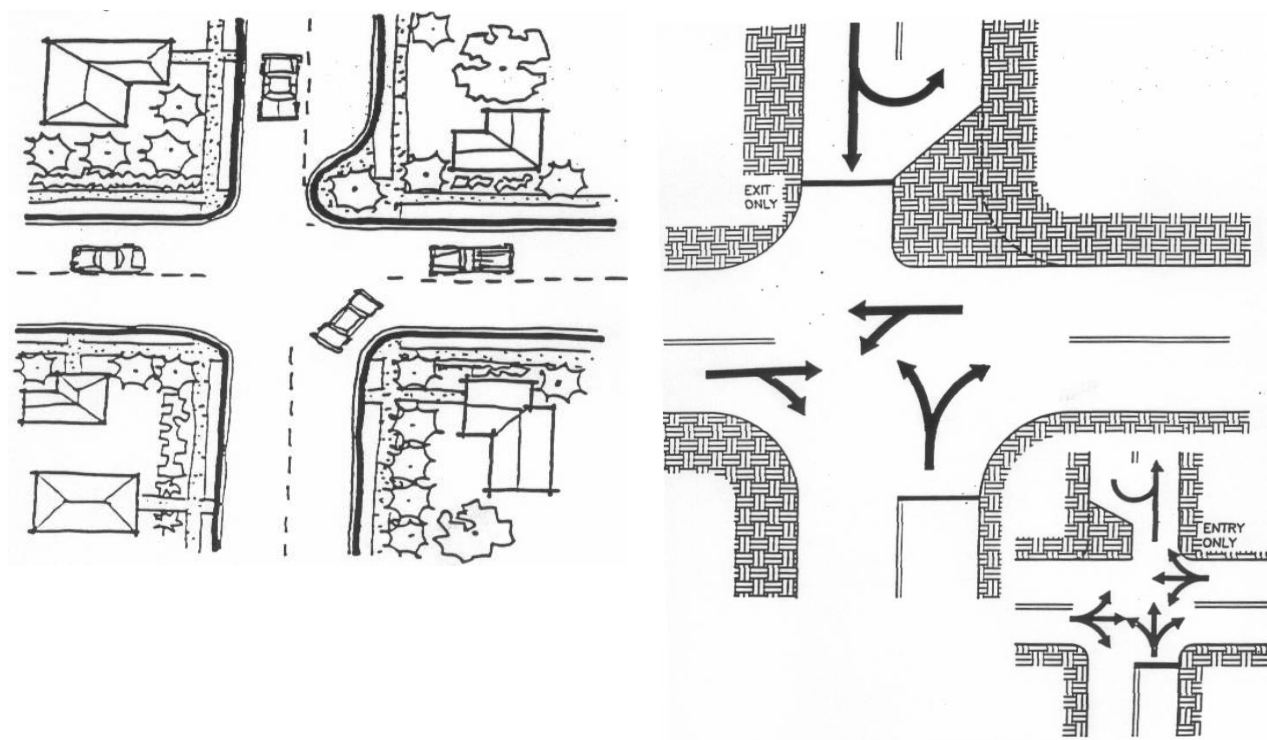
## DIAGONAL DIVERTER – EMERGENCY ACCESS



| Advantages                                                                                  | Disadvantages                                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Reduces or eliminates cut through traffic</li> </ul> | <ul style="list-style-type: none"> <li>May inconvenience residents gaining access to their properties</li> <li>Depending on design may be subject to violation by unauthorized vehicles</li> <li>Altered traffic patterns may increase trip length</li> </ul> |

| Evaluation Considerations |                 |                   |                  |                |                                   |                                 |
|---------------------------|-----------------|-------------------|------------------|----------------|-----------------------------------|---------------------------------|
| Safety                    | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                    | Emergency Services              |
| Improvements              | Yes             | Yes               | Slight Increase  | Small Increase | \$10,000 to \$60,000 per location | Response times may be increased |

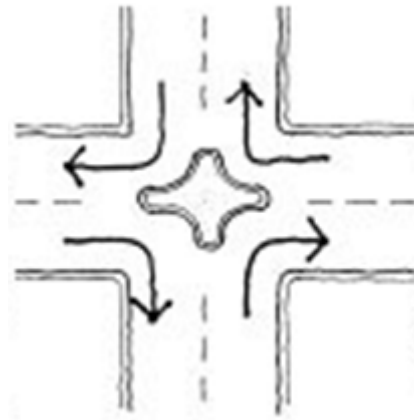
## SEMI-DIVERTER



| Advantages                                                                                                                                                                                                                                                                                                                                                           | Disadvantages                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Reduces through traffic in one direction and possibly in the other</li> <li>• Allows two-way traffic in the remainder of the street</li> <li>• Good for pedestrians due to shorter crossing distance</li> <li>• Provides space for landscaping</li> <li>• Can be designed to provide two-way access for bicycles</li> </ul> | <ul style="list-style-type: none"> <li>• Reduces access for residents</li> <li>• Emergency vehicles are only partially affected as they have to drive around partial closure with care</li> <li>• Compliance with semi-diverters is not 100%</li> <li>• May increase trip length for some residents</li> <li>• Maintenance responsibility if landscaped</li> </ul> |

| Evaluation Considerations    |                 |                   |                  |                |                                  |                                 |
|------------------------------|-----------------|-------------------|------------------|----------------|----------------------------------|---------------------------------|
| Safety                       | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                   | Emergency Services              |
| Improved Pedestrian Crossing | Possible        | Yes               | Small Increase   | Small Increase | \$5,000 to \$25,000 per location | Response times may be increased |

## STAR-DIVERTER



| Advantages                                                                                                                                                                                                                                                                                                                                                           | Disadvantages                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Reduces through traffic in one direction and possibly in the other</li> <li>• Allows two-way traffic in the remainder of the street</li> <li>• Good for pedestrians due to shorter crossing distance</li> <li>• Provides space for landscaping</li> <li>• Can be designed to provide two-way access for bicycles</li> </ul> | <ul style="list-style-type: none"> <li>• Reduces access for residents</li> <li>• Emergency vehicles are only partially affected as they have to drive around partial closure with care</li> <li>• Compliance with semi-diverters is not 100%</li> <li>• May increase trip length for some residents</li> <li>• Maintenance responsibility if landscaped</li> </ul> |

| Evaluation Considerations    |                 |                   |                  |                |                                  |                                 |
|------------------------------|-----------------|-------------------|------------------|----------------|----------------------------------|---------------------------------|
| Safety                       | Speed Reduction | Traffic Reduction | Fuel Consumption | Pollution      | Estimated Cost                   | Emergency Services              |
| Improved Pedestrian Crossing | Possible        | Yes               | Small Increase   | Small Increase | \$5,000 to \$25,000 per location | Response times may be increased |

## APPENDIX 2 – NTMP PROJECT APPLICATION FORM

### Form A

Contact Name \_\_\_\_\_ Day Phone \_\_\_\_\_

Neighborhood \_\_\_\_\_ Date \_\_\_\_\_

Local Address \_\_\_\_\_

Which neighborhood street(s) are of concern? \_\_\_\_\_

What traffic problems have you identified affecting the above? \_\_\_\_\_

How many property owners/residents did you and NTMP staff identify in your petition area? \_\_\_\_\_

Have you received the minimum of at least 65% of property owner/resident signatures on your petition form?

☐

Yes

☐

No

What signature percentage have you received? \_\_\_\_\_%

Please return the completed application form along with the signed petition forms within 90 calendar days to:

LFUCG Division of Traffic Engineering  
Neighborhood Traffic Management Program  
101 E. Vine Street, Suite 300  
Lexington KY 40507

#### For Office Use Only

Project Number \_\_\_\_\_ Date Application Received \_\_\_\_\_

Date Preliminary Analysis Completed \_\_\_\_\_

Identified Problems ☐ existing ☐ perceived

Date of first neighborhood workshop \_\_\_\_\_ Traffic team yes ☐ no ☐

Date of project presentation to neighborhood \_\_\_\_\_ Consensus reached yes ☐ no ☐

Date of project presentation to Council \_\_\_\_\_

Council Action ☐ favorable ☐ unfavorable

Date of project implementation \_\_\_\_\_

Project review date \_\_\_\_\_ Project successful yes ☐ no ☐



# Traffic Signal System

## Environmental Quality & Public Works Committee

June 16, 2015

Environmental Quality & Public Works  
Division of Traffic Engineering

# Presentation Overview

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- Signal infrastructure and ownership
- Signal structure types
- Signal installation costs
- Signal maintenance costs
- New technologies
- FY16 projects

# Signal Infrastructure and Ownership

---

- 377 signalized intersections in Fayette County
  - 137 owned by LFUCG
  - 240 owned by KYTC
- All signals are maintained by LFUCG
- Signals communicate back to TMC via:
  - Fiber Optic – 240 intersections
  - Leased phone drops – 79 intersections
  - Wireless – 45 intersections
  - No Comm – 13 intersections

# Signal Structure Types

---

## Span wire

- Steel strain poles
- Wood poles
- Various span configurations
- Very little boring or trenching required
- Wiring exposed to the elements – maintenance issues
- Signal heads sway in wind – visibility issues
- Aesthetic issues

# New Strain Poles with Double Cabinet



# Comparison on Strain Poles



Old Strain Pole

New Strain Pole meeting current structural stds

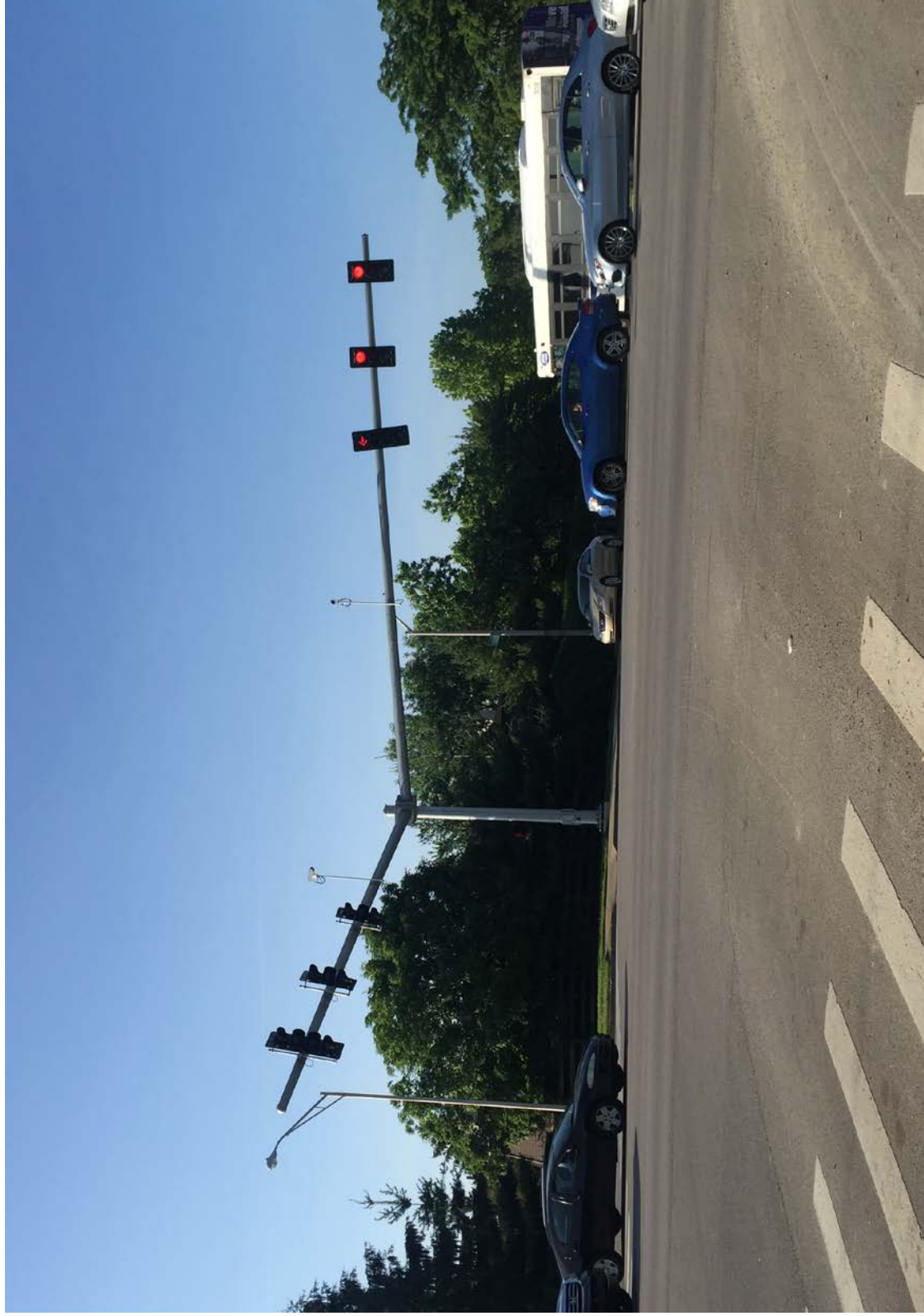
# Signal Structure Types

---

- Mast arms
  - Galvanized steel (powdercoat option)
  - Wiring protected from elements – underground
  - Signal heads rigidly mounted
  - May require fewer poles
  - Conduits and junction boxes can fill with water – maintenance issues
  - Aesthetically pleasing design
- Pedestal poles, if needed for pedestrian access

# Dual Mast Arm Install

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# Signal Installation

---

- Span wire
  - Intersection construction cost \$110-130K
  - KYTC standard is span wire
  - LFUCG re-builds sometimes use span wire
- Mast arm
  - Intersection construction cost \$150-190K
  - All new LFUCG signal construction uses mast arms
  - Re-builds use mast arms if feasible

# Signal Maintenance

---

- Received \$330K + materials in FY15 for KYTC signal maintenance
  - 240 intersections
  - ~\$1,062 per intersection
- Received \$48.5K in FY15 for LFUCG signal & fiber maintenance
  - 137 intersections
  - ~\$360 per intersection
  - \$85,000 in FY16 Mayor's Proposed Budget
  - Re-builds funded with MAP funds

# Maintenance Priorities

---

- Reactive maintenance
- Significant wiring and infrastructure deterioration at over 40 LFUCC owned intersections
- Reduce number of emergency repairs
- Reduce frequency of signals going into flash
- Diagonal spans
- Intersection Prioritization Matrix Development

# Emergency Repairs



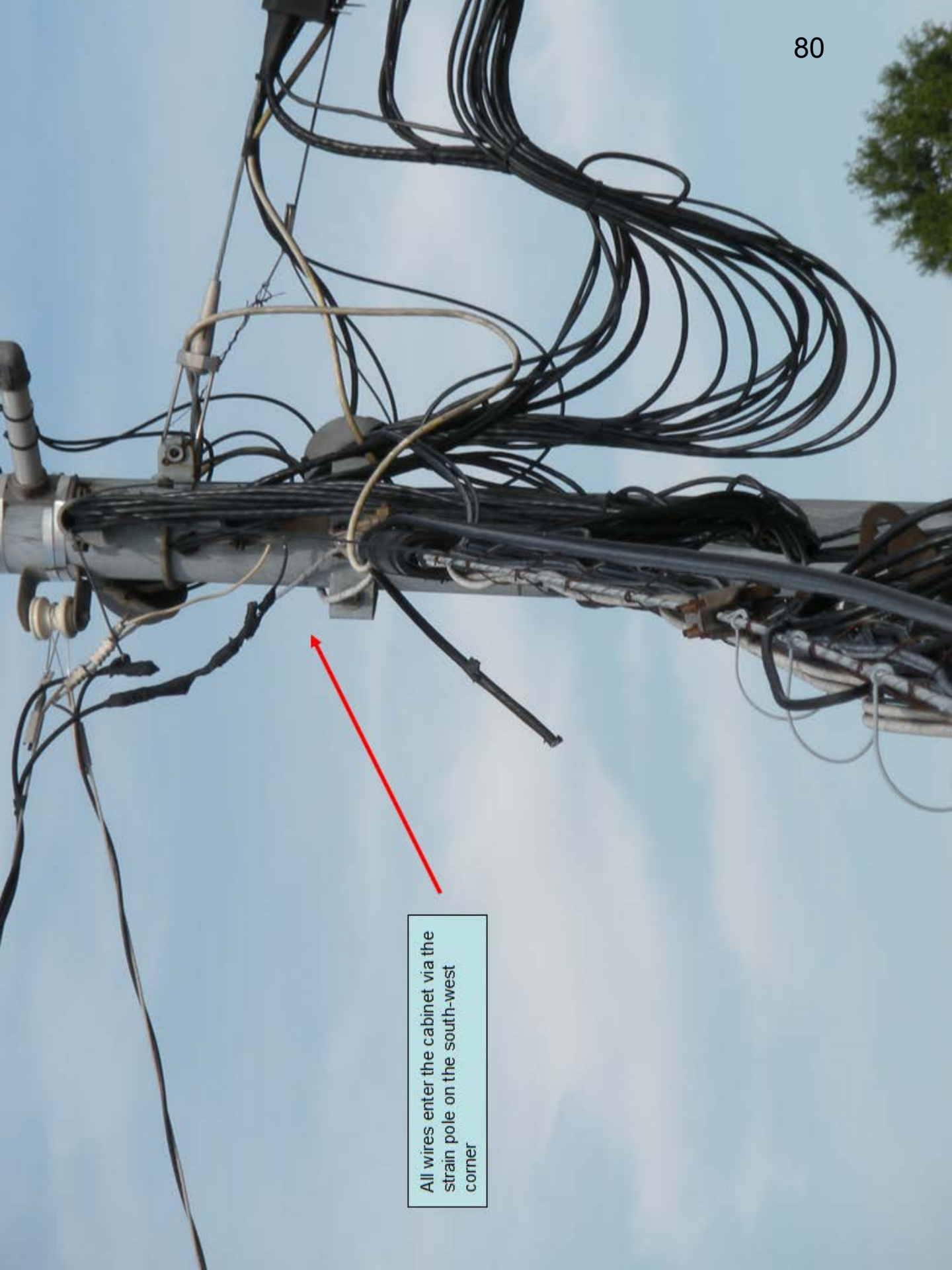


Emergency repair  
splice

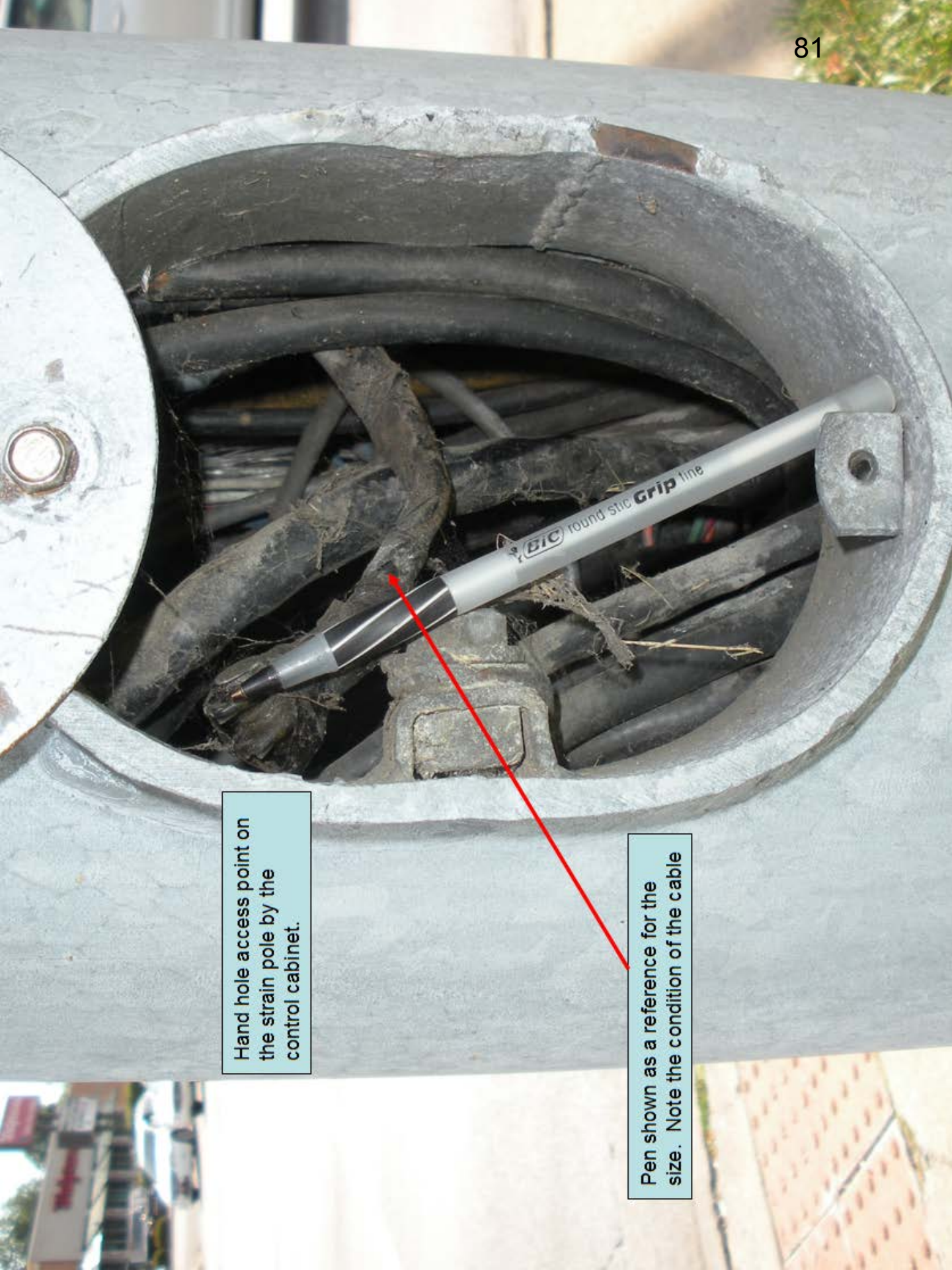






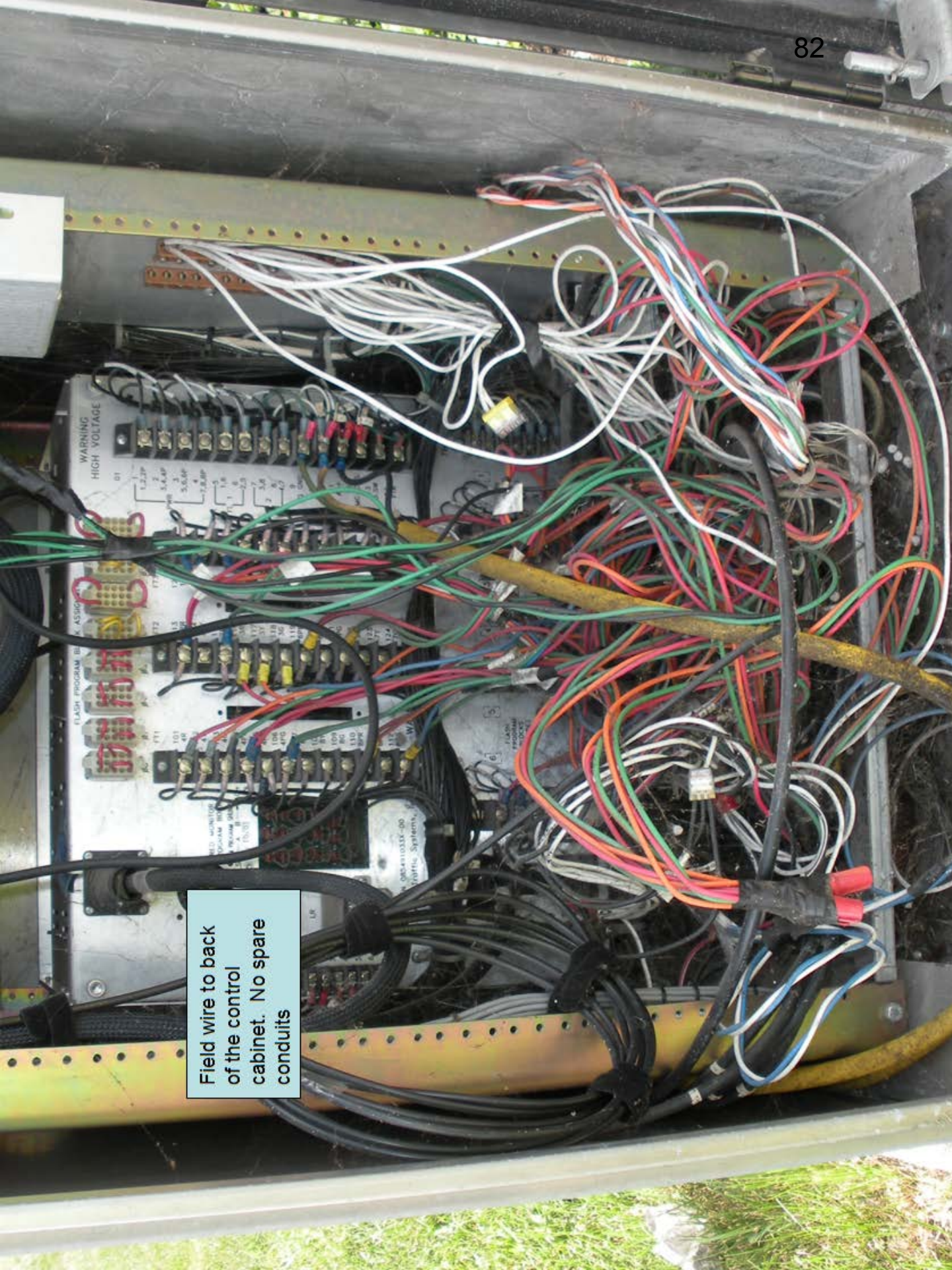


All wires enter the cabinet via the strain pole on the south-west corner



Hand hole access point on the strain pole by the control cabinet.

Pen shown as a reference for the size. Note the condition of the cable

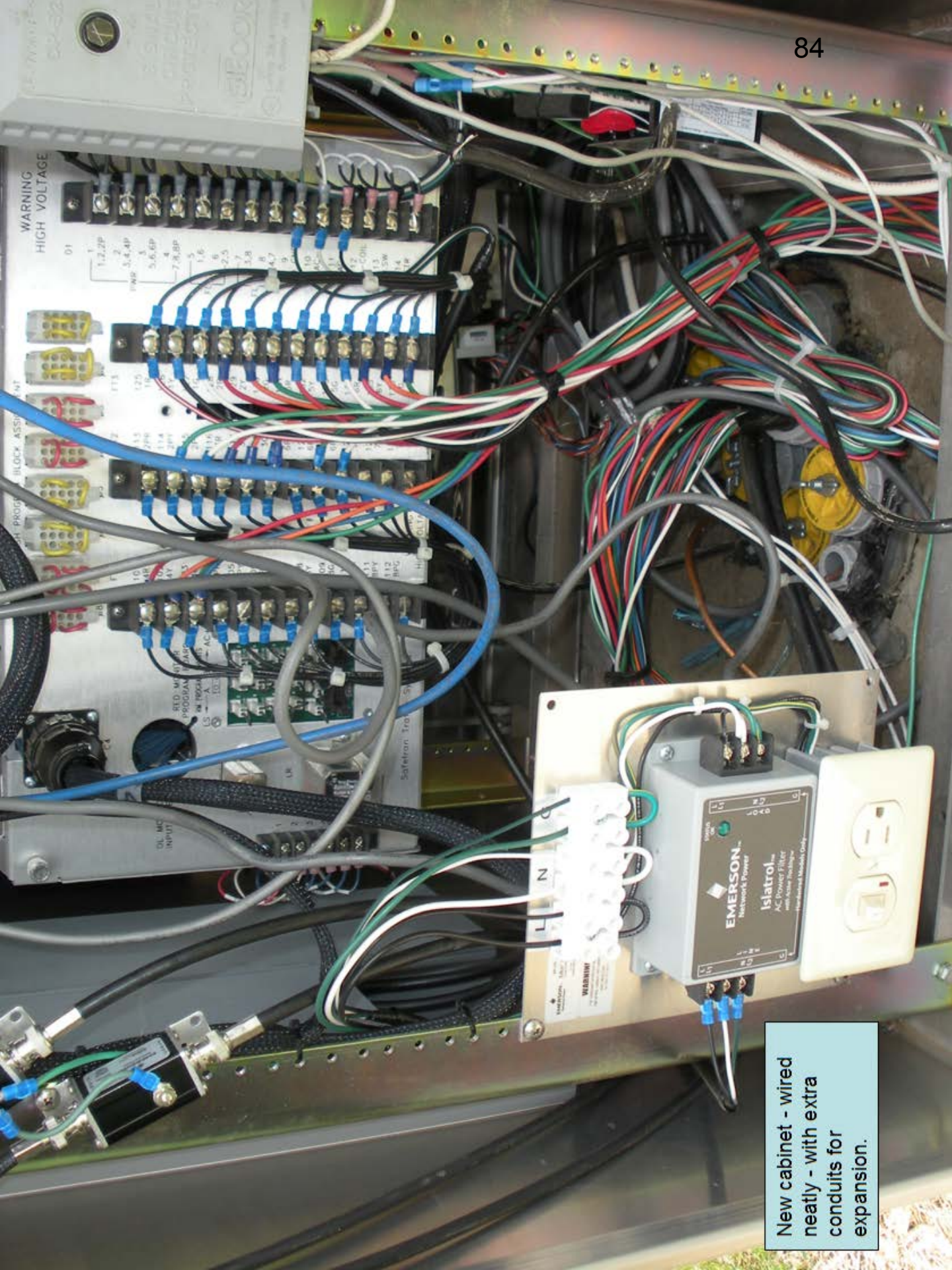


Field wire to back  
of the control  
cabinet. No spare  
conduits

# New Infrastructure

New strain pole with extra conduits for expansion.





New cabinet - wired neatly - with extra conduits for expansion.

# New Technologies

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- Adaptive Signal Control
- BlueTOADs
- Traffic Camera Video Distribution to internet
  - Camera IP conversion

# Adaptive Signal Control

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- ~\$35,000 per intersection + make-ready
- \$750/year/intersection for maintenance

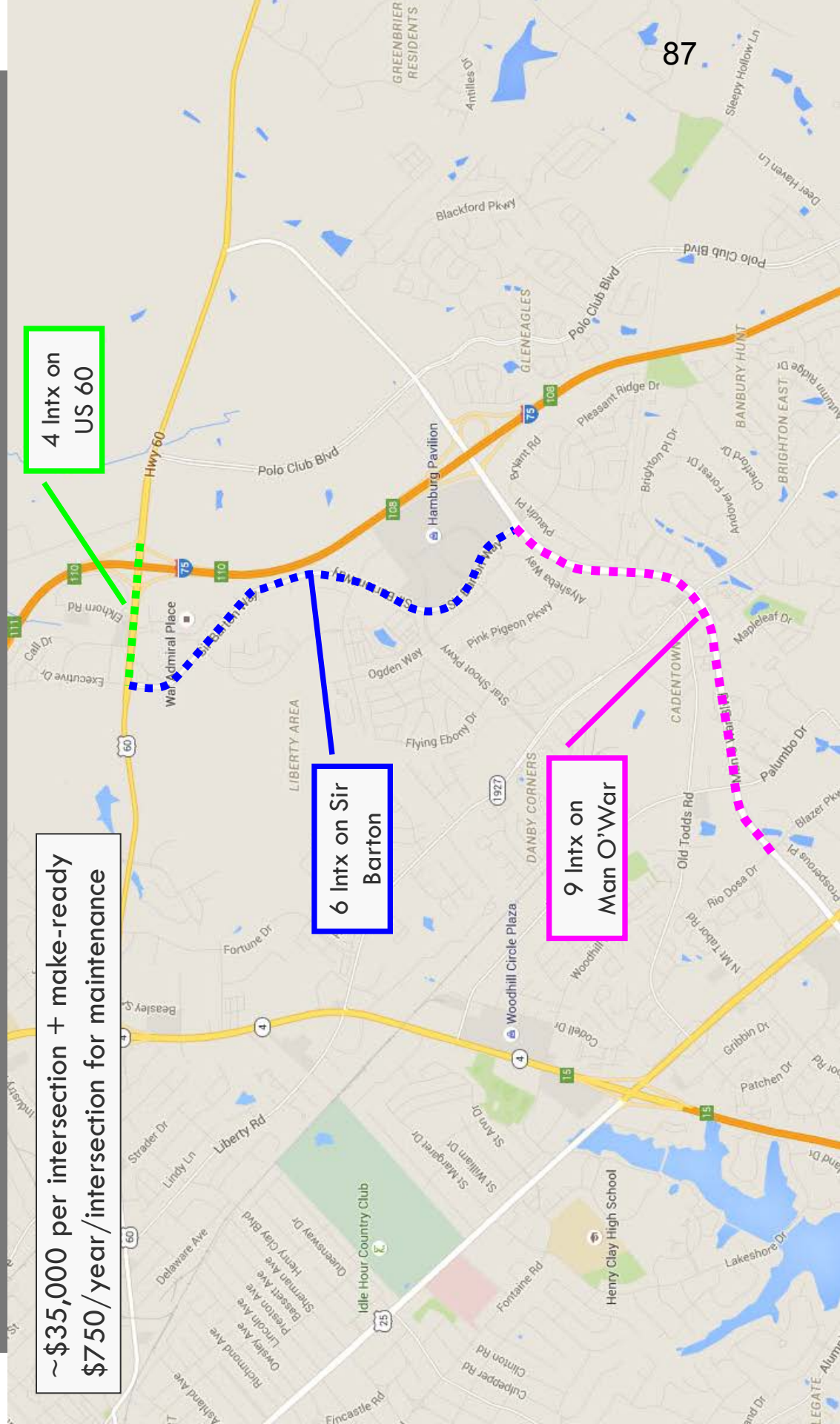
# Adaptive Signal Control

~\$35,000 per intersection + make-ready  
\$750/year/intersection for maintenance

4 Intx on  
US 60

6 Intx on Sir  
Barton

9 Intx on  
Man O'War



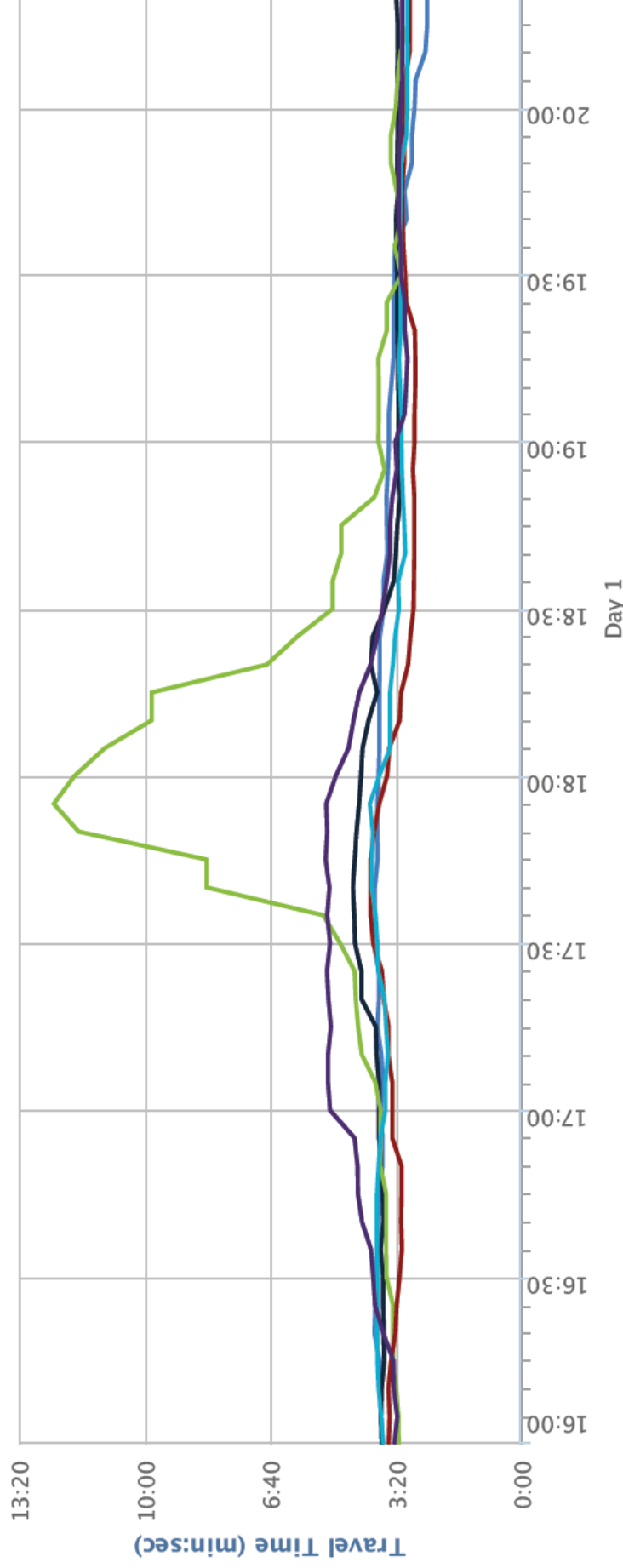
## Lexington, KY Speed Map



# BlueTOADs Reporting Tools

## Comparison Report: Smoothed Speed (5-min)

Time Interval: 16:00:00 - 21:00:00



- Richmond/MOW to MOW/Todds - (2015-04-29 - 2015-04-29)
- Richmond/MOW to MOW/Todds - (2015-04-08 - 2015-04-08)
- Richmond/MOW to MOW/Todds - (2015-04-15 - 2015-04-15)
- Richmond/MOW to MOW/Todds - (2015-04-22 - 2015-04-22)
- Richmond/MOW to MOW/Todds - (2015-04-23 - 2015-04-23)
- Richmond/MOW to MOW/Todds - (2015-04-24 - 2015-04-24)

# Traffic Camera Feed Distribution





Sign Out

Change Password

susan\_byrd@gspnet.com

LA DOTD Example

Set as default

Manage Video Wall

(Fullscreen -> F11)



I-12 at Drusilla 01/20/2015 09:05:49 AM





I-12 at Essen 01/20/2015 09:07 AM





I-10 at 6811 Ave  
01/20/2015 09:07:12 AM





I-10 at Acadian 01/20/2015 09:07 AM



# FY16 Capital Projects (in MPB)

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6 Signalized Intersection Re-builds \$900K

- Regency & Pasadena
- Wilson Downing & Camelot
- Chinoe & Alumni
- Southland & Cherrybark
- Southland & Southview
- Woodland & Columbia

Adaptive Traffic Signal Control \$312K

Pedestrian Safety/ADA Improvements \$200K

Traffic Management Center Upgrades \$150K

Operational Spot Improvements \$300K

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\$1,862K



# Questions?

| Current Division of Water Quality Project Information Through May 2015 |                                                                                    |  |  |  | Color Key For Project Status                                    |           |                                                        |                                             |                                                       | PROJECTS COMPLETED LAST SIX MONTHS |  |
|------------------------------------------------------------------------|------------------------------------------------------------------------------------|--|--|--|-----------------------------------------------------------------|-----------|--------------------------------------------------------|---------------------------------------------|-------------------------------------------------------|------------------------------------|--|
| 1                                                                      | Consent Decree Related Projects in Red                                             |  |  |  | NOTE: LIST DOES NOT INCLUDE ALL CONSENT DECREE PROJECTS PLANNED |           |                                                        |                                             |                                                       | PROJECTS CURRENTLY UNDERWAY        |  |
| 2                                                                      | PROJECTS COMPLETED LAST SIX MONTHS                                                 |  |  |  | BUDGET                                                          | FUND      | CONTRACTOR                                             | STATUS                                      | PROJECTS TO BEGIN NEXT SIX MONTHS                     |                                    |  |
| 3                                                                      | Blue Sky Pump Station and Force Main Total Project Cost                            |  |  |  | \$2,348,882.34                                                  | 4003      | Bell Engineers/Grant/Hubert Excavation and Contracting | Complete-punch list                         | 7 & 12                                                |                                    |  |
| 4                                                                      | West Hickman WWTP Odor Control Improvements (RMP)                                  |  |  |  | \$1,039,000.00                                                  | 4003      | Smith Contracting Inc./Hazen & Sawyer/Van Hook         | Complete                                    | 4 & 12                                                |                                    |  |
| 5                                                                      | Expansion Area 2A Force Main/Pump Station Total Project Cost (RMP)                 |  |  |  | \$7,138,932.00                                                  | 4003      | Smith Contractors /GRW/ Easements                      | Complete                                    | 12 & 6                                                |                                    |  |
| 6                                                                      | Expansion Area 2A Gravity Line Construction (RMP)                                  |  |  |  | \$1,227,783.86                                                  | 4003      | Schroeder Construction                                 | Complete-punch list                         | 12 & 6                                                |                                    |  |
| 7                                                                      | Wolf Run Pump Station Construction (RMP)                                           |  |  |  | \$4,363,706.00                                                  | 4003      | W. Rogers Co.                                          | Pump Station Complete-punch list/demolition | 12 & 2                                                |                                    |  |
| 8                                                                      | Wolf Run Force Main Construction (RMP)                                             |  |  |  | \$4,228,435.00                                                  | 4003      | Howell                                                 | Complete-punch list                         | 12 & 2                                                |                                    |  |
| 9                                                                      | Purchase/Installation Clarifiers 4 Units Town Branch WWTP                          |  |  |  | \$1,254,328.00                                                  | 4002/4003 | Ovivo/Pace                                             | Complete                                    | 2                                                     |                                    |  |
| 10                                                                     | Purchase/Installation Clarifiers 4 Units West Hickman WWTP                         |  |  |  | \$1,535,644.00                                                  | 4002/4003 | Ovivo/Pace                                             | Complete                                    | 4 & 12                                                |                                    |  |
| 11                                                                     | East Lake Trunk Sewer Total Project Cost (RMP)                                     |  |  |  | \$756,482.00                                                    | 4003      | Cleary Construction/Vision RPR/Eng. Palmer             | Complete                                    | 7                                                     |                                    |  |
| 12                                                                     | Idle Hour Total Project Cost (RMP)                                                 |  |  |  | \$1,197,437.00                                                  | 4003      | Free Contracting/Vision                                | Complete-punch list                         | 5                                                     |                                    |  |
| 13                                                                     | Bob O Link Trunk Sewer Construction/RPR (RMP)                                      |  |  |  | \$2,487,507.94                                                  | 4003      | Free Contracting/Integrated                            | Complete                                    | 11                                                    |                                    |  |
| 14                                                                     | Century Hills Trunk Sewer Construction/RPR (RMP)                                   |  |  |  | \$1,183,030.10                                                  | 4003      | Todd Johnson Contracting Inc./Vision                   | Complete                                    | 7                                                     |                                    |  |
| 15                                                                     | Woodhill Trunk Sewer Design (RMP)                                                  |  |  |  | \$207,600.00                                                    | 4003      | HMB                                                    | Complete                                    | 5 & 7                                                 |                                    |  |
| 16                                                                     | Relocation Vactor Uploading Station for Town Branch WWS Tank                       |  |  |  | \$391,998.00                                                    | 4003      | Smith Construction                                     | Complete                                    | 2                                                     |                                    |  |
| 17                                                                     | I & I Sanitary Sewer Rehabilitation Completed to date In FY 2015                   |  |  |  | \$4,285,215.00                                                  | 4003      | Leak Eliminators                                       | Complete                                    | City Wide                                             |                                    |  |
| 18                                                                     | Leestown Pump Station Decommission                                                 |  |  |  | \$236,276.00                                                    | 4003      | Leak Eliminators                                       | Complete                                    | 2                                                     |                                    |  |
| 19                                                                     | Wolf Run Main Trunk A Construction (RMP)                                           |  |  |  | \$460,049.64                                                    | 4003      | Layne                                                  | Complete                                    | 11 & 12                                               |                                    |  |
| 20                                                                     | Wilson Downing Tributary Study                                                     |  |  |  | \$74,665.00                                                     | 4052      | Integrated                                             | Complete                                    | 4                                                     |                                    |  |
| 21                                                                     | Anniston/ Wickland Phase 3 Construction                                            |  |  |  | \$989,346.00                                                    | 4052      | LAGCO INC                                              | Complete                                    | 6                                                     |                                    |  |
| 22                                                                     | Green Acres Sewer Replacement Design                                               |  |  |  | \$97,950.00                                                     | 4051      | Nesbitt Engineers                                      | Complete                                    | 1                                                     |                                    |  |
| 23                                                                     | Bolivar St. Stormwater Improvements- Easement/Construction                         |  |  |  | \$39,033.00                                                     | 4052      | G&G Paving                                             | Complete                                    | 1                                                     |                                    |  |
| 24                                                                     | Gribbin Dr. Basin Improvement Design                                               |  |  |  | \$47,640.00                                                     | 4052      | Stantec                                                | Complete                                    | 5                                                     |                                    |  |
| 25                                                                     | Town Branch Culvert Condition Assessment                                           |  |  |  | \$45,956.00                                                     | 4052      | ECSI                                                   | Complete                                    | 1                                                     |                                    |  |
| 26                                                                     | Green Acres Sanitary Sewer Replacement                                             |  |  |  | \$699,355.00                                                    | 3400      | Grants Excavating                                      | Complete                                    | 1                                                     |                                    |  |
| 27                                                                     | FY 2012 Class A Stormwater Quality Incentive Grant                                 |  |  |  | \$87,230.00                                                     | 4052      | Heartland Homeowners Association #1 & #2               | Complete                                    | 12                                                    |                                    |  |
| 28                                                                     | FY 2012 Class B Infrastructure Stormwater Quality Incentive Grant                  |  |  |  | \$150,000.00                                                    | 4052      | Bluegrass Stockyards LLC                               | Complete                                    | 2                                                     |                                    |  |
| 29                                                                     | FY 2012 Class B Infrastructure Stormwater Quality Incentive Grant                  |  |  |  | \$320,400.00                                                    | 4052      | Fayette County Public Schools: Clays Mill Elementary   | Complete                                    | 10                                                    |                                    |  |
| 30                                                                     | FY 2013 Class A Stormwater Quality Incentive Grant                                 |  |  |  | \$47,714.00                                                     | 4052      | Lansdowne Neighborhood Association                     | Complete                                    | 4                                                     |                                    |  |
| 31                                                                     | FY 2013 Class A Stormwater Quality Incentive Grant                                 |  |  |  | \$53,340.00                                                     | 4052      | Friends of Wolf Run                                    | Complete                                    | 3,10,11                                               |                                    |  |
| 32                                                                     | FY 2013 Class B Education Stormwater Quality Incentive Grant                       |  |  |  | \$29,213.00                                                     | 4052      | Living Arts and Science Center                         | Complete                                    | 1                                                     |                                    |  |
| 33                                                                     | FY 2014 Class B Education Stormwater Quality Incentive Grant                       |  |  |  | \$33,751.00                                                     | 4052      | Living Arts and Science Center                         | Complete                                    | 1                                                     |                                    |  |
| 34                                                                     | TOTAL                                                                              |  |  |  | \$37,057,899.88                                                 |           |                                                        |                                             |                                                       |                                    |  |
| PROJECTS CURRENTLY UNDERWAY                                            |                                                                                    |  |  |  | ENCUMBRANCES                                                    | FUND      | CONTRACTOR                                             | STATUS                                      | ESTIMATED COMPLETION                                  |                                    |  |
| 36                                                                     | Blue Sky Old Treatment Plant Demolition and Lagoon Dewatering                      |  |  |  | \$361,124.00                                                    | 4003      | Free Contracting                                       | Underway                                    | Summer 2015                                           |                                    |  |
| 37                                                                     | West Hickman A Trunk Sewer Replacement Construction/RPR (RMP)                      |  |  |  | \$3,865,468.00                                                  | 4003      | Garney                                                 | Construction underway                       | RMP deadline December 2015                            |                                    |  |
| 38                                                                     | Town Branch WWTP Wet Weather Storage Tank Construction (RMP)                       |  |  |  | \$19,108,000.00                                                 | 4003      | Judy Construction                                      | Construction underway                       | Fall 2016                                             |                                    |  |
| 39                                                                     | Town Branch WWTP Wet Weather Storage Tank Design/RPR (RMP)                         |  |  |  | \$953,771.00                                                    | 4003      | GRW                                                    | Design complete and construction underway   | Construction started Fall 2014                        |                                    |  |
| 40                                                                     | Woodhill Construction (RMP)/RPR Construction Management                            |  |  |  | \$3,086,992.00                                                  | 4003      | Free Construction/Vision RPR                           | Bid awarded construction underway           | Winter 2015                                           |                                    |  |
| 41                                                                     | West Hickman Wet Weather Storage Design                                            |  |  |  | \$1,206,000.00                                                  | 4003      | Tetra Tech                                             | Design underway                             | Winter 2016                                           |                                    |  |
| 42                                                                     | Lower Cane Run WWS Tank Design (RMP)                                               |  |  |  | \$524,510.00                                                    | 4003      | HDR                                                    | Design underway                             | RMP Deadline December 2016                            |                                    |  |
| 43                                                                     | Wolf Run Wet Weather Storage Tank (RMP)                                            |  |  |  | \$4,740,000.00                                                  | 4003      | Judy Construction                                      | Bid awarded                                 | RMP deadline December 2015                            |                                    |  |
| 44                                                                     | Wolf Run Wet Weather Storage Tank Design/Construction Management (RMP)             |  |  |  | \$398,413.00                                                    | 4003      | Tetra Tech                                             | Design underway                             | Construction should start Spring 2015                 |                                    |  |
| 45                                                                     | UK Trunk A Engineering (RMP)                                                       |  |  |  | \$172,950.00                                                    | 4003      | MSE                                                    | Design underway                             | RMP Deadline December 2016                            |                                    |  |
| 46                                                                     | Remedial Measures Plans (RMP) Program Management/Implementation                    |  |  |  | \$1,044,418.00                                                  | 4003      | Hazen & Sawyer                                         | RMPs completed and pending EPA approval     | Implementation of RMP projects in process and ongoing |                                    |  |
| 47                                                                     | Capacity Assurance Program (CAP)                                                   |  |  |  | \$1,662,500.00                                                  | 4003      | Stantec                                                | CAP Implementation Began July 3, 2013       | CAP 5 yr Implementation ongoing-contract thru FY 2017 |                                    |  |
| 48                                                                     | CMOM (Capacity, Management, Operations and Maintenance) Program Project Management |  |  |  | \$500,000.00                                                    | 4003      | Hazen & Sawyer                                         | EPA approved plan/implementation underway   | 128 of 179 program elements implemented               |                                    |  |
| 49                                                                     | CMOM Manhole Monitoring                                                            |  |  |  | \$129,694.00                                                    | 4003      | ADS                                                    | Underway                                    | Ongoing                                               |                                    |  |
| 50                                                                     | Implementation of CMOM PS Operation Improvements                                   |  |  |  | \$388,237.94                                                    | 4003      | Various                                                | EPA approved plan/implementation underway   | Ongoing                                               |                                    |  |
| 51                                                                     | CMOM Gravity Line Preventative Maintenance                                         |  |  |  | \$1,000,000.00                                                  | 4003      | Robinson                                               | EPA approved plan/implementation underway   | Ongoing                                               |                                    |  |
| 52                                                                     | Hartland Pump Station No 1 Improvements                                            |  |  |  | \$142,600.00                                                    | 4003      | Kenny Inc                                              | Pending Council approval                    | Construction to begin Spring 2015                     |                                    |  |
| 53                                                                     | Decommission of Deer Haven Pump Station                                            |  |  |  | \$18,006.00                                                     | 4002      | Kenvirons                                              | Design should be complete January 2015      | Construction to begin Spring 2015                     |                                    |  |
| 54                                                                     | Marquis Sewer Upgrade                                                              |  |  |  | \$49,950.00                                                     | 4003      | Kentucky Engineering Group                             | Project to be bid late Spring 2015          | Construction to begin Summer 2015                     |                                    |  |
| 55                                                                     | Hillenmeyer Pump Station Decommission                                              |  |  |  | \$319,001.00                                                    | 4003      | Free                                                   | Council approved bid                        | Summer 2015                                           |                                    |  |
| 56                                                                     | I & I Sanitary Sewer Rehabilitation (Citywide) Balance Remaining for FY 2015       |  |  |  | \$1,153,334.00                                                  | 4003      | Purchasing Unit Price Contract (Leak Eliminators)      | Ongoing                                     | Ongoing                                               |                                    |  |
| 57                                                                     | RMP Town Branch WWTP Headworks Improvement                                         |  |  |  | \$75,000.00                                                     | 4003      | Strand                                                 | Underway                                    | Summer 2015                                           |                                    |  |
| 58                                                                     | SCADA Design Electrical and Computer Operations/SCADA Improvements                 |  |  |  | \$17,585,050.00                                                 | 4003      | Smith Contracting, Inc./Strand                         | Construction nearly complete                | Summer 2015                                           |                                    |  |
| 59                                                                     | TB Solids Centrifuge Project Design/Construction                                   |  |  |  | \$2,103,555.00                                                  | 4002      | Building Crafts Inc./HDR                               | Construction contract awarded               | Construction to begin Summer 2015                     |                                    |  |
| 60                                                                     | WH Brick Repair (Part 2) Construction                                              |  |  |  | \$235,155.00                                                    | 4002      | McNutt Construction                                    | Construction continues                      | Spring 2015                                           |                                    |  |
| 61                                                                     | West Hickman Building Expansion                                                    |  |  |  | \$41,180.00                                                     | 4003      | GRW                                                    | Design                                      | Summer 2015                                           |                                    |  |
| 62                                                                     | MS4 Project Management 2015                                                        |  |  |  | \$816,000.00                                                    | 4052      | Tetra Tech                                             | New Contract Awarded to Tetra Tech          | Winter 2016                                           |                                    |  |
|                                                                        |                                                                                    |  |  |  |                                                                 |           |                                                        |                                             | City Wide                                             |                                    |  |
|                                                                        |                                                                                    |  |  |  |                                                                 |           |                                                        |                                             | 2                                                     |                                    |  |
|                                                                        |                                                                                    |  |  |  |                                                                 |           |                                                        |                                             | 2, 4 & 12                                             |                                    |  |
|                                                                        |                                                                                    |  |  |  |                                                                 |           |                                                        |                                             | 2                                                     |                                    |  |
|                                                                        |                                                                                    |  |  |  |                                                                 |           |                                                        |                                             | 4 & 12                                                |                                    |  |
|                                                                        |                                                                                    |  |  |  |                                                                 |           |                                                        |                                             | 4 & 12                                                |                                    |  |
|                                                                        |                                                                                    |  |  |  |                                                                 |           |                                                        |                                             | City Wide                                             |                                    |  |

|     |                                                                   |                 |      |                                                     |  |                                      |                                        |                  |
|-----|-------------------------------------------------------------------|-----------------|------|-----------------------------------------------------|--|--------------------------------------|----------------------------------------|------------------|
| 63  | Coldstream Park Stream Restoration SEP Design                     | \$250,000.00    | 4051 | CDP Engineers                                       |  | Design Submittal under review by EPA | EPA deadline for construction 1/3/2016 | 2                |
| 64  | Walhampton Drive Stormwater Improvements Construction             | \$705,632.00    | 4051 | Grants Excavating                                   |  | Construction underway                | Summer 2015                            | 4                |
| 65  | Rogers Road Stormwater Improvement Project Design                 | \$99,500.00     | 4052 | ECSI                                                |  | Design 90% Complete                  | Spring 2015                            | 6                |
| 66  | Cardinal Lane Stormwater Improvement Phases 2 & 3 Design          | \$89,205.00     | 4052 | Bell Engineers                                      |  | Design 90% Complete                  | Spring 2015                            | 10               |
| 67  | Lafayette/Southbend FEIMA acquisition/demolition                  | \$750,000.00    | 4052 | TBD                                                 |  | Offers to Purchase Underway          | Spring 2015                            | 11               |
| 68  | Wilson Downing Tributary Alternate Analysis                       | \$21,900.00     | 4052 | Stantec                                             |  | Analysis underway                    | Summer 2015                            | 4                |
| 69  | Ft Sumter/Gayle Stormwater Project                                | \$180,000.00    | 4052 | Property acquisition                                |  | Pending Council approval             | Spring 2015                            | 6                |
| 70  | Green Acres Stream Rehab and Vegetative Buffer Planting           | \$177,650.00    | 3400 | Eco Gro                                             |  | Construction underway                | Fall 2015                              | 1                |
| 71  | Clays Mill (3461) Drainage Analysis                               | \$11,600.00     | 4052 | ECSI                                                |  | Design Analysis Underway             | Spring 2015                            | 9                |
| 72  | Pimlico Pkwy (3455) Drainage Analysis                             | \$8,150.00      | 4052 | ECSI                                                |  | Design Analysis Underway             | Spring 2015                            | 8                |
| 73  | Gribbin Dr. Basin Investigation                                   | \$34,240.00     | 4052 | Leak Eliminators                                    |  | Underway                             | Winter 2015                            | 5                |
| 74  | Clayvis Ct./ Colonial Dr. Stormwater Improvement                  | \$13,947.00     | 4051 | Sensabaugh                                          |  | Construction to start                | Spring 2015                            | 4, 11            |
| 75  | Haven Ct./ Cane Run Rd. Stormwater Improvement Design             | \$17,940.00     | 4052 | Bell Engineers                                      |  | Design Analysis Underway             | Spring 2015                            | 6, 7             |
| 76  | FY2011 Class B Infrastructure Stormwater Quality Incentive Grant  | \$321,576.48    | 4052 | Klausing Group, Inc.                                |  | Ongoing                              | Winter 2015                            | 2                |
| 77  | FY 2012 Class A Stormwater Quality Incentive Grant                | \$7,200.00      | 4052 | Friends of Wolf Run #2 (BMP retrofit)               |  | Ongoing                              | Winter 2015                            | 3,10,11          |
| 78  | FY 2012 Class A Stormwater Quality Incentive Grant                | \$4,185.00      | 4052 | Friends of Wolf Run #3 (health assessments)         |  | Ongoing                              | Winter 2015                            | 3,10,11          |
| 79  | FY 2012 Class A Stormwater Quality Incentive Grant                | \$17,000.00     | 4052 | Martin Luther King Neighborhood Association         |  | Ongoing                              | Winter 2015                            | 1                |
| 80  | FY 2012 Class B Education Stormwater Quality Incentive Grant      | \$17,514.00     | 4052 | UK Research Foundation (w/ James Lane Allen Elem.)  |  | Ongoing                              | Winter 2015                            | 11               |
| 81  | FY 2012 Class B Infrastructure Stormwater Quality Incentive Grant | \$360,160.00    | 4052 | Community Montessori School - Montessori Middle     |  | Ongoing                              | Winter 2015                            | 10               |
| 82  | FY 2012 Class B Infrastructure Stormwater Quality Incentive Grant | \$60,440.00     | 4052 | Living Arts and Science Center                      |  | Ongoing                              | Spring 2015                            | 1                |
| 83  | FY 2013 Class A Stormwater Quality Incentive Grant                | \$36,828.80     | 4052 | Brighton Woods Neighborhood Association             |  | Ongoing                              | Spring 2015                            | 6                |
| 84  | FY 2013 Class B Infrastructure Stormwater Quality Incentive Grant | \$50,000.00     | 4052 | The Southland Association (Feasibility Study)       |  | Ongoing                              | Spring 2015                            | 3,10,11          |
| 85  | FY 2013 Class B Infrastructure Stormwater Quality Incentive Grant | \$215,745.00    | 4052 | Embrace Church                                      |  | Ongoing                              | Summer 2015                            | 1                |
| 86  | FY 2013 Class B Infrastructure Stormwater Quality Incentive Grant | \$203,944.00    | 4052 | The Fountains at Andover                            |  | Ongoing                              | Summer 2015                            | 7                |
| 87  | FY 2013 Class B Infrastructure Stormwater Quality Incentive Grant | \$148,169.00    | 4052 | Habitat for Humanity                                |  | Ongoing                              | Summer 2015                            | 5                |
| 88  | FY 2013 Class B Infrastructure Stormwater Quality Incentive Grant | \$350,000.00    | 4052 | J M Smuckers                                        |  | Ongoing                              | Summer 2015                            | 1                |
| 89  | FY 2014 Class A Stormwater Quality Incentive Grant                | \$28,875.00     | 4052 | Friends of Wolf Run                                 |  | Ongoing                              | Winter 2015                            | 3,10,11          |
| 90  | FY 2014 Class A Stormwater Quality Incentive Grant                | \$3,530.00      | 4052 | Harrods Hill Neighborhood Association               |  | Ongoing                              | Winter 2015                            | 10               |
| 91  | FY 2014 Class A Stormwater Quality Incentive Grant                | \$65,954.52     | 4052 | Southern Heights Neighborhood Association           |  | Ongoing                              | Winter 2015                            | 4                |
| 92  | FY 2014 Class A Stormwater Quality Incentive Grant                | \$46,640.48     | 4052 | Waterford II Neighborhood Association               |  | Ongoing                              | Summer 2015                            | 4                |
| 93  | FY 2014 Class B Education Stormwater Quality Incentive Grant      | \$2,500.00      | 4052 | Fayette County Public Schools: Bryan Station Middle |  | Ongoing                              | Winter 2015                            | 6                |
| 94  | FY 2014 Class B Education Stormwater Quality Incentive Grant      | \$22,299.00     | 4052 | University of KY Research Foundation                |  | Ongoing                              | Winter 2015                            | 3                |
| 95  | FY 2014 Class B Infrastructure Stormwater Quality Incentive Grant | \$302,557.00    | 4052 | G&J Pepsi-Cola Bottlers, Inc.                       |  | Ongoing                              | Winter 2015                            | 11               |
| 96  | FY 2014 Class B Infrastructure Stormwater Quality Incentive Grant | \$350,000.00    | 4052 | Lexmark International, Inc.                         |  | Ongoing                              | Winter 2015                            | 1                |
| 97  | FY 2014 Class B Infrastructure Stormwater Quality Incentive Grant | \$275,000.00    | 4052 | Sanford E. Levy, LLC                                |  | Ongoing                              | Winter 2015                            | 3                |
| 98  | FY 2015 Class A Stormwater Quality Incentive Grant                | \$80,588.50     | 4052 | North Limestone Community Development Corporation   |  | Ongoing                              | Fall 2016                              | 1                |
| 99  | FY 2015 Class B Education Stormwater Quality Incentive Grant      | \$30,000.00     | 4052 | Bluegrass Greensource                               |  | Ongoing                              | Spring 2016                            | 3                |
| 100 | FY 2015 Class B Infrastructure Stormwater Quality Incentive Grant | \$286,630.00    | 4052 | Transit Authority of Lexington, KY (Lextran)        |  | Ongoing                              | Fall 2016                              | 1                |
| 101 | Total                                                             | \$67,328,009.72 |      |                                                     |  |                                      |                                        |                  |
| 102 | PROJECTS TO BEGIN NEXT SIX MONTHS                                 |                 |      | CONTRACTOR                                          |  | STATUS                               | ESTIMATED START                        | Council District |
| 103 | West Hickman WWTP Clarifier Flow Distribution                     | TBD             | 4003 | TBD                                                 |  | Bid Summer 2015                      | Late Summer 2015                       | 4 & 12           |
| 104 | Lower Cane Run WWS Tank Design (RMP)                              | TBD             | 4003 | TBD                                                 |  | Bid Summer 2015                      | Late Summer 2015                       | 2                |
| 105 | East Hickman Pump Station Design (RMP)                            | TBD             | 4003 | TBD                                                 |  | Bid Summer 2015                      | Late Summer 2015                       | 7                |
| 106 | UK Trunk A Construction (RMP)                                     | TBD             | 4003 | TBD                                                 |  | Bid Summer 2015                      | EPA Deadline December 2016             | 2                |
| 107 | Rogers Road Stormwater Improvements                               | \$3,000,000.00  | 4052 | TBD                                                 |  | Bid Summer 2015                      | Summer 2015                            | 6                |
| 108 | Cardinal Lane Stormwater Improvement Phases 2 & 3 Construction    | \$300,000.00    | 4052 | TBD                                                 |  | Bid late Spring 2015                 | TBD                                    | 10               |
| 109 | Wilson Downing Tributary Improvement Design                       | TBD             | 4052 | Stantec                                             |  | Initial Alternative Analysis         | TBD                                    | 4                |
| 110 | Tucson Dr. Stormwater Improvements Design                         | TBD             | 4052 | TBD                                                 |  | TBD                                  | TBD                                    | 10               |
| 111 | FY 2014 Class A Stormwater Quality Incentive Grant                | \$55,000.00     | 4052 | Northside Neighborhood Association                  |  | Awarded/Contract Stage               | Spring 2015                            | 1                |
| 112 | FY 2014 Class B Infrastructure Stormwater Quality Incentive Grant | \$13,893.00     | 4052 | Living Arts and Science Center                      |  | Awarded/Contract Stage               | Spring 2015                            | 1                |
| 113 | FY 2015 Class A Stormwater Quality Incentive Grant                | \$40,834.40     | 4052 | Brighton Woods Association Inc.                     |  | Awarded/Contract Stage               | Summer 2015                            | 6                |
| 114 | FY 2015 Class A Stormwater Quality Incentive Grant                | \$31,170.00     | 4052 | Friends of Wolf Run                                 |  | Awarded/Contract Stage               | Summer 2015                            | 3, 10, 11        |
| 115 | FY 2015 Class A Stormwater Quality Incentive Grant                | \$12,841.00     | 4052 | Palomar Hills Townhome Association Inc              |  | Awarded/Contract Stage               | Summer 2015                            | 10               |
| 116 | FY 2015 Class B Education Stormwater Quality Incentive Grant      | \$33,906.00     | 4052 | Living Arts and Science Center                      |  | Awarded/Contract Stage               | Summer 2015                            | 1                |
| 117 | FY 2015 Class B Education Stormwater Quality Incentive Grant      | \$2,495.00      | 4052 | William Henderson (UeducateU)                       |  | Awarded/Contract Stage               | Summer 2015                            | 1, 5             |
| 118 | FY 2015 Class B Infrastructure Stormwater Quality Incentive Grant | \$50,000.00     | 4052 | Kentucky Horse Park                                 |  | Awarded/Contract Stage               | Summer 2015                            | 12               |
| 119 | FY 2015 Class B Infrastructure Stormwater Quality Incentive Grant | \$350,000.00    | 4052 | Kentucky Horse Park                                 |  | Awarded/Contract Stage               | Summer 2015                            | 12               |
| 120 | FY 2015 Class B Infrastructure Stormwater Quality Incentive Grant | \$175,000.00    | 4052 | Link-Belt Construction Equipment Co                 |  | Awarded/Contract Stage               | Summer 2015                            | 6                |
| 121 | FY 2015 Class B Infrastructure Stormwater Quality Incentive Grant | \$47,000.00     | 4052 | Phil Holoubek                                       |  | Awarded/Contract Stage               | Summer 2015                            | 3                |
| 122 | FY 2015 Class B Infrastructure Stormwater Quality Incentive Grant | \$59,534.00     | 4052 | Thoroughbred Center                                 |  | Awarded/Contract Stage               | Summer 2015                            | 12               |
| 123 |                                                                   |                 |      |                                                     |  |                                      |                                        | May-15           |

## Environmental Quality & Public Works Committee Referrals

| Items Moved from Environmental Quality Committee                                                                  | Referred By      | Date             | Status                                                            |
|-------------------------------------------------------------------------------------------------------------------|------------------|------------------|-------------------------------------------------------------------|
| Waste Management Funding Options                                                                                  | Stinnett         | 5/13/2011        | Waste Management Task Force                                       |
| Consolidate Greenway Responsibilities                                                                             | EQ Link          | 6/19/2011        | April 2015                                                        |
| Empower Lexington Plan                                                                                            | Kay              | 3/20/2012        | Annual Update Summer 2015                                         |
| Distillery District Update                                                                                        | Kay              | 11/6/2012        | Nov 2014; May 2015                                                |
| Urban Forestry Management Plan                                                                                    | Gibbs            | 1/28/2014        | Item recommended in Tree Canopy Survey<br>To be heard Summer 2015 |
| Retention/Detention Maintenance & Enforcement                                                                     | Mossotti         | 10/14/2014       | Fall 2015                                                         |
| Private Streets: Enforcement, Maintenance & Specifications                                                        | Mossotti         | 11/29/2013       | Fall 2015                                                         |
| Review & Update Snow & Ice Control Plan / Annual Update                                                           | Stinnett / Brown | 2/24/2015        | May 2015; updated plan in Aug./Sept. 2015                         |
| Fiber Optic Technology                                                                                            | Farmer           | 5/6/2014         | Sept 2014                                                         |
| Streetlights -- Analysis of lighting types, installation/lease costs, rebates for LED lights                      | Mossotti         | 10/14/2014       | March 2015                                                        |
| Todd's Road Widening Phase II                                                                                     | Stinnett         | 4/15/2009        | Ongoing, last reported to committee Jan. 2015                     |
| Safe Routes to School                                                                                             | Ford             | 1/22/2015        | March 2015                                                        |
| Pavement Management                                                                                               | Farmer           | 2/12/2015        | February 2015                                                     |
| Keep Lexington Beautiful Annual Report                                                                            | Henson           | 3/10/2015        | April 2015                                                        |
| <b>Traffic Signal System</b>                                                                                      | <b>Stinnett</b>  | <b>3/17/2015</b> | <b>June 2015</b>                                                  |
| Changing Signalized Intersections to Four Way Stops -- Woodland Ave. & Central Ave., Kentucky Ave. & Central Ave. | Gibbs            | 4/7/2015         | April 2015                                                        |
| <b>Neighborhood Traffic Management Program</b>                                                                    | <b>Moloney</b>   | <b>4/14/2015</b> | <b>June 2015</b>                                                  |
| Reduction of Speed Limit on Jouett Creek Drive                                                                    | Scutchfield      | 4/21/2015        | May 2015                                                          |
| Sidewalks -- Priority List & Funding                                                                              | Stinnett         | 6/2/2015         |                                                                   |