Project No. 16L0004

Bowman Avenue and Vermilion Street Study

City of Danville

June 2018

HANSON

Engineering | Planning | Allied Services

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SECTION 1.0 EXECUTIVE SUMMARY

Hanson Professional Services and RATIO were hired by the Danville Area Transportation Study (DATS) to review Bowman Avenue and Vermilion Street and evaluate economic and transportation related alternatives for reducing the concentration of traffic along Vermilion Street.

An assessment of the existing economic conditions shows pockets of economic stability and growth centered on:

- The northern portions of Vermilion Street (IL Route 1) for commercial development.
- The residential corridor surrounding Vermilion Street from Voorhees Street to Winter Avenue.
- The intersection of Main Street and Bowman Avenue.

It will be the responsibility of Danville area leaders to leverage the stability of these economic zones while concurrently focusing their energies on efforts that will modernize the local economy and reverse employment and population declines. This effort can be supported through improvements to existing infrastructure assets that promote and enhance quality of life and economic conditions. Overarching themes from the public involvement effort were centered on the desire to calm traffic on Vermilion Street, make Vermilion Street safer between Voorhees Street and Winter Avenue, use the existing assets to make north-south travel easier, and remove delay associated with the Bowman Avenue grade crossings.

Using the information on relating improvements to quality of life and the potential for creating economic growth for a 21st Century digital economy, transportation needs and improvements identified. Each improvement was summarized by expected benefits of the project, potential implementation time frame, the necessary catalyst for moving forward, and the relative cost.

It is recommended to consider the “Be Prepared to Stop” wig-wag for Bowman Avenue for immediate implementation.

Following the implementation of the wig-wag, updates to Vermilion Street, including a road diet or raised intersection, should be discussed with IDOT to determine opportunities for improvements. The roadway is currently IL Route 1 and is under the jurisdiction of the Department.

The Bowman Avenue grade separations should continue to be studied until the benefit cost ratio is determined to be above 1.0. Items to include in the benefit-cost ratio include reduction in rear-end crashes as well as the efficiency benefits to the City of Danville Fire Department response times and operational costs.

The improvements to the Voorhees Street rail crossings and the Lynch Road improvements should be implemented as additional development begins to occur on Lynch Road.

A table summarizing all the studied transportation improvements is provide on the next page.

Improvement	Quality of Life	Facilitate 21st Century Digital	Recommended Time Frame	Catalyst	Cost
Vermilion Street Traffic Calming and Beautification	✓		Near Term (1-5 Years)	Coordination and Agreement with IDOT	$$$
Bowman Avenue Grade Separations	✓		Mid Term (5-10 Years)	Benefit Cost Ratio above 1.0 including reduction in crashes and impacts to the Danville Fire Department *Or* Additional Residential Development on North Bowman Avenue	$$$$
Bowman Avenue Flashing Wig-Wag	✓		Immediate (0-1 Years)	Design and Coordination with the Railroads	$
Voorhees Street Grade Separation	✓	✓	Long Term (10+ Years)	Additional Development in vicinity of Lynch Road	$$$
Intersection Improvements at Lynch Road and Main Street		✓	Long Term (10+ Years)	Additional Development in vicinity of Lynch Road	$$
Extension of Lynch Road North from Voorhees Street		✓	Long Term (10+ Years)	Additional Development in vicinity of Lynch Road	$$$

SECTION 2.0 DEFINING VISION AND GOALS

Using trend lines from 1990 to 2017, the Danville area employment data illustrates past and future economic challenges. These trend lines are shown in Figure 1.

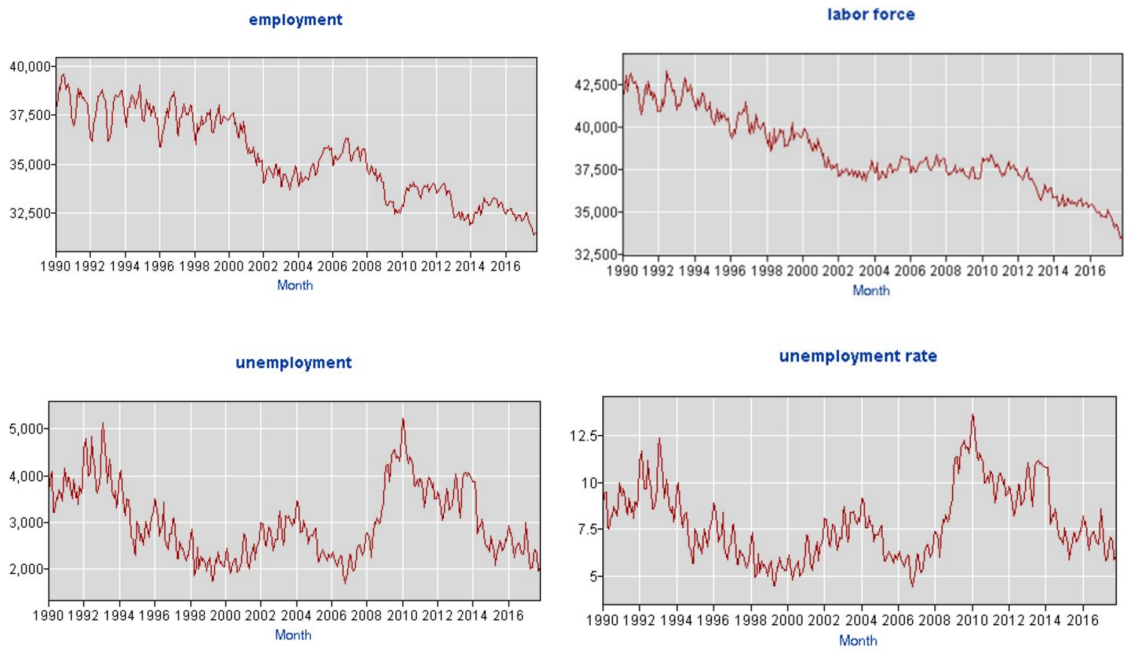

Figure 1: Existing Economic Trendlines

However, the in-depth assessment of the existing economic conditions shows pockets of economic stability and growth centered on:

- The northern portions of Vermilion Street (IL Route 1) for commercial development.
- The residential corridor surrounding Vermilion Street from Voorhees Street to Winter Avenue.
- The intersection of Main Street and Bowman Avenue.

It will be the responsibility of Danville area leaders to leverage the stability of these economic zones while concurrently refocusing their energies on efforts that will modernize the local economy and reverse employment and population declines. The goal of this document is to:

- Provide ways to leverage existing infrastructure assets in support of improvements to quality of life and economic conditions, and
- Present a vision for shifting the economic paradigm of the Danville region. The vision presented is not the only way to achieve success, but it is intended to provide the kind of thought provoking discussion required to lead the region towards future prosperity.

Transportation infrastructure improvements should support at least one of the two parts of the vision. Ideally, projects would support both an improvement in the quality of life for existing residents and a shift to a 21st century digital economy. The ability to support both objectives helps limit unwarranted capital investment and provide targeted funding opportunities once the market establishes its needs. The descriptions of these objects along with identification and analysis of the transportation projects that support the economic evolution of the region follows.

2.1. Quality of Life

Quality of life can mean different things to different portions of the population within any region. In Danville, congestion is relatively minor, so recommended transportation projects that support improvements in quality of life should provide:

- comfortable walking and biking facilities,
- fewer vehicular crashes,
- efficient response from emergency services, and
- neighborhood redevelopment and stability.

Achieving these types of goals can stabilize, or even enhance, existing economic success through increasing property values, a more inviting environment to visitors, amenities for existing residents, and positive first impressions to people considering relocation to Danville.

The transportation improvements associated with this type of situation are not usually new alignment projects, but rather, projects that rebuild or maintain existing infrastructure. Incorporating road diets, right-of-way beautification, and other urban street design elements into regular maintenance or life cycle reconstruction is generally a cost effective method of project delivery.

Compiling the information gathered through the public involvement process and the existing conditions analysis, the residential context zone of Vermilion Street (Voorhees Street to Winter Avenue) should be considered for an urban redesign. The goal of the urban redesign would be to slow traffic through the context zone to create a safer condition for vehicles, pedestrians, and bikes without having a detrimental impact on the capacity of the roadway. The improvements should be constructed without the purchase of right-of-way and could include converting the road cross section from four to three lanes along with street trees in a green space between the curb and sidewalk, and the construction of wider sidewalks that meet public right-of-way guidelines (PROWAG).

Identified Transportation Need: *Urban Redesign of Vermilion Street (Voorhees to Winter)*

In Danville, at-grade crossings between busy railroads and arterial streets like Bowman Avenue or Voorhees Street can become barriers to commerce, create noise disturbances, require additional life-safety service investments, and create severe crashes between pedestrians, bikes, vehicles, and trains. The at-grade crossings along Bowman Avenue and Voorhees Street are example locations where grade separations should be installed.

Identified Transportation Need: *Improved Mobility on Bowman Avenue and Voorhees Street*

Investment in residential neighborhood plans for areas near the Main Street/Bowman Avenue intersection can help revitalize the local residential real estate market as well as provide a blueprint for creating new and attractive housing options. This type of planning document could be used to develop strategies to inventory and revitalize homes on the south end of the Bowman Avenue corridor. A neighborhood plan should take opportunities for demolition, infill, and adaptive reuse into consideration before making a recommendation to pursue greenfield residential development.

Lastly, quality of life is usually enhanced through retention and development of employment opportunities, and an effective way to stabilize the local job market is to inventory existing buildings or engage successful small businesses in transition and growth planning. Danville can use its existing EPA Brownfield Grant to complete these efforts.

2.2. Growth in the 21st Century Digital Economy

A vision for the Danville area could be to create a 21st Century digital economy and build the transportation system that will support such an endeavor. Transformation of the local economy is intended to restore the employment and population base that was lost over the past generation. It will take another generation to build a high-skill workforce that can support a 21st Century digital economy. The high-skilled workforce and digital economy could be based on technologies like the Internet of Things (IoT) and 3D manufacturing. The transportation improvements that support these efforts should be considered for long term capital planning and implemented on an as needed basis given development conditions.

The suggested digital economy will significantly reduce manufacturing production costs by replacing rote labor jobs with full-scale robotics and processing automation. These types of activities will allow many manufacturing companies to return to the United States from countries where labor is cheap but digital expertise is rarer. Industries of this nature require proximity to engineering talent and a sophisticated workforce that can understand, maintain, and operate advanced manufacturing equipment.

Danville can take advantage of these trends and rebuild its workforce by leveraging the following competitive advantages:

- Proximity to advanced engineering institutions and their graduates. The University of Illinois, Purdue University, and Rose Hulman Institute of Technology are all within a few hours of Danville. These universities will provide the highly educated leadership that can make the “I-74 Advanced Manufacturing and Logistics Corridor” a reality. The Danville Area Community College will also play a vital role in job training and matching pre-certified individuals with local employers’ accelerating need for talented, tech-savvy employees. Figure 2 shows the engineering institutions in relation to the City of Danville.

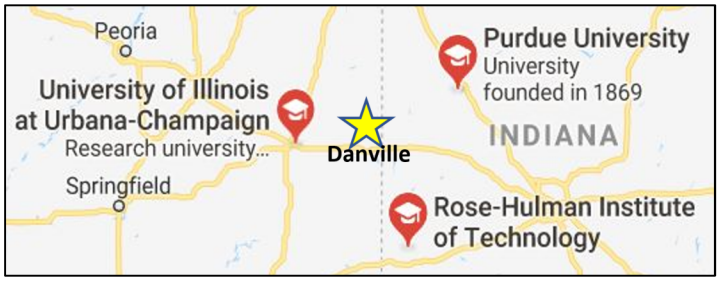

Figure 2: Map of Advanced Engineering Institutions

- Proximity to 40 million people within a five-hour drive. Chicago, St. Louis, Indianapolis, Louisville, Cincinnati, Columbus, and Milwaukee are all within the five hour drive limit. This allows for on-demand shipping for parts and products between these major metropolitan areas without the daily delay that comes with operating inside of one.
- Immediate access to I-74 and CSX and NS Railroads. Trucks will need easy and direct access to I-74, which is fast becoming an Advanced Manufacturing and Logistics Corridor through the heart of the industrial Midwest from Cincinnati to the Quad Cities. The I-74 Corridor is intersected by six major interstate highways that serve critical manufacturing corridors: I-55 (St. Louis-Chicago), I-57 (Chicago-Memphis), I-65 (Chicago-Nashville), I-69 (Detroit-Houston), I-75 (Detroit-Atlanta), I-71 (Louisville-Cleveland).

Throughout the study process, stakeholders mentioned a desire for greenfield logistic and industrial development on North Bowman Avenue, and it was believed that unpredictable congestion at the

Bowman Avenue at-grade crossings combined with the need for more travel lanes on North Bowman Avenue limited the opportunities for this development.

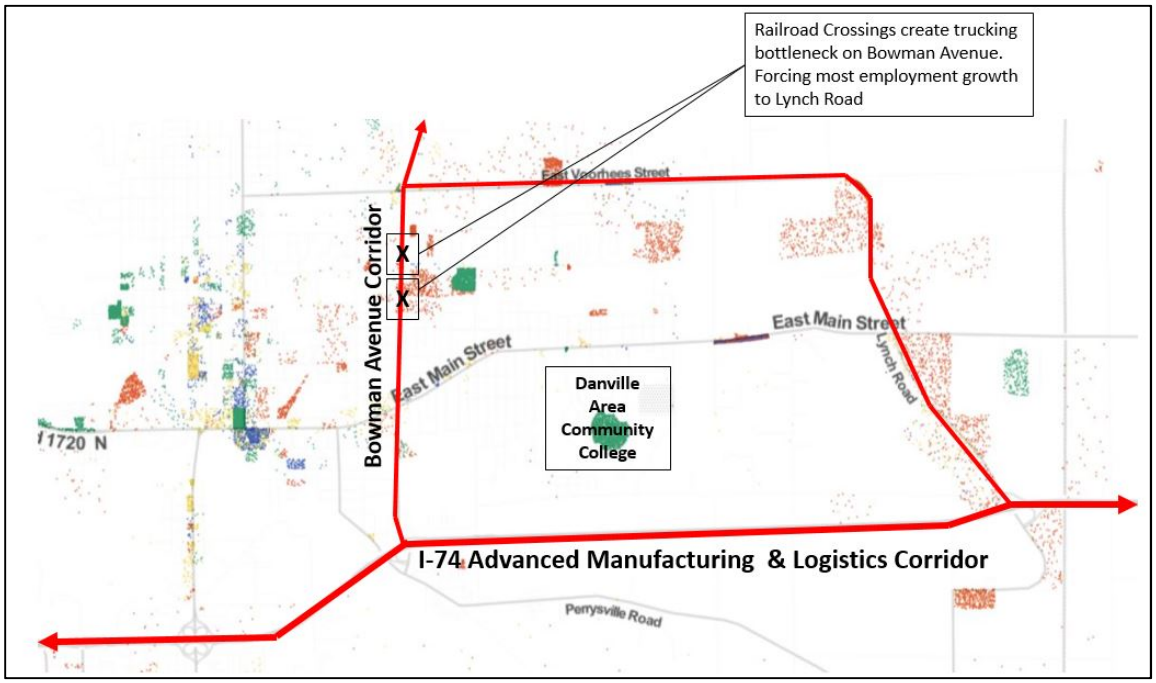

Figure 3: Advanced Manufacturing and Logistics Corridor

However, ground conditions give anecdotal evidence that logistic and manufacturing business prefer the more direct access to I-74 that the Lynch Road area provides. Fortunately, this portion of the urbanized area also has undeveloped land that could be used for these purposes.

Available ground around Lynch Road can contribute approximately 1,700 acres that could be used for advanced manufacturing and logistics development. Most of these undeveloped areas are served by, or could be relatively easily served by, water, sanitary sewer, and low cost roadway improvements.

Identified Transportation Need: *Truck Accessibility Upgrades on Lynch Road, Voorhees Street, and Makemson Road*

The development map in Figure 4 represents possible Near-Term (1-10 years) development areas in blue with orange road upgrades, and the red area represents Future Long-Term (10-20 years) development area with the yellow road upgrades for future development in this area. The Near-Term development areas represent more than 1000 acres while the Future Long-Term development area has an additional 700 plus acres. The road upgrades should be deferred until a development is committed and ideally, part of the initial construction burden could be incentivized or potentially shared with the developer.

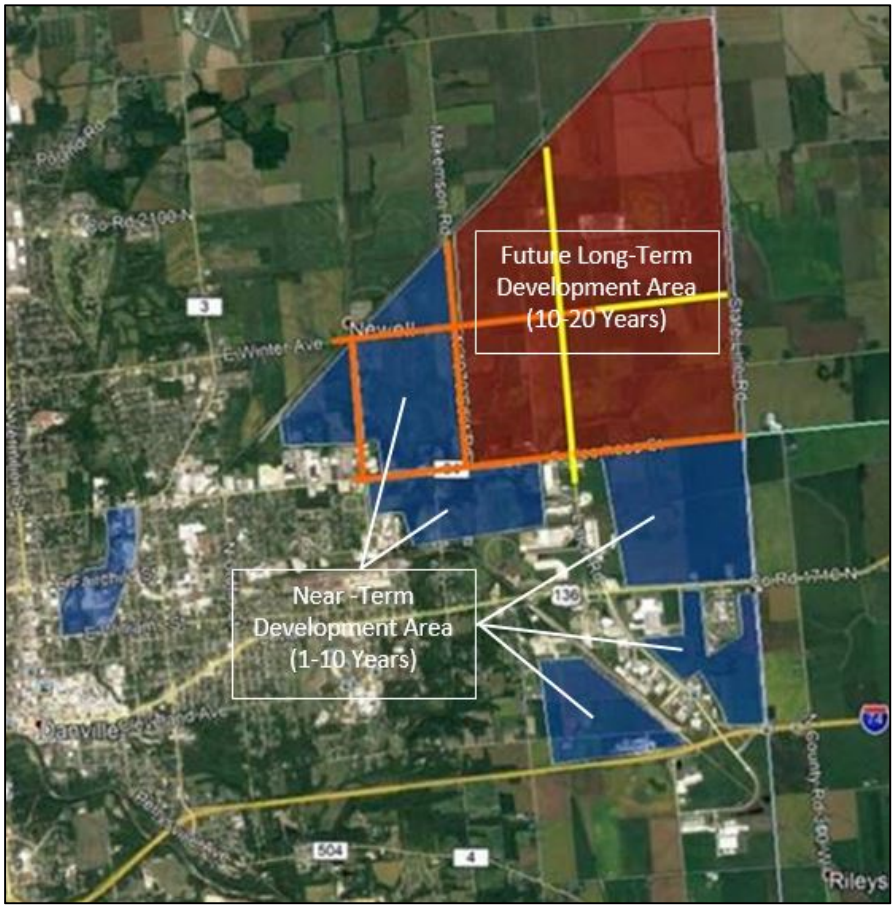

Figure 4: Industrial Use Development Map

Approximately 1,700 acres could attract 30-70 advanced manufacturing and logistics firms, creating 2,400-7,000 new jobs. This would have a ripple effect, or “multiplier effect”, within the Danville economy that could result in 3,400-11,000 new jobs in total. A summary of the household projections and housing unit demand increases is shown in Table 1.

Population will follow employment if Danville continues to improve its quality of life and K-12 educational system. If not, many top employees will commute to Danville from other regional centers in Illinois and Indiana.

This will increase the demand for rental and for-sale housing options in the Danville metropolitan area. Though this will occur over a 20-30 year period, the planning must be completed today to prepare for future growth.

Table 1: Household Projections and Housing Unit Projected Demand

Factor	Low Estimate	High Estimate	Comment
Total Employment	2,400	7,000	Derived from filling ~1700 acres of Advanced Manufacturing & Logistics with 30-70 firms with between 75-100 jobs/firm.
Total Population	6,000	17,000	Population derived from a 2.5 multiplier for every job created consistent with current job/population ratio.
New Households	2,500	7,100	Used 2.4 person per household consistent with current household size in Vermilion Co.
Owner Units (60%)	1,500	4,250	Vermilion Co. homeownership percent is 60% as of 2017 estimates.
Rental Units (40%)	1,000	2,850	Rental is around 40% for Vermilion Co.

The population expansion allows for future residential and mixed use growth around the Liberty Lane/Bowman Avenue intersection, and the development also supports quality of life goals associated with concerns obtained during the public involvement process that new growth should be encouraged to locate along North Bowman Avenue.

The conservative growth estimates in Danville may generate new demand for about 25,000 SF of commercial retail. This could be coupled with multifamily residential development of around 150 new apartment units, requiring about 150,000 SF and likely be built on two levels. If joined with commercial retail, a 175,000 SF mixed-use commercial development may be viable with future employment and population growth along North Bowman Avenue. The Liberty Lane/Bowman Avenue intersection may be an excellent location for this mixed-use project as it is able to support the 12-acre footprint required by such a development. Figure 5 shows the residential and mixed use development map.

Using the more conservative population growth projection, the single-family residential market would also receive a significant boost of around 1,500 housing units. Much of this housing will go to existing homes in Danville, but new housing may likely be demanded as well. Land along the west side of North Bowman south and north of Liberty Lane would fit existing land use patterns of single-family residential in the area. It could generate growth for 800-1200 new homes and would likely require 200 acres over the next 20-30 years.

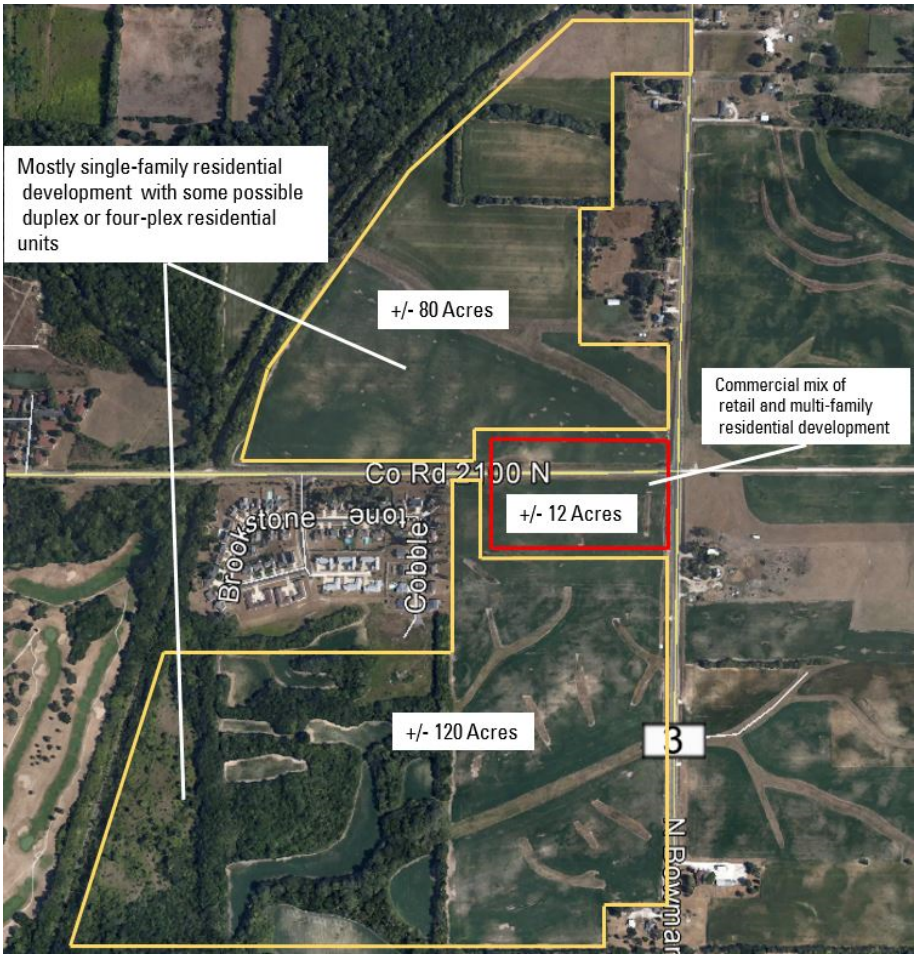

Figure 5: Residential and Mixed Use Development Map

Identified Transportation Need: *Transportation Network Improvements to Facilitate Residential and Commercial Growth on North Bowman Avenue*

SECTION 3.0 SAFETY ANALYSIS

A safety analysis reviewed crashes from 2012 through 2014.

Vermilion Street, from Fairchild Street to Voorhees Street experiences the highest crash rate on the portion of Vermilion Street studied. However, the severity rate of this section is among the lowest in the studied area. Most of the crashes occur at the major intersections along Vermilion, and safety improvements will be considered along the corridor in the upcoming evaluations. It should also be noted that the second highest crash rates within the studied Vermilion Street corridor is from Voorhees to Winter, which is most likely due to the lack of a center two-way left turn lane and high density of driveways and side streets.

Bowman Avenue between Main Street and Voorhees Street also experiences a high crash rate, and the severity rate is high as well. This is a trend that should investigated. The crash type with highest rate was rear-end crashes with 66 crashes over the three year period with 21 of the crashes resulting in some level of injury. There are two railroad at-grade crossings that could be contributing to the rear-end crashes.

Identified Transportation Need: *Rear End Crash Reduction on Bowman Avenue*

Table 2: Crash Analysis

Corridor	Segment	3-Year Crash Totals						Average ADT	Length of Segment (mi)	Crash Metrics	
		Total	Fatal	A Injury	B Injury	C Injury	PDO			Crash Rate	Severity Rate
Bowman Avenue	**I-74 to Main**	**19**	0	4	2	1	12	9040	1.10	**1.7**	**3.2**
Bowman Avenue	**Main to Voorhees**	**141**	0	4	20	22	95	8100	1.40	**11.4**	**2.0**
Bowman Avenue	**Voorhees to Winter**	**29**	0	3	2	5	19	7900	1.15	**2.9**	**2.3**
Bowman Avenue	**Winter to Newell**	**27**	1	0	4	0	22	6060	2.05	**2.0**	**1.9**
Vermilion Street	**Fairchild to Voorhees**	**61**	0	2	7	11	40	17700	0.50	**6.3**	**1.9**
Vermilion Street	**Voorhees to Winter**	**85**	0	3	12	7	63	17100	1.00	**4.5**	**1.9**
Vermilion Street	**Winter to Liberty**	**92**	0	5	8	11	68	21660	1.00	**3.9**	**1.9**
Vermilion Street	**Liberty to Newell**	**98**	1	3	6	10	78	13040	2.00	**3.4**	**1.7**

SECTION 4.0 STAKEHOLDER INFORMATION GATHERING

A public survey was available online or in hard copy at the public meeting. The survey was advertised on the City's website and on flyers.

The questions and responses were:

1. Would you be more likely to walk/bike if Vermilion Street was safer?
    - 56% No, 43% Yes, 1% Skipped
2. Would you be more willing to us Bowman Avenue for Driving, rather than Vermilion Street if:
    - In order of most frequent selection: there were railroad overpasses/underpasses, it had more travel lanes, less traffic signals, and higher speed limits
3. As a driver, do you avoid any specific intersections, street or railroad crossing in Danville?
    - 75% Yes, 24% No, 1% Skipped
        - Most common words were Bowman and Vermilion
4. Do you consider Vermilion Street to be safe?
    - 56% Yes, 43% No, 1% Skipped
5. If you do not consider Vermilion Street to be safe, please select the following characteristics that you believe would help improve safety.
    - In order of most frequent selection: add a center lane from Voorhees to Winter, decrease the amount of traffic, decrease truck traffic, decrease vehicular speeds, Increase distance from the curb to the sidewalk, and widen sidewalks
6. As a pedestrian, do you avoid any specific intersections, street or railroad crossing in Danville?
    - 59% No, 35% Yes, 6% Skipped
        - Most common word was Vermilion
7. As a bicyclist, do you avoid any specific intersections, street or railroad crossing in Danville?
    - 63% No, 22% Yes, 15% Skipped
        - Most common words were Vermilion, Voorhees, and Gilbert
8. Do you live in Danville?
    - 86% Yes, 13% No, 1% Skipped
        - What is the nearest intersection to your house? Most common words were: Vermilion, Winter, Voorhees, and Bowman
9. What do you like about Vermilion Street?

- Most common words: Vermilion, homes, lanes, and north.

At the public meeting, several concepts were presented and the public was asked to place stickers to "vote" on their preferred solution.

The first board showed the "Danville Trends" which outlined the information presented in the existing conditions economic analysis. The board is shown in Figure 6.

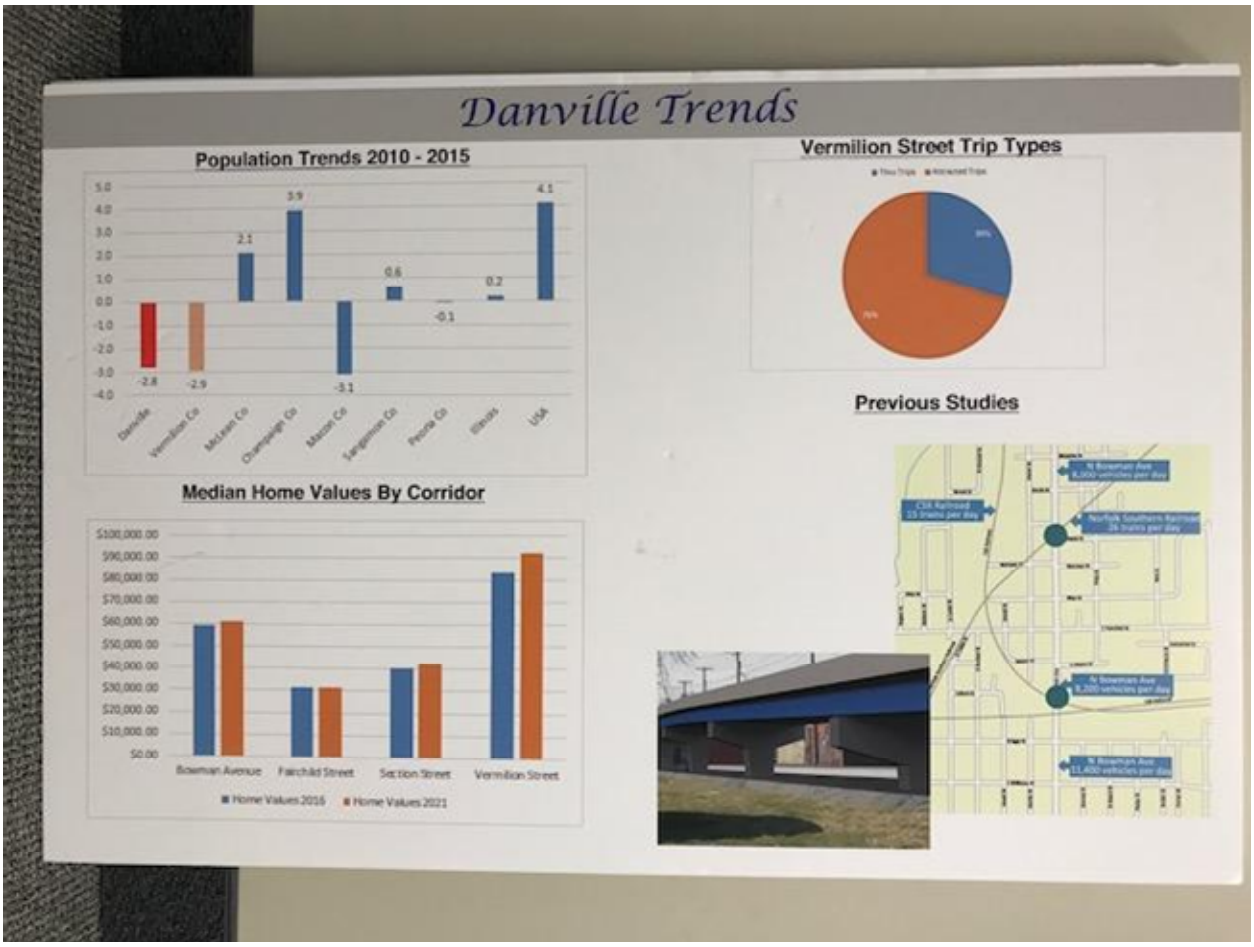

Figure 6: Danville Trend Public Involvement Board

The second board asked the question "Beltline or Bowman?" At the station, it was explained that the purpose of the Beltline project was to create a bypass of the downtown area for freight and passenger vehicles. This would help preserve Vermilion Street and create more efficient movements of freight. However, this is an expensive option. The other alternative is to improve Bowman Avenue in order to accomplish some of the same goals. There were spaces to place stickers next to "Beltline", "Bowman" or "No Build." As shown in Figure 7, Beltline and No Build were tied with five votes and using Bowman had nine votes.

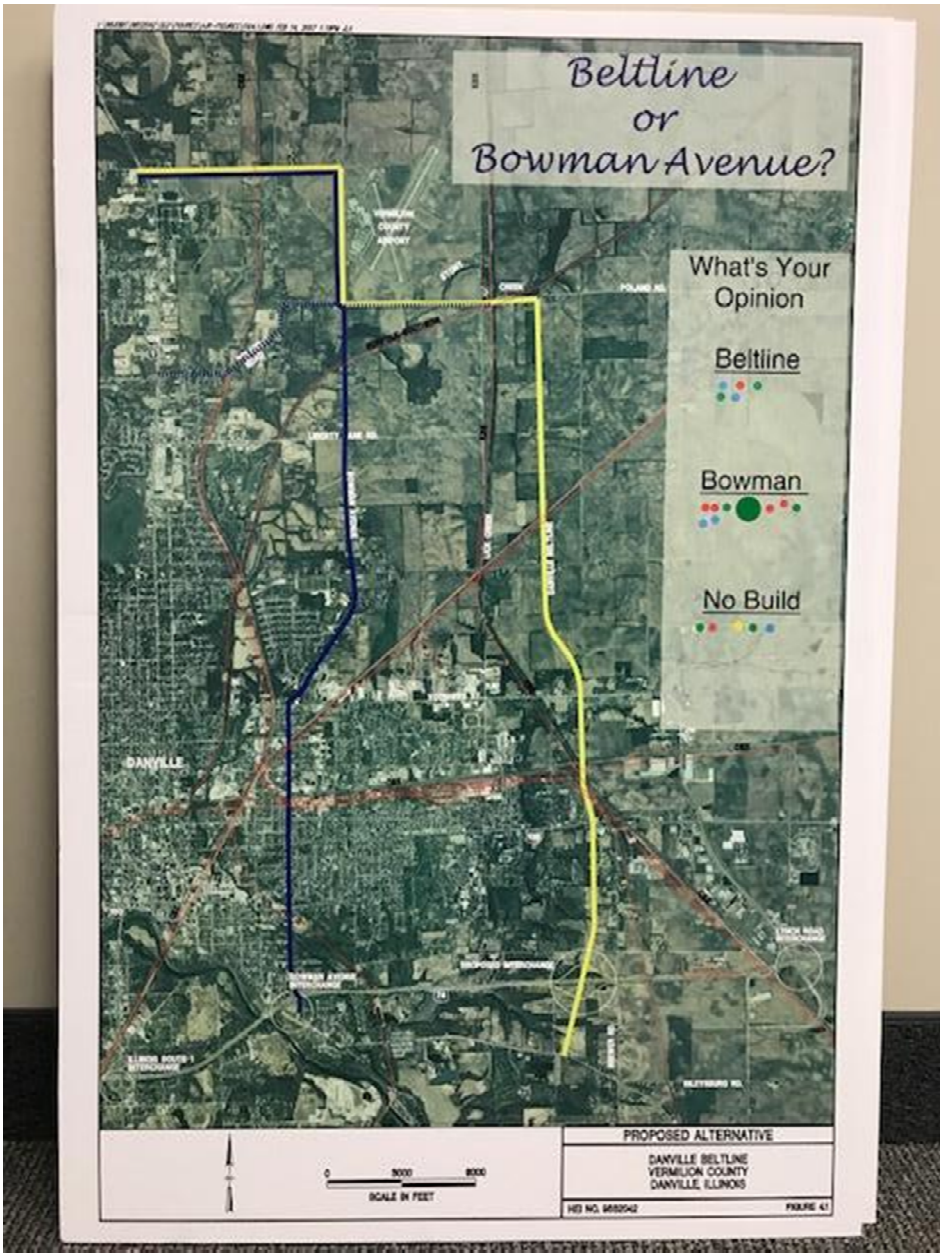

Figure 7: Beltline or Bowman Avenue Public Involvement Board

The third board asked the attendants to mark where they experienced delay and/or unsafe conditions. Delay was primarily associated with the railroad crossings and the most frequent unsafe conditions were noted on Vermilion Street between Voorhees Street and Winter Avenue. Figure 8 shows the board with the public responses.

Figure 8: Safety and Delay Public Involvement Board

The fourth board showed the conditions for pedestrians on Vermilion Street. The attendants were then asked what they would do to create more pedestrian space on Vermilion Street. The options included: reduce travel lanes, purchase land, or do not create more pedestrian space. As seen in Figure 9, the most popular answer was “reduce travel lanes”, followed by “do not create more pedestrian space”. “Purchase land” was the least popular option with only a single vote. The “do not create more pedestrian space” and “Purchase Land” responses were interpreted to mean that constituents would like to preserve the private property that fronts Vermilion Street by supporting reduction in travel lanes to create more comfortable and wider sidewalk facilities.

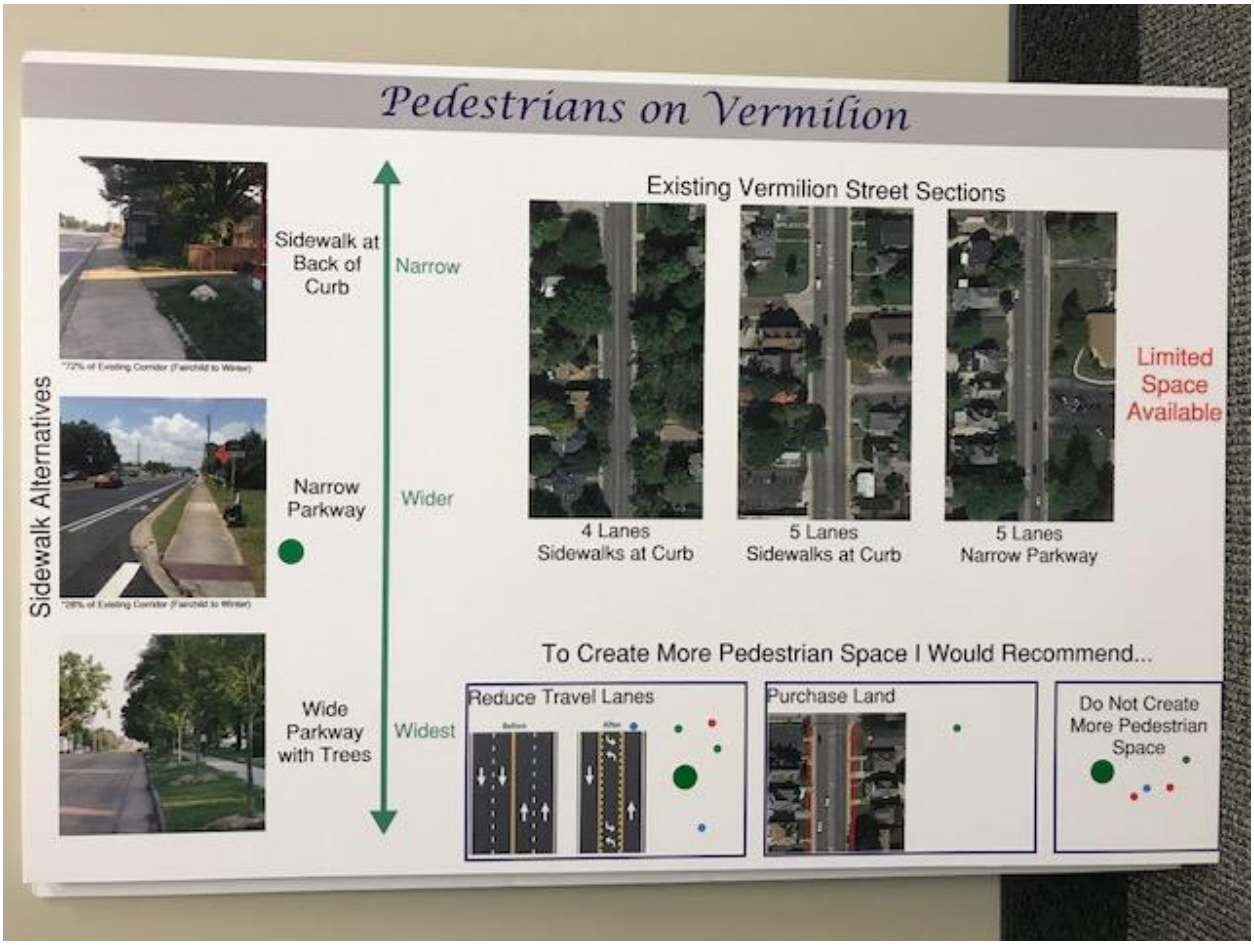

Figure 9: Pedestrians on Vermilion Public Involvement Board

The fifth and final board addressed speeds on Vermilion Street. The first question asked if people drive at an unsafe speed on Vermilion. Fourteen people answered yes and 4 people answered no. The bottom of the board then displayed several traffic calming measures that could be incorporated and asked for opinions. The options included reduce travel lanes, dynamic speed signs, and installing urban design elements. All the options saw similar levels of support. Figure 10 shows the board.

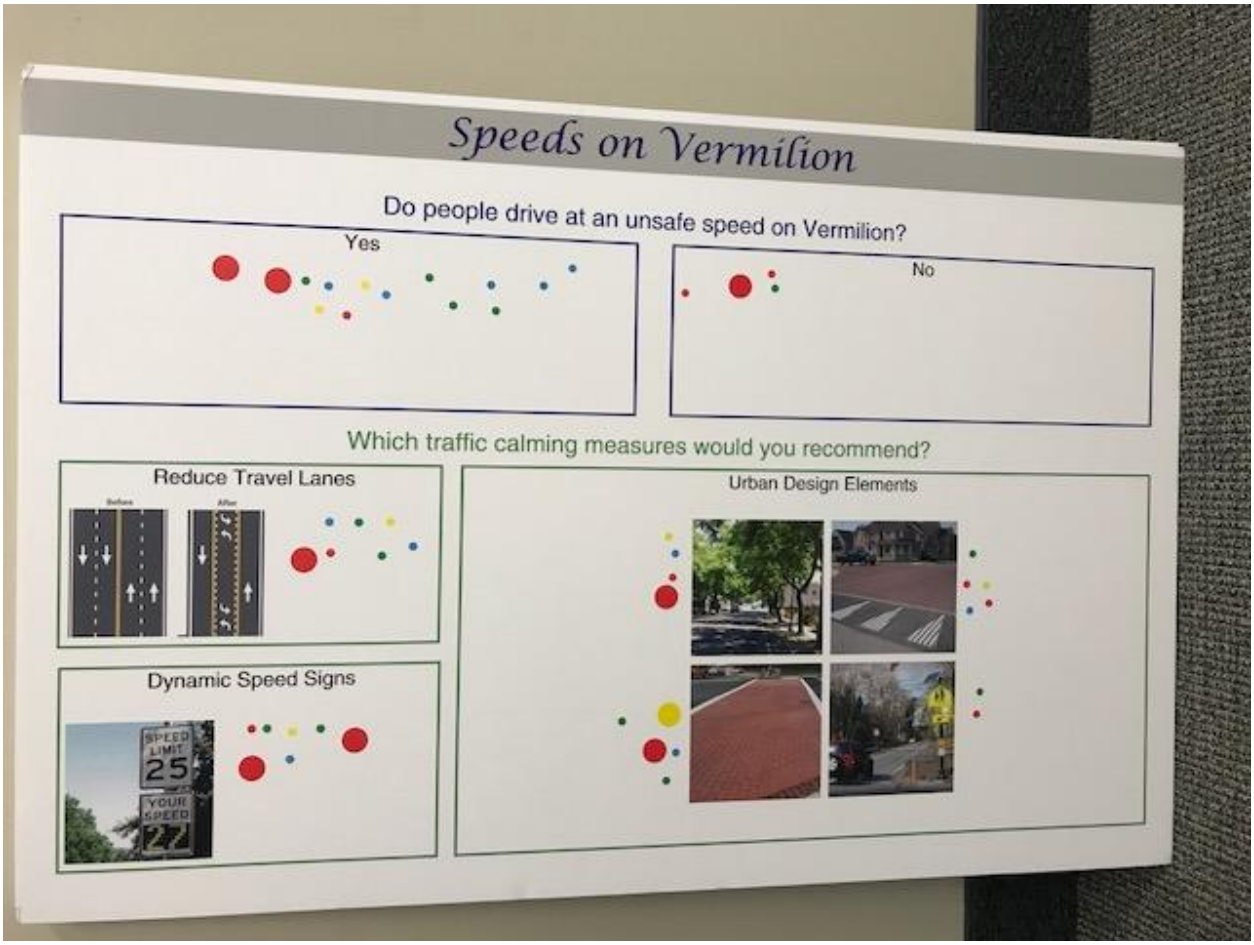

Figure 10: Speeds on Vermilion Public Involvement Board

The overarching themes of the public involvement process centered around the desire to calm traffic on Vermilion Street, make Vermilion Street safer through the four lane section, use the existing assets to make north-south travel easier, and remove delay associated with the Bowman Avenue grade crossing.

Identified Transportation Need: *Traffic Calming and Safety on Vermilion Street and Delay Reduction on Bowman Avenue*

SECTION 5.0 EXISTING AND NO BUILD TRAFFIC CONDITIONS

The average daily traffic (ADT) counts are posted online at gettingaroundillinois.com. The data is collected by either IDOT or local agencies and then combined in a single source that is publically available. Data is typically collected every other year for each location.

The ADT's for the past 11 years along the major corridors in Danville were collated along with the annual percent change for the past 10-11 years. In general, the corridors experienced some volume reductions or very small volume growth.

The roadways were grouped into sections to determine a projected growth rate. Although the traffic volumes have been historically declining, the lowest growth rate that was assumed was 0.0% and the highest growth rate assumed was 1.0%. In general, the growth rates coincided with data provided in the existing market analysis. Vermilion was shown as growing the most between 0.5% and 1.0% annually while Bowman Avenue was shown growing the least with the north section expecting no growth.

Figures showing the growth rate of the corridors in Danville are attached in the appendix.

Using this methodology, the expected average daily traffic volumes by 2040 in the No Build Scenario along Vermilion Street are shown in Table 3.

Table 3: Projected Vermilion ADT, No Build

Vermilion Street Segment	Existing ADT	Future ADT
Fairchild Street to English Street	19,000	21,000
English Street to Voorhees Street	18,700	20,700
Voorhees Street to Winter Avenue	17,800	19,700
Winter Avenue to Liberty Lane	26,500	32,300
Liberty Lane to Poland Road	20,600	25,100
Poland Road to Newell Road	20,500	25,000

If volume growth in Danville continues to be concentrated along the Vermilion Street corridor, the four lane section between Voorhees and Winter may be over capacity and require a center turn lane or barrier median in order to facilitate safe and efficient traffic operations. Widening this section is not desirable by the public. When asked to consider options for safety and pedestrian improvements in this section of the Vermilion Street, the least desirable course of action was widening the corridor to a five lane section.

Existing five lane sections may require a barrier median in order to address existing and anticipated safety concerns.

Identified Transportation Need: *Prevention of Continued Traffic Consolidation on Vermilion Street*

Key intersections throughout Danville were analyzed to determine future intersection level of service with the existing geometry. The 2040 No Build expected levels of service for 8 intersections are shown in Table 4. The intersections are level of service "C", or better, which is an acceptable design. This is because the intersections have been designed with the necessary turn lanes to allow for proper operations.

Table 4: Expected Level of Service at Key Intersections, No Build

Key Intersection	Existing LOS	Future LOS
Bowman Avenue and Fairchild Street	B	B
Bowman Avenue and Main Street	B	B
Bowman Avenue and Voorhees Street	B	C
Bowman Avenue and Winter Avenue	B	C
Vermilion Street and Fairchild Street	C	C
Vermilion Street and Voorhees Street	B	C
Vermilion Street and Winter Avenue*	C	C
Main Street and Gilbert Street	C	C

** IDOT has recommended additional turn lanes at the Vermilion Street and Winter Avenue intersection. It was assumed the additional southbound right turn lane was to be constructed in 2018, and therefore, was included in both the existing and future analysis.*

SECTION 6.0 ADDRESSING THE TRANSPORTATION NEEDS

Several transportation needs were identified during the vision defining, data collection, and public involvement sections. The impacts of implementing these visions and transportation projects have been evaluated at a high level to guide future planning and preliminary engineering efforts. The transportation needs fit into three categories:

- Improvements to Vermilion Street
  - Urban redesign on Vermilion Street from Voorhees Street to Winter Avenue (Section 2.1)
  - Traffic Calming on Vermilion Street (Section 4.0)
- Mobility Improvements on Bowman Avenue
  - Improved mobility on Bowman Avenue and Voorhees Street (Section 2.1)
  - Rear End Crash Reduction on Bowman Avenue (Section 3.0)
  - Delay Reduction on Bowman Avenue (Section 4.0)
- Planning for Future Traffic Associated with Growth
  - Truck accessibility upgrades on Lynch Road, Voorhees Street, and Makemson Road (Section 2.2)

- Prevention of continued traffic consolidation on Vermilion Street (Section 5.0)

6.1. Urban Redesign and Traffic Calming on Vermilion Street

Two of the identified transportation needs touched on the concept of updating Vermilion Street to better match the surrounding context. Vermilion Street is primarily a residential corridor and the well-kept historic homes are holding or increasing in value. The 2016 median home value on Vermilion Street was $83,529. This value was expected to rise to $92,477 by 2021 which is an annual increase of 2.05%. This is solid growth in Illinois where home prices are expected to remain stagnant or fall. **The current roadway does not support these conditions.** The road is a wide four or five-lane facility with narrow sidewalks and heavy traffic volumes.

Previous speed studies have been performed along the corridor, and the observed 85th percentile speed is 43 mph. Since the noncompliance rate is greater than 50%, IDOT is recommending increasing the speed limit from 35 mph to 40 mph. The higher speed limit would likely increase the severity of pedestrian crashes and reduce safety through the high density access zones. Drivers are likely not complying with the speed limit because there is a disconnect between the roadway characteristics and expected operating speed. Geometric and urban design elements have been evaluated to reduce speeds as an alternative to increasing the posted speed limit.

The segment between Voorhees Street and Winter Avenue is the only four-lane section on the corridor. The quality of life portion of the regional overview and the public involvement process identified the need to slow vehicles and make a more comfortable environment for pedestrians through the residential context zone along Vermilion Street (Voorhees Street to Winter Avenue). Because of the residential character in this section of Vermilion, the public and city officials would like to achieve the intended goals without the purchase of right-of-way. Using that premise, Vermilion Street from Voorhees Street to Winter Avenue was evaluated for a potential road diet, converting four lanes to three lanes. Synchro/SimTraffic corridor level capacity analysis employing the No Build traffic demand assuming no migration to the surrounding streets shows the potential impacts that a road diet would have on Vermilion Street operations. The road diet would be expected to improve pedestrian comfort along Vermilion Street by:

- Decreasing vehicular speed through the area,
- Reducing vehicular crashes caused by the intersecting driveways/side streets by 20-40%, and
- Creating the room to add green space and street trees between the road and the sidewalk.

The right northbound lane on Vermilion would be dropped as a right turn lane at the intersection of Voorhees Street. The right side southbound lane would be dropped as a right turn lane at the intersection of Winter Avenue. If during preliminary engineering, the delay associated with a single southbound through lane is unacceptable, the southbound through lane could be continued and dropped after the intersection.

The impacts to the intersection of Vermilion Street and Voorhees Street include:

- Delay per vehicle at the intersection is estimated to be 30.7 seconds.
- There will be slight increases to the delay experienced for each movement.

- The westbound left turn lane will need to be extended 50 feet to accommodate the 95th percentile queue.
- All queues will clear during each peak hour cycle if the cycle length is lengthened to 120 seconds.
- Only the eastbound left turn movement is expected to increase to a level of service E (>55 seconds).
- Queues experienced at the intersection will be longer for the northbound through, southbound through, and westbound left turn movements.

The impacts to the residential segments include:

- Fewer gaps to turn from driveways and side streets onto Vermilion Street.
- Delay experienced for egress movements on side streets and driveways will slightly increase.

The impacts to the intersection of Winter Avenue and Vermilion Street include:

- Delay per vehicle at the intersection is estimated to be 34.7 seconds.
- A second northbound through lane will need to be added at the Vermilion Street and Raymond Avenue intersection.
- A westbound right turn lane should be constructed.
- The eastbound left turn movement will need to be extended 125 feet to accommodate the 95th percentile queue
- There will be increases to the delay experienced for each movement.
- The westbound left turn, westbound through, northbound left, and southbound left movements are expected to increase to a level of service E (>55 seconds).
- Of these movements, only the southbound left movement has an estimated demand greater than 70 vehicles per hour.
- Queues experienced at the intersection will be longer, especially for the southbound through and eastbound left turn movements.
- All queues will not clear during each peak hour cycle. The queues for the southbound through and westbound through will require two cycles to clear for approximately four traffic signals cycles during the peak hour.

The Vermilion Street and Winter Avenue intersection operations will be key to the perceived success of the road diet implementation. Currently, IDOT has completed an Intersection Design Study for Winter Avenue and Vermilion Street intersection. Since modifications to the intersection are pending, a detailed study of the road diet should be completed to influence IDOT's plan with the solution desired by Danville residents. The study should determine if drivers will begin to avoid the intersection or create unmet demand and congestion that Danville residents are not accustomed to encountering. There are three specific mitigations that need to be explored in more detail in order to determine the improvements that need implemented if a road diet is preferred.

1. The existing two southbound through lane configuration could be maintained southward to the intersection of Swisher Avenue and Vermilion Street. This configuration should provide level of service D or better (<55 seconds delay) for all movements and an approximate 30% reduction in the southbound queue length.

2. Consider improvements to intersections along Jackson Street and Gilbert Streets if traffic begins to migrate to those corridors due to congestion at the Winter Avenue and Vermilion Street intersection. This condition could be studied further with travel demand modeling efforts if a Vermilion Street road diet is a desired outcome of this study as the current analysis does not predict any migration to Jackson Street or Gilbert Street.

3. Traffic signal coordination with the signal to the north will likely improve the operations of the southbound through movement by 5-10%.

The urban redesign should focus on adding beautification elements and improved multi-modal facilities in order to create an attractive corridor that represents the heart of Danville as well as the character of the street when the homes were built. Figure 11 shows how the 66 feet of existing right-of-way could be reconfigured to include canopy trees, wider sidewalks, and a wide comfortable parkway. These features would create a sense of comfort and beauty that would match the historic homes that line the corridor. The vertical elements of the trees would create a visual tunnel that has been proven to slow traffic.

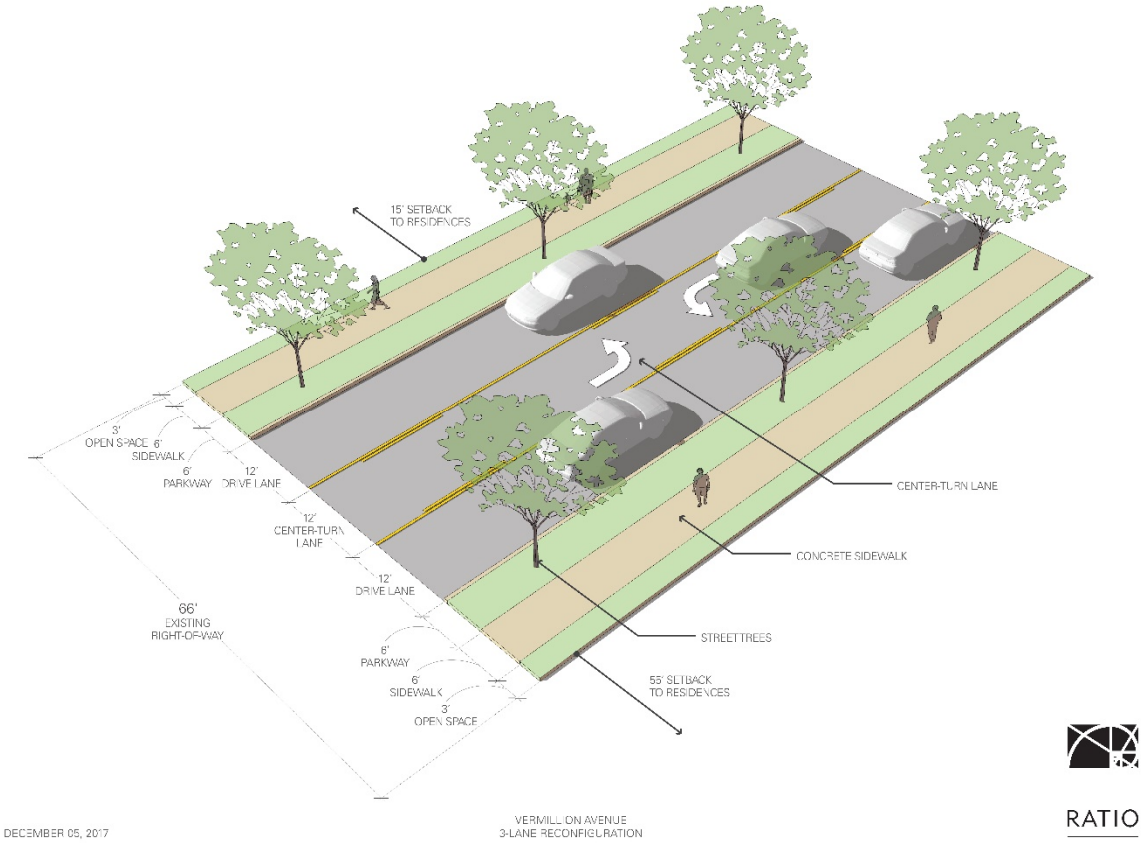

Figure 11: Three-Lane Section on Vermilion Street

Another potential option for traffic calming on Vermilion Street is the potential for raised intersections to highlight locations where pedestrians may be present and to bookend the sections of the corridor where the purpose of the street is not solely vehicular throughput. These intersections would help communicate a change in context to drivers. Figure 12 shows the potential layout of a raised intersection at Winter Avenue.

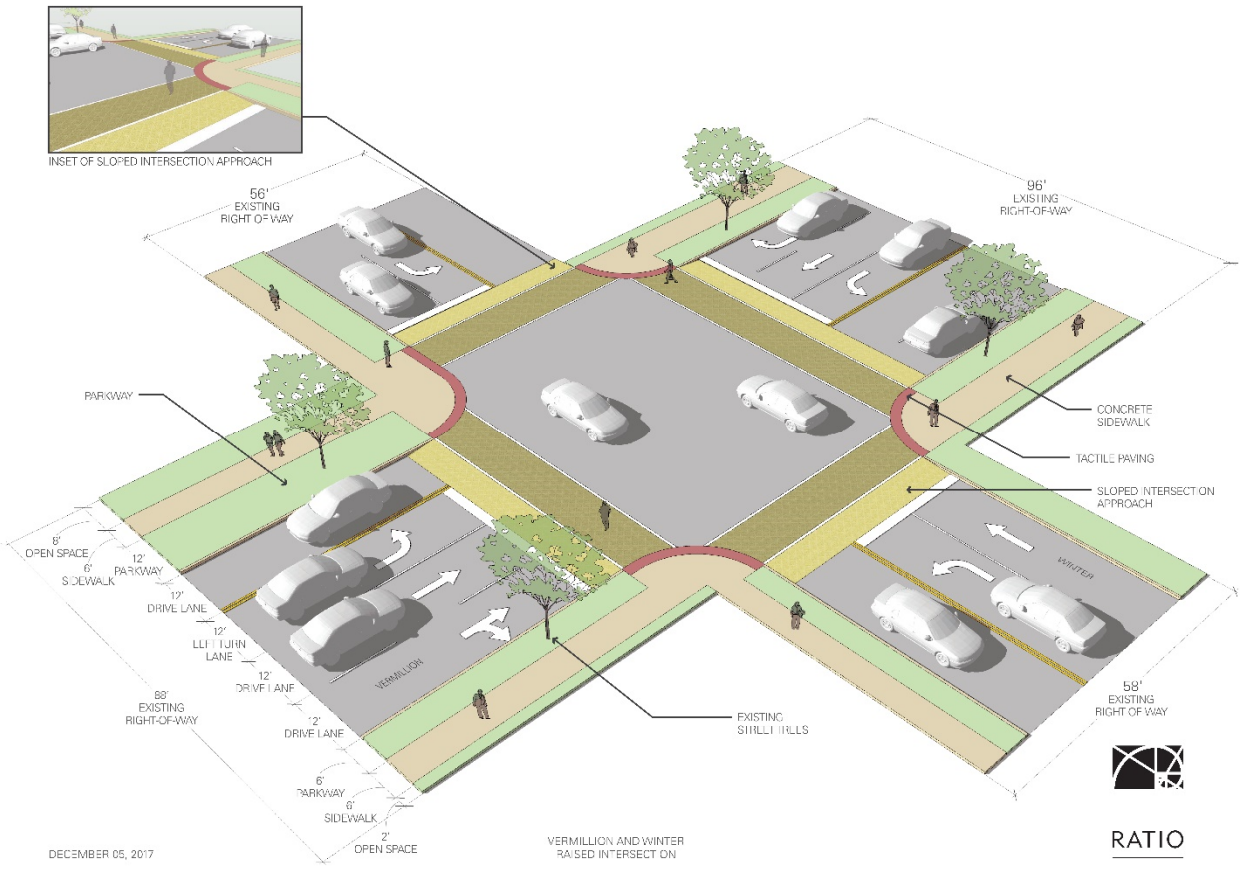

Figure 12: Raised Intersection at Winter Avenue and Vermilion Street

Another way to make Vermilion Street more inviting for pedestrians and other non-motorized travelers is the reduction of trucks on the corridor.

Streetlight Data uses cell phone usages and other GPS based applications to track a portion of all trips through the entire United States network. This allows for accurate extrapolation of ADT data into Origin-Destination pairs throughout the City. For this project, the data was used to estimate the rate that vehicles would likely reroute from Vermilion Street if an alternative route was provided.

The City was broken into 16 zones based on transportation barriers and the 5 major entry and exit locations were coded into the system. To determine how many trips would reroute, a “passthrough” marker was placed on Vermilion Street between Voorhees Street and Winter Street.

Figure 13 shows the origin and destinations zones for commercial trips that pass through Vermilion Street between Winter Avenue and Voorhees Street (Yellow Dot). The zones with darker red shades have a higher number of trips either beginning or ending in the zone. As shown, the zones near Vermilion Street are the heaviest and as the zones move further east, less trips on Vermilion Street are produced from these areas. This indicated that most of the commercial trips that are present on Vermilion Street are there because they are either beginning or ending on the corridor.

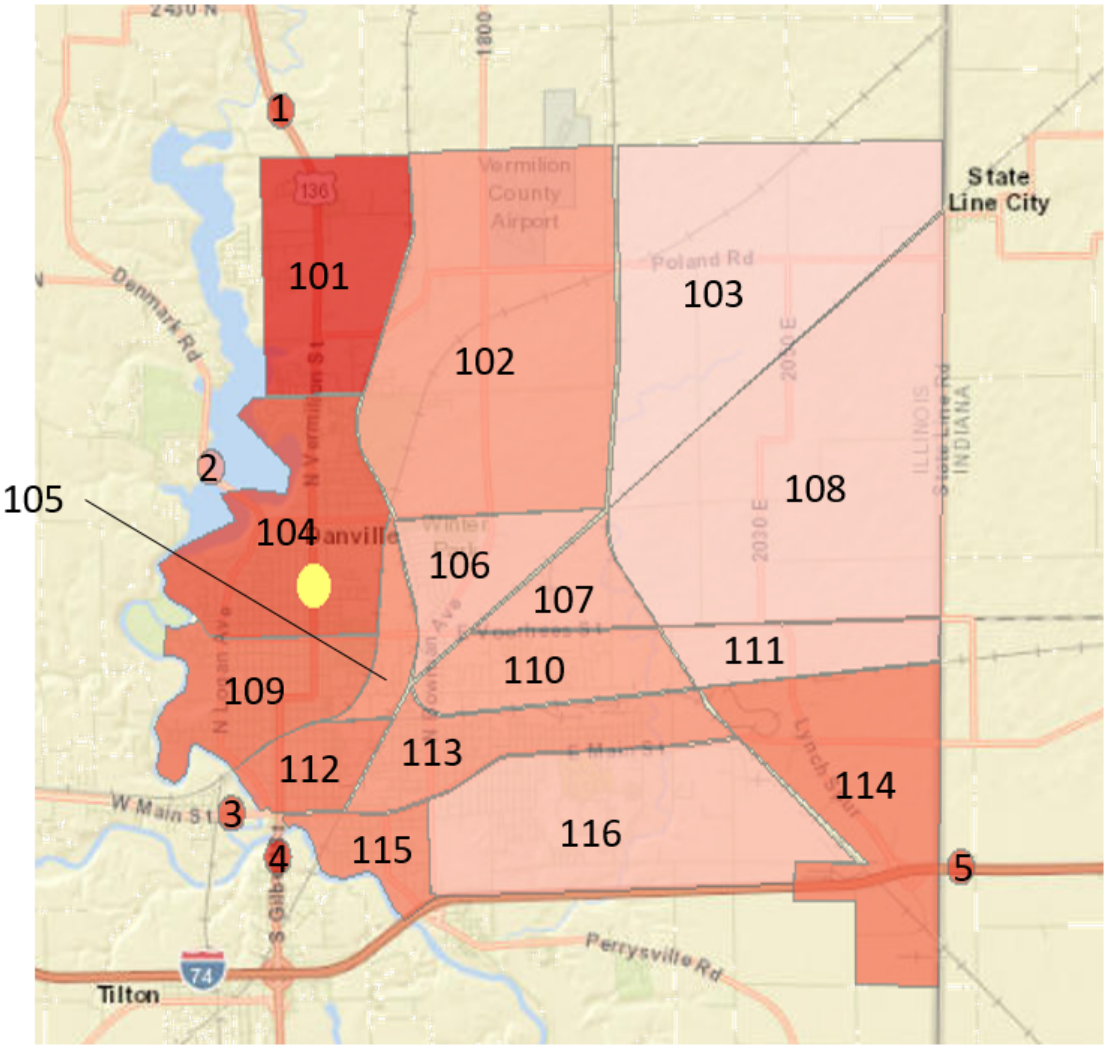

Figure 13: Trip Origin and Destination Zones

There are two types of commercial trips that would be able to relocate. They include:

- Trips that begin and end in locations that do not require traveling as far west as Vermilion Street (i.e. Zone 116 to Zone 1)
- Trips that begin and end outside of Danville that could be directed to use a different arterial

through town. (i.e. Zone 5 to Zone 1)

The percentage of existing commercial trips that would be able to reroute away from Vermilion Street are calculated in Table 5.

Table 5: Commercial Trips on Vermilion Street

Commercial Trips With Origins and Destinations That Do Not Require the Use of Vermilion Street

Origin	Destination	% of Vermilion Street Commercial Trips	Total
102	1	0.01%	0.42%
	4	0.20%	
	5	0.01%	
	103	0.00%	
	105	0.05%	
	106	0.01%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.03%	
	114	0.01%	
	115	0.11%	
	116	0.00%	
103	1	0.00%	0.02%
	4	0.02%	
	5	0.00%	
	102	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
105	1	0.35%	0.51%
	4	0.05%	
	5	0.00%	
	102	0.05%	
	103	0.00%	
	106	0.01%	
	107	0.00%	
	108	0.00%	
	110	0.02%	
	111	0.00%	
	113	0.01%	
	114	0.01%	
	115	0.02%	
	116	0.00%	
106	1	0.09%	0.14%
	4	0.01%	
	5	0.00%	
	102	0.00%	
	103	0.00%	
	105	0.01%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.01%	
	115	0.02%	
	116	0.00%	
107	1	0.50%	0.54%
	4	0.01%	
	5	0.01%	
	102	0.00%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.01%	
	114	0.01%	
	115	0.01%	
	116	0.00%	
108	1	0.01%	0.01%
	4	0.00%	
	5	0.00%	
	102	0.00%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
110	1	0.51%	0.56%
	4	0.01%	
	5	0.01%	
	102	0.02%	
	103	0.00%	
	105	0.00%	
	106	0.01%	
	107	0.00%	
	108	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
111	1	0.05%	0.06%
	4	0.00%	
	5	0.00%	
	102	0.00%	
	103	0.00%	
	105	0.00%	
	106	0.01%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
113	1	0.27%	0.33%
	4	0.02%	
	5	0.01%	
	102	0.02%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.01%	
	111	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.01%	
114	1	1.70%	1.75%
	4	0.03%	
	5	0.01%	
	102	0.00%	
	103	0.01%	
	105	0.00%	
	106	0.00%	
	107	0.01%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	115	0.00%	
	116	0.00%	
115	1	0.34%	0.55%
	4	0.02%	
	5	0.03%	
	102	0.12%	
	103	0.00%	
	105	0.02%	
	106	0.02%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.01%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
116	1	0.08%	0.09%
	4	0.00%	
	5	0.00%	
	102	0.01%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.01%	
1			4.74%
	102	0.00%	
	103	0.00%	
	105	0.41%	
	106	0.18%	
	107	0.72%	
	108	0.00%	
	110	0.69%	
	111	0.07%	
	113	0.61%	
	114	1.66%	
	115	0.27%	
	116	0.14%	
4			0.58%
	102	0.33%	
	103	0.02%	
	105	0.03%	
	106	0.04%	
	107	0.00%	
	108	0.01%	
	110	0.02%	
	111	0.01%	
	113	0.02%	
	114	0.05%	
	115	0.06%	
	116	0.01%	
5			0.14%
	102	0.01%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.01%	
	113	0.01%	
	114	0.02%	
	115	0.09%	
	116	0.00%	

Commercial Trips That Pass Thorugh Danville

Origin	Destination	% of Vermilion Street Commercial Trips	Total
1	4	7.05%	17.48%
	5	3.94%	
4	1	4.85%	
	5	0.15%	
5	1	1.49%	
	4	0.00%	

Sum of O-D Pairs That Do Not Require the Use of Vermilion Street = 10.44%

Sum of O-D Pairs that Pass Through Danville = 17.48%

Sum of O-D Pairs That Could be Rerouted away from Vermilion Street = 27.92%

The data presented in Table 5 shows that approximately 72% of trucks would not be able to be relocated away from Vermilion Street. The largest OD pair that is not a pass through is the combination of Route 1 to the north (Zone 1) and the area south of the east-west CSX Transportation railway and east of the north-south CSX Transportation railway (Zone 114). Trucks heading south on IL Route 1 could either continue south and turn left on Voorhees Street, or turn left onto Newell Road, right onto Bowman Avenue, and left onto Voorhees Street. Even without the rail crossing barriers that exist on Bowman Avenue and Voorhees Street, the additional turns could be enough to make the Vermilion Street corridor remain attractive. Using this pair as an example, it was assumed that only half of the commercial vehicles that could relocate would reroute to Bowman Avenue. This results in a reduction of 14% of the trucks on the corridor.

The same analysis was completed for personal trips, but the rate was found to be significantly lower. The data indicates that drivers that have the option to take alternate routes are already selecting them. The list of trips that do not require traveling as far west as Vermilion Street, and the percentage of personal trips on Vermilion Street that are making these trips are shown in Table 6.

Since this value is already a fairly small percentage of trips, it is assumed that no personal trips currently on Vermilion Street would relocate to a different corridor.

Table 6: Personal Trips on Vermilion Street

Passenger Vehicle Trips With Origins and Destinations That Do Not Require the Use of Vermilion Street

Origin	Destination	% of Vermilion Street Commercial Trips	Total
102	1	0.00%	0.45%
	4	0.37%	
	5	0.02%	
	103	0.00%	
	105	0.02%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.02%	
	116	0.00%	
103	1	0.00%	0.00%
	4	0.00%	
	5	0.00%	
	102	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
105	1	0.00%	0.05%
	4	0.02%	
	5	0.00%	
	102	0.02%	
	103	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
106	1	0.10%	0.20%
	4	0.07%	
	5	0.02%	
	102	0.00%	
	103	0.00%	
	105	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
107	1	0.02%	0.02%
	4	0.00%	
	5	0.00%	
	102	0.00%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
108	1	0.00%	0.00%
	4	0.00%	
	5	0.00%	
	102	0.00%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
110	1	0.02%	0.05%
	4	0.00%	
	5	0.00%	
	102	0.02%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
111	1	0.00%	0.00%
	4	0.00%	
	5	0.00%	
	102	0.00%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
113	1	0.02%	0.07%
	4	0.00%	
	5	0.00%	
	102	0.02%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.02%	
	116	0.00%	
114	1	0.05%	0.07%
	4	0.02%	
	5	0.00%	
	102	0.00%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
115	1	0.07%	0.10%
	4	0.00%	
	5	0.00%	
	102	0.02%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
116	1	0.00%	0.10%
	4	0.02%	
	5	0.00%	
	102	0.05%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.02%	
1			0.32%
	102	0.00%	
	103	0.00%	
	105	0.05%	
	106	0.05%	
	107	0.02%	
	108	0.00%	
	110	0.07%	
	111	0.00%	
	113	0.00%	
	114	0.05%	
	115	0.05%	
	116	0.02%	
4			0.30%
	102	0.20%	
	103	0.00%	
	105	0.00%	
	106	0.07%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.02%	
	114	0.00%	
	115	0.00%	
	116	0.00%	
5			0.00%
	102	0.00%	
	103	0.00%	
	105	0.00%	
	106	0.00%	
	107	0.00%	
	108	0.00%	
	110	0.00%	
	111	0.00%	
	113	0.00%	
	114	0.00%	
	115	0.00%	
	116	0.00%	

Passenger Vehicle Trips That Pass Thorugh Danville

Origin	Destination	% of Vermilion Street Commercial Trips	Total
1	4	0.47%	1.14%
	5	0.10%	
4	1	0.50%	
	5	0.00%	
5	1	0.07%	
	4	0.00%	

Sum of O-D Pairs That Do Not Require the Use of Vermilion Street = 1.74%

Sum of O-D Pairs that Pass Through Danville = 1.14%

Sum of O-D Pairs That Could be Rerouted away from Vermilion Street = 2.88%

The assumed truck rate on Vermilion Street is 3%, with the expected redistribution of 14% of commercial vehicles, the new truck rate would be approximately 2.6%. Without the reduction in personal vehicles, the ADT and peak hour volumes are not expected to decrease significantly.

If transportation projects are implemented that can reroute truck traffic and provide alternative routes and zones for redevelopment, the future ADT of the corridor is expected to remain static for passenger vehicles and reduce slightly for commercial vehicles. With the truck percentage dropping from the current 3.0% to the expected 2.6%, approximately 75 to 100 trucks will be removed from Vermilion Street each day. Table 7 shows the existing and future ADT for the urban redesign and traffic calming on Vermilion Street scenario.

Table 7: Existing and Remaining ADT

Vermilion Street Segment	Existing ADT	Remaining ADT
Fairchild Street to English Street	19,000	18,925
English Street to Voorhees Street	18,700	18,625
Voorhees Street to Winter Avenue	17,800	17,725
Winter Avenue to Liberty Lane	26,500	26,400
Liberty Lane to Poland Road	20,600	20,525
Poland Road to Newell Road	20,500	20,425

The information in this section was presented to IDOT District 5 on April 27, 2018. At the meeting, City of Danville officials asked IDOT to either consider a road diet on Vermilion Street (IL Route 1) from Voorhees Street to Winter Avenue, or consider moving the IL Route 1 designation to Bowman Avenue. If IL Route 1 moves to Bowman Avenue the City of Danville would need to consider the implications of taking jurisdiction of Vermilion Street and potentially Gilbert Street from I-74 to Newell Road.

6.2. Safer Mobility Options on Bowman Avenue and Voorhees Street

Three of the identified transportation needs discussed the importance of changes to the railroad crossings to improve the safety of Danville residents. These needs have been investigated by the City of Danville through the completion of a quiet zone study to reduce noise throughout the city and a Highway Safety Improvement Program study to evaluate benefits from improved protections or grade separations throughout Danville.

High frequency and severity crash rates were identified along Bowman Avenue. The higher than expected rates are likely associated with rear end collisions from congestion at the at-grade rail crossings. These crossing were also identified as congestion concerns from the public and the Danville Fire Department. Figure 14 shows the location of the three Danville Fire Stations in relation to the delay causing grade crossings.

The station on the east side of town is located on Griffin Street and is currently isolated by the two busiest tracks in Danville. The CSX Transportation railway line on the south side carries approximately 15 trains per day and the NS Railway line carries approximately 48 trains per day. The portion of town that this station can effectively serve is limited to the space between these tracks. However, without a station in this part of town, response times to emergencies would be increased.

Removing the delay associated with the crossings could allow for more efficient Fire Department operations. This could end up saving the tax payers money in the long term. The cost saving benefits to the Fire Department should be studied and considered when evaluating the benefit cost of the grade crossing alternatives.

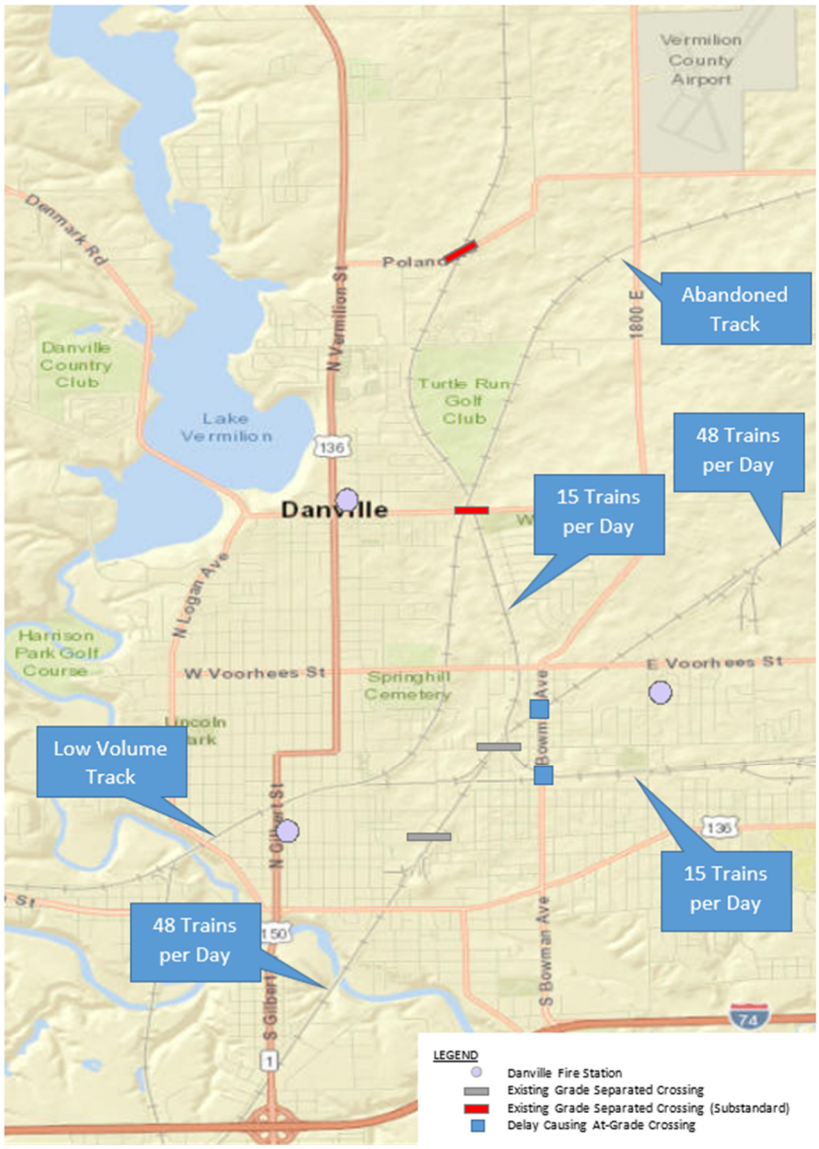

Figure 14: Fire Station Locations and Rail Crossings

When rear end crashes are the most prevalent crash on a corridor it generally indicates that there are unexpected or lengthy queues. Since the intersections function at acceptable levels of service, the rear end crashes are likely caused by delay associated with the at-grade crossings on Bowman Avenue. A grade separated crossing would completely eliminate the queues associated with the crossings.

In the near term, "Be Prepared to Stop" or "Queue Ahead" signs with a dynamic, flashing wig-wag that is activated by the train could reduce the number of crashes for a significantly lower cost and in faster implementation time. Figure 15 shows what the wig-wag set up could look like. This could be especially helpful for southbound Bowman Avenue where the curves in the alignment may be causing sight distance concerns.

Figure 15: Be Prepared to Stop Wig-Wag

The construction of the Bowman Avenue Grade Separations can also support development around the Vermilion Regional Airport. Through the stakeholder interview process, airport personnel stated that the airport owns 177 acres of land that they believe to have potential for industrial and logistic development. Airport personnel has identified their ideal tenant as a distribution center. The grade separations may encourage this growth scenario by removing the delay and safety barriers between the airport and I-74.

6.3. Additional Traffic Associated with Potential Future Development

The traffic associated with realizing the vision of a 21st Century manufacturing economy may require transportation upgrades to Bowman Avenue and Liberty Lane to support the residential and mixed use development and upgrades to Lynch Road, Voorhees Street, and Makemson Road.

There are three new uses that will have new trips associated with them:

- Residential Housing on North Bowman,
- Industrial Developments on Lynch, and
- Commercial Uses on North Bowman.

A portion of the trips will overlap. For instance, a typical trip from a housing unit is a trip from home to work and a typical trip at an industrial development is an employee traveling from home to work. In reality, these are the same trips. Therefore, a percentage of the trips from each use will be removed to avoid double counting.

The conversion to the 21st Century Digital Economy will create demand for increased transportation within and outside of Danville. In order to estimate the increases in demand, site specific trips were generated for an average weekday using the Trip Generation Manual, 10th Edition from the Institute of Transportation Engineers. This calculation was completed using a manufacturing land use creating 2,400 new jobs. Those 2,400 employees located in the previously identified 1,700 acres near Lynch Road and Voorhees Street are estimated to generate 5,930 trips per day. Of those 5,930 trips, 2520 are expected to derive from the Near Term Growth areas and 3,410 will be generated by the Long

Term Growth area. Trips associated with employment centers need to be distributed to the network. The following is the process required to complete that calculation.

1. The number of trips attracted to the site from outside the Danville area must be estimated. In this case, data from NCHRP 365 was used to determine that it is reasonable to assume that 50% of the trips attracted to the site could be from outside of the Danville region.

2. The number of trips attracted to the site from within the existing boundaries of Danville can then be determined through subtraction. For the manufacturing site near Lynch Road and Voorhees Street, 50% of the trips will come from within the City of Danville.

3. Trips need to be distributed to the network that accesses areas outside of Danville. It was assumed that I-74, via Lynch Road, and Main Street (US 136) were the external attraction nodes for all trips associated with areas outside of Danville. These assumptions and the accompanying calculations show an increase in ADT on:

    - Lynch Road, north of I-74, of 2350 vehicles per day, which results in an expected ADT of 7,850.

    - Main Street (US 136), east of Lynch Road, of 650 vehicles per day, which results in an expected ADT of 5,950.

4. Trips need to be distributed to the network that access the City of Danville. It was assumed that all the trips that desire to stay within the boundaries of the City of Danville would need to choose one of three arterial routes to move east and west. Those routes were assumed to be Main Street (US 136), Voorhees Street, and Winter Avenue as each of these streets will provide some level of access to the near and long term growth sites. These assumptions and the accompanying calculations show an estimated increase in ADT on:

    - Winter Avenue, east of Bowman Avenue, of 450 vehicles per day, which results in a proposed ADT of 4,500.

    - Voorhees Street, east of Bowman Avenue, of 1,050 vehicles per day, which results in a proposed ADT of 10,650.

    - Main Street (US 136), east of Bowman Avenue, of 1,500 vehicles per, which results in a proposed ADT of 15,000.

5. An assumption was made to not distribute the traffic volumes to north-south streets because trips will disperse and further mitigate any trip generation that will happen the further one gets from site.

The expansion of the Advanced Manufacturing and Logistics Development is predicted to have a ripple effect that will create the need for new housing stock. The new housing stock is expected to be centered around the intersection of Bowman Avenue and Liberty Lane. It was assumed that 200 acres near the intersection could be used to for residential development. Those 200 acres were estimated to contain 1,000 single family dwelling units. Again, the increases in transportation demand were calculated using the latest edition of the Trip Generation Manual. The 1,000 homes are expected to

generate 9,450 trips per day. These trips were distributed to the surrounding transportation network, and the calculations estimate that the average daily traffic on:

- Bowman Avenue, north of Liberty Lane, could increase from 5,200 to 8,000.
- Bowman Avenue, south of Winter Avenue, could increase from 8,500 to 13,000.
- Liberty Lane, west of Bowman Avenue, could increase from 4,100 to 6,300.

Due to the increase in traffic from the industrial uses on Lynch Road, the intersection of Lynch Road and Main Street will need studied in detail as development occurs. Peak hour counts and projections should be reviewed as developments are built along the roadway. Winter Avenue, Voorhees Street, and Main Street (US 136) are expected to function with appropriate levels of service even after the full build out of the development. As the build out of the manufacturing area progresses, the operations at the Voorhees Street at-grade crossing should be monitored for potential safety concerns.

The residential traffic produced at the Liberty Lane and Bowman Avenue node will be dispersed between north and south Bowman Avenue and west Liberty Lane. Bowman Avenue, south of Liberty Lane is expected to increase to an ADT around 13,000. IDOT standards would recommend widening the roadway to a five lane cross section after the ADT crosses the 12,500 vehicles per day threshold, however, in urban settings, this ADT usually operates very well in a three lane section. The corridor should be monitored for delay issues, but the three lane section is expected to be satisfactory.

The grade crossing on Liberty Lane should be monitored and evaluated due to the added traffic. The ADT is expected to be around 6,300 which would be able to be carried by the existing two lane roadway.

SECTION 7.0 PRIORITIZING TRANSPORTATION IMPROVEMENTS

The transportation improvements determined by addressing the transportation needs were compiled in a table to show the expected benefits of the projects, as well as the potential time frame, the necessary catalyst for moving forward, and the relative cost of the improvement. The information is summarized in

Table 8.

Table 8: Transportation Improvements

Improvement	Quality of Life	Facilitate 21st Century Digital	Recommended Time Frame	Catalyst	Cost
Vermilion Street Traffic Calming and Beautification	✓		Near Term (1-5 Years)	Coordination and Agreement with IDOT	$$$
Bowman Avenue Grade Separations	✓		Mid Term (5-10 Years)	Benefit Cost Ratio above 1.0 including reduction in crashes and impacts to the Danville Fire Department *Or* Additional Residential Development on North Bowman Avenue	$$$$
Bowman Avenue Flashing Wig-Wag	✓		Immediate (0-1 Years)	Design and Coordination with the Railroads	$
Voorhees Street Grade Separation	✓	✓	Long Term (10+ Years)	Additional Development in vicinity of Lynch Road	$$$
Intersection Improvements at Lynch Road and Main Street		✓	Long Term (10+ Years)	Additional Development in vicinity of Lynch Road	$$
Extension of Lynch Road North from Voorhees Street		✓	Long Term (10+ Years)	Additional Development in vicinity of Lynch Road	$$$

It is recommended to consider the “Be Prepared to Stop” wig-wag for Bowman Avenue for immediate implementation.

Following the implementation of the wig-wag, updates to Vermilion Street, including a road diet or raised intersection, should be discussed with IDOT to determine opportunities for improvements. The roadway is currently IL Route 1 and is under the jurisdiction of the Department.

The Bowman Avenue grade separations should continue to be studied until the benefit cost ratio is determined to be above 1.0. Items to include in the benefit-cost ratio include reduction in rear-end crashes as well as the efficiency benefits to the City of Danville Fire Department response times and operational costs.

The improvements to the Voorhees Street rail crossings and the Lynch Road improvements should be implemented as additional development begins to occur on Lynch Road.

SECTION 8.0 PUBLIC INFORMATION MEETING

After the Bowman Avenue and Vermilion Street Study was completed, a final public information meeting was held to present the results of the study. The meeting was held on June 7th, 2018 at the Danville First Church of Nazarene. Figure 16 through Figure 21 show the boards presented at the public meeting. Seven members of the public attended the meeting and responses to the proposed plan were generally positive. The concerns from the attendees involved finding funding avenues for the projects discussed without detrimentally affecting the on-going maintenance for the existing transportation system, and a concern that a three lane section would restrict traffic on the main thoroughfare through town (Vermilion Street/IL 1).

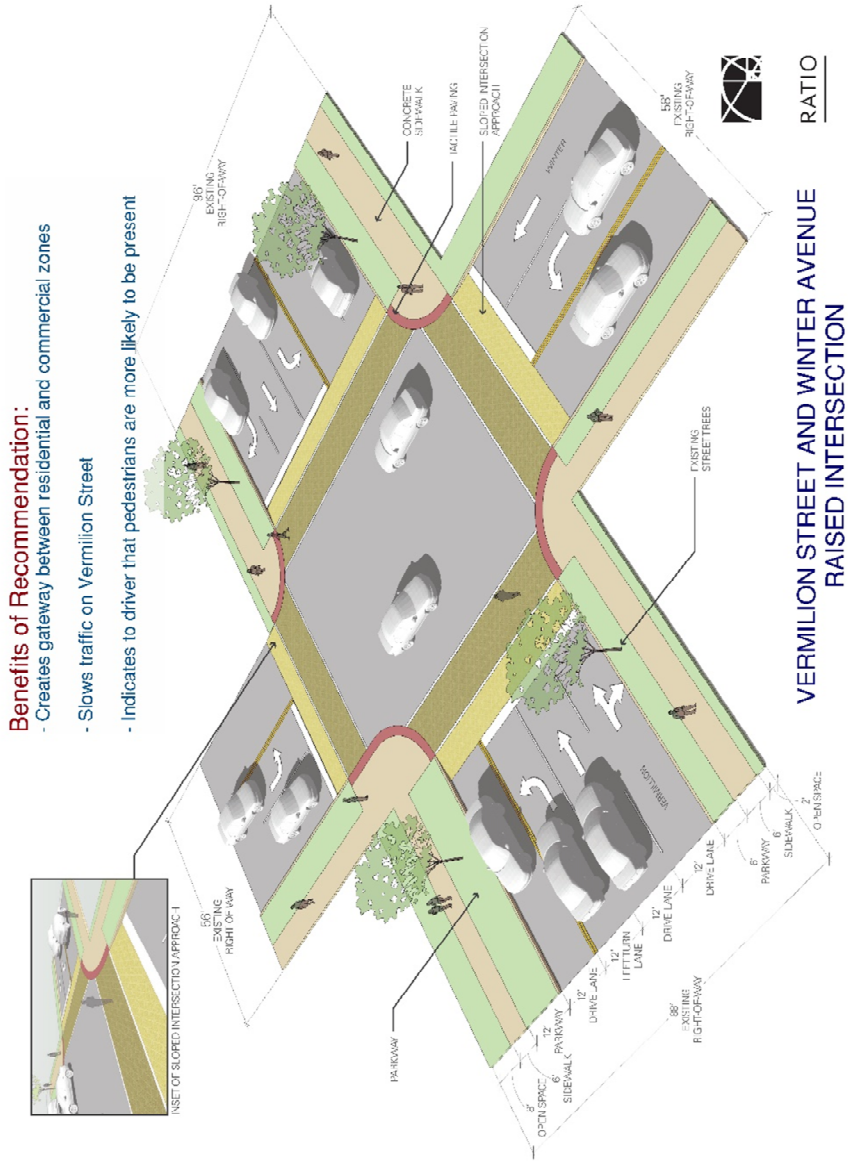

Figure 16: Vermilion Street and Winter Avenue Raised Intersection

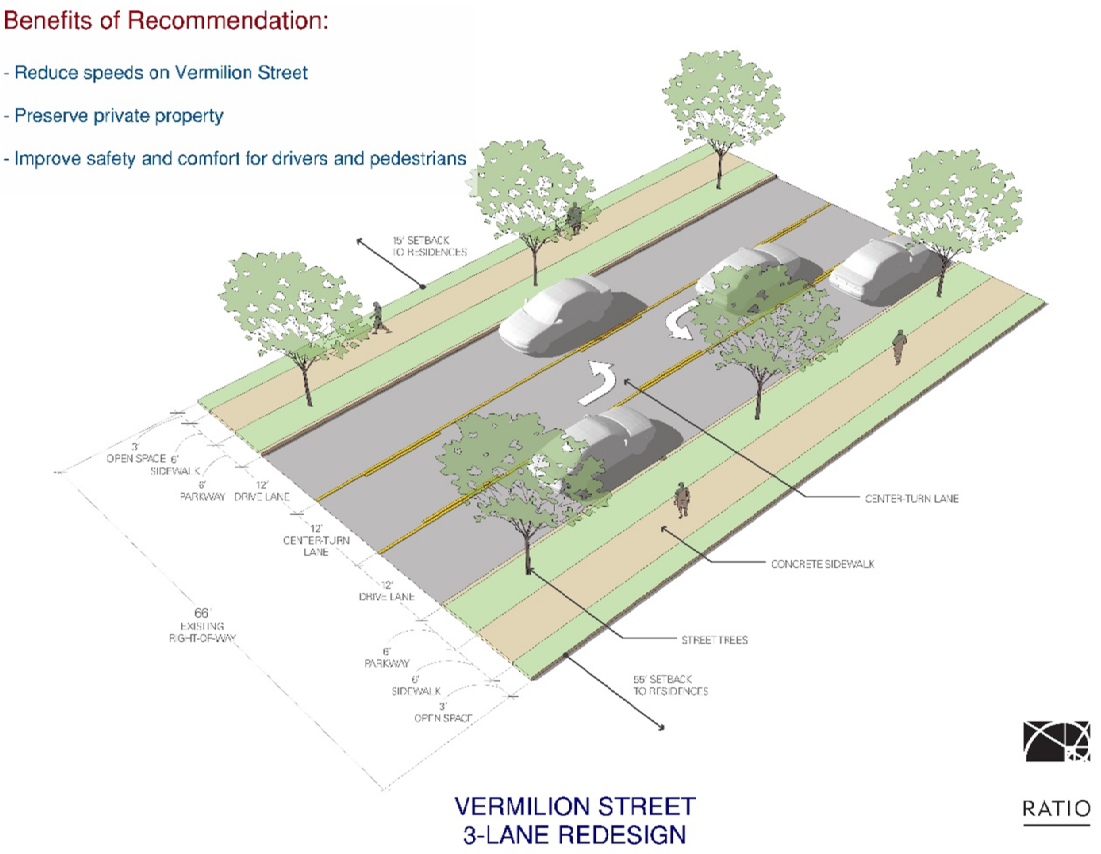

Figure 17: Vermilion Street 3-Lane Section

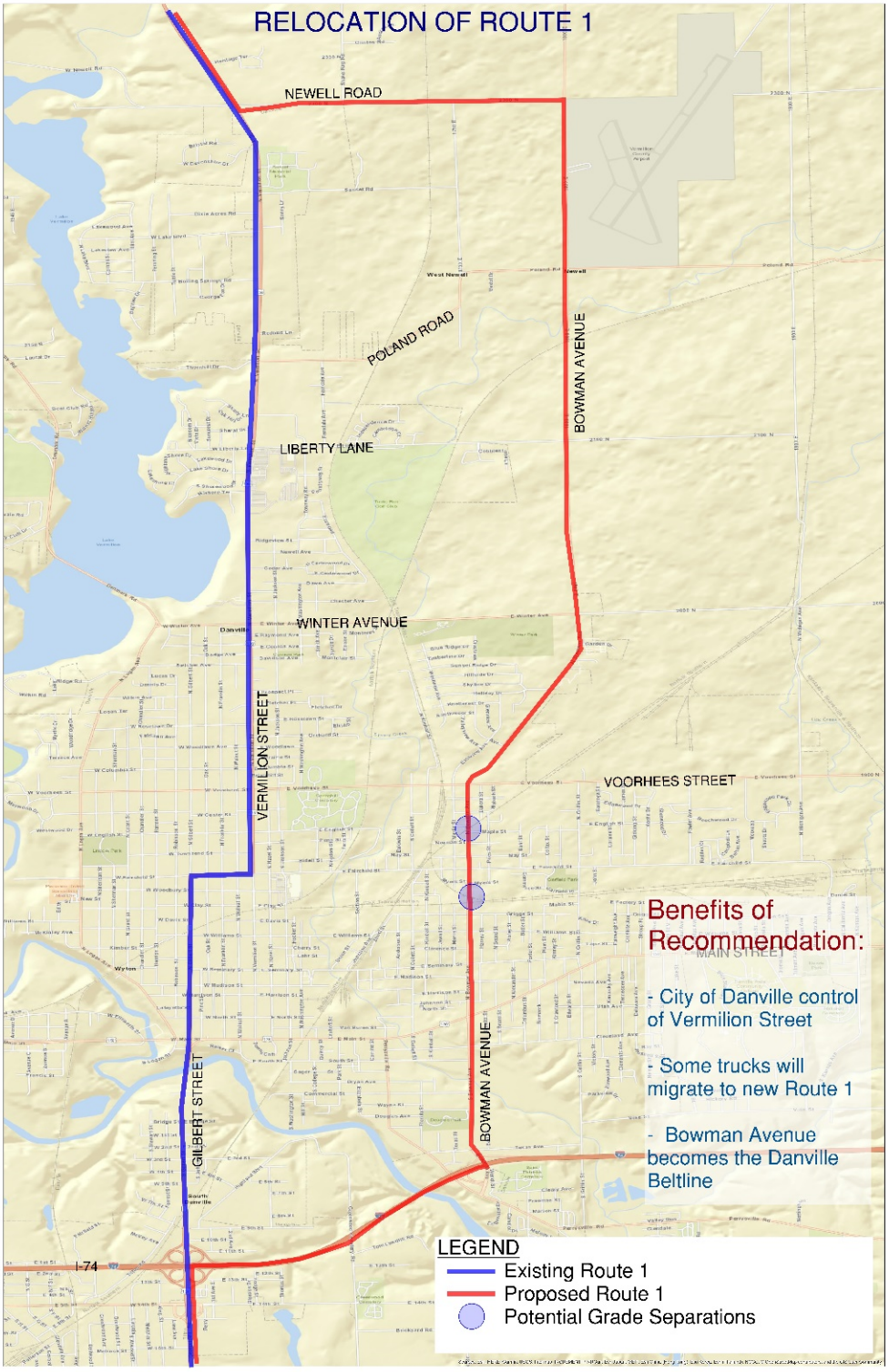

Figure 18: Relocation of Route 1

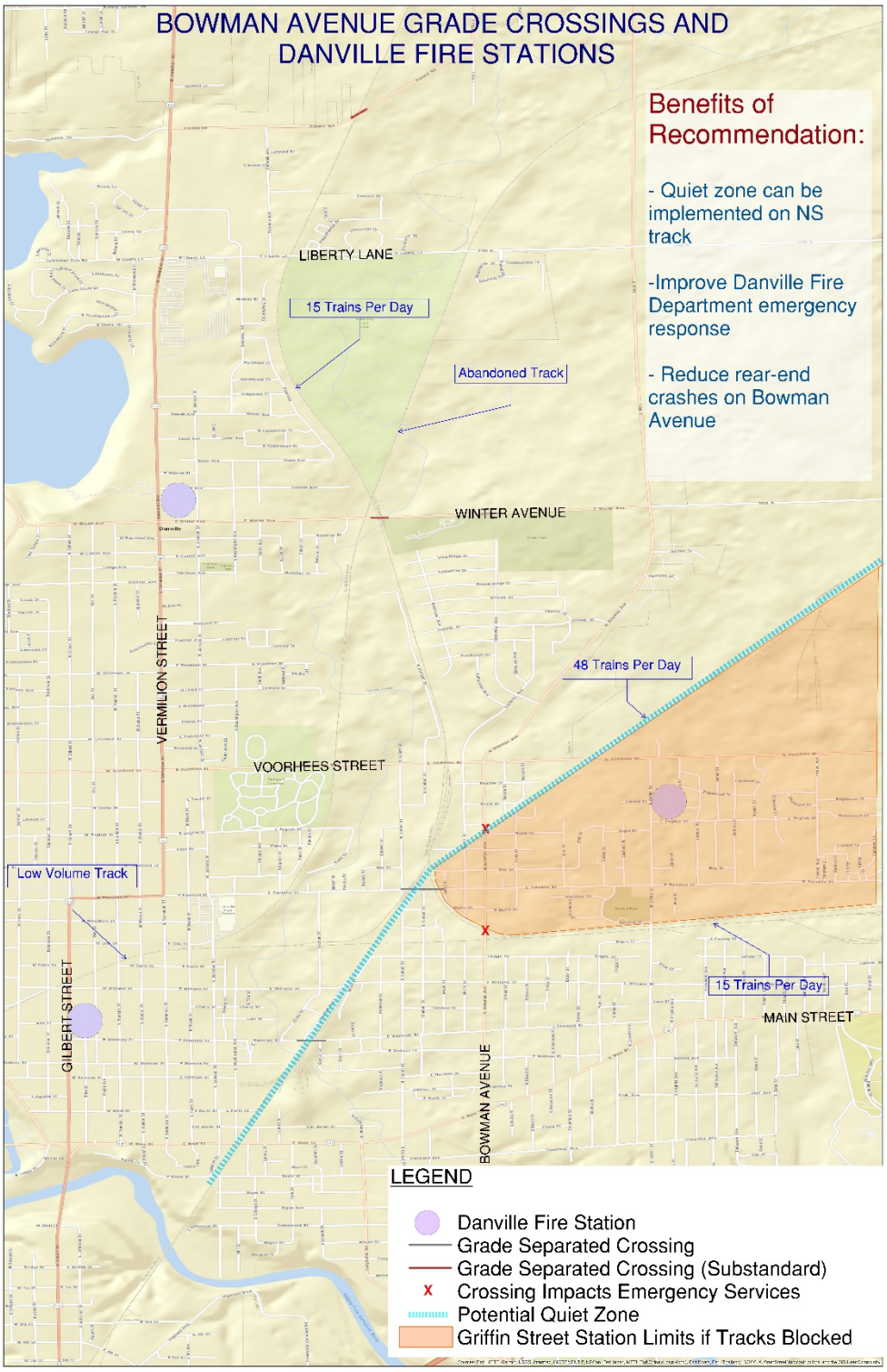

Figure 19: Bowman Avenue Grade Crossings and Danville Fire Department

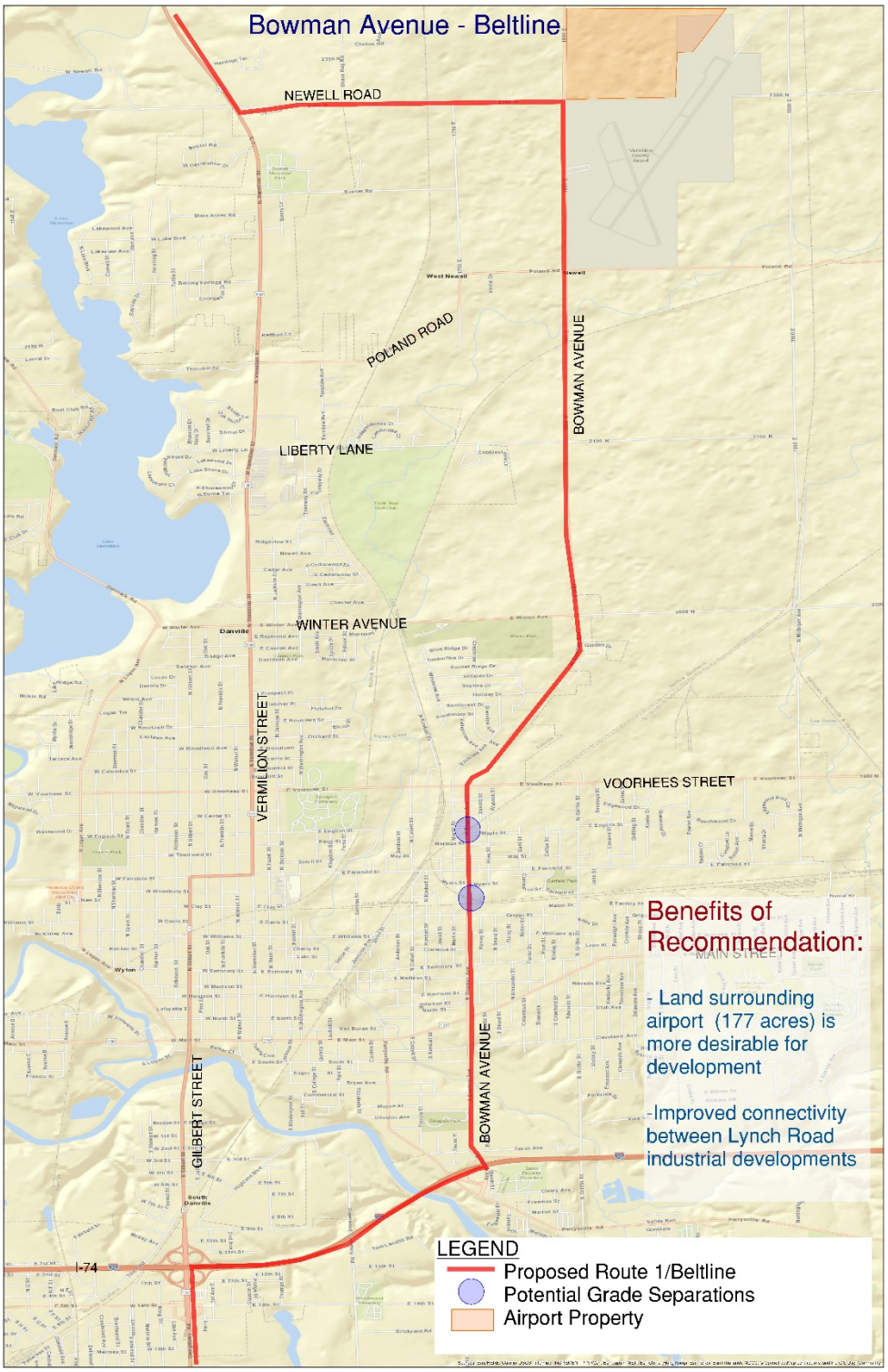

Figure 20: Bowman Avenue as the Danville Beltline

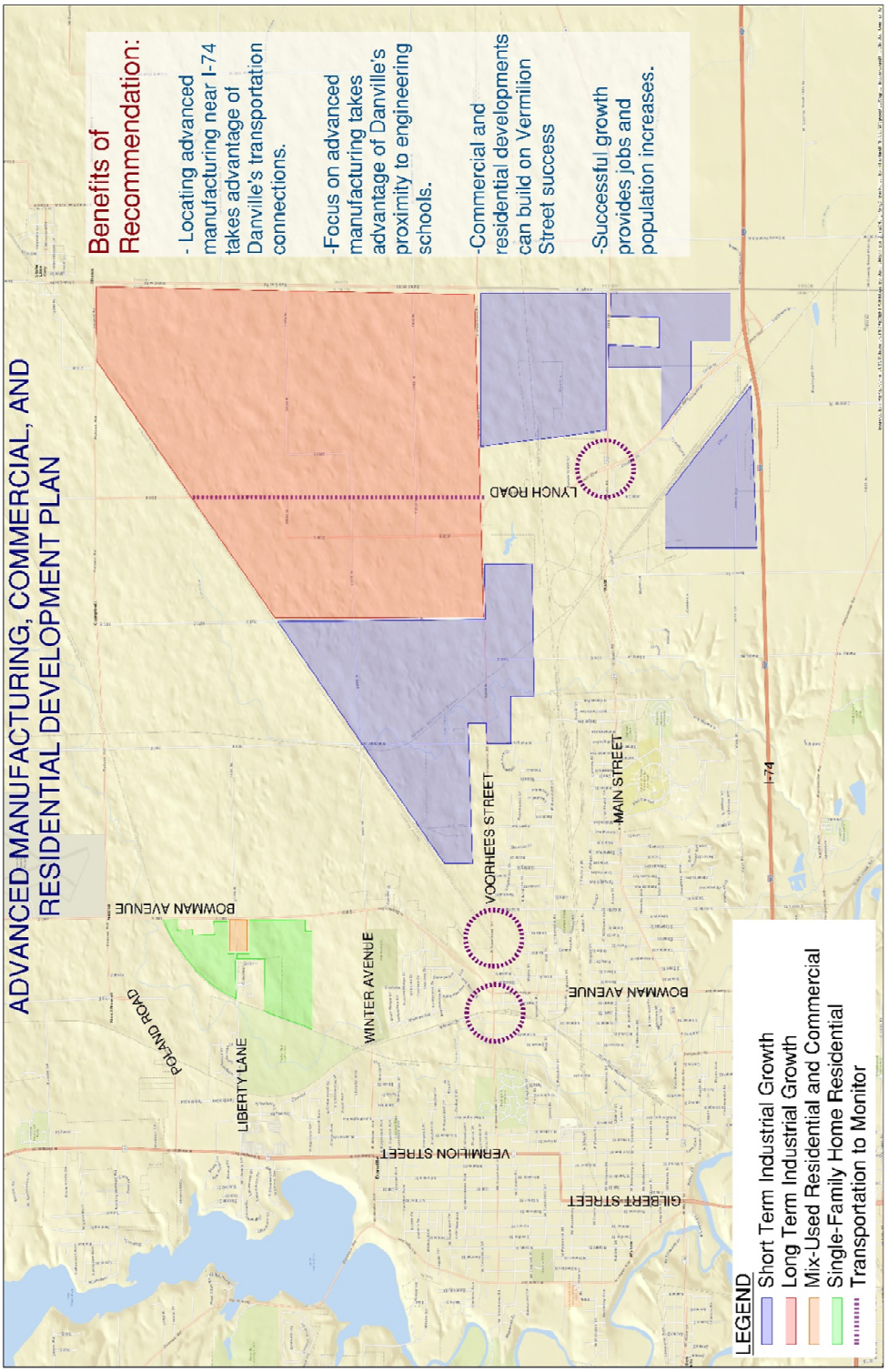

Figure 21: Advanced Manufacturing, Commercial, and Residential Development Plan