



# Vermillion

## Area Multimodal Transportation Plan

## Report Appendices



August 2012



# APPENDIX A: PUBLIC MEETING SUMMARIES



# Vermillion

## Area Multimodal Transportation Study

October 2011 Stakeholder  
and Public Information  
Meeting Summary





## MEMORANDUM

**Bill Troe, AICP**

**Jason Carbee, AICP**

12120 Shamrock Plaza

Suite 300

Omaha, NE 68154

(402) 334-8181

(402) 334-1984 (Fax)

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**To: Jose Dominguez, City of Vermillion  
Steve Gramm, South Dakota DOT  
Study Advisory Team**

**Date:** November 10, 2011

**Subject: Summary of Vermillion Area Transportation Plan Stakeholders Committee and Public Meetings, October 26-27, 2011**

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### ***OVERVIEW***

The purpose of this memorandum is to document:

- The information presented at the October 26-27, 2011 Stakeholders Committee and Public Meetings.
- The feedback received from those in attendance.

### ***NOTICE OF MEETINGS***

The public meeting was publicized ahead of time through the following means:

- Newspaper public notices appeared in the Vermillion Plain Talk on October 7 and October 14, 2011.
- The study website provided a notice of the meeting.
- The City of Vermillion's Facebook page provided a notice of the public meeting and a link to the study website on October 25, 2011.

A letter was sent to the stakeholders committee members the week of October 10-14 inviting them to the October 26 Stakeholders committee.

### ***MEETING DETAILS***

The stakeholders committee meeting was held October 26 at 6:30 PM. The public meeting on October 27 started at 6:45, with Bill Troe providing a brief presentation at 7:00. The agenda for the meetings were:

1. Introductions
2. Overview of the Transportation Plan (Presentation)
3. Discussion of Draft Transportation Goals and Objectives
4. Transportation Issues Discussion

## 5. Wrap Up

At both meetings, after the presentation those in attendance broke into small groups and marked up large maps of Vermillion and discussed area transportation issues. The sign-in sheets for those in attendance at both meetings are provided in the appendix.

The presentation portion of the public meeting was broadcast live on the City's government TV channel. Included in the appendix are the materials that were handed out to those in attendance. The items handed out include:

- Agenda
- Evaluation Form
- Comment Sheet
- Draft Plan Goals and Objectives
- Transportation Funding Priority Survey (i.e., "\$100 Survey")

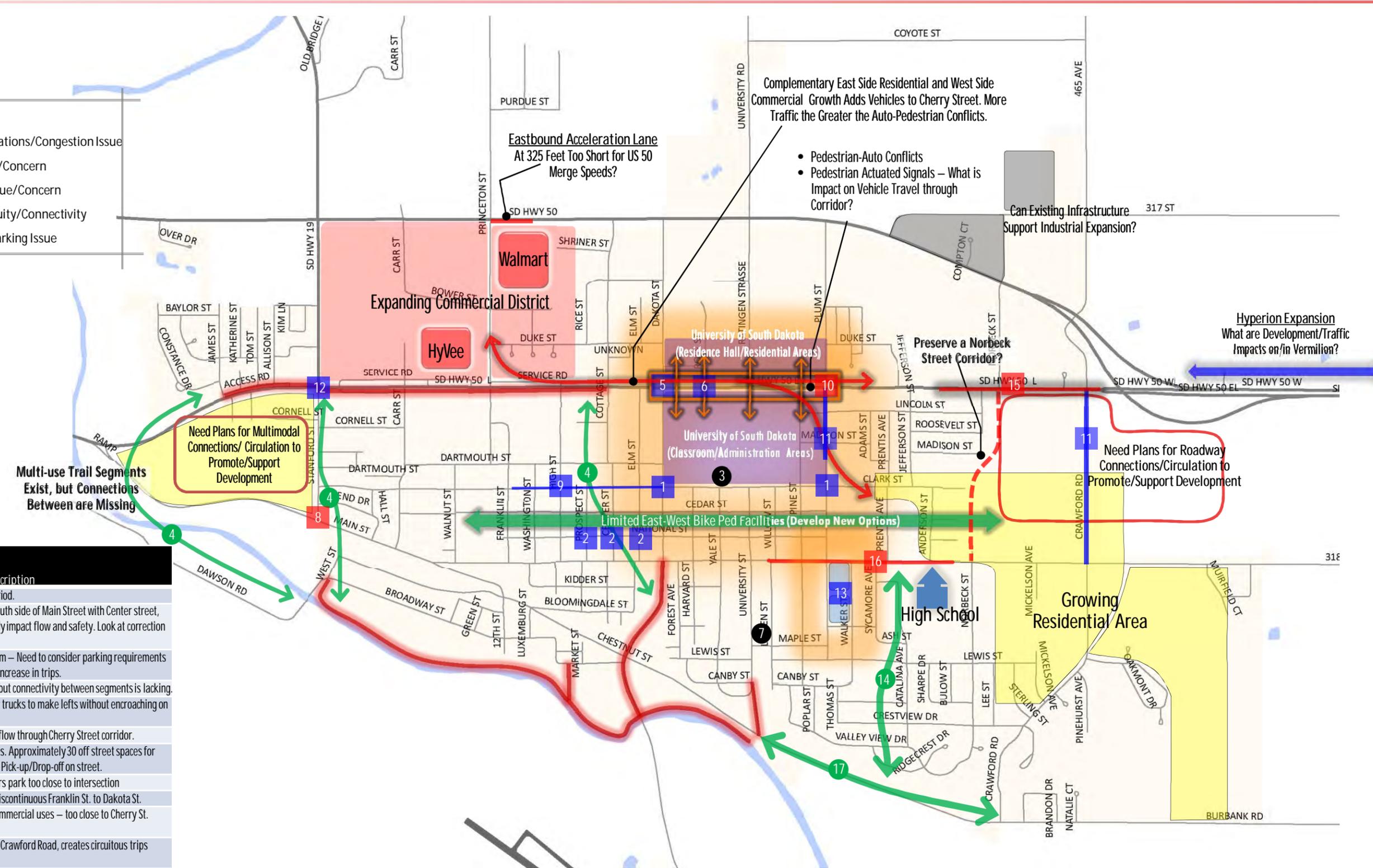
The appendix also includes a copy of the presentation slides, the sign-in sheet for those present at the meetings, and a \$100 survey that was filled out and returned.

## ***SUMMARY***

The summary of the issues that we received from at the stakeholders committee and public meetings is shown on Page 3. **No comments were received on the draft Goals and Objectives.**

If you have any questions or comments about this, please contact Bill Troe at 402.952.2522 or at [Bill.Troe@urs.com](mailto:Bill.Troe@urs.com).

- Legend**
- - Traffic Operations/Congestion Issue
  - - Safety Issue/Concern
  - - Land Use Issue/Concern
  - - Trail Continuity/Connectivity
  - - On-street Parking Issue



Number	Description
1	Intersection congested during peak period. Offset approaches on north side and south side of Main Street with Center street, Prospect Street and Elm Street negatively impact flow and safety. Look at correction options.
2	Expansion of the National Music Museum – Need to consider parking requirements (off-street) (autos and tour buses) and increase in trips.
3	Nice segments of multi-use trail exist, but connectivity between segments is lacking.
4	Turning radii not large enough to allow trucks to make lefts without encroaching on cross route stopped vehicles.
5	Fixed time signal – creates inefficient flow through Cherry Street corridor.
6	Jolley School – on-street parking issues. Approximately 30 off street spaces for approx 40 staff and over 300 students. Pick-up/Drop-off on street.
7	Safety – sight distance issues when cars park too close to intersection
8	Clark Street – South side sidewalk is discontinuous Franklin St. to Dakota St.
9	Assess to north side parking lot and commercial uses – too close to Cherry St. Creates safety and operations issues.
10	Truck restrictions along new section of Crawford Road, creates circuitous trips and/or neighborhood cut-through trips.
11	Intersection congestion is growing.
12	Hospital – On-street parking Stop controlled intersections, create congestion issues. Parking shortage?
13	Lacking north-south bike connections/facilities.
14	Along 5-Lane section, need to improve pedestrian crossing safety.
15	Before and after school – Mixing of school and hospital traffic causes congestion and safety concerns. Pedestrian and auto conflicts on Main Street
16	Extend multi-use trail to the east.
17	

Figure #  
 Transportation System Issues/Concerns/Considerations Identified by Stakeholders and Public (October 2011)



Memorandum  
Vermillion Study Advisory Team  
November 10, 2011

Page 4

***APPENDIX - STUDY MEETING MATERIALS***

## ***PRESENTATION SLIDES***

# Vermillion Area Transportation Plan 2012-2032

## Overview of the Area Transportation Plan



# Agenda

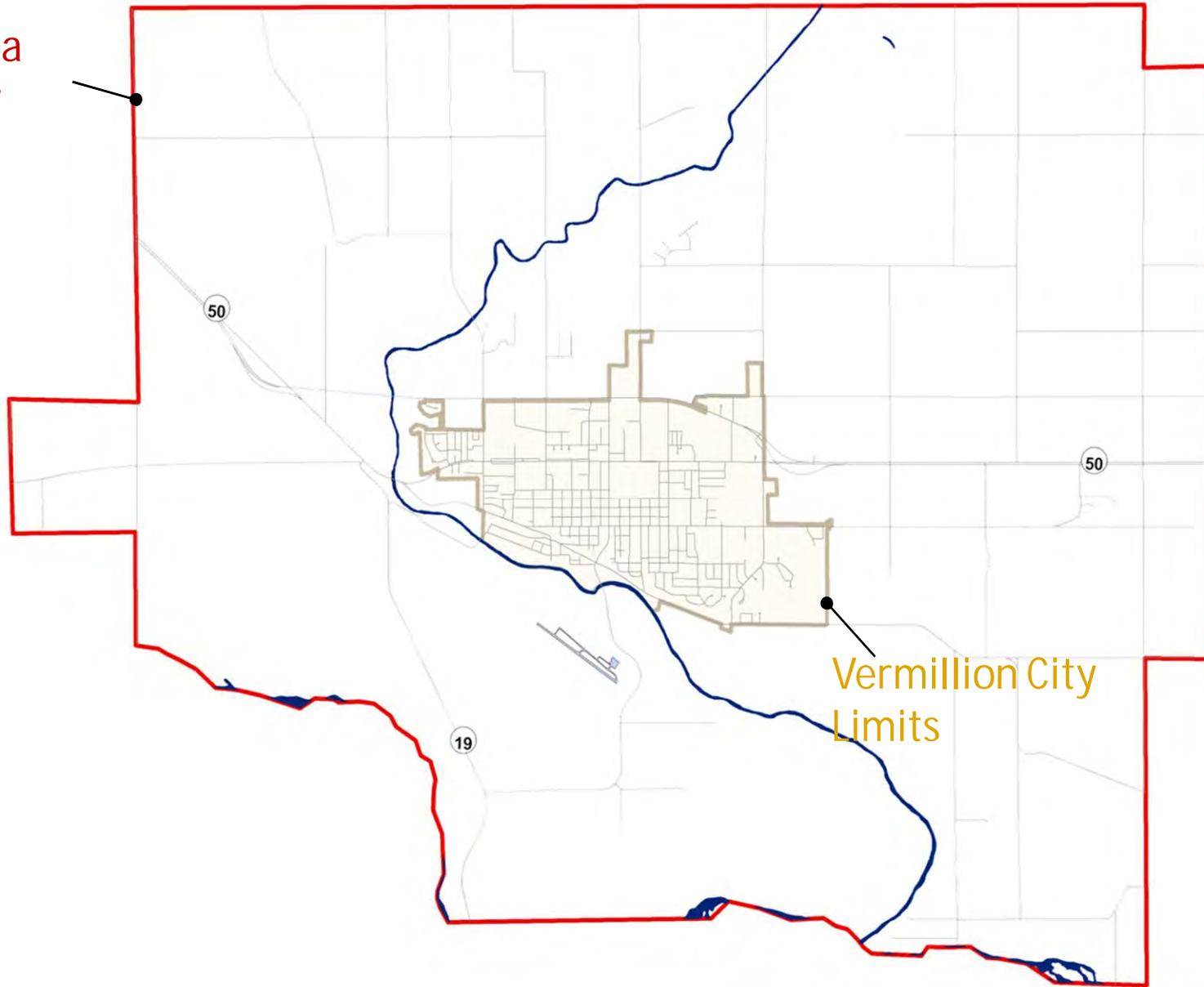
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- Review What is the Transportation Study
- Information on Committees:
  - Study Advisory Committee
  - Stakeholders Committee
- Discuss Preliminary Transportation Goals/Objectives
- Discuss Current Transportation System:
  - Areas that need to be addressed
  - Are there specific groups/populations that are underserved?
  - Connections that are missing?



# Plan Study Area

Study Area  
Boundary



Vermillion City  
Limits

# The Transportation Plan

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- The Area Transportation Plan:
  - Will be a Blueprint guided by Local Vision
  - Is Multimodal:
    - Roadways
    - Trails and Sidewalks
    - Transit
  - Identifies Current / Emerging Issues and Needs
  - Lists the Area's Transportation Improvement Priorities:
    - Covers the next 20 years
  - Identifies Funding Needs / Capabilities

# What is Covered in the Plan?

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- Regionally Significant Roadway Needs
  - Arterials and Collectors
- Transit System Needs
- Public Trail / Sidewalk Needs
- Travel Management Programs
  - Rideshare/carpool/vanpool programs
  - Intelligent transportation systems (ITS)
- Projects and Programs Using State and Federal Dollars
- Corridor Preservation



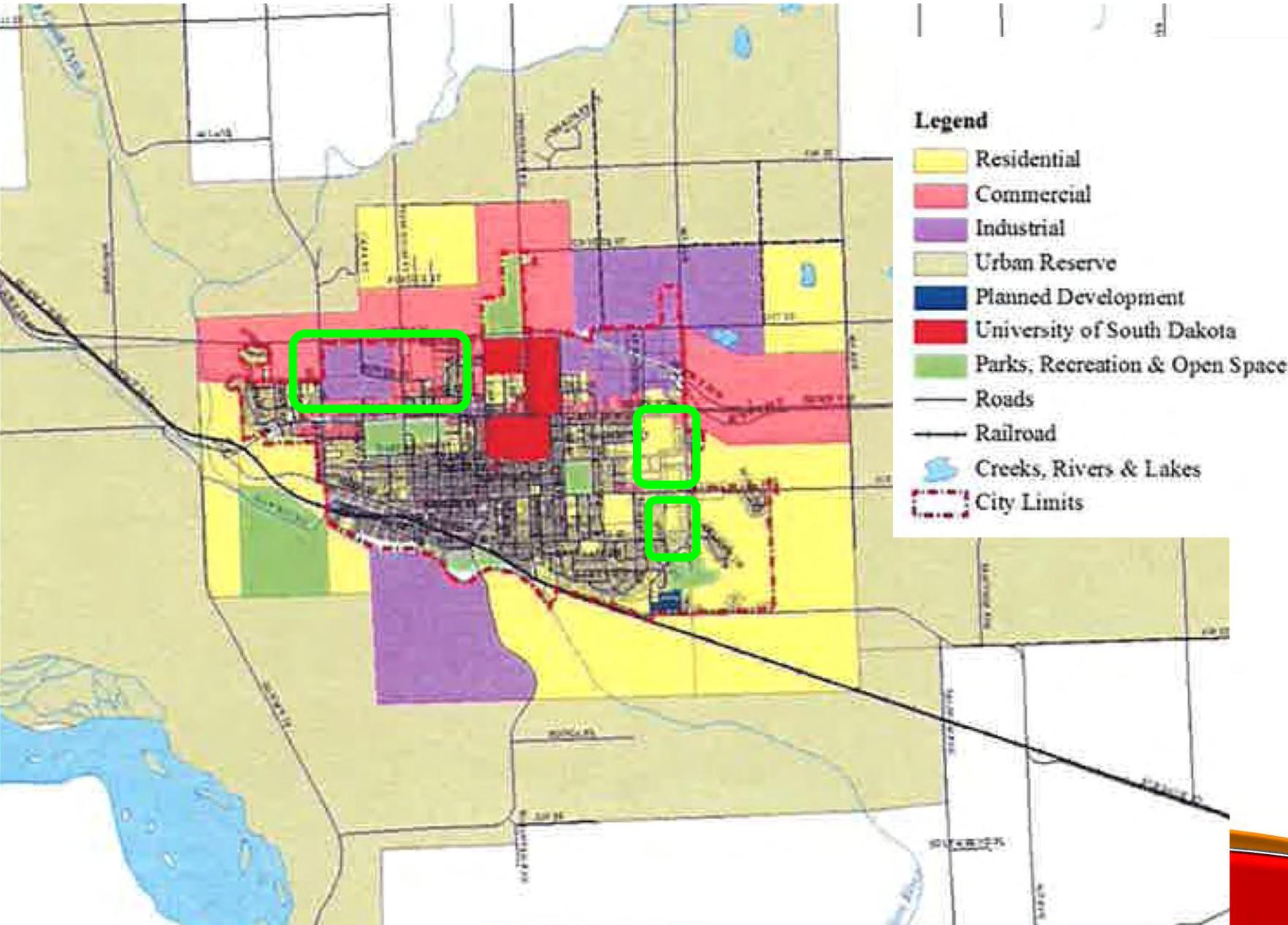
# Build on and Expand Past Efforts

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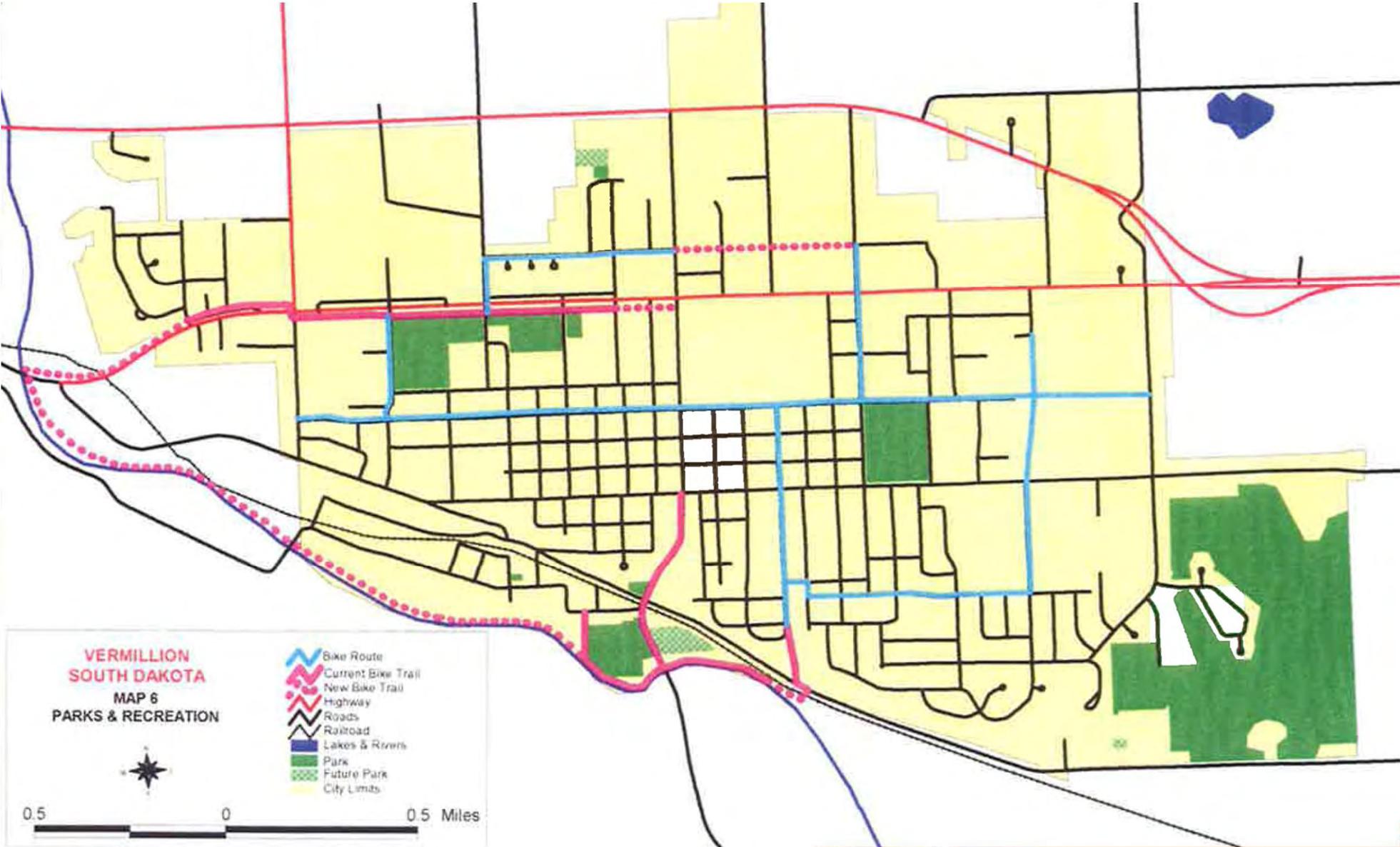
- Capitalize on Past Work:
  - 2000 – 2020 Comprehensive Plan (updated 2011)
  - Vermillion Transportation Study (2004)
  - South Dakota Statewide Long Range Transportation Plan (2010)
- Collect New Information
- Incorporate *All* Modes
- Consider New Issues
  - Pedestrian Crossings
  - Neighborhood Parking



# Comprehensive Plan – Land Use Concept



# Comp Plan – Bike/Ped Improvements



# Completing the Transportation Study

## Step 1

- What is Vision/ Goals?
- What are Needs?
- Prioritize Needs
- Define Performance Measures
- How are Current Needs Met?
- What are the Resources:
  - Roads
  - Trails/Sidewalks
  - Transit
  - Funding by Source

## Step 2

- Potential Concepts/Ideas /Changes to Address Gaps
- Review Alternatives:
  - Address Needs (Priorities)
  - Relative to Other Performance Measures
- Coordination Opportunities
- Partnering Opportunities

## Step 3

- Recommendations
  - Projects/Services
  - Timing
- Capital Needs
- Check Recommendations Against Needs/Priorities
- Develop Implementation Plan

Public Engagement

# Alternatives We Will Examine

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- Management: Doing More with What We Have:
  - Upgrade Signals
  - Add Turn Lanes
  - Change Intersection Treatment
  - Convert to/from One-Way Pairs
  - Carpool / Vanpool
  - New Pedestrian Amenities / Controls
  - Parking Policy Adjustments
- Expansion: Doing More with More
  - Add Through Lanes
  - New Corridors
  - New Interchanges
  - Extended / New Trails
  - Increased Transit Coverage / Service Hours / Frequency
- Enhancements: Integrating Modes of Travel:
  - Trails / Sidewalks

# Groups in the Plan Update Process

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- Public – Meetings/Stakeholders Committee
- Study Advisory Team – staff from:
  - City
  - County
  - South Dakota DOT
  - USD
- Mayors/Commissioners from member jurisdictions – Decision makers



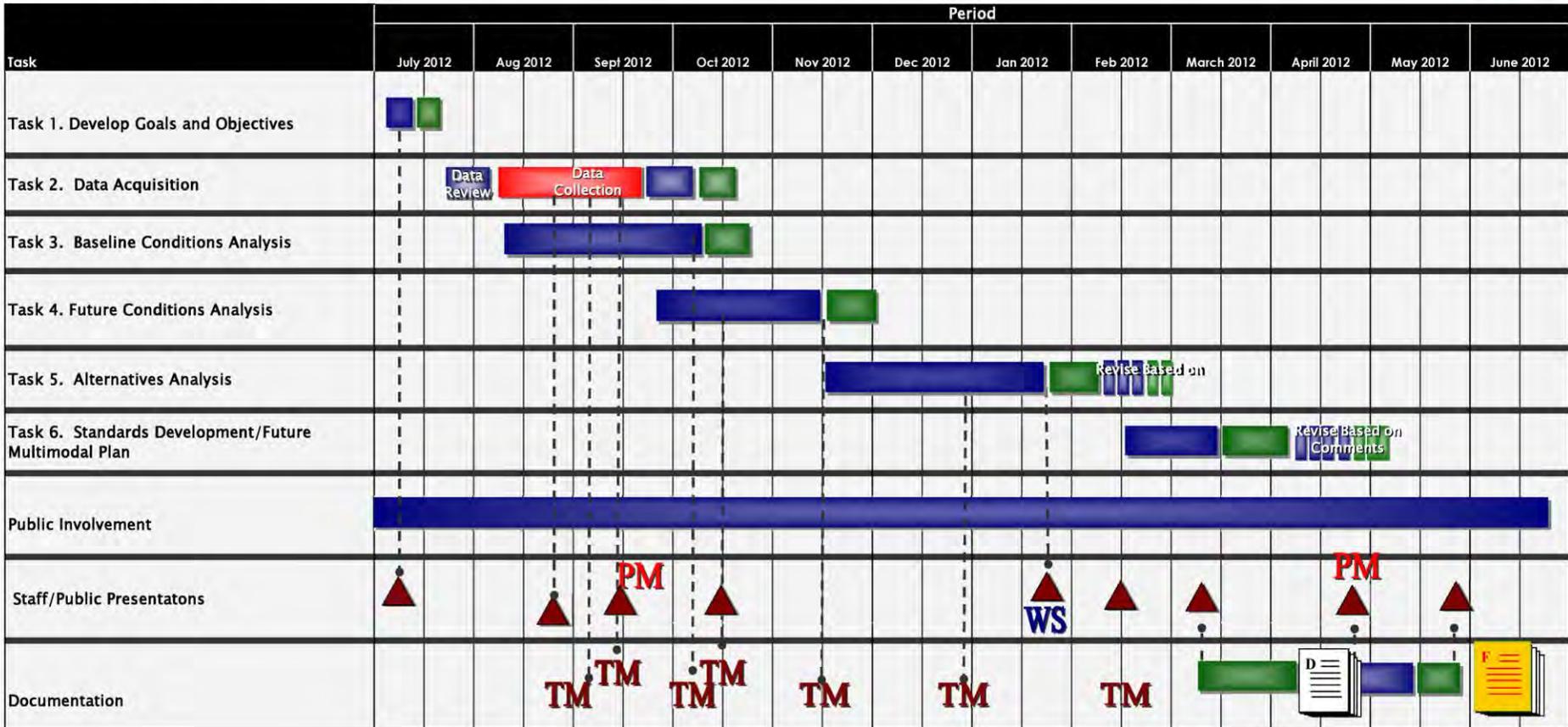
# Draft Transportation Goals

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- Goal #1: Provide an efficient multimodal transportation system that effectively moves people and goods.
- Goal #2: Provide a safe and secure transportation system.
- Goal #3: Maintain the existing transportation system.
- Goal #4: Manage the transportation system's impact on the social and natural environment.
- Goal #5: Provide a transportation system that supports and enhances the area's economy and supports the Comprehensive Plan.

# Transportation Plan Schedule

Proposed Project Schedule  
Vermillion Area Master Transportation Plan



- - Data Collection
- - Analysis
- - Develop/Document Conclusions Recommendation

- ▲ - Staff Meetings
- ▲ PM - Stakeholder/Public Meeting(s)
- ▲ WS - Workshop (Staff)
- ▲ TM - Technical Memorandum/Interim Report

# Staying Involved

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- Public Meeting in Spring 2012
- Plan Website:
  - [VermillionTransportation.blogspot.com](http://VermillionTransportation.blogspot.com)
- On-Line Survey
  - Link via Plan Website
  - Or go to:  
[www.surveymonkey.com/s/vermillion\\_transportation\\_survey](http://www.surveymonkey.com/s/vermillion_transportation_survey)

# Issues Discussion

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- What are Your Transportation Issues?
  - Good / Model Areas of System
  - Problems with System
  - Significant Sources of Traffic
  - Opportunities for Improvements
- Provide any Input on Draft Goals



# Thank you!

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- Contact Information:
  - Bill Troe: 402.952.2522 or [Bill.Troe@URS.com](mailto:Bill.Troe@URS.com)
- Website: [VermillionTransportation.blogspot.com](http://VermillionTransportation.blogspot.com)

***PUBLIC MEETING PUBLIC NOTICE***

For publication on October 7 and 14, 2011

SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION  
CITY OF VERMILLION

**NOTICE OF PUBLIC INFORMATION  
MEETING / OPEN HOUSE #1  
VERMILLION TRANSPORTATION STUDY**

**Date:** October 27, 2011  
**Time:** 6:45 P.M. – 8:00 P.M.  
**Place:** Council Chambers, City Hall  
25 Center Street, Vermillion, SD 57069

The South Dakota Department of Transportation (SDDOT) and the City of Vermillion will hold an open house style public information meeting to discuss and receive public input to the on-going long range transportation study. The long range transportation study is being updated from 2005 and represents the master plan for roadway, bike, pedestrian and transit improvements in town through 2035.

The purpose of this public information meeting/open house is to provide residents, business owners and university students/faculty/administrators with:

- Background on what goes into the long range transportation plan.
- An opportunity to voice your experience with daily travel throughout the community and to provide staff preparing the plan with ideas that you believe could improve the safety, efficiency and quality of the transportation system.
- Information on how to keep informed and involved throughout the year long project.

At 7:00 p.m. the open house will include a brief overview of the plan development process. Staff would like to reserve most of the meeting time to gather your input on gaps you experience in the system; things that you think work well and should be replicated elsewhere in town; and concerns that you have with the roadway network, the bike network, sidewalks and trails, parking issues; and bottlenecks in the system.

Notice is further given to individuals with disabilities that this open house/public meeting is being held in a physically accessible place. Please notify the SDDOT ADA Coordinator at least 48 hours prior to the open house meeting if you have special needs for which this department will need to make arrangements. The telephone number for making special arrangements is 605-773-3540 or 1-800-877-1113 (Telecommunication Relay Services for the Deaf).

All persons interested in helping to shape the future Vermillion transportation system are invited to attend this meeting/open house to share your views any time between 6:45 p.m. and 8:00 p.m. Those who cannot attend the meeting or desire further information regarding the study may visit the study's webpage at:

<http://vermilliontransportation.blogspot.com/>  
or contact Steve Gramm at (605) 773-6641 /  
email [steve.gramm@state.sd.us](mailto:steve.gramm@state.sd.us).

Notice published twice at the total approximate cost of \$258.24.

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## ***MEETING HANDOUTS***



Vermillion Area Master Transportation Plan  
Public Meeting  
October 27, 2011  
Meeting Agenda

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1. Introductions
2. Overview of the Transportation Plan
3. Discussion of Draft Transportation Goals and Objectives
4. Transportation Issues Discussion
5. Wrap Up

## Draft Vermillion Transportation Plan Goals and Objectives

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Goal #1: Provide an efficient multimodal transportation system that effectively moves people and goods.

- Evaluate whether or not the current functional classification of streets is appropriate based on their current and/or future role in the transportation network.
- Identify improvements to the arterial and collector street network needed to accommodate current and projected traffic.
- Evaluate current Major Street Plan (See Comprehensive Plan) for consistency with development and transportation system objectives.
- Identify sidewalk, trail and on-street improvements that would enhance bicycle and pedestrian connectivity across Vermillion.
- The bicycle and pedestrian system should connect activity centers including, but not limited to, USD campus to downtown; west side retail to USD campus; outlying residential subdivisions to the city center.
- Identify the appropriate portions of the 2000 – 2020 Comprehensive Plan recommended bike routes to integrate into the Transportation Plan.
- Identify actions that would improve the efficiency of Vermillion Public Transit.
- Enhance wayfinding and gateways to the university.

Goal #2: Provide a safe and secure transportation system.

- Identify high crash locations and evaluate appropriate actions to improving safety.
- Review locations of automobile – pedestrian conflicts and evaluate potential safety improvements.
- Incorporate state and local emergency response and security plans into the Transportation Plan.
- Identify, prevent, manage, or respond to threats (natural and human) to the motorized and non-motorized transportation system and its users.

Goal #3: Maintain the existing transportation system.

- Prepare a plan for preserving, maintaining and improving the existing multimodal transportation system.
- Before building new roadway corridors, promote improvement of an existing multimodal corridor whenever it is appropriate and supports development plans.
- Identify and reserve/protect planned future transportation corridors.

- Promote a corridor access management approach that balances the needs of land access with corridor safety and mobility.

Goal #4: Manage the transportation system's impact on the social and natural environment.

- Maintain or reduce current per-capita levels of vehicle miles traveled and vehicle hours traveled.
- Engage citizens in all stages of the transportation planning process.
- Coordinate transportation plan actions with the appropriate state and federal agencies responsible for natural resources, environmental protection and historic preservation.
- Address the impacts to neighborhood character and quality of life when considering transportation investments.
- Limit future negative transportation system impacts by coordinating land development planning and transportation planning. Promote multimodal transportation improvement concepts that are complementary to and compatible with adjacent uses/activities, building types and setbacks and sensitive natural and social features of the region.

Goal #5: Provide a transportation system that supports and enhances the area's economy and supports the Comprehensive Plan.

- Coordinate area economic development activities and plans with the transportation plan.
- Develop a transportation plan that supports the Comprehensive Plan, including preservation of agricultural uses on the urban fringe and development within the City Limits.
- Assess parking issues and needs from the perspectives of the user and property owner, taking into account that different uses have different requirements regarding desirable walk distance, number of spaces, etc.
- Create, enhance and maintain multimodal connections to major business, the university and other institutional and tourist destinations.
- Implement transportation projects/programs that enhance resident, worker, student and visitor quality of life.
- Maintain truck routes to preserve the flow of goods and services to/from Vermillion.
- Provide adequate parking to support key activity centers.
- Involve development community, planning staff and University Planner on the Plan Stakeholders Committee.



## Vermillion Area Transportation Plan Public Meeting, October 27, 2011 Evaluation Form

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Please fill out this form and return it at the end of the meeting. PLEASE RATE THE FOLLOWING STATEMENTS USING THE SCALE BELOW

SA = Strongly Agree    A = Agree    U = Undecided    D = Disagree    SD = Strongly Disagree

1. I understood the goals of the public information meeting.

SA       A       U       D       SD

2. The introductory presentation was valuable in helping me understand the plan objectives.

SA       A       U       D       SD

3. I was comfortable sharing my thoughts and ideas about transportation issues.

SA       A       U       D       SD

4. I had an opportunity to learn about the ideas and opinions of others.

SA       A       U       D       SD

5. Everyone had an opportunity to speak and share ideas.

SA       A       U       D       SD

6. What did you like least about the meeting?

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7. What did you like most about the meeting?

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8. What suggestions do you have for future public workshops and meetings?

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9 How did you learn about this meeting?

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## Vermillion Area Transportation Plan Transportation Funding Priority Survey

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If you had a \$100 to spend on transportation related improvements in the Vermillion area, how would you allocate your \$100 among the following transportation categories:

- |   |          |
|---|----------|
| Maintenance of existing roads, transit and trails | \$ _____ |
| Roadway Safety Projects                           | \$ _____ |
| Multi-Use Trails Expansion                        | \$ _____ |
| On-Street Pedestrian / Bike System Expansion      | \$ _____ |
| Transit System Expansion                          | \$ _____ |
| Roadway Improvements / Expansion                  | \$ _____ |
| Other: _____                                      | \$ _____ |
| Other: _____                                      | \$ _____ |

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TOTAL

\$100

## ***SIGN-IN SHEETS***



# VERMILLION AREA MASTER TRANSPORTATION PLAN PUBLIC MEETING SIGN IN SHEET

October 27, 2011

Name	E-mail and Phone Number
Steve Gramm	Steve.gramm@State.sd.us
Travis Gulbrandsen	travis.gulbrandsen@plains-talk.net
Rod Gall	Rod.Gall@state.sd.us
Jordan Muller	jnmuller@vyn.midea.net
Matt Heard	Matthewheard@gmail.com
Mike Moran	mike.moran@usd.edu
Jordan Muller	
Larry Brady	lbrady@hotmail.com
Steve White	swhite@usd.edu 670-1220



**VERMILLION AREA MASTER TRANSPORTATION PLAN  
STAKEHOLDERS MEETING SIGN IN SHEET**

October 26, 2011

Name	E-mail and Phone Number
Kevin Brady	kbradybrady@gmail.com 605.670.1662
Dewald Beach	Beach308@hotmail.com 670-9113
Andy Martinez	ajimbartinez@hotmail.com 677-9063
Cathy Wagner	CAWAGNER@USD.EDU 677-6319
Barb Bauersky	barbb@sesdoc.org 624-7433
Melvin Walz	Melvin@DakotaRealty 670-1694
Gowan Walker	VERN80@MSN.COM 605-624-3510
Mary B. Edelen	medelen44@hotmail.com 624-4760
Gerry Tracy	gerry.tracy@sesdoc.org 624-4419
Tim Tracy	timothy.tracy@santofordhealth.org 624-2611
Dan VanPeursem	dpeursem@usd.edu
Andrew Nilges	Andrew.Nilges@usd.edu



## Vermillion Area Transportation Plan Transportation Funding Priority Survey

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If you had a \$100 to spend on transportation related improvements in the Vermillion area, how would you allocate your \$100 among the following transportation categories:

Maintenance of existing roads, transit and trails	\$ <u>50</u>
Roadway Safety Projects	\$ <u>10</u>
Multi-Use Trails Expansion	\$ <u>20</u>
On-Street Pedestrian / Bike System Expansion	\$ _____
Transit System Expansion	\$ _____
Roadway Improvements / Expansion	\$ <u>20</u>
Other: _____	\$ _____
Other: _____	\$ _____

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**TOTAL**

**\$100**



# Vermillion

## Area Multimodal Transportation Study

April 30 and May 1, 2012  
Stakeholder and Public  
Information Meeting  
Summary





## MEMORANDUM

**Bill Troe, AICP**

**Jason Carbee, AICP**

12120 Shamrock Plaza

Suite 300

Omaha, NE 68154

(402) 334-8181

(402) 334-1984 (Fax)

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**To: Jose Dominguez, City of Vermillion  
Steve Gramm, South Dakota DOT  
Study Advisory Team**

**Date:** May 7, 2012

**Subject: Summary of Vermillion Area Transportation Plan Stakeholders Committee and Public Meetings, April 30 and May 1, 2012**

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### ***OVERVIEW***

The purpose of this memorandum is to document:

- The information presented at the April 30 and May 1, 2012 Public and Stakeholders Committee Meetings.
- The general discussions and feedback received from those in attendance.

### ***NOTICE OF MEETINGS***

The public meeting was publicized ahead of time through the following means:

- Newspaper public notices appeared in the Vermillion Plain Talk on April 13 and April 20, 2012.
- A public notice also appeared in the USD Volante student newspaper on April 18, 2012.
- The study website provided a notice of the meeting.
- The City of Vermillion's Facebook page provided a notice of the public meeting and a link to the study website.

A letter was sent to the stakeholders committee members the week of April 16-20, 2012 inviting them to the May 1 Stakeholders committee.

### ***MEETING DETAILS***

**Public Meeting:** The meeting started at 5:30 PM. Approximately 20 large plots were hung throughout the room that documented:

- Existing Conditions, including traffic operations, crashes and identified issues
- Future Conditions, including future traffic and future land development areas
- Alternatives being considered, with details of options being considered shown in 6 different locations.

Bill Troe started the meeting with a presentation that provided a summary of the study to this point and an overview of the alternatives analysis process. Following the presentation, Bill opened it up for discussion on potential alternatives with those in attendance.

One gentleman in attendance noted that he would like to see street lights placed to illuminate Highway 50 intersections with Norbeck St and Crawford Rd. In discussions with City and SDDOT staff, it was decided that if they were installed, it would be the City's responsibility to put them in.

Then those in attendance discussed the safety of the turns on and off of SD 50 along the corridor. Some in attendance noted that there were no westbound left-turn lanes at Crawford Road / SD 50 intersection. It was also discussed that many of the left-turn lanes along SD 50 (Norbeck and Cottage were specifically mentioned) were relatively narrow.

It was discussed that the upgrade to the signal at Cherry St / Rose Ct would be helpful for vehicle progression in the corridor. Some in attendance noted that it was currently the only signalized intersection along Cherry Street where vehicles typically get stopped by red lights.

Someone noted that they would like to see sidewalks along Crawford Road. He lives on Cherry Street west of Crawford, but his mailbox is on Crawford Rd and he wanted to be able to walk to get his mail. Jose Dominguez noted that the City is starting to fill in some sections of sidewalks adjacent to undeveloped lots.

The items handed out included:

- Newsletter 1: Overview of the Transportation Plan
- Newsletter 2: Overview of the Alternatives Analysis Process

**Stakeholders Committee:**

The meeting started at 6:00 PM. Bill Troe provided a presentation that summarized some of the alternatives analysis process, and went into some details on alternatives in a few locations. The issue areas that were described in some detail included:

- SD 50 Congestion / Safety Alternatives
- USD South Campus On-Street Parking Alternatives
- Downtown Vermillion Center / Main / Court Street Intersection Alternatives
- Bicycle and Pedestrian Connectivity Alternatives

The same plots that were hung for the public meeting were also displayed for the stakeholders committee meeting. Those in attendance indicated that the study was on-track and was addressing the proper issue areas with a reasonable approach and set of alternatives. It was noted that the University did not have anyone in attendance, and that it would be desirable for the study team to get some direct feedback from the University.

The items handed out to attendees included:

- Newsletter 1: Overview of the Transportation Plan
- Newsletter 2: Overview of the Alternatives Analysis Process

### ***SUMMARY***

The appendix provides copies of:

- Copies of the slides used for the presentation.
- The advertisement that appeared in the Plain Talk
- Hand-outs provided at each meeting.
- Sign-in sheets from each meeting.

If you have any questions or comments about this, please contact Bill Troe at 402.952.2522 or at [Bill.Troe@urs.com](mailto:Bill.Troe@urs.com).

Memorandum  
Vermillion Study Advisory Team  
May 7, 2012

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***APPENDIX - STUDY MEETING MATERIALS***

## ***PRESENTATION SLIDES***

# Vermillion Area Transportation Plan 2012-2032

Study Update  
April 30, 2012



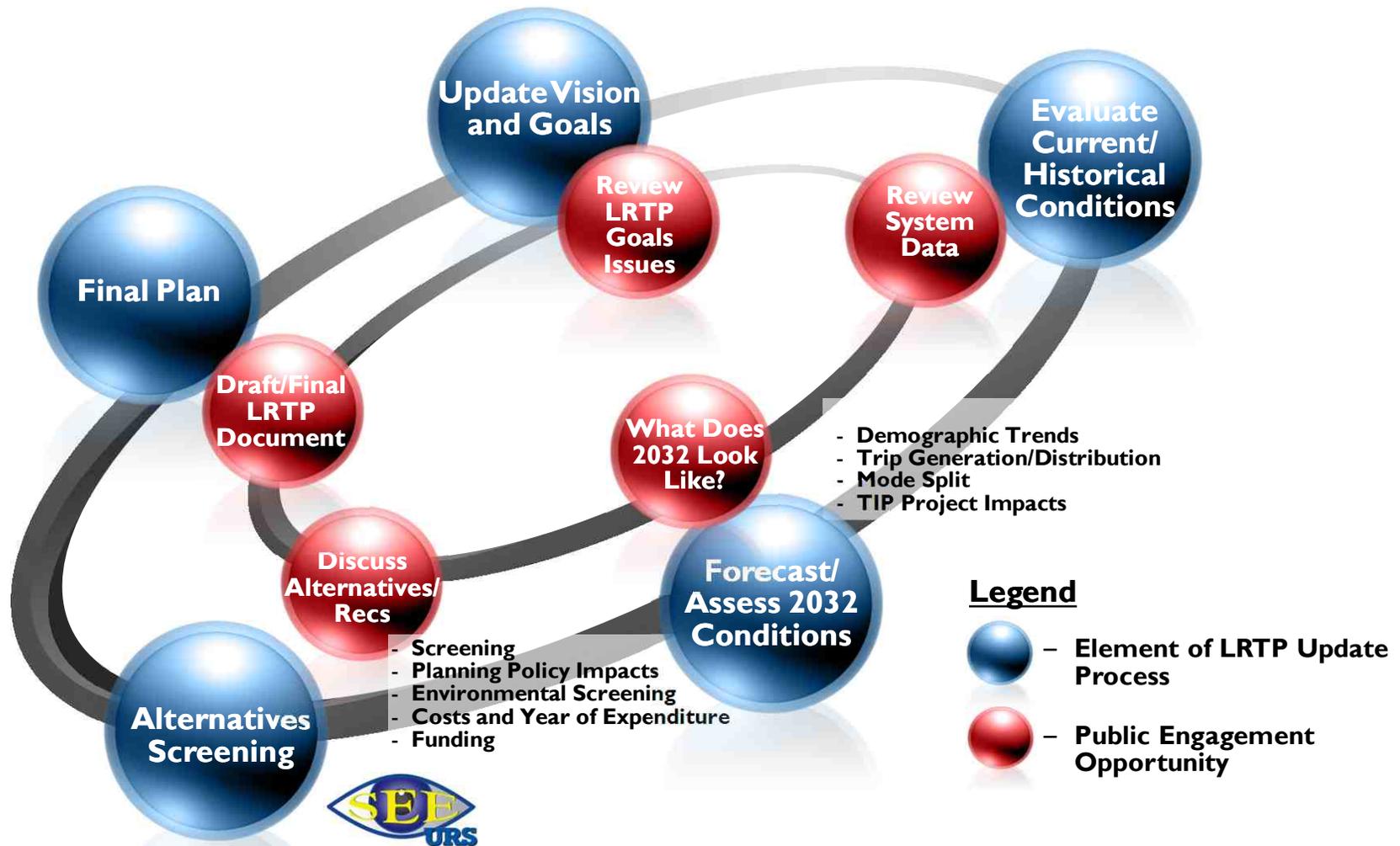
# Agenda

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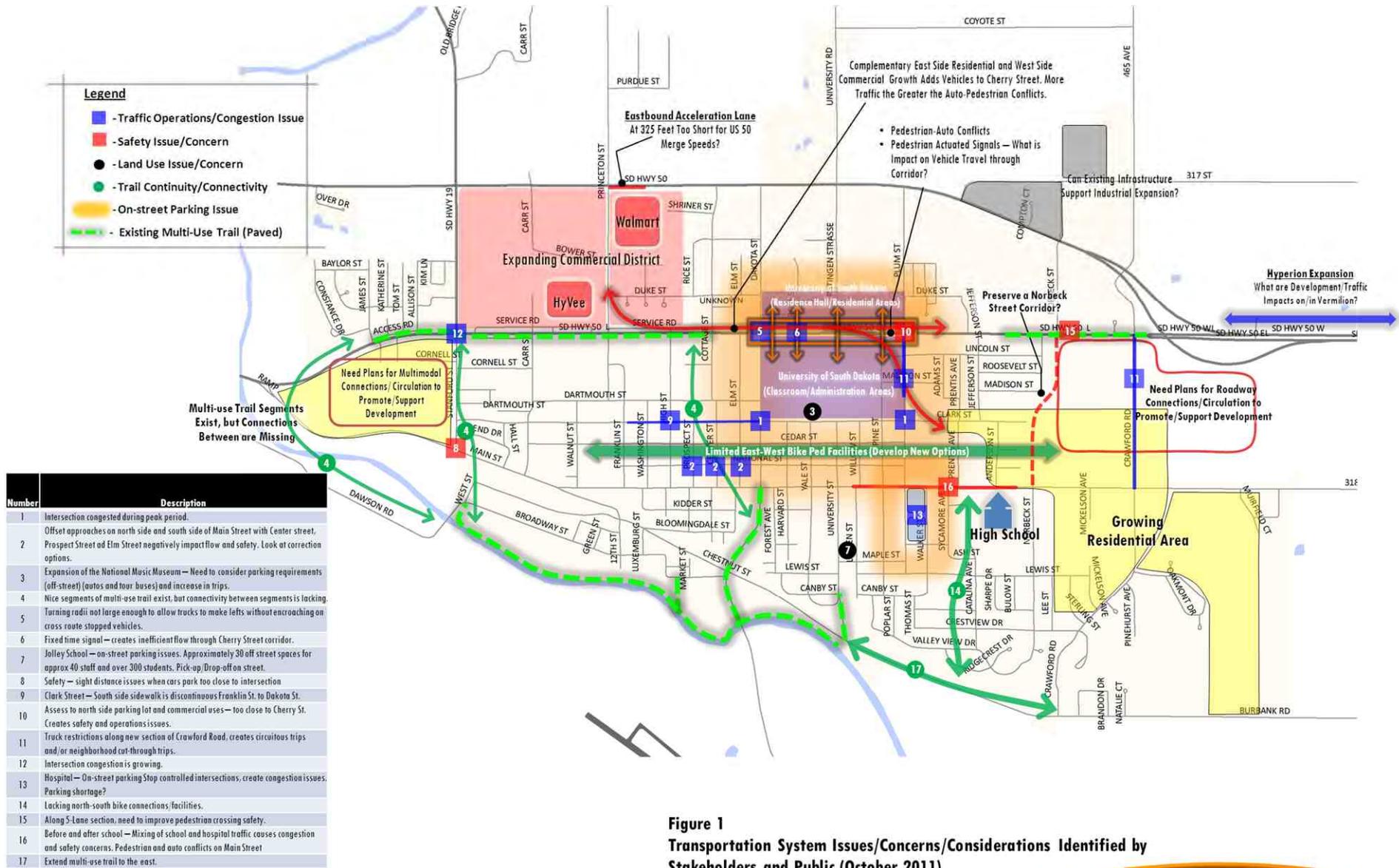
- **Purpose of Meeting:**
  - **Introduce Alternatives Analysis Process**
  - **Introduce Screening Criteria**
  - **Discuss Improvement Ideas**
- **Development and Its Effect:**
  - **Growth Areas**
  - **Traffic Forecasts**
- **Steps Used to Address an Issue:**
  - **Looking to All Modes**



# Approach

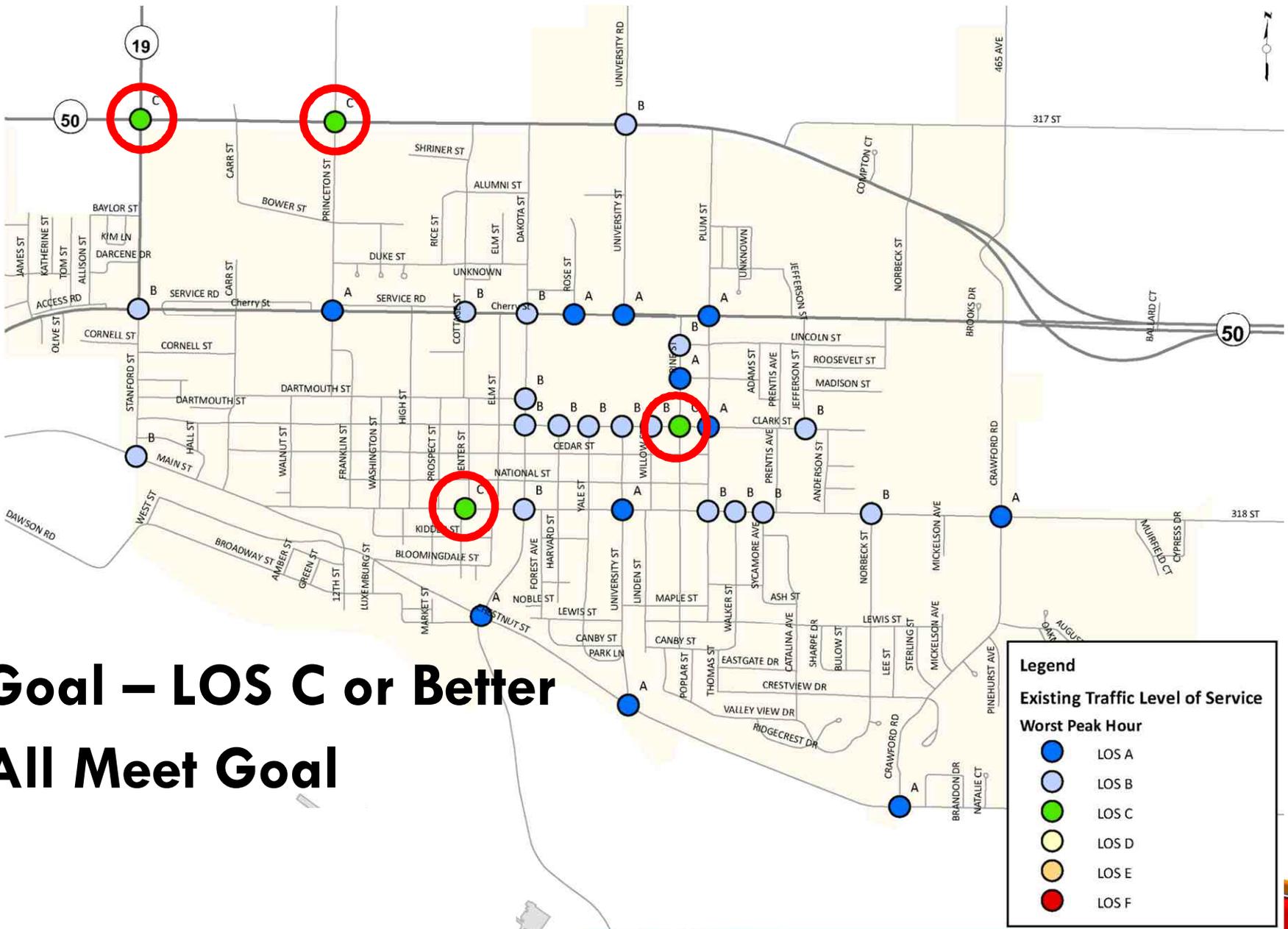


# Issues



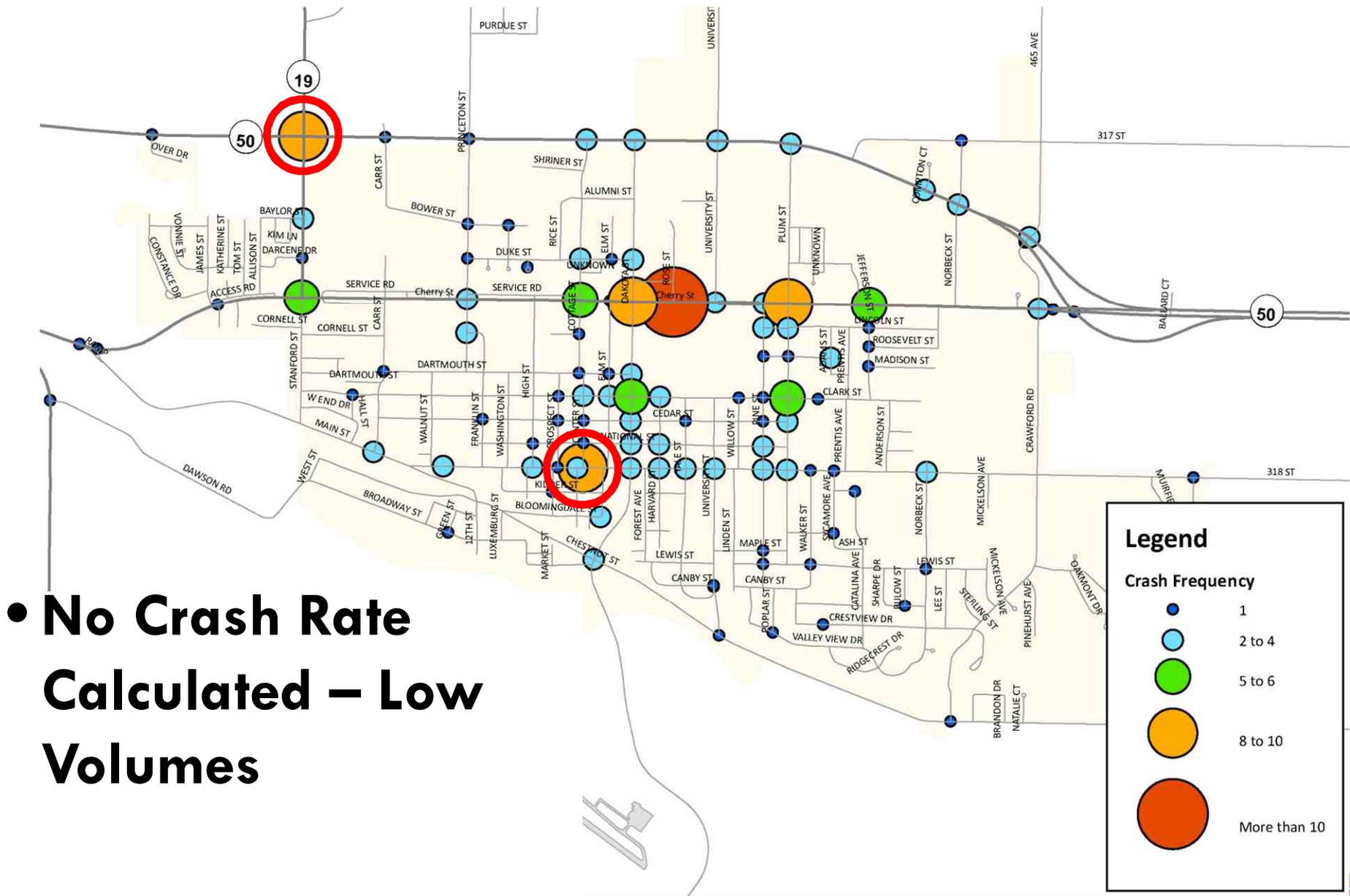
**Figure 1**  
**Transportation System Issues/Concerns/Considerations Identified by Stakeholders and Public (October 2011)**

# Current Traffic Operations/Congestion



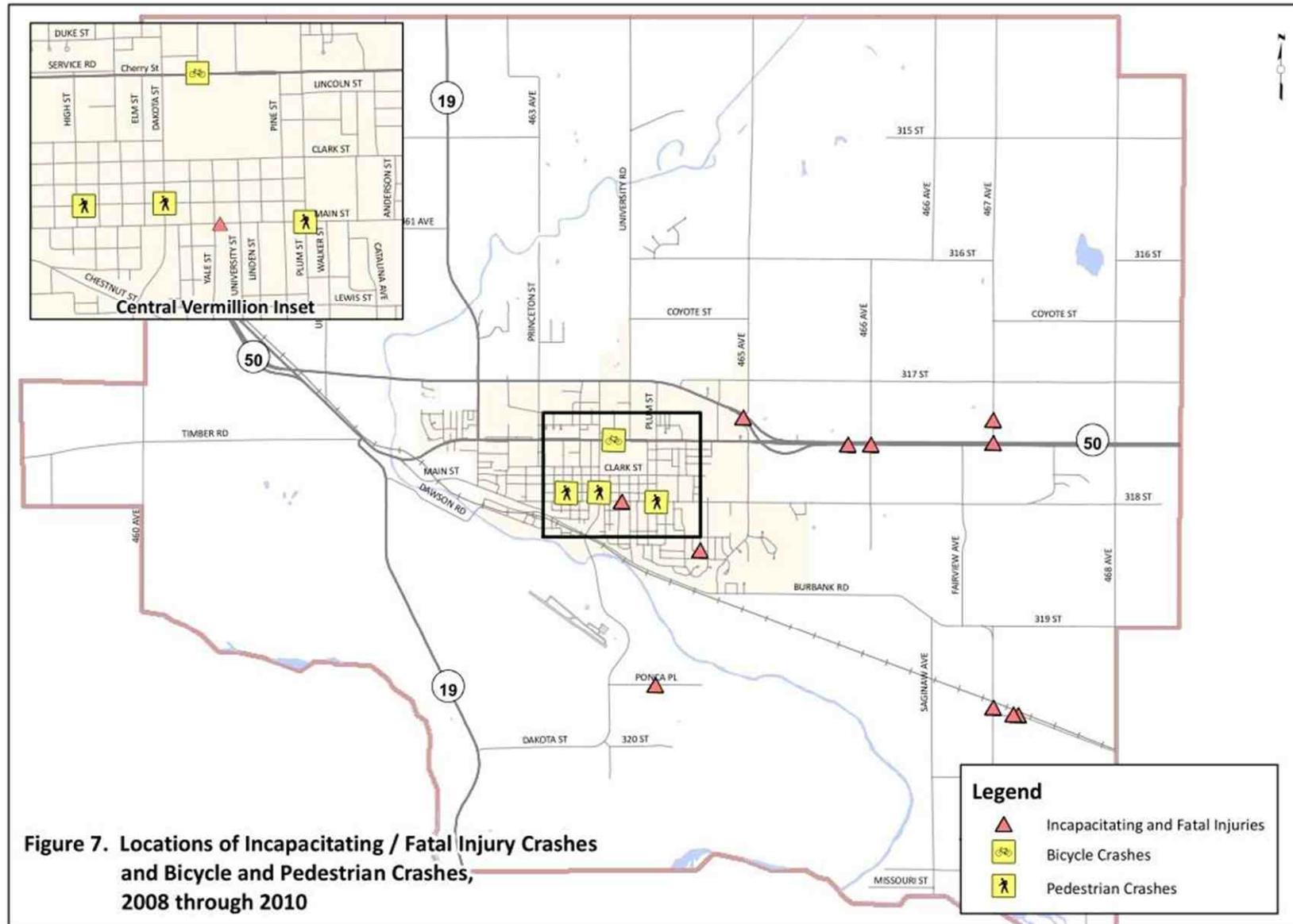
- **Goal – LOS C or Better**
- **All Meet Goal**

# Current Crash Data

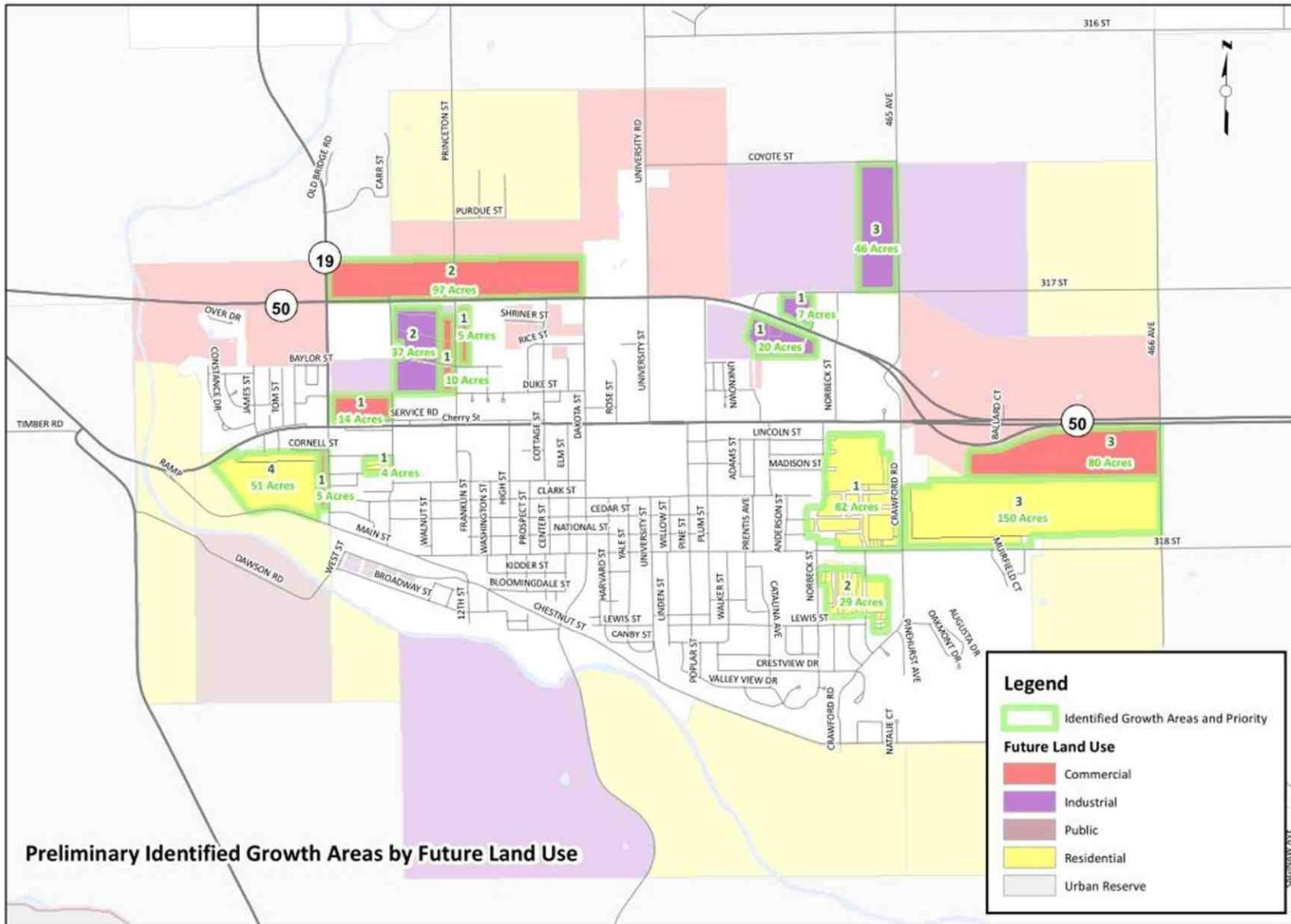


- **No Crash Rate Calculated – Low Volumes**

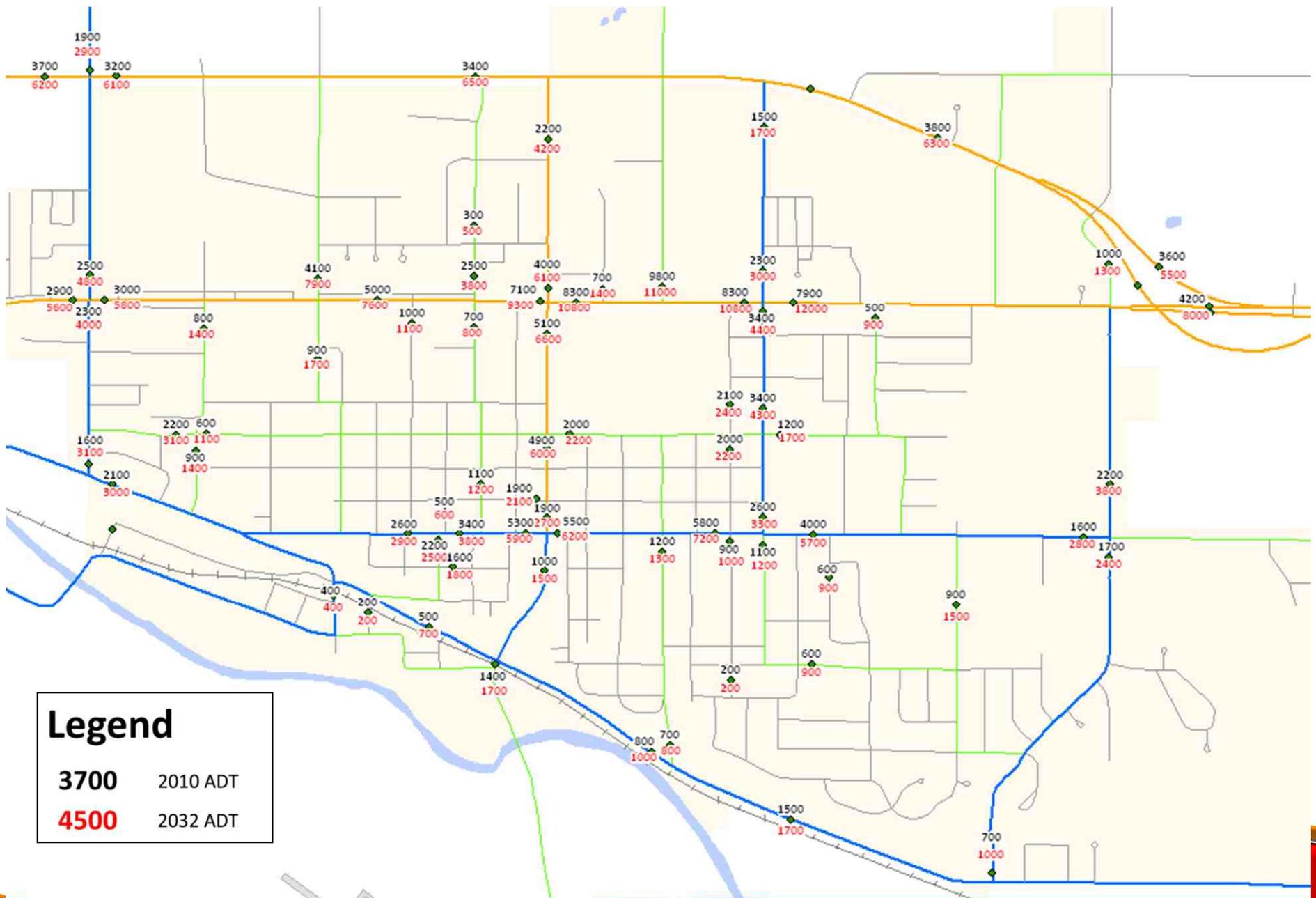
# Severity and Bike/Peds



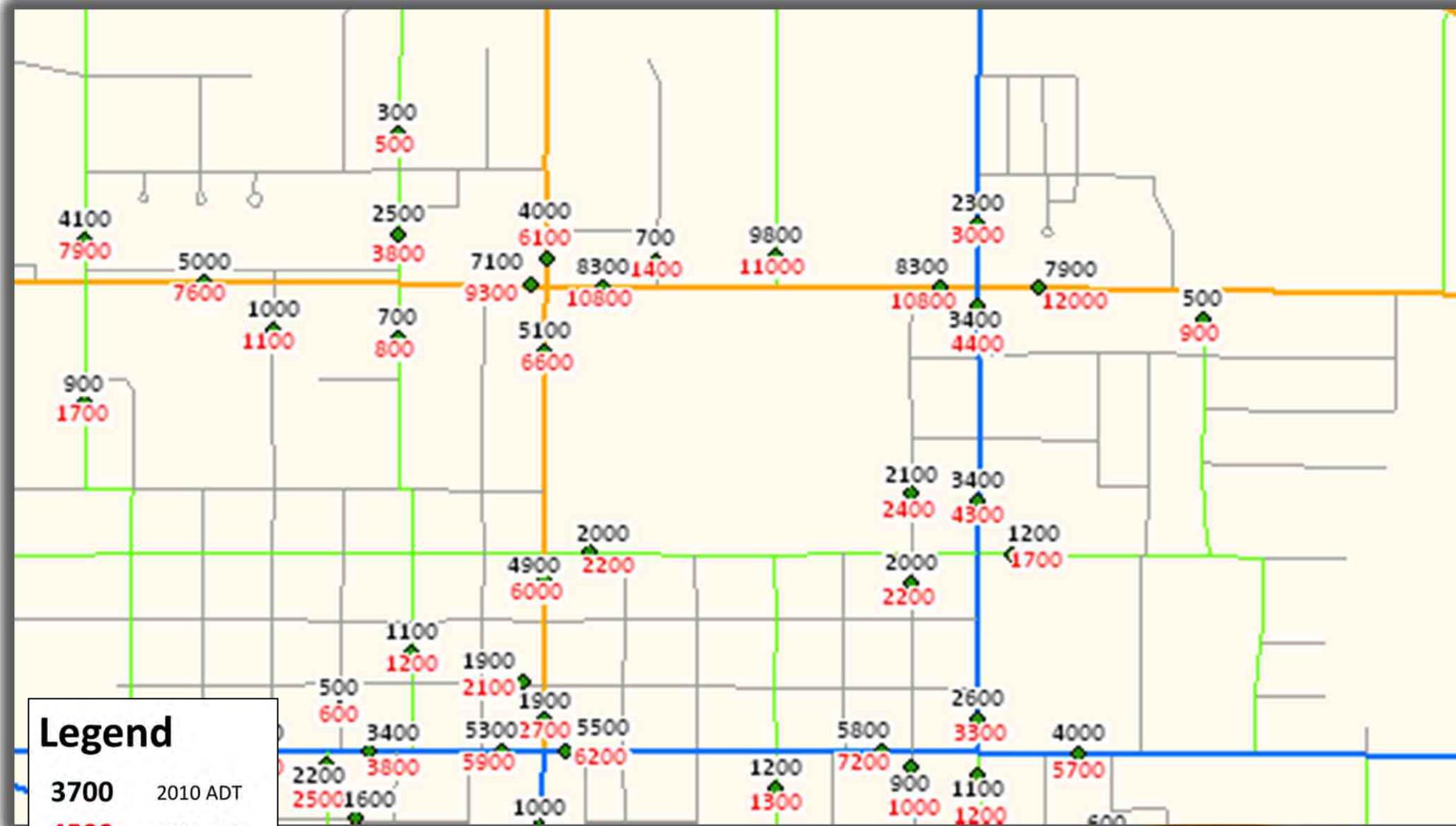
# Identified Growth Areas



# Future Traffic (2032)

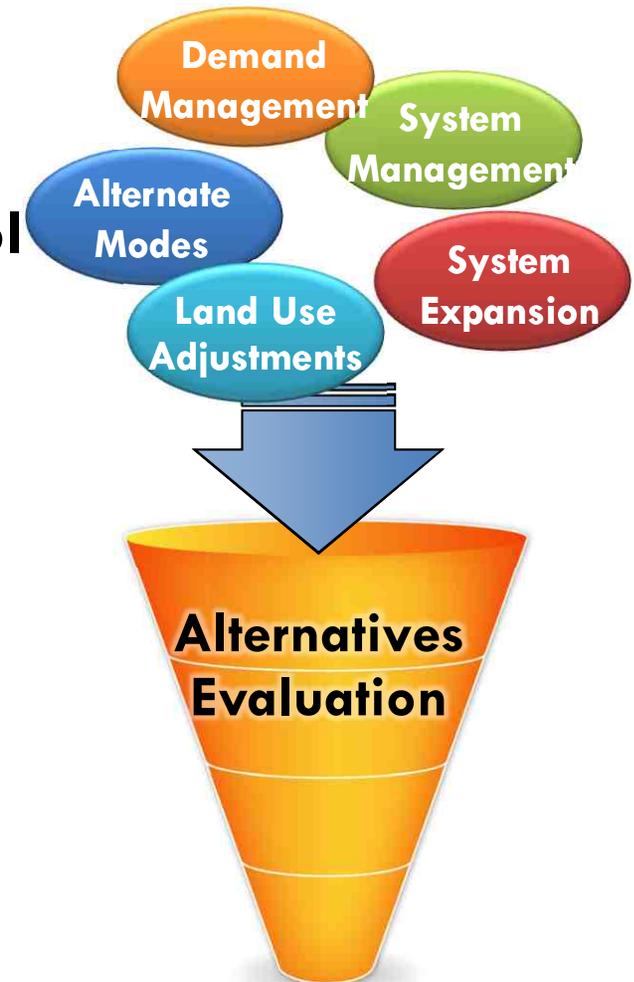


# Future Traffic (2032)



# Addressing Issues

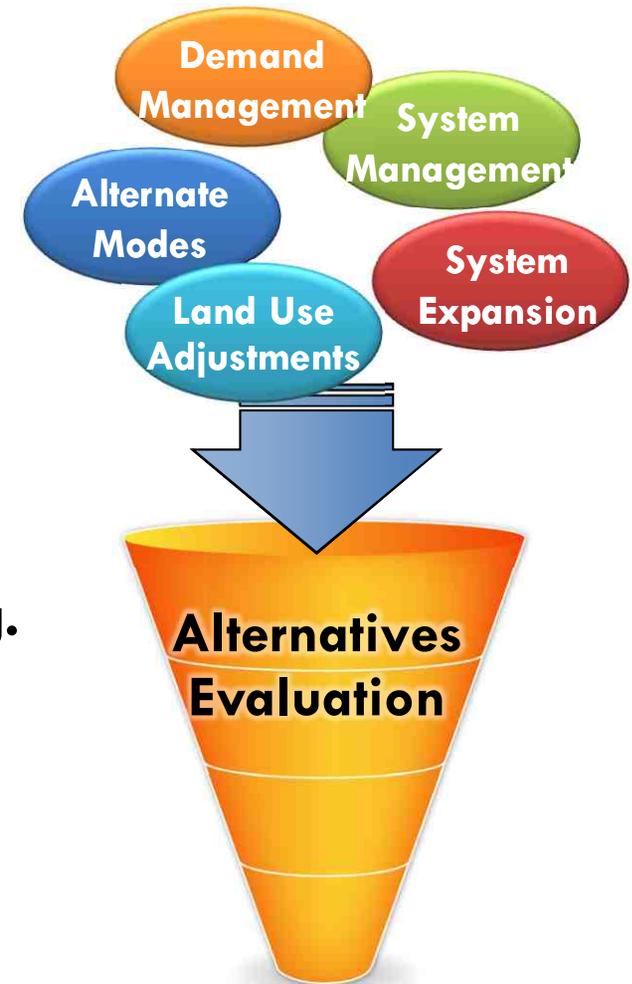
- **Intersection Capacity / Safety:**
  - **System Management Solutions:**
    - Add turn-lanes at intersection.
    - Change the current intersection control (replace stop sign with sign; signal timing, etc.)
    - Provide advanced warning for safety.
    - Remove problem driveways/alleys/streets.
  - **Expansion Solutions:**
    - Add more through lanes to streets.
    - Add new streets to share load.



# Addressing Issues

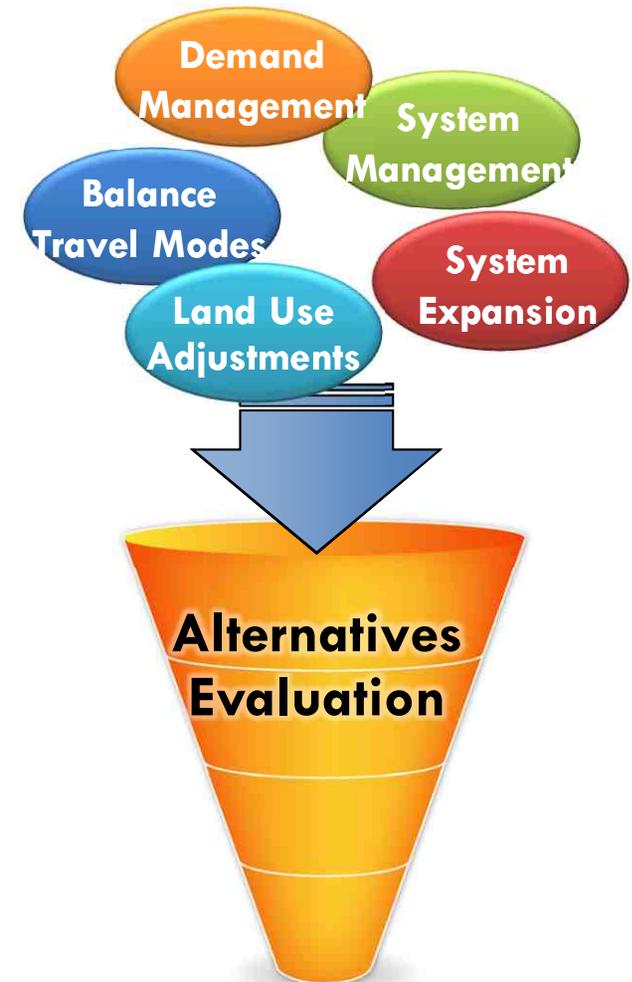
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- **Intersection Capacity / Safety:**
  - **Demand Management Solutions**
    - Encourage carpooling / ridesharing.
    - Work with employers to adjust shift change times to avoid peak hour of travel.
  - **Alternate Travel Modes Solutions:**
    - Increase transit service in area.
    - Increase share using bikes or walking.
  - **Land Use Adjustment Solutions:**
    - Reduce intensity of land uses to reduce trip generation..
    - Shift development to areas capacity.



# Addressing Issues

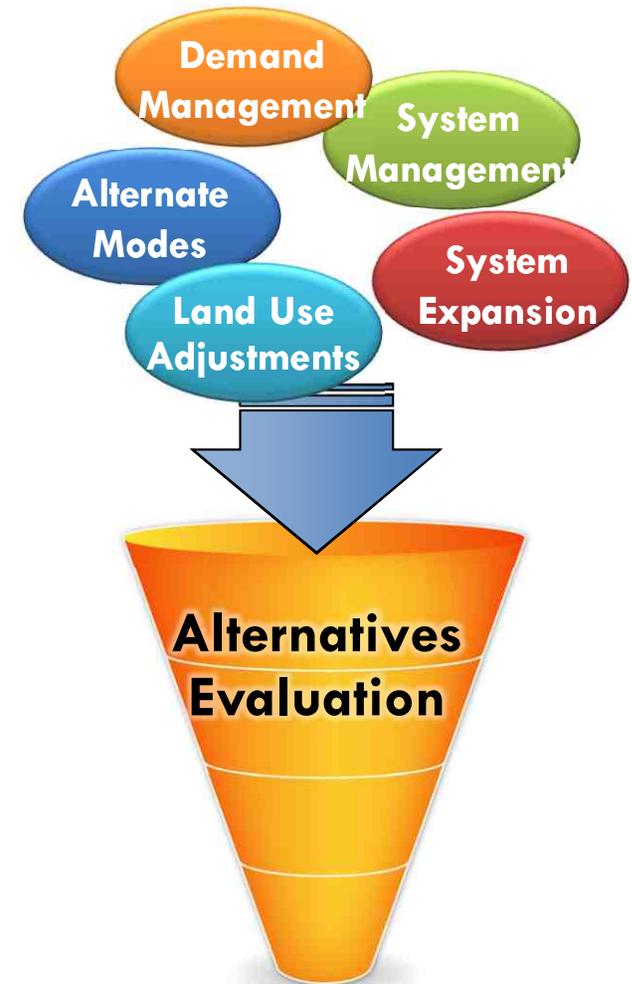
- **Issue: Limited Bicycle / Pedestrian Access**
  - **System Management Solutions:**
    - Restripe existing roadway and add signage to provide bike lanes.
    - Remove on-street parking to provide area for bikes.
    - Add pedestrian amenities to corridor (improved crossings, intersection bump-outs, street furniture, etc.).
  - **Expansion Solutions:**
    - Widen roadway to allow for on-street bike lanes.
    - Build new off-street trails.



# Addressing Issues

---

- **Issue: Pedestrian – Vehicle Conflicts**
  - **Demand Management Solutions**
    - Encourage carpooling / ridesharing to reduce vehicular demand that plays a part in conflicts.
  - **Land Use Adjustment Solutions:**
    - Promote mixed use development – Resulting in less demand by pedestrians to cross major streets.



# Addressing Issues

- **Parking Shortage**

- **System Management Solutions:**

- **Identify:**

- Locations with capacity
      - Ideas to get people to use

- **Increase marketing for transit**

- **Expansion Solutions:**

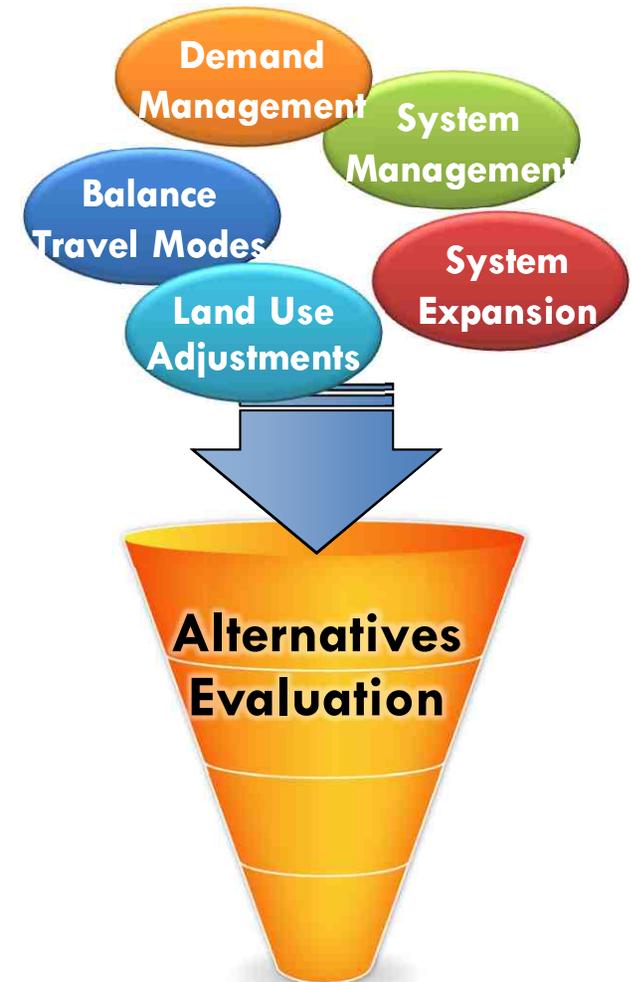
- **Add off-street parking:**

- Lots
      - Structure

- **Provide shuttle to remote lots**

- **Demand Management Solutions**

- **Encourage carpooling/ridesharing to reduce vehicle demand**
    - **Encourage transit use**



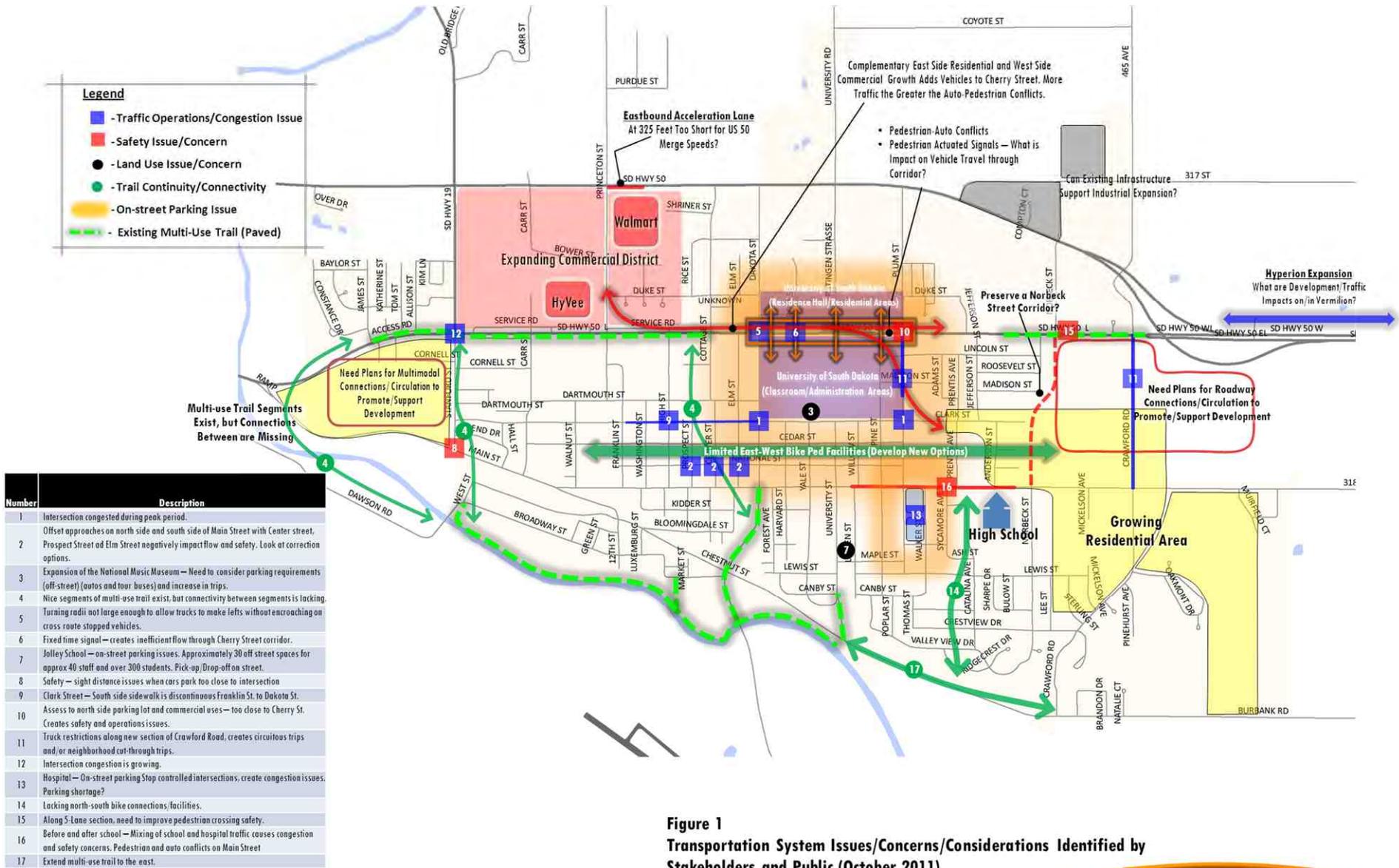
# See Methodology in Review

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- **Social:** What are the impacts to adjacent land uses (residents and businesses) and cultural impacts? Can the community support the alternatives?
- **Engineering:** Does the alternative provide the desired capacity and / or safety benefits? Does it fit with local or state design guidelines?
- **Economic:** What are the costs? Are there other economic benefits from the alternative?



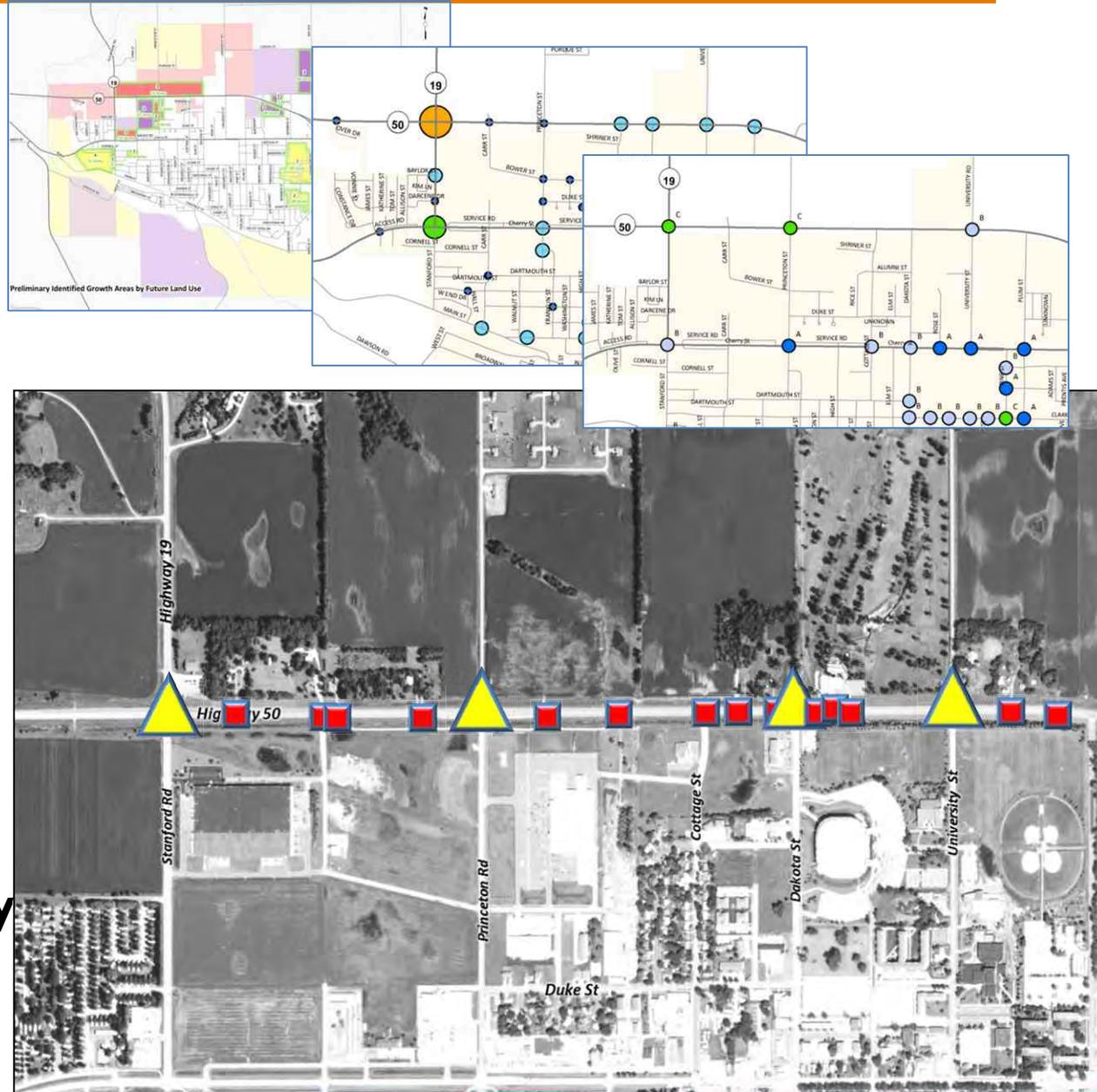
# Issues



**Figure 1**  
**Transportation System Issues/Concerns/Considerations Identified by Stakeholders and Public (October 2011)**

# Transportation Alternatives

- **Example Issue Area:  
SD Highway 50**
- **Why an Issue?**
  - **Current - Some Operations**
  - **Future Commercial Growth Area**
  - **Crashes at Stanford / SD 50**
  - **Future Congestion at Stanford, Princeton, Dakota and University Intersections**



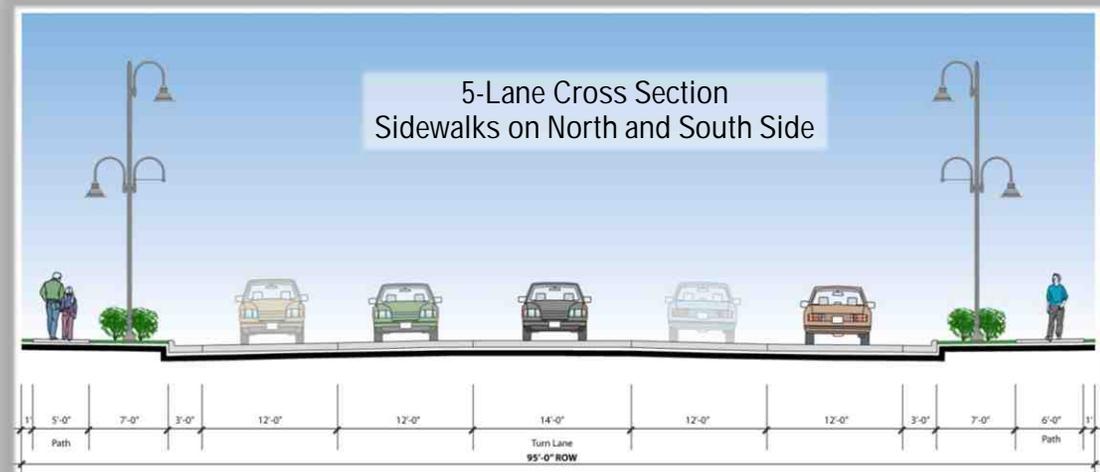
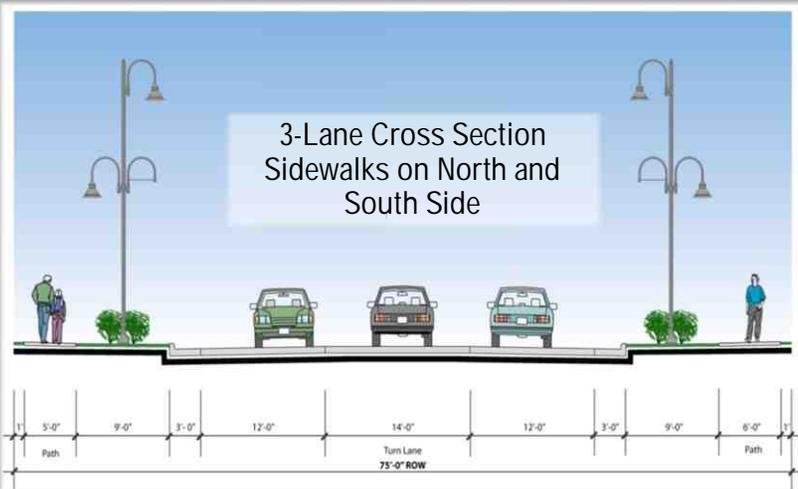
# Potential Management Alternatives



# Potential Management Alternatives



# Potential Management Alternatives



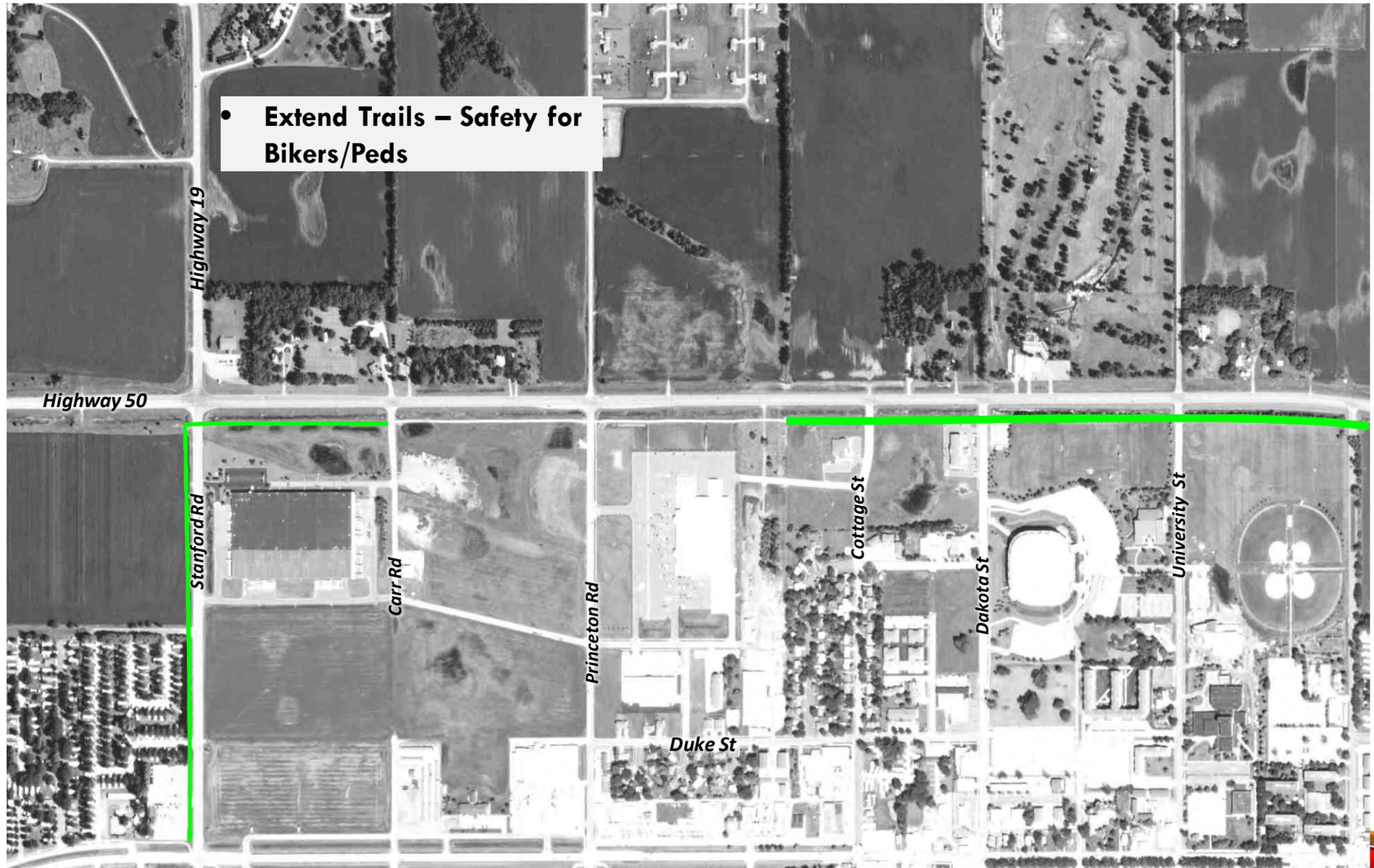
# Potential Expansion Alternatives



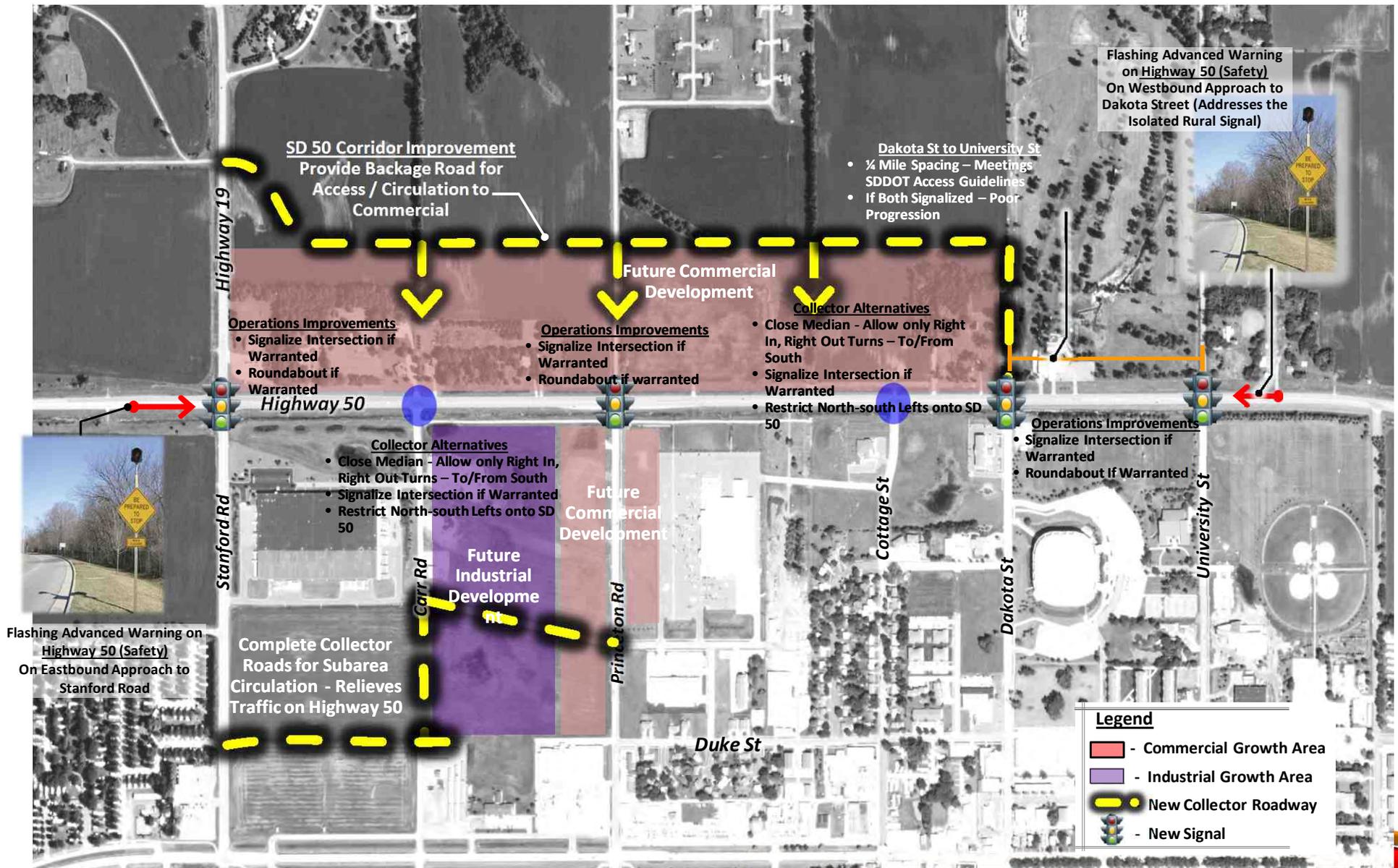
# Potential TDM Alternatives



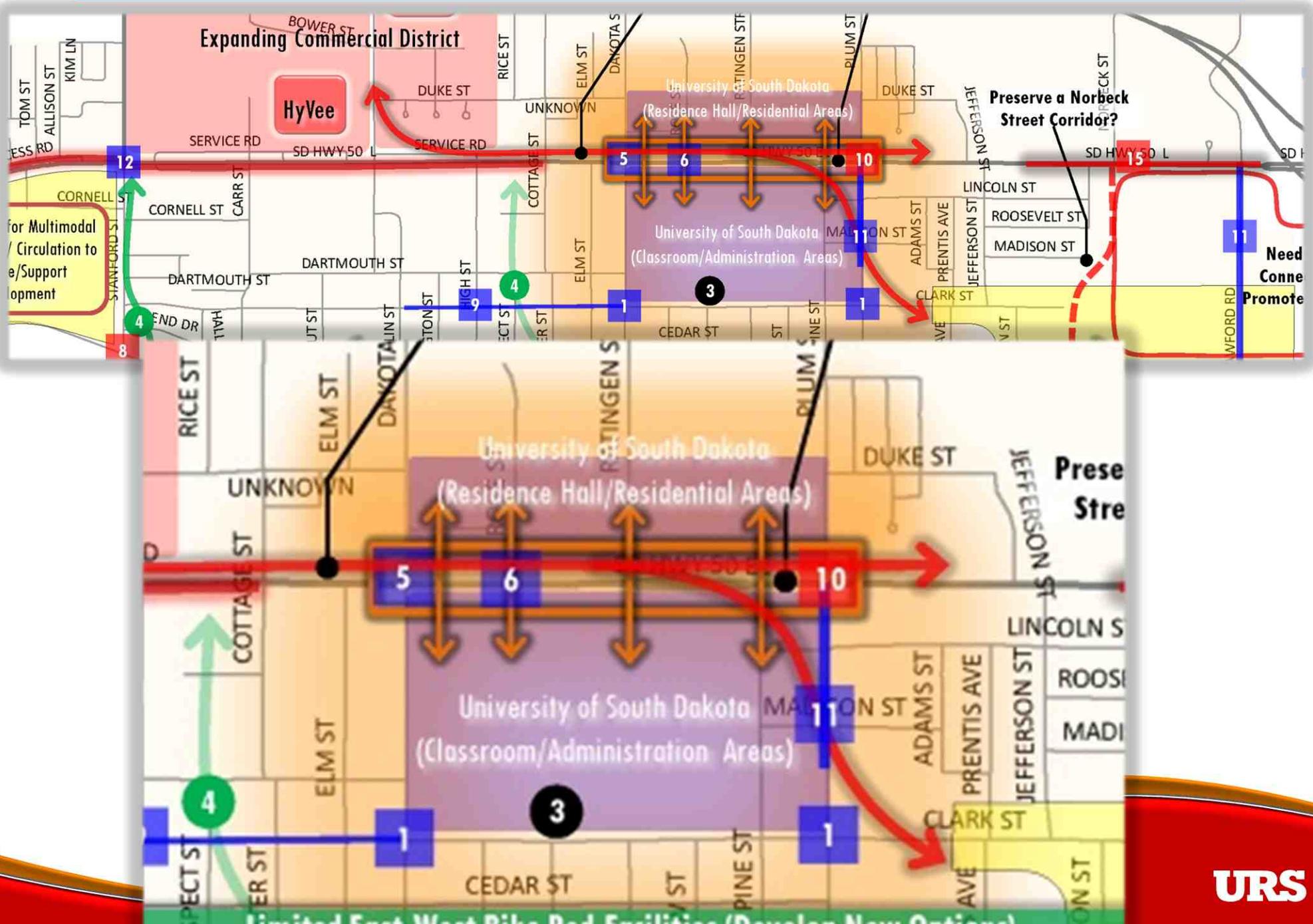
# Potential Multimodal Alternatives



# Need to Look Beyond Immediate Corridor



# Parking and Pedestrian/Vehicle Conflicts



# What Do You Think?

---

- **Plots in Conference Room**
  - **Questions?**
  - **Comments?**
  - **Ideas?**

# Thank you!

---

- **Contact Information:**

- **Bill Troe: 402.952.2522 or [Bill.Troe@URS.com](mailto:Bill.Troe@URS.com)**

- **Website: [VermillionTransportation.blogspot.com](http://VermillionTransportation.blogspot.com)**

***PUBLIC MEETING ADVERTISEMENT***

construction of a sanitary sewer to serve the Country Kitchen, a new restaurant being built on Cherry Street.

The Downtown Mall has caused much discussion. It is located between Mount's Recreation and Hanny's

provide the entertainment at Slagle Auditorium during Dakota Days. If you want to attend you must hurry as the tickets are almost gone.

END 1973



TUESDAY, APRIL 17TH, 2012  
@ 7:30PM  
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SLAGLE HALL  
FREE ADMISSION!!!!



USD BRASS CHOIR  
& PERCUSSION ENSEMBLE  
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An Evening With



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A backing ensemble featuring musicians from the USD Symphony Orchestra

**FRIDAY, APRIL 20<sup>TH</sup>**

Aalfs Auditorium in Slagle Hall (414 E. Clark St.), Vermillion, SD  
Doors open at 7pm - Show starts at 8pm - Reserved Seating

Tickets available in the Fine Arts Building at the University of South Dakota (Open M-F, 10am to 2pm - Cash Only), charge by phone (866) 300-8300 & online at [JadePresents.com](http://JadePresents.com)

Limited student tickets available in the Fine Arts Building for only \$25! (USD students only / I.d. required)



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**SOUTH DAKOTA DEPARTMENT OF  
TRANSPORTATION  
CITY OF VERMILLION  
NOTICE OF PUBLIC INFORMATION MEETING  
OPEN HOUSE #2  
VERMILLION AREA TRANSPORTATION STUDY**

Date: April 30, 2012  
Time: 5:30 P.M. – 7:00 P.M.  
Place: Council Chambers  
City Hall  
25 Center Street  
Vermillion, SD 57069

The South Dakota Department of Transportation (SDDOT) and the City of Vermillion will hold an open house style public information meeting to discuss and receive public input to the on-going Vermillion Area Transportation Study. The long range transportation study represents the master plan for roadway, bike, pedestrian and transit improvements in town through 2032.

The purpose of this second public information meeting/open house is to provide residents, business owners and university students/faculty/staff with:

- A summary of transportation system issues identified by the Vermillion Community.
- Locations of future residential and job growth.
- Estimates of future traffic conditions.
- Potential changes to the future roadway, bus / transit, bicycle and pedestrian systems.

At 5:30 p.m. the open house will include a brief overview of study progress. Staff would like to reserve most of the meeting time to take questions and gather input from those in attendance. This will include getting the public's impressions on the study findings and gather your input on the types of potential changes to the future transportation system that you would like to see, including options for the roadway network, the bike network, sidewalks and trails, parking issues; and transit.

Notice is further given to individuals with disabilities that this open house/public meeting is being held in a physically accessible place. Please notify the SDDOT ADA Coordinator at least 48 hours prior to the open house meeting if you have special needs for which this department will need to make arrangements. The telephone number for making special arrangements is 605-773-3540 or 1-800-877-1113 (Telecommunication Relay Services for the Deaf).

Those who cannot attend the meeting or desire further information regarding the study may visit the study's website at <http://vermilliontransportation.blogspot.com/> or contact Steve Gramm at (605) 773-6641 / email: [steve.gramm@state.sd.us](mailto:steve.gramm@state.sd.us).

Notice published twice at the total approximate cost of \$258.24.

## ***MEETING HANDOUTS***



## Contacts:

City of Vermillion  
Jose Dominguez, PE  
Traffic Engineer  
City of Vermillion

677-7708

Josed@cityofvermillion.com

## SDDOT

Steve Gramm, PE  
Data Analysis Engineer  
SDDOT

605-773-6641

Steve.Gramm@state.sd.us

## URS Corporation

Bill Troe, AICP  
Project Manager

402-952-2522

Bill.Troe@urs.com

## PURPOSE OF THE TRANSPORTATION STUDY

The *Vermillion Transportation Study* serves a variety of purposes, including:

- It is a vision document aiding in defining the long-term transportation system for Vermillion and the anticipated growth area.
- The plan provides policy direction for decisions regarding implementation of improvements and management program to maintain the high quality transportation system.

The transportation plan is a framework document that serves as a comprehensive reference guide regarding transportation and land use issues facing Vermillion. Additionally, the plan provides priorities for implementing projects to meet short-term deficiencies while working towards the ultimate transportation system the city is trying to achieve.

The plan provides the goals, principles, and policies used to shape the transportation system today and into the future. The plan provides a look at existing conditions and what the future may look like based on current development practices. This plan also provides recommendations for future work items that the city may want to pursue to enhance transportation planning and implementation efforts.

## TRANSPORTATION GOALS

Goal #1: Provide an efficient multimodal transportation system that effectively moves people and goods.

Goal #2: Provide a safe and secure transportation system.

Goal #3: Maintain the existing transportation system.

Goal #4: Manage the transportation system's impact on the social and natural environment.

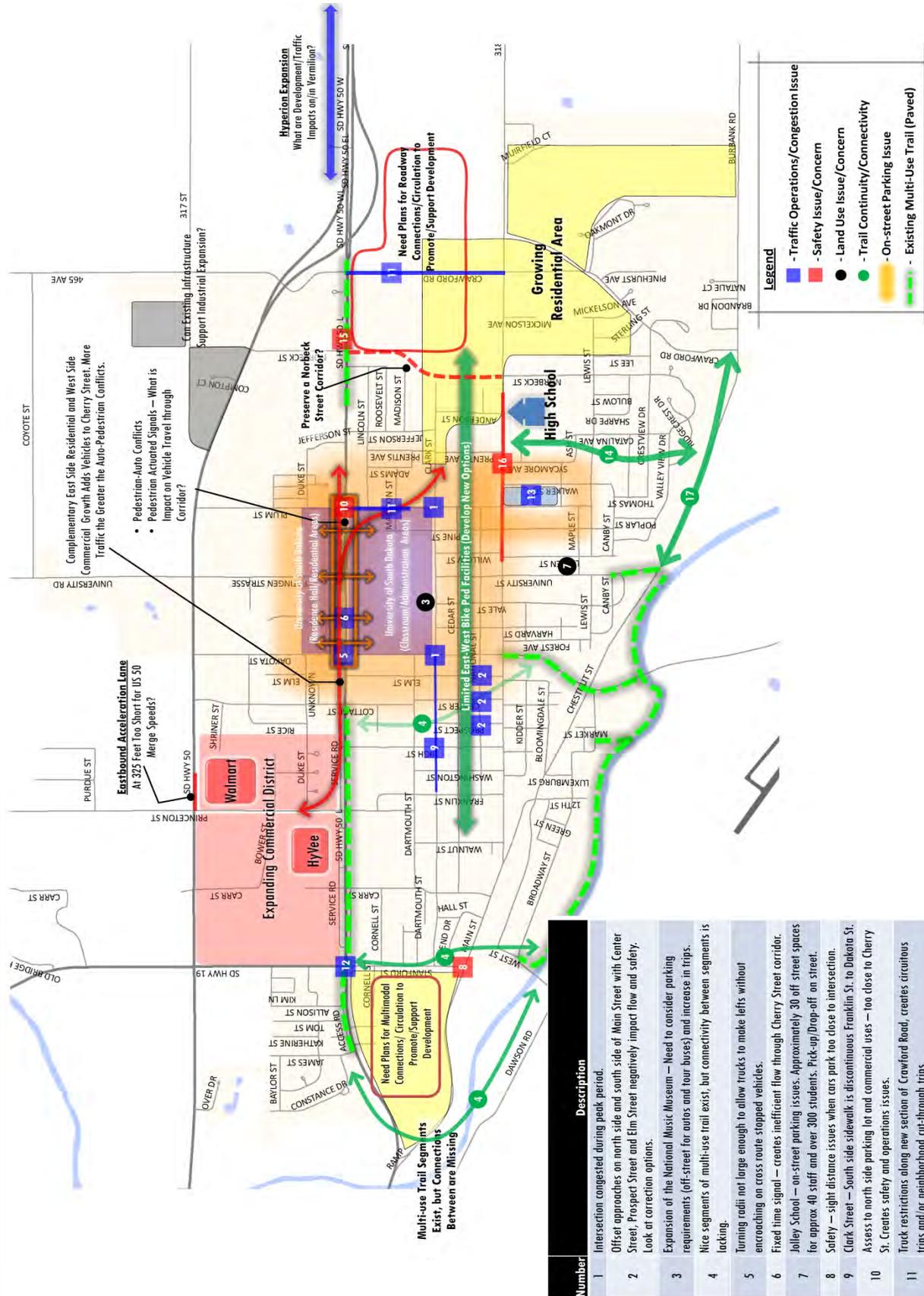
Goal #5: Provide a transportation system that supports and enhances the area's economy and supports the Comprehensive Plan.

**Objectives associated with each goal are provided on the project website: [vermilliontransportation.blogspot.com](http://vermilliontransportation.blogspot.com).**

## TRANSPORTATION PLAN DEVELOPMENT PROCESS



## TRANSPORTATION ISSUES AND FORCES IDENTIFIED BY PUBLIC



## Contacts:

City of Vermillion  
Jose Dominguez, PE  
Traffic Engineer  
City of Vermillion

677-7708

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## SDDOT

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## URS Corporation

Bill Troe, AICP  
Project Manager

402-952-2522

Bill.Troe@urs.com

## NEWSLETTER #2: APRIL 2012

Newsletter #1 is available at: [www.vermilliontransportation.blogspot.com](http://www.vermilliontransportation.blogspot.com).

## EVALUATION OF TRANSPORTATION ALTERNATIVES

The first phase of the Transportation Study has involved a dialogue between the study team and the community to get your impressions of transportation in Vermillion, including the street and highway system, the pedestrian and bicycle system, the transit service, parking and freight in the area, etc. This first phase has also included the study team completing technical analyses of how the current transportation system operates, and comparing those outcomes to Vermillion's transportation vision, goals and objectives. As we have worked through this information-gathering phase of the process, transportation issues, deficiencies and opportunities have been identified. The ultimate goal of the study is to develop feasible solutions to the problems and challenges identified, which is facilitated through the alternatives evaluation.

## ALTERNATIVES EVALUATION PROCESS

A successful Transportation Study requires a comprehensive and objective alternatives evaluation process. The Vermillion Transportation Study is implementing a comprehensive alternatives evaluation with the "SEE approach". Through the SEE methodology, all potential transportation alternatives are assessed from the three following "perspectives":

- **S**ocial: What are the impacts to adjacent land uses (residents and businesses) and cultural impacts? Can the community support the alternatives?
- **E**ngineering: Does the alternative provide the desired capacity and / or safety benefits? Does it fit with local or state design guidelines?
- **E**conomic: What are the costs? Are there other economic benefits from the alternative?

The SEE methodology ties into the Vermillion area's vision for its transportation system, which is to provide a system that:

- Supports mobility and economic development.
- Provides for an efficient transportation service, measured in terms of modal capacity, speed, convenience and safety.
- Provides for interconnectivity and use of all travel modes.
- Balances transportation service with the neighborhood and environmental impacts associated with construction.
- Fits with local land use policies.
- Reflects the values of the community.
- Has the support of the community.
- Is financially feasible.

The "Alternatives Approach" section on the next page provides the types of solutions that we will be looking at as we complete the Alternatives Evaluation.

## ALTERNATIVES APPROACH

The outline below provides an illustration of how we are going through the alternatives evaluation approach that includes:

- ❖ **What is the issue?**
  - *What are the potential types of solutions?*

Listed below is a summary of potential solutions to observed issue types.

- ❖ **Issue: Intersection Capacity / Safety.**
  - *System Management Solutions:*
    - Add turn-lanes at intersection.
    - Change the current intersection control, such as replace a stop sign with a sign, change signal timing, etc.
    - Provide advanced warning for safety.
    - Remove problem driveways/alleys/streets.
  - *Expansion Solutions:*
    - Add more through lanes to streets.
    - Add new streets to share load.
  - *Demand Management Solutions*
    - Encourage carpooling / ridesharing.
    - Work with employers to adjust shift change times to avoid peak hour of travel.
  - *Balance Travel Modes Solutions:*
    - Increase transit service in area.
    - Increase share using bikes or walking.
  - *Land Use Adjustment Solutions:*
    - Reduce intensity of land uses to reduce trip generation..
    - Shift development to areas with more capacity to handle growth.
- ❖ **Issue: Limited Bicycle / Pedestrian Access**
  - *System Management Solutions:*
    - Restripe existing roadway and add signage to provide bike lanes.
    - Remove on-street parking to provide area for bikes.
    - Add pedestrian amenities to corridor (improved crossings, intersection bump-outs, street furniture, etc.).
  - *Expansion Solutions:*
    - Widen roadway to allow for on-street bike lanes.
    - Build new off-street trails.
- ❖ **Issue: Pedestrian – Vehicle Conflicts**
  - *System Management Solutions:*
    - Adjust signal timing to limit vehicle-pedestrian conflicts.
    - Provide additional signing to reduce conflicts.
  - *Expansion Solutions:*
    - Add sidewalks/trails.
    - Provide grade-separated pedestrian crossing to eliminate conflicts.
    - Build more sidewalks in corridor to reduce conflicts.
  - *Demand Management Solutions*
    - Encourage carpooling / ridesharing to reduce vehicular demand that plays a part in conflicts.
  - *Land Use Adjustment Solutions:*
    - Promote mixed use development – Resulting in less demand by pedestrians to cross major streets.



## ***SIGN-IN SHEETS***



## VERMILLION AREA MASTER TRANSPORTATION PLAN PUBLIC MEETING #2 SIGN IN SHEET

April 30, 2012

Name	E-mail and Phone Number
Steve Gramm	steve.gramm@state.sd.us 605-773-6641
Jeff Brosz	Jeff.brosz@state.sd.us 605-773-5439
Travis Gulbrandsen	travis.gulbrandsen@plintalk.net
Rod Gall	Rod.Gall@state.sd.us 605-668-2729
Jerry Wilson	wilson57069@gmail.com 624-9279
Dary Wright	624-4327
Michael Carr	mcarr@vgn.midco.net 624-5521
John Prescott	johnp@cityofvermillion.com 677-7050



## VERMILLION AREA MASTER TRANSPORTATION PLAN STAKEHOLDERS MEETING #3 SIGN IN SHEET

May 1, 2012

Name	E-mail and Phone Number
JASON CARBEE	jason.carbee@urs.com
Andy Martinez	ajmbmartinez@hotmail.com
KEVIN BRADY	bikingbrady@gmail.com
Mary B. Edelen	medelen44@hotmail.com 624-4760
Joni Dominguez	jased@cityofvermillion.com
Joan Hatter	Vern80@msn.com

# APPENDIX B: POPULATION, HOUSEHOLD AND EMPLOYMENT PROJECTIONS SETUP



## MEMORANDUM

**Bill Troe, AICP**

**Jason Carbee, AICP**

12120 Shamrock Plaza

Suite 300

Omaha, NE 68154

(402) 334-8181

(402) 334-1984 (Fax)

---

**To: Jose Dominguez, City of Vermillion  
Steve Gramm, South Dakota DOT  
Study Advisory Team**

**Date:** January 25, 2012

**Subject: Vermillion Population, Household and Employment Projection Overview**

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### ***OVERVIEW***

The purpose of this memorandum is to provide a set of various 2032 study area population, household and employment projections for the Vermillion Area Transportation Plan. Several different sources of data and projections are provided and summarized in this memorandum. It is our intention to discuss the various projections with the Study Advisory Team (SAT) at our January 31 meeting and settle on a set of “recommended” projections to use for the Transportation Plan. These housing and employment growth projections are an important step in the transportation plan, because the change in Vermillion’s people and jobs between today and 2032 will directly correlate to how traffic and travel patterns change in Vermillion.

The memo presents data from various sources and attempts to document any similarities and differences among the data. Utilizing the various sources of population and employment data and projections assists in identifying consistent growth trends in the Vermillion area and lends reasonableness and consensus to the projection process and results.

The Vermillion Area Transportation Plan study area includes the city of Vermillion and contiguous portions of Clay County outside of the city, as documented in Figure 1. The sources of population, household and employment data used for this memorandum, include:

- US Decennial Census 2010 Data
- *Vermillion Comprehensive Plan, 2000 – 2020* (2011)
- Woods and Poole Economics, Inc., *2011 County Data Pamphlet for Clay County, SD*
- US Census Bureau, *Longitudinal Employer-Household Dynamics Data* (2009)
- South Dakota Department of Labor, Labor Market Information Center
- South Dakota Rural Life and Census Data Center

Based on these various data sources, the memorandum documents the established base year levels of population and employment and summarizes the growth trends identified by each source of data. Based on the assessments, a draft set of 2032 population, household and employment projections for low growth, mid growth and high growth are provided.

We recognize that the University plays a significant role in both the development and transportation demands in the Vermillion area. We are treating development on the USD campus as a separate exercise. USD has provided us with a campus master plan and other documents that outline their intended growth plan. When we meet with the SAT later to work through a growth allocation scenario, where we distribute new jobs and households to locations across the Vermillion area, we will address growth areas on the USD campus.

## ***POPULATION AND HOUSEHOLD DATA***

The objective of this task was to evaluate the various sources of data available and develop future year (2032) population and household projections. The first step in projection future development levels is to understand existing and historical levels.

The study area population and household data uses a base year of 2010 because it corresponds with the most recent US Census Data available. As shown in Figure 1, the study area for this plan is larger than the City limits of Vermillion, but does not encompass all of Clay County. The 2010 study area population and household estimates were developed from the Census 2010 Summary File 1, using Census block geography. Block-level data available for the 2010 US Census was evaluated to provide the appropriate breakdown of Clay County, Vermillion and Study Area population and households for the 2010 base year. That data is provided in Table 1.

**TABLE 1. 2010 Population and Household Data**

Analysis Area	2010		
	Population	Households <sup>1</sup>	Persons per Household
Clay County	13,861	5,109	2.71
Vermillion	10,571	3,811	2.77
Study Area	11,400	4,120	2.77

Source: Census 2010 Summary File 1, US Census Bureau

<sup>1</sup> 1,966 residents are listed as living in College / University group quarters, which are not included as part of a household.

As shown in Table 1, approximately 93 percent of the population and households in the study area fall within Vermillion's city limits. The study area accounts for approximately 82 percent of the population and 81 percent of households in Clay County.

### **2032 Population Projection Summary**

The study area population and household projections focused on four data sources:

- US Census Data, 1970 to 2010
- Woods and Poole Economics, Inc., 2011, *County Data Pamphlet for Clay County, SD*
- *City of Vermillion Comprehensive Plan, 2011*
- South Dakota Rural Life and Census Data Center, *South Dakota State and County Demographic Profiles*

The trends developed using data from each of these sources were evaluated and compared to provide a range of the potential population growth scenarios for the study team to consider.

*Historical US Census Population Data*

Analysis of historical population trends offers a starting point for estimating future population growth. Population data for Vermillion and for all of Clay County are presented in Table 2 for the Decennial Censuses of 1970 through 2010.

**TABLE 2. Historical Population for Clay County and Vermillion**

	1970	1980	1990	2000	2010
Clay County	12,826	13,713	13,193	13,510	13,864
Vermillion	9,128	10,136	10,034	<b>9,765</b>	10,571

Sources: 1990 CPH-2-1, US Census Bureau  
 Census 2000 Summary File 1, US Census Bureau  
 Census 2000 Summary File 1, US Census Bureau

A linear regression-based trend model was developed for both the Vermillion and Clay county as a baseline for developing study area population projections. The trend model is a relatively simple approach that fits historical data into an equation summarizing a data trend, which is then extrapolated to project future levels of population. The regression model was applied to the Census data presented in Table 3 to extrapolate population growth through 2032<sup>1</sup>.

**TABLE 3. Historical Population and Linear Trend Population Projection**

	Historical Population Counts					Trend Projections		Trend Growth, 2010 to 2032
	1970	1980	1990	2000	2010	2022	2032	
Clay County	12,826	13,713	13,193	13,510	13,864	14,020	14,208	+ 344 (2.5%)
Vermillion	9,128	10,136	10,034	9,765	10,571	11,036	11,346	+ 775 (7.3%)

Source: URS Corporation

While not a complex approach to developing population projections, the linear regression model provides a benchmark for a reasonable level of study area population growth.

*Woods and Poole Population Projections*

Woods & Poole Economics, Inc. is a firm that specializes in long-term county economic and demographic projections. The Woods and Poole projections are based on a proprietary methodology that incorporates demographic and economic models to complete projections of county-level employment and population. Their demographic model follows a cohort-component projection method that estimates birth and mortality rates and migration projections, and is a widely accepted source for population and employment projections. The Woods and Poole

<sup>1</sup> The 2000 population total for Vermillion was smoothed out in the trend analysis, as the 2000 population total for Vermillion appears underreported. This is supported by three observations:

- The 2000 Census reported over 500 “college/university” group quarters persons as Clay County residents outside of Vermillion. All other Censuses (including 2010) counted them all as Vermillion residents.
- Clay County’s population grew during the 1990s, while Vermillion’s reported population declined, contrary to historical trends.
- The 2000 Census-reported population total was significantly lower than the 2000 Comprehensive Plan’s 2000 estimate provided by the Census.

population and household projections for Clay County are presented in Table 4.

**TABLE 4. Woods and Poole Population and Household Projections, Clay County**

	2010	2022	2032	Trend Growth, 2010 to 2032
Clay County Population	13,864	14,167	14,464	+ 600 (4.3%)
Clay County Households	5,110	5,399	5,431	+ 321 (6.3%)

Source: Woods and Poole Economics, Inc. Washington, DC. 2011

*Vermillion Comprehensive Plan*

The 2000 – 2020 Vermillion Comprehensive Plan was developed in 2000 and provided 2000 to 2020 population projections, based on an evaluation of historical demographic trends within the city. The Comprehensive Plan was updated in 2011 to reflect a new Future Land Use map, but the population estimates and projections were not changed. The Comprehensive Plan projections were developed prior to the release of the 2000 US Census counts for Vermillion, and included 2000 estimates that were significantly higher than the reported 2000 Decennial US Census population for Vermillion. A comparison of Comp Plan and Census Data is provided in Table 5. As shown in Table 5, although the estimates provided for 2000 were higher than the actual count, the projected 20-year *amount* of growth (13.5%) is not significantly different than the amount of growth predicted by the other two methods summarized above (6% to 7%).

**TABLE 5. Comparison of Comprehensive Plan and Census Counted Population for Vermillion**

Data Source	1960	1970	1980	1990	2000	2010	2020	2000 to 2020 Growth
Comp Plan Data / Projections	6,702	9,128	10,136	10,013	11,400 <sup>1</sup>	12,176 <sup>1</sup>	12,938 <sup>1</sup>	13.5%
Census Population Count	6,702	9,128	10,136	10,034	9,765	10,571	-	

Source: *Vermillion Comprehensive Plan 2000-2020*, 2011.

<sup>1</sup> Denotes estimates / projections

Based on the data provided in the Comprehensive Plan, Vermillion was anticipated to grow by 77 persons per year between 2000 and 2020. Extrapolated out to 2032, that would be a growth of 1,690 persons, or a 16% growth over the 2010 Census population of 10,571.

*South Dakota Rural Life and Census Data Center Projections*

The South Dakota Rural Life and Census Data Center (SDRLCDC) is the South Dakota State Data Center and operates as a cooperative venture between the U.S. Census Bureau and South Dakota State University. One of the Center’s publications is the *South Dakota State and County Demographic Profiles*, which provides County-by-County demographic breakdowns, including population projections through 2020. Table 6 shows the historical and projected population trend for Clay County based on the SDRLCDC trend analysis.

**TABLE 6. South Dakota Rural Life and Census Data Center Population Trends for Clay County**

	1960	1980	1990	2000	2010	2020
Clay County	10,810	13,689	13,186	13,537	14,158	14,590

Source: *South Dakota State and County Demographic Profiles*, South Dakota Rural Life and Census Data Center, 2008.

Based on the data provided by the SDRL / CDC, Clay County was anticipated to grow by 43 persons per year between 2010 and 2020. Extrapolated out to 2032, that would be a growth of 950 persons, or a 7% growth over the 2010 Census population of 13,864.

**Population / Household Projection Summary**

Four different sets of city and/or county population growth rates were identified based on the approaches summarized above. These four different sets of growth rates are presented in Table 7.

**TABLE 7. Population Growth Projection Summary**

Area	Regression Trend	Woods and Poole	Vermillion Comp Plan	SDRLCDC
Vermillion	7%	6%	16%	
Clay County	3%	4%		7%

Taken together, the data indicate a Vermillion population growth between 6% and 16% between 2010 and 2032. If applied to the 2010 study area population of 11,400 and 2010 study area household total of 4, 120 the 2032 population forecasts would range from:

- A low-end projection of 12,100 study area residents (700 added population) by 2032, or 4,457 households (337 new households).<sup>2</sup>
- A high-end projection of 13,200 study area residents (1,800 added population) by 2032, or 4,862 households (742 new households).

***EMPLOYMENT DATA***

The objective of this task was to evaluate the available employment projection data and to develop a range 2032 employment projections. As with the population projections, the first step in completing projections of employment is to first establish employment levels for the base year.

***Base Year Employment Data***

Detailed base year employment data by place-of-work was available for this study from the South Dakota Department of Labor (SDDOL) and from the Census Bureau’s Longitudinal Employer-Household Dynamics (LEHD) database. It was possible to select the total employment

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<sup>2</sup> Household projections based on the Woods and Poole estimated persons-per-household ratio of 2.715 in 2032, down from 2.76 in 2010.

by industry type for just the Transportation Plan study area from the LEHD.

**TABLE 8. Distribution of Study Area Jobs by Generalized Industry**

Job Type	2009 Jobs	Industry Percentage
Retail	1,165	21.6%
Service	1,369	25.4%
Government	2,088	38.7%
Industrial	518	9.6%
Other / Office <sup>1</sup>	258	4.8%
All Non-Farm Jobs	5,398	100.0%

Sources: US Census Bureau, LEHD Data 2009  
URS Corporation

The total non-farm employment from the LEHD database for Clay County was 5,701 jobs. Thus, the study area accounts for an estimated 95% of all jobs in Clay County.

Total Vermillion employment from the SDDOL database for 2010 (average of all 12 months) was 5,770. This was quite similar to the total employment derived from the LEHD database. If we assume that 95% of Clay County jobs are within the study area, the SDDOL estimate of 2010 study area employment is 5,480. **The remainder of this analysis assumes that 2010 wage and salaried employment for the study area is 5,480 jobs.**

*Trend Analysis SDDOL Employment Data*

Summary-level employment data that dates back to 1990 are available from the SDDOL for the Vermillion Micropolitan Statistical Area (MiSA), which encompasses the study area and some area beyond it. The historical data from the SDDOL were not available by the industry sectors documented in Table 8, so the data are presented only in terms of total employment. The MiSA data were summarized to include annual average employment, which is documented in Table 9.

**TABLE 9. SD Department of Labor Employment Estimates for Vermillion Micropolitan Statistical Area**

Vermillion MiSA				
Year	Total Employment		Total Employment	
1990	6,590		2001	6,750
1991	6,620		2002	6,750
1992	6,620		2003	6,935
1993	6,560		2004	7,090
1994	6,775		2005	7,080
1995	6,815		2006	7,260
1996	6,790		2007	7,405
1997	6,830		2008	7,475
1998	7,015		2009	7,310
1999	7,850		2010	7,275
2000	7,215			

Source: South Dakota Department of Labor, Labor Market Information Center, Labor Force Statistics Database.

Similar to the population data, the historical employment growth data were used to establish a simple trend model. This approach fit the historical data and extrapolated an employment trend to 2032. The linear trend extrapolation of historical SDDOL data indicates a 13% growth in 2010 to 2032 study area employment. Based on the data provided in Table 9, the following bullets summarize the trend extrapolated employment for the study area:

- 2010 Employment: 5,480 (from SDDOL)
- 2022 Employment: 5,910
- 2032 Employment: 6,210

*Woods and Poole Data*

The employment data received from the SDDOL was compared to employment information contained in the Woods and Poole database. There were some significant discrepancies between the total employment reflected in the Woods and Poole data and the other two data sources in terms of total number of new employees, based on the types of jobs that each data source counts. The SDDOL data counts only full- and part-time wage and salary employment covered by the Unemployment Insurance program, which covers nearly all establishments. However, the Woods and Poole data include additional employment categories not covered by the Unemployment Insurance programs. The categories included in the Woods and Poole data, but not covered by the SDDOL data include:

- Self-employed individuals/proprietorships
- On-campus student jobs
- Private household and agricultural workers
- Railroad employees

- Religious and private institutions and schools

The Woods and Poole data tend to double count some employment, since self-employed / proprietorship employment often includes individuals who hold another full- or part-time, salaried job<sup>3</sup>. While the Woods and Poole data offers a more complete summary of Vermillion employment, the employment totals reflected in the SDDOL data likely capture the vast majority of employment relevant to transportation plan in terms of travel demand. The value of the Woods and Poole employment dataset for this application is that it includes a sophisticated approach to projecting local area employment growth by sector.

**TABLE 10. Study Area Employment by Generalized Industry, including Self-Employed**

Industry	2010		2022		2032	
	Jobs	Percentage	Jobs	Percentage	Jobs	Percentage
Retail	1,258	11.2%	1,716	12.3%	2,285	13.2%
Service	4,678	41.7%	6,528	46.9%	8,714	50.4%
State and Local Government	2,852	25.4%	2,779	20.0%	2,819	16.3%
Industrial	1,408	12.6%	1,887	13.6%	2,447	14.2%
Other Office <sup>1</sup>	612	5.5%	656	4.7%	718	4.2%
Farm	405	3.6%	341	2.5%	294	1.7%
Total	11,213	100.0%	13,907	100.0%	17,277	100.0%

Source: Woods and Poole Economics, Inc. Washington, DC. 2011

<sup>1</sup> Includes employment in the Administrative, Management and Federal industries.

As shown in Table 10, the Woods and Poole employment model is projecting significant increases in overall employment (54% increase), with the largest percentage gains in the retail (82%), service (86%) and industrial (74%) industries. There is relatively no change in State and Local government employment projected, which includes jobs at USD.

The SDDOL also has provided shorter-term (2008-2018) **statewide** projections of job growth by industry<sup>4</sup>. Those statewide projections assumed a 9% growth in all jobs for South Dakota between 2008 and 2018. The industry classifications do not match up perfectly with the Woods and Poole data, but generally had the following 10-year growth projections:

- South Dakota 2008 to 2018 Retail Job Growth: 10%
- South Dakota 2008 to 2018 Service Job Growth: 13%
- South Dakota 2008 to 2018 Government Job Growth: 2%
- South Dakota 2008 to 2018 Industrial Job Growth: 11%
- South Dakota 2008 to 2018 Other Industry Job Change: 0%

<sup>3</sup> Woods and Poole staff reported that 42 percent of the jobs reported in Clay County were self-proprietorships, a significantly larger percentage than in most areas. These jobs are often second jobs and are not typically significant sources of trip generation. If those jobs are removed from the total, and the on-campus student jobs are considered, the Woods and Poole dataset is likely similar to SDDOL data for Wage and Salary workers.

<sup>4</sup> Labor Market Information Center, South Dakota Department of Labor, December 2010.

This indicates that generally, the Woods and Poole dataset was consistent with the SDDOL statewide projections in terms of which industries had the highest projected growth: retail, service and industrial.

**Employment Projection Summary**

Employment projections were developed with both the SDDOL historical data trend analysis and Woods and Poole data. Both of these sources included data at the county level (with SDDOL projections at the State level also analyzed). The growth rates identified for Clay County are likely consistent with the growth rates for the study area, as study area employment accounts for approximately 95 percent of Clay County employment. Table 11 shows the various employment growth rate projections by source.

**TABLE 11. Employment Growth Projection Summary, 2010 to 2032**

	<b>Regression Trend</b>	<b>Woods and Poole</b>	<b>SD DOL Statewide<sup>1</sup></b>
Vermillion / Clay County	13%	54%	
Statewide			19%

<sup>1</sup> Based on extrapolating the statewide 10-year trend to a 22-year trend.

***RECONCILING THE POPULATION AND EMPLOYMENT DATA SOURCES***

The data sources generally indicate employment growth projections that are greater proportionally than population growth. To assess what a “reasonable” level of growth might be for Vermillion, we researched a similar community to Vermillion: Brookings. While Vermillion and Brookings are distinctly different communities, because they are similar-sized communities with the two largest public universities in the state it was believed that Brookings was the best possible comparison community for Vermillion. Our objective was to get a sense of how Vermillion’s current and projected job market compares to Brookings in terms of jobs per household. Table 12 shows the 2010 population and employment levels for Vermillion and Brookings.

**TABLE 12. Comparison of Vermillion and Brookings Jobs and Population**

<b>City</b>	<b>2010 Pop</b>	<b>Estimated 2010 Jobs</b>	<b>Jobs / Person</b>
Vermillion Area	11,400	5,480	0.48
Brookings City	22,056	12,270	0.56

Sources: Census 2010 Summary File 1, US Census Bureau  
 South Dakota Department of Labor, Labor Market Information Center, Labor Force Statistics Database.

If Vermillion currently has a lower ratio of jobs per person than a similar community like Brookings, perhaps it has a greater capacity to accommodate more employment growth than population growth.

Table 13 shows the ratio of Vermillion population to jobs under three different employment growth scenarios based on the population and employment work documented previously in this

memo:

- A **low growth scenario**, based on population and employment growth from historical trends.
- A **high growth scenario**, with population projections based on *Vermillion Comprehensive Plan, 2000 to 2020* growth rates and employment projections based on an application of Woods and Poole dataset industry employment growth rates.
- A **mid growth scenario**, that averages the population and employment growth from the low and high growth scenarios.

**TABLE 13. Comparison of Potential Population and Employment Growth Scenarios**

Area / Growth Scenario		Population	Employment	Jobs per Person
Vermillion Area	2010	11,400	5,480	0.48
	2032 Low Growth	12,100 <sup>1</sup>	6,210 <sup>3</sup>	0.51
	2032 High Growth	13,200 <sup>2</sup>	8,060 <sup>4</sup>	0.61
	2032 Mid Growth <sup>5</sup>	12,650	7,140	0.56
2010 Brookings		22,056	12,270	0.56

Source: URS Corporation

1 Based on Population Trend Extrapolation

2 Based on Vermillion Comp Plan 2000 to 2020 population growth

3 Based on SDDOL Employment Trend Extrapolation

4 Based on Woods and Poole Dataset employment growth rate projections by industry, 2010 to 2032.

5 Based on an average of the Low Growth and High Growth scenarios.

Details on the projected employment breakdown by scenario and industry are provided in Table 14.

**TABLE 14. Summary of Projected Job Change by Industry and Growth Scenario, 2010 to 2032**

Industry	2010 Employment by Industry	Percent of 2010 to 2032 Employment Change	2032 Employment by Scenario		
			Low Growth	Mid Growth	High Growth
Retail	1,180	37.2%	1,460	1,800	2,140
Service	1,390	46.5%	1,750	2,170	2,590
State and Local Government	2,120	-0.8%	2,100	2,100	2,100
Industrial	530	15.1%	640	780	920
Other Office	260	1.9%	260	290	310
Total	5,480	-2%	6,210	7,140	8,060

Source: URS Corporation

It is our intention to talk about these potential employment and population growth scenarios at the January 31 SAT meeting, and work with the group to select a recommended growth scenario.

***LAND DEVELOPMENT IMPLICATIONS***

An additional element of forecasting future development conditions is forecasting how much land will be required to accommodate the projected growth in persons, households and employment. To estimate how much land might be needed to accommodate the various employment and housing growth scenarios, we looked at how much land has historically been consumed to accommodate current job and housing levels in three categories:

- Commercial (retail, service and other office)
- Industrial
- Residential

Figure 2 illustrates a map of current land uses in Vermillion, based on GIS data available within the city limits. Figure 2 does not consider rural residential development, which is a small portion of the housing in the study area. Based on the GIS data, the urban land used by category is:

- Commercial: 210 acres
- Industrial: 130 acres
- Residential (urban): 790 acres

Table 15 provides a summary of our estimate of current land consumed in Vermillion by the three land use categories above, and the resulting Urban Development Density.

**TABLE 15. 2010 Estimated Urban Development Density by Land Use Type**

<b>Land Use Category</b>	<b>2010 Estimated Acres Consumed</b>	<b>2010 Units (Urban Only)</b>	<b>2010 Urban Development Density</b>
Commercial	210	2,830 jobs	13.5 jobs / acre
Industrial	130	530 jobs	4.1 jobs / acre
Residential	790	3,811 households	4.8 HH / acre

*Sources:* URS Corporation, SECOG GIS files

The 2000-2020 Comprehensive Plan assumed that future development mixed between single-family residential and multi-family residential would consume approximately 3.4 dwelling units per acre. The Comp Plan also included a 50% multiplier on the residential growth assumptions to identify sufficient land for development needs, and the net result was an assumption of 2.66 dwelling units per acre of needed residential land.

Based on the levels of housing and job growth identified in Tables 13 and 14, the potential land development needs by land use category are provided in Table 15. The table also provides the land use needs identified in the 2000 - 2020 Comprehensive Plan for comparison.

**TABLE 15. Land Development Needs by Land Use Type and Growth Scenario**

Land Use Type	New Employees / Houses		New Land (Acres)		2000-2020 Comp Plan Needs
	Low Growth	High Growth	Low Growth	High Growth	
Commercial	640	2210	50 <sup>1</sup>	160 <sup>1</sup>	108
Industrial	110	390	30 <sup>1</sup>	100 <sup>1</sup>	110
Residential	337	742	130 <sup>2</sup>	280 <sup>2</sup>	290

Sources: URS Corporation, 2000-2020 Vermillion Comprehensive Plan

1 Based on our estimates of current jobs / acre density for each category.

2 Based on residential density identified in 2000-2020 Comp Plan of 2.66 housing units per acre.

Figure 3 shows the future land use areas identified by the 2011 update to the Comprehensive Plan.

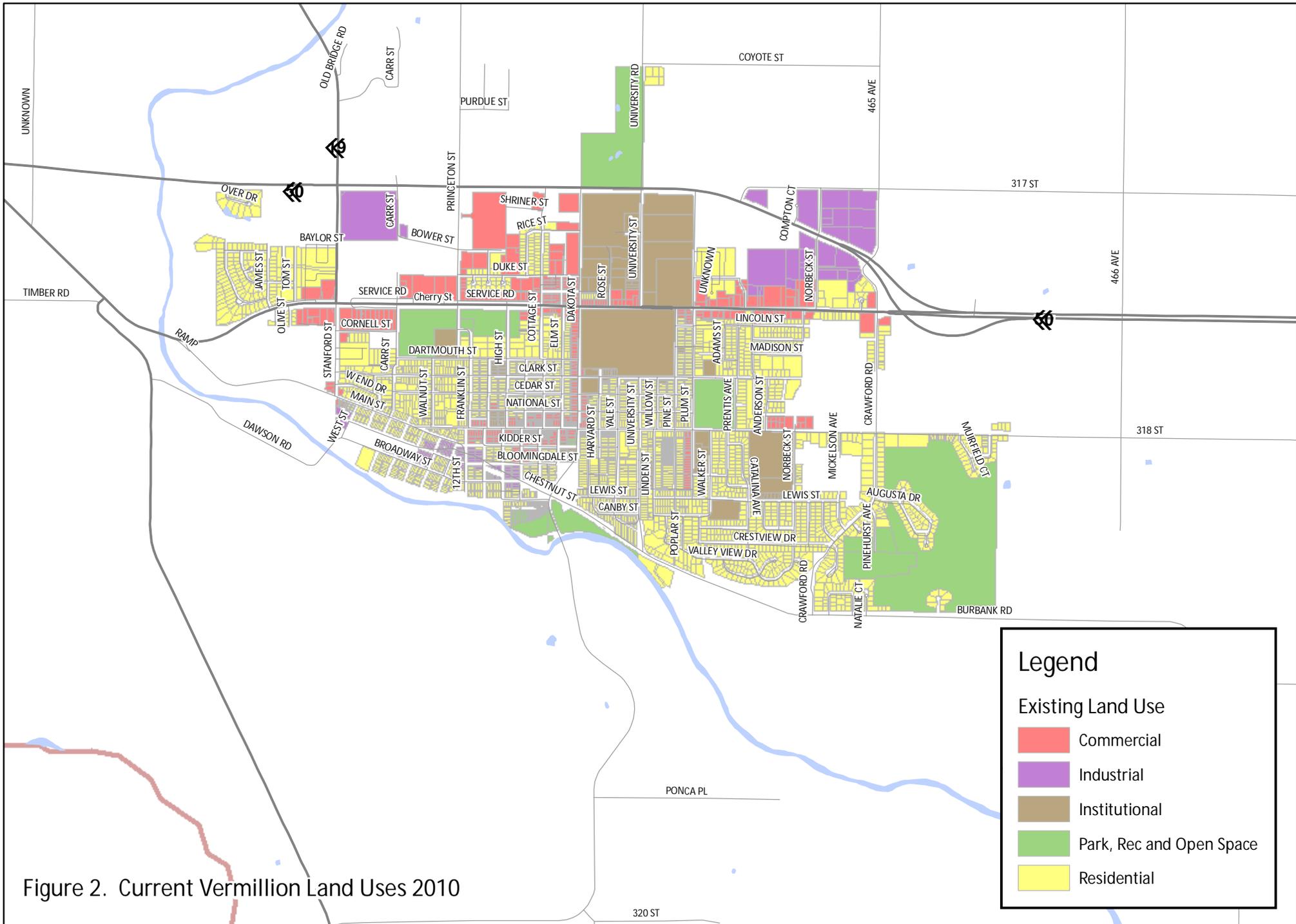
***SUMMARY***

It is requested that team members review the assumptions and results of the study area population and employment projections presented in this memorandum. We know there is a lot of detailed information provided in here, and expect that there will be questions and clarifications required. We will discuss the information contained in this memo at our January 31, 2012 meeting. It is hoped at that meeting we will agree upon a population, housing and employment growth total to use for the Transportation Plan.

After the Study Advisory Team has recommended a job and housing growth scenario, our next job will be to allocate that growth to various study area locations.

If you have any comments on any of the material covered in this memo, please contact Jason or Bill.





### Legend

Existing Land Use

- Commercial
- Industrial
- Institutional
- Park, Rec and Open Space
- Residential

Figure 2. Current Vermillion Land Uses 2010

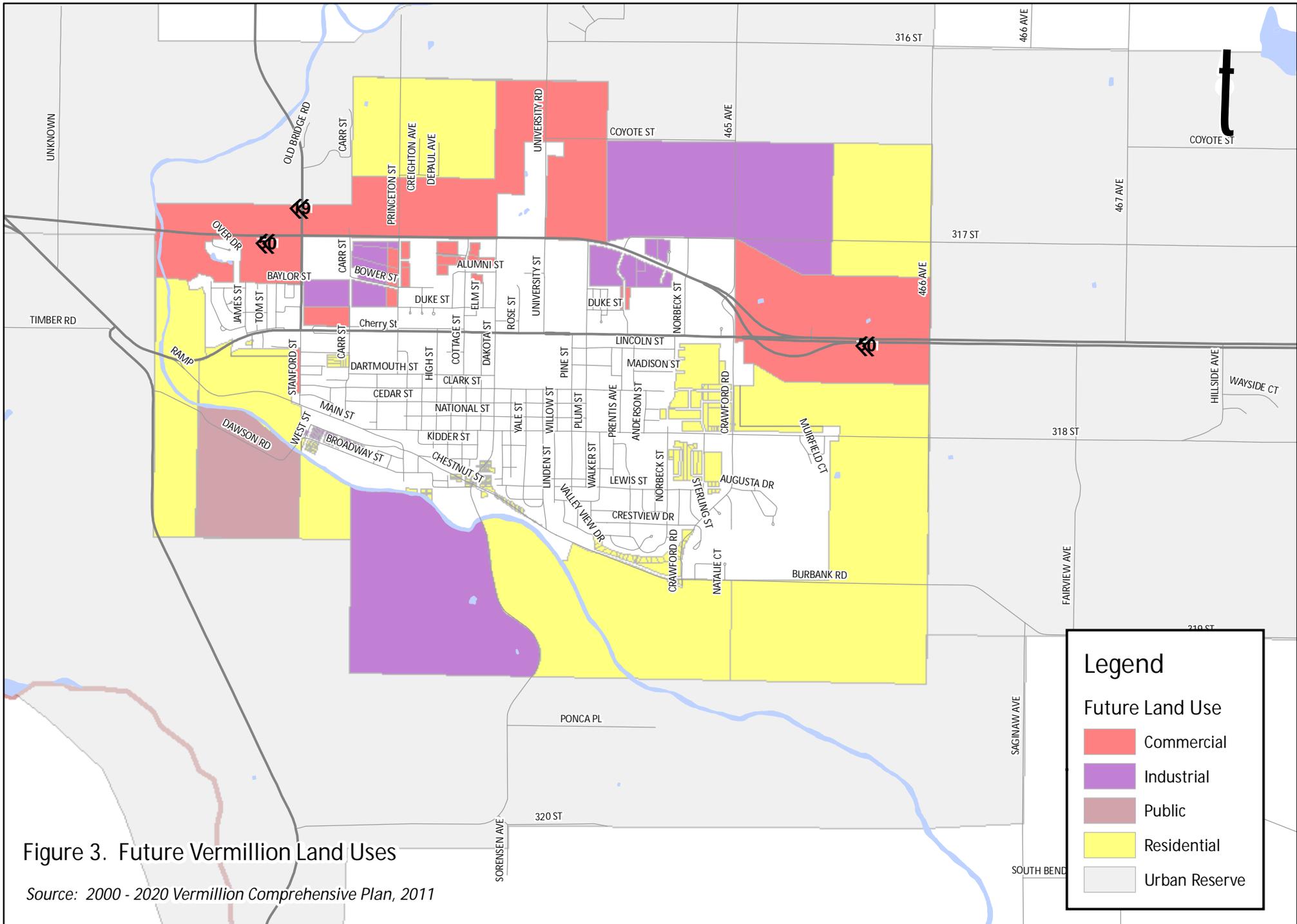


Figure 3. Future Vermillion Land Uses

Source: 2000 - 2020 Vermillion Comprehensive Plan, 2011

**Legend**

Future Land Use

- Commercial
- Industrial
- Public
- Residential
- Urban Reserve

# APPENDIX C: ALTERNATIVES ANALYSIS SUMMARY TABLE

**Table. Summary of Vermillion Area Alternatives by Issue Area with Cost Estimates**

Issue / Area of Concern	Alternative Focus Element	Alt ID	Project Alternatives	Evaluation by Perspective			Draft Planning-Level Construction Cost Estimate
				Social	Engineering	Environmental	
<b>Congestion / Safety along SD 50 Intersections through Vermillion</b> - Princeton / SD 50 - Stanford / SD 50 - Dakota / SD 50 (to serve future commercial development) - University / SD 50	No Action	1A	Maintain existing 2-way stop control at arterials and collectors for Northbound and Southbound traffic.	Future traffic/congestion combined with 2-way stop control on north and south approaches makes access into / out of future commercial development north of SD 50 more difficult (Limited gaps).	Intersection delays for stop-controlled approaches are forecasted to increase by 2032: - Stanford / Highway 19: LOS "F" by 2032 - Princeton: LOS "F" by 2032 - University: LOS "E" by 2032  Identified safety issue at Stanford St intersection would likely get worse with no change to intersection control.  Potential for increased angle crashes with current 2-way stop control.  Traffic on SD 50 would continue to travel through Vermillion at free-flow speeds.	Increased delay / idling for side streets would increase fuel consumption and increase vehicle emissions.	None.
	Revise / Change Arterial Intersections	1B	Signalize arterial intersections along SD 50.  Provide advanced warning on SD 50 for signals.	Provides north-south approaches with green time/gaps to get to/from SD 50, which improves accessibility of developments.  Signal increases capacity - Can handle more traffic - Can allow more development.	Signals would introduce some delay to through traffic on Highway 50, which is not present today. Signalized intersections will operate at LOS A/B in 2032.  1/2 mile spacing between signalized intersections at Princeton, Stanford and Dakota provides good vehicle progression.  1/4 mile spacing between University St / Dakota St is bad for progression.  SDDOT access control guidelines allow 1/4 mile signal spacing in urban SD 50 corridor.  Signals tend to reduce angle crashes, but can lead to more rear-end crashes.  Active advanced detection / warning signs and flashing beacons can result in improved safety for signals in corridor like SD 50 where motorists are transitioning from a rural, high-speed facility.  Typically a 40% reduction in injury crashes at signals with advanced detection warning compared to those without (source: FHWA).	*See Note 1.	4 Signals = \$800,000. Advanced warning on each end = \$50,000.
		1C	Implement roundabouts at Princeton, Stanford, Dakota and University St intersections.	Larger, rural roundabouts might require some additional right-of-way acquisition.	Roundabout can result in improved traffic safety and reduced travel delays in some situations. However, majority of traffic at SD 50 intersections is through traffic - reduced travel time benefit for this traffic compared to current condition.  Application on state highway is non-traditional and would require some right-of-way acquisition at these volumes and speeds.	*See Note 1.	4 two-lane roundabouts = \$4,000,000
		1D	Provide grade-separated interchanges at Stanford St and Dakota St.	Right-of-way acquisition required to accommodate footprint of interchanges.	Meets desired interchange spacing of 1 mile or more.  Interchange would provide more capacity than required through 2032 - interchange would be "overinvestment" at this location.  Princeton St still at LOS "F" in 2032.	*See Note 1.	\$20,000,000
		1E	Provide grade-separated split diamond interchange at Princeton and Stanford. Frontage road on each side of SD 50, east ramps at Princeton and west ramps at Stanford.	Right-of-way acquisition required to accommodate footprint of interchanges.	Interchange would provide more capacity than required through 2032 - interchange would be "overinvestment" at this location.  Split diamond interchange frontage road would require moving existing trail south of SD 50.	*See Note 1.	\$20,000,000

Issue / Area of Concern	Alternative Focus Element	Alt ID	Project Alternatives	Evaluation by Perspective			Draft Planning-Level Construction Cost Estimate
				Social	Engineering	Environmental	
Congestion / Safety along SD 50 Intersections through Vermillion (continued)	Reconstruct SD 50 Roadway	1F	Reconstruct Highway 50 as a 3-lane roadway between Stanford and Cherry Street ramps.	* As SD 50 corridor urbanizes, it is assumed speeds along corridor will be closer to 45 mph. * Reduced vehicle lanes provide sufficient vehicle capacity while providing a cross-section more conducive to pedestrians and bicycles.	Current pavement widths in section range from 55 feet to 65 feet wide.  Would provide sufficient capacity through 2032 and beyond.  3 travel lanes for vehicles will require approximately 38 feet. Remaining pavement width would be sufficient to provide on-street bike lanes or could be eliminated.  Conversion to 3-lanes would allow for implementation of single-lane roundabouts at intersections.  If Hyperion facility is built, SD 50 demand could increase significantly. 3-lane section might not accommodate.		\$5,250,000 with full reconstruction.
		1G	Reconstruct Highway 50 as a consistent 66 foot width 5-lane roadway between Stanford and Cherry Street ramps.		Wider over-all cross-section provides more lateral separation for turning traffic for improved safety.  Consistent 66 foot wide cross-section would provide sufficient pavement width with no right-of-way impacts.		Complete urban reconstruction - \$6,400,000 Minor widening with no reconstruction - \$750,000.
	Revise / Change Collector Intersections	1H	Eliminate left turns at Carr St and Cottage St	Converting Carr St to right-in right out only might change access for Polaris south of SD 50.	Channelizing the approaches and adding SD 50 median treatments to prevent left-turns at Carr St and Cottage St will improve access control along SD 50, improving future safety and minimizing collector-related delays.  Restricting turns at these collector intersections will increase out-of-direction travel for some motorists.	Reducing delay for traffic reduces fuel consumption and improves air quality.	\$50,000
		1I	Signalize Carr St and Cottage St	Provides full access into / out of developments north and south of SD 50.	Collector signalization would be secondary priority coming after arterial signalization.  Spacing between Carr St and Dakota St is less than 1/4 mile. Would not meet SDDOT Access guidelines if both were signalized.  If combined with signalization at arterials, this concept would result in poor progression in SD 50 corridor.	Increased delay / idling on SD 50 could increase fuel consumption and auto emissions.	\$400,000
	Build Support Roads	1J	Extend Duke St and Carr St to provide circulation to industrial / commercial area between Stanford - Princeton south of SD 50.	Completed collector network results in more complete access for residents to businesses in this subarea.	A completed collector road network results in improved internal circulation. Traffic on arterials is then more focused on mobility, rather than land access.	Limited environmental aspects.	\$1,600,000. Some developer funding?
		1K	Construct a commercial backage road north of future commercial development area (north of SD 50).	Backage road results in enhanced access for future commercial area.  Improved business access can provide economic benefits to busines and community.	Allows traffic to access commercial developments from arterial intersections. Would complement SD 50 arterial signal concepts.  Backage concept results in sufficient setback from SD 50 for efficient access control. More limited turning / queuing conflicts than a frontage concept would provide here.  If signal is provided at Dakota St, east terminus of backage road would be a new north leg of Dakota St at SD 50. If there is no signal at Dakota St, east terminus could be at University St.	Limited environmental aspects.	\$5,000,000. Some developer funding?

Issue / Area of Concern	Alternative Focus Element	Alt ID	Project Alternatives	Evaluation by Perspective			Draft Planning-Level Construction Cost Estimate
				Social	Engineering	Environmental	
On-Street Parking Conflicts between USD and Neighborhood Residents Near South Campus.	No Action	2A	Maintain current USD / City parking levels and policies in and around south campus.	Neighborhoods adjacent to USD campus will continue to have on-street parking at effective capacity when classes are in session.	<p>Estimated current USD-related demand for on-street parking in neighborhoods adjacent to south campus is 350 vehicles.</p> <p>Campus lots south of Cherry St currently have approximately 1,100 permit parking spots.</p> <p>On-campus lots south of Cherry are currently at "effective capacity" - over 85% spots utilized.</p> <p><b>Figure 11</b> shows estimates of USD-related on-street parking demand by sector.</p>		None.
	Modify Off-Street Parking at USD	2B	Add More Off-Street Parking to South Campus	<p>Consistent with <i>USD Campus Master Plan</i> . "Vehicle Circulation and Parking" section discusses adding perimeter parking lots as property is acquired.</p> <p>USD parking permits currently cost \$120 per year.</p>	<p>To meet estimated on-street south campus demand, an additional 350 off-street stalls would need to be added on south side of campus.</p> <p><b>Figure 11</b> shows on-street parking demand by sector. The selection of locations for new off-street parking lots could be loosely planned based on observed demand by sector.</p> <p>Adding 350 off-street parking spots would be an approximate 32% increase in south campus parking.</p> <p>Simply adding permit parking will likely not address all USD on-street usage in neighborhood. On-street parking is free; USD permits cost money.</p>	Impervious surface parking lots cause additional water runoff affecting water quality and minor increased potential for flooding.	Surface Lot Cost = \$1,750,000 Parking Garage Cost = \$8,750,000
				2C	Change parking policies / pricing on campus to better utilize available parking near DakotaDome.	<p>Consistent with USD Campus Master Plan.</p> <p>From USD Campus Plan - Price remote lots at a lower cost than centrally-located lots.</p>	<p>The University is solely responsible for on-campus parking policies.</p> <p>Similar to the "Add More Off-Street Parking to South Campus" alternative (above), simply reducing the price of north Campus lots will likely not address all USD on-street usage in neighborhood, as on-street parking is free.</p>
	On-Street Parking Restrictions	2D	Incorporate On-Street Parking Permit System for Residents.	<p>Eliminating on-street parking requires some additional time walking from more remote lots for USD folks currently parking on-street.</p> <p><b>Figure 12</b> shows that the walking distance to most academic buildings from DakotaDome Lots (Lot #20) is greater than 5 minutes.</p> <p>Resident parking permits would limit the ability for residents to have visitors.</p> <p>New annual cost for neighborhood residents (approximatley \$10 to \$30 per year).</p>	<p>With no USD student / staff demand in neighborhood streets, there would be more than enough on-street parking available for residential demand .</p>	Less time spent circulating looking for a parking spot reduces energy consumption, reduces emissions.	Limited capital cost (Signage). Administrative costs, annual permit sticker production costs, and enforcement costs - self-funding through fees (permit and enforcement).  \$10-\$30/Year for Permit
				2E	Eliminate On-Street Parking in USD-Area Neighborhoods While Classes are in Session.		<p>In addition to restricting USD-related parking, this policy would also restrict neighborhood residents from parking on-street near their homes during the day. Likely viewed as a negative by many neighborhood residents.</p> <p>Implemented for several hours during classes (potentially 8 AM to 3 PM during the week).</p> <p>Parking would need to shift to on-campus lots for USD commuters or in driveways / alley garages for residents during weekdays.</p>
	Provide Shuttle Service to DakotaDome Lots	2F	Run shuttle bus from Dakota Dome lots to provide improved access between under-utilized lots and south campus destinations.	<p>Improved transportation options for students and USD staff.</p> <p>Is it enough to encourage higher use of Dakota Dome commuter lots for parking?</p>	<p>Assumed route: DakotaDome to MUC and back along Rose (southbound), Cherry (westbound), Dakota (northbound) or approximately 0.85 miles.</p> <p>Assumed 6 minute headways between bus arrivals, with opportunity to add a stop at Coyote Village.</p> <p>Shuttle service will be more effective in concert with neighborhood parking restrictions (alt 2D or 2E).</p>	Perhaps neutral. New bus in operation (negative). Some reduced personal auto circulation when looking for a parking spot (positive).	\$100,000 / Annual Costs. Including bus lease and maintenance.

Issue / Area of Concern	Alternative Focus Element	Alt ID	Project Alternatives	Evaluation by Perspective			Draft Planning-Level Construction Cost Estimate
				Social	Engineering	Environmental	
Travel Delays / Safety at Main St - Center St - Court St Offset Intersection	No Action	3A	Maintain current Main - Center - Court St signalized intersection.		Through 2032 - LOS "C" operations (acceptable). Similar traffic - Similar operation results in similar crashes (Currently one of 5 highest frequency crash intersections). 1 injury crash in last 3 years - All other property damage only.		None.
	Change Intersection Treatment	3B	Remove traffic signal and add median along Main St to eliminate left-turns on all approaches.	Reduced vehicular access along Center, Main and Court St (negative perception by business owners?). Adds to out-of-direction travel for motorists that today make lefts.	Reduces east-west delay to zero. All intersection delay to north-south, but still acceptable (better than today). Crashes - Would be reduced (based on current types). Left-turns would be moved to another downtown intersections (acceptable?)	*See Note 1.	Less than \$100,000 in reconstruction / signing costs.
		3C	Convert intersection to 2-way stop control for Northbound and Southbound traffic. East-west traffic on Main St would not stop.		Through 2032 - LOS "B" operations (acceptable). Safety - Sight distance is concern - Need to see all approach and determine who has ROW. Safety - Would reduce Main Street rear-end crashes that occur due to signal change. Right angle crashes - Likely increase	Two-way stop eliminates delays for Main St, similar levels of delay for northbound and southbound traffic. Overall reduced fuel consumption and reduced emissions.	Limited cost - signal removal and new signs.
		3D	Convert intersection to roundabout.	Significant property impacts. Main St - 60 feet wide and buildings on each side are only about 80 feet apart. Additional right-of-way needed - Results in acquisition of at least one building on the corner.	Stopped delay for ALL approaches falls to zero. Safety - All types observed - Typically lowered by roundabout.	*See Note 1.	Approximately \$750,000, not including property acquisition.
		3E	Convert Main St to 1-way operation through downtown, pair with Kidder St.	More circuitous flow in downtown. Businesses - Only one direction by storefront - Negative perception.	Reduce delays on all approaches at Center / Court / Main. Safety - Reduced right angle crashes.	*See Note 1.	Limited cost.
		3F	Convert Court St and Center St to one-ways oriented away from Main Street.	More circuitous flow in downtown. Businesses - Only one direction by storefront - Negative perception.	Reduce delays on all approaches at Center / Court / Main. Safety - Reduced right angle crashes.	*See Note 1.	Limited cost.

Issue / Area of Concern	Alternative Focus Element	Alt ID	Project Alternatives	Evaluation by Perspective			Draft Planning-Level Construction Cost Estimate
				Social	Engineering	Environmental	
Pedestrian - Auto Conflicts along Cherry St at USD Campus	No Action	4A	Maintain current Cherry St treatment of pedestrian crossings and vehicle flow through USD campus.	Does not address safety/operations issues as pedestrian and auto volumes grow.	<p>Observations - 65% of hourly pedestrian crossings are in the 15-minutes before classes start.</p> <p>Rose Ct, University St and east campus pedestrian crossing of Cherry St - Combined peak hour pedestrian crossings - 650.</p> <p>Pedestrian demand - Forecasted to increase as new residence halls added north of Cherry St and all food service moved south of Cherry St.</p> <p>Vehicle queues - Longest were 8 to 9 vehicles during peak conditions.</p> <p>Operations - Through 2032 LOS "C" or better at all signalized intersections.</p> <p>Sensitivity to ped volume change - if pedestrian crossing increase 100% - Crossings operate at LOS B/C during peak 15 minutes (Acceptable). Pedestrian level of service at Cherry St crossings - 2012: LOS B. Through 2032: LOS B or C (Acceptable).</p>		None.
	Pedestrian System Improvements	4B	Pedestrian Overpass over Cherry St.	ROW impacts: Substantial including building acquisitions. Can 2nd floor connection be provided into either MUC or Patterson Hall? If yes, could be positive.	<p>Pedestrian demand is dispersed to 3 or 4 crossings of Cherry St. A single pedestrian overpass will not address all of the conflicts.</p> <p>Pedestrians won't use overpass if it is more direct or convenient to cross the street at grade.</p>	Visual impacts?	Approximately \$1,500,000.
		4C	Add Quality Streetscaping, Street Furniture and Fencing to Focus Pedestrian Activity to Designated Crosswalks.	<p>Aesthetics and reducing pedestrian conflicts - Consistent with and complement USD Campus Master Plan. Cannot look like a fence.</p> <p>University is currently cutting back on landscaping maintenance budget.</p>	<p>Safety - Eliminating/reducing mid-block crossing reduces ped-auto crash potential. Mid-block crossing volume is low relative to intersections.</p> <p>Conflicts with snow storage?</p> <p>Limited space for berm/wall combinations.</p>	Street plantings can be incorporated in to small-scale storm water detention areas in corridor: environmental benefit.	Can vary, but likely \$250,000 or less. Partial funding from USD.
	Signal System Improvements	4D	Adjust Pedestrian Actuation Policy to Reduce Cherry Street Delay/Queues - Increase Time between Ped Button Push and Ped Walk	<p>Will increase "jay walking". More "jay walking" can lead to more ped-auto conflicts.</p> <p>University views current pedestrian signal control as traffic calming in Cherry Street corridor.</p>	<p>Vehicle operations on Cherry St improve/fewer vehicles in queues.</p> <p>Vehicle improvement - Minor as operations are very good.</p> <p>Vehicle/pedestrian crashes increase.</p>	Less delay/fewer stops on Cherry Street - Reduces energy consumption and emissions.	Analysis and implementation - likely \$50,000 or less.

Issue / Area of Concern	Alternative Focus Element	Alt ID	Project Alternatives	Evaluation by Perspective			Draft Planning-Level Construction Cost Estimate
				Social	Engineering	Environmental	
Lack of Area-wide Bicycle and Pedestrian Connectivity.	No Action	5A	Maintain current non-motorized system as is.	Does not address public input received - Need more complete bike/ped system.	Significant gaps will remain in the bicycle and pedestrian network without expanding the system.	No change	None.
	Off-Street Multiuse Trail Improvements	5B	Extend Riverfront Trail east to Crawford Rd.	Need to acquire ROW, but increment is small.	North side or south side of Burbank St? If South - needs to be south of RR.	Adding non-motorized system connectivity - Promotes use of non-auto travel. Other than in and around the USD campus, year round (Winter) walking / biking trips are focused more on recreational use.	\$200,000 without right-of-way acquisition.
		5C	Provide new off-street connections to Vermillion River Trail on west side of city.	Possibly limited property impacts. Right-of-way available for bluff connection on west side near Stanford St / West St.	Grades along bluff (approximately 8%) might require some switchbacks.		\$25,000
		5D	Provide new off-street trail along SD 50 between Princeton St and Crawford Rd.	This part of Vermillion is targeted for future commercial and industrial growth. Trail would provide non-motorized access to shopping / jobs. Right-of-way along SD 50 is 200'. Current trail appears to be located in easement outside of SDDOT right-of-way.	0.5 miles of trail already built east and west of Princeton St. Limited direct connection to residential development, but this trail would be an east-west segment connecting the regional non-motorized system.		\$360,000
		5E	Extend Crawford Rd Trail North To SD 50. On-Street through Existing Built Residential - Off-street In Other Areas	If propose off-street south of Main, need to acquire ROW (Not likely warranted).	North of Main, Trail would likely get built as residential developments are constructed.		Less than \$10,000
		5F	Provide Clark St Trail as roadway improvements are made when neighborhoods are developed.	Provides a key non-motorized connection, including Prentiss Park and the university from new east side neighborhoods.	East of Anderson, Trail would likely get built as residential developments are constructed.		\$200,000
		5G	Provide Stanford St trail between Cherry and SD 50	Provides west side non-motorized connection between employment areas, residential and future commercial opportunities.	Connects to trail currently being built along Stanford St for Main to Cherry reconstruction project.		\$125,000
		On-Street Bike Routes	5H	* Plum St from Main St to SD 50	Use existing pavement to designate corridors for bikes / autos to share.		Routes are relatively low volume, continuous streets with flat grades. Bikes would use existing travel lanes. Main St route through downtown has diagonal parking. If selected, City might consider reverse diagonal parking for safety reasons.
	5I		* Clark St from Stanford St to Plum St				
	5J		* Main Street from Stanford St to Crawford Rd.				
	5K		* High St / Cottage St corridor from SD 50 to Main St.				
	5L		* Norbeck St / Crestview St corridor from Cherry St to Crawford Rd.				
	Sidewalk Improvements	5M	Add sidewalks in areas without service and pedestrian demand. - North Dakota St. - North University St - Nort Plum St.	Provides enhanced access for households with limited auto-access.  There are economic benefits of increasing overall accessibility to businesses.	This year and / or next, City is anticipated to build sidewalks in key corridors of Stanford from Main to Cherry and Princeton north of Cherry.	\$90,000	

Issue / Area of Concern	Alternative Focus Element	Alt ID	Project Alternatives	Evaluation by Perspective			Draft Planning-Level Construction Cost Estimate
				Social	Engineering	Environmental	
Hospital Parking / Circulation / Conflicts with High School Traffic.	No Action.	6A	No changes adjacent to hospital.	None.	Current 4-Way stop configuration is forecasted to operate at LOS "C" in 2032 (Acceptable). Hospital staff shift change between 2:00 PM and 3:00 PM. Gradual change with little exiting congestion. VHS lets out between 3:23 and 3:29 PM every day. Little / no overlap between VHS and Sanford staff.	Limited environmental aspects.	None.
	Intersection Changes	6B	Signalize Plum / Main Intersection.	Minimal social aspects of traffic signal.	Improves LOS to "B" through 2032. Confirm meets warrant before implementation. Investment warranted based on LOS "C" with stop control?	*See Note 1.	\$200,000
	Pedestrian Access Changes	6C	Add pedestrian cross-walk to Plum St from Visitor parking lot.	Signed and marked cross-walk would provide enhanced safety to visitors parking west of Plum St.	Main Visitor parking lot is west of Plum St. There was one reported pedestrian-vehicle crash in 2009 near Hospital - crash reported at Main / Plum intersection. No crashes at this crossing recorded. City concerns with parking removal required for mid-block pedestrian crossing.	Limited environmental aspects with cross-walk.	Less than \$10,000, including ADA curb cuts, signing and striping.
Ensure Contiguous Networks in Future Eastern Growth Area	No Action	7A	Allow neighborhood to develop without providing collector street in / out of growth area.	Unplanned access into neighborhood can increase travel times for travelers and can lead to undesirably high traffic volumes on local streets.	Lack of collector streets in future neighborhoods can lead to poor neighborhood mobility and to increased level of local street and driveway access onto adjacent arterial streets.		None.
	Subarea Circulation	7B	Build Norbeck St as a continuous corridor from Main St to Cherry St.	Right-of-Way is preserved for Norbeck St west of Crawford for Neighborhood Collectors.	2-lane section will provide sufficient capacity neighborhood circulation through 2032.		\$1,400,000. Some developer funding?
		7C	Extend Clark St from its current terminus as a continuous corridor into residential growth areas east of Crawford Rd.	Right-of-Way is preserved for Clark St west of Crawford for Neighborhood Collectors. Acquire necessary right-of-way for collectors east of Crawford during development approval process.	As land is assembled for development east of Crawford Rd, ensure that Clark St alignment is maintained to allow for continuous collector corridor on both sides of Crawford.	Provide trail with Clark St (Alternative 8B) to provide sufficient non-motorized connectivity into established portions of Vermillion.	\$3,000,000. Some developer funding?
		7D	Create North-South Collector ("Muirfield St"?) to connect with Main St / Muirfield Ct intersection.	Acquire necessary right-of-way for collectors east of Crawford during development approval process.	As land is assembled for development east of Crawford Rd, ensure that north-south collector alignment is maintained to allow for circulation to Main St.		\$1,000,000. Some developer funding?
	Future Intersection Control	7E	Install traffic signal at Crawford Rd - Cherry St by 2032.	Provides improved access onto Cherry St from neighborhoods to the south and businesses to the north.	Signal at Crawford Rd - Cherry St will likely be warranted by 2032 based on planning evaluation. Signal - Results in lower angle crashes. Signal - Result in higher rear-end crashes. Provide active advanced warning sign for westbound traffic entering Vermillion from SD 50.	*See Note 1.	\$200,000
		7F	Build roundabout at the Crawford Rd - Cherry St intersection.	There are currently no roundabouts in Vermillion. Roundabout on 4-lane arterial roadway might not be the best place to introduce roundabouts to Vermillion residents.	Roundabout - Generally lower crash rate than signal or stop control (vehicles slow down). Urban roundabout - Acceptable operations through 2032.	*See Note 1.	\$750,000

Issue / Area of Concern	Alternative Focus Element	Alt ID	Project Alternatives	Evaluation by Perspective			Draft Planning-Level Construction Cost Estimate	
				Social	Engineering	Environmental		
Ensure Contiguous Networks in Future Western Growth Area	No Action	8A	Allow neighborhood to develop without providing collector street in / out of growth area.	Unplanned access into neighborhood can increase travel times for travelers and can lead to undesirably high traffic volumes on local streets.	Lack of collector streets in future neighborhoods can lead to poor neighborhood mobility and to increased level of local street and driveway access onto adjacent arterial streets.		None.	
	Subarea Circulation Improvements	8B	Extend Clark St into residential growth areas west of Stanford St.	Acquire necessary right-of-way for collectors west of Stanford St during development approval process.	As land is assembled for development west of Stanford St, ensure that Clark St alignment is maintained to allow for continuous collector corridor on both sides of Stanford St.  2-lane collector roads will provide sufficient capacity through 2032.	Provide sidewalks in neighborhood for connectivity to future sidewalks / trails in Stanford St corridor.	\$1,000,000. Some developer funding?	
		8C	Provide backage road to future commercial development west of Stanford.		Provides development opportunities on BOTH side of road (frontage road - only one side).  Removes property access from SD 50 (eliminates one function).  Increases setback from SD 50 intersection, improves operations and safety and provides more queuing.	Provide sidewalks for connections between neighborhood and commercial area.	\$750,000. Some developer funding?	
		8D	Create North-South collector to connect with Cherry St.		New collector road would be southbound stop controlled - Main St would continue to be a free movement.	Provide sidewalks in neighborhood for connectivity to future sidewalks / trails in Stanford St corridor.	\$800,000. Some developer funding?	
		8E	Realign Kennedy St so that it intersects with the James St - Cherry St intersection. Make intersection 2-way stop controlled.		New house constructed south of James-St Cherry St intersection. May require acquisition for this alternative to be implemented.	Realigning Kennedy St to meet with James St at Cherry will eliminate an offset intersection in future. This will provide a safety benefit compared to doing nothing.	\$100,000. Not including right-of-way acquisition.	
	Revise / Change Adjacent Intersections	8F	Add Northbound left turn lane at Stanford St - Cherry St intersection.	Limit social aspects with intersection changes.	Currently stop controlled for northbound and southbound traffic.  By 2032 - Northbound and southbound approaches LOS "C". Added NB left turn lane - Slight delay reduction - Still LOS "C".  Will be adequate pavement (Stanford) for left turn lane with 2012 widening project.	*See Note 1.	Minimal cost - restripe pavement.	
		8G	Signalize Stanford St - Cherry St intersection.	Limit social aspects with intersection changes.	Long term might be needed, depending on adjacent development. 2032 LOS - "B" without signal.  Assess signal warrant before action.		\$200,000	
	Future Congestion at Clark St and Dakota St	No Action.	9A	Maintain 4-way stop control at intersection.	Limited.	Peak traffic highly influenced by USD class schedule.  With out improvements, current 4-way stop will operate at LOS "D" in 2032 PM peak.	Increased delays and congestion will lead to some increase fuel consumption and emissions during peak periods.	None.
		Revise Intersection Control.	9B	Convert intersection to traffic signal controlled.	Minimal social aspects of traffic signal.	Traffic signal installation would improve operations to LOS "B" in 2032 PM peak.		\$200,000
9C			Convert intersection to a single-lane roundabout.	Standard urban roundabout - Minor right-of-way impact - Less than 5' strip at intersection. No building impacts.	Diameter - 100' with travel lanes, 120' with sidewalks.  Roundabout provides LOS "A" through 2032.  Some conflict with driver expectations as traffic signals are present 4 blocks north (Cherry / Dakota) and 4 blocks south (Cherry / Main)? City prefers consistent intersection treatment (signals) through Dakota St corridor.	*See Note 1.	\$750,000	

Issue / Area of Concern	Alternative Focus Element	Alt ID	Project Alternatives	Evaluation by Perspective			Draft Planning-Level Construction Cost Estimate
				Social	Engineering	Environmental	
Future Congestion at Clark St and Pine St	No Action.	10A	Maintain as a 4-way stop intersection.	Poor operations will negatively impact access, increase crashes, increase travel time.	Intersection highly influenced by traffic to / from University. Very high percentage of daily traffic occurs during hour after classes dismiss.  By 2032, forecasted to operate at LOS "F".	Increased delays and congestion will lead to some increase fuel consumption and emissions during peak periods.	None.
	Revise Intersection Control.	10B	Add left-turn lanes on all approaches by removing on-street parking adjacent to intersection and restriping.	Turn lanes would require removing on-street parking for about 100' on each approach to intersection.	Adding left-turn lanes only provides LOS "D" in 2032 PM peak hour.  Does not meet goal through 2032, but could provide acceptable mid-term (2022) solution.	*See Note 1.	Less than \$10,000.
		10C	Convert intersection to traffic signal controlled.	Minimal social aspects of traffic signal.	Provides LOS "B" operations (Acceptable).		\$200,000
		10D	Convert intersection to single lane roundabout.	Standard roundabout - Property acquisition.  Compact urban roundabout would require minor or no property acquisition (at most, about a 5' arc on corners).  Approaches to roundabout would require some on-street parking removal.	Compact urban roundabout with 80-90' diameter (100-110' diameter including sidewalks) would suffice.  Roundabout provides LOS "A" through 2032.  This size roundabout accommodates single-unit trucks (not semis). Clark and Pine are NOT truck routes.		\$250,000
Safety at Burbank Rd Curve east of the 467th Ave / Railroad Crossing	No Action.	11A	Make no safety improvements at Burbank Rd Curve.		Three injury crashes on this curve in three years.  Currently has a curve warning sign.		None.
	Revise Warning Signing.	11B	Improve advanced warning signing by adding Chevron signs on curve.	Potential safety improvement for drivers.	Chevron signs on curves and/or sequential flashing beacons can result in an approximate 40% crash reduction (source: FHWA).	Limited environmental aspects.	Limited costs for additional chevron signage. If crashes persist, a flashing advanced warning sign would cost less than \$10,000.
Safety at Chestnut Rd at Burbank Rd / University St Intersection	No Action.	12A	Make no safety improvements at Chestnut Rd / Burbank Rd / University St Intersection.	Residence at intersection has been struck by vehicles.	2 of 3 crashes - speed related.  Improved "active" warning could increase driver awareness.  City has recently added speed limit signs, red flags and reflective tape on approaches.		None.
	Revise Warning Signing / Rumble Strips.	12B	Add advanced warning signing and add rumble strips.	Potential to benefit safety of drivers and adjacent property owners.	City has recently added speed limit signs, red flags and reflective tape on approaches.	Limited environmental aspects.	Limited costs for additional signage / rumble strips.

\*Note 1: The environmental benefits of reduced delays and congestion include reduced fuel consumption and improved emissions.

## APPENDIX D: WHEN IS A TRAFFIC SIGNAL WARRANTED?

There are proposals to implement traffic signals in several locations as a part of this Plan. Traffic signals are often utilized to control traffic at higher volume intersections, and the traffic analysis has found that they would provide benefits at several Vermillion intersections by 2032. Prior to installing a traffic signal a signal warrant study must be completed to determine if traffic signal control would improve the safety and/or operations for the intersection. A signal warrant study evaluates traffic, pedestrians, safety, and physical characteristics of the intersection with respect to following categories of traffic signal warrants:

1. Eight-Hour Vehicular Volume
2. Four- Hour Vehicular Volume
3. Peak Hour Vehicular Volume
4. Pedestrian Volume
5. School Crossing
6. Coordinated Signal System
7. Crash Experience
8. Roadway Network
9. Intersection Near a Railroad Grade Crossing

In general, the various types of signal warrants are summarized in the following bullets:

- The traffic volume warrants consider a combination of traffic volumes for the major street and the highest volume side street volume. The threshold traffic volumes are based on the number of traffic lanes serving traffic on both the major and side streets. In some cases, such as the Peak Hour Warrant the threshold traffic volumes are based on nomograph diagrams. In other cases it is based on fixed volume of traffic, such as the Eight-Hour Warrant.
- The Pedestrian signal warrant considers the volume of pedestrians and vehicles at an intersection. Minimum threshold volumes for both pedestrians and vehicles must be met before considering installation of a traffic signal based on this warrant. The School Crossing warrant also has minimum pedestrian volume requirements, but it also considers the number of adequate gaps in vehicle traffic that pedestrians can utilize to safely cross the major roadway. Before installing a traffic signal based on pedestrian volumes it is important to consider other measures such as crossing guards.
- A traffic signal can provide improved safety for certain types of crashes such as angle crashes, but could lead to more crashes for the major street traffic in the form of rear end crashes. A documented crash history must be compiled and other measures considered before installing a traffic signal based on the Crash warrant.
- The location of the intersection, where a traffic signal is being considered, with respect to other signalized intersections, railroad crossings and the functional classification of the roadways can sometimes be used to warrant a traffic signal.

A full engineering study should be done any time a traffic signal is being considered so that all factors can be evaluated. The engineering study should use local agency preferences when evaluating traffic volume warrants. Additional information on all of these warrants can be found in the *Manual on Uniform Traffic Control Devices (MUTCD)*, 2009 Edition.