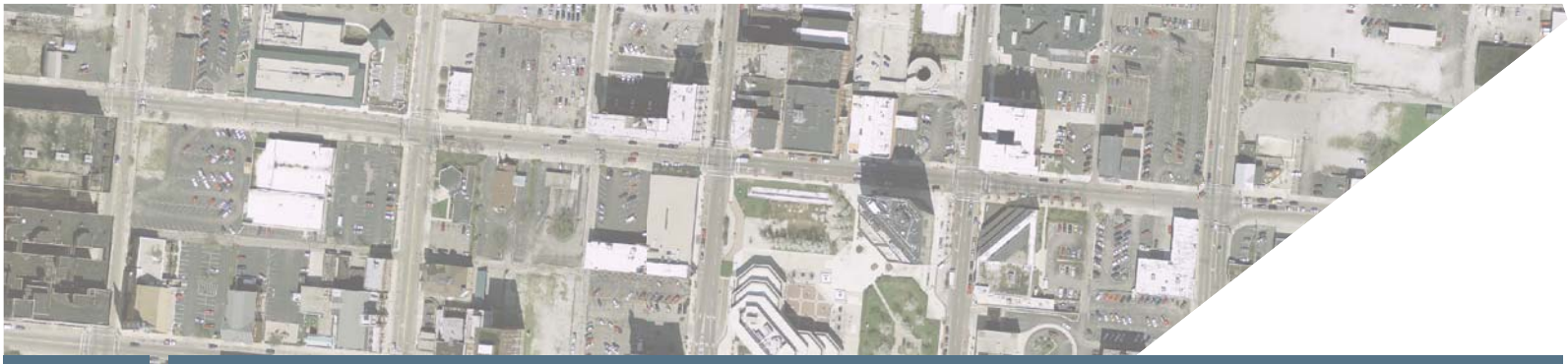

Springfield Downtown Streets Conversion Study

Final Report

Prepared For:
Clark County-Springfield TCC

Prepared By:
BIRD HOUK
A DIVISION OF OHM

Date:
August 12, 2011

Springfield Downtown Streets Conversion Study

Final Report

PREPARED FOR

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August 4th, 2011

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Executive Summary

Purpose

The **Springfield Downtown Street Conversion Study** explores the feasibility study of converting several downtown streets from one-way to two-way traffic operation. The goal is to further the economic competitiveness and mobility throughout downtown Springfield by recommending a street system that improves multimodal interaction, way finding, walkability, and quality of life, while maintaining acceptable parking and traffic operations.

The study area for the Springfield Downtown Streets Conversion Study is generally described as Main and High Streets from Yellow Springs Street to Spring Street, Fountain Avenue from High Street to Columbia Street and Limestone Street from High Street to North Street.

The purpose of this project is to improve the existing transportation infrastructure in order to support community growth and development as identified by the City of Springfield and others, such as, the Center City Association, the Greater Springfield Chamber of Commerce, and the Community Improvement Corporation of Springfield. This project is needed to support recent redevelopment initiatives, planned investments and the overall economic development goals of Springfield.

Public Involvement

To ensure that the recommended alternative is comprehensive and offers benefits to all types of users, the study process identified public participation from residents, property owners, and the business community, as well as agency coordination, as critical to the success of this study.

In September 2010, at the beginning of the project, the study team developed a Public Involvement Plan outlining ways to disseminate study information and solicit public input (see **Appendix B** – Public Involvement Plan). The Public Involvement Plan identified steering committee meetings, public meetings, and the TCC website (http://www.clarktcc.com/ streetsconversion.htm) as the primary methods for sharing and soliciting information. Over the course of nine months, the study team hosted four steering committee meetings and two public meetings with 2 meetings per day.

The final set of public meetings on February 15, 2011, unlike the first public meeting which generated only 26 questionnaires, the second public meeting generated 104 questionnaires. The questionnaires and associated comments from the second public meeting overwhelmingly supported implementation of Alternative 1. The steering committee thus agreed to the recommendation of Alternative 1 in the final planning report.

Existing & Future Conditions

The existing conditions were assessed as part of the needs analysis. The needs analysis is an essential component of the purpose and need statement, because all developed alternatives must meet the need of a project. The existing conditions analysis helped identify needs by assessing High Street, Main Street, Fountain Avenue and Limestone Street in the following areas: traffic operations, safety, access, pedestrian walkability, multimodal components, environmental factors, and red flags.

The City of Springfield, as well as, other developers and partners have been working on future development opportunities at various locations throughout downtown. The Center City Association has also been working to identify development opportunities.

These recent and proposed projects/investments in the downtown will establish a better economic environment as well as generate additional traffic in the downtown. Travel demand modeling and capacity analysis was conducted for the year 2030 in order to assess the operational needs of the street network, assuming some of the above referenced projects happen.

Alternatives

In November 2010, after conducting research and reviewing the existing and future conditions with the public at the October 5, 2010 public meeting and analyzing the results of the initial public survey and comment period, the study team began developing conceptual alternatives that would meet the purpose and need.

Alternative 1 includes improving and converting all of the streets studied, which includes Main Street, High Street, Fountain Avenue, and Limestone Street, to two-way traffic. Under this alternative the east-west streets of Main Street and High Street would be converted to two-way streets between Race Street and Spring Street and the north-south streets of Fountain Avenue and Limestone Street would be converted to two-way streets between North Street and High Street.

Alternative 2 includes converting High Street and Main Street to 2-way traffic flow from Yellow Springs Street to Spring Street.

Alternative 3 includes converting Fountain Avenue to 2-way traffic flow from High Street to Columbia Street and converting Limestone Street to 2-way traffic flow from High Street to North Street where the current 2-way travel begins/ends.

Other improvements would be pedestrian and multimodal oriented such as new sidewalks and curb ramps, street trees and lighting, benches and trash receptacles, and pavement markings for identifying bike routes or reminders to share the road.

No specific bike lanes or routing was developed as part of this study; however, the steering committee noted that the issue should be explored further in future engineering phases of study. For now, Sharrow pavement markings are included as part of the alternative to remind drivers to be alert to other modes of transportation.

Alternative analysis was completed in order to assist the steering committee and public in determining the trade-offs and costs of each alternative

The No Build or do nothing alternative was included in the analysis. The cost of doing nothing is zero; however, the trade-off is that no changes are made to the current condition.

The analysis was both qualitative and quantitative. The qualitative analysis was based on the goals of the study and feedback from both the steering committee and the public as to which measures were the most important to them. The quantitative analysis was based on traffic analysis results and cost estimates prepared for each alternative.

All three conceptual alternatives were modeled to assess the feasibility of converting the streets from one-way to two-way traffic operations. Each alternative was modeled using the 2030 projected

volumes in order to compare the results to the 2030 No Build condition.

For each alternative, the traffic modeling showed that traffic redistributed itself to minimize delay in the system. The intersection level analysis for each alternative still showed that the system would operate efficiently with only slightly increased delay at certain intersections. For all three alternatives, the intersection with the highest percentage of capacity utilized in the peak hour is still shown to operate less than 100% (full capacity), resulting in acceptable traffic operations throughout the modeled area.

The study team developed planning level cost estimates for each of the conceptual alternatives. In order to better understand the cost numbers for each alternative, the costs were broken down in a menu style table so that the steering committee and the public could see which components contributed the most or least to the overall cost of each alternative, see **Table i.i**.

Table i.i: Construction Cost Estimates

Construction Cost				
Alternative	Without Pavement M/F	With Pavement M/F	Streetscaping Only	Total Project Cost
Alternative 1 High Street, Main Street, Fountain Avenue, Limestone Street Conversion	$2.5 M	$3.2 M	$5.9 M	$9.1 M
Alternative 2 High Street and Main Street Conversion	$1.85 M	$2.4 M	$4.9 M	$7.3 M
Alternative 3 Fountain Avenue and Limestone Street Conversion	$0.667 M	$0.9 M	$0.96 M	$1.86 M

M/F = Pavement mill & fill overlay of 3" curb replacement is included in the streetscaping cost

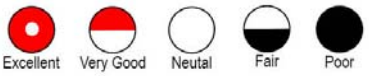
A matrix was developed for comparing the alternatives, **Table 2**. The matrix represents both qualitative and quantitative categories for each of the alternatives considered. The No Build alternative was not scored as it is the existing condition and the baseline for which the alternatives are measured against. Since the alternatives build on each other, Alternative 1, which includes all facets of Alternatives 2 & 3, scores the best in most categories.

Table i.ii: Evaluation Matrix

Alternative	Criteria							
	Traffic Operations (Capacity, Travel Time)	**Access** (EMS, Connections)	**Wayfinding** (Pedestrian, Transit)	**Econ. Development** (Visibility, Placemaking)	**Supports Proposed Projects**	**Walkability** (Pedestrian Experience)	**Cost** (Construction Cost in Millions)	***Potential Net Parking Spaces**
Alternative 1 High Street, Main Street, Fountain Avenue, Limestone Street Conversion							$9.1	+ 70
Alternative 2 High Street and Main Street Conversion							$7.3	+ 41
Alternative 3 Fountain Avenue and Limestone Street Conversion							$1.86	+ 29
No Build			existing conditions					

* "New" spaces do not include areas where ability to park exists but striping is absent (e.g. High and Main)

The scale is an evaluation of each alternatives' effiency and/or level of improvement to the overall transportation network



Conclusions

Based on the research and analysis conducted as part of this study two conclusions (questions answered) were made regarding the conversion of streets in the project study area.

Is converting the studied streets feasible from a traffic operations standpoint?

Yes. The traffic analysis performed for the downtown, including the conversion of the studied streets to two-way travel, resulted in acceptable operations throughout the downtown network through the year 2030. The traffic analysis included intersections outside the study area that would receive rerouted traffic as a result of the network rebalancing itself due to drivers adjusting their travel patterns to take advantage of the new traffic flow.

Will the conversion of the studied streets benefit the economy of downtown?

Yes. All of the research presented in Section 6.0 and referenced in Appendix F concludes that street conversions are successful in benefiting the economy of areas adjacent to the conversions. However, conversions alone are not the sole reason for rejuvenating the economy but are a contributing factor as part of an overarching strategy.

Recommended Alternative

During the final steering committee meeting on April 4, 2011, the committee reviewed all of the alternatives and the public comments received to date. After discussing the merits of each alternative, the potential for phasing, the analysis matrix and probable costs associated with each alternative, the committee agreed to recommend Alternative 1 for further development. Alternative 1 was also the alternative most widely supported by the public (see **Section 2.0** and **Appendix B**).

Alternative 1 includes converting all 4 studied streets to two-way traffic flow along with implementing streetscape enhancements and multimodal improvements, such as the potential for additional bus stops and Sharrows that increase awareness of bicycle traffic by emphasizing sharing vehicle lanes with bicyclist.

The steering committee agreed not to phase the implementation of the alternative because of challenges associated with access and traffic signal equipment installation and operations.

The next step for the recommended alternative is to identify a potential funding source and position the alternative for continuation into and through the ODOT PDP. The next steps of the ODOT PDP involve collecting more data and beginning detailed engineering and environmental studies for the specific components of the recommended alternative.

1. Introduction

1.0 Overview

The **Springfield Downtown Street Conversion Study** explores the feasibility study of converting several downtown streets from one-way to two-way traffic operation. The goal is to further the economic competitiveness and mobility throughout downtown Springfield by recommending a street system that improves multimodal interaction, way finding, walkability, and quality of life, while maintaining acceptable parking and traffic operations.

This is a planning level study and while some of the data and analysis utilized for decision making included the results of engineering analysis, that analysis was only conducted at a level required for conceptual planning level decision making. This study only sought to answer feasibility level questions, such as “can the downtown streets operate acceptably under two-way traffic operation, and will the public accept the trade-offs associated with making the switch to two-way travel?” If the recommendations of this study are to proceed toward implementation they will require additional engineering and environmental detail.

1.1 Background

The history of street conversion projects dates back to the first half of the twentieth century, when two-way streets were converted to one-way streets to help accommodate high traffic volumes in urban

areas; shifting both people and development away from downtowns and into the sprawling suburbs[1]. For some cities, one unintended consequence of converting to one-way streets was a decrease in downtown public and private investment and a confusing street network. In recent years, the role of downtowns has shifted from commuter hot spots towards becoming entertainment and cultural hubs and destination locations for those living in the suburbs. In an effort to increase downtown economic development, many cities have converted their one-way streets back to two-way streets, demonstrating that two-way streets provide the same functionality of one-way streets while increasing pedestrian safety and the visibility and accessibility of downtown businesses.

The Clark County-Springfield Transportation Coordinating Committee (TCC) in conjunction with the City of Springfield and the Ohio Department of Transportation (ODOT) in the fall of 2010 began a feasibility study to examine the conversion of several downtown Springfield streets from one-way to two-way traffic operation.

The TCC, the City and ODOT envisioned the study resulting in an outline of transportation concerns, impacts and trade-offs, livability and walk ability issues, potential economic benefits, and costs related to converting downtown streets from one-way to two-way traffic operation. In addition, the study would solicit public participation and document all public involvement efforts. This document represents the results of the above collaborative effort.

1.2 Process Overview

To ensure that the recommended alternative is comprehensive and offers benefits to all types of users, the study process identified public participation from residents, property owners, and the business community, as well as agency coordination, as critical to the success of this study.

The following is a general outline of the study process.

1. Define the Study Area
2. Collect existing data
3. Analyze existing and future conditions
4. Develop draft Purpose and Need statement
5. Public Involvement meeting #1 and comment period
6. Develop conceptual alternatives
7. Analyze conceptual alternatives
8. Public Involvement meeting #2 and comment period
9. Select recommended alternative
10. Draft Report of findings/recommendations

[1] Glatting Jackson Kercher Anglin Lopez Rinehart, Inc. “Downtown Streets: Are We Strangling Ourselves on One-Way Networks?” TRB Circular

11. Final Report
12. Presentation to the TCC board

1.3 Study Area

The study area for the Springfield Downtown Streets Conversion Study is generally described as Main and High Streets from Yellow Springs Street to Spring Street, Fountain Avenue from High Street to Columbia Street and Limestone Street from High Street to North Street. **Figure 1** illustrates the described study area.

This area includes the densely developed core blocks of downtown, including City Hall, as well as blocks to the west of the core that have less development and some surface parking lots. The primary land uses in the study area are commercial, retail and office with little to no residential housing present.

The study area also includes the Springfield City Area Transit (SCAT) bus center at the Heritage Center along High Street.

1.4 Purpose and Need Statement

The full text for the draft Purpose and Need can be found in **Appendix A**. The following is an excerpt.

Purpose Statement

The purpose of this project is to improve the existing transportation infrastructure in order to support community growth and development as identified by the City of Springfield and others, such as, the Center City Association, the Greater Springfield Chamber of Commerce, and the Community Improvement Corporation of Springfield.

Need Elements

Over the past five years, the City of Springfield and private developers have invested millions into the redevelopment of downtown Springfield. The following table provides a list of downtown investments that rely of the City of Springfield's transportation infrastructure. The City of Springfield's transportation infrastructure provides critical support for the success of these investments.

Table 1: Recent and Planned Downtown Investment

Project Name	Project Sponsor	Completion Date	Known Investment
City of Springfield Streetscape Improvements (Phase I)	Public/Private Partnership	2007	$3,000,000
Regional Cancer Treatment Center (New Facility)	Public/Private Partnership	2008	10,500,000
Shawnee Apartments Renovation	Private	2008	$8,000,000
Ohio Valley Medical Center (New Private Surgical Hospital)	Private	2009	$15,000,000

Project Name	Project Sponsor	Completion Date	Known Investment
City of Springfield Streetscape Improvements (Phase II)	Public	2010	
Bushnell Building Renovation	Public/Private Partnership	2011	$10,000,000
Springfield Regional Medical Center (New Hospital)	Public/Private Partnership	2011	$240,000,000
Center City Park (Phase I)	Public/Private Partnership	2011	$2,000,000
North/Columbia Streets realignment project to support the new Springfield Regional Medical Center	Public	2011	$6,000,000
Neighborhood Stabilization Program	Public	2011	$10,000,000
Hollenbeck Bayley Creative Arts and Conference Center (New Facility on Clark State Community College Downtown Campus)	Private	2011	$12,000,000
Main & High Signal Interconnect	Public	2011	$2,000,000
Multi-model Transportation Center	Public	Planned	
Ohio Valley Regional Medical Center Office Building	Private	Planned	
Springfield Regional Medical Center Office Building	Private	Planned	
Mental Health Treatment Center	Private	Planned	
Office Building	Private	Planned	
National Trail Parks and Recreation Ice Arena	Public/Private Partnership	Planned Early 2012	
City of Springfield Streetscape Improvements (Phase III)	Public	Planned	

Goals and Objectives

Many of the recent and future improvements in downtown Springfield stem from two documents – the City of Springfield's Unified Plan and the Center City Association's study titled *Restarting the Heart: The Center City Renewal*. These two documents detail numerous goals and objectives. Following are some of those goals and objectives which directly relate to this project's purpose and need.

In 2007, the City of Springfield presented a *Unified Plan* that provides a comprehensive approach to organizing and encouraging valuable physical and economic development in downtown Springfield. Two of the goals identified in the *Unified Plan* are 1) to assist in future transportation, corridor planning, and transportation demand management in downtown Springfield, and 2) to promote pedestrian activity in downtown Springfield.

Furthermore, the City of Springfield's 2007 *Unified Plan* details the following economic development objectives:

- To retain and expand existing downtown businesses

- To attract new downtown businesses and developments
- To retain current downtown employment and create new downtown employment opportunities
- To make downtown businesses and parking highly visible and attractive

The City of Springfield's 2007 *Unified Plan* also desires, as Capital Improvement objectives, to improve the quality and design of right-of-way and to enhance pedestrian appeal.

In 2002, the Center City Association worked with members of the American Institute of Architect's Regional/Urban Design Assistance Team (R/UDAT) to study downtown Springfield. The results of this study are documented in *Restarting the Heart: The Center City Renewal*. Recommendations from this study include:

- Connecting downtown developments and districts with well designed, active streets and public spaces, and
- Enhancing corridors and gateways into downtown to create a positive experience of arrival.

More specifically, the *Restarting the Heart: The Center City Renewal* plan suggested achievement of the following goals for the core district of downtown Springfield.

- Enhancing the streets and sidewalks;
- Developing Fountain Avenue as a central passage for pedestrians, cyclists, and cars;
- Create a central park for Springfield around City Hall;
- Creating a mixed use area that includes conference facilities, an ice rink, housing and shared parking;
- Extend bike trails into the Center City to the Clark State Performing Arts Center, focusing more attention on this district as a regional destination;
- Conversion of the other one-way pairs back to two-way traffic with curb parking is proposed and would help travelers feel that are coming to the Center City, not just passing through the Center City.

Summary

In summary, this project is needed to support recent redevelopment initiatives, planned investments and the overall economic development goals of Springfield.

2. Public Involvement

2.0 Public Involvement

In September 2010, at the beginning of the project, the study team developed a Public Involvement Plan outlining ways to disseminate study information and solicit public input (see **Appendix B** – Public Involvement Plan). The Public Involvement Plan identified steering committee meetings, public meetings, and the TCC website (http://www.clarktcc.com/streetsconversion.htm) as the primary methods for sharing and soliciting information. Over the course of nine months, the study team hosted four steering committee meetings and two public meeting days. The subsequent text summarizes each of the six meetings. The sign in sheets, detailed meeting minutes, handouts and displays for each meeting are included in **Appendix B** – Steering Committee Meetings, Public Meetings.

The first steering committee meeting was held on September 21, 2010. Attendees of the meeting included representatives from the Clark County-Springfield TCC, the City of Springfield, and the consultant team. At this meeting, the consultant team shared the results of initial data collection and introduced to the steering committee the public involvement plan. The steering committee discussed approaches for hosting the first public meeting and soliciting public comments.

The first public meeting was held on October 5, 2010. Twenty-nine key project stakeholders were notified of the meeting by mail and asked to participate in the study by attending one of two identical workshop sessions. Fourteen stakeholders attended the morning session. After a brief introduction and presentation, the fourteen stakeholders divided into three groups to discuss with group facilitators concerns and interests related to the conversion of downtown streets. Ten stakeholders attended the evening session. Rather than dividing into groups, all stakeholders participated in a roundtable discussion about their concerns and interests associated with the project. Commonly repeated concerns among stakeholders at both sessions related to parking impacts, access to and between key downtown locations, and an overall confusion experienced by visitors using Springfield's one-way downtown streets.

A second steering committee meeting was held on November 2, 2010. Again, attendees of the meeting included representatives from the Clark County-Springfield TCC, the City of Springfield, and the consultant team. At this meeting, the consultant team shared the results of the October 5, 2010 public meeting and presented updated data collection information. The steering committee discussed the conceptual alternatives and how to begin refining and evaluating alternatives.

A third steering committee meeting was held on February 2, 2011. Attendees of the meeting included the Clark County-Springfield TCC, the City of Springfield, the consultant team, and a representative from the Center City Association. The steering committee discussed an addendum to the original Public Involvement Plan (see **Appendix B** – Public Involvement Plan). The purpose of the addendum was to establish an approach for increasing public awareness of and participation in the second public meeting. To increase attendance at the February 2010 public meeting, the steering committee agreed to add key stakeholders to the mailing list, advertise on local news channels, advertise in local papers, post flyers, and distribute email notices. The steering committee also planned the format of the second public meeting and reviewed draft meeting displays and handouts. A record of the media releases and coverage can be found in **Appendix B** – Media Record.

A second public meeting was held on February 15, 2011. Two identical sessions, one in the morning and one in the evening, attracted 123 attendees. The meeting consisted of a presentation by the study team, an open microphone period for comments, and time for attendees to browse displays and ask questions of the study team.

A final steering committee meeting was held on April 4, 2011. Attendees of the meeting included the Clark County-Springfield TCC,

the City of Springfield, the consultant team, and a representative from the Center City Association. At this final meeting, the consultant team shared the results of the February 15, 2011 public meeting. Unlike the first public meeting which generated only 26 questionnaires, the second public meeting generated 104 questionnaires. The questionnaires and associated comments from the second public meeting overwhelmingly supported implementation of Alternative 1. The steering committee thus agreed to the recommendation of Alternative 1 in the final planning report.

Summaries of all questionnaires received throughout the study and the actual questionnaires and comments are included in **Appendix B** – Public Comments.

3. Data Collection

3.0 DATA COLLECTION

The study team worked with the TCC and the City of Springfield to collect data for the analysis of the existing and future conditions as well as the alternatives analysis.

Traffic volume data for the entire downtown area was supplied to the team for use in the travel demand modeling of the greater downtown area. This data, as well as jobs data supplied by the City, was utilized in developing traffic volume projections for the study area. This data is critical to analyzing the effect of changing the travel patterns downtown.

Previous studies and plans were reviewed for background and additional data that may support the study efforts. Many of these resources were focused on specific aspects of the downtown that go beyond the intended level of detail of this study. However, the recommendations and findings of these previous studies and plans are useful when developing conceptual alternatives.

3.1 Travel Demand Model

Traffic modeling was performed for this study to evaluate the current traffic conditions, expected traffic conditions if no streets are converted to two-way, and expected traffic conditions under three scenarios of street conversions. Current models from the Ohio

Department of Transportation were used and refined for this use. These models dynamically estimate new traffic patterns given a set of street changes. The models also account for changes in land use and development, such as the new hospital.

3.2 Previous Studies and Projects

The following list of studies and resources were provided to the study team, via the TCC, City or private organizations, for review and background knowledge. Many of these studies support the vision for improving downtown and making it more economically competitive and attractive to new business and residents.

- RUDAT
- Downtown Land Use Map
- Thoroughfare Map
- Unified Plan
- 2008 Parking Study
- SCAT (Springfield City Area Transit) operational plan – web site
  http://www.scatrideline.com/
- Current or future development proposal site plans
- 2009 Intermodal Feasibility Study
- Current City Traffic Counts
- Existing right-of-way documentation
- Main and High Street Signalization Study/Plans

4. Existing Conditions

4.0 Existing Conditions

The existing conditions were assessed as part of the needs analysis. The needs analysis is an essential component of the purpose and need statement, because all developed alternatives must meet the need of a project. The existing conditions analysis helped identify needs by assessing High Street, Main Street, Fountain Avenue and Limestone Street in the following areas: traffic operations, safety, access, pedestrian walkability, multimodal components, environmental factors, and red flags.

4.1 Capacity Analysis: No Build – Base Year

The traffic data mentioned in **Section 3.1** was utilized to perform capacity analyses for the study area streets under existing one-way travel conditions. This analysis was called the No Build – base year.

Under current conditions, see **Figure 2**, the downtown area has plenty of capacity during peak hours and does not experience significant delays. In the AM the peak hour, the analysis shows that all of the intersections are at 55% capacity or less.

The analysis results and traffic volumes utilized for the existing condition analysis can be seen graphically in **Appendix C**.

4.2 Walk Audit

A walk audit of the downtown was conducted by the study team and TCC staff. The purpose was to assess the pedestrian experience and walkability of the streets in the study area. The walk audit results were shared at the first public meeting and can be found graphically in **Figure 3**. The detailed block by block assessment can be found in **Appendix D**.

The results show that many of the blocks were in need of some pedestrian related improvements. The blocks that were rated “good” or “excellent” all are in areas that have recently been improved by projects within the downtown area.

During the study process and after the walk audit was conducted the City began construction on the Main and High signalization upgrade project, which improved many of the intersection related concerns identified in the walk audit for those two streets.

4.3 Multimodal

Springfield is currently served by bus transit operated by the Springfield City Area Transit (SCAT). SCAT is a public private partnership between the City and a private operator. SCAT currently operates 11 fixed bus routes, all of which begin and end at the central SCAT bus center. The central SCAT bus center exists downtown within the study area along High Street at the Heritage Center just west of City Hall and Fountain Square. The buses pull in at an angle, with the potential for multiple arrivals at a time, and leave by pulling through their parking stall and turning back onto High Street. This exiting maneuver seems to work well because traffic has multiple lanes on High Street with which to allow the buses room to exit.

During the walking audit and subsequent field visits very few bus stops were observed. One shelter was observed and one bench in poor condition. The study team was informed that the SCAT buses do not typically have formal stop locations. With a two-way street system, return bus stops are traditionally across the street from the arrival stop. A one-way street system creates a unique condition for buses in that the return stop is sometimes over a block away due to the directionality of the bus travel.

There is one bike route north of the study area, the Buck Creek Path, and one bike route south of the study area, the Little Miami Scenic Trail, which begins at Center and Jefferson Streets and proceeds to the southwest.

A downtown trail linkage is not signed and riders switching trails must share the downtown streets with vehicles. No additional pavement markings such as Sharrows or bike lanes exist. A key linkage mentioned by the stakeholders to the study team was the desire to provide a better connection for bicyclists; between the

Heritage Center, on the southern edge of the study area, and the dedicated Buck Creek Path, north of downtown. The RUDAT report mentions the same desire in relation to the Clark State Performing Arts Center and its surrounding area.

4.4 Safety

None of the studied intersections were ranked on the City of Springfield's hot spot list for safety. It was agreed that there were no traffic safety concerns at any of the intersections at this time, but the study would progress mindful of not only vehicle safety but pedestrian safety as well.

4.5 Access

Access was field observed during the walk audit. Many businesses had multiple curb cuts, in some instances curb cuts existed with no functional access due to a change of use beyond the right-of-way. Currently many businesses operate on a right-in, right-out basis. The city blocks do contain a defined alleyway system that most occupants within the block can access either through defined driveways or through less defined access such as a parking lot that becomes part of the alley.

The walk audit identified that access to the City Hall Parking garage is directional, meaning the entrance is accessed by heading eastbound on High Street and the exit directs vehicles southbound on Fountain Avenue.

Delivery access for the majority of the study area businesses is through on-street loading/unloading.

4.6 Environmental Overview

Step 1 of the Ohio Department of Transportation (ODOT) Project Development Process (PDP) for Minor Projects requires identification of red flags. ODOT defines red flags as locations of concern within the study area that require additional study or coordination and that ultimately may impact items such as, but not limited to, the proposed project schedule or the estimated project budget.

As part of the Red Flag Summary a literature search and field observation were conducted for potential environmental red flags.

Following is a list of some, but not all, environmental red flags typically encountered:

- Section 4(f) and 6(f) properties (e.g. public parks, historic sites, and wildlife/waterfowl refuges)
- Cultural Resources (i.e. National Register of Historic Places listed and eligible history/architecture and archeological sites)
- Cemeteries
- Bike trails/bikeways

- Rivers and streams
- Wetlands
- Floodplains
- Hazardous material sites (e.g. Superfund site, landfill, gas stations, oil and gas wells, etc.)
- Potential environmental justice communities
- Sensitive public Involvement sites (i.e. churches, hospitals, etc.)
- Known threatened and endangered species

The specific details of that analysis are included in **Appendix E** and summarized below in **Section 4.7** However, from a purely NEPA (National Environmental Policy Act) standpoint, two areas of note are 1) the number of historical properties/structures in the downtown Springfield area and 2) the current and planned park spaces. Each of these is treated as special components of the NEPA process (Section 106 and Section 4f, respectively). If a project moves forward as a result of this study, the design team will need to be aware of potential impacts to these resources and the documentation and public involvement that such impacts may require.

4.7 Red Flag Summary

A preliminary red flag summary was completed for sections relevant to the level of study being conducted. Sections, such as Geotechnical, were not completed since that information was not needed for testing the feasibility of alternatives related to a traffic operations change.

The red flag summary lists potential environmental and design issues that should be considered as the project progresses further into the development process. When the project enters the ODOT PDP the red flag summary will need to be updated and the incomplete sections will need to be completed at the appropriate time. The red flag summary is included in **Appendix E**.

5. Future Conditions

5.0 Future Conditions

The City of Springfield, as well as, other developers and partners have been working on future development opportunities at various locations throughout downtown. The Center City Association has also been working to identify development opportunities. Some of the proposed development opportunities are shown in **Figure 4** and others are listed in **Section 1.4** as part of the Purpose and Need.

These recent and proposed projects/investments in the downtown will establish a better economic environment as well as generate additional traffic in the downtown. Travel demand modeling and capacity analysis was conducted for the year 2030 in order to assess the operational needs of the street network, assuming some of the above referenced projects happen.

5.1 Base: No Build

In order to assess the future benefit of any alternatives developed as part of the study, there must be a baseline condition to which to compare alternatives. This baseline is established by projecting future traffic volumes and assessing the network operations under current roadway configurations at a point 20 years in the future. This baseline is referred to as the “No Build” or “Do Nothing” alternative.

If the No Build is selected as the recommended alternative, then no further action or study will be taken with regard to converting traffic flows to 2-way on the studied streets.

Traffic modeling and analysis was performed for the 2030 No Build scenario. The 2030 Base model (no conversions) incorporates expected changes in land use and the street network by 2030. This included the new hospital, north of North Street between N. Plum Street and N. Wittenberg Street, and the resulting roadway changes. It also included other population and employment changes expected in the downtown. The modeling shows that the downtown street system would still operate efficiently in the future. However, growth, primarily from the proposed hospital, does have a noticeable impact on future traffic operations. In both the AM and PM peak hour, the worst intersection delays are consistently along N. Spring Street. The worst intersection capacity is operating at less than 70%, which is acceptable from a traffic operations perspective. A graphic summary and the detailed results can be found in **Appendix C**.

All conceptual alternatives will be compared to the No Build results to determine if they will provide a benefit beyond the No Build in the future. Traditionally, this is an easy comparison. However, in the case of an alternative that changes the directional flow of a street from one-way to two-way; the alternative will likely never provide better traffic operations than the No Build. The comparison thus becomes the level the vehicular delay is increased over the No Build and whether that is acceptable to the public when considering the entire scope of potential benefits from the traffic flow change.

6. Economic Impact Study

6.0 Economic Impact Study

A preliminary economic impact study was conducted through research of existing studies that have measured the impact of a two-way street conversion on a downtown. ***The impact study also included primary research specific to this study. Primary research was conducted by surveying cities known to have considered or implemented street conversions that were of comparable in size and character to Springfield, as well as communities that have completed conversions studies but their results were not captured by existing studies.*** Resources consulted and some of the articles utilized for the study have been included in **Appendix F**.

6.1 Introduction

This purpose of the economic impact analysis is to guide the City of Springfield with their street conversion project(s) by analyzing the economic impacts of other comparable conversion projects and identifying the economic impacts that have resulted as an outcome of the street conversion.

It became clear through this process that quantifiable economic indicators used to measure the economic success of completed studies were not readily available. The little data that did exist at the

Note: An economic impact assessment and review was conducted as part of the study. As part of this assessment a review of the current literature that addresses the economic impacts associated with one-way to two-way street conversions was conducted. At the time this study, one of the most comprehensive studies that documents the economic impacts associated with street conversion was a study conducted in Fargo North Dakota. This study was reviewed and referenced and some of the key findings from this report are cited in this section. This study was selected because it is was comprehensive and was of a comparable size to Springfield.

As a way to complement the Fargo study, additional cities of similar size and/or economic conditions to Springfield were contacted to expand the economic impact assessment. The information gained from this assessment was used to evaluate the potential alternatives developed as part of this study. It is important to note that each city and their transportation and economic conditions are unique, as is each alternative presented in this report. No direct correlation or relationship could be identified that would specifically quantify the economic impacts of the alternatives presented in this study. However, general trends and economic impacts associated with conversions in the literature and case studies in other cities does build support for the potential impacts that may be realized as a result of street conversions in Springfield.

time of this study was largely skewed or obsolete due to the unique economic conditions that existed at the time this study was completed. This coupled with many of the planned development projects in downtown Springfield (e.g. New Springfield Regional Medical Center) clouded the ability to truly measure the economic impacts germane to the alternatives outlined in this study. As a result, the economic impact analysis conducted and outlined in this section, provides a general assessment of the economic impacts that may be expected relative to the precedents in other communities.

6.2 Benefit Analysis

Accessibility

One-way streets can often seem confusing, especially for new visitors, and frequently do not provide direct access to downtown destinations. According to a study published by The Transportation Research Board, a one-way system can yield approximately 120-160% of the turning movements of a two-way system and an increased travel distance of 20-50% [2]. Increasing accessibility will, in turn, increase the attractiveness of the downtown as a destination for new visitors and developers. Businesses tend to abound where customers can find convenience and access to the storefront. Slower traffic speeds and walkability will allow for increased downtown business awareness. Below are examples cited in the City of Fargo's Economic Impact Study of positive business impacts resulting from one-way to two-way street conversions.

- West Palm Beach, Florida (population: 85,000) reported a dramatic increase in new retail shops, restaurants, and residential use. Property values in turn increased. They attribute the change to exchanging mobility (i.e., vehicle speed) with access brought about by the two-way circulation, as well as livability through streetscape design.
- Toledo, Ohio (population: 323,000) reported that long time vacant buildings are now being occupied or sold to developers for new shops and restaurants.
- Merchants in Lafayette, Indiana (population: 50,000) at first were very concerned about the loss of traffic but found that business traffic actually picked up after the conversion. Some parking was lost to install left-turn lanes. The City's Economic Development Officer reports that "no one would want to go back to one-way traffic".
- Charleston, South Carolina (population: 95,000) experienced a dramatic increase in new retail and service businesses in the area.

[2] Walker, Wade G, et al "Are We Strangling Ourselves on One-Way Networks?" TRB Circular E-CO19: Urban street Symposium

- Lubbock, Texas (population: 200,000) reports that the City has not received any unfavorable comments and the general consensus is that the conversion has been beneficial to the central business district which is now experiencing growth.
- In Kitchener, Ontario (population: 209,000) office vacancies declined from 35% to 11%, new housing units increased by 700 units, and street front retail vacancy rates declined from 12.4% to 7.8%.
- Albuquerque, New Mexico (population: 678,000) reports that automobiles do not move as quickly out of the downtown area, but more people seem to be staying in the downtown after hours.

Capacity and Reduced Speeds

When comparing one-way streets to two-ways streets, the most noticeable difference is the ability of one-way streets to carry heavier loads. The results of this effect are that two-way streets tend to have slower overall traffic speeds as a function of the lower carrying capacity. A study published within the Journal of the Institution of Engineers found an average speed difference of 4 to 5 mph resulting in an extra 6 minutes of travel time per half mile for two-way streets[3]. Although this may be a problem for those commuting out of the city, it is an attractive advantage for those seeking accessibility to the downtown as a destination, thus increasing the incentive for downtown redevelopment. Additionally, two-way conversion projects will occasionally displace traffic onto parallel corridors making these areas more attractive for redevelopment[4].

Safety

There are generally three issues that are addressed when discussing the safety factor for one-way to two-way street conversion projects: conflict points, speeds, and emergency vehicle accessibility. In general, there are less conflict points along one-way streets (i.e. conflicting turning movements at intersections) resulting in more numerous accidents along two-way streets. However, since two-way streets tend to have slower speeds, this results in less severe accident occurrences along these roadways. Furthermore, two-way streets tend to have improved accessibility for emergency vehicles. According to a previous economic impact analysis conducted by the City of Fargo, the Fire Chief of Chattanooga, TN supported the street conversion project since accessibility of emergency vehicles would not be limited to a single direction.

As the desire for more walkable communities increases, so does the concern for pedestrian and cyclist safety. Pedestrian and bicycle safety is found to increase with two-way street conversions due in part to the decreasing speeds. Most two-way streets permit median

[3] Meng, Lum Kit and Thu, Soe "A Microscopic Simulation Study of Two-Way Street Network Versus One-Way Street Network" Journal of The Institution of Engineers, Singapore (Vol. 44, Issue 2, 2004)

[4] City of Fargo Economic Impact Study. Draft. September 13, 2010

placement which allows for pedestrians to cross fewer lanes at once. In addition, cyclists confront fewer conflict points and fewer turning movements across multiple lanes.

6.3 Springfield Economic Redevelopment Conditions

Based on the overall positive economic results surveyed from recent conversion projects within comparably sized cities, it is anticipated that the conversion of one-way to two-way streets in downtown Springfield will have significant economic impacts on the city. The conversion will allow better access to downtown and establish a foundation to create economic opportunities for area businesses and residential development. Springfield is in an ideal position to experience increasing downtown economic development and redevelopment opportunities. Springfield is located within close proximity to major interstates I-70 and I-75, as well as two major airports (Dayton and Columbus). According to the Community Improvement Corporation of Springfield and Clark County (CIC), in 2009 Site Selection Magazine ranked Dayton, OH as the #1 medium sized metropolitan in the county. Furthermore, Springfield, within one of the thirteen counties represented in the Dayton Region, was ranked #2 for small sized metropolitan in 2009 for most expanded corporate facilities. The CIC's annual report also noted that over 3,100 jobs have been created and $735 million has been invested in economic development projects in Springfield. Recent redevelopment projects include the downtown Marriott Courtyard Hotel, the expansion of service within the Springfield Area Transit system, and the NextEdge Applied Research and Technology Park housing notable tenants including LexisNexis and Avetec.

6.4 Conversion Project Survey

Overview

This study is intended to provide the City of Springfield with indicators of the benefits of one-way to two-way street conversion projects. Seven cities were evaluated to help determine the economic impacts experienced by similarly sized cities. A previous economic impact analysis conducted by the City of Fargo[5], was used as a model and expanded upon for the purpose of this survey. Five cities were evaluated in the Fargo Study based on their population sizes, ranging from 64,049 persons to 757,688 persons; and the location of their converted streets in proximity to the downtown. The evaluation included Austin Texas; Des Moines, Iowa; Fort Collis Colorado; Lafayette, Indiana; and Vancouver, Washington. Alma, Michigan and Chattanooga, Tennessee were also evaluated in addition to the original five cities from the Fargo Study (see **Table 2**). The additional cities were evaluated based on responses from a survey sent to local

[5] City of Fargo Economic Impact Study. Draft. September 13, 2010

officials with significant roles in the street conversion projects (see **Table 3** for the results of the survey). The survey questionnaires with responses received can be found in **Appendix F**.

Representatives from the traffic engineering department and street drainage department of Lubbock, Texas were also contacted; however, survey responses were not received. Furthermore, the Community Planning and Development Office of the City of Kalamazoo, MI, was also contacted, but the department was unable to complete the survey because the city's conversion projects are still pending.

Recent Downtown Street Conversions				
City	**Streets Converted from 1-Way to 2-Way**	**Major Access to/from downtown**	**Length of Street Conversion**	**Year of Street Conversion**
Austin, TX	Cesar Chavez Street	No	5 blocks	2008
Des Moines, IA	Court and Walnut Avenues and Locust Street	No	3 to 4 blocks east	2006
Fort Collins, CO	Mason and Howe Streets	Yes	1+ mile	2010
Lafayette, IN	Main Street	Yes	9 blocks	1994
Vancouver, WA	Broadway Main Street "C" Street	Yes	7 to 8 blocks each	2007 2008 2009
Chattanooga, TN	MLK Blvd McCallie Ave Baily Ave	NA	NA	NA
Alma, MI	Superior Street and Center Street	Yes	6 blocks each	2005

Table 3: Street Conversion Study Questionnaire Results

Street Conversion Objectives and Economic Impacts							
	Austin, TX	**Des Moines, IA**	**Fort Collins, CO**	**Lafayette, IN**	**Vancouver, WA**	**Alma, MI**	**Chattanooga, TN**
1. Part of a larger redevelopment strategy…							
Was the city's one-way or two-way street conversion part of a larger redevelopment plan? Yes/No	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
2. Improve the existing traffic and/or transportation systems. . .							
Did the conversion improve auto access / traffic flow?	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**

Did the conversion improve the public transit system (access, additional stops, etc.)?	**No**	**No**	**Yes**	**Yes**	**Yes**	**N/A**	**N/A**
Did the conversion support the addition of bicycle lanes?	**Yes**	**No**	**Yes**	**No**	**No**	**No**	**No**
Were sidewalks widened through the conversion process?	**Yes**	**No**	**Yes**	**No**	**No**	**No**	**No**
3. Support/Stimulate Development/Redevelopment . . .							
Did the conversion stimulate the development of new offices buildings/or tenant build-outs?	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**No (economy)**	**No (economy)**
Did the conversion stimulate the development of new residential units?	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Did the conversion attract new retailers?	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**No**	**No**
Did the conversion attract new hotel/and lodging	**No**	**Yes**	**No**	**No**	**Yes**	**No**	**No**
Did the conversion generate new public investment (e.g. public buildings/parks)?	**City Hall; Library Planned**	**Parking Garage**	**No**	**No**	**Parking Garage**	**Walking Trail**	**Walking Trail**
4. Direct economic indicators…							
Did the conversion increase residential occupancy?	**Yes**	**No**	**Yes**	**No**	**Yes**	**Yes**	**N/A**
Did the conversion increase retail occupancy?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**N/A**
Did the conversion increase office occupancy?	**Yes**	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**N/A**

Survey Results

Most surveyed conversion projects were components of larger redevelopment plans. Alma, Michigan for example, chose to convert its city's streets to help improve traffic flow to the downtown district and cater to the needs of area businesses. Most cities concluded that their street conversion projects resulted in improvements in overall traffic flow and stable ADT (Average Daily Traffic) Volumes.

Many cities noted that the street conversion projects stimulated economic development within their communities, especially when those street conversions were in downtown areas; however, it is important to note that the two additional cities surveyed, Alma and

Chattanooga, both responded negatively towards increases in new office building and retail development. This may be an indicator of economic conditions rather than a result of the conversion projects. In Alma and Chattanooga, new office spaces were built but have remained vacant in concurrence with the recent economic downturn. Conversely, most cities did note increases in office and residential occupancy in existing buildings, as well as increases in retail occupancy. It is essential for communities to maximize utilization of existing infrastructure while still promoting both public and private development. One-way to two-way street conversion projects are one approach cities may use to provide accessibility to downtown districts and provide more opportunities for potential developers while maintaining and attracting mixed uses within the existing infrastructure.

Public development also increased within the majority of surveyed cities. Two cities reported the construction of parking garages (Des Moines and Vancouver) while Alma and Chattanooga constructed public walking trails in accordance with the overall conversion plans.

The surveyed components are intrinsically linked, all emphasizing the notion that increased accessibility will lend to a city's attractiveness to developers. The survey suggests that an increase in traffic flow to a downtown area will bring increased occupancy in office, residential and retail space and potentially spur new development in the area.

Additional Economic Benefits

Other cities nationwide have experienced positive results with their one-way to two-way street conversion projects. The City of Fargo projected increased employment opportunities with its street conversion project. The City projected a net increase of jobs, not including temporary jobs, resulting from the construction of the street conversion projects. The City of Springfield may also witness similar results. In addition, with a street conversion there is a potential commercial rental rates will increase due to an increase in demand for retail shops. And, a street conversion may aid the ability of local landlords to attract more tenants due to the improved access to downtown.

Indirect benefits are also anticipated with Springfield's street conversion project. Multiplier effects will contribute to the overall economy of the city. Multipliers are the results of dollars spent within the community on construction materials and wages earned by the addition of new employment.

6.5 Summary

Once conversion projects were completed, most surveyed cities recorded an increased ease of access for visitors and residents of the community. This then contributed to increased interest by developers in the areas adjacent to the converted streets. To summarize, other positive results witnessed by the surveyed cities included:

- An increase in temporary jobs due to construction projects; an increase in permanent jobs due to commercial and office development.
- An increase in public development projects.
- A rise in retail occupancy within the existing infrastructure.
- Less severe vehicular accidents due to a decrease in speed along two-way streets.
- An increase in demand for retail shops.
- An ease in accessibility for emergency vehicles.

Thus, the results of the one-way to two-way street conversion economic impact survey indicate that the proposed street conversion project within the City of Springfield will yield positive economic results. During a time when most cities are in the midst of suppressed economic development, Springfield will gain an economic advantage to its downtown and open doors for positive economic growth.

For more information on the studies and resources consulted for this overview see the resource and website list in **Appendix F**.

7. Conceptual Alternatives

7.0 Conceptual Alternatives

In November 2010, after reviewing the existing and future conditions with the public at the October 5, 2010 public meeting and analyzing the results of the initial public survey and comment period, the study team began developing conceptual alternatives that would meet the purpose and need.

7.1 Street Sections

The first step in developing conceptual alternatives was for the steering committee to agree on street sections to be applied throughout the study area. The study team presented the steering committee with the street sections illustrated in **Figure 5**. These sections were developed to include complete street components such as bike lanes, parallel parking, reduced lane widths, streetscape, medians, and two-way traffic flow.

After discussion, the steering committee decided to proceed with a street section that contained parallel parking on both sides of the street and two-way traffic flow with turn lanes at the intersections as needed. Sharrow pavement markings and signage would be incorporated to remind drivers to be aware of bicycle users. When possible, the travel lanes would be wider to provide more area for shared use of the roadway. Parking and streetscape would be

included to provide a buffer between vehicular traffic and pedestrians, as well as serving as a traffic calming feature. The goal was not only to provide acceptable traffic operations but to improve the pedestrian experience and develop the street in a way that promoted the use of other modes of transportation.

7.2 Streetscape

The City of Springfield has official right-of-way policy regarding streetscape for the downtown Springfield area. These goals and standards can be found in the Unified Capital Improvement Plan, pages 24-26 of the City's Unified Plan and included in **Appendix G** of this study. The plan establishes right-of-way policy for three design package types related to streetscape treatment. Page 24 of the Unified Plan, included in **Appendix G**, illustrates where in the downtown the three design package types are to be applied.

The highest level of streetscape is concentrated in the core block area. The intensity of streetscape features is then reduced the farther the block face is from the core block area.

Design Package Type 1 features:

Type 1 features granite curbs with clay brick paving utility strip and concrete sidewalk. Street trees are located every 40 feet. Site furnishings, including street lighting, benches and trash receptacles, are placed where appropriate.

Note: The only difference between Type 1 and Type 2 is the use of Granite for curb material in Type 1 and Concrete in Type 2.

Design Package Type 2 features:

As illustrated in **Figure 6**, Type 2 features concrete curbs with clay brick paving utility strip and concrete sidewalk. Street trees are located every 40 feet. Site furnishings, including street lighting, benches and trash receptacles, are placed where appropriate.

Design Package Type 3 features:

As illustrated in **Figure 6**, Type 3 features concrete curbs with a lawn utility strip and concrete sidewalk. Street trees are alternated with elevated planter boxes every 40 feet. Site furnishings, including street lighting, benches and trash receptacles, are placed where appropriate.

Figure 6 also depicts how urban spaces can be added to the street through building design as well as how bump outs can be incorporated into the street design to not only add planting space but provide shorter intersection crossings, which increase pedestrian safety.

7.3 Alternative 1

Alternative 1 includes improving and converting all of the streets studied, which includes Main Street, High Street, Fountain Avenue, and Limestone Street, to two-way traffic. Under this alternative the east-west streets of Main Street and High Street would be converted to two-way streets between Race Street and Spring Street and the north-south streets of Fountain Avenue and Limestone Street would be converted to two-way streets between North Street and High Street. **Figure 7** illustrates how the traffic flow would change under this alternative versus the existing condition.

The street section proposed under this alternative is a minimalist approach. The typical cross section would include two travel lanes and parallel parking on either side of the street. Turn lanes are shown on **Figure 8** only where there is a traffic capacity need for them. The proposed street section will fit within the existing curbed street and would not require widening of the street. Curbs may need to be moved for the installation of bump-outs or in some cases to accommodate truck turning movements.

Other improvements would be pedestrian and multimodal oriented such as new sidewalks and curb ramps, street trees and lighting, benches and trash receptacles, and pavement markings for identifying bike routes or reminders to share the road.

No specific bike lanes or routing was developed as part of this study; however, the steering committee noted that the issue should be explored further in future engineering phases of study. For now, Sharrow pavement markings are included as part of the alternative to remind drivers to be alert to other modes of transportation.

7.4 Alternative 2

Alternative 2 includes converting High Street and Main Street to 2-way traffic flow from Yellow Springs Street to Spring Street. **Figure 9** illustrates how the traffic flow would change under this alternative versus the existing condition.

The street section proposed under this alternative is a minimalist approach. The typical cross section would include two travel lanes and parallel parking on either side of the street. Turn lanes are shown on **Figure 10** only where there is a traffic capacity need for them. The proposed street section will fit within the existing curbed street and would not require widening of the street. Curbs may need to be moved for the installation of bump-outs or in some cases to accommodate truck turning movements.

Other improvements would be pedestrian and multimodal oriented such as new sidewalks and curb ramps, street trees and lighting, benches and trash receptacles, and pavement markings for identifying bike routes or reminders to share the road.

No specific bike lanes or routing was developed as part of this study; however, the steering committee noted that the issue should be explored further in future engineering phases of study. For now, Sharrow pavement markings are included as part of the alternative to remind drivers to be alert to other modes of transportation.

7.5 Alternative 3

Alternative 3 includes converting Fountain Avenue to 2-way traffic flow from High Street to Columbia Street and converting Limestone Street to 2-way traffic flow from High Street to North Street where the current 2-way travel begins/ends. **Figure 11** illustrates how the traffic flow would change under this alternative versus the existing condition.

As indicated, Alternative 3 includes improving the north-south streets of Fountain Avenue and Limestone Street through the study area. The areas that border these two streets are typically developed with occupying businesses. Much of the sidewalks and block faces in this alternative have already been improved through streetscape projects.

The street section proposed under this alternative is a minimalist approach. The typical cross section would include two travel lanes and parallel parking on either side of the street. Turn lanes are shown on **Figure 12** only where there is a traffic capacity need for them. The proposed street section will fit within the existing curbed street and would not require widening of the street. Curbs may need to be moved for the installation of bump-outs or in some cases to accommodate truck turning movements.

Other improvements would be pedestrian and multimodal oriented such as new sidewalks and curb ramps, street trees and lighting, benches and trash receptacles, and pavement markings for identifying bike routes or reminders to share the road. Since many of the blocks in this alternative have recently been upgraded with streetscape and pedestrian oriented features, as indicated by the high ratings received during the walk audit, the addition of new features on these blocks will be minimal.

No specific bike lanes or routing was developed as part of this study; however, the steering committee noted that the issue should be explored further in future engineering phases of study. For now, Sharrow pavement markings are included as part of the alternative to remind drivers to be alert to other modes of transportation.

8. Alternatives Analysis

8.0 Conceptual Alternatives

Alternative analysis was completed in order to assist the steering committee and public in determining the trade-offs and costs of each alternative

The No Build or do nothing alternative was included in the analysis. The cost of doing nothing is zero; however, the trade-off is that no changes are made to the current condition.

The analysis was both qualitative and quantitative. The qualitative analysis was based on the goals of the study and feedback from both the steering committee and the public as to which measures were the most important to them. The quantitative analysis was based on traffic analysis results and cost estimates prepared for each alternative.

8.1 Traffic Analysis of Alternatives

All three conceptual alternatives were modeled to assess the feasibility of converting the streets from one-way to two-way traffic operations. Each alternative was modeled using the 2030 projected volumes in order to compare the results to the 2030 No Build condition.

- *Alternative 1* considered what would happen if the east-west streets of Main Street and High Street were converted to two-way streets between Race Street and Spring Street and if the north-

- south streets of Fountain Avenue and Limestone Street were also converted to two-way between North Street and High Street. *Alternative 2* evaluated the conversion of just Main Street and High Street to two-way streets between Race Street and Spring Street.
- *Alternative 3* analyzed the street conversion of only Fountain Avenue and Limestone Street to two-way between North Street and High Street.

For each alternative, traffic redistributed itself to minimize delay in the system. The intersection level analysis for each alternative still showed that the system would operate efficiently with only slightly increased delay at certain intersections. For all three alternatives, the intersection with the highest percentage of capacity utilized in the peak hour is still shown to operate less than 100% (full capacity), resulting in acceptable traffic operations throughout the modeled area. The peak hour traffic volumes and capacity results can be seen graphically in **Appendix C**. The detailed results can be found in the tables and analysis reports included on the CD in **Appendix C**.

For comparison purposes, the Vehicle Miles Traveled (VMT), Vehicle Hours Traveled (VHT), and Vehicle Hours of Delay (VHD) from the traffic models were compared; and statistically there is no significant difference between any of the modeled networks.

Overall, each of the alternatives affects the downtown roadway system in a different way but does not cause an overloading of that system. In each case, the intersection delays, vehicle miles traveled, vehicle hours traveled, and vehicle hours of delay remain fairly consistent with the Base model run (No Build). Under the alternative configurations, there is still enough intersection capacity. This allows the traffic to re-distribute in the most efficient manner. Any of these alternatives, as well as the Base (No Build), will work for the City of Springfield from a traffic operations standpoint.

In is important to note, that the public ranked travel time last among the ten decision making criteria in the “very important” category.

8.2 Access

The public ranked access as the third highest criteria for decision making between alternatives, sixty-one and one half percent of respondents ranked “access” as “very important”.

Access issues were raised by stakeholders throughout the study process. For example, Springfield City Area Transit (SCAT) expressed concern about the ability of its buses to leave the downtown bus center if a change was made to the current traffic patterns. This scenario was analyzed and the model showed that the

buses should be able to exit the bus center with little to no additional delay.

In addition, some stakeholders expressed concern for businesses with directional access and drive-thrus, and the effect a change in traffic patterns would have on these businesses' site operations. The initial feeling was that as a worst case scenario the access may remain right-in, right-out, which is how it functions currently.

The directional access at the City Hall Parking garage will have to be "flipped" so that vehicles will enter the garage off of Fountain Avenue and exit on to High Street. This particular access solution requires both High Street and Fountain Avenue to be converted to two-way travel at the same time.

Loading zones were a topic of discussion both with the steering committee and the public. The concern is that a change in travel direction would limit the ability of vehicles to maneuver around delivery vehicles parked in the roadway. One solution discussed was to create marked delivery zones at the beginning of blocks that receive regular high volumes of deliveries. Other concerns related to the ability of larger trucks to maneuver in and out of the delivery zones and the potential for larger trucks to block traffic instead of utilizing the delivery zones.

During steering committee meetings, the topic of access was discussed in relation to each alternative. The steering committee agreed that access issues would be decided on a case by case basis through further study as an alternative moves to detailed engineering.

Two-way streets tend to have improved accessibility for emergency vehicles. The Springfield Fire *Rescue* Division Chief Nick Heimlich supports the street conversion project saying "Two-way traffic improves our access to any given address…with two-way traffic patterns, general movement through the affected area offers twice the route choices." Mr. Heimlich's division responds to incident locations from multiple directions. Two-way streets would allow not only more direct access from multiple directions but provide motorists clear direction in discerning what their responsibility is with regard to providing a clear lane of access (pull over to right versus the current choice of right or left). The Chief's entire comment can be found in **Appendix B**.

Another advantage discussed by the public is the opportunities for more direct connections and shorter travel distances.

8.3 Wayfinding

The public ranked wayfinding, or the ability to intuitively navigate the street system downtown, as the second most important criteria. Sixty-five percent of respondents ranked it as "very important" for making a decision between alternatives. Comments were made

regarding giving directions to landmarks or businesses and the difficulty in explaining the seemingly meandering routes needed to access certain points downtown. The overall opinion was that two-way streets would provide a more tradition travel pattern and a more understandable way of navigating downtown. Some of the public were concerned about the sudden ending of two-way travel and the beginning of one-way travel on the same street and the safety implications of unsuspecting drivers.

Two-way streets would also make utilizing bus transit more intuitive as stops could be located across the street from each other as opposed to blocks away in the case of one-way street patterns.

8.4 Walkability

The public ranked walkability, described as the pedestrian experience when walking downtown, as the fourth most important criteria. Sixty and one-half percent of respondents ranked it as “very important” for making a decision between alternatives.

Walkability also relates to the friendliness of downtown streets toward the pedestrian, for example: are crossings safe and handicap accessible, is the street pleasant to walk down, does the area feel safe and enjoyable and do businesses exist that promote pedestrian activity.

The alternatives that rank the highest for walkability are the alternatives that go the farthest in addressing the needs indicated in the walk audit, **Section 4.2**.

8.5 Safety

There are generally three issues that are addressed when discussing the safety factor for one-way to two-way street conversion projects: conflict points/sequences, speeds, and emergency vehicle accessibility.

In general, there are less conflict points along one-way streets (i.e. points where vehicles can collide) resulting in more numerous accidents along two-way streets. However, since two-way streets tend to have slower speeds, this results in less severe accident occurrences along these roadways.

As the desire for more walkable communities increases, so does the concern for pedestrian and cyclist safety. Pedestrian and bicycle safety is found to increase with two-way street conversions due in part to the decreasing speeds. Most two-way streets permit median placement which allows for pedestrians to cross fewer lanes at once. In addition, cyclists confront fewer conflict points (points where the cyclist could collide with a vehicle) and fewer turning movements across multiple lanes.

Pedestrians face fewer conflict sequences (opportunities for vehicles to collide with them) when crossing a two-way street versus a one-way street. For a two-way street crossing, a pedestrian faces two crossing sequences (one for each direction crossing). For a one-way street crossing, the pedestrian can face up to 16 different conflict sequences depending on which leg of the intersection they are crossing. **Figure 13** illustrates this comparison of pedestrian crossing conflict sequences. For more detail see the article*: Downtown Streets – Are We Strangling Ourselves on One-Way Networks?*, in **Appendix F**. As mentioned in **Section 8.2**, two-way streets tend to have improved accessibility for emergency vehicles.

8.6 Supports Economic Development and Proposed Projects

The public ranked economic development as the most important criteria. Seventy nine percent of respondents ranked it as "very important" for making a decision between alternatives.

The economic benefits of two-way street conversions are addressed in **Section 6.0**. One benefit related to the direction of travel is the visibility of storefronts at an intersection. As a vehicle approaches an intersection, the driver's cone of vision can take in a certain percentage of a storefront on either opposite corner. However, with a one-way street approach only half of the intersection gets exposure to vehicular traffic. For example, with a one-way system a northbound driver can only see storefronts on the north side of the intersection; thus, storefronts on the south side of the intersection are at a competitive disadvantage from an exposure standpoint. Less exposure is especially difficult for businesses that rely on pass-by traffic for business and advertising. If the street was two-way, then all corners would have an equal driver exposure potential and thus all corners would be equally desirable from a development perspective. **Figure 14** illustrates this principle of "eclipsing" storefronts. For more detail see the article: *Downtown Streets – Are We Strangling Ourselves on One-Way Networks?*, in **Appendix F**.

Table 1, in **Section 1.4**, lists recent and proposed economic development projects that the conversion of the studied streets would benefit.

Seemingly, the more streets that are converted by an alternative the more opportunity to support economic development projects or opportunities exist.

8.7 Access Management

Access management was discussed at various points in the study process. It is recognized that certain existing drives may have to remain right-in, right-out after conversion. This would be due to a high

volume of left turning traffic entering the drive, which could potentially queue and block the thru traffic on the mainline street. Examples include the entrance to the post office or a bank drive thru. The study team discussed these example scenarios with the steering committee and it was decided that access management would be better addressed in the future more detailed engineering phases of the recommended alternative. This would allow for more information to be collected regarding traffic demand in and out of particular drives, roadway geometrics and traffic operations. More information would allow for a better determination of recommended access.

In general, it was agreed that any recommended alternative would proceed with the goal of reducing, consolidating, or at a minimum, maintaining the number of access points along the study area streets. The fewer access points there are midblock the better the street will function. As parcels begin to redevelop and land uses change, it will be imperative that access is reviewed at that time.

The study area has a well developed alley system. This system should be promoted and utilized to its fullest potential in order to assist the major streets in maintaining their operational levels. From a street operations standpoint, the ideal access scenario would be that all parcels are accessed via the alley system and no curb cuts exist along the major streets.

8.8 Parking

Each of the alternatives illustrates the potential for gaining on-street parking as part of the conceptual alternative. These parking additions are conceptual and will need to be studied in further engineering detail when more detailed base mapping information is available and the final roadway geometrics are established. The parking spaces indicated as “gained” are generally a result of reducing the number of travel lanes in areas that currently do not have on-street parking. Other parking spaces “gained” are based on the apparent ability to fit parking in. Some parking spaces were moved across the street from their current location due to travel lane alignment issues. Prohibiting factors such as fire hydrants and distance from the intersection were only estimated based on limited aerial information. Parking spaces will need to be investigated further. Overall, the concepts show that the potential to gain on-street parking exists; the exact number and location of spaces will have to be determined in future engineering phases of project development.

8.9 Cost Estimates

The study team developed planning level cost estimates for each of the conceptual alternatives. In order to better understand the cost numbers for each alternative, the costs were broken down in a menu

style table so that the steering committee and the public could see which components contributed the most or least to the overall cost of each alternative. This allowed for a discussion of phasing the improvements based on available funds or applying to different funding sources for different components of the project. The categories were broken down as:

- *"Without pavement Mill & Fill overlay (M/F)"* – This category included all items necessary to achieve the change in traffic flow from one-way to two-way including traffic signals, signage, removal of old pavement markings and installation of new pavement markings. It does not include a new pavement overlay. This is the bare essentials cost.
- *"With pavement Mill & Fill overlay (M/F)"* – This category included all items necessary to achieve the change in traffic flow from one-way to two-way including traffic signals, signage, removal of old pavement markings and installation of new pavement markings. This includes grinding the pavement down (milling) and replacing it with a new three inch depth pavement overlay to provide a cleaner look to the street. This category does not include replacing the curb.
- *"Streetscaping Only"* – This category only includes costs associated with installing/replacing streetscape features. Curb replacement and sidewalk replacement are included in this cost category. The streetscape cost was developed based on features outlined in the City's Unified Capital Improvement Plan, as described in **Section 7.2** of this study. A price per streetscape design package Types 2 & 3 was developed for each alternative. The price is per "block street" which includes both sides of a street for one block length. The blocks requiring design package Type 1 in the study area already have granite curb and appear to have many of the other included streetscape components; therefore, a cost estimate was not developed for Type 1 as it was felt that those blocks did not require further upgrading. The "Streetscaping Only" cost was shown separate to aid in discussion about phasing and the potential for seeking separate funding for the streetscape, including private development dollars.
- *"Total Project Cost"* – this is the max cost column and adds the "With pavement Mill & Fill overlay (M/F)" and the "Streetscaping Only" costs together to get a grand total for doing everything at once.

Note: The developed costs were for construction only. Engineering service fees for further project development could be estimated at approximately 20% of construction cost.

Table 4: Construction Cost Estimates

Construction Cost				
Alternative	Without Pavement M/F	With Pavement M/F	Streetscaping Only	Total Project Cost
Alternative 1 High Street, Main Street, Fountain Avenue, Limestone Street Conversion	$2.5 M	$3.2 M	$5.9 M	$9.1 M
Alternative 2 High Street and Main Street Conversion	$1.85 M	$2.4 M	$4.9 M	$7.3 M
Alternative 3 Fountain Avenue and Limestone Street Conversion	$0.667 M	$0.9 M	$0.96 M	$1.86 M

Appendix H contains the cost estimate worksheets showing items, quantities, and unit pricing included in each **Table 4** category.

8.10 Conceptual Alternatives Matrix

A matrix was developed for comparing the alternatives, **Table 5**. The matrix represents both qualitative and quantitative categories for each of the alternatives considered. The No Build alternative was not scored as it is the existing condition and the baseline for which the alternatives are measured against. Since the alternatives build on each other, Alternative 1, which includes all facets of Alternatives 2 & 3, scores the best in most categories. This is due to Alternative 1 providing more improvement over the existing conditions for the largest area. An example would be wayfinding, which is measured by a visitor's ability to easily and intuitively navigate downtown. The more streets that are converted to a more conventional 2-way travel pattern above the existing condition the easier it will be for downtown visitors to navigate, whether by vehicle, bike, or transit.

Table 5: Evaluation Matrix

Alternative	Criteria							
	Traffic Operations (Capacity, Travel Time)	**Access** (EMS, Connections)	**Wayfinding** (Pedestrian, Transit)	**Econ. Development** (Visibility, Placemaking)	**Supports Proposed Projects**	**Walkability** (Pedestrian Experience)	**Cost** (Construction Cost in Millions)	***Potential Net Parking Spaces**
Alternative 1 High Street, Main Street, Fountain Avenue, Limestone Street Conversion							$9.1	+ 70
Alternative 2 High Street and Main Street Conversion							$7.3	+ 41
Alternative 3 Fountain Avenue and Limestone Street Conversion							$1.86	+ 29
No Build			existing conditions					

* "New" spaces do not include areas where ability to park exists but striping is absent (e.g. High and Main)

The scale is an evaluation of each alternatives' effiency and/or level of improvement to the overall transportation network

Excellent | Very Good | Neutal | Fair | Poor

As with the above example, much of the scoring in the other categories is based on the number of blocks or size of the area receiving the improvement, with the idea that more is better.

The exception to the progressive scoring would be traffic operations and cost. It is accepted that a one-way street system is the most efficient system for moving vehicular traffic by traditional operational measures. Converting to a two-way traffic flow does reduce traffic operational efficiency, but as the alternative analysis has shown, it does not reduce it below a normal acceptable standard (neutral).

9. Conclusions

9.0 Conclusions

The responses to the following questions have been developed based on the specific results of this study in relation to the feasibility of converting the study area streets to two-way traffic in the City of Springfield. The responses have also been developed based on case study research utilized during the course of the study.

9.1 Two Key Feasibility Questions

Is converting the studied streets feasible from a traffic operations standpoint?

Yes. The traffic analysis performed for the downtown, including the conversion of the studied streets to two-way travel, resulted in acceptable operations throughout the downtown network through the year 2030. The traffic analysis included intersections outside the study area that would receive rerouted traffic as a result of the network rebalancing itself due to drivers adjusting their travel patterns to take advantage of the new traffic flow.

Will the conversion of the studied streets benefit the economy of downtown?

Yes. All of the research presented in **Section 6.0** and referenced in **Appendix F** concludes that street conversions are successful in benefiting the economy of areas adjacent to the conversions. However, conversions alone are not the sole reason for rejuvenating the economy but are a contributing factor as part of an overarching strategy.

9.2 Initial Stakeholder Concerns Regarding Conversion

Would a conversion result in loss of on-street parking?

No. All three concepts presented in this study showed the potential for gaining on-street parking due to a reduction in lanes on the studied streets. The exact number of parking spots gained will be determined after further engineering study.

Are one-way streets more efficient?

This depends on the topic. In relation to traffic operations, yes, one-way streets are the most efficient for moving traffic in and out of an area quickly and efficiently. In relation to transit, no, one-way streets are not more efficient. Bus stops, for example, are often blocks apart due to patrons having to arrive on one street and then find a return stop on another street, because of the one-way travel. For a two-way system, bus stops are typically across the street from each other for arriving and departing patrons.

How would a street conversion affect snow removal?

A street conversion could potentially affect the way snow removal is currently performed. But many cities across the Midwest, including Springfield, have two-way streets downtown and are able to remove snow from those streets. If converted, new techniques or schedules may need to be implemented to address snow removal on the studied streets.

How would the conversion affect street maintenance?

The street conversion will most likely change the way maintenance is performed on the studied streets. However, Springfield does have two-way streets existing downtown and maintenance is performed on those streets. If converted, those techniques would most likely have to be applied to the studied streets.

How would we pay for the conversion?

The most likely funding source is Federal Highway funds. Some of the proposed non-roadway improvements, like streetscape, may have potential for private funding.

What about pedestrian safety of one-way streets compared to two-way streets?

Research indicates that two-way streets are safer, due to lower travel speeds by vehicles. Two-way streets also tend to have less travel lanes to cross which creates a shorter crossing distance and exposure to vehicular traffic. Two-way streets also offer the opportunity for medians and other pedestrian refuge treatments that can reduce the crossing distances for pedestrians.

Two-way street crossing have only two conflict sequences for the pedestrian, while one-way streets can have up to sixteen sequences in which vehicles can conflict with a pedestrian while crossing a single leg of an intersection. For more a more detailed explanation of conflict sequences see the article “Downtown Streets – Are we Strangling Ourselves on One-Way Streets” in **Appendix F**. The same article also states that “there are simply more (typically 30-40%) vehicle/pedestrian conflicts within a one-way street network than in a comparable two-way system”.

While some of the research indicates that vehicle-pedestrian crashes can be higher for two-way streets that have been converted from one-way, the Fargo study in **Appendix F** suggests that crashes increase because there are more pedestrians using the street post conversion therefore increasing the opportunity for crashes.

Would a street conversion provide a better sense of place and economic development potential?

All of the research presented in **Section 6.0** and referenced in **Appendix F** concludes that street conversions can help improve economic conditions in areas adjacent to the conversions. It is important to note however, the conversions alone are not the sole reason for rejuvenating the economy but are a contributing factor as part of an overarching strategy.

Street conversions are also becoming a tool for supporting place making. Place making involves determining what the public wants to identify with in a certain district or area. What do they want the “place” to be? For a downtown, it usually starts with a desire for a “traditional” downtown. This idea is generally based on the pre-suburban boom downtown model. In this ideal, downtown is the commercial, social and civic hub of the region and often the identity of the community. Historically, those downtowns contained two-way street grids that supported multiple modes of transportation equally. Today, as

downtowns seek to revitalize themselves, downtowns are looking for an identity that can take advantage of high density development and multiple modes of transportation to once again establish a sense of place that is unique to downtown and attractive to those who typically do not visit downtown. One of the first steps explored is re-establishing the complete streets of the past by converting the streets back to two-way travel.

Would a conversion affect the network of alleys and be a concern for loading zones?

No impact to the ally network is foreseen. If access management is employed as part of an alternative, then one impact may be a higher use of the alley network.

Loading zones were discussed with the stakeholders and the public. Some challenges were presented with regard to changing the streets to two-way traffic; however, solutions were also presented. Challenges and solutions will be explored in more detail during the preliminary engineering phase of any project development.

How are building access and bank drives thrus impacted when converting to two-way streets?

The worst case scenario may be that building access becomes right-in and right-out, which is essentially how it is currently. Some specific access issues were discussed during the study, such as the access to the parking garage at City Hall that would require switching the entrance and exit; however, the level of detail needed to fully investigate and mitigate access issues was beyond the scope of this study. Access issues will be investigated fully in the preliminary engineering phase of any project when the appropriate level of information can be incorporated into the decision making process.

Would turning radii be a problem with two-way streets? Setbacks would be required for left turn lanes.

Each of the intersections will be analyzed for appropriate turning radii during the preliminary engineering phase of any project. One option, to avoid moving curbs to accommodate larger turning radii, would be to provide more distance between the stop bar and the intersection area.

9.3 Questions Outlined in the Request for Proposal

Do two-way streets create a less confusing circulation pattern, and which is more intuitive to all users?

Yes, two-way streets are a more traditional traffic pattern and most users associate it with being more intuitive. Visitors better

understand a two-way street pattern which allows them to focus on finding their destination.

The Fargo study in **Appendix F** references the experiences of New Haven, CT, and Hickory, NC, where conversion to two-way streets resulted in a less confusing travel for out-of-town visitors, which led to the community developing a "user friendly" image.

Survey results from the first public meeting for this study showed that 17 of 20 respondents believed that two-way streets would be less confusing for circulation in downtown Springfield, **Appendix B** – Public Comments.

Do two-way streets eliminate indirect routes, which reduce travel time, fuel consumption and emissions?

Mostly yes, and in theory, yes. Two-way streets allow for the most direct access of locations; however, depending on a patrons direction of travel and the access management applied along the street, the driver may be required to take a more "indirect route" to access their destination using a two-way street system. This of course is not necessarily true for all destinations, and in the case of the alternatives proposed for Springfield, an indirect route will be the exception not the rule.

By allowing more direct access and less circulative routing, it would reason that travel time, fuel consumption and emissions would be reduced. Some research supports this. The research, however, is typically conducted for larger networks where the sheer number of circulative routes over the potential delay created shows a difference in vehicle miles traveled, fuel consumption and emissions. Though vehicle miles traveled, fuel consumption and emissions actually increase with congestion (due to increase delay and time spent idling at intersections) and, in theory, a street conversion "creates congestion" when compared to the one-way "optimal" system.

Travel time, fuel consumption and emissions were analyzed for the alternatives presented for this study. The results showed no noticeable change over the base condition. This is most likely due to the amount of excess capacity at each of the intersections downtown and the networks ability to balance itself in an efficient manner without increasing travel time or intersection delay. Thus, the most likely result will be a net zero effect for Springfield.

Do two-way streets provide more direct routes to downtown destinations?

Two-way streets allow for the most direct routing to locations; however, depending on a patrons direction of travel and the access management applied along the street, the driver may be required to take a more "indirect route" to access their destination. This of course

is not necessarily true for all destinations, and in the case of the alternatives proposed for Springfield, an indirect route will likely be the exception not the rule.

Do two-way streets generally increase traffic congestion at intersections?

Generally yes, this is due to the way congestion is measured. It is a weighted formula that weighs heavily on the number of vehicles that can pass through an intersection at a given time. Therefore, the more through lanes that are provided for a fixed number of vehicles the lower the congestion or average vehicle delay will be. When through lanes are taken away, the delay per vehicle increases. The introduction of more conflicting turning movements at the intersection (i.e. left turns) may add delay. If traffic signal time is needed to protect a left movement via a turn phase, then the time available for the through vehicles is reduced. The time for through vehicles counts the most toward lowering the average delay per vehicle.

In Springfield, the traffic volumes were low enough that the one-way system was found to have excessive capacity such that when through lanes were removed there was minimal change in the average vehicle delay. Also, many of the signalized intersections did not require protected turn phases when traffic flow was switched to two-way. Although a two-way system technically increases delay over the existing condition, in Springfield a two-way system will not create congestion. All of the intersections under two-way operation still operate well above acceptable industry measures for congestion. For more information see the detailed analysis in **Appendix C**.

Do two-way streets require left turn lanes at intersections, which may eliminate on-street parking adjacent to the intersection?

Some intersections were found to require left turn lanes. These left turn lanes are shown on the conceptual alternatives in **Figures 8**, **10** and **12**. The need for left turn lanes is typically based on traffic volume demand. A need can also be based on crash history at a particular intersection or a geometric deficiency that creates the need; however, there were no safety concerns that led to turn lanes being included at this time.

The geometrics of the intersections will be studied in further engineering detail during subsequent phases of the project development process. At such time, a determination of the impact, if any, to adjacent parking will be made. Impacts to parking will largely depend on the size of the left turn lane required.

Do two-way streets create frustrating inefficiency?

In regards to traffic operations, the answer could be yes. Since the purpose of one-way streets are to move large volumes of traffic at high speeds in and out of an area, a driver that wishes to simply get out of an area would see the slower speeds of a two-way street as less efficient. However, if the driver had a destination oriented purpose for traveling downtown and wanted to be able to "experience" downtown, locate a sign for a business or park then that driver would see the slower more organized flow of two-way streets as more efficient. Two-way streets offer more efficiency in regard to access and routing to a destination.

Do two-way streets increase the number of conflict points at intersections, and may increase certain types of crashes (i.e. angle)?

Yes, two-way streets do create more conflict points at intersections. Conflict points are points where vehicles can collide. The increase is due to the added turning movements at the intersection and creating more opportunity for vehicles to intersect each other. Some studies have shown an increase in crashes, other show a drop. The number of crashes is most likely more dependent on the amount of traffic and the intersection itself (timings, geometrics, and driver behavior) than the direction of travel. More statistics can be found in the research in **Appendix F**.

Industry accepted research states that while the opportunity for crashes may be higher for two-way street intersections the resulting crashes are less dangerous due to the lower speeds that two-way streets usually operate at compared to one-way streets.

Do two-way streets reduce opportunity to increase traffic capacity if ever needed?

This question is relative. One-way streets can be said to reduce the opportunity to increase capacity if the road is already as wide as it can get within the right-of-way and building faces of an urban street.

At a full capacity scenario, and not a fixed volume of traffic scenario, then two-way streets in downtown Springfield would have an increased opportunity for adding capacity due to the ability to impact on-street parking and gain additional capacity through the addition of turn lanes or through lanes.

Obviously, a single two-way street handles less volume than a multi lane one-way street. From that perspective, if the two-way street was at capacity then the one-way scenario for the same amount of volume would have "built-in" excess capacity. However, with this scenario the two-way street is only carrying one street worth of volume. One-way streets are part of a pair and therefore need the

extra capacity because that single street is carrying the volume of two streets.

Another advantage to a two-way street system is that the resulting grid allows for multiple route choices. As one street gets congested, drivers will switch to a parallel street to reach their destination and the system begins to "balance" itself. One positive by product is more traffic on other previously less traveled corridors which could potentially improve the economic viability of those corridors.

Do two-way streets improve pedestrian perception of the street as less of a barrier?

Yes, all of the research (see **Appendix F**) indicates that pedestrians feel the higher speeds and wider intersection crossings of one-way streets create a barrier for pedestrians. Two-way streets are more traditional and therefore pedestrians are more comfortable interacting with two-way streets. With two-way streets, speeds are generally lower, traffic volume is generally lower, the width of the street is usually narrower, and pedestrians have the choice to walk with the flow of traffic or facing traffic. These are all concepts that make a pedestrian feel safer. Walkability was ranked fourth highest on the list of decision making criteria by the Springfield public. This indicates a desire to walk downtown. The one-way streets may be a barrier to the public feeling safe or comfortable enough to walk downtown.

Do two-way streets increase exposure of adjacent businesses to passing motorists?

Yes, and this can be explained in two ways. The first is called "eclipsing" and involves the visibility of businesses on intersection corners, see **Section 8.6** for a brief explanation of "eclipsing". See the article: Downtown Streets – Are We Strangling Ourselves on One-Way Networks?, in **Appendix F** for a more detailed explanation.

The second aspect is that the slower speeds of vehicles in a two-way system allows the driver more time to read and react to store front signage mid-block. For businesses that rely on pass-by traffic, this makes a tremendous difference in the viability of a mid-block location.

Do two-way streets make downtown a more attractive destination?

The research in **Section 6.0** and **Appendix F** indicates that two-way streets do make downtown a more attractive destination not only for the public but businesses and developers. The majority of the

studied cities who have completed conversions have seen an increase in economic activity and patrons.

From **Section 6.2**:

- Toledo, Ohio (population: 323,000) reported that long time vacant buildings are now being occupied or sold to developers for new shops and restaurants.
- Merchants in Lafayette, Indiana (population: 50,000) at first were very concerned about the loss of traffic but found that business traffic actually picked up after the conversion. The City's Economic Development Officer reports that "no one would want to go back to one-way traffic"
- Albuquerque, New Mexico (population: 678,000) reports that automobiles do not move as quickly out of the downtown area and more people seem to be staying in the downtown after hours.

Do two-way streets make downtown a more attractive destination to a variety of transportation modes, thus expanding the potential economic market?

Two-way streets do make the opportunity to utilize additional modes of transportation more convenient. As discussed in previous sections, transit becomes more intuitive and easy to access, especially for visitors, on a two-way system. The lower speeds of two-way streets also allow pedestrians and bicyclist to feel more comfortable mixing with traffic and sharing the right-of way.

As far as mode usage, it is hard to discern if an increase in alternative mode usage would be due to increased market or people who normally feel compelled to drive downtown switching to another mode merely because they can.

In the end, it is not necessarily the mode of transportation that expands the market of downtown; rather, it is the capturing of repeat visitations by persons who do not normally visit downtown or who come to downtown once and because they do not like the experience they choose not to return.

10. Recommended Alternative

10.0 Recommended Alternative

During the final steering committee meeting on April 4, 2011, the committee reviewed all of the alternatives and the public comments received to date. After discussing the merits of each alternative, the potential for phasing, the analysis matrix and probable costs associated with each alternative, the committee agreed to recommend Alternative 1 for further development. Alternative 1 was also the alternative most widely supported by the public (see **Section 2.0** and **Appendix B**).

Alternative 1 includes converting all 4 studied streets to two-way traffic flow along with implementing streetscape enhancements and multimodal improvements, such as the potential for additional bus stops and Sharrows that increase awareness of bicycle traffic by emphasizing sharing vehicle lanes with bicyclist.

The steering committee agreed not to phase the implementation of the alternative because of challenges associated with access and traffic signal equipment installation and operations.

The next step for the recommended alternative is to identify a potential funding source and position the alternative for continuation into and through the ODOT PDP. The next steps of the ODOT PDP involve collecting more data and beginning detailed engineering and environmental studies for the specific components of the recommended alternative.