Sisters
Transportation System Plan

Technical Appendix

Appendix

Appendix A: Public Involvement Summary
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Appendix A: Public Involvement Summary

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To:	Chris Maciejewski, DKS
From:	Christine Egan, JLA Public Involvement
Re:	Appendix of Public Involvement Activities for the City of Sisters TSP Update Project
Date:	March 17, 2009

Enclosed are summary reports for each of the three areas of public involvement implemented as part of the City of Sisters' TSP Update process. These three areas are:

1. Ten interviews with Potentially Affected Individuals
2. Four public meetings (forums, workshops and open houses)
3. Convening and facilitating five meetings with a Project Advisory Committee

PAI Interviews

- Contact information for the ten people interviewed. List provided by Eileen Stein, City Manager for the City of Sisters
- Summary of one-on-one interviews conducted February 6 and 7, 2008. Report includes overall themes from all ten interviews, and summaries for each stakeholder – identified by interest or concern.

Four Public Meetings

- Community Open House #1, December 5, 2007. Includes a summary of public comment provided at information stations at the event and by comment card. Demographic profile of event participants summarized from event sign in sheet and aerial map inviting participants to identify their place of residence and employment. Immediately following the event, Eileen Stein took event sign-in sheets to update project stakeholder list.
- Community Workshop #2, April 29, 2008. Alta Planning and Design team organized and hosted this workshop. Packet includes an event summary and sign in sheets.
- Community Forum #3, October 29, 2008. Includes an event summary, participant handout, comment form, sign in sheets and original completed comment forms. Event summary includes demographic profile of event participants, summary of public comment provided at information stations and in comment forms.

Project Advisory Committee

- Committee and Project Team rosters and contact information
- Committee Charter and Protocols, approved March 19, 2008
- Meeting summaries for meetings #1, #2, #3, #4 and #5.

CITY OF SISTERS

Transportation System Plan Update

Community Open House #1
December 5, 2007

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City of Sisters TSP Update
Event Summary

December 18, 2007

CITY OF SISTERS

Event Name:	Community Open House #1
Event Date:	Wednesday, December 5, 2007 6:00 – 9:00 PM
Location:	Sisters Middle School
Community Attendance:	38 people

The purpose of the first public meeting for the City of Sisters TSP Update was to review a variety of solution concepts to address congestion and safety concerns on Highway 20 and to obtain public feedback regarding the community's preferences on the transportation plan goals and objectives and solution concepts. The meeting was staffed by members of the consulting team (DKS, Alta and JLA) and staff members with the City of Sisters, including Mayor Brad Boyd.

The event opened with a welcome and project introduction by Mayor Boyd, presentation by consultant team manager, and then an open house format to encourage community members to visit and provide input at six information stations staffed by members of the project team.

Attachments:

- Station Flipchart Summaries (complete)
- "Where Do You Live" Map
- TSP Survey Summary (Comment Cards)
- Sisters Summary (verbatim comments from Comment Cards)
- List of Community Participants

Event Flow:

Thirty eight participants were welcomed at a sign-in table by project staff and asked to identify where they lived and worked by adding red and blue push pins on a large aerial map (Appendix B). Those results are summarized below in "Demographic Profile." In addition, project staff encouraged participants to consider taking a Citizen Advisory Committee application and visit each of the project stations and displays before the event formally started.

City of Sisters Mayor Boyd welcomed participants and discussed previous TSP planning processes and outcomes, the current planning effort and goals, and relevant issues and opportunities. Following the Mayor's introduction, Carl Springer, DKS project manager, provided a Power Point presentation outlining TSP goals from 2001 and the updated goals for the current process. He also presented visual comparisons and maps illustrating couplets, road widening and bypass alternatives, and a variety of design options to improve pedestrian and bike safety and access and

traffic flow. During his presentation, Carl fielded a number of questions and comments from the audience regarding ODOT's role and responsibility in the current process, outcomes from previous TSP planning efforts, and the status of other recommended improvements in the 2001 TSP.

Following Carl's presentation, participants were asked move around the room and visit and provide input at each of the six information stations staffed by project staff. The informal setting allowed community participants to interact with project and city staff members in one-on-one conversations relating to each of the solution concepts and TSP goals. Below is a summary of participants' comments at the six stations.

Info Stations/ Flipchart Summary of Participant Comments:

(Complete summary in Appendix A)

1. **No build – Option of doing nothing to address the issues on Hwy 20:**
   - Current conditions are very undesirable
   - Allowing congestion in downtown may give negative perception of city
   - Even if nothing is done to the roadway, some other design features are desired

2. **Widen –Option of widening Hwy 20 to accommodate increased traffic:**
   - The low cost of widening alternative makes them more attractive, especially as a short-term solution while waiting for other options to materialize.
   - Pedestrian mobility is the key to economic viability and may be best accommodated by adding some pedestrian friendly features to the cross-section.
   - A center turn lane with pedestrian refuges in median would be a good solution.
   - In the ideal situation, there would be room for bike lanes
   - A narrow travel-way is desirable for various reasons
   - Increasing the traveled-way is not desirable for various reason:

3. **Couplet –Option of directing traffic on a combination of Hood, Main and/or Cascade:**
   - Parking impacts, i.e. conversion of angle to parallel parking
   - Could promote development at the ends of the couplet where traffic volumes are highest instead of in the middle of the couplet
   - A couplet is a better option than a bypass for downtown businesses
   - Consider roundabouts at the east end of a couplet to see if a solution at Cascade/Locust is possible (instead of a realignment of Hwy 20)
   - Possibly convert Hood Street into a Bicycle Boulevard as a parallel facility to a couplet
   - Agreement that two-lane streets in a couplet are better for pedestrian mobility than one 4 or 5-lane highway

4. **Alternate route/Bypass - Option to create alternate route or bypass around the City:**
   <u>Alternate Route</u>
   - One use could be to require thru trucks to use the alternate route.
   - The Barclay-Locust route may negatively impact the elementary school on Locust.
   - Roundabouts should be utilized at intersections where alternate route connects to main route in order to provide easy merge and diverge movements.
   - Alternate routes potentially have negative impacts to nearby homes.
   - A potential concern of an alternate route through Adams is that it would extend through forest service property.

Bypass

- There are positive results of a bypass: Relieve congestion by moving trucks and thru traffic out town, and improve safety of HWY 20/HWY 126 intersection
- There are negative results: Cascade Avenue businesses will lose customers and may have negative impacts to nearby homes.
- Even with the bypass, it would be out of direction and may not be used.

5. **Other – Other options not yet considered:**
   - Stop lights are needed at Cascade/Locust and Cascade/Pine intersections
   - Crossing guards would help coordinate pedestrian crossing at 3 or 4 key downtown intersections so that traffic doesn't stop on Cascade.
   - If there is a bypass, it should be at least one mile outside of city limits

6. **TSP Goals – Review 2001 TSP goals as compared to new goals for TSP Update 2008:**

   The following new goals should be added
   - Improving connections with bike trails and existing community trails
   - Transportation system should support city's vision of being a destination versus a way point
   - Solutions should manage long-term traffic demand forecasts (i.e. for 20-year horizon)

   Display Board

   The list of goals and corresponding number of dots (representing what people felt to be most important) are as follows:

Goal	Number of Dots
Livability	15
Safety	14
Economic vitality	9
Sustainability	8
Provide travel choices	5
Quality design	5
Reliability and mobility	1
Efficient and innovative funding	1
Compatibility	1

Demographic Profile of Community Participants:

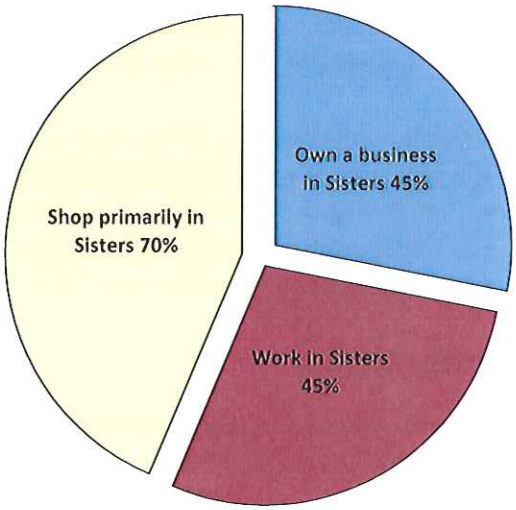
Thirty-eight (38) participants signed in at the welcome table. Of these, 16 indicated on the **SIGN IN SHEET** that they owned a business in and/or around the City of Sisters. More than 7 participants took a citizen advisory committee application, with a couple completing the applications at the event. Completed applications were given to Eileen with the City of Sisters.

On the **AERIAL MAP,** 18 people identified their residences as being outside the City of Sisters, and 12 within the city. Seventeen people identified their place of work as within the City, with 12 of those 17 working or owning a business directly on Highway 20.

Participants also were encouraged to complete **COMMENT CARDS**. Of the thirty-eight community members who attended the meeting, twenty-three (23) participants completed the three-page card. Out of those people, all indicated that they were year round residents of the City of Sisters.

Forty-four (44%) percent of respondents indicated that they currently lived within city limits with another 48% indicating that they lived more than 1 mile outside of the City.

Of the 23 respondents, 45% indicated that they owned a businesses in Sisters, 45% indicated that they worked in Sisters, and 70% percent noted that they shopped primarily in the city.

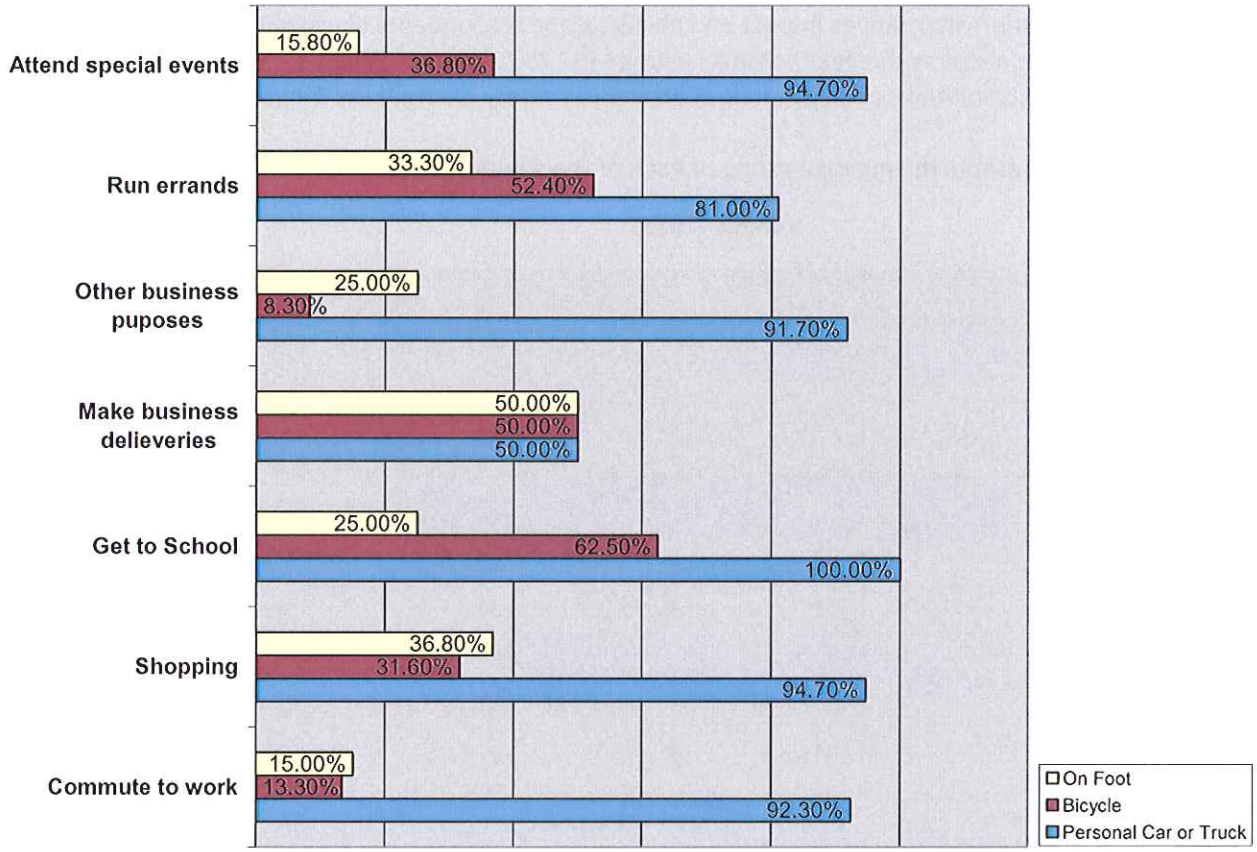


Comment Card Summary:

Participant Travel Habits and Primary Modes of Transportation

The comment card asked participants to provide basic information about their daily travel habits and methods of transportation within the City of Sisters. Figure 1.2 highlights a summary of responses. The majority of respondents indicated that they used a personal car or truck to get to school, attend special events, shop in sisters, commute to work and for other business related purposes. Many participants (more than 33% in most cases) indicated that they preferred to use their bicycle for around town trips as well as for recreational purposes. Fifty percent (50%) of all respondents indicated that they preferred to travel by foot for business deliveries and 39% noted that they primarily walked to shopping destinations.

Figure 1.2: Primary Mode of Transportation and Travel Habits



HWY 20 Solution Concepts

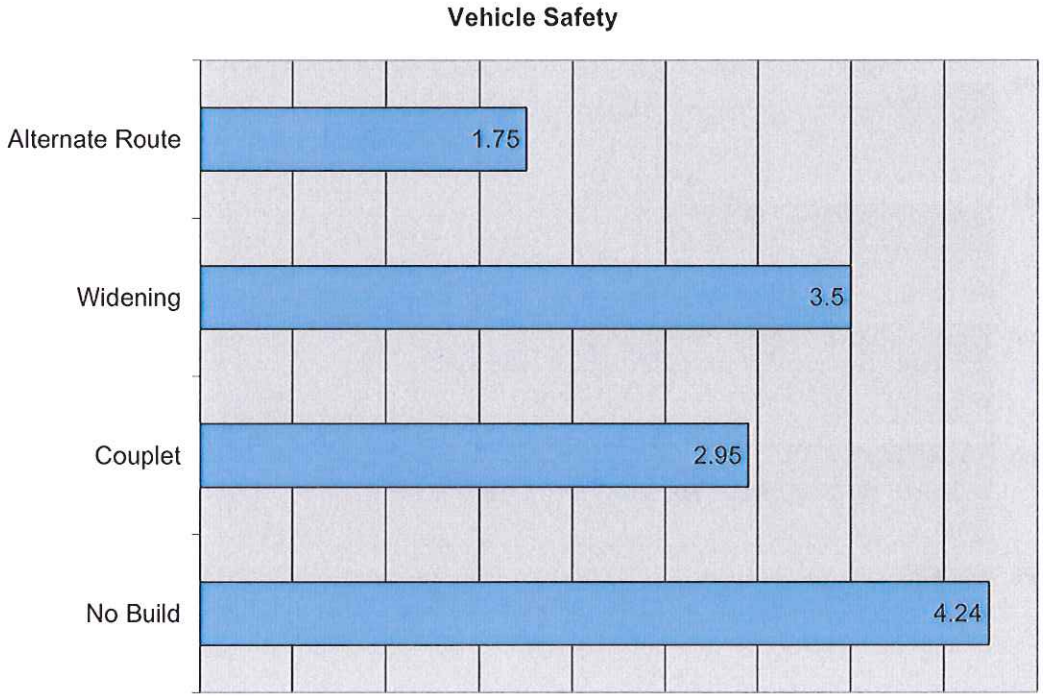
Participants were asked to rate each solution concept on a scale of 1 through 5 (1= best and 5= worst) according to how well each concept addressed a variety of transportation related topics. Topics included bike and pedestrian safety, intersections, truck traffic and livability. Participant responses are outlined below, indicating the rating average of each of the solution concepts.

Overall, the No Build solution alternative was consistently ranked by the majority of respondents as the worst solution concept. An Alternate Route concept was favored by many respondents, and was rated as the best concept on a variety of topics. The Couplet concept varied in terms of respondent preferences, ranking fairly high on several concepts, such as bike and pedestrian safety and traffic circulation, but ranking lower on topics such as livability and economic development. Widening was consistently ranked within the 3-5 range with higher marks on topics such as vehicle safety and traffic circulation. The figures below outline the average rating of each of the solution concepts according to each transportation topic.

Vehicle Safety

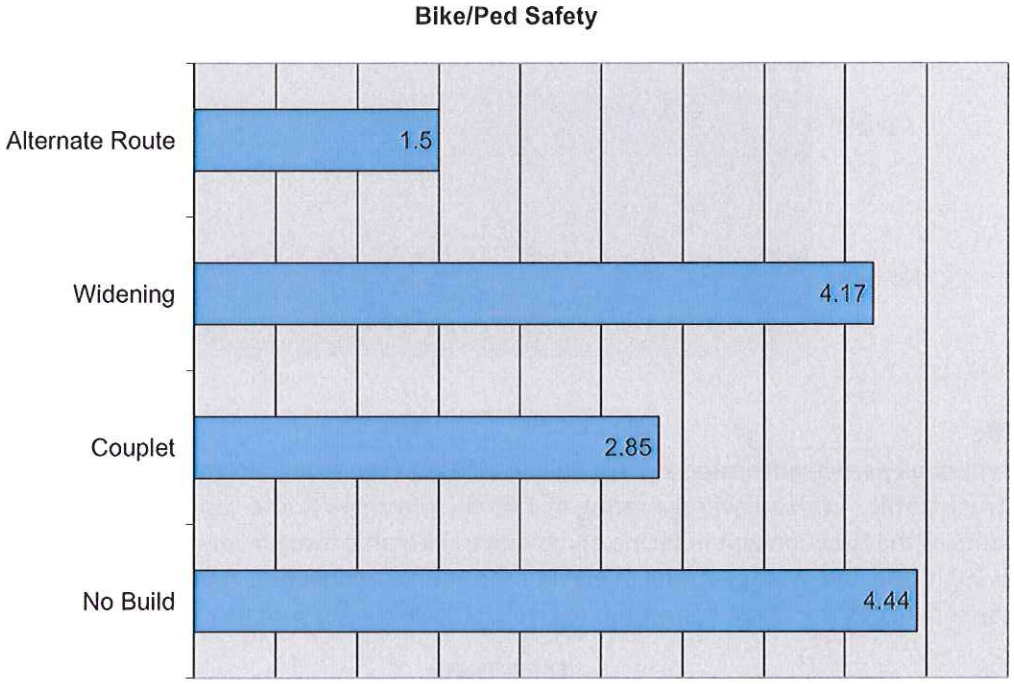
In terms of the solution alternatives impact on vehicle safety, respondents consistently rated the Alternative Route concept as the best possible solution (57.1% of all respondents). No Build was rated the worst in terms of this solutions ability to help solve vehicle safety issues in the City of Sisters.

The figure below presents the average rating of each of the solution concepts.



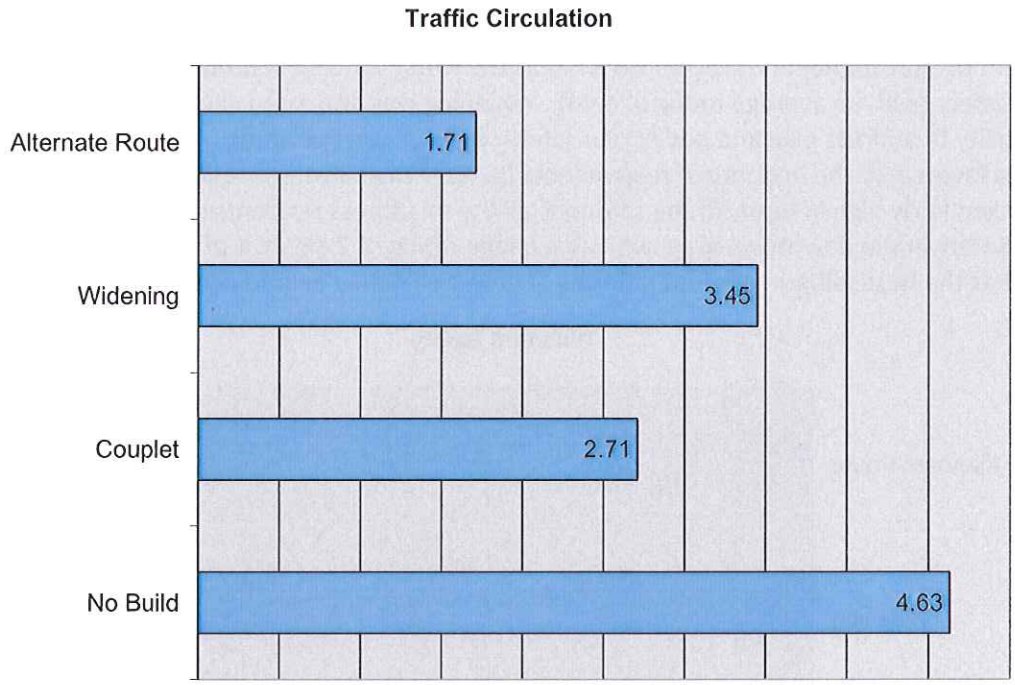
Bike/Ped Safety

The figure below highlights the average rating of each of the four transportation solution concepts. Sixty-three percent of all respondents selected No Build as the worst concept in terms of the impact to bike and pedestrian safety (with an average rating of 4.44). Widening was also rated very low in terms of the solutions ability to address bike and pedestrian safety (with an average rating of 4.17). An Alternate Route concept was favored by the majority of respondents (57%) with an average rating of 1.53. A Couplet concept ranked fairly high in terms of the solutions ability to address residents concerns about bike and pedestrian safety in the downtown area, with an average rating of 2.85 (26% of all respondents selected the Couplet as the best solution concept in terms of how well it may help to address this topic).



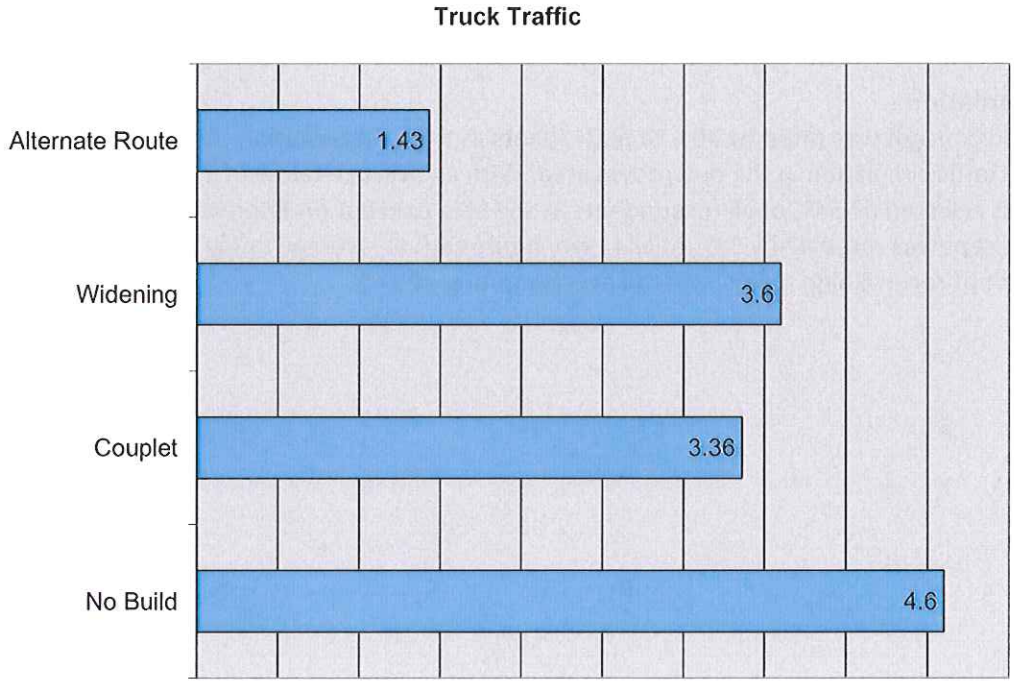
Traffic Circulation

The No Build concept was rated by 70% of participants as the worst solution concept in terms of the ability to address traffic circulation in the downtown area. With an average rating of 1.71 an Alternate Route concept was selected by 54% of all respondents as the best concept for improving traffic circulation. The Couplet concept was rated #2 by 33% of all respondents with an average rating of 2.71. A Widening concept did not receive high marks, with an average rating of 3.45.



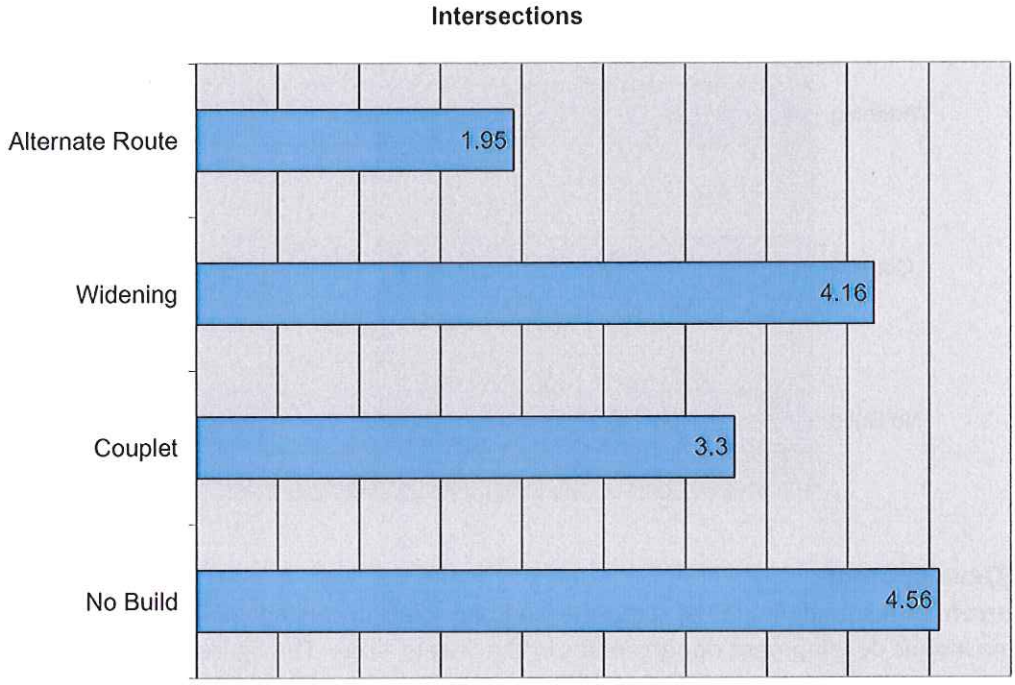
Truck Traffic

Eighty-percent of all participants rated the No Build concept as the worst alternative in terms of an ability to address truck traffic. With an average rating of 1.43 the Alternate Route concept was selected by 64% of all respondents as the best concept in terms of moving truck traffic away from the downtown area. The figure below highlights the average rating of each of the solution concepts. A Couplet concept was rated by 27.3% of respondents as the worst concept in regards to truck traffic, with an average rating of 3.36.



Intersections

Alternate route was rated the best solution alternative by 38% of respondents in terms of their impact on the city's intersections (average rating of 1.95). Sixty-three percent rated No Build as the worst concept, and 53% of all respondents rated Widening as a 4.16. The Couplet solution received an average rating of 3.30 in relation to intersection issues in the downtown Sister's area.

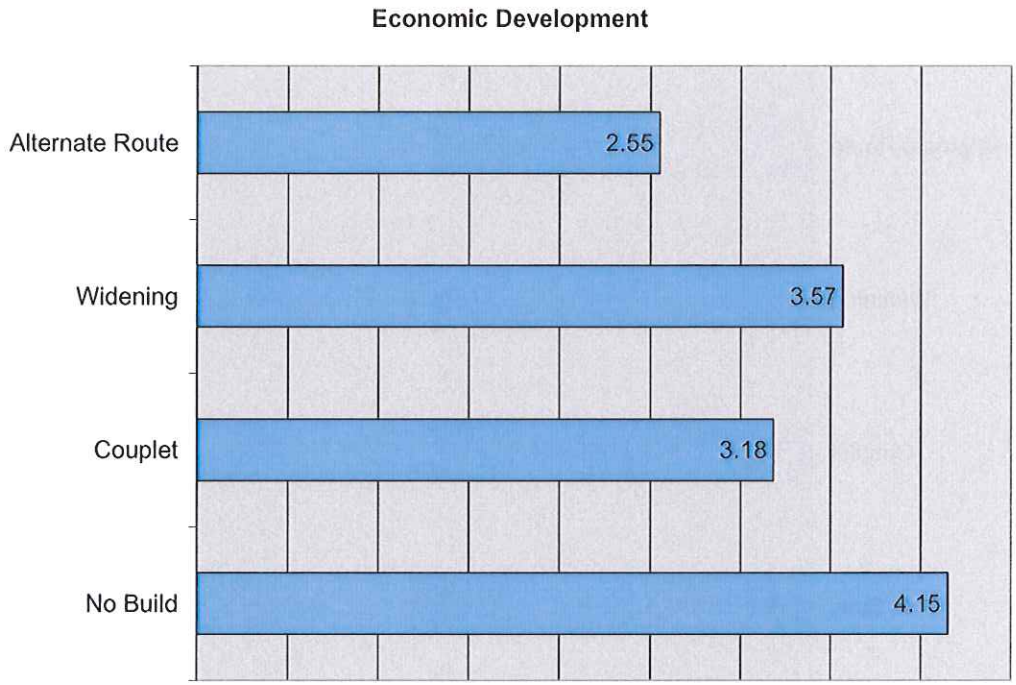


Livability

No Build was rated the worst in terms of addressing livability in Sisters (62% of total respondents), alternate route was rated the best concept by 55% of participants. Thirty-six (36%) of comment card respondents rated the Couplet concept as a 3.27 out of 5 (5 being the worst concept) it in terms of its impact on livability. With an average rating of 1.95, the Alternate Route alternative was ranked by 55% of respondents as the best solution for maintaining quality of life and livability in the Sister's area.

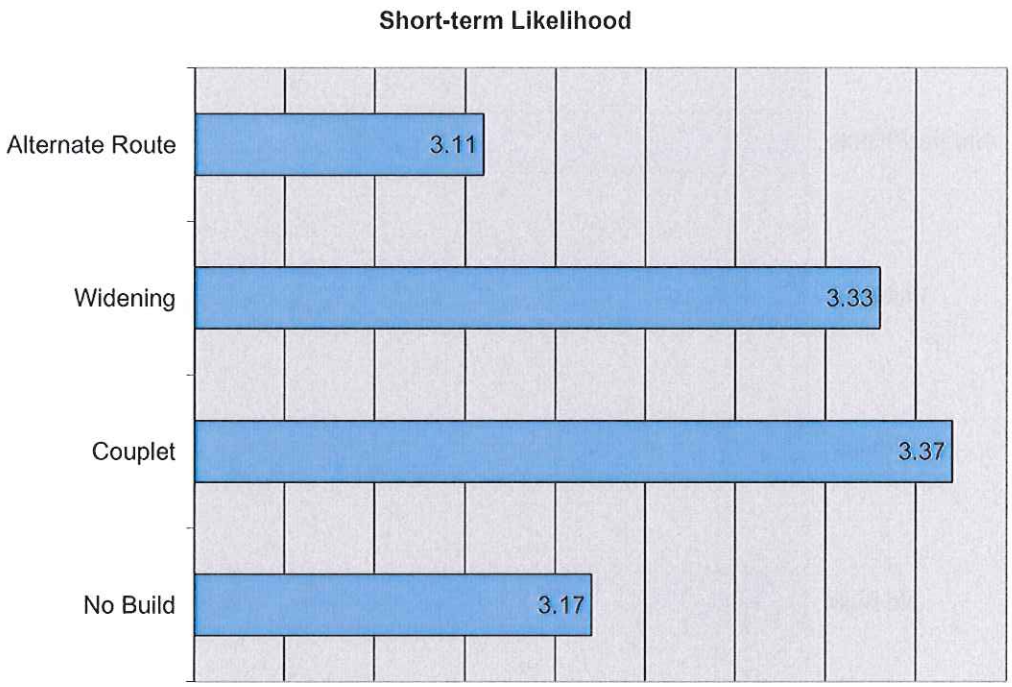
Economic Development

Fifty-five percent of respondents (52%) rated the No Build solution concept as the worst choice in terms of impacts to economic development opportunities in the Sisters' area. The figure below highlights the average rating of each of solution concepts. With an average rating of 3.18 the Couplet alternative was rated by 27% of respondents as the worst concept in terms of the impact to economic development in the downtown corridor. The Alternate Route concept received the greatest number of high-end votes, with the average rating of 2.55.



Short Term Likelihood

Participants were asked to rate each solution concept in terms of the short-term likelihood that the concept would be locally implemented. Responses to this question varied, but consistently hovered between 3 and 5. The figure below highlights the average rating of each solution alternative. Forty-Five percent (45%) of all respondents indicated that the No Build concept would be the most likely solution alternative to be pursued in the near future (with an average rating of 3.1). Thirty percent indicated that they felt the Alternate Route concept would be the most likely concept to be pursued (with an average rating of 3.1). Widening was consistently selected as the concept least likely to be pursued by decision makers in the near future (30% of all respondents ranked Widening as a 5).



What is the best and worst feature of each of the HWY 20 Solutions?

Participants were asked to describe what they felt to be the best and the worst features of each of the HWY 20 solution concepts. The question also asked participations to describe how they felt the solution concept could be improved? The statements below indicate the most referenced topics or key statements included in this response. Responses included:

No Build

Best features

- Cheap-cost effective
- Maintains economic viability of downtown

Worst features

- Not a sustainable solution
- Increased congestion
- Does not address the problem

Couplet

Best features

- Increases traffic flow
- Retail visibility-economic viability
- Safety
- Retains cascade character

Worst features

- Ugly and unwelcoming to visitors
- Kills small town feel
- Spreads traffic over 3 streets, not just 1
- Impact to business owners

Widening

Best features

- Inexpensive
- Could include bike lanes
- Better for cars

Worst features

- Death of sisters
- Not a sustainable solution
- Unsafe
- Impacts to business owners/residents

Alternate Route

Best features

- Retains village feel/community character
- Improves livability
- Gets trucks out of downtown

Worst features

- Fear that tourists won't come downtown
- Finding/purchasing land is costly
- Challenges in finding a route

Suggestions to improve solution concepts: Participant suggestions were consolidated into key themes or topics. For a list of complete answers please see Appendix A.

- **Roundabouts-** Roundabouts were consistently mentioned by participants as a solution improvement that should be pursued by the city of Sisters
- **Landscaping and Amenities-** Participants suggested downtown and neighborhood landscaping as possible solution improvements specifically for the No Build solution concept and
- **Temporary Re-Routing**- Re-routing vehicles during summer time periods when congestion problems are at their worst
- **Pedestrian Walkway**- Participants consistently suggested that the downtown area be turned into a pedestrian mall. This comment was most often linked to the No Build, Alternate Route and Couplet concepts. Respondents suggested that Hood and Main should be converted to a pedestrian mall and/or Cascade. Benefits included a heightened sense of place/destination, as well as increased safety for pedestrians and economic vitality for downtown business owners.
- **Bypass**- A bypass option was suggested by a portion of respondents (about 27 %) suggested a Bypass solution be included as a solution concept improvement. Many noted that a bypass was the only way to address all of the pressing transportation needs and issues in the Sisters' area.
- **Bike Lanes**- Many responses suggested an increased emphasis on bike lanes and safe bike access into the downtown.
- **Parallel Parking Downtown**-Participants suggested converting/increasing the amount of parallel parking spaces in the downtown area.

Top Transportation Concerns in Sisters: Participants were asked to identify their top two concerns regarding transportation in Sisters. The responses outlined below highlight the most consistently identified participant concerns.

- **Safety**-Participants consistently selected pedestrian, vehicle and bike safety as their number one transportation concerns
- **Impacts to Businesses**-Many participants were concerned about the impact of transportation solutions on downtown businesses and the tourism economy
- **Livability and Community Character**- Retaining community character and viability of downtown
- **Connectivity**-Both in terms of traffic flow and pedestrian/bicycle access
- **Viability**- Pursing solution concepts that would be viable to implement, fund, and capable of addressing community concerns and needs

Public Reaction to Community Open House

What did you like about tonight's meeting?
Overall participants seemed impressed and appreciative of the opportunity to interact with project staff and transportation engineers. The open house structure encouraged intimate conversations between project staff and community members and allowed participants to ask pressing questions and receive relevant information. Community members indicated that they felt the structure and layout of the event conveyed an effective process and welcomed input from the community.

What could we have done differently?
Several participants noted a frustration with the tangential questions that surfaced during the opening presentation. Many felt that facilitation could have limited these questions and allowed for a more streamlined presentation with more time to visit stations and interact with staff. Other comments indicated a certain level of unease with the Major's role in the opening presentation, specifically Mayor Boyd's introduction to the project and the solution concepts. One comment suggested a frustration with ODOT's perceived influence and support of traffic options that are not consistent with the needs and desires of local residents. Residents suggested that in order to address this, the community should revisit a community vision and focus on livability as they key issue.

CITY OF SISTERS

Transportation System Plan Update

Community Workshop #2
April 29, 2008

jla public involvement

Collaborative planning, decisions & communication

City of Sisters TSP Update
Event Summary

April 29, 2008

CITY OF SISTERS

Event Name:	Community Open House #2 (Safe Routes to School)
Event Date:	Tuesday, April 29, 2008 6:30 – 8:30 PM
Location:	Sisters Middle School
Community Attendance:	22 people (6 PAC members)

The purpose of the second public meeting for the City of Sisters TSP Update was to introduce the concept of Safe Routes to School (SR2S) and gather public input on what material the SR2S plan should include. The ultimate goal of this plan is to increase the number of children walking and biking to the Elementary and Middle School. This plan will focus on safety, education, and encouragement for parents, students and staff, and create a framework to organize the Safe Routes to School Program, curriculum and activities. The meeting was staffed by members of the consulting team from Alta Planning and Design and staff members with the City of Sisters, including Mayor Brad Boyd.

Event Flow:

Twenty-two participants were welcomed at a sign-in table by city staff. Each attendee received $100 'Sisters Dollars' for use in a voting exercise, held at the end of the program.

The event opened with a welcome and project introduction by Mayor Boyd, followed by a presentation from Alta Planning and Design covering the basic concept and elements of SR2S Programs. Leland Bliss, the administrator of the existing SR2S grant gave a brief presentation on the status of current efforts at the Elementary and Middle Schools and Leslie Waltz, current coordinator of SR2S activities at the Elementary School, elaborated on efforts specific to the Elementary School.

The second half of the event included a small group mapping activity facilitated by Alta staff. The Elementary and Middle School were considered separately. Midway through the exercise participants were invited to switch groups to allow them a chance to comment on both schools. Participants were asked to point out problem areas, commonly used travel routes, and propose potential engineering solutions. Each group was also asked to brainstorm a list of possible education, encouragement and enforcement programs and concepts for possible inclusion in the Plan. The meeting closed with a 'sisters dollars' exercise. During this time attendees, voted for which of the 5'Es (Education, Encouragement, Engineering, Enforcement, Evaluation) they wished to prioritize during the development of the SR2S plan.

Public Comments – General Responses:

Attendance was lower than anticipated but attendees represent a number of involved parties including the school district, teachers, parents, the mayor, public works and the general public. Overall, the response to developing a SR2S plan was positive. Meeting attendees agreed that parents drive their children very short distances to schools due to feeling that opportunities for safe travel are limited by traffic conflicts, highway crossings, and incomplete or missing facilities.

Generally, physical projects, such as engineering received the most support during group break out sessions. This may have been affected by a general lack of familiarity with education/encouragement concepts and a disproportionate amount of meeting time dedicated to mapping the physical surroundings around the schools. General comments and feedback included the following

- High speeds on state freeways create challenging conditions for travel at both schools
- A major challenge is to create safe routes that will allow children at new developments to get to school safely
- Incomplete facilities create travel barriers at both the Elementary and Middle School
- Some parents will drive their children two or three blocks
- Inadequate bike parking at both schools
- Walkers and bikers conflict while traveling on sidewalks that are too narrow
- A plan should balance the needs of walkers and cyclists
- The greatest motor vehicle hazard is created by tourists traveling through town. They pay attention to the surroundings rather than traffic
- Traffic does not slow down on the east and west end of town
- Many people feel that bike facilities should be completely separated from traffic facilities
- Some engineering may need to happen prior to encouragement and education to create safe travel routes to the school. (Travel should not be encouraged on facilities known to present hazards)

Map Summary – Sisters Elementary School:

Summary of issues

- Safe crossings of Cascade are a major issue
- Cars parked outside of bus barn does not leave room for kids to walk, except in the street
- Pick-up/drop-off traffic creates excessive fumes
- Pick-up/drop-off traffic patters create significant congestion and creates a safety hazard
- No safe crossing facilities in the parking lot for pick-up/drop-off
- Crosswalks are not adequately visible on Highway 20
- Crossing of Locust is not adequately visible
- New path around the school administration building may not be wide enough for kids walking and biking simultaneously
- Missing bike lane on locust at highway 20 creates an unsafe, forced merge situation

Map Summary – Sisters Middle School:

- Missing connections on Mckinney Butte restrict travel opportunities
- Opportunities to create safe ped/bike facilities exist on the north side of the school, off Mckinney Butte Road
- Traffic will increase on highway 242 when it becomes the main route into Sisters

Education/Encouragement/Enforcement/Evaluation Summary:

- Incentives are important for any program
- Encourage carpooling
- Implement a walking school bus (possibly use high school students as escorts)
- Consolidating bus stops may reduce travel time and encourage less driving
- Implement a commute to school challenge or other type of contest
- Educate cyclists about the dangers of sidewalk riding (One barrier is that parents feel that elementary students should not be riding on busy streets such as Locust and Cascade)
- Event to publicize the completion of the Hwy 242 bike/ped path to the Middle School
- Conduct focus groups with kids to identify biking/walking incentives
- Routes should be safe before education/encouragement commences
- Possible drawing for a free bike as a prize
- Bike/walk day set up at a satellite location so children can walk en masse to the Elementary School. Make this a regular event
- Get a volunteer group to come and teach safety

Prioritization Exercise – (Sisters Dollars)

Participants were asked to vote with their dollars to prioritize which of the 5E's they felt were most important for the creation of a successful SR2S plan in Sisters. The vote resulted in the following ranking:

- Engineering
- Enforcement
- Education/Encouragement (tied)
- Evaluation

Engineering received nearly twice the number of votes as enforcement. This likely reflects fact that engineering projects are visible and solve problems familiar to meeting participants. Engineering projects are also a common element of SR2S plans in communities new to the idea and concept of SR2S. This reflects the idea that the existence of safe facilities will create a solid base for encouragement and education activities to occur.

Enforcement activities were only covered minimally at this event. The high ranking of this element reflects its importance in the minds of participants.

Transportation System Plan Update
Community Workshop #2

Bicycle and Pedestrian Modes
Safe Routes to School

Sisters Middle School

Tuesday, April 29, 2008
6:30 to 8:30 p.m.

For questions, please contact Eileen Stein, City Manager at
549-6022, ext. 205 or estein@ci.sisters.or.us

SR2S – COMMUNITY FORUM OUTLINE
Arrive Sisters around noon.

2 PM Walk about, meet at the elementary.
2 – 230 – elementary school tour
Group splits, heads across town to middle school
Middle school group heads across town and observes departure,
Elementary school group joins middle school group around 3:15.
3:15 – 3:45 Middle school tour.
Wrap-up

5:30 PM for setup and facilitator training. To be done in partnership with City staff.

6:30 PM – event starts (anticipated 30 – 50)

- welcome by Mayor 5 - 10
- Power point – 20 - 30 min
- Leslie Waltz – Safe Routes program at the elementary school
- Leland Bliss – Safe Routes program district wide and at the middle school.
- Map exercise break 40 min
    - Mark up the maps showing common walking/bicycling routes to school and problem areas (e.g., difficult crossings, missing sidewalks, suggested improvements, etc.
    - The group would also talk about non-infrastructure issues, and identify programmatic efforts they would like to see added or improved upon (we'll have boards listing existing programs and a menu of others).
    - Ask one person from each group to give a 1 minute report about what the group found.
- Summarize discussion
    - What we heard
    - Vote results
    - Additional questions/comments
    - Questions and comments
- Lynne Mutre to speak on next steps of grant, funding, implementation and the importance of volunteers
- Sisters dollars voting activity (which of the 5E's to emphasize)
    - Facilitators to help collect and count money during vote
        - Final chance for closing comments

8:30 PM – break down return to PDX.

alta PLANNING + DESIGN

Sisters Transportation System Plan Update
Safe Routes to School Community Forum - April 29, 2008

Name	Organization/Affiliation	Phone	PAC Member	Email
Elaine R. Drakulich	Sisters Schools	541-549-8521		drakulich@outlawnet.com
Brad Boyd	City of Sisters	549-2471	✓	bsb@bendbroadband.com
Bill Farley	None	504-8355		bfarley@shortwebserver.com
Shauna Bell	City Council	549-0316		sbell@ci.sisters.or.us
Brad Grimm	City	323-5201		
Lynne Mutrie	BICYCLE TRANSPORTATION ALLIANCE	503-226-0676-18		lynne@bta4bikes.org
Michele Sims		549-1609		sims.mw@gmail.com
Jeff Sims	Sisters Trails	549-1609		jmsims@outlawnet.com
Bob Shaw	Sisters TSP		✓	bshaw@outlawnet.
Leslie Waltz	SRTS	610-6219	✓	lwaltz@outlawnet.com
C Humphreys	Sisters Trails Alliance	815 1543	✓	chuckinsisters@msn.com
John Tekau	Sis. Area Res.	480-9015		jttekau@outlawnet.com
Wendy Holzman	CCI			wendomere@gmail.com
John Rahm	Sisters Trails	549-8049		jrahm@bendcable.com
Bill Mintiens		504-6696		BRONCO@BENDBROADBAND.COM

alta PLANNING + DESIGN

Sisters Transportation System Plan Update
Safe Routes to School Community Forum - April 29, 2008

Name	Organization/Affiliation	Phone	PAC Member	Email
Leland Bliss	School Dist	549-8521 x 4017		blissl@outlawnet.com
DAVE MARLOW	CITY PC	504-2413		runninghorse@YKWC.NET
BRUCE BOWEN	CCI		✓	
mary Fan	Sisters Trails	549-8992		mfan@bmctotalcare.com
Pat Thompson		610-3780		Pat.Heidi@msn.com
Carey Toiello	PC	549-0999	✓	
Jana Novotny	Sister Trail	549-8425		janan@bendbroadband.com

CITY OF SISTERS

Transportation System Plan Update

Community Forum #3
October 29, 2008

jla public involvement

Collaborative planning, decisions & communication

Thank you for Attending the Transportation System Plan Community Forum

City of Sisters

For questions, please contact Eileen Stein, City Manager at 549-6022, ext. 205 or estein@ci.sisters.or.us

City of Sisters

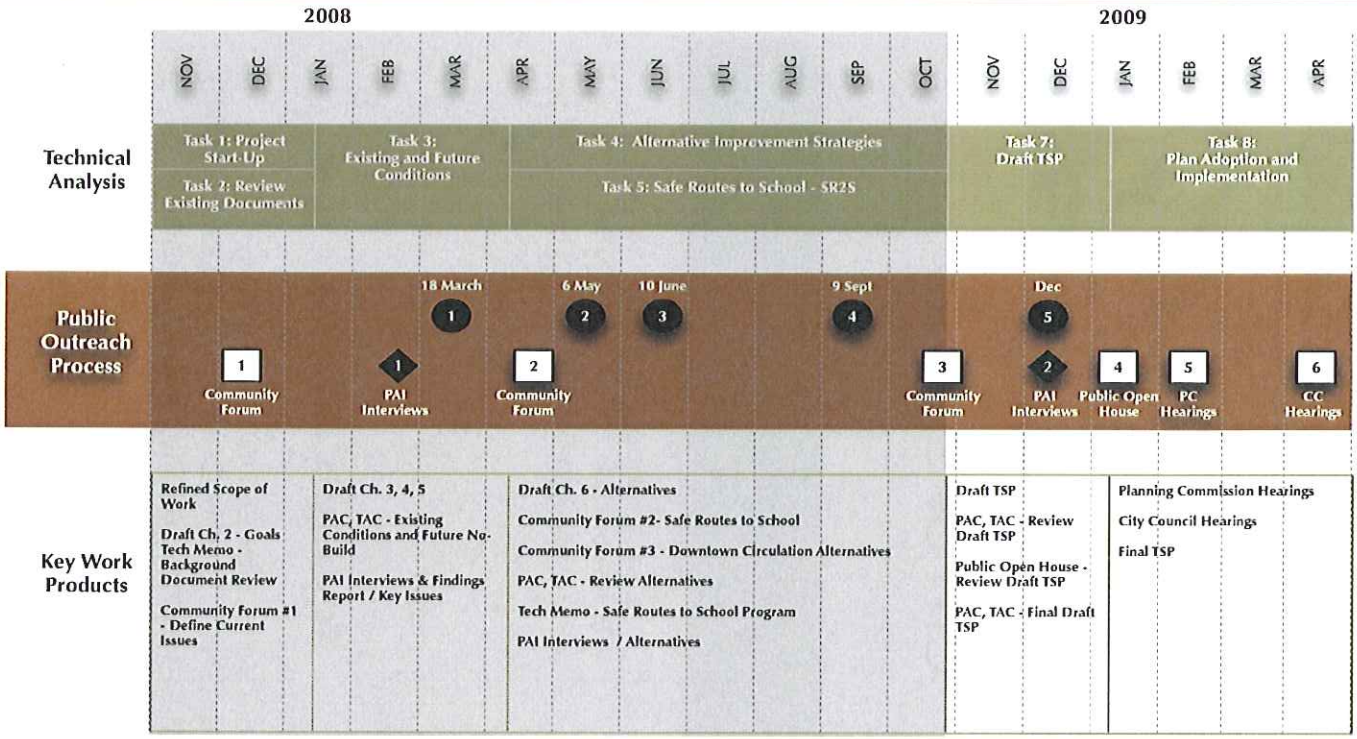
Transportation System Plan Update
Community Forum #3

Sisters Middle School
Wednesday, October 29, 2008
6:30 to 8:30 p.m.

Tonight's Agenda

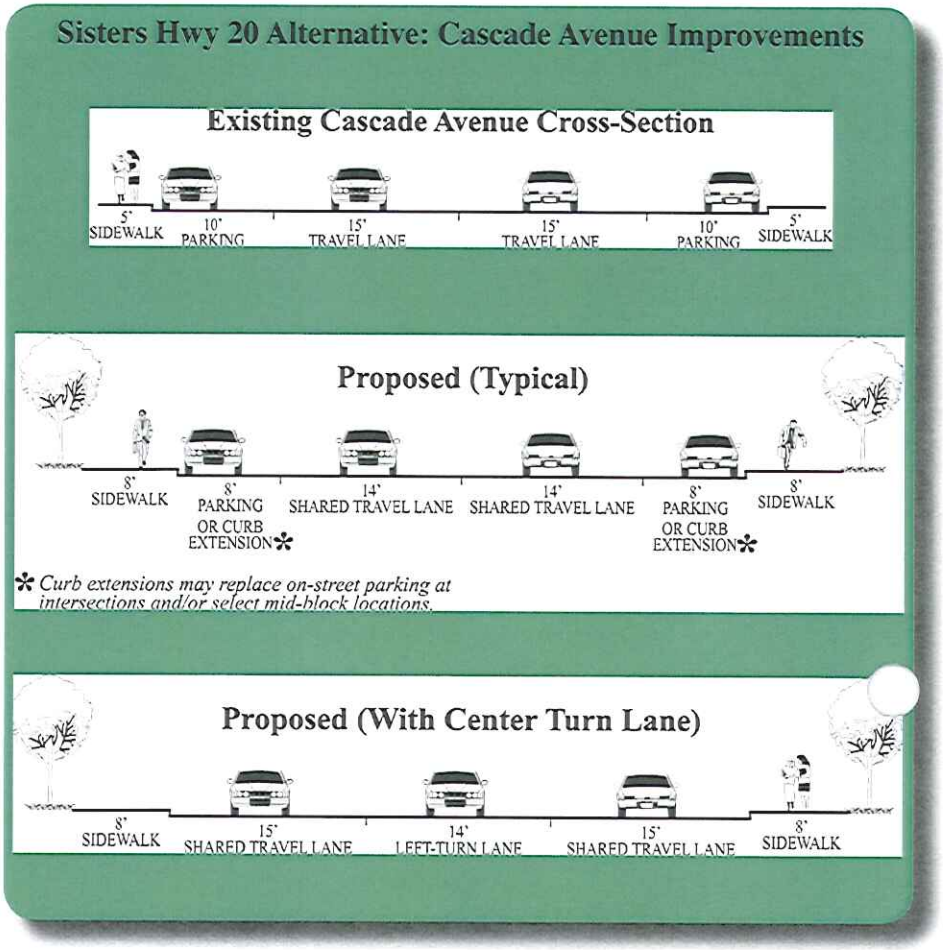
6:30	Sign in
6:40	Welcome / Event Orientation
6:45	Presentation by Chris Maciejewski/DKS
7:00	Presentation by Project Advisory Committee Members
7:15	Community Input at Stations: Open House
8:15	Summarize Community Input at Stations
8:30	Adjourn

PROJECT SCHEDULE



NOTES

Notes:



Transportation System Plan History

The current Sisters Transportation System Plan (TSP) was adopted by City Council in 2001. Many of the transportation improvements it recommended have been completed. The current TSP is based on 2020 city population forecast of 1,710 people. During the 2004 Comprehensive Plan update the population forecast was adjusted to project a 2020 population of 3,400 people. One purpose of the TSP Update is to align the plan's population and growth assumptions with the 2004 Comprehensive Plan.

The City of Sisters also conducted a couplet refinement planning process in 2004 which re-raised community questions about the feasibility of an alternate route outside the Urban Growth Boundary (UGB). The TSP Update we are now beginning will address the issue of how to position the City of Sisters for a future alternate route and what needs to be done to address traffic congestion and improve safety in the short run.

This TSP Update is an opportunity for the community of Sisters to assess previous decisions and review new alternatives to:

- Improve traffic flow and safety
- Identify short and long-term Highway 20 traffic solutions
- Upgrade bike and pedestrian travel including Safe Routes to Schools
- Upgrade key intersections along Highway 20

To engage the community in this process, the City has hosted three community forums, sponsored interviews with ten community stakeholders and worked closely with a citizen advisory committee over the last nine months. Tonight's event is an opportunity for the broader community to review Highway 20 alternatives to improve traffic flow and safety for the City of Sisters.

Please complete and return your survey and thank you for participating in tonight's meeting.

Sisters Hwy 20 Alternative: Hood-Main Couplet

Existing

Improved

Sisters Hwy 20 Alternative: Alternate Route

Existing (Barclay)

Improved (Barclay)

City of Sisters TSP Update
Event Summary

November 3, 2008

CITY OF SISTERS

Event Name:	Community Open House #3
Event Date:	Wednesday, October 29, 2008 6:30 – 8:30 PM
Location:	Sisters Middle School
Community Attendance:	48 people

The purpose of the third public meeting for the City of Sisters TSP Update was to provide the broader community of Sisters the opportunity to comment on the Project Advisory Committee's preferred alternative for Highway 20 and proposed improvements for Cascade Avenue. Community input from the three information stations and comments cards indicate that a **clear majority of participants who attended the event support the Project Advisory Committee's recommendation for an Alternate Route.**

Flow of the Event:

The event opened with a welcome and introduction by the consultant meeting manager (Christine Egan/JLA) and a presentation by the consultant team manager (Chris Maciejewski/DKS) to present TSP history, process and progress to date on the TSP Update Plan. Presentation included details about the two Highway 20 alternatives considered by the Project Advisory Committee: Couplet and Alternate Route. After the presentation, three members of the Project Advisory Committee presented the Committee's role in the TSP process and their reasoning for unanimously recommending the Alternate Route as the preferred solution for Highway 20.

Following presentations, participants were encouraged to visit and provide input at three stations: 1) Alternate Route, 2) Couplet, and 3) Cascade Avenue Improvements. Each station was staffed by members of the consultant project team. Station staff summarized community input and Mayor Brad Boyd closed the meeting.

Demographics of Event Participants:

Nearly 50 community members attended the meeting, including seven of the ten Project Advisory Committee members, an ODOT representative and four city staff. Fourteen community members identified themselves as business owners on the sign in sheet.

Participants were also asked to identify where they live and work on a large map of Sisters and the surrounding area. Seventeen people indicated that they work within the City of Sisters, with the majority of those jobs along Hood Avenue. Twelve people identified their homes within the City of Sisters and thirteen living beyond the city's limits.

Attachments:

- Event Program
- List of Community Participants (from comment cards and sign in forms)

Info Stations/ Flipchart Summary of Participant Comments:

Community members were given the opportunity to visit three input and information stations during the open house portion of the event. Each station was staffed by a member of the consultant. Public input from each station is provided (verbatim).

Couplet Station

Strengths:

- Keeps traffic passing through town in view of downtown
- Couplet would work with highway designation remaining with Cascade Avenue to avoid loss of diagonal parking on Hood and Main. Hood and Main effectively become the "alternate routes"

Challenges:

- Ruins downtown core and village atmosphere
- Removes too much parking
- Moves away from previous work, i.e. near City Hall
- Post office on Barclay creates more cross town traffic

Cascade Avenue Improvements

Strengths:

- Woodstock/SE 41st-SE 52nd Avenues in Portland, similar commercial main street with ped and bike access
- Left lanes support flow of traffic
- Wider sidewalks improves pedestrian experience
- Congestion is City's "friend"; Speed is the problem
- Narrow traffic lanes as much as possible (narrow to 12 ft rather than 14 ft) will make it more ped friendly at crossings

Challenges:

- Eliminating three feet between parked cars and traffic flow

- Left turns needed in more places than Pine street and...., eliminating parking is bad
- Dundee as an example: left turn lane doesn't address congestion
- Be aware that four way stops may function better than a signal light

Alternate Route

Strengths:

- Signals make sense, like intersection improvements, good for school crossings
- The traffic flow at the Hwy 20 signals with the additional turn lanes and phasing make sense with the alternate route
- The roundabout at Barclay/Locust School crossings at Hwy 20/Locust would be good with the traffic signal
- Possibility of providing a pedestrian refuge island on the south leg of Locust/E Cascade for the school crossing to the library

Challenges:

- Trucks wouldn't be forced to alternate route. Best solution would be to require trucks to use the alternate route. This plan doesn't quite accomplish that.
- Some concerns about the right-of-way required for the arterial upgrades along the developed portions of Locust.

Comment Card Summary

Twenty-eight people completed the comment forms included with the event programs. Of those, 21 respondents (95%) agreed with the Project Advisory Committee's recommendation for the Alternate Route concept. One person disagreed with the Committee's recommendation.

Demographics:

Nine of the people who completed the comment card live within Sisters city limits, with most living outside city limits by more than one mile (Figure 1). Nearly all of the comment card respondents live in Sisters year-around (95 percent). More than one-third (31.8%) of the respondents own a business in Sisters, half work in the city and a large majority shop primarily in Sisters (81.8%).

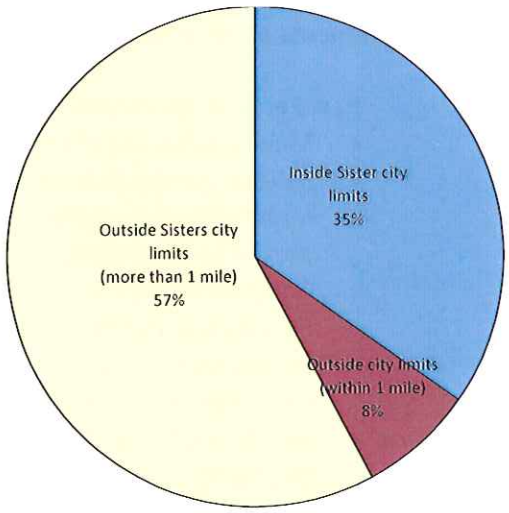


Figure 1: Comment Card Question: Where Do You Live?

Comments on Couplet Alternative:

Respondents were asked to identify the best and worst features of each alternative: Couplet and Alternate Route. Respondents also could provide ideas on how to improve the alternative or address its challenges. Below are the comments for the Couplet.

Best Features of the Couplet

- Best with Cascade maintaining Hwy 20 designation
- Takes almost all traffic off Cascade Avenue
- Makes Cascade Avenue a slower "city" street

- Moves traffic; traffic flow

Worst Features of the Couplet

- Don't like for pedestrians
- Negatively impacts the downtown core and town livability
- Splits city; degrades local streets; costs more; cannot be phased
- Cost; time frame
- Divides the town geographically
- Too disruptive to business
- Bisects city (intercity travel difficult); not safe
- Destroys village atmosphere and livability
- Spreads misery to three streets and doesn't solve problem
- Disrupts traffic flow; reduces parking
- Would have to cross three streets, "fractures" the town; loss of parking
- Does not get the traffic out of downtown Sisters
- Still keeps too much traffic in town
- Traffic circle at a school crossing

How to Improve the Couplet

- No solutions offered

Comments on Alternative Route:

Best Features of the Alternate Route

- Moves traffic out of town, maintains livability of downtown core. Wider sidewalks
- Relieves congestion during peak travel time and events
- Matches traffic problem perfectly; maintains viability of downtown core; enhances safety; preserves local traffic; easier to implement
- Gets cars off Cascade Avenue
- Best choice; flexible option
- Should relieve overflow traffic; addition of signals; addition of islands; roundabouts good as they drive down Cascade
- Keeps livability of downtown, safer for pedestrians
- Get trucks out of downtown
- Routes traffic away from core
- Moves traffic without damaging livability
- Flexible; least disruption; both short and long
- Phased approach
- Moves traffic out of downtown Sisters
- Keeps thru-traffic from downtown area; creates pedestrian friendly street
- Very flexible phased construction; more affordable
- No traffic circles

Worst Features of the Alternate Route

- Very concerned about removing majority of peak tourist season traffic that may be passing through - totally away from downtown core

- Cost
- Impact on Locust and Camp Polk
- Possible loss of some tourists going through town that didn't plan to stop in Sisters that end up stopping
- Takes business from downtown core
- Creates potential bike-pedestrian barrier at Barclay
- Bulb outs along Cascade Avenue

How to Improve the Alternate Route

- Cascade Avenue with turn lanes and no parking
- Better if we could remove on-street parking to have left turn lanes and wider sidewalks
- Narrow travel lanes to 12' - widen sidewalks and parking to reduce speed and make more pedestrian friendly
- Get rid of ALL parking on Cascade Avenue. It will create congestion if it stays - push back on ODOT on this one; improve pedestrian crossings on Locust; strengthen N/S bike access from Barclay to/over Cascade
- Traffic control on Barclay and Highway 20 should be Phase 1; Limit on bike and ped traffic in industrial area
- Need to add appropriate signage about "Business district ahead" to make sure visitors don't end up on bypass by mistake
- Make it the State Highway so that trucks can be routed there
- Couple with pedestrian-friendly Cascade Avenue, with little to no parking and wide sidewalks
- Take the opportunity to improve bike-ped access through city, especially N.S.; take parking off Cascade Avenue; provide more pedestrian amenities
- Explore using roundabouts
- Overhead pedestrian bridge near Locust and Highway 20
- Start by just putting in stop signs at Barclay and Camp Polk
- If trucks are NOT diverted out of downtown Sisters, you are wasting your time and money to encourage development and businesses to move to Sisters
- Use traffic circles instead of lights to keep traffic moving
- Try to "encourage" truck traffic to use alternate route - Barclay as State Hwy
- Traffic lights at Barclay/20 and Locust/Cascade; make alternate the through route and Cascade Avenue the city street business route; with proper signage and signals on the alternate route showing it as the Hwy, there would be far less traffic on Cascade and NO need for bulb outs.
- Fine job by the Committee; more study re: signal lights vs. roundabouts; has there been any consideration regarding elementary school relocation?

Traffic Signals or Roundabouts at Major Intersections:
Respondents considered two different traffic management options: multilane roundabouts and traffic signals to be used with either alternative. Over half of the respondents (58%) preferenced roundabouts over traffic signal lights (42%). See Figure 2.

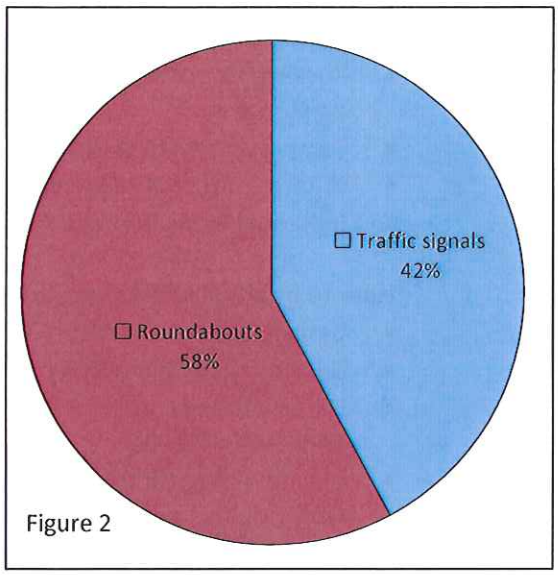


Figure 2

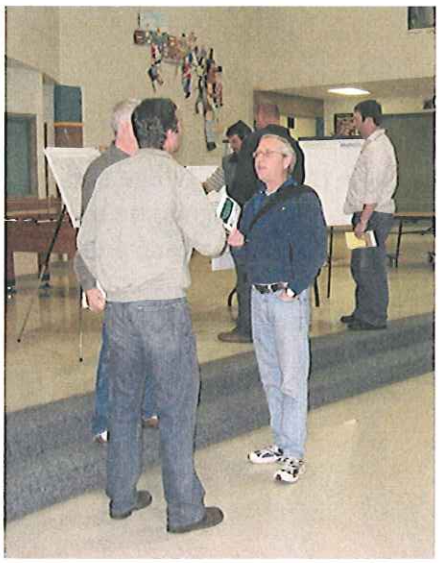
Other comments provided:

- Depends on uses. Roundabouts are more visually pleasing but with Smart tech lights, would help detour traffic when congested.
- Whichever is the least cost to build and maintain.
- Roundabouts chosen for aesthetics mostly. But signal at Locust/Hwy 20 because of school.
- Quickest solution.
- Traffic signals for Hwy 20 and Locust; Roundabouts for Locust and Barclay.
- Roundabouts, if possible.
- Start with signals sometime in future and then use roundabouts.
- Try to remove snow from a roundabout or street sweep bulb-outs or roundabouts.

Public Reaction to Community Open House

What did you like about tonight's meeting?

Overall, participants liked the event format, especially the presentations by the three Project Advisory Committee members and Chris Maciejewski/DKS. Participants felt that the format provided the community an opportunity to learn about and provide input on both options, while also understanding the Project Advisory Committee's explanation for recommending the Alternate Route. Participants felt that the event was informative and interactive and the presentations were thoughtful, clear, and concise and provided a good visual representation of the alternatives.



What could we have done differently?

Three respondents noted that it was difficult to hear some speakers and suggested using a microphone at future events. Other participants recommended a longer event session and that the city make the project drawings, photos and documents available ahead of time so community members can review them before the meeting.

City of Sisters

CITY OF SISTERS TRANSPORTATION SYSTEM PLAN UPDATE

COMMUNITY FORUM

OCTOBER 29, 2008

NAME	ADDRESS	EMAIL	BUSINESS OWNER	[redacted]
Ed Protas	PO Box 1858 Sisters	EDPROTAS@NWLINK.COM	Yes (No)	No
Ralph White	69170 Barclay Dr		(Yes) No	—
Grey Charon		Grey.charon@otak.com	Yes (No)	
Erik Huffman	Bend.	erik.huffman@otak.com	Yes (No)	
Gov. Barbara Plomen	945 E Creekview Dr Sisters	GOV-BARBARA@MSN.COM	Yes (No)	
Brad Boyd	P.O Box 1421 Sisters OR 97759		(Yes) No	
Doug Hancock	P.O. Box 1208 Sisters	hancockdoug@gmail.com	(Yes) No	
Tim Hay	PMB 8272 POB 8000 Black Butte	MBHAY1@AOL.COM	Yes (No)	
Sandy Gardsell	15915 Pilot Dr	Sandyg@bendcable.com	(Yes) No	
Pat Thompson	P.O. Box 1164		(Yes) No	
Frank P. Grotheer	712 S Pine Meadow St. Box 1493		Yes (No)	
Leslie Waltz	P.O. Box 622 97759	lwaltz@outnet.com	Yes (No)	
Phil Gerber	PO Box 1172 97759	phil@grrbrr.com	Yes (No)	
Ronni Duff	69475 Greenridge Lp. Sist	Billronni@aol.com	Yes (No)	
Bill Duff	" "	" "	Yes No	
John Morter	69480 Green Ridge Lp, Sist		Yes (No)	
Robert Shaw	POB 2147		(Yes) No	
Dan Doggett	PO B 847	thegewel@outbownet.com	(Yes) No	
Eva Eagle	17212 Pine Dr	eva.eagle@mac.com	Yes (No)	
Bruce Bowen			Yes No	

City of Sisters

City of Sisters Transportation System Plan Update

Community Forum
October 29, 2008

Name	Address	Email	Business Owner		[redacted]
Larry Howick	15175 Wagon Wheel (Tollgate)			No	
Ron Ronald	14825 Saddle Horn "	RON@SISTERSOREGONPROPERTIES.COM	Yes	No	
Chuck Humphreys	14985 Remuda Rd Sisters	chuckinsisters@msn.com	Yes	No	
Jim Bryant	ODOT		Yes	No	
J.A. Bogart	467 E. Black Butte		Yes	No	
Ryan A. Engstrom	16008 CATTLE DR. RD	grampshay@yahoo.com	Yes	No	
Barbara K Dubin	340 E Aspenwood		Yes	No	
CHRIS WILDER	PO Box 833 - 140 W. CASCADE AVE	chrysno@sbcglobal.net	Yes	No	
GARY MILLER	PO Box 1335	gmiller@sisnet.com	Yes	No	
Wendy Holzman	324 E. Arpeto Lp	wendomere@gmail.com	Yes	No	
Karen Snyder	623 N. Freemont St.		Yes	No	
JAMES DOHERTY	623 N. FREEMONT ST.		Yes	No	
Tim Edwards	340 S. Timber Creek		Yes	No	
Michael Robbel	69363 Green Ridge Lp		Yes	No	
PETER STORTON	178 S ELM	PSTORTON@BENDBROADBAND.COM	Yes	No	
Tia Lewis	549 SW Mill View Way	tlewis@schwabe.com	Yes	No	
Maggie Sims	14865 Cherrera, Si	sim.mw@gmail.com	Yes	No	
[illegible]	5605 Pine	ostarlundb@q.com	Yes	No	
Jennifer Haken	PO Box 1601		Yes	No	
			Yes	No	
			Yes	No	

City of Sisters

City of Sisters Transportation System Plan Update

Community Forum
October 29, 2008

Name	Address	Email	Business Owner	Interested in serving as a CAC member?
Brittany Cleland	97 NW Adams Pl #4 Bend	bcleland@schwabe.com	Yes No	
Jeff Sims	14865 Cascadia Sisters	jmsims@outlawnet.com	Yes No	
Charlene Weed	PO Box 1233	Weeds@coinet.com	Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	
			Yes No	

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:

Email (if you wish to be included on our email update list):

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☐ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☐ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☐ Work in Sisters?
- ☐ Shop primarily in Sisters?
- ☐ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet			
Alternate Route			

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☐ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☐ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:

Email (if you wish to be included on our email update list):

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a
- [x] Year-round resident?
- [ ] Seasonal resident?

3. Do you *(choose any that apply)*
- [x] Own a business in Sisters?
- [x] Work in Sisters?
- [x] Shop primarily in Sisters?
- [x] Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet	Best with Cascade maintaining Hwy 20 designation		
Alternate Route		WORST	— very concerned about removing majority of peak tourist season traffic that may be passing through — totally away from downtown core

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- [ ] Traffic signals
- [x] Roundabout either option seems fine to me

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- [ ] Yes
- [x] No think too much is being make out of "building" the town. Keep in mind Cascade is still 3 way and you only have to look one direction when crossing Hood & Main if they are one way

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

Couplet Configuration w/ roundabouts
But leave Cascade Hwy - 2 way
Preserve Parking

What did you like about tonight's meeting?	Anything we could have done differently?
Liked the fully developed Couplet concept	

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Jeff Sims

Email (if you wish to be included on our email update list): jmsims@outlawnet.com

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☒ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☒ Year-round resident?
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3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☒ Work in Sisters?
- ☐ Shop primarily in Sisters?
- ☐ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		X	Don't know.
Alternate Route	X		Cascade w/ turn lanes + no parking.

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☐ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☐ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Ralph White
549-1870

Email (if you wish to be included on our email update list):

1. Where do you live?
- ☐ Inside Sisters city limits
- ☑ Outside Sisters city limits (within 1 mile)
- ☐ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☑ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☑ Own a business in Sisters?
- ☐ Work in Sisters?
- ☐ Shop primarily in Sisters?
- ☐ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		will destroy downtown 3 highways to cross not one	- How does camp Polk traffic go east stop considering it - this is a town not a throughfare
Alternate Route	relieves conjection during peak travel time and events		narrow travel lanes to 12' - wider sidewalks & parking to reduce speed and make more pedestrian friendly

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☐ Roundabout

> least cost to build & maintain

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☑ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?
Advisory Committee presentation was reasuring - I vote with them Alternate Route Pedestrian friendly down town	- please consider designing improvements as soon as possible so as properties develop they can be implemented per plans

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Wendy Holzman

Email (if you wish to be included on our email update list):
wendomere@gmail.com

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a
- [x] Year-round resident?
- [ ] Seasonal resident?

3. Do you *(choose any that apply)*
- [ ] Own a business in Sisters?
- [ ] Work in Sisters?
- [x] Shop primarily in Sisters?
- [x] Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		Dont like for pedestrians and how would impact the downtown core and town liability	
Alternate Route	Moves traffic out of town Maintains viability of downtown core Wider sidewalks	Better if we could remove on street parking to have left turn lanes and wider sidewalks	

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- [ ] Traffic signals
- [ ] Roundabout

– Would depend on uses: Roundabouts more visually pleasing but with smart tech lights would help detour traffic when congested

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- [x] Yes
- [ ] No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

What did you like about tonight's meeting?	Anything we could have done differently?
• Hearing from PAC members • Stations and interactive aspects	Some speakers were a little harder to hear

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:

Email (if you wish to be included on our email update list):

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☑ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☐ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☐ Work in Sisters?
- ☐ Shop primarily in Sisters?
- ☑ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet			
Alternate Route	✓		

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☑ Roundabout aesthetics mostly But signal at Locust / Hwy 20 b/c of school

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☑ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

What did you like about tonight's meeting?	Anything we could have done differently?
* City needs policies adopted as part of TSP to help guide right of way acquisition — ie	(when to acquire, under what circumstances public / private partnership opportunities

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Chuck Humphreys

Email (if you wish to be included on our email update list):

chuckinsisters@msn.com

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☒ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☒ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☐ Work in Sisters?
- ☒ Shop primarily in Sisters?
- ☒ Regularly travel through Sisters?

☒ kids in school

☒ meet friends in Sisters (a social center)

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet	Sets almost all traffic off Cascade	Splits city Degrades local streets Costs more Cannot be phased	Can it be improved?
Alternate Route	• makes traffic movement perfectly • maintains viability of downtown core • enhances safety • preserves local traffic • easier to implement		• Get rid of ALL parking on Cascade (it will create congestion if it stays) - push back on ODOT on this one) • Improve pedestrian crossings on Locust • Strengthen N/S bike access from Barclay to/over Cascade

= 4 lane Elm as well as Pine?

= freight vs walk-load for refuge?

=

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☒ Traffic signals
- ☐ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?
	longer session

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

V

Name: Pat Thompson

Email (if you wish to be included on our email update list):

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a
- [x] Year-round resident?
- [ ] Seasonal resident?

3. Do you *(choose any that apply)*
- [x] Own a business in Sisters?
- [x] Work in Sisters?
- [x] Shop primarily in Sisters?
- [x] Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		Cost Time Frame	
Alternate Route		Cost	Traffic control on Barclay + 20 should be phase 1 Limit on Bike + Ped Traffic in ~~ind~~ industrial area.

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- [ ] Traffic signals
- [ ] Roundabout
- [x] Quickest Solution

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- [x] Yes
- [ ] No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:

Email (if you wish to be included on our email update list):

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3. Do you *(choose any that apply)*
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- ☐ Work in Sisters?
- ☒ Shop primarily in Sisters?
- ☐ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		Not Good	
Alternate Route	2+ Cars off Cascade		

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☒ Traffic signals
- ☐ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

What did you like about tonight's meeting?	Anything we could have done differently?
very informative – Good job	use a "mike" when talking

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:

Email (if you wish to be included on our email update list):

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☑ Outside Sisters city limits (more than 1 mile) 2 miles

2. Are you a
- ☑ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☑ Work in Sisters?
- ☑ Shop primarily in Sisters?
- ☑ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		Divides the town geographically	
Alternate Route	Best choice Flexible option	Impacts on Locust/Camp Blk	

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☑ Traffic signals for Hwy 20 & Locust
- ☑ Roundabout on Locust & Barclay

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☑ Yes On the PAC.
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

What did you like about tonight's meeting?	Anything we could have done differently?
Thank you to DKS. Well done.	

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: CHRIS WILDER

Email (if you wish to be included on our email update list): chrysmo@sbcglobal.net

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☒ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☒ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☒ Own a business in Sisters?
- ☒ Work in Sisters?
- ☒ Shop primarily in Sisters?
- ☒ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet	X	WAY TOO DISRUPTIVE TO BUSINESSES!!	NOT A GOOD SOLUTION FOR LOCAL BUSINESSES!!
Alternate Route	– SHOULD RELIEVE OVERFLOW TRAFFIC – ADDITION OF SIGNALS	– POSSIBLE LOSS OF SOME TOURISTS GOING THROUGH TOWN	NEED TO ADD APPROPIATE SIGNAGE ABOUT "BUSINESS DISTRICT AHEAD"

– ADDITION OF ISLANDS – ROUND-ABOUT GOOD AS THEY DRIVE DOWN CASCADE

THAT DIDN'T PLAN TO STOP IN SISTERS THAT END UP STOPPING

TO MAKE SURE VISITORS DON'T END UP ON BYPASS BY MISTAKE.

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☒ Traffic signals
- ☐ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

What did you like about tonight's meeting?	Anything we could have done differently?
Good format – liked Chris' opening on the summary of the project & findings. Liked the Committee Members explaination of what ~~they~~ option they choose.	X GOOD FORMAT

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Karen Snyder
James Dotherty

Email (if you wish to be included on our email update list):
rocketjed@bendbroadband.com

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a
- [x] Year-round resident?
- [ ] Seasonal resident?

3. Do you *(choose any that apply)*
- [ ] Own a business in Sisters?
- [ ] Work in Sisters?
- [ ] Shop primarily in Sisters?
- [ ] Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet	makes CASCADE A slower, "CITY" ST.	Bisects CITY (intercity travel difficult) not safe	
Alternate Route	Keeps Liveability of Downtown, safer for pedestrians	Takes business from Downtown core	

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- [ ] Traffic signals
- [x] Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- [x] Yes
- [ ] No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?
Excellent presentation by consultants and committee members. We learned about both options and feel confident the committee's recommendation is the best option.	

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:

Email (if you wish to be included on our email update list):

1. Where do you live?
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- [x] Work in Sisters?
- [x] Shop primarily in Sisters?
- [x] Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		X	Bad idea - no way to improve.
Alternate Route	X		make it the State Hwy so that trucks can be routed there.

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- [ ] Traffic signals
- [x] Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- [x] Yes
- [ ] No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?
Good presentation - esp. from Advisory Comm. members. Good turn out of public	

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:
EVA EAGLE

Email (if you wish to be included on our email update list):
eva.eagle@mac.com

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☒ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☒ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☐ Work in Sisters?
- ☒ Shop primarily in Sisters?
- ☒ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		DESTROYS VILLAGE ATTRACTIVENESS, LIVABILITY	DON'T DO IT!
Alternate Route	GET TRUCKS OUT OF DOWNTOWN	COST	COUPLE W/ PEDESTRIAN-FRIENDLY CASCADE, W/LITTLE TO NO PARKING + WIDE SIDEWALKS

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☒ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Rod Roberts

Email (if you wish to be included on our email update list):
Rod@sistersoregonproperties.com

1. Where do you live?
- ☐ Inside Sisters city limits
- ☒ Outside Sisters city limits (within 1 mile)
- ☐ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☒ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☒ Work in Sisters?
- ☐ Shop primarily in Sisters?
- ☐ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet			
Alternate Route	✓		Yes Roundabout Rd #20 + Locust with Sehorbin intersection Traffic light Hwy 20 [illegible]

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☒ Traffic signals unless roundabout intersection
- ☐ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:

Email (if you wish to be included on our email update list):

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3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☒ Work in Sisters?
- ☒ Shop primarily in Sisters?
- ☒ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		3 STREETS MISSED TO 3 STREETS DOESN'T SOLVE PROBLEM	
Alternate Route	ROUTES TRAFFIC AWAY FROM CORE	CREATES POTENTIAL BIKE-PED BARRIER ON BARCLAY	BE SURE TO TAKE THE OPPORTUNITY TO IMPROVE BIKE-PED ACCESS THROUGH CITY, especially N-S. Take parking off Cascade, more pedestrian amenities

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☒ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?
GOOD, CLEAR PRESENTATION OF COMMITTEE'S WORK	

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:

Email (if you wish to be included on our email update list):

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3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☐ Work in Sisters?
- ☒ Shop primarily in Sisters?
- ☒ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet	moves traffic	cost Destroys downtown	
Alternate Route	moves traffic without damaging livability	cost	explore using roundabouts.

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☒ Roundabout if possible

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?
opportunity for public input	

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Blair Ostarlund

Email (if you wish to be included on our email update list):

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a
- [ ] Year-round resident?
- [x] Seasonal resident?

3. Do you *(choose any that apply)*
- [ ] Own a business in Sisters?
- [ ] Work in Sisters?
- [ ] Shop primarily in Sisters?
- [ ] Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet	Disrupts	Traffic Flow Reduces Parking makes it hard to get PO	
Alternate Route	Flexible Least disruption both short & long		

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- [x] Traffic signals
- [ ] Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- [x] Yes
- [ ] No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?
Thoughtful presentation	

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:

Email (if you wish to be included on our email update list):
EDPROTHAS@NWOLINK.COM

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
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2. Are you a
- [x] Year-round resident?
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- [x] Work in Sisters?
- [x] Shop primarily in Sisters?
- [x] Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		HAVING TO CROSS 3 STREETS "FRACTURES" THE TOWN LOSS OF PARKING	
Alternate Route	PHASED APPROACH		OVERHEAD PEDESTRIAN BRIDGE NEAR LOCUST & HWY 20

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- [ ] Traffic signals
- [x] Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- [x] Yes
- [ ] No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

What did you like about tonight's meeting?	Anything we could have done differently?
GOOD FORMAT VISUAL PRESENTATIONS HAVING MEMBERS OF THE ADVISORY COMMITTEE SPEAK TO THE PROCESS.	PROVIDE MATERIALS AHEAD OF TIME OR AFTERWARDS – DOCUMENTS MATERIAL TO THE PROCESS OR DECISION. PHOTOS, DRAWINGS, PDF'S, ETC.

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: John Morter

Email (if you wish to be included on our email update list):

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
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2. Are you a
- ☒ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☐ Work in Sisters?
- ☒ Shop primarily in Sisters?
- ☐ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		X	Won't work Not pedestrian friendly
Alternate Route	✓		Start by just putting in stop signs at Barclay & Camp Polk

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☒ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?
	No

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: FRANK E. ENGSTROM

Email (if you wish to be included on our email update list):

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
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- [x] Year-round resident?
- [ ] Seasonal resident?

3. Do you *(choose any that apply)*
- [ ] Own a business in Sisters?
- [ ] Work in Sisters?
- [x] Shop primarily in Sisters?
- [ ] Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		Does Not get the truck out of Down Town SISTERS	
Alternate Route	gets the trucks out of down Town SISTERS		if the truck are not diverted out of down Town Sisters you are wasting your time & money to encourage development & business to come to Sisters

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- [ ] Traffic signals
- [ ] Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- [ ] Yes
- [ ] No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:
Bill & Ronni Duff

Email (if you wish to be included on our email update list):

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☒ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☒ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☐ Work in Sisters?
- ☒ Shop primarily in Sisters?
- ☐ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		Still keeps too much traffic in town	
Alternate Route	Keeps through traffic from downtown area. Pedestrian friendly		Use traffic circles instead of t. lights to keep traffic moving

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☒ Roundabout !!

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

What did you like about tonight's meeting?	Anything we could have done differently?
Being able to provide input. Lots of well-presented info. Project Advisory Committee input.	Use microphone for hard of hearing seniors. Dim lights for best viewing of screen.

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Brad Boyd

Email (if you wish to be included on our email update list):

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a
- [x] Year-round resident?
- [ ] Seasonal resident?

3. Do you *(choose any that apply)*
- [x] Own a business in Sisters?
- [x] Work in Sisters?
- [x] Shop primarily in Sisters?
- [ ] Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet			
Alternate Route			

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- [x] Traffic signals
- [ ] Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- [x] Yes
- [ ] No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Doug Hancock

Email (if you wish to be included on our email update list):

1. Where do you live?
- ☐ Inside Sisters city limits
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- ☒ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☒ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☒ Own a business in Sisters?
- ☒ Work in Sisters?
- ☒ Shop primarily in Sisters?
- ☒ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet	traffic flow	destroys downtown area	
Alternate Route	very flexible, phased construction, more affordable		

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☐ Roundabout

start w/signals, sometime in future use roundabouts

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

What did you like about tonight's meeting?	Anything we could have done differently?
Chuck!	

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Bob Shaw

Email (if you wish to be included on our email update list):

1. Where do you live?
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2. Are you a
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- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☒ Own a business in Sisters?
- ☒ Work in Sisters?
- ☐ Shop primarily in Sisters?
- ☒ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet			abandon the idea
Alternate Route			try to "encourage" truck traffic to alternate route – Barclay as State Hwy??

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☒ Traffic signals
- ☐ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?
Concise overview.	

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:
ROGER ENGSTROM

Email (if you wish to be included on our email update list):
gramps hog@yahoo.com

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☒ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☒ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☐ Work in Sisters?
- ☐ Shop primarily in Sisters?
- ☒ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet		TRAFFIC CIRCLE @ A School crossing	forget the COUPLET Idea
Alternate Route	NO TRAFFIC CIRCLES	bulb OUTS ON CASCADE	TRAFFIC LIGHTS @ BRCLAY + 20 And LOCUST + CASCADE, MAKE ALTERNATE the Through ROUTE (HWY) + CASCADE the CITY STREET BUSINESS ROUTE

WITH PROPER SIGNAGE + SIGNALS ON the ALTERNATE ROUTE Showing IT AS the HWY. THERE WOULD BE FAR LESS TRAFFIC ON CASCADE + NO NEED for bulbouts...

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☒ Traffic signals
- ☐ Roundabout

TRY to REMOVE SNOW from A ROUNDABOUT OR STREET SWEEP bulb OUTS OR Roundabouts

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ■ Yes
- ☐ No +

(PREFER YOU LOOK AT Long term funding SAY 50 YRS INSTEAD OF 20 SO IT SPREADS OUT THE COST FOR THE South Bypass which is the ULTIMATE, SOLUTION IN THE FUTURE ANYWAY's

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

What did you like about tonight's meeting?	Anything we could have done differently?

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name:

Email (if you wish to be included on our email update list):

1. Where do you live?
- ☐ Inside Sisters city limits
- ☒ Outside Sisters city limits (within 1 mile)
- ☐ Outside Sisters city limits (more than 1 mile)

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- ☒ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☒ Own a business in Sisters?
- ☐ Work in Sisters?
- ☒ Shop primarily in Sisters?
- ☐ Regularly travel through Sisters?

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet			
Alternate Route	✓		Fine job by the committee. More study re: light vs Roundabout — Has there been any consideration to the elem. school relocation?

Thank you —

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☐ Roundabout See response pg 1

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☒ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?
Very informative	Great job —

Please drop your completed form in one of the Comment Drop Boxes located around the room.

Transportation System Plan Update
Community Meeting Comment Form
October 29, 2008

City of Sisters

Name: Erik Huffman

Email (if you wish to be included on our email update list):

erik.huffman@otak.com

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☒ Outside Sisters city limits (more than 1 mile)

2. Are you a
- ☐ Year-round resident?
- ☐ Seasonal resident?

3. Do you *(choose any that apply)*
- ☐ Own a business in Sisters?
- ☐ Work in Sisters?
- ☐ Shop primarily in Sisters?
- ☐ Regularly travel through Sisters?

I am an engineer from Bend who would like to be included on your email update list.
I'd rather not comment on the project. I'd just like to keep track of what's going on.

4. What are the best and worst features of each of the Hwy 20 alternatives (use back page if needed)?

Hwy 20 Alternative	*BEST*	*WORST*	*How to improve the solution concept*
Couplet			
Alternate Route			

6. To improve traffic flow and safety, the Hwy 20 alternatives may utilize multi-lane roundabouts or traffic signals at major intersections. Considering their differences in character (e.g. aesthetics, performance, driver expectation, property impacts, and cost) which of these two features do you prefer (select one)?
- ☐ Traffic signals
- ☐ Roundabout

7. Do you support the Project Advisory Committee recommendation that the alternate route is the preferred solution for Hwy 20?
- ☐ Yes
- ☐ No

If you answered no to Question 7, what solution for Hwy 20 would you prefer?

_____

_____

What did you like about tonight's meeting?	Anything we could have done differently?

Please drop your completed form in one of the Comment Drop Boxes located around the room.

CITY OF SISTERS

Transportation System Plan Update

Potentially Affected Interest Interviews
February 2008

jla public involvement

Collaborative planning, decisions & communication

City of Sisters
TSP Update
Potentially Affected Interests List

Business Owner on Cascade Ave.
Melissa Ward, Sisters Bakery, 549-0361
Rosie Horton, Common Threads, 549-5648
John Leavitt, Leavitt's Western Wear, 549-3161

Business Owner on Hood Ave.
Brad Smith, Paulina Books, 549-0866
Janet Brockway, Bedouin, 549-3079

Business Owner on Main Ave.
Angeline Rhett, Angelines, 549-9122
Jeff Perrin, The Fly Fisher Shop, 549-1419
Fred McCalou, Sisters Feed Store, 549-6165
Phil Arends, Desert Wings Travel, 549-8988

School/Parent Interests
Jana Novotony, Safe Routes to School Advocate, 549-8425
Leland Bliss, Sisters School District Facilities Manager, 549-8921, ext. 4017
Jan Silberman, Sisters Elementary School Principle, 549-8981

Bicycle Advocate
Chuck Humphries – will be on the CAC
John Rahm, Sisters Trails Committee, 549-8049

Neighborhood Reps
Wendy Holzman, 549-8558
Greg Zadow, 549-3534
Piper Lucas, 549-8555

Realtor/Developer
Rad Dyer, Ponderosa Properties, 549-2002
Bill Reed, Reed Bros. Coldwell Banker Realty, 549-6000
Shane Lundgren, Dutch Pacific Properties, 549-9630

Freight
Oregon Trucking Association

Sisters Area Chamber of Commerce
Tate Metcalf, Chamber Board President, 549-6878
Mike Robillard, 549-0251

Emergency Services
Taylor Robertson, Chief, Sisters-Camp Sherman Fire District, 549-0771
Dave Elliott, Board President, Sisters-Camp Sherman Fire District, 549-7829

Sisters TSP Update
PAI Interviews Summary Report

Introduction and Background
Ten one-on-one interviews were conducted with potentially affected residents and business owners within the Sister's community on February 6 and 7, 2008.

Interviews were conducted with people representing the following interests:

- Business owner on Cascade Avenue
- Business owner on Hood Avenue
- Business owner on Main Avenue
- School/Parent
- Neighborhood Representative
- Bike/Ped Advocate
- Freight/Transportation – Oregon Trucking Association
- Sisters Area Chamber of Commerce
- Emergency Services
- Realtor/Development

Purpose of the Interviews
- Assess the community's understanding and acceptance of the City's TSP Update approach.
- Increase the City and consultant team's knowledge of public needs, concerns and interests regarding this project.
- See problem/project through the eyes of potentially affected individuals.
- Establish relationships at the beginning of the process.

Overall Themes
- **Bicycle/Pedestrian Safety** – Bike and pedestrian safety was the most consistently noted concern. Narrow sidewalks, lack of bike lanes, traffic flow, and vehicle speed on Cascade Avenue were all mentioned as barriers to bicycle and pedestrian safety. Many residents and business owners were specifically concerned about bike and pedestrian crossings on Cascade Avenue.
- **Bike Lanes** – Stakeholders expressed significant support for the construction of city-wide bike lanes, specifically bike lanes that would address safety concerns in the downtown area and support safe routes to school for children and parents. All interviewees supported the construction of bike lanes as one of the most important short term transportation solutions for the Sisters area.
- **Support for Bypass** –There was large support for a Bypass option as the most viable and successful long term transportation improvement. The majority of interviewees selected only the Bypass option as the best improvement alternative.
- **Event and Holiday Traffic Congestion** – Representatives from the Freight community, businesses, parents, bike and emergency Services all mentioned the magnitude and negative impact of event and holiday traffic congestion on the city of Sisters. Increased

traffic flow during peak tourist season and special community events creates serious bike, ped and community safety concerns.

- **Locust/ Hwy 20 intersection** – Consistently noted as one of the worst intersections in the Sisters area by most of the stakeholders interviewed.
- **Coordination with ODOT** – There was a concern among many residents and business owners that coordination with ODOT may serve as the greatest obstacle in the success of the Sisters TSP Update Process.
- **Funding** – Both the availability of funds and an agency willingness to fund a community-selected transportation improvement option appeared consistently in conversations with potentially affected residents and business owners. Many felt that a lack of funds or lack of agency support for specific improvements would serve as the major obstacle.
- **City leadership and "special interests"** – Several groups mentioned a disconnect between the city's interests and the needs/interests of the larger community. Some felt that in order to ensure equal community representation on this project, residents from outside the UGB should be allowed to vote on decisions and express their support for transportation improvements. Others felt that a lack of city leadership allowed "special interest" groups to influence transportation decisions and contributed to a lack of common understanding and community goals.
- **Opportunity for Coordination with USDA Forest Service** - Several interviewees mentioned the opportunity to coordinate with the Forest Service to purchase 80 acres of land that could potentially be used to build a bypass.

Below is a summary of individual interview comments and concerns.

Business Owners on Cascade Avenue

Business owner on Cascade Avenue emphasized the importance of maintaining the unique and small town community character of Sisters. Traffic congestion and pedestrian/bicycle safety were both identified as serious problems to be addressed by the TSP update. Interviewees expressed a strong support for the Bypass option, as well short term improvements such as bike lanes, bike racks, stop lights and school crossing sights.

Other improvement suggestions included sidewalk widening, traffic signals and stop signs on Larch and Fire, as well as the construction of pedestrian walkways that would cross over Cascade Avenue supporting both an architectural "destination" and pedestrian safety during heavy congestion periods.

Problems and Concerns (existing)	• Traffic congestion during July and August • Preserve town's character (small, safe and family-oriented)
Project Obstacles	• Business interests and personal interests standing in the way of making a decision that is best for the entire town
Overcome Obstacles	• Give a voice to those that are focused on the town's best interest
Short-term solutions – Vehicle/traffic improvements	• Stop lights • Stop signs and school crossings on Larch Street • Stop sign at Sisters Drug Corner • Use Barclay Road for alternate route as a short-term solution
Short-term solutions – Bike and Ped Improvements	• Add Bike lanes on Main or Adams NOT on Hood • Signals and stop signs at Larch and Fir • Widen sidewalk to provide safe walking area for pedestrians
Long Term Solutions	• Bypass – Use Barclay road as alternate route • Bike lanes and bike racks on Adams • Ped walkways across Cascade – architectural design/ destination • Stop lights
Bike Routes and Biking Destinations	• Routes: Side Streets and not on Cascade • Destinations include: Restaurants, bike shop (Euro sport), school, shops
Barriers to Walking and Biking	• No clear bike paths • No inviting bike racks to secure bike parking • Narrow sidewalks on both sides of Cascade • No stop signs or signals on Cascade for safe ped crossings (or for ADA)
Congestion	• Fir and Cascade
Community Outreach	• Nugget Ad • Radio Stations • School Flyers • Pass out handouts at local businesses, careful with the message • Water/sewer interest
Other groups to contact	• Cascade Gifts • Librarian • Liquor store owner

Business Owners on Hood Avenue

Bike and ped safety is a concern for the Hood Avenue business owner, specifically heightened safety concerns during peak tourist season, community events and holidays. Strong support for short term solutions such as bike paths, traffic signals, and restricted left hand turns on Cascade, Elm, Pine and Locust/Cedar. Retaining parking on Hood Avenue was sited as an important project goal, and while the Bypass option was selected as the best long term solution to transportation concerns in the area, interviewees also supported construction of an Alternate Route as a temporary fix to quickly address community safety concerns.

Problems and Concerns (existing)	• Preserve parking downtown for businesses on Hood • Keep foot /bike traffic in the downtown core business areas • Alternate Route
Project Obstacles	• Acquiring property from the elementary school for an alternate route – could reduce school safety • Funding/Construction time for Bypass alternative
Overcome Obstacles	• Talk with Elem school about future improvement/location plans • Apply for fed/state grants, rural development grants • Marketing – ODOT and community members
Short-term solutions – Vehicle/traffic improvements	• Restrict left hand turns on Cascade, Elm, Pine and Locust/Cedar to lead onto Hood • Designate alternate route used for holidays/ special events
Short-term solutions – Bike and Ped Improvements	• Design bike paths on Camp Polk for children(safe shoulders) • Signal lights at Barclay and Hwy 20 w/ lighting for ped safety • Widen Hwy 20 at intersection with Hwy 126.
Long Term Solutions	• Bypass – Not sure that an alternate route would accommodate 2020 growth projected • Alternate Route – Include bike lanes, sidewalks, ensure feasibility with schools and new commercial and residential developments along McKinley Butte.
Bike Routes and Biking Destinations	• Routes: Hood, Main, Camp Polk, Elm • Destinations include: Buckrum Trail (bike trail), Three Creeks, Camp Polk to trails outside UGB
Barriers to Walking and Biking	• Camp and Polk/Hwy 20 for Elementary school needs better lighting at intersections • No bike lanes on Barclay • Barclay and Hwy 20 intersection needs better lighting and turnouts at intersection
Congestion	• Cascade and Fir Street • Problems show up during holidays and special events • Hwy 20 and Barclay
Community Outreach	• Nugget Ad • Radio Stations • School Flyers • Post office bulletin board • Athletic Club bulletin board • Notices to new developments outside of town

Business Owners on Main Avenue

Business owner on Main Avenue identified bike and ped issues in the business cove area as one of the most significant problems that should be addressed by the Sisters TSP update. Traffic congestion along Cascade Avenue was also mentioned as an issue, although ranked at a lower priority for business owners along Main Avenue. Interviewees mentioned that a lack of bike lanes and on-street parking limits bike and ped mobility in/throughout Sisters. Traffic congestion and flow on Cascade makes ped and bike crossing difficult and dangerous.

The Locust/Hwy 20 intersection was identified as the worst intersection in the Sisters area, and recommendations for improvements to this intersection included a roundabout that would allow for traffic moving on Hwy 20 to keep moving. Recommendations for short-term improvements included increased turning lanes on Cascade, increased traffic signals, bike lanes, and peak season alternate routes.

Problems and Concerns (existing)	• Bicycle and pedestrian safety • Traffic congestion on Cascade Avenue
Project Obstacles	• Funding
Overcome Obstacles	• Getting residents behind the program and preferred alternative
Short-term solutions – Vehicle/traffic improvements	• Left turn lanes on cascade (take parking away). • Alternate routes during the summer peak season. • Traffic signal at elementary school/HWY 20 • Traffic signal at Barclay and Hwy. 20.
Short-term solutions – Bicycle and Pedestrian Improvements	• Create better bike paths within the city limits • Traffic signals at the elementary school and Hwy 20. • Widen Cascade for bike/ped access and move parking to Hood and Main and side streets
Long Term Solutions	• Bypass could be Barclay alternative route. Need signage, widening and turn-offs. Identify as "truck route" for peak season
Bike Routes and Biking Destinations	• Routes: Sides Streets, Main Avenue, Hood Avenue • Destinations include: Village Green Park, City Park, Bank, Schools, Post office, Athletic Club (Five Pine)
Barriers to Walking and Biking	• Limited bike paths and no bike lanes • Parking on Cascade limits mobility • Traffic on Cascade creates safety concerns (crossing)
Congestion	• Locust/Hwy 20 intersection
Community Outreach	• Nugget Ad • Radio Stations • School Flyers • High School Email Blast • Chamber of Commerce Email • Health Club/Bank Bulletin
Other groups to contact	• Business owners in Industrial Park along Barclay alternate route • Civics and Government Teachers as well as High School Leadership Teacher
Best Project Result	• Community Consensus on solution

School/Parent

Bike and ped safety was the major concern for School/Parent representative. A lack of separate bike lanes and bike/ped routes restricts visibility and limits opportunities for parents and children to commute safely. Other concerns included traffic congestion and safety concerns at Locust and Hwy 20 intersection.

Suggested improvement (both short term and long term) included: Increased signage (specifically for bike/pedestrians), Build outs and curb extensions, designated "park and walks" located on the east and west ends of town, as well as supporting an increased community awareness about the benefits of walking and biking.

Interviewee supported Bypass option and had strong concerns about the impacts of an Alternate Route, specifically the potential impacts to the Elementary school.

Problems and Concerns (existing)	• Heavy traffic on Hwy 20 • Pedestrian/bike/child safety crossing Hwy 20 • Sidewalks and separate bike lanes
Project Obstacles	• Bypass – no one wants a bypass in their backyard • Funding • Community Awareness – biking and walking
Overcome Obstacles	• Redirect transportation dollars to bypass solution • Chart ODOT and save cost used for couplet for a long term fix (i.e.: Bypass) • Use other cities to demonstrate the benefits of a walkable/bikeable city
Short-term solutions – Vehicle/traffic improvements	• Park and Walk: Locate public parking lots at the east and west ends of town so that people can walk and/or ride their bike into town
Short-term solutions – Bicycle and Pedestrian Improvements	• Bike Paths – separate paths for safer bike travel along Jefferson Street and Elm Street • Increase bike/ped friendly connections to parks, schools and downtown • Use alleys as ped routes (between Main, Cascade and Hood) • Provide signage for directions and yield • "Build outs" and curb extensions
Long Term Solutions	• Bypass – Completely avoids the entire city • Negative aspects of Alternate Route – Impacts to Elementary school (district just finished planning a $2 million investment to improve existing elementary school) • Separate bike paths increasing connections between town and middle school as well as from Jefferson to the Five Pines area • Underpass pedestrian crossing for pedestrians and children to and from school
Bike Routes and Biking Destinations	• Routes: Elm Street leading to Village Green Park and to Three Creeks trail head, Jefferson Street, Barclay

Barriers to Walking and Biking	• Bike lanes on Camp Polk are not used due to the high speed traffic and the fact that bike lanes are too close to the traffic • Crossing Hwy 20 • No bike lanes downtown • No sidewalks (except on Hood, Main, Cascade, and new developments)
Congestion	• Locust/Hwy 20 intersection • Create a pedestrian crossing at Cedar and Hwy 20
Community Outreach	• Nugget Ad • Radio Stations • School Flyers • Display plans and alternatives on the City website and at City Hall • Water/sewer bill inserts
Other groups to contact	• School district representatives • Five Pine Developer
Best Project Result	• Bike paradise • Reduce local car traffic and through traffic impacts

Neighborhood Representative

Interview responses indicated that there was a potential disconnect between city government representatives and those residents living outside of the UGB. This internal tension, coupled with ODOT's previous attitudes/actions towards coordination with the City could potentially create serious obstacles to the implementation of successful transportation solutions. Representatives from the Sisters area neighborhood associations indicated support for a Bypass option due to the long term benefits and support of community livability.

Major concerns for neighborhood representative focused on bike and ped safety. Suggestions for improvements included: visible ped and bike crossings, restricted left hand turns, center refuges, speed control, and increased signage to increase bicycle and ped visibility.

Problems and Concerns (existing)	• Pedestrian un-friendly • Long term solutions – look forward 10/15 years
Project Obstacles	• Disconnect between city government and the people outside the UGB who cannot vote • ODOT attitude towards coordination
Short-term solutions – Vehicle/traffic improvements	• NOT in favor of a couplet • Redo Cascade with left turns, center refuge • Create more visible crossings, more signs to control speed limits through town
Short-term solutions – Bicycle and Pedestrian Improvements	• Can't make Cascade Safe
Long Term Solutions	• Bypass – all other ideas will wear out in a few years • Bypass is the key to livability for this town – current set up is frustrating for teachers, travelers and locals
Bike Routes and Biking Destinations	• Routes: To schools • Destinations include: Washington Park to Park and Trail use off of Elm
Barriers to Walking and Biking	• Locals are good about stopping for both bikes and peds
Congestion	• Locust/22nd – terrible for pedestrians • Hwy 20/126 – difficult for all vehicles especially bikes
Community Outreach	• Nugget Ad • Radio Stations – High School Station • School Flyers • Community Bulletins

Freight – Transportation

The representative from the freight community seemed most concerned with pedestrian and bicycle safety. Other concerns included increased congestion during holiday and community events as well as bike lanes and safe and protected crossings for pedestrians. The freight community noted that constant coordination with ODOT could serve as the key to moving forward with a viable bypass option for the community.

Project Obstacles	• Coordination with ODOT on Bypass option • Funding
Overcome Obstacles	• Need to coordinate with ODOT to ensure that they are a main player in the TSP update progress.
Short-term solutions – Vehicle/traffic improvements	• Create alternative/bypass route for truck traffic with signage for special events and holidays
Short-term solutions – Bicycle and Pedestrian Improvements	• Maintain and include bike lanes for existing roads • Create cycling alternative routes north or south of Hwy 20 • Overhead (covered) walkways for pedestrians
Long Term Solutions	• Bypass around town with no signals
Bike Routes and Biking Destinations	• Routes: North and South of main drag
Barriers to Walking and Biking	• Unsafe street crossings
Congestion	• No intersection in particular • Drivers identify increased congestion and delay time during holidays and special community events
Community Outreach	• Nugget Ad • Radio Stations • School Flyers • Bend Bulleting – which covers the majority of Deschutes County
Other groups to contact	• Involve Oregon Trucking Association through email updates • Fuel companies • Flatbed/lumber companies • Haulers
Best Project Result	• Safety – bicycle, pedestrian, vehicle

Sisters Area Chamber of Commerce

The representative from the Sisters Area Chamber of Commerce emphasized the negative impacts of commuter congestions and traffic on local businesses, pedestrians and cyclists. The Locust and Hwy 20 intersection was specifically mentioned as one of the worst and most dangerous intersections in the Sisters area. Interviewees indicated a strong support for a Bypass option, specifically to get large trucks and peak season traffic flow out of town – supporting bicycle and pedestrian safety.

Problems and Concerns (existing)	• Commuter congestion • Locust and Hwy 20 intersection • Bike and pedestrian safety
Project Obstacles	• Selling the solution to the community
Overcome Obstacles	• Put people over or under the HWY • Get people outside of the UGB engaged in the process
Short-term solutions – Vehicle/traffic improvements	• Temporary re-route during the summer months and on weekends
Short-term solutions – Bicycle and Pedestrian Improvements	• Get more people on bikes • Create central bike parking downtown • Create safe pedestrian crossings across Hwy 20
Long Term Solutions	• Bypass – Get big trucks out of town • Decrease volume on roads • Support bicycle transportation as a form of traffic not only as recreation • Increase bike access from downtown to trails and other destinations • TSP should deal with how to get outside the UGB development dwellers into downtown
Bike Routes and Biking Destinations	• Routes: Back roads and side streets
Barriers to Walking and Biking	• Unsafe - Streets are narrow with cars on both side • Traffic on main streets are dangerous – many commuters are tourists and are not looking for bikes/peds
Congestion	• Locust/Hwy 20 intersection • Pine and Hwy 20
Community Outreach	• Nugget Ad • KLVR and KBND • School Flyers • Barclay Square pedestrian crossing and public bathrooms • Bend Bulletin • Chamber Email list
Best Project Result	• Change the image of sisters – not congested and safe

Emergency Services

The greatest concern for this stakeholder was the impact existing traffic congestion has on emergency response time. Bike and ped safety in the downtown corridor was also cited as a concern, and something that needed immediate action. Suggestions for short term solutions included: preservation and improvement of the regional trail system (increase downtown access), alternate route, turning lanes and traffic lights at Barclay/McKinley Butte and Hwy 20 intersection, bump-outs and demarcation, restricted speed limits and a city wide street plan for bicycle/ped improvements.

Problems and Concerns (existing)	• Safety – for Pedestrians • Safety – Response time for emergency responses
Project Obstacles	• Funding – Availability of funds to support a long term solution • Lack of direction and leadership from the city council/political will • Special interests – lack of a common understanding and goals • Rift between the Businesses and the city
Short-term solutions – Vehicle/traffic improvements	• Alternate Route is good option for public safety, kids, traffic risks • Turning lanes / traffic lights at Barclay/McKinley Butte and Hwy 20 intersection
Short-term solutions – Bicycle and Pedestrian Improvements	• Trail System – preserve and improve • Adopt citywide street plan • More traffic calming; Improve visibility • 20 MPH needs to stay • Bump-outs and Demarcation
Long Term Solutions	• Sale of USFS parcel HWY 20 to Barclay – impact possibilities for facility and west end • Re-route Brooks-Scanlon haul route south of Sisters to keep log trucks out of town
Bike Routes and Destinations	• Destinations include: Trail System
Walking/Biking Barriers	• Speed limits – both ends of town dangerous for bikes and peds
Congestion	• Barclay/McKinley Butte and Hwy 20 –worst accidents occur. Need turning lanes and traffic lights at this intersection • Locust and 22nd – safety at the elementary school • Hwy 20/126 junction • Elm/Hwy 20
Community Outreach	• Nugget Ad • Radio Stations • School Flyers • Water/Sewer Insert
Other groups to contact	• Barbershops • Whole Foods • Ray's Grocery • Post Office • Realtor • USFS
Best Project Result	• Community Consensus, Citywide agreement w/County and ODOT

Realtor/Developer

Representatives from this interest group also indicated strong support for a Bypass option as the long term solution for the region. Traffic congestion during holidays, tourist season and community events compounded with the negative impacts and safety concerns created by large trucks and RV's traveling through downtown were referenced as the top two concerns the TSP update process should address. Support for transportation improvements and features that would assist in the safe and protected mobility of cyclists and pedestrians across Cascade and through the Barclay/Hood Avenue Corner were heavily referenced.

Problems and Concerns (existing)	• Trucks and RV traffic through downtown • Barclay/Hood Avenue Corner • Traffic congestion during holidays and special events • Through-traffic impacts and congestion
Project Obstacles	• Coordination w/ODOT – Does not seem to support Bypass option
Overcome Obstacles	• Talk with Forest Service about purchasing 80 aces to develop Bypass/route on
Short-term solutions – Vehicle/traffic improvements	• Hood/Cascade
Short-term solutions – Bicycle and Pedestrian Improvements	• Move pedestrians and bikes over or under • Increase trail linkage and safety on side streets
Long Term Solutions	• Bypass: Preferred by most residents
Bike Routes and Biking Destinations	• Routes: Sides Streets • Destinations include: Bike trails are at the edge of town. New development approvals include looking at trail access
Barriers to Walking and Biking	• Unsafe bike/pedestrian Hwy crossing
Congestion	• Barclay and McKinley Butte • Locust and Hwy 20
Community Outreach	• Nugget Ad • Radio Stations • School Flyers • www.outlaw.net (meet for coffee and doughnuts 2nd and 4th Tuesdays) • Bulletins
Other groups to contact	• Other Developers
Best Project Result	• Resolution

Bike/Ped Advocate

The interview candidate from this interest group indicated strong support for transportation improvements to accommodate safe bicycle and pedestrian travel. In contrast to other interest group representatives, Bike/Ped Advocates supported the Couplet option as the most viable and effective option for enhancing the city and supporting bike and pedestrians. Other suggested improvements included strong support for a pedestrian mall at Cascade Avenue as well as the construction of a middle turning lane and restricted (seasonal) left hand turns at Pine, Locust, and Elm.

Problems and Concerns (existing)	• Congestions during peak tourists season • Bike and Pedestrian friendly in City Vision and Concept Plan but not in actuality
Project Obstacles	• Parking – put diagonal parking on Cascade • Crossings and Couplets – one way traffic so it is easier to cross
Overcome Obstacles	• Couplet is not an option that everyone likes – this option would need strong leadership
Short-term solutions – Vehicle/traffic improvements	• Middle turning lane • Restrict some streets to no left turn (limit to 3 intersections) – Pine, Locust, Elm in the summer • There are urban renewal funds available for Main, Hood and Cascade
Short-term solutions – Bicycle and Pedestrian Improvements	• Jefferson and Adams for east/west lanes • Cross town connectivity • Only cross on one side on north/south intersections to be highly visible
Long Term Solutions	• Couplet can be done in a way that would enhance the city • Close off blocks on either side of Barclay Park and make it a pedestrian/bike mall extension
Bike Routes and Biking Destinations	• Routes: Jefferson – East/West corridor for bikes, Adams, Alleys as possible route although not continuous
Barriers to Walking and Biking	• Cascade – Narrow streets and parked cars separated path may not be safety way to go in terms of the visibility of bikes
Congestion	• Locust at 22nd – More regular school and housing, crowded and dangerous
Community Outreach	• Nugget Ad • Radio Stations • School Flyers • Water/Sewer Insert • Trails Email
Other groups to contact	• Others in support of closing Cascade to create a pedestrian mall
Best Project Result	• Pedestrian Mall with traffic split around it

CITY OF SISTERS

Transportation System Plan Update

Project Advisory Committee
March - December 2008

jla public involvement

Collaborative planning, decisions & communication

Project Advisory Committee Rooster
Transportation System Plan Update

Revised 3/19/08

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City of Sisters:
Transportation System Plan UPdate

Project Advisory Committee (PAC)
Protocols

Revised March 19, 2008

Purpose of Partnering Protocols

For any collaborative process to proceed smoothly, it is helpful for those involved to agree at the outset on the purpose of the partnership and on the procedures by which the group understands it will conduct its interactions and discussions. The purpose of this document is to outline the Project Advisory Committee's role and responsibilities and to establish meeting and communication procedures.

Committee Role

The City of Sisters has established a Project Advisory Committee whose members represent a range of project impacted, interested and influential stakeholders. The Committee will meet up to five times between March and October 2008 to review findings and analysis, discuss transportation solution ideas and provide guidance to the Project Team on updates on the TSP Update recommendations. Project team members include the consultant team led by DKS Associates, and staff from the City of Sisters, Oregon Department of Transportation and Deschutes County.

Responsibilities

Project Advisory Committee will

- Advise the Project Team and the TAC about ideas, concerns, observations and experiences regarding traffic, safety, land use and livability issues that may affect the planning process.
- Represent the interests and perspectives of their constituencies.
- Communicate project progress to their respective constituencies and convey feedback to the Project Team.
- Ask questions and seek information to ensure understanding.
- Actively participate in the project by contributing to project meetings and reviewing materials before meetings.
- Strive to attend all meetings and arrive on time.
- Notify the designated city staff (Kathy Nelson) if you will be late or absent.
- Abide by the PAC protocols.

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The facilitator will

- Ensure that everyone has an equal opportunity to participate.
- Solicit comments and perspectives from many PAC members before a member speaks multiple times on an issue.
- Keep meetings moving and focused on the agenda.
- Start and end meetings on time unless the group agrees to extend the meeting time.
- Provide time for public comment at the beginning of each meeting and ensure that public comment is an item on each agenda.
- Enforce PAC protocols.

Meeting Ground Rules

- Respect the views of others.
- Listen to others with the intent of understanding.
- Let others finish before speaking.
- "Share the air" - let others speak once before speaking twice.
- Ask questions when you don't understand.
- Raise issues honestly, clearly and early in the process.
- Focus questions and comments on the subject at hand and stick to the agenda.
- Focus on the future. When discussing issues of the past, give clear examples and link the past to the future.
- Avoid side discussions.
- Voice concerns and complaints in the meetings.
- Put cell phones on silent mode.
- Have fun.

Meeting protocols

- Meetings and committee discussions will be facilitated.
- Meetings will be approximately 2-hours and begin and end on time. If agenda items cannot be completed on time, the group will decide if the meeting should be extended or if an additional meeting should be scheduled, subject to approval by the City of Sisters.
- Agency and city representatives may respond to committee members' questions and participate in discussions at PAC meetings.
- Facilitator will provide opportunities for public comment at the beginning of each meeting not to exceed 10 minutes of allotted meeting time or 3 minutes per individual without the committee's consent. The committee can request additional opportunities for public comment if they see fit.
- Ground Rules will be displayed at all committee meetings
- Meeting materials will be distributed by e-mail at least one week before the scheduled meeting. Reference materials and project background may be distributed at the meeting, as needed.
- Meetings summaries will be prepared and distributed with other meeting materials ten (10) business days following the meeting. During a meeting, members can request a particular minority viewpoint be captured in the meeting summary.
- Alternates or proxies are not allowed.

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- Representatives from the Oregon Department of Transportation and Deschutes County may attend committee meetings to observe and provide technical expertise as needed. They will not be voting members of the committee.
- Meetings will be open to the public to observe; public comment can be given at committee meetings or community forums.
- Prior to the meeting, comments on non-agenda items should be provided in writing to Eileen Stein, City Manager for the City of Sisters (541-323-5205).

Communications outside meetings

- Individual committee members are encouraged to share the PAC's progress with their respective constituencies at meetings, by e-mail or through newsletters.
- Committee members will notify the Mayor Brad Boyd (541-815-5474) about any news media inquiries and refer requests for official statements or viewpoints about the project to the City of Sisters. Committee members will not speak for the PAC to the media, but may offer personal views.

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CITY OF SISTERS

Sisters TSP Update
Project Advisory Committee
Meeting #1
March 18, 6-8:45pm

PAC Members Present:	Bruce Bowen, Jeff England, Doug Hancock, Chuck Humphreys, Jerry Norquist, Bob Shaw, Leslie Waltz and Mayor Brad Boyd
PAC Members Absent:	Jean Keenan and Carey Tosello
Others:	Eileen Stein, Brad Grimm (City of Sisters), Jim Bryant (ODOT) and Peter Russell (Deschutes County)
Consultant Team:	Carl Springer and Chris Maciejewski (DKS), Christine Egan (JLA)

I. Introductions/ Welcome

Mayor Boyd opened the meeting, expressed excitement to begin working on the TSP Update. Mayor introduced Carl Springer from DKS, who presented Chris Maciejewski (Traffic Engineer, DKS) and Christine Egan (Public Involvement Specialist, JLA). Christine initiated a round-robin exercise for committee self-introductions. Each PAC member stated their name, affiliation, number of people they knew on the committee, and their interest in the project and/or serving on the committee. Lists of PAC member interests:

a. Grant writer for Safe Routes to School program
b. Must travel through Sisters to get anywhere
c. Planning commissioner (Chuck Humphreys)
d. Maintain city's character as "small town", sense of community, livability
e. Maintain mobility needs
f. Choose to live in Sisters/Sisters area
g. Can provide insight from other TSP processes in other cities
h. Concerned about pressure to move additional traffic through town
i. Member of the City's citizen involvement committee
j. Competing interests, finding balance, formulating solutions
k. Executive Director of Cycle Oregon, bike advocacy
l. Transportation infrastructure- statewide (Oregon as bellwether state)
m. Ensure that options and recommendations mesh with county plans/standards
n. Participated in earlier advisory committees for City transportation processes
o. Organize annual Quilt Show

II. Project Overview and Decision Making Process

Carl presented a PowerPoint presentation. Highlights:

a. We are drafting a complete transportation plan, not just a highway plan. Our time horizon is 20 years, forecasting for 2030. With regards to project schedule, we will move August PAC meeting to September. The plan that DKS forwards will be considered by the Planning Commission this fall, and then forwarded to City Council to consider and adopt. The PAC will have a take home assignment to start thinking about strategies and priorities

for bike and pedestrian mobility and safety. Carl emphasized that no solutions are proposed at this point. The last TSP chapter will address financing options for TSP.

b. PAC Questions:

Q: Is project financing an ongoing discussion or something we do at the end?

DKS response: We try to do it incrementally but without solutions recommended, we can't talk in details

Q: How does ODOT feel about this process?

ODOT response: ODOT will be a part of this process, and that is why we are at the table. Typically these projects don't come out fully funded. We will have to work it out. ODOT needs to be in agreement with the City as a service provider.

Q: What is the timing for the project?

DKS response: Probably break the projects down, similar to a capital improvement project cycle: short, mid and long range projects that you roll out with a coordinated budget (5, 10, 20 years)

Q: What if you do something today you may not want ten years down the road? Do you make that investment now, knowing it may need to be redone in ten years?

DKS response: This Committee will discuss a graduation process with transition points. This will involve the financing piece.

Q: We need to be creative because transportation funding is limited.

III. Committee Roles, Responsibilities, and Operations

Christine reviewed the draft protocols and noted a change in the roles of other related committees. TAC and Project Team will be merged into one group, and all members will attend PAC meetings. Committee also provided comment and changes to the draft document. Changes will be made and revised document sent to PAC and the project team.

a. Regarding ground rules, strike: "Voice concerns and complaints at the meeting, ~~not outside of after the meeting."~~

b. Regarding meeting protocol, add: "Meetings… or if an additional meeting should be scheduled <u>upon approval by the city manager</u>"

c. Regarding meeting protocol, change: "Meetings will be <u>3 hours</u> and"

d. Regarding media communication, replace Eileen Stein with Mayor Brad Boyd: "PAC members will notify <u>Mayor Brad Boyd</u>

IV. Reviewing Existing Needs Analysis, Future Forecasts and Future Needs

DKS announced that consultant team is available to meet with individual PAC member (no more than 4 to avoid a quorum) before or after PAC meetings to review and discuss technical materials and consider changes. DKS will meet with Bruce Bower, Chuck Humphries and Mayor Boyd tomorrow morning at 7:30am to go over technical memos. See attached PowerPoint presentation for talking points and highlights:

a. PAC Questions:

Q: Can the committee review your assumptions for land use around Sisters, as that would heavily influence the forecasting?

City Manager response: The data DKS used was based on population growth for the City, which was also used for the City's recently updated comp plan and wastewater plan.

Q: Did you consider potential changes like elementary school moving/relocating?

Q: Are your traffic volumes influenced by what's going on in Jefferson and Deschutes counties?

Q: The figure showing 45 percent of highway traffic is going through town rather than stopping. That is a surprising number
DKS response: Surprised us too, but matched our real world inputs.

Q: Things have changed since 2001 (last TSP), land use has definitely changed.

Q: Question about Automatic Travel Recorder (ATR)
ODOT response: ODOT collects data throughout the year to get seasonal trends
DKS response: In response to PAC request, we will send ATR data electronically to PAC members

b. Facilitator raised a question to PAC members noting that some PAC members will want to review technical data more closely, which may require additional PAC meetings. How do other PAC members feel about the PAC's scope of work and what level of detail do you want to consider during our PAC meetings?

Leslie and Jean: Community as a whole wants to have this information and we want to know that it is correct. If it is, the PAC doesn't' need to go over it at every meeting in detail.

Doug, Jerry and Jeff: PAC's time is best spent at the policy level, but we want to know the data is correct. We need to understand what the data is telling us.

Bob: I assume we use the data to look for trends, not specific details: too much detail may lie outside scope of work for the PAC.

PAC Consensus:

- Consultant team will review input points needed from PAC and forums to determine if need additional PAC meetings.
- Meeting with individual PAC members who want to review and discuss tech data and calculations in more detail.

V. Next Steps- Review Alternatives

a. Refer to Carl's Powerpoint presentation for details

b. Alternatives Reviewed
- No build
- Change uses on existing highway
- Hood/ Main Couplet
- Cascade/ Hood Couplet
- Cascade/ Main Couplet
- Alternative Route- Barclay
- Easterly Alternative Route
- Close-in bypass (from 2001, TSP)
- Outlying Bypass

c. PAC Responses to list of alternatives to consider/Other options to add:

Q: Buckaroo Trail/Hwy 20 intersection (connects to Desperado Frontage Road)?
DKS response: We will talk to the City about adding this intersection to the scope.

Q: Team should look at Five Pine area

Q: Indian Fjord

Q: Are changes planned for Hwy 126 and Hwy 20 intersection (Buckaroo connection).
ODOT response: No change anticipated for realigning this intersection. But this may be something to keep in mind.

d. Jim Bryant, ODOT: The Buckaroo Trail/Hwy 20 option would lie outside the jurisdiction of this TSP. This idea would be illustrative of where you would have another jurisdiction having to adopt this plan as part of their transportation planning/TSP, i.e. Deschutes County. The County isn't scheduled to start their TSP planning for at least 3-4 months. Issues to consider: How would you rely on a solution outside of the City's authority?
e. Committee voted to extend the meeting to 8:45pm by voice vote

Next Committee meeting is tentatively scheduled for Tuesday, May 7, 6-9 pm at City Hall (pending City approval)

CITY OF SISTERS

Sisters TSP
PAC #2 Meeting Summary
May 6, 6-8:45pm
Sisters City Hall
Revised 6/12/08

PAC Members Present:	Bruce Bowen, Mayor Boyd, Jeff England, Doug Hancock, Chuck Humphreys, Jean Keenan, Bob Shaw, Carey Tosello, Leslie Waltz
PAC Members Absent:	Jerry Norquist
Project Team:	Eileen Stein, Brad Grimm and Eric Porter, City of Sisters Jim Bryant, ODOT Peter Russell, Deschutes County
Consultant Team:	Carl Springer and Chris Maciejewski (DKS) and Christine Egan (JLA)

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1) **Meeting Agenda and Introductions**
   a) Christine Egan, facilitator, welcomed everyone, asked if there were any changes to Meeting #1 Summary. None requested.
   b) Christine surveyed PAC members to see how many attended the Bike / Ped Workshop on April 29. Six PAC and two audience members attended the event.
   c) Reviewed agenda.

2) **Summary from "Safe Routes to Schools Workshop"**
   a) a. Chris presented results from the workshop as summarized by Alta.
      (1) Results from a dollar allocation exercise at the event indicated that "Engineering" garnered the largest community support. Other categories included: Enforcement, Education, Encouragement and Evaluation
      (2) Chris reviewed a map of existing bike and ped facilities with identified issues and problems, as reported from workshop participants.
      (3) Chris confirmed that a final event summary and a SR2S plan will be presented to PAC members at the next meeting to review and comment.
      (4) Comments from PAC members about the event:
         (a) Chuck: Locust could use a sidewalk. Crossing Locust is a problem
            (i) Comment: "There are a number of dirt trails where people are trailblazing short cuts"
         (b) Chuck: Not impressed with note taking during this particular exercise (*identifying problems/issues on map*) at the workshop
         (c) Eileen: I believe during this process, facilitators were trying to encourage people to write their ideas down on the maps and flipcharts. There was much more discussion than facilitators could keep up on.
         (d) Mayor Boyd: Connection between Tollgate and school is the best connection we have. Right now it is crushed gravel.

3) **Review Ranking for Bike and Ped Strategies**
   a) Chris presented results from PAC homework for Bike and Ped Strategies. DKS received comments/rankings from five PAC members. Chris reminded the group that the consultant team will use this feedback on priorities to help guide transportation investments and improvements.
      i) The top five **ped strategies** ranked by those who completed homework:
         (1) Construct crossing enhancements
         (2) Fill gaps in existing sidewalk network
         (3) Balance the needs of all users
         (4) Fill gaps or improve sidewalk on arterials and collectors
         (5) Connect residential areas to key generators.
      ii) PAC Comments:
         (1) Chuck: I saw a lot of overlap in the strategies listed. I combined them into categories: Connections, Crossings and Filling Gaps
         (2) Chris: Are we are on the right track based on this ranking? If we group strategies in this way, how does the committee feel?
      iii) PAC voted to support prioritizing ped strategies by three categories:
         (1) Safe crossings for pedestrians
         (2) Focus on connectivity
         (3) Address gaps where identified
   b) Chris presented ranked **bike strategies**, per PAC homework/rankings
      i) Chuck suggested revised categories:
         (1) Connections (tied for first place)
         (2) Bicycle lanes (tied for first place)
         (3) Signing (as related to safety, directional/guidance)
         (4) Balance user needs
      ii) PAC Comments
         (1) Mayor Boyd: We are not directing Alta to look at bike lanes on every street, i.e. Highway 20, particularly when there are functional lanes on adjacent streets and routes.
         (2) Jim Bryant: What are the city's policies for bike facilities? Does it require alternative parallel routes? Do bicyclists want to get to the same places as cars?
         (3) Mayor Boyd: We don't need bike facilities on Cascade Avenue.
         (4) Bob Shaw: We need a specific bike/ped plan to review, wrapped into TSP.
         (5) Chris: We don't yet have enough information to discuss bike/ped costs as related to different alternative packages.
      iii) PAC votes to support prioritizing bike strategies by three categories:
         (1) Connections
         (2) Bike lanes to fill in gaps in the system
         (3) Signing (safety, directional and guidance)
      iv) Group assumed that bike strategies would inherently consider "Balancing user needs", and therefore, declined to include category in ranked strategies.

4) **Present Highway Evaluation Criteria for Alternative Screening Process**
   a) Christine briefly reviewed group process to present and prioritize alternatives for further study.
   b) Chris/DKS explained the need to screen the 11 options so the project team could conduct

a more focused analysis on a smaller subset. Chris acknowledged that the PAC may choose to not screen any options at this point.

i) This level of screening would be based primarily on qualitative criteria to present a snapshot of the project and its costs, timeline and impacts. Criteria sources drawn from:
   (1) Previous Sisters TSP
   (2) State guidelines
   (3) What other cities have used in developing their TSPs
   (4) Feedback from the December 2007 Open House where participants were asked to rank identified transportation goals and policies. Participants ranked "livability" as the number one goal, with "safety" as second.

ii) Draft screening measures developed from these ranked goals and policies – Examples:
   (1) Screening measures for Livability goal: Barrier effect, neighborhood impact and freight trucks through downtown.
   (2) Screening measure for Safety goal: Study area crash rates
   (3) Screening measures for Economic Vitality goal: parking impacts and developed property impacts.

c) PAC Comments:

i) Bruce: I don't see a strong match between what is listed on goals and policies and the top row on the matrix.

ii) Chuck: On the Safety goal, difficult because crash rate may be low because parents are driving their kids to school due to unsafe pedestrian connections. You can't measure real conflicts/crashes because it's an *avoidance* issue – may not be measurable.
   (1) Chris: Barrier effect might capture this (the fact that some parents are driving their kids to school). SR2S will capture this as well.
   (2) Chuck: Measure of safety may be number of kids being driven to school, measuring number of kids walking to school.
      (a) Mayor Boyd: This is a broad brush approach. We're not getting that detailed at this point in the process.

iii) Carl Springer, DKS: We are comparing couplet to couplet, bypass to bypass, rather than comparing Couplet A to Bypass B.

iv) Chuck: We have to view this as an incomplete measurement at this point, but I understand the point / process.

v) Bruce: Aesthetics might help me measure between couplets.
   (1) Mayor Boyd: Could be captured under quality design.
   (2) Jean: Could we add aesthetics to this list of screening measures?

vi) Chuck: Add other items to Economic Vitality such as, design for sidewalk cafes.

vii) Bruce/Jean: Are you assuming on-street parking is a good or bad thing? We might not see it that way. Could be a parking area versus on-street parking, where a designated parking area might be preferred.

viii) Jean: Feel like these criteria are engineering based. We feel they should also reflect the community's values.
   (1) Chris: Goals and policies were reviewed and modified at the December Open House. These goals and policies reflect community values; the criteria are based on these revised goals and policies. We used the goals/policies to develop criteria that were the easiest to measure for this preliminary screening process.

ix) Mayor Boyd: I think we could do the exercise with just the terms.
   (1) Leslie: But does that mean you will just use the engineering terms to measure?
   (2) Jim Bryant: Economic analyses are not part of the scope of work for this project, so that won't be available to use as a measurable criteria.
x) Mayor Boyd: Economic Vitality begs the question of "do people see us as a destination or are they passing through."
xi) Chuck/Jean: Measure of travel time through Sisters is a measure for non-residents, not for residents of Sisters.
xii) Bruce: Vehicle miles traveled, how is it related to the goal of Sustainability?
   (1) Chris: It measures energy expended. Fewer miles traveled the better. This is also a statewide goal for all communities.

d) Chris presented maps for each of the eleven alternatives. PAC was asked to review, discuss pros and cons for each and then suggest alternatives to either advance to the next phase of study, or remove from further consideration based on presented criteria.
   i) Widening Highway 20: Two Options
      (1) Option I: 3 lanes with full turn access (REMOVE)
         (a) Is there enough physical width to do this?
         (b) Lane widths would vary and will be determined later in the analysis
         (c) Won't provide the opportunity for ped refuge islands
         (d) Would curb extensions be possible?
         (e) Only where on-street parking is maintained
         (f) Storage for left turns is limited
         (g) Design would be a continuous center turn pocket
         (h) Could cause back-ups in Downtown
      (2) Option II: 3 lanes with limited turns from Hwy 20 (KEEP)
         (a) Need left turn onto Spruce street
         (b) Provides ped islands and better ped safety
         (c) Ped crossings limited to one side of each intersections
            (i) prohibited at other crossings
         (d) Increases traffic flow
         (e) Could bottleneck peds on ped islands and crosswalks
            (i) Are vehicles required to stop on both sides of the island when peds are crossing to the island?
         (f) Could end up with wider lanes
         (g) Freight width regulated by the state
            (i) Needs to be considered in the width between islands and the curb.
   ii) Couplets: Three options
      (1) Option III: Hood and Main Couplet (PENDING)
         (a) DKS recommends keeping this option
            (i) additional enhancements to the ends of the couplet could improve operations beyond what was considered in the refinement plan, including maintaining flow on Cascade Avenue
         (b) Residents south of Hood cannot get to schools and Ray's Market without looping around (crossing the highway twice)
         (c) Would loose diagonal parking (only parallel on the highway)
         (d) Previous preferred option in TSP/refinement plan
         (e) Could close Cascade Avenue for community events
         (f) Moving traffic to Hood is a concern, closer to residential area

(g) Could this be re-designated as a "special transportation area" providing the city relief on diagonal parking limitations?
(i) State requirements would still not allow angled parking

(2) Option IV: Cascade and Main Couplet (KEEP)
(a) DKS recommends keeping this option
(b) Would keep highway traffic separate from Hood Street, which carries high local volumes
(c) Council, Engineers and ODOT preferred this option.

(3) Option V: Cascade and Hood Couplet (REMOVE)
(a) Residents south will be impacted
(b) Moving truck traffic closer to residential area, will impact livability

iii) Alternate Routes: Two Options

(1) Option VI: Barclay and Locust (KEEP)
(a) May consider these as an interim option or phase
(b) Include signage directing traffic during peak periods
(c) Locust goes by the school, which would be a concern for high traffic volumes during school hours
(d) Could keep Cascade as the state highway; use this alternate route as a relief valve. Short term planning: Could use as an alternate route but not as the state highway.
(e) Congestion monitoring on Cascade could be implemented to activate the alternate route
(f) Investments need to be made to improve Barclay and Locust to arterial standards and improve intersection controls at each end
(g) Two-thirds of traffic through Sisters does not stop in town
(i) FACTCHECK request at Meeting #4: Forty five percent peak hour traffic is through traffic

(2) Option VII: Barclay and Extension (REMOVE)
(a) Need signage directing traffic
(b) Environmental wetland and developed property impacts with potential alignments
(c) Possibly would impact the airport
(d) More of a bypass hybrid

iv) Bypass: Five Options

(1) Option VIII: Bypass /Close South (PENDING)
(a) Environmentally sensitive lands
(b) Exclusive Farm Use area
(c) Expensive land acquisition

(2) Option IX: Bypass/Close North (PENDING)
(a) Wetland areas
(b) Close to the airport
(c) Expensive land acquisition
(d) Steep grade at McKinley Butte

(3) Option X: Brooks Scanlon (KEEP)
(a) Avoids Tollgate
(b) Runs through USDA Forest Service lands
(c) Existing Right of Way where possible
(d) Option could include a western terminus as Hood Street extension

(e) Would require goal exception to Oregon Land Use Laws (improvements outside the urban growth boundary)

(4) Option XI: Bypass / Far North (REMOVE)

(a) Would run through significant developed residential properties/private land

(b) Significant topographic and environmental constraints

(5) Option XII: Barclay and Locust (PENDING)

(a) Use the alternate route as a new highway corridor

(i) Cascade Avenue would possibly convert to a city street

5) Next Steps- Review Alternatives

a) Review decisions from last PAC meeting

b) Finish PAC discussion and screening for Bypass Options

c) Present and Discuss Bike and Pedestrian Alternatives

d) Present Draft memo for Safe Routes to Schools

Action Items

Tasks/Request	Requested by	Respond/Deliver	Assigned to
1. SR2S Event Summary	PAC	Send PAC by email?	Kim/Alta
2. Follow up with Jeff England regarding bypass options	Jeff England	Meeting or telephone call	Mayor/Project Team

CITY OF SISTERS

Sisters TSP
PAC #3 Meeting Summary
June 10, 6-9:00 pm
Sisters City Hall

Final 8/12/08

PAC Members Present:	Bruce Bowen, Mayor Boyd, Jeff England, Doug Hancock, Chuck Humphreys, Jean Keenan, Bob Shaw, Carey Tosello and Jerry Norquist
PAC Members Absent:	Leslie Waltz
Project Team:	Eileen Stein, Brad Grimm and Eric Porter, City of Sisters Jim Bryant, ODOT Peter Russell, Deschutes County
Consultant Team:	Chris Maciejewski, DKS Steve Durrant and Kim Voros, Alta Planning and Design Christine Egan, JLA Public Involvement

1) Meeting Agenda and Introductions

- *Review Meeting Agenda*: Christine Egan, facilitator, welcomed everyone and reviewed the modified meeting agenda, which was reordered so Jim Bryant from ODOT could participate in the bypass alternatives discussion before leaving for a hearing in Redmond. Agenda change also provided the PAC open-ended time to discuss bike/ped and SR2S plan.
- *Alta representatives* Steve Durrant and Kim Voros introduced themselves.
- *Approve Meeting Summary*: The PAC accepted the summary from PAC meeting #2 with two adjustments raised by Chuck Humphreys:
  1. Some PAC members had different recall regarding which couplet alternatives the PAC agreed to keep for further analysis. Meeting summary stated that the PAC eliminated the Cascade/Hood option, and kept the Hood/Main and Cascade/Main. Chuck's recall was that the PAC agreed only to keep the Cascade/Main couplet, and remove both the Hood/Main and Cascade/Hood options. As the facilitator, Christine tabled the discussion until after the bike/ped and SR2S presentation by Alta.
  2. Second issue on page five, summary identified "two thirds of traffic as through-traffic." Information presented in DKS' forecasting memo stated that the Sisters' transportation plan estimated 45 percent of peak hour traffic as through-traffic based on a license plate survey. Christine clarified that the purpose of the meeting summary is to capture what PAC and presenters say during the PAC meeting, not to reprint or correct PAC comments based on previous reports or information. Christine confirmed that the meeting summary would be footnoted with the documented information from the forecasting memo.
- *Revised Project Timeline:* Chris Maciejewski, DKS Project Manager, reviewed the work completed so far and next steps for beginning data analysis and visual simulations for the alternatives this summer. The project schedule has been updated to accommodate

additional PAC meetings and provide a two-month block of time to complete the analysis and simulations. DKS will present and discuss detailed analyses for each of the identified alternatives at an extended PAC meeting on Tuesday, September 16, 4 pm to 8:30 pm (with a 30 to 45-minute break in between)

2) **Complete Screening Process for Highway Alternatives – Bypass**

- DKS asked the PAC to review and consider four bypass alternatives at second its May meeting. At that time, the PAC decided to 1) Add Barclay/Locust, which was originally included as an alternate route option; 2) Remove the Far North option, and; 3) Keep the Brooks Scanlon option. Following the meeting, Chris and Christine followed up with Jeff England regarding north-end alignments. Below are five bypass options to be considered.
  1. Option VIII: Bypass/Close South
  2. Option IX: Bypass/Close North
  3. Option X: Brooks Scanlon (keep)
  4. Option XI: Bypass/Far North (remove)
  5. Option XII: Barclay/Locust as designated state highway
- The PAC completed screening for the three remaining options (VIII, IX and XII). The PAC decided to remove all North-end alignments (IX and XI) due to costs associated with private property and right-of-way acquisitions, identified wetland impacts, lack of a direct route and potential conflicts with the airport. The PAC confirmed that South-end options looked easier when managing some of these same issues. Conceptually, the route would cut across city and forest service-owned properties, which may be difficult, but not impossible.
- PAC comments regarding Option VIII/Close South:
  1. The conceptual route identified on the map is too far out and wedged between sewage treatment plant and edge of town. Conceptually the route would cut through the Dorsal property, abut PMR, and back up to numerous residential properties, which may lead to community resistance.
  2. Shift the route farther south and west to redirect traffic away from town. Could be a shorter route and closer to sewage treatment plan by skirting the west side of town. Could tie into Brooks Scanlon, but terminuses need to be outside of the city limits to avoid bisecting the town (in relation to Tollgate and Redmond Highway).
  - <u>To address issues associated with the Bypass/Close South option, the PAC asked the Consultant team to propose one south bypass option for SAC consideration.</u> In developing that option, Consultant team will evaluate how far south it extends and how it could tie into Highway 20 on the west and east ends. Consultant team may propose recommendations for each of these identified issues.
- Barclay/Locust: Chris clarified that adding the Barclay/Locust option to the bypass list would mean that Barclay / Locust route would become the designated state highway. Needed improvements would include removing access points and flattening/widening curves, which would adversely impact adjacent properties (access and acquisitions). Ultimately, it would require bringing this route closer to highway standards and relinquishing local access management to ODOT.
- PAC Comments:
  1. The Barclay/Locust option doesn't make sense as a long-term solution because we already see traffic backed up before cars even get to town. Route could be part of the City's interim solution to address traffic volumes over the course of time. This route

could work much better than it has in the past with major changes. For example, the City could incorporate traffic circles at the terminuses to better direct traffic to the route. The City could also provide a traffic circle at the intersection for the airport.

2. City perspective (Brad Grimm): This route is not a good bypass option. The costs to buy the property and right of way to smooth those curves would be astronomical and the route would bisect the City.
3. Chris/DKS response: We could propose/develop design solutions that could create long-term capacity (20 years) for this alternate route as a phased-in approach to controlling traffic volumes. DKS could also investigate what the additional costs and feasibility would be in converting this to a state highway (bypass), but DKS concurs that this route would not be an ideal bypass.

- PAC agreed to have DKS evaluate this option as an interim/phased-in solution to manage traffic volumes for up to twenty years.
  1. Jim Bryant (ODOT) reminded the group that a bypass is a long-term solution that will require significant dollars and time. As such, the community should keep couplet alternatives on the table to avoid boxing the City into one or two options that may not be feasible for ODOT to partner on. He suggested that the Barclay/Locust alternate route could be an appropriate interim solution, with a Brooks Scanlon modification as a long-term option.

1) Present and Discuss Bike and Pedestrian Alternative System Plans and Draft Plan for Safe Routes to Schools

- Steve Durrant from Alta presented the results of community and PAC feedback regarding priorities for bikes and pedestrian improvements
  1. Bike: Improve connections to destinations, complete gaps in the bike lane system and signage (directional, guidance and safety signage).
  2. Pedestrians: Safe crossing, improve connectivity between destinations and fill gaps.
- Steve reviewed the principles of the recommendations Alta is making, as a well as the techniques and treatments for addressing these priorities. The goals of tonight's discussion are to get a sense of the PAC's priorities for these principles, where these treatments should happen around town, when they should happen over time, and how to distribute the dollars over the next twenty years. Steve suggested that there may be solutions that the City wants to hit earlier and others to backfill gaps in the system. He also asked the PAC to consider what level of bike and ped facilities does the City want to encourage in the farther regions of the community?
- PAC comments:
  1. Is there room for bike lanes, parking, travel lanes and sidewalks in town? (Mayor Boyd's response: Short answer is no. We should widen the sidewalks on Cascade to create a better ped environment, don't put the bike lanes on this street; instead put in left turn lanes. Steve's response: Add signage that directs bikes to a safer alternate route and/or signage that instructs bikes on how they might use Cascade instead.)
  2. Does ODOT frown upon putting bikes in a travel lane with vehicles on a state highway? (Response: The law says we have right to use the highway as long as it's 20 mpg or so.)
  3. Are Hood and Main both diagonal? (Steve's Response: Yes, both are in certain places, which means that for a safe passage through town we are probably looking at

the next two streets out (Jefferson and Adams). Head-in parking is a dangerous unless you have a large reservoir behind the car. Other PAC response: Cascade Avenue is not suitable for bikes.)

- Steve summarized that the group seemed to favor bike boulevards and treatments that would improve the quieter local streets with signage, striping and traffic-calming devices. He asked the group if they would like to keep through-traffic off of those streets or add bike lanes. Bike boulevards would work in Sisters, quieter street with way-finding, connections to destinations and providing kids a safe route to get to school.
- PAC comments:
  1. We're talking about the whole menu of options. The City's whole grid should bike-friendly.
  2. We need to reduce vehicle miles traveled (VMTs); get people out of their cars.
  3. We like the "share the road" concept for Sisters, although bike boulevards give people a sense of safety so they are more likely to allow their kids to walk or bike to school or the library.
  4. We want Alta's recommendation about how to treat the major routes and head-in parking areas, and how to manage the unimproved gravel shoulders with regards to parking.
- Steve discussed the distribution of funds for bike and ped facilities, education, encouragement, enforcement and evaluation. He explained that the City can do some things now without spending much money, i.e. education, awareness, at least for locals and regular visitors to let them know there are kids and people on the street. We can remind drivers to slow down and share the road, especially on neighborhood streets.
- PAC comments:
  1. Does the $5 million include things like pullouts, traffic calming, and speed bumps? (Steve's Response: Yes, it does.)
  2. I'd like to see the majority of dollars spent on infrastructure. Seems there are other ways to work on education and encouragement, such as with committees and entities that do these types of tasks. (Steve: When we refer to $5 million, we are talking about their money as well. We will need to clarify that someone needs to be spending money on education and encouragement.)
  3. Since we don't have any of the numbers to discuss at this point, I don't think we would oppose spending 10 percent on education over twenty years and 90 percent on infrastructure. But, let's make sure we get the projects done before we spend all of the money on education.
  4. Part of the attractiveness about infrastructure is that you can hire a contractor to build and manage the project. Soft costs/solutions are education and encouragement, which involves a lot of work and time with teachers and parents. I think we have to guard against doing what is easiest. You can get a lot of bang for the buck with soft solutions.
  5. Can we ask/investigate how other Oregon communities have invested their dollars in the five "E" areas and their results? It would be valuable information to have for this step in the process.
  6. We need to think about how these pieces fit together and when to build the new pieces of infrastructure, perhaps time it with the encouragement and enforcement, so

you are leveraging the parts rather than spending "x" dollars on education and enforcement as a stand-alone.

7. The City of Sisters is a recreational community. We want to encourage people to recreate here. We want to encourage them to walk, ride their bikes and in some cases, ride their horses into town. That's a real sales point among equestrian folks. We need to get people out of their cars and make it easy for them to identify where they can safely and enjoyable pass through town. Not just for bicyclists, but we should be encouraging our own residents to use the City without getting into their car. That will help promote our economic interests as well.
8. It is important to fashion a formula for Sisters that will change over time. We need to develop a good encouragement program, ramp up evaluation, and hit heavy on infrastructure throughout. Initiate a couple of these things early where we can create momentum around and then perhaps broadcast around town to help improve connectivity. It is critical to ramp up an evaluation program – invest and establish a baseline early on. Keeping in mind, it doesn't require a huge investment.
9. Create a system so our residents can walk and bike more. We also want to make it so people can say, "I went to vacation in Sisters where I parked my car at the lodge/hotel and left it there for the weekend." Not only is that good for the state of living and health for our residents, but a good economic driver as well. Someone can't do that in Bend or Redmond; we have the opportunity to do that in Sisters. It's important we not miss that chance.
10. A couplet would destroy the ability to do this.
11. Have you ever seen a community tie their design standards to education or encouragement requirements? (Steve response: We have seen city codes where bike parking and showers are required as part of a new development. I haven't seen an education program tied to design standards, but you could perhaps tie it to a payment-in-lieu of option for developers. For example, if there isn't a bike or ped improvement directly associated with a developer's property, the City could require the developer to put in the value someplace else to support education or enforcement. Could tie it into VMTs.)

- Steve and Kim led discussion regarding geographic distribution of improvements, although no specifics at this time.
- PAC Comments
  1. Doesn't the City already have an extensive sidewalk system in the core area as shown in the map? There are gaps on Main, and it is important to complete those gaps as quickly as possible. Don't we already have programs / plans in place to address this?
  2. Important to use shared pedestrian and bike pathways through town where they are segregated for bikes and peds use only. Our bike/ped plan should provide connectivity with what is shown on the map as a designated shared use path (around the athletic club) (Mayor Boyd response: The City is talking about creating a shared-use path from that side of town, connecting over to Jefferson and the new age McDonalds. We are discussing a funding mechanism)
  3. We ultimately want a similar connection on the north side of Cascade as well.
  4. Another high priority is a shared use path that kids living out in Timber Creek Alley /Timber Pine and Black Butte would use to get to middle school. They are not going to go down across Cascade Avenue to Jefferson Street. The City could create a path along Adams street, perhaps a shared use path across the 80 acres of forest service

land and require future development to accommodate that path. From Adams to Pine, go across Barclay Drive and Highway 20. There also needs to be something along Locust Street, probably have to go all the way out to Barclay, off road trail would be ideal to connect with the existing pathway (wide shoulder) on Camp Polk Road.

5. To clarify, a shared-use path is a segregated pathway for bike and peds, separated from the street. It is not a sidewalk. This is what folks are talking about creating through town so both bicyclists and pedestrians can use it rather than walking or riding on the street.
6. The idea is to get people who are uncomfortable riding their bikes or walking on the road to start riding and walking. They won't do it unless it is segregated from the cars. Aesthetically, it says "small town", rather than "asphalt", "striped bike lane" or "concrete pavement." This is not a city like Portland.
7. I would like to see a conceptual extension of the shared-use path out to Barclay to perhaps someday make a connection to Indian Fjord – an ideal destination. The City is planning a trail at Crossroads, which would be good to conceptually show that planned trail on your map.
8. The number one priority for bike/ped is crossing the highway. The discussion about a couplet totally changes the situation for bike/ped treatments. We can't do the plan without knowing what we are going to do on Cascade. We will need major developed crossings on Cascade, Fir, Main and/or Hood, although crossing Main and Hood is not difficult right now, it may be in the future.

- Steve summarized the PAC's comments noting that Alta will use Safe Routes to School as one of the guiding criteria for prioritizing infrastructure improvements – improving crossings, closing gaps, making connectivity, pulling in shared-use pathways and developing a kind of spine for traveling across town. Alta will prepare a white paper with its recommendations based on PAC comments. DKS will email it to PAC members before our next PAC meeting in September meeting so that PAC members have an opportunity to review and provide feedback prior to our meeting.

3) Completing Screening Process for Highway Alternatives (Couplets)

- Chris (DKS) explained that the Technical Advisory Committee, with representatives from the City of Sisters, Deschutes County and ODOT, suggested that the Project Team consider keeping all of the couplets on the table for further study. TAC members were concerned that by removing all or most of the couplet options, the City could be boxed into considering options that aren't feasible, and would therefore have to go back to the drawing board to reevaluate other options, including other couplet concepts.

  The PAC acknowledged the TAC's concern, but emphasized that by keeping one or more couplet option for further study, they may be advancing options that are not favorable to most PAC members and City Council. Some members expressed a desire to remove all couplet options from further consideration.

  Acknowledging the TAC's concern, the PAC decided it would only advance one couplet option and voted in favor of having DKS recommend the "most feasible" option in light of the PAC identified concerns and comments in the meeting. To identify the most feasible couplet option, Chris/DKS asked the PAC to clarify their preference on two key

issues: Keep Cascade open as a local street or maintain on-street parking on Hood and Main. The majority of PAC members preferenced keeping Cascade open as a local street. This preference is consistent with the outcome of the couplet refinement plan, and the group agreed to refine the Hood/Main couplet to create the best couplet alternative possible, including modifications to the end treatments of the couplet.

4) **Next Steps- Review Alternatives**
   - Next PAC meeting (#4) is scheduled for Tuesday, September 16. It will be an extended meeting scheduled with a half hour break in between
     1. First half of the session: 4-6 PM
     2. Break 6-6:30 pm
     3. Second half of the session: 6:30-8:30 pm

Action Items

Tasks/Request	Requested by	Respond/Deliver	Assigned to
White Paper with recommendations based on PAC comments at Meeting #2	Steve Durrant	Send via email to PAC three weeks prior to September 16 meeting	Kim Voros, Alta
Report on DKS' preferred couplet for further analysis	PAC	Send email notice to PAC and TAC by July 15	Chris Maciejewski, DKS

City of Sisters TSP Update
Project Advisory Committee Meeting #4

September 16, 2008 -- 4:00 – 8:30 p.m.
Council Chambers, City Hall
Agenda

Meeting Goals

- Review Highway 20 Alternatives
- Discuss a preferred Hwy 20 Alternative reflecting short and long range strategies (to share at Forum #3)
- Introduce Implementation Strategies

4:00 p.m.	**Meeting Agenda & Introductions**	Christine
4:15 p.m.	**Present and Discuss Highway 20 Alternatives** • Widen Highway: 3 lanes with limited turns • Couplet: Hood/Main • Alt Route: Barclay / Locust • Bypass options: South	Chris/DKS
5:15 p.m.	**Select Preferred Alternatives** • Evaluation Exercise	Chris/Christine
6:30 p.m.	**Break (30 minutes)**	Christine
7:00 p.m.	**Discussion: Selected Alternatives** • Review Exercise Results • Project Phases: long and short term solution	Christine
7:30 p.m.	**Introduce Implementation Strategies**	Chris
8:00 p.m.	**Next Steps:** • Forum #2, October 15 (tentative) • Proposed PAC meeting date, October 28	Chris/ Christine
8:15 p.m.	**Thanks and Adjourn**	Christine

(Version 1)

PAC #4 Meeting Notes

Meeting Notes
PAC Meeting #4
Sisters TSP

16 Sep 2008

Theme for tonight: Share information learned over the summer; try to reach consensus on preference to advance to the public.

Q: Question
C: Comment

Review of Alternatives

Cascade Turn Lanes

- Clear spacing from curb to island limits options for median / pedestrian island
- Need design exceptions with ODOT to allow for wider sidewalks and raised median islands
- Desirable for sidewalks to be 10 to 12 feet
- Q: Can we modify the island design to be narrower, lower and still get the wider sidewalks?
- Q: Can we offset the parking loss with a new off-street parking lot?
- C: Value to bicyclists with parking removal (in addition to ped xings)

Couplet on Hood and Main

- Modified west end of couplet to allow neighborhoods south of Hood to get to schools on west side
- East side couplet has major land impacts / closes South Locust leg
- C: North-south flows not well served; same for access to Elementary School from the north
- C: Jefferson becomes the new Hood Street—serving local trips away from the highway
- C: Need to reduce entering vehicle speeds; roundabouts seem more effective

Alternate Route

- Local share of project much higher / $22 M
- Q: Will Alternate Route serve freight traffic? YES
- C: Traffic on Cascade tends to stay; whereas with couplet they are on parallel routes
- C: Hwy 20 from Hwy 126 to Locust is essential segment to remove bottleneck on peak weekends
- Q: Can we get off-street multi-use path as an alternative to sidewalks near schools?
- C: Better flexibility to phasing in pieces, and staging based on how the city really does grow

Bypass

- A footnote in the TSP talking about needs for subsequent 20-years; but not needed within the planning horizon

- Need to encourage Deschutes County to identify the future need and not mess up the future possibility

Discussion of PAC Preferred Alternatives

- C: Thanks for giving us real options
- Group de facto elects to support the Alternate Route as the preferred plan
- Not as threatening / radical of change as the Couplet—more palatable
- C: Removal of on-street parking on Cascade will be a challenge; have to widen sidewalks to back fill the space—otherwise, not a value
- Look at modified center island that can fit within ODOT exceptions (talk with ODOT design staff)
- Get STA designation on Cascade Avenue / need request letter from City Council to ODOT Region Manager
- Q: Can we do 2 WB lanes from Hwy 126 to Locust today? Rather than wait for the 4-lane x-section?
- Need to layout phasing of implementation as part of the plan
- Need well defined pedestrian plan for Locust near school
- Q: How does the TSP get implemented by city, county and state agencies?
- Q: Please re-look at access to the Pumphouse Gas Station (SW corner of Hwy 20 / Locust)
- Q: Can roundabouts work on either end?
- C. Cascade / Locust to become full access once signal at Locust / Hwy 20 is built
- Q: Is there an interim version of a traffic signal at Hwy 20 / Locust; Can we just leave both options in the TSP?
- Q: Can we get off-street multi-use path as an alternative to sidewalks near schools?
- Pros / Cons for signal vs. roundabout for both options

CITY OF SISTERS

Sisters TSP Update
Project Advisory Committee
Meeting #5
December 16, 2008

PAC Members Present: Bruce Bowen, Mayor Boyd, Jeff England, Doug Hancock, Chuck Humphreys, Jean Keenan, Carey Tosello, Leslie Waltz, and Jerry Norquist

PAC Members Absent: Bob Shaw

Project Team: Eileen Stein, Brad Grimm and Eric Porter, City of Sisters
Gary Farnsworth and David Boyd, ODOT

Consultant Team: Chris Maciejewski (DKS) and Steve Durrant (Alta)

I. Meeting Agenda and Introductions

a. Chris Maciejewski, DKS, welcomed everyone, asked if there were any changes to the agenda. None requested.
b. Chris noted there were two members of the public present that may want to address the PAC.
c. Terry Daniels – resident with home fronting Locust
   - 15 homes front Locust, 6 of which are owner occupied, met to discuss impacts of Alt. Route
   - Concerned about impacts to property value, safety, and pollution. However, they agree the improvement is needed.
   - The residents wants the City to make the Locust improvement aesthetically pleasing and construct a barrier to protect the neighborhood (e.g. a fence)
d. John Wren – owner of Sisters Pump House
   - At the meeting to learn about access/impact to his business

II. Re-Cap from Community Forum

a. Chris summarized the Community Forum, including the community's general consensus and preference for the Alt. Route as compared to the couplet.

III. Discussion of Pedestrian and Bicycle Plans

a. Steve Durrant led a discussion re: proposed pedestrian and bicycle modal plans.
b. Comments on the Pedestrian Plan included:
   - Project priorities should be independent of cost
   - Add language that frontage improvements may not always be made by developers if it is beyond their proportional share. Good to have full list of projects, but exactions can't always be counted on.
   - Are the mapped trail alignments specific? Some of the trails would be better if they had separation from the highway. Steve commented that they were conceptual alignments to be refined later.
   - There was discussion about the need for a crossing of Hwy 20 near

Buckaroo Trail. The group agreed that a mid-block crossing between Hwy 126 and Buckaroo Trail should be added.

- There was discussion of using Pine as a significant pedestrian corridor when crossings of Hwy 20 would be difficult with the proposed left turn lanes. The group agreed that pedestrian crossing enhancements at the intersection of Pine/Hwy 20 would focus on east-west movements, not north-south.
- The crossing of McKinney Butte for the middle school should align with the Tollgate Trail (which leads to a path across the school site that students use).
- The discussion of the "Hood Corridor" needs to be defined – from where to where?
- Three of the pedestrian crossing projects should be moved to high priority:
  - A (check with Chuck)
  - B (check with Chuck)
  - C (check with Chuck)

c. Comments on the Bicycle Plan included:

- The bike lanes shown on Hood and Main should be extended all the way to the east.
- Figure 5-3 needs to be checked with the cross sections in Chapter 7 and rectified.
- The group agreed that back-in diagonal parking was OK given the use of a swale/curb to prevent overhang on the sidewalks.
- The group discussed the need for bike lanes vs. a trail along Locust and Camp Polk north of East Cascade. The group agreed to leave this detail for the design of the road improvements.
- The bicycle boulevards should include additional traffic calming treatments.

IV. Discussion of the Motor Vehicle Plan

a. Chris led a discussion of the Motor Vehicle Plan.

b. Comments included:

- In Chapter 3, the ADT discussion should stress that the seasonal variation in traffic is the issue we are designing for.
- The Alternate Route should be described as a seasonal relief valve.
- There was a lengthy discussion of the pros/cons of constructing roundabouts instead of traffic circles at Hwy 20/Locust and Hwy 20/Barclay. The group agreed to add a roundabout feasibility study to the motor vehicle project list, which would need to address:
  - Geometrics
  - Land use impacts
  - Operations (e.g. queuing)
  - Sensitivity to a Barclay extension east of Locust and relocation of the elementary school
- Locust should be designed with a landscape buffer (including street trees) to screen the fronting homes. A fence was not desirable.
- The group discussed options for the Cascade Avenue treatments,

including input from ODOT staff on minimum cross section requirements. Four options were reviewed (a. narrow the existing cross section, b. remove parking and provide a center turn lane, c. remove parking on one side, and d. remove parking on both sides but do not provide a center turn lane). Each option had differences in resulting sidewalk width. Based on the consideration of optimizing the pedestrian environment, supporting business, and protecting the character of the downtown, the group agreed to pursue the following option:

- Narrow the existing roadway to 44' curb to curb
- 8' sidewalks
- Retain on-street parking
- Utilize curb-extensions and extend the curb extensions along Cascade Avenue to create wider/plaza areas (which would have some parking impacts)
- Offset parking impacts with surface parking lots
- Pursue a design exception with ODOT for this cross section before moving forward with the Draft TSP to the final Community Forum and adoption process.

- The functional class of Cedar from Main to Adams should be neighborhood route
- The designation of Tyee needs further review. Staff agreed to work with interested members on this designation.
- The intersection of Hwy 20/Jefferson was discussed based on concerns of limiting Jefferson to right-in/right-out and the impacts of diverting that traffic to other roadways. The group agreed to add a strategy recommendation in the TSP that would required the construction of Hwy 20 improvements to consider (in the following order):
    - Provide a left-turn lane and full access if possible
    - Provide a left-turn lane and full access. Manage left-turn demand by installing a diverter on Jefferson to prevent through traffic past Locust and install traffic calming on Locust/Washington.
    - Restrict Jefferson to right-in/right-out and provide circulation improvements or impact mitigation local streets.

V. Discussion of the Finance Plan

a. Chris led a discussion of the Finance Plan.
b. Comments included:
    - The estimated system development charges seem too high to garner community support. Add language that other options should be pursued to reduce the burden on development within the City.
    - Table 7-5 total cost needs to be updated.

VI. Draft TSP Wrap-Up

a. The group unanimously agreed to move the Draft TSP forward, with the changes discussed, to the Community Forum and adoption process.

Sisters TSP
PAC #5 Meeting Summary
December 16, 2008
Sisters City Hall

PAC Members Present:	Bruce Bowen, Mayor Boyd, Jeff England, Doug Hancock, Chuck Humphreys, Jean Keenan, Carey Tosello, Leslie Waltz, Jerry Norquist
PAC Members Absent:	Bob Shaw
Project Team:	Eileen Stein, Brad Grimm and Eric Porter, City of Sisters Gary Farnsworth and David Boyd, ODOT
Consultant Team:	Chris Maciejewski (DKS) and Steve Durrant (Alta)

I. Meeting Agenda and Introductions

a. Chris Maciejewski, DKS, welcomed everyone, asked if there were any changes to the agenda. None requested.
b. Chris noted there were two members of the public present that may want to address the PAC.
c. Terry Daniels – resident with home fronting Locust
   - 15 homes front Locust, 6 of which are owner occupied, met to discuss impacts of Alt. Route
   - Concerned about impacts to property value, safety, and pollution. However, they agree the improvement is needed.
   - The residents want the City to make the Locust improvement aesthetically pleasing and construct a barrier to protect the neighborhood (e.g. a fence)
d. John Wren – owner of Sisters Pump House
   - At the meeting to learn about access/impact to his business

II. Re-Cap from Community Forum

a. Chris summarized the Community Forum, including the community's general consensus and preference for the Alt. Route as compared to the couplet.

III. Discussion of Pedestrian and Bicycle Plans

a. Steve Durrant led a discussion of the proposed pedestrian and bicycle modal plans.
b. Comments on the Pedestrian Plan included:
   - Project priorities should be independent of cost

- Add language that frontage improvements may not always be made by developers if it is beyond their proportional share. Good to have full list of projects, but exactions can't always be counted on.
- Are the mapped trail alignments specific? Some of the trails would be better if they had separation from the highway. Steve commented that they were conceptual alignments to be refined later.
- There was discussion about the need for a crossing of Hwy 20 near Buckaroo Trail. The group agreed that a mid-block crossing between Hwy 126 and Buckaroo Trail should be added.
- There was discussion of using Pine as a significant pedestrian corridor when crossings of Hwy 20 would be difficult with the proposed left turn lanes. The group agreed that pedestrian crossing enhancements at the intersection of Pine/Hwy 20 would focus on east-west movements, not north-south.
- The crossing of McKinney Butte for the middle school should align with the Tollgate Trail (which leads to a path across the school site that students use).
- The discussion of the "Hood Corridor" needs to be defined – from where to where?
- Four of the pedestrian crossing projects should be moved to high priority:
  - Intersection at Barclay and Pine
  - Intersection of Hwy 20 and Hwy 126
  - McKinney Butte from Middle School to Hwy 20
  - Camp Polk from Barclay to city limits

c. Comments on the Bicycle Plan included:
- The bike lanes shown on Hood and Main should be extended all the way to the east.
- Figure 5-3 needs to be checked with the cross sections in Chapter 7 and rectified.
- The group agreed that back-in diagonal parking was OK given the use of a swale/curb to prevent overhang on the sidewalks.
- The group discussed the need for bike lanes vs. a trail along Locust and Camp Polk north of East Cascade. The group agreed to leave this detail for the design of the road improvements.
- The bicycle boulevards should include additional traffic calming treatments.

IV. Discussion of the Motor Vehicle Plan

a. Chris led a discussion of the Motor Vehicle Plan.

b. Comments included:
- In Chapter 3, the ADT discussion should stress that the seasonal variation in traffic is the issue we are designing for.
- The Alternate Route should be described as a seasonal relief valve.
- There was a lengthy discussion of the pros/cons of constructing roundabouts instead of traffic circles at Hwy 20/Locust and Hwy

20/Barclay. The group agreed to add a roundabout feasibility study to the motor vehicle project list, which would need to address:
    - Geometrics
    - Land use impacts
    - Operations (e.g. queuing)
    - Sensitivity to a Barclay extension east of Locust and relocation of the elementary school
- Locust should be designed with a landscape buffer (including street trees) to screen the fronting homes. A fence was not desirable.
- The group discussed options for the Cascade Avenue treatments, including input from ODOT staff on minimum cross section requirements. Four options were reviewed (a. narrow the existing cross section, b. remove parking and provide a center turn lane, c. remove parking on one side, and d. remove parking on both sides but do not provide a center turn lane). Each option had differences in resulting sidewalk width. Based on the consideration of optimizing the pedestrian environment, supporting business, and protecting the character of the downtown, the group agreed to pursue the following option:
    - Narrow the existing roadway to 44' curb to curb
    - 8' sidewalks
    - Retain on-street parking
    - Utilize curb-extensions and extend the curb extensions along Cascade Avenue to create wider/plaza areas (which would have some parking impacts)
    - Offset parking impacts with surface parking lots
    - Pursue a design exception with ODOT for this cross section before moving forward with the Draft TSP to the final Community Forum and adoption process.
- The functional class of Cedar from Main to Adams should be neighborhood route
- The designation of Tyee needs further review. Staff agreed to work with interested members on this designation.
- The intersection of Hwy 20/Jefferson was discussed based on concerns of limiting Jefferson to right-in/right-out and the impacts of diverting that traffic to other roadways. The group agreed to add a strategy recommendation in the TSP that would required the construction of Hwy 20 improvements to consider (in the following order):
    - Provide a left-turn lane and full access if possible
    - Provide a left-turn lane and full access. Manage left-turn demand by installing a diverter on Jefferson to prevent through traffic past Locust and install traffic calming on Locust/Washington.
    - Restrict Jefferson to right-in/right-out and provide circulation improvements or impact mitigation local streets.

V. Discussion of the Finance Plan

a. Chris led a discussion of the Finance Plan.
b. Comments included:
    - The estimated system development charges seem too high to garner community support. Add language that other options should be pursued to reduce the burden on development within the City.
    - Table 7-5 total cost needs to be updated.

VI. Draft TSP Wrap-Up

a. The group unanimously agreed to move the Draft TSP forward, with the changes discussed, to the Community Forum and adoption process.

City of Sisters TSP Update
Event Summary

Revised July 9, 2009

CITY OF SISTERS

Event Name:	Community Open House #4
Event Date:	Tuesday, June 2, 2009 6:30 – 8:30 PM
Consultant Team at the event:	Chris Maciejewski, Carl Springer and Brad Coy, DKS Kim Voros, Alta
Location:	Sisters City Hall
Community Attendance:	29 people

The purpose of the fourth public meeting was to provide the broader community of Sisters the opportunity to review and comment on the final Draft TSP.

Flow of the Event:

Chris Maciejewski with DKS, the consultant project manager, opened the event by welcoming participants, introducing the project team, and leading a Powerpoint presentation about the project. He discussed the history, process and progress in developing the Draft TSP Update, as well as some details about three key areas of the Plan: Cascade Improvements, Alternate Route - Hwy 20, and bicycle/pedestrian improvements.

Following the presentation, Chris encouraged participants to visit and provide input at three stations corresponding to the Plan's focus areas. Members of the consultant project team staffed each station and summarized community input. Chris Maciejewski closed the meeting at 8:30 pm.

Demographics of Event Participants:

Nearly 30 community members attended the meeting, including five of the ten Project Advisory Committee members and two ODOT representatives. Nine community members identified themselves as business owners on the sign in sheet.

Participants also identified where they live and work on a large map of Sisters and the surrounding area. Four people indicated that they work within the City of Sisters. Nine people identified their homes within the City of Sisters, with a cluster of five being in the Timber Creek area.

Info Stations/ Flipchart Summary of Participant Comments:

Community members were given the opportunity to visit three input and information stations during the open house portion of the event. Each station was staffed by a member of the consultant team. Public input from each station is provided below.

Cascade Improvements

- Address parking loss on Cascade Avenue (can we do a surface lot near Pine Street?)
- Like improved visibility with curb extensions for pedestrians and vehicles movements from the side street
- Consider constructing a roundabout at Highway 20 and Pine Street
- Consider a mountable design with curb extensions to facilitate larger vehicles and vehicles with trailers turning from side streets

Alternate Route – Hwy 20

- Post truck height and weight-limits on Timber Creek Bridge
- Sign routes (right turns required)
- Consider smaller roundabout plus truck to alternate route
- No temporary signal if roundabouts are desired (if a signal goes in, it will not be removed)

Bike/Ped/SRTS

- Need crosswalk at Green Ridge and Locust (high speed traffic turns right)
- Locust needs a crosswalk to accommodate pedestrian traffic from Hood Avenue north of school into downtown
- Pedestrian path on Pine Street from Main to Barclay should be a high priority (mentioned multiple times)
- Complete the crosswalk across Adams at Elm Street
- The Washington Boulevard project should be part of action plan given its key role in east/west bicylce traffic
- Need to separate bicycle/pedestrian traffic along Locust (multi-use path width must be adequate – 10' minimum)
- Pedestrians must have space to walk on East Cascade to and from the elementary school
- Enforcement of the speed limit near the elementary school should be a high priority

Comment Card Summary

Twelve people completed the comment forms included with the event programs. Overall, there were safety concerns, especially surrounding schools, in the Timber Creek Bridge area, and at important pedestrian crossings. There were multiple comments about the need for roundabouts rather than traffic signals.

Demographics:

Ten of the twelve people who completed the comment card live within the city limits, with the other two respondents living outside city limits by more than one mile. All twelve of the comment card respondents live in the Sisters area year-around. Two of the respondents own a business in Sisters, almost half work in the city. Nine respondents indicated that they shop in Sisters.

Comments on Pedestrian and Bicycle Plans:

Respondents were asked if they felt the Draft TSP Action Plan projects were the correct high-priority projects to pursue funding for. Comments are provided below (verbatim).

- High priority should be given to separate bike-ped traffic from cars, especially on routes to schools and service businesses
- I like the back-in angle parking - safer for drivers and bikes. Seems like a bike boulevard on Washington should be a high priority for a safer bike environment.
- Safe Routes to Schools, pedestrian safety in the downtown core, and safe and visible lanes of traffic for cyclists are key. The plan overall seems to address these. Need enforcement of speed limit near schools.
- If pedestrians and bicycle plans are a priority, then why does the TSP plan to use the Timber Creek Neighborhood as a traffic calming area?
- Yes, but with a roundabout on the east end of Highway 20.
- Okay, suggest more emphasis on Timber Creek Bridge traffic in a residential area.
- Very concerned about plan to use Timber Creek Bridge as a regular route to 126. This would make the elementary school surrounded on all sides by the busiest streets in Sisters. Very unsafe for our children and not worth a little less traffic through Locust and Hwy 20. Locust is already bad enough for kids without that bridge opening. Make it a ped/bike bridge with emergency use accessible.
- I like the plan (to improve the pedestrian environment). Yes to roundabouts!

Comments on Motor Vehicle Plan

Respondents were asked to comment specifically about the planned improvement on Cascade Avenue and the Hwy 20 Alternate Route. Comments are provided below (verbatim).

- I like the idea of narrow pedestrian crossings; it encourages people to cross at crosswalks. Also, I like pulling parking back from intersections
- No traffic signals! Where is the couplet option (with roundabouts)?
- Roundabouts are safer and look better than signals. Drop the ITS solution. Conduct the feasibility study now so we don't waste time and money on a temporary signal.
- I'm in favor of all of them; I prefer roundabouts rather than lights only IF there are safe pedestrian crossings.
- I would like to see as much emphasis and enforcement for getting trucks off Cascade as possible. I realize this is not legally enforceable, but would like as much effort as possible. Whatever works to get drivers to use the alternate route will help maintain the vitality of downtown and encourage a more bicycle and pedestrian friendly town.
- I would like to see a crosswalk on Locust at Green Ridge. My school age children and I cross there daily and I worry with more traffic that it is going to be even scarier than it is now. There is also a lot of foot traffic coming from Green Ridge into town. I feel that they would also use a crosswalk there at the intersection of Green Ridge and Locust Street.
- I would like to add my input in favor of roundabouts and EXTREME OPPOSITION to signals. Roundabouts are safer, slow traffic, can be beautiful and make a statement about our town and priorities. I have lived in numerous foreign countries and Washington DC; roundabouts move a lot of traffic safely and effectively. They are more expensive, but the long-term pay off is huge.
- Okay

- The traffic plan for the Timber Creek Bridge is Unacceptable!
- I like the idea of the couplet with one-way traffic in and out of Sisters. I propose looking at making Cascade pedestrian/bike only. It would be a gathering place for the town!

General Plan Comments

Respondents were asked to provide general comments about the plan overall:

- Please consider what the "community feel" would be with stop lights coming into town. So unattractive.
- I will get feedback from Timber Creek people. I hope they feel better about the plan.
- High traffic volume on Timber Creek Bridge will very negatively impact the surrounding community creating safety hazards and decreased livability.
- Vote for roundabouts, although more expensive, they keep the unique feel of Sisters as a small town, as well as safety and less environmental impact. No traffic lights in Sisters!

Public Reaction to Community Open House

People who completed comment cards were given an opportunity to comment on the meeting and public process for the project. Of the twelve people who submitted comment cards, five provided feedback on the event and public process. Comments provided below (verbatim).

- Great visual aids, very helpful.
- I think the TAC/ PAC was very well formed and put in a lot of time/energy. I wish the community had felt the need to be more involved.
- Yes, adequate opportunity for public input.
- Good process, a lot of thought went into the plan.
- Nicely structured opportunity for input appreciated.

Media Outreach and Event Coverage

Eileen Stein, City Manager for Sisters, managed media outreach for the public meeting by posting an event notice in The Nugget, the city's local newspaper. The notice ran May 13, 20 and 27.

The City of Sisters invites you to share your views...

Transportation System Plan Update Community Workshop #4

Draft Transportation System Plan

Sisters City Hall Tues., June 2, 2009 6:30-8:30 p.m.

For questions please contact Eileen Stein, city manager, at 323-5205 or estein@ci.sisters.or.us

At the event, a television reporter from a Bend station interviewed Eileen Stein. To view television coverage: http://kohd.com/news/local/121928

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Shawn Diez

Phone Number: _____ **Email:** _____

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a:
- [x] Year-round resident
- [ ] Seasonal resident

3. Do you *(choose any that apply)*:
- [ ] Own a business in Sisters?
- [x] Work in Sisters?
- [ ] Shop primarily in Sisters?
- [ ] Regularly travel through Sisters

(over)

Please drop your completed form in one of the **Comment Drop Boxes** located around the room, email your comments to Eileen Stein at **estein@ci.sisters.or.us** or mail to **P. O. Box 39, Sisters, OR 97759.**

4. Pedestrian and Bicycle Plans: Are the Draft TSP Action Plan projects the correct high-priority projects for the City to pursue funding for implementation? If not, which other projects would you suggest?

Very concerned at ~~the~~ the plan to use Timber Creek Bridge as a regular route to 126. This would make the Elementary School ~~the~~ be surrounded on all sides by the busiest streets in Sisters. Very unsafe for our children and not worth a little less traffic through Locust & Hwy 20.

5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

Locust is already bad enough for kids w/o that bridge opening.

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

Make it a pedestrian/bike bridge with emergency use available.

7. What did you like about tonight's meeting? Anything we could have done differently?

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Sharri Bertagna

Phone Number: 610 - 6416 **Email:** bertagna@bendbroadband.com

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a:
- [x] Year-round resident
- [ ] Seasonal resident

3. Do you *(choose any that apply)*:
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- [x] Work in Sisters?
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(over)

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5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

No trafic signals!

Where is couplet option? (with roundabouts)

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

7. What did you like about tonight's meeting? Anything we could have done differently?

Please consider what the community feel would be with stop lights coming into town. So unattractive.

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Carey Tosello

Phone Number: 9-0959 **Email:** Crtosello@msn.com

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a:
- [x] Year-round resident
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5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

Roundabouts are safer and look better than signals. Drop the ITS solution. Do the feasibility study now so we don't waste time & money on a temp. signal

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

7. What did you like about tonight's meeting? Anything we could have done differently?

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Ann Richardson

Phone Number: 549-0989 **Email:** Ann@tlcinc.com

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☒ Outside Sisters city limits (more than 1 mile)

2. Are you a:
- ☒ Year-round resident
- ☐ Seasonal resident

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4. Pedestrian and Bicycle Plans: Are the Draft TSP Action Plan projects the correct high-priority projects for the City to pursue funding for implementation? If not, which other projects would you suggest?

I like the back in angle parking - safer for drivers AND bikes

seems like a bike blvd. on WA should be a high priority - safer bike environment

5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

I'm in favor of all of them

I prefer roundabouts over lights IF there are safe pedestrian crossings.

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

yes

yes

7. What did you like about tonight's meeting? Anything we could have done differently?

great visual aids - very helpful

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Wendy Holzman

Phone Number: 549-8558 **Email:** wendomere@gmail.com

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
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2. Are you a:
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4. Pedestrian and Bicycle Plans: Are the Draft TSP Action Plan projects the correct high-priority projects for the City to pursue funding for implementation? If not, which other projects would you suggest?

Safe routes to school, pedestrian safety in the downtown core, and safe + visible "lanes of traffic" for cyclists are key. The plan overall seems to address these. Need enforcement of speed limit near schools.

5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

I would like to see as much emphasis and enforcement of getting trucks off Cascade as possible. I realize this is not legally enforcable but would like as much effort on this as possible.

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

I think the TAC / PAC was very well formed and put in a lot of time / energy. I wish the community had felt the need to be more involved! I will get feedback from Timber Creek people I hope they feel better about the plan.

7. What did you like about tonight's meeting? Anything we could have done differently?

Whatever works to get drivers to use the Alternate Route will help maintain the vitality of downtown and encourage more bicycle and

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Laurie Kimsell

Phone Number: 503-784-4030 **Email:**

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- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a:
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4. Pedestrian and Bicycle Plans: Are the Draft TSP Action Plan projects the correct high-priority projects for the City to pursue funding for implementation? If not, which other projects would you suggest?

– If Pedestrian & Bicycle Plans are a priority then why does the TSP plan to use the Timber Cull neighborhood as a Traffic Calming area?

5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

My Questions were not fully addressed about the bridge!

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

7. What did you like about tonight's meeting? Anything we could have done differently?

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Susan Stafford

Phone Number: 549-2107 **Email:** suzstafford@bendbroadband.com

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- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
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2. Are you a:
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5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

I like the plan — good

yes to roundabout!

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

High traffic volume on Timber Creek bridge will very negatively impact the surrounding community — creating safety hazards & decreased livability

7. What did you like about tonight's meeting? Anything we could have done differently?

Nicely structured. Opportunity for input appreciated.

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Trisha Liddell

Phone Number: 549-6561 **Email:** trischliddell@hotmail.com

1. Where do you live?
- [x] Inside Sisters city limits
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4. Pedestrian and Bicycle Plans: Are the Draft TSP Action Plan projects the correct high-priority projects for the City to pursue funding for implementation? If not, which other projects would you suggest?

yes, but w/ a roundabout on the east end of Hwy 20

5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

I would like to see a crosswalk on Locust at Greenridge. My school-age children & I cross there daily & I worry with more traffic that it is going to be even scarier than it is now.

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

there is also a lot of foot traffic coming from Greenridge into town. I feel that they would also use a crosswalk there at the intersection of Greenridge & Locust St.

7. What did you like about tonight's meeting? Anything we could have done differently?

Thanks.

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Jennifer McCrystal

Phone Number: 541 549 8834 **Email:** delsie joy@yahoo.com

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a:
- [x] Year-round resident
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I would like to add my input in favor of round abouts + opposition (extreme!) to signa
Roundabouts are safer slow traffic, can be beautiful + make a statement about our tou
+ priorities.

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

I have lived in numerous foreign countries + Washi
ton D.C., (cities of significant size) + they
move a lot of traffic safely + effectively
They are more expensive, but the long
term pay off is huge!

7. What did you like about tonight's meeting? Anything we could have done differently?

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June 2, 2009

City of Sisters

Name: Ron VOGELTANZ

Phone Number: 541-549-1480 **Email:** CRVOGEL@PEOPLEPC.com

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a:
- [x] Year-round resident
- [ ] Seasonal resident

3. Do you *(choose any that apply)*:
- [ ] Own a business in Sisters?
- [ ] Work in Sisters?
- [x] Shop primarily in Sisters?
- [ ] Regularly travel through Sisters?

(over)

Please drop your completed form in one of the **Comment Drop Boxes** located around the room, email your comments to Eileen Stein at **estein@ci.sisters.or.us** or mail to **P. O. Box 39, Sisters, OR 97759.**

4. Pedestrian and Bicycle Plans: Are the Draft TSP Action Plan projects the correct high-priority projects for the City to pursue funding for implementation? If not, which other projects would you suggest?

OKAY

SUGGEST MORE EMPASIS ON TIMBER CREEK BRIDGE TRAFFIC IN A RESIDENTIAL AREA

5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

OKAY

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

OKAY

7. What did you like about tonight's meeting? Anything we could have done differently?

OKAY

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Michele Sims

Phone Number: 408 4777 **Email:** sims.mw@gmail.com

1. Where do you live?
- ☐ Inside Sisters city limits
- ☐ Outside Sisters city limits (within 1 mile)
- ☑ Outside Sisters city limits (more than 1 mile)

2. Are you a:
- ☑ Year-round resident
- ☐ Seasonal resident

3. Do you *(choose any that apply)*:
- ☐ Own a business in Sisters?
- ☑ Work in Sisters?
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- ☑ Regularly travel through Sisters?

(over)

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4. Pedestrian and Bicycle Plans: Are the Draft TSP Action Plan projects the correct high-priority projects for the City to pursue funding for implementation? If not, which other projects would you suggest?

HIGH PRIORITY SHOUD BE GIVEN TO SEPARATE BIKE-PED TRAFFIC FROM CARS, ESPECIALLY ON ROUTES TO SCHOOLS & SERVICE BUSINESS.

5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

I LIKE THE IDEA OF NARROW PED X-INGS - ENCOURAGES PEOPLE TO CROSS AT CROSSWALKS. ALSO LIKE PULLING PARKING BACK FROM INTERSECTIONS

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

GOOD PROCESS - A LOT OF THOUGHT WENT IN TO PLAN

7. What did you like about tonight's meeting? Anything we could have done differently?

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: Shawn Diez

Phone Number:_____ **Email:**_____

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a:
- [x] Year-round resident
- [ ] Seasonal resident

3. Do you *(choose any that apply)*:
- [ ] Own a business in Sisters?
- [x] Work in Sisters?
- [ ] Shop primarily in Sisters?
- [ ] Regularly travel through Sisters?

(over)

Please drop your completed form in one of the **Comment Drop Boxes** located around the room, email your comments to Eileen Stein at **estein@ci.sisters.or.us** or mail to **P. O. Box 39, Sisters, OR 97759.**

4. Pedestrian and Bicycle Plans: Are the Draft TSP Action Plan projects the correct high-priority projects for the City to pursue funding for implementation? If not, which other projects would you suggest?

5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

(2) I propose looking at making Cascade (Hwy 20 through town) a pedestrian/bike only that would be a gathering place for the town!

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

(1) I like the idea of the couplet with one way traffic in and out of Sisters.

7. What did you like about tonight's meeting? Anything we could have done differently?

(3) I also vote for roundabouts. Although more expensive, they keep the unique feel of Sisters as a small town as well as the safety and less environmental

(4) No traffic lights in Sisters!

Transportation System Plan Update
Community Meeting Comment Form
June 2, 2009

City of Sisters

Name: DAVID + CATHERINE CHILDRESS

Phone Number: 541 549 6963 **Email:** CAT.DAVE@BENDBROADBAND.COM

1. Where do you live?
- [x] Inside Sisters city limits
- [ ] Outside Sisters city limits (within 1 mile)
- [ ] Outside Sisters city limits (more than 1 mile)

2. Are you a:
- [x] Year-round resident
- [ ] Seasonal resident

3. Do you *(choose any that apply)*:
- [ ] Own a business in Sisters?
- [ ] Work in Sisters?
- [x] Shop primarily in Sisters?
- [ ] Regularly travel through Sisters

(over)

Please drop your completed form in one of the **Comment Drop Boxes** located around the room, email your comments to Eileen Stein at **estein@ci.sisters.or.us** or mail to **P. O. Box 39, Sisters, OR 97759.**

4. Pedestrian and Bicycle Plans: Are the Draft TSP Action Plan projects the correct high-priority projects for the City to pursue funding for implementation? If not, which other projects would you suggest?

5. Motor Vehicle Plan: Do you have any comments specific to the planned improvements to enhance Cascade Avenue to improve the pedestrian environment? Do you have any comments specific to the proposed Highway 20 Alternate Route?

THE ~~TRAFFIC~~ Traffic Plan for the Timber Creek Bridge is unacceptable

6. General Plan Comments: Did the TSP development process, including four community forums, provide adequate opportunity for public input? Does the Draft TSP provide a reasonable balance of mobility, safety, community livability, and cost?

7. What did you like about tonight's meeting? Anything we could have done differently?

Appendix B: Draft Report Comment Log

#	Date	Source	Comment	Response	Proposed Action
1	2-Dec-08	Email from Eric Porter (City of Sisters)	"I spoke with Chris Doty and Mark Radabaugh this morning re: 28' wide streets with unrestricted parking on both sides. Chris Doty was involved in the 'great debate' over the adequacy of these reduced width streets approximately 8 years ago in Redmond. Chris supports the reduced width streets with two provisos – (1) that they only be allowed to serve single family dwelling units, and (2) that they must have rear-lot alleys. Mark Radabaugh indicated that DLCD supports reduced-width streets, particularly in TSP updates. He also indicated that we might make a case for having exceptions to reduced street widths if we can demonstrate that we have a higher than average number of RV's, which have greater spatial parking needs than passenger cars. Lastly, I discussed this with Dave Wheeler, Fire Marshal for the Sisters / Camp Sherman Fire District just now. He indicated that he does not support the reduced width streets with unrestricted parking on both sides, citing the Oregon Specialty Fire Code standard of 20' clear which would not be met by this street width. He will discuss this with the Redmond Fire Marshal and send a formal comment back to us later."	This was addressed with the cross sections in the Draft TSP.	None
2	15-Dec-08	Email from Carey Tosello	"You [DKS] state that 'we need to enforce the right-in/right-out at Hwy 20/Jefferson' - does this mean traffic entering town from the east will not be able to turn left on Jefferson? And they will also not be able to turn left on Locust either - correct? If this is all true, I am concerned that a lot of the traffic that makes those lefts now (especially at Jefferson) will be using Five Pine/Coyote Springs to get to the south side of town. Which could have a large (and negative) impact on the Five Pine, Coyote Springs & Buck Run neighborhoods."	Vehicles were projected to use Jefferson Avenue and Buckaroo Trail to cut through the southern portion of Sisters. The PAC decided to add a strategy recommendation in the TSP that would require the construction of Highway 20 improvements to consider three alternatives is the following order: (1) provide a left-turn lane and full access if possible, (2) provide a left-turn lane and full access but manage left-turn demand by installing a diverter on Jefferson Avenue to prevent through traffic past Locust and also install traffic calming at the Locust Street/Washington Avenue intersection, and (3) restrict Jefferson Avenue to right-in/right-out and provide improvements or impact mitigation to local streets.	Add a strategy recommendation in the TSP to address Jefferson Avenue cut-through
3	15-Dec-08	Email from Mark Radabaugh, DLCD	Any alterative should be supportive of reduced local street widths, but allow for certain alternative ways to manage them, such as single-loaded parking standards, if there is substantial evidence to support an alternative management scheme. In the case of RVs, you would need to document an 'unusually' high number where no parking alternative exists, and then develop an alternative method (through parking standards) of managing them on a reduced street width.		To be reviewed by City staff and cross sections for local streets adjusted as needed.
4	16-Dec-08	Letter from Taylor Robertson (Fire Chief)	"The Sisters-Camp Sherman Fire District supports the overall direction and content of the Transportation Safety Plan, but does not support the language in the plan specifying narrower road widths. The Oregon Fire Code states in OFC 2007 503.2 that fire apparatus access roads shall have an unobstructed width of 20 feet. The 20 foot width is specific to driving area and does not include parking. The question of narrow streets, while accomplishing many worthy goals, is not conducive to emergency access and can result in delayed response, and the inability to deploy lifesaving equipment (hoses, pumps, medical equipment, and personnel). . . The fire district has noted this problem particularly in two subdivisions in town with roads that are 28 feet in width with parking on both sides of the street. Our access is significantly impaired now in these areas and we oppose expanding this problem."		To be reviewed by City staff and cross sections for local streets adjusted as needed.
5	16-Dec-08	PAC #5 Meeting Summary	In Chapter 3, the ADT discussion should stress that the seasonal variation in traffic is the issue we are designing for.		Update discussion in Draft TSP
6	16-Dec-08	PAC #5 Meeting Summary	The Alternate Route should be described as a seasonal relief valve.		Update discussion in Draft TSP

#	Date	Source	Comment	Response	Proposed Action
7	16-Dec-08	PAC #5 Meeting Summary	There was a lengthy discussion of the pros/cons of constructing roundabouts instead of traffic circles at Hwy 20/Locust and Hwy 20/Barclay. The group agreed to add a roundabout feasibility study to the motor vehicle project list, which would need to address: (1) Geometrics, (2) Land use impacts, (3) Operations (e.g. queuing), (4) Sensitivity to a Barclay extension east of Locust and relocation of the elementary school		Update Draft TSP as noted.
8	16-Dec-08	PAC #5 Meeting Summary	Locust should be designed with a landscape buffer (including street trees) to screen the fronting homes. A fence was not desirable.		A note note will be added to the Locust project description as described.
9	16-Dec-08	PAC #5 Meeting Summary	The group discussed options for the Cascade Avenue treatments, including input from ODOT staff on minimum cross section requirements. Four options were reviewed: (1) narrow the existing cross section, (2) remove parking and provide a center turn lane, (3) remove parking on one side, and (4) remove parking on both sides but do not provide a center turn lane. Each option had differences in resulting sidewalk width. Based on the consideration of optimizing the pedestrian environment, supporting business, and protecting the character of the downtown, the group agreed to pursue the following option: (1) Narrow the existing roadway to 44' curb to curb, (2) 8' sidewalks, (3) Retain on-street parking, (4) Utilize curb-extensions and extend the curb extensions along Cascade Avenue to create wider/plaza areas (which would have some parking impacts), (5) Offset parking impacts with surface parking lots, (6) Pursue a design exception with ODOT for this cross section before moving forward with the Draft TSP to the final Community Forum and adoption process.		The Draft TSP will be updated to include the agreed upon Cascade Avenue cross section (per futher coordination with ODOT and City staff).
10	16-Dec-08	PAC #5 Meeting Summary	The functional class of Cedar from Main to Adams should be neighborhood route		Update Draft TSP as noted.
11	16-Dec-08	PAC #5 Meeting Summary	The designation of Tyee needs further review. Staff agreed to work with interested members on this designation.		Update Draft TSP as directed by staff.
12	16-Dec-08	PAC #5 Meeting Summary	The intersection of Hwy 20/Jefferson was discussed based on concerns of limiting Jefferson to right-in/right-out and the impacts of diverting that traffic to other roadways. The group agreed to add a strategy recommendation in the TSP that would required the construction of Hwy 20 improvements to consider (in the following order): (1) Provide a left-turn lane and full access if possible, (2) Provide a left-turn lane and full access. Manage left-turn demand by installing a diverter on Jefferson to prevent through traffic past Locust and install traffic calming on Locust/Washington. (3) Restrict Jefferson to right-in/right-out and provide circulation improvements or impact mitigation local streets.		Add a strategy recommendation in the TSP to address Jefferson Avenue cut-through
13	16-Dec-08	PAC #5 Meeting Summary	The estimated system development charges seem too high to garner community support. Add language that other options should be pursued to reduce the burden on development within the City.		Update Draft TSP as noted.
14	16-Dec-08	PAC #5 Meeting Summary	Table 7-5 total cost needs to be updated.		Update Draft TSP as noted.
15	16-Dec-08	PAC #5 Meeting Minutes	Project priorities should be independent of cost	Project priorities were assessed independently of cost. Reording of the projects is dependent on the PAC or other public input.	No action at this time

#	Date	Source	Comment	Response	Proposed Action
16	16-Dec-08	PAC #5 Meeting Minutes	Add language that frontage improvements may not always be made by developers if it is beyond their proportional share. Good to have full list of projects, but exactions can't always be counted on.	Alta will add this note to relevant portion of the bike/ped chapters	Alta will add this note to relevant portion of the bike/ped chapters
17	16-Dec-08	PAC #5 Meeting Minutes	Are the mapped trail alignments specific? Some of the trails would be better if they had separation from the highway. Steve commented that they were conceptual alignments to be refined later.	Trail alignments are conceptual and the exact location should be determined after a more detailed study.	Alta will add this note to relevant portion of the bike/ped chapters
18	16-Dec-08	PAC #5 Meeting Minutes	There was discussion about the need for a crossing of Hwy 20 near Buckaroo Trail. The group agreed that a mid-block crossing between Hwy 126 and Buckaroo Trail should be added.	Alta will add this project to the table and maps	Alta will add this project to the table and maps. City staff to provide recommendation for project priority.
19	16-Dec-08	PAC #5 Meeting Minutes	There was discussion of using Pine as a significant pedestrian corridor when crossings of Hwy 20 would be difficult with the proposed left turn lanes. The group agreed that pedestrian crossing enhancements at the intersection of Pine/Hwy 20 would focus on east-west movements, not north-south.	Alta will add this note to the project description	Alta will add this note to the project description
20	16-Dec-08	PAC #5 Meeting Minutes	The crossing of McKinney Butte for the middle school should align with the Tollgate Trail (which leads to a path across the school site that students use).	Alta will move the proposed crossing improvement and adjust the project description accordingly in the map, table and text.	Alta will move the proposed crossing improvement and adjust the project description accordingly in the map, table and text.
21	16-Dec-08	PAC #5 Meeting Minutes	The discussion of the "Hood Corridor" needs to be defined – from where to where?	I believe this discussion references to the Southern cross town connector.	Alta will clarify the description of this corridor
22	16-Dec-08	PAC #5 Meeting Minutes	Three of the pedestrian crossing projects should be moved to high priority:	Addressed in comments 49-51	Addressed in comments 49-51
23	16-Dec-08	PAC #5 Meeting Minutes	The bike lanes shown on Hood and Main should be extended all the way to the east.	Alta will make the changes to the table and map	Alta will make the changes to the table and map
24	16-Dec-08	PAC #5 Meeting Minutes	Figure 5-3 needs to be checked with the cross sections in Chapter 7 and rectified.	Alta will check the section in figure 5-3 and modify as appropriate	Alta will check the section in figure 5-3 and modify as appropriate
25	16-Dec-08	PAC #5 Meeting Minutes	The group agreed that back-in diagonal parking was OK given the use of a swale/curb to prevent overhang on the sidewalks.	No change to plan	No change to plan
26	16-Dec-08	PAC #5 Meeting Minutes	The group discussed the need for bike lanes vs. a trail along Locust and Camp Polk north of East Cascade. The group agreed to leave this detail for the design of the road improvements.	Alta will make this note in the plan and show a trail on the map in addition to the bike lane. (project description will note that this is a detail for a refined study)	Alta will make this note in the plan and show a trail on the map in addition to the bike lane. (project description will note that this is a detail for a refined study)
27	16-Dec-08	PAC #5 Meeting Minutes	The bicycle boulevards should include additional traffic calming treatments.	Language discussing bicycle boulevards will be modified to read that the appropriate level of boulevard development will involve a more detailed study.	Language discussing bicycle boulevards will be modified to read that the appropriate level of boulevard development will involve a more detailed study.
28	16-Dec-08	Steve's Notes	Crossing at Middle School should be placed at HS on McKinney Butte Rd.	Addressed in comment 20	Addressed in comment 20
29	16-Dec-08	Steve's Notes	Pine Street Shared Use Path should be extended to Cascade	Alta will make the change to the table and maps	Alta will make the change to the table and maps
30	16-Dec-08	Steve's Notes	Additional trail along Locust/Camp Polk	Addressed in comment 26	Addressed in comment 26

#	Date	Source	Comment	Response	Proposed Action
31	16-Dec-08	Steve's Notes	Bicycle Boulevards discussion should be revised to remove 'minimum treatments' and instead to indicated that more detailed study is required to determine the appropriate treatment level	Language discussing bicycle boulevards will be modified to read that the appropriate level of boulevard development will involve a more detailed study. (Also note comment 27)	Language discussing bicycle boulevards will be modified to read that the appropriate level of boulevard development will involve a more detailed study. AND the project costs will be increased to allow for up to three spot improvements beyond the minimum treatment.
32	16-Dec-08	Steve's Notes	Priority changes to 3 pedestrian projects	Addressed in comments 49-51	Addressed in comments 49-51
33	16-Dec-08	Steve's Notes	Hwy 20 from Hood/Main bike boulevard cost	Should be amended to include the minimum LF cost and 3 spot treatments at Level 3	Alta will make this change to the cost tables and project description
34	16-Dec-08	Steve's Notes	Add shared use path facility on the South side of McKinney Butte Road between the Middle School and High School	Alta will add this project to the table and maps	Alta will add this project to the table and maps
35	16-Dec-08	Steve's Notes	Extend shared use path segment on Washington to make a complete connection	Alta will adjust the segment on the table and maps	Alta will adjust the segment on the table and maps
36	16-Dec-08	Steve's Notes	Extend bicycle boulevard segment on Main Ave to make a complete connection	Alta will adjust the segment on the table and maps	Alta will adjust the segment on the table and maps
37	16-Dec-08	Steve's Notes	Extend proposed bike lanes on Hood Avenue to complete the connection to Highway 20	Alta will adjust the segment on the table and maps	Alta will adjust the segment on the table and maps
38	16-Dec-08	Steve's Notes	Extend the bike lanes along Highway 20 from Camp Polk Road to Larch to make a complete connection	Alta will adjust the segment on the table and maps	Alta will adjust the segment on the table and maps
39	16-Dec-08	Steve's Notes	Extend bike lanes from Hood Avenue along Cedar Street to Washington to make a complete connection	Alta will adjust the segment on the table and maps	Alta will adjust the segment on the table and maps
40	21-Jan-09	Email From Chuck	Why not put the bike-ped path along Arrowleaf, rather than along HW20?	The path along Highway 20 will take the place of a sidewalk along the highway. Nothing will prevent cyclist and pedestrian travel along Arrowleaf, but requiring them to do so would mandate out-of-direction travel	No action at this time
41	21-Jan-09	Email From Chuck	The first crosswalk on McKinney Butte (starting at 242) should be moved south to the SOAR (now the SPRD) access way (which is shared with the high school parking lot) -- this would cross directly over to a path at the Middle School.	This was not discussed in the PAC meeting. Any further discussion of this change should occur at the upcoming Open House or Planning Commission meeting	No action at this time
42	21-Jan-09	Email From Chuck	The "high visibility" crosswalk with beacons along McKinney Butte at the rear entrance of the middle school is certainly helpful for the Hayden Homes development, but I think we should carefully consider a second one (or move this one) to the corner with the east entrance to the high school (where the Tollgate trail effectively exits) because this is the route used from Tollgate and from the HS to get to the MS.	The meeting minutes reflect a discussion that the crossing of McKinney Butte road should be shifted to align with the Tollgate Trail. A second high visibility crossing was not discussed. Discussion of a second crossing, if desired, should occur at the upcoming Open House or Planning Commission Meeting	Alta will move the crossing to align with the Tollgate Trail
43	21-Jan-09	Email From Chuck	That path that crosses the Forest Service triangle from the 3 Winds Shopping Center to W Cascade west of Pine does not seem to terminate very eloquently -- it should cross W Cascade and then continue on to Pine somehow	The meeting minutes of the PAC reflect the discussion that the trail alignments are conceptual at this time. Any further discussion about the path's alignment should occur at the upcoming Open House or Planning Commission Meeting	No action at this time

#	Date	Source	Comment	Response	Proposed Action
44	21-Jan-09	Email From Chuck	Striping Elm from city limits to Hood -- raise to High priority (because Elm gets a lot of fast recreational and woodcutter traffic) -- also on this route, what can be done about the Whychus creek narrow bridge -- can it be widened for pedestrians and cyclists somehow? Also signage should direct thru-cyclists onto Washington.	The change in project priority was not discussed at the PAC meeting. Further changes to the project priority should be discussed at the upcoming Open House or Planning Commission Meeting	No action at this time
45	21-Jan-09	Email From Chuck	Unclear what road 2nd item under "low priority" in Table 6-3 refers to.	This was a typo in the project table. 'Bike Lane' should have read 'Barclay Drive'	Alta will make this correction in the upcoming draft
46	21-Jan-09	Email From Chuck	I wonder if kids (little kids) will use Adams (and Washington) as EW connectors if there are no bike lanes -- will a "bike boulevard" be enough to convince parents that it is safe?	This is a discussion of safety and comfort	Alta will add a discussion of safety and comfort to the narrative of bike boulevards
47	21-Jan-09	Email From Chuck	We need specific proposals for signage destinations (where they would be put, what they would say) as well as directional signs to encourage thru-riders to use Main/Hood or Adams and Washington -- (I'm sure there will be many interactions of this, but some professional advice at the beginning would sure help) -- although maybe this is not part of the TSP other than making a proposal...	We can add a discussion of basic signing design guidelines and key features that should be signed.	Alta will add a discussion of signing design guidelines and key features to the chapter narrative
48	21-Jan-09	Email From Chuck	The 12'bike path on N or McKinney Butte from 242 to SMS: 2 questions: a) is this supposed to be SHS? and b) why the north side IF the destination is the Middle School?	The pathway is along the north side of McKinney Burette road because of its proximity to the Tollgate Trail. Also, sidewalks already exist on the south side of the road. Placing the path on the north side of the road fills a gap in the existing facilities.	No action at this time
49	21-Jan-09	Email From Chuck, Steve's Notes, PAC #5 Meeting Minutes	Intersection at Barclay and Pine -- move to High	This change in priority was discussed at the PAC meeting	Alta will upgrade this project to high priority
50	21-Jan-09	Email From Chuck, Steve's Notes, PAC #5 Meeting Minutes	Intersection of 20 and 126 -- move to High	This change in priority was discussed at the PAC meeting	Alta will upgrade this project to high priority
51	21-Jan-09	Email From Chuck, Steve's Notes, PAC #5 Meeting Minutes	McKinney Butte from SIMS to HW20 -- High	This change in priority was discussed at the PAC meeting	Alta will upgrade this project to high priority
52	21-Jan-09	Email From Chuck	Camp Polk from Barclay to city limits -- High	This change in priority was not discussed at the PAC meeting (only changes to intersection priorities were discussed). Any further discussion about the changes to project priority should occur at the upcoming Open House or Planning Commission Meeting	No action at this time

#	Date	Source	Comment	Response	Proposed Action
53	28-Jan-09	Email from Chuck Humphries	The Deschutes County Bicycle Pedestrian Advisory Committee is of the unanimous opinion that "roundabouts were safer, much safer -- provided they are designed correctly . . . In general, the evidence indicates that well-designed roundabouts calm traffic better, resulting in lower speeds all the time (when a light is green, drivers don't slow down and sometimes even speed up); no one "runs" a roundabout as they sometimes do a red light . . . if we are really concerned about making Sisters a pedestrian friendly place, a roundabout would seem better able to accomplish that than a light. I think it may be appropriate for the PAC to push back on the tentative conclusion to use lights, and to demand much better analysis and data supporting lights -- not only in terms of costs (not everyone seems to believe that a roundabout would cost more initially -- and as it has lower maintenance costs, the "life of intersection" cost might well be lower even if initial costs were higher) but also in terms of safety. I would hope that ALTA could weigh in on this as well. Of course, there is also the obvious aesthetic preference by almost everyone for roundabouts..."	DKS and Alta agree upon the following feedback: single-lane roundabouts have been found to be safer in many situations than a traffic signal. However, multi-lane roundabouts (which is what would be needed for Hwy 20) have not been found to be as safe for pedestrian and bicyclists (at least not in any research the consultant team has seen). Alta does not generally recommend multi-lane roundabouts when considering pedestrian and bicycle safety. There is a considerable difference between the smaller (typically 130' or so diameter) urban single-lane roundabouts that exist in Bend vs. what would be a large (minimum 220' diameter) highway multi-lane roundabout for Hwy 20. Very different in vehicle speeds (15 mph vs. 25 mph) and it would introduce multi-lane crossing for pedestrians. As for cost, the multi-lane roundabout at Hwy 20/Locust would have a large right of way (and business) impact that increases the cost beyond the signal. In addition, to properly connect the roadways to the roundabout our preliminary layouts indicated significant road realignments on Hwy 20 and Locust to connect at proper angles. These two things combined significantly up the cost of constructing a roundabout at this location (compared to a less constrained location).	Update the Draft TSP per comment #7.
54	28-Jan-09	Email from Chuck Humphries	The Deschutes County Bicycle Pedestrian Advisory Committee was asked " How best to channel cyclists from busier to quieter streets (which would be a less direct route)? (The stated goal of the grid design is to get more cyclists onto Washington and Adams, and off Hood, Main and Cascade.) . . . The advice was having really good bicycling maps of the town, plus some education efforts."	Comment noted. The Draft TSP is consistent with these comments.	None
55	28-Jan-09	Email from Chuck Humphries	The Deschutes County Bicycle Pedestrian Advisory Committee was asked "How best to design multimodal corridors (Adams and Washington)? . . . No specific advice, but recognition of the problem and the obvious need to involve residents, among others, in the redesign."	Comment noted.	None.
56	28-Jan-09	Email from Chuck Humphries	The Deschutes County Bicycle Pedestrian Advisory Committee was asked "Would they agree with ALTA's proposal for converting head-in diagonal parking with back-in diagonal parking? . . . This elicited some incredulity from those unfamiliar with it, but strong support from those with experience. In addition to clear benefits for cyclists, some also noted that back-in diagonal parking would be very beneficial to motorists who now often have to back out of diagonal spaces into the traffic lane blind (because SUVs, vans, and pickups with tops block all view)."	Comment noted. The Draft TSP is consistent with these comments.	None.

#	Date	Source	Comment	Response	Proposed Action
57	20-Feb-09	Letter from City Engineer (Richard D. Nored -- HGE INC., Architects, Engineers, Surveyors & Planners)	"We have reviewed the preliminary draft of the TSP, and have some general comments for your review. Our noted concerns are provided as follows: (1) The expressed goals are good, and the plan addresses the existing transportation system well. (2) There is considerable duplication in the text. (3) One concern is that the report appears to be largely generic rather than specific. Much of the verbage could apply to any community, and is not specific to Sisters. (4) The financial plan will be difficult to implement. Overall costs of 37 million dollars by 2030 are enormous for Sisters. (5) The suggested reduction in single occupant vehicle trips will be difficult to achieve. Sisters is a rural community, and multiple occupants per vehicle is likely not realistic. (6) The proposed back-in diagonal parking will have significant financial challenges and potential legal concerns to be addressed in Sisters. (7) Estimates for bike paths in Table 6-3 do not take into account conversion of the existing parking situation, and additional curbing that would be required for Main and Washington Streets. (8) Bike path costs for new paths in Chapter 7 appear to be extremely low. (9) Drainage issues and costs in	Comments were reviewed by DKS and City staff.	DKS will review cost estimates for bike paths as requested. Cost estimate details will be provided in the appendix.
58	20-Mar-09	Letter from Tia M. Lewis	"As the City moves forward with its transportation planning, and particularly with the selection of the Atlernative Route, it will be important to establish guidelines and policies for right of way acquisition decisions. We suggest those guidelines and policies be included in the TSP Update process. Enclosed herewith is our suggested languate to include in teh draft TSP amendement being prepared by DKS." The suggested language was then provided.	Eric Porter (City of Sisters) emailed Tia Lewis on June 5, 2009, and said the following: "Tia, We ran your proposed text by our City Attorney – he has recommended against including this proposed text in the TSP."	None
59	31-Mar-09	Email from Jim Bryant (ODOT Region 4) on Chapter 7	"I'll go ahead and send you these partial comments on Chap 7. The biggest issues are the lack of discussion and documentation on how and why the local alternative route is a superior solution to the others under consideration. I know you're working on it so we will review when it becomes available. "	The Alternative Analysis Memoranum (included as Appendix O) documents the preferred alternative selection process.	Provide ODOT with the Alternative Analysis Memoranum (no change needed in TSP body relating to alternatives analysis). Also, update TSP Chapter 7 based on ODOT review comments
60	31-Mar-09	Email from Jim Bryant (ODOT Region 4) on Chapter 7	"The other issue is the benefits/case for an STA. Much, if not all, of the identified benefits from the STA classification will be provided through the design exception for a traditional downtown classification. An STA may still be a good idea, but the reason and need for an STA should clearly explicated from the perspective of added benefits after the Cascade cross-section and design exception have been agreed to by ODOT."	City staff has conducted further coordination with ODOT Region 4 staff on the STA issue. The STA is not a critical element for adoption of the TSP per Jim Bryant's comments.	Review STA discussion in Draft TSP with City staff and make changes as necessary.
61	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Various minor edits of wording, etc. were made		Incorporate edits as necessary
62	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on page 7-2, "Why? Are you saying an STA would provide a 'more sustainable and ... yield greater returns...' If so, how."	City staff has conducted further coordination with ODOT Region 4 staff on the STA issue. The STA is not a critical element for adoption of the TSP per Jim Bryant's comments.	Review STA discussion in Draft TSP with City staff and make changes as necessary.

#	Date	Source	Comment	Response	Proposed Action
63	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	On page 7-3, Add the following: "However, since the highway through Sisters is also classified as a freight route, ODOT cross-sectional standards for a Traditional Downtown/Commecial Business District achieve the results as could be obtained through the STA designation. The desired Cascade cross-section requires an exception to ODOT standards under either designation. This TSP will reflect a cross-section with an approved ODOT exception anyway."	The proposed design exception for Cascade Avenue has been coordinated with ODOT Region 4 and District staff.	Update Draft TSP language as appropriate.
64	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on page 7-3, "The Sisters Code must take steps to protect the transportation system as a whole not just neighborhood streets. This entire section needs to clarify impacts to neighborhood streets in the context of impacts and mitigations to the whole transportation system."	The intent of the language in the Draft TSP was to add an additional traffic impact study requirement for neighborhood impacts, not to remove the need to study impacts on other roads as currently required.	The Draft TSP language will be reveiwed and clarified as appropriate.
65	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on page 7-4, "We are in the process of approving a cross section w/bulbouts at Pine and OAK and the bulbouts are not a design exception item."		The Draft TSP language will be updated.
66	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on page 7-5 and Figure 7-4, "Not sure of this roadway classification. You seem to be trying to name a minor collector something else. Neighborhood streets are typically another name for local streets so this classification will be confusing. Better to stick to generally accepted street classification. If you want to more finely parse local streets I don't care but that's not what you intend here so maintain the minor collector designation."	The neighborhood routes are not intended to be collector streets that would require improvements such as the addition of bicycle lanes. They are intented to be between a collector and a local street. This classification been used in numerous TSPs in Oregon that have been approved by other ODOT regions and DLCD.	None.
67	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on page 7-8, Tyee Drive "Appears to provide a needed connection on the south part of town between Three Creeks Rd and Locust." Intimation is that it should be left as a collector.	This classification was reviewed by the PAC and agreed to be turned into a local street as the connection is actually a seasonal park access roadway.	Change Tyee classification to local street as directed by the PAC.
68	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on page 7-9, Cross-sections become standards upon TSP approval. Therefore, ODOT also needs to agree to the state highway cross-sections.	Comment noted.	None.
69	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on page 7-9 regarding Cascade Avenue STA Implementation section, "This section will need to be revised to reflect the Design Exception, if approved. See also my earlier comments on the STA. The DE may be for existing conditions but w/redevelopment of property, full standards (primarily sidewalks) will need to be met (i.e. additional row)."	Comment noted.	Update Draft TSP language as appropriate.
70	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on Figure 7-2 regarding Cascade Ave cross-sections, "Will need to revise to DE, if approved. However, we all want to get to 10' sidewalks so we redevelopment, the standards should remain 10 and city code should require the necessary dedication and frontage improvements with redevelopment."	Comment noted.	Update Draft TSP language as appropriate.
71	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on page 7-21 regarding alternatives analysis, "This is the major issue resolved in the TSP. A thorough discussion and side-by-side comparison is needed. Deferring the technical details to an Appendix is ok, but the primary issues in determining the preferred solution should be discussed in this section."	Comment noted.	Update Draft TSP language with key findings from Appendix O.
72	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on page 7-21 regarding the statement that this plan assumes that the Highway 20 improvements that complement the Alternate Route are part of the financially committed system, "For the purposes of meeting TPR requirements in the development of a TSP (045) but does not meet 060)."	Comment noted.	Update the Draft TSP language to clarify this discussion.

#	Date	Source	Comment	Response	Proposed Action
73	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on Table 7-5, "Add the intersection improvement at OR 126/Creekside . . . Does this [Project 10] include construction of new road linking OR 126 to E. Cascade and the OR 126 intersection improvement?"	The most recent version of the preferred alternative does not require improvement to at OR 126/Creekside to meet ODOT mobility standards.	Remove improvements from the final Synchro file and update Table 7-6.
74	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on Table 7-6: Two study intersections under City jurisdiction exceed LOS D.	LOS D is not the recommended mobility standard for the City. New mobility standards are recommended as listed in Table 7-6 and are listed in Goal 7, Policy d of Chapter 2.	None
75	31-Mar-09	Chapter 7 review by Jim Bryant (ODOT Region 4)	Comment on Figure 7-8: "add "Locally Designated Local Truck Route" for Barclay-Locust"		The Draft TSP will be updated as noted.
76	31-Mar-09	Email from Jim Bryant (ODOT Region 4) on Chapter 9	"A couple of issues that I point out in this chapter include the statements about reasonably likely. As you know, a TSP has to identify a reasonable funding package for the 20-years of improvements identified in the TSP. I believe the draft TSP meets that burden. However, that is not to be confused with similar "reasonably likely" contained in the the TPR under OAR 600-12-0060. Improvements on City of Sisters streets for which SDCs are collected may be considered reasonably likely for 0060 purposes, but the proposed conceptual funding mechanisms available to implement the TSP-identified projects on state facilities are not sufficient to satisfy 0060."	Distinction noted	The Draft TSP will be updated to reflect reasonably likeley for planning purposes vs. 0060 purposes related to projects on ODOT facilities and the recommended new funding sources.
77	31-Mar-09	Email from Jim Bryant (ODOT Region 4) and in Chapter 9 review	In email: "The other issue is the action plan funding vs the master plan list. I don't see the need for the action plan. I confuses me and I am very conversant with TSPs so I imagine it would be confounding to others as well." In chapter review: "Having a Master Plan and Action Plan is confusing and as far as I can tell pointless. In the Redmond TSP, the distinction was between reasonably likely to be funded (those included for SDC funding). Here that's not the case."	Our intent is that the Action Plan is the financially constrained project list, and the Master Plan is the full project list. This may have been confusing given the assumptions related to ODOT funding partnerships.	The Draft TSP will be updated to clarify the purpose of Action Plan and Master Plan, and the ODOT portion of the Alt. Route will not be on the Action plan. Table 7-5 will be updated to distinguish which funding plan the projects align with.
78	31-Mar-09	Email from Jim Bryant (ODOT Region 4) on Chapter 9	"Finally, I'm not sure what the assumed $19 million in ODOT funding is in table 9-3 on page 9. Is it an increase in the gas-tax or is it 'new' ODOT money. If the latter, it should be reclassified as a funding gap. If its the former, does it assume a legislative package for increased gas tax?"	The project team does not know the specific mechanisms to fund ODOT's contribution to the Hwy 20 improvements - it was deemed reasonable that ODOT would partner with the City to compelte these improvements over then next 20 years. This will be clarified consistent with the Action Plan vs. Master Plan and financial constraints comments.	Update the Draft TSP language to clarify this discussion.
79	31-Mar-09	Chapter 9 review by Jim Bryant (ODOT Region 4)	Various minor edits of wording, etc. were made		Incorporate edits as necessary
80	31-Mar-09	Chapter 9 review by Jim Bryant (ODOT Region 4)	Comment on Table 9-1 regarding street fund annual amount: "$300,000 is gas tax/utility fee or General fund. That leaves $115 in state gas tax. What is the current allocation and was assumed for the future allocations to arrive at $115/hr."		The funding stream analysis tables will be included in the appendix and referenced in Chapter 9.
81	31-Mar-09	Chapter 9 review by Jim Bryant (ODOT Region 4)	Comment on Table 9-1 regarding street fund annual amount: "How did you arrive at 4470 trips. Does build out of the UGB match projected population growth?"	The 4470 trip ends is consistent with the forecasts developed for the City UGB consistent with the Comprehensive Plan (including their coordinated populalation projection).	A footnote will be added to the number of trips that refers to the forecasting memorandum.

#	Date	Source	Comment	Response	Proposed Action
82	31-Mar-09	Chapter 9 review by Jim Bryant (ODOT Region 4)	Comment on page 9-3 regarding trip growth estimate assumption of full UGB build-out: "This overestimates SDCs if it exceeds the 20-yr population projection."	The 4470 trip ends is consistent with the forecasts developed for the City UGB consistent with the Comprehensive Plan (including their coordinated populalation projection).	A footnote will be added to the number of trips that refers to the forecasting memorandum.
83	31-Mar-09	Chapter 9 review by Jim Bryant (ODOT Region 4)	Comment on Table 9-3 regarding new ODOT funding source: "Is this new revenue or formula gas tax allocation?"	The project team does not know the specific mechanisms to fund ODOT's contribution to the Hwy 20 improvements - it was deemed reasonable that ODOT would partner with the City to compelte these improvements over then next 20 years. This will be clarified consistent with the Action Plan vs. Master Plan and financial constraints comments.	Update the Draft TSP language to clarify this discussion.
84	7-Apr-09	Email from Scott Aycock (works for COIC, which administers the Cascades East Transit program)	"First, here are the current details of the service: Local service is offered every Tuesday, from 9:00am to 3:30pm. A 'community connector shuttle' is offered to Bend (with transfers to LaPine, Redmond, Prineville, and Madras/Metolius/Culver) twice a day, M-F."		These additional details will be added to the Transit section of TSP Chapter 3.
85	7-Apr-09	Email from Scott Aycock (works for COIC, which administers the Cascades East Transit program)	"Second, while Sisters is currently small in size, that doesn't help mobility-impaired people get to essential services or places of employment within Sisters or, as is especially the case for Sisters, to essential services and/or places of employment in Redmond, Bend, and other communities."		City staff to provide direction - do we want to promote additional service?
86	7-Apr-09	Email from Scott Aycock (works for COIC, which administers the Cascades East Transit program)	"Third, CET is currently in the midst of working with local community groups (e.g. Senior Council of Sisters, City Council) to identify modifications/additions to these services, and expects to add additional 'local' services as an outcome of those discussions."	As new local service plans are created, the TSP can be udpated.	None.

#	Date	Source	Comment	Response	Proposed Action
87	7-Apr-09	Email from Scott Aycock (works for COIC, which administers the Cascades East Transit program)	"Finally, the Greater Sisters Community Vision document includes the following language: 5.2 Goal Statements by Focus Area: The following is a summary of the goals developed by community members over the course of the three Leadership Summits. The focus areas were identified using the community survey and input at Leadership Summit I; the goals were initially drafted at Leadership Summit II, September 7, 2006 and refined at Leadership Summit III January 27, 2007. Built Environment * Infrastructure and Land Use Goal 1: There is a reduction in through traffic in downtown Sisters and adequate parking for visitors. Goal 2: Sisters has a public transportation system and a pedestrian and bicycle-friendly city core that minimizes motor vehicle use. Goal 3: The community focuses on the preservation of spaces that help preserve the historic community character. Goal 4: The Sisters community has housing available for all socioeconomic levels. Goal 5: Emerging technology in conjunction with green development and sustainability is embraced in the Greater Sisters community. Goal 6. New development is environmentally sensitive, protects critical/essential wildlife habitat, and is energy efficient. I just thought that these types of considerations should be included in the document."	Comment noted.	Insert the Vision Statement goals into Chapter 2 of the TSP (text to insert provided by City staff).

#	Date	Source	Comment	Response	Proposed Action
88	28-May-09	Email from Carey Tosello	Some reasons why I believe roundabouts are a better solution for Sisters . . . Roundabouts at either end of the city would immediately tell you that you are entering someplace different than all of the other cities in Oregon that greet you with a RED light, Roundabouts slow all traffic to 20 mph (Every car passing the elementary school will be traveling at a safe speed! Traffic lights allow traffic to enter town at highway speeds), Roundabouts are safer (Ever heard of a fatality at a roundabout? In fact the Arizona Department of Transportation offers the following in support of roundabouts: Reduces injury accidents by 75 percent and fatal accidents by 90 percent, Increases efficient traffic flow up to 50 percent, Helps the environment by reducing carbon emissions by double digits, Decreases fuel consumption by as much as 30 percent), Roundabouts allow bikes to move thru the intersection without stopping, Roundabouts allow locals to easily move around town without sitting at a red light on the 300 days that we don't have traffic congestion, Placing a signal at Locust and Hwy 20 would require 5-6 lanes of pavement going east/west (visualize Hwy 20 at Empire in Bend), Roundabouts would allow for the community to place art in the center (What better way to welcome people to our town than with some local art in the middle of the road. Plus having some 'unusual' art would provide fodder for conversation at the coffee house!), Roundabouts are environmentally friendly (They require no electricity to operate and don't contribute to greenhouse gasses by having cars idling, then accelerating away like signals do.), Bend has installed dozens of roundabouts - even at busy intersections - and they are aesthetically pleasing, accepted by the public, and move traffic efficiently, Several states (AZ, KS, MN, MD) have installed them on highways. The Sisters Vision statement calls for an 'authentic village atmosphere,' and the 'protection of the town character.' Roundabouts meet these goals while traffic lights come up short.	In the Project Advisory Committee Meeting #5, the PAC did not reach a consensus regarding the use of traffic signals or roundabouts at the two ends of the Barclay-Locust Alternate Route (i.e., the Hwy 20/Barclay and Hwy 20/Locust intersections). The PAC liked the look and character of the roundabouts that were considered for the Hood-Main Couplet alternative and decided to add a roundabout feasibility study to the TSP project list to determine whether roundabouts would be a viable intersection improvement option for the Barclay-Locust Alternate Route. While the roundabouts would act as gateway treatments into town and would provide an aesthetic quality and traffic calming effect, there are also additional costs that would need to be addressed in the feasibility study, including: the difficulty of integrating the roundabouts with the dynamic ITS solutions, the increased costs (likely on the order of millions), the additional land use impact issues (particularly on east side of downtown Sisters near the elementary school), and increased difficulty for pedestrian crossings since it would be a multi-lane roundabout and would require circular travel.	Add a roundabout feasibility study to the TSP project list. This study's purpose would be to determine whether roundabouts would be a viable intersection improvement option for the Barclay-Locust Alternate Route.
89	28-May-09	Email from May Fan	" I'm writing in support of roundabouts. They have been very well received because of efficient traffic flow in other locations, cutting waiting/idling time substantially. I think we should make this happen."	See response to email from Carey Tosello (#88)	
90	28-May-09	Email from Rob Corrigan	"I think that Carey is right on with his thinking here. Sisters is a special place, and I agree with Carey that a roundabout at either end of town will help promote that idea (consciously and subconsciously) to the large number of people who pass through own every day. Thanks for all the hard work that has lead us to the point we've reached, and I hope that accommodating Carey's excellent idea doesn't present too great an obstacle at this point."	See response to email from Carey Tosello (#88)	
91	28-May-09	Email from Catherine Black	"Tosello's push for roundabouts rather than traffic lights sounds like a good idea unless there's something I'm missing?"	See response to email from Carey Tosello (#88)	
92	28-May-09	Email from Merry Ann Moore	"I wanted to weigh in in favor of roundabouts vs. stoplights or stop signs for Sisters. It's a much friendlier approach for cyclists who can maintain momentum, and I understand it's much more efficient from a fuel-economy/environmental emissions standpoint. Also, I personally feel much less stressed by traffic that is moving, even if very slowly, than just sitting stopped waiting for a light to change. I believe many tourists will feel the same, and will be less likely to bypass Sisters if they can keep moving through town."	See response to email from Carey Tosello (#88)	

#	Date	Source	Comment	Response	Proposed Action
93	29-May-09	Email from John Troike	"My wife, Judy and I are current residents of Bend and plan to build our future home in Aspen Lakes. We are frequent visitors to charming Sisters and realize the value that Roundabouts have brought to Bend. They really do improve traffic flow and are an aesthetic improvement to the landscape. We strongly urge you to consider building roundabouts at both east and west entrances to Sisters."	See response to email from Carey Tosello (#88)	
94	30-May-09	Email from Carl and Dorothy Judd	"We live in Sisters and think roundabouts on either end are a good idea. It would be safe because of the low town speed. I like the idea of art in the middle. We also think they would work better than stop lights as it keeps traffic moving."	See response to email from Carey Tosello (#88)	
95	30-May-09	Email from Susan	"Just want to put in my 2-cents worth in support of roundabouts over traffic lights. They keep the traffic flowing, slowly and safely. It seems maintenance costs would be far lower with roundabouts. A bonus is just that they are far more visually pleasing than any stoplight."	See response to email from Carey Tosello (#88)	
96	30-May-09	Email from Debra Frigulti	"Carey Tosello, in The Nugget, proposed a terrific idea! Since no one, merchants or residents, is happy with one way streets (couplets!) the idea of roundabouts at Cascade and Locust and over by Ray's is a great idea. They would slow traffic down (and tourists coming through, not to Sisters always seem to exceed the speed limit). It might make it infinitely easier to get across the highway for residents and high school kids and cut down on accidents and injuries or worse. Perhaps if the roundabouts were at least two lanes wide it would prevent a severe back-up except for rodeo and quilt show weekends and still make them usable for the eighteen wheelers and those of us hauling horse trailers. If the speed limit for the roundabouts is clearly posted and enforced, they just might work! Maybe the Ghiglieri Gallery would consider donating a couple of their life-size horse statues for the center or the roundabouts (wouldn't that be nice!) I still wish we had a by-pass, but that has been under discussion for the last twenty years and probably will never happen, at least not in my life-time. Thanks for your hard work and I hope the traffic planning committee considers the roundabouts."	See response to email from Carey Tosello (#88)	
97	2-Jun-09	Community Open House #4 Event Summary	Community members visited an input and information station addressing Cascade Improvements. Public input (verbatim) from this station included: "(1) Address parking loss, (2) Like improved visibility with curbs, (3) Consider RAB at Highway 20 and Pine Street, (4) Consider mountable area on curb extensions to help with trailers turning from side streets"		Update Draft TSP to include consideration of off-street parking near Hwy 20/Pine Street and to note curb extension designs should consider mountable areas to facilitate large vehicles turning from the side-street.
98	2-Jun-09	Community Open House #4 Event Summary	Community members visited an input and information station addressing the Hwy 20 Alternate Route alternative. Public input (verbatim) from this station included: "(1) Truck height and weight-limits on Timber Creek Bridge, (2) Sign routes (right turns required), (3) Consider smaller RAB plus truck to alternate route, (4) No temporary signal."	The bridge limitations on the Timber Creek Bridge are not in the scope of the TSP. Roundabout size will be determined through design of the intesection and may be clarifed during the feasibility study.	None.

#	Date	Source	Comment	Response	Proposed Action
99	2-Jun-09	Community Open House #4 Event Summary	Community members visited an input and information station addressing Bike, Ped, and Safe Routes to School topics. Public input (verbatim) from this station included: "(1) Crosswalk at Green Ridge or Locust (high speed traffic turns right), (2) Locust needs a crosswalk to accommodate pedestrian traffic from Hood Avenue north of school into downtown, (3) Pedestrian path on Pine Street from Main to Barclay should be a high priority. (mentioned multiple times), (4) Complete the crosswalk across Adams at Elm Street, (5) Washington Boulevard project should be part of action plan given its key role in east/west bike traffic, (6) Need to separate bike/ped traffic along Locust (multi-use path width must be adequate – 10' minimum), (7) Pedestrians must have space to walk on East Cascade to and from the elementary school, (8) Enforcement of the speed limit near the elementary school should be a high priority."		To be reviewed by Alta with City staff coordination.
100	2-Jun-09	Community Open House #4 Event Summary	Twelve people completed the comment forms included with the event programs. Overall, there were safety concerns, especially surrounding schools, in the Timber Creek Bridge area, and at important pedestrian crossings. There were multiple comments about the need for roundabouts rather than traffic signals.	The Draft TSP recommendation for a roundabout feasability study is consistent with this direction.	None.
101	2-Jun-09	Community Open House #4 Event Summary	Regarding whether the Draft TSP Action Plan projects were the correct high-priority projects to pursue funding for, comment card comments (verbatim) included: "(1) High priority should be given to separate bike-ped traffic from cars, especially on routes to schools and service businesses, (2) I like the back-in angle parking - safer for drivers and bikes. Seems like a bike boulevard on Washington should be a high priority for a safer bike environment, (3) Safe Routes to Schools, pedestrian safety in the downtown core, and safe and visible lanes of traffic for cyclists are key. The plan overall seems to address these. Need enforcement of speed limit near schools, (4) If pedestrians and bicycle plans are a priority, then why does the TSP plan to use the Timber Creek Neighborhood as a traffic calming area? (5) Yes, but with a roundabout on the east end of Highway 20, (6) Okay, suggest more emphasis on Timber Creek Bridge traffic in a residential area, (7) Very concerned about plan to use Timber Creek Bridge as a regular route to 126. This would make the elementary school surrounded on all sides by the busiest streets in Sisters. Very unsafe for our children and not worth a little less traffic through Locust and Hwy 20. Locust is already bad enough for kids without that bridge opening. Make it a ped/bike bridge with emergency use accessible, (8) I like the plan (to improve the pedestrian environment). Yes to roundabouts!"	If the the Timber Creek Bridge was restricted from general motor vehicle traffic, the preferred solution for Hwy 20 would not longer meet ODOT mobility standards due to diverting traffic to OR 126 and Hwy 20. This issue may be revisited if the County TSP identifies an extenstion of Barclay east of Camp Polk Road that would connect to OR 126.	None.

#	Date	Source	Comment	Response	Proposed Action
102	2-Jun-09	Community Open House #4 Event Summary	Regarding the planned improvement on Cascade Avenue and the Hwy 20 Alternate Route, comments card comments (verbatim) included: "(1) I like the idea of narrow pedestrian crossings; it encourages people to cross at crosswalks. Also, I like pulling parking back from intersections, (2) No traffic signals! Where is the couplet option (with roundabouts)? (3) Roundabouts are safer and look better than signals. Drop the ITS solution. Conduct the feasibility study now so we don't waste time and money on a temporary signal. (4) I'm in favor of all of them; I prefer roundabouts rather than lights only IF there are safe pedestrian crossings. (5) I would like to see as much emphasis and enforcement for getting trucks off Cascade as possible. I realize this is not legally enforceable, but would like as much effort as possible. Whatever works to get drivers to use the alternate route will help maintain the vitality of downtown and encourage a more bicycle and pedestrian friendly town. (6) I would like to see a crosswalk on Locust at Green Ridge. My school age children and I cross there daily and I worry with more traffic that it is going to be even scarier than it is now. There is also a lot of foot traffic coming from Green Ridge into town. I feel that they would also use a crosswalk there at the intersection of Green Ridge and Locust Street. (7) I would like to add my input in favor of roundabouts and EXTREME OPPOSITION to signals. Roundabouts are safer, slow traffic, can be beautiful and make a statement about our town and priorities. I have lived in numerous foreign countries and Washington DC; roundabouts move a lot of traffic safely and effectively. They are more expensive, but the long-term pay off is huge. (8) Okay, (9) The traffic plan for the Timber Creek Bridge is Unacceptable! (10) I like the idea of the couplet with one-way traffic in and out of Sisters. I propose looking at making Cascade pedestrian/bike only. It would be a gathering place for the town!"	Comments noted.	Crossing of Locust at Green Ridge to be reviewed by Alta in coordiation with City staff.
103	2-Jun-09	Community Open House #4 Event Summary	Regarding the planned improvement on Cascade Avenue and the Hwy 20 Alternative Route in general, comments card comments (verbatim) included: "(1) Please consider what the "community feel" would be with stop lights coming into town. So unattractive. (2) I will get feedback from Timber Creek people. I hope they feel better about the plan. (3) High traffic volume on Timber Creek Bridge will very negatively impact the surrounding community creating safety hazards and decreased livability. (4) I vote for roundabouts, although more expensive, they keep the unique feel of Sisters as a small town, as well as the safety and less environmental impact. NO TRAFFIC LIGHTS IN SISTERS!"	Comments noted.	None
104	8-Jun-09	Email from Chuck Humphries	Comments Regarding Ped/Bike Plans: Just to reiterate points make by others and captured on the flip chart. Move the Washington Ave Bike Boulevard to the Action Plan (to complete the connection across town from the new 242 path); get sidewalks or separated pedestrian paths on Pine and Locust (n of 20), Barclay-Pine intersection, 20-126 intersection, sidewalks along McKinny Butte from SMS to 242 and to 20. In discussions with others, there is also concern about transitioning the new bike path on the north side of 242 (which is a 2-way path) to 1-way paths on either side of Hood (if that is the ultimate route chosen). Some have suggested extending the 242 path east along 242 (in front of Les Schwab) as an alternative, eventually intersecting with Pine (I'm not sure I support this, but it is an option that some actually use today, via the sidewalk).	Alta will add the reference to Washington and Adams on pages 6-12 and 6-13 as requested (i.e., that we add Washington and Adams as bike boulevards to the discussion of bike lanes on Hood and Main as a part of the complete solution for moving bikes through downtown)	To be reviewed by Alta with City staff coordiation.

#	Date	Source	Comment	Response	Proposed Action
105	8-Jun-09	Email from Chuck Humphries	Comments Regarding Roundabouts: Strongly support multilane roundabouts at 20/Barclay and 20/Locust (in lieu of lights), with specific attention to physical and striping design to enhance safety of vehicles, bicycles and pedestrians, and with specific attention to footprint to minimize ROW issues. (In particular, I believe the simple drawing used to illustrate 20/Locust is out of proportion and out of scale -- we should take care to make the illustrations as accurate as possible (given what we know) or present 2-3 alternatives where a single design might not be obvious. Otherwise, we risk biasing the debate.) I also think we need more detail on the various costs of these options -- and in particular I am not sure I buy into the rough estimates given in Sep 08 that RABs would be 3x more expensive than lights. In short, this is a plea for a thorough analysis of RABs and for a neutral presentation of the comparison of lights and RABs (e.g., multilane roundabouts are perhaps not as safe as single-lane roundabouts -- which presented only by itself would bias against multilane roundabouts, but I think the evidence shows that both are safer than lights which is the relevant comparison). We need to take care, though, not to allow the prospect further and expensive studies of the issue to become, themselves, a reason simply to adopt lights -- so the study needs to be appropriately dimensioned . . . I was very glad to see the two major intersections now shown as either lights or roundabouts; I think this I the right approach at this stage (however, one slide still has reference only to lights...and this should be revised).	See response to email from Carey Tosello (#88)	
106	8-Jun-09	Email from Chuck Humphries	Comments Regarding Preferred Alternative: I strongly support the Alternate Route, as a "variable" solution to a "variable" problem.	Already incorporated into TSP	None
107	8-Jun-09	Email from Chuck Humphries	Comments Regarding Parking: Strongly endorse back-in diagonal parking -- and should emphasize that this is beneficial not only, or not even, so much as safety for bicycles but as safety for motor vehicles (especially in a town with high percentage of SUVs, vans, pick-ups, and other large vehicles that obscure sight lines when backing out of diagonal spaces.	Already incorporated into TSP	None
108	8-Jun-09	Email from Chuck Humphries	Comments Regarding Financing: Please present costs clearly as 20 year totals (even giving an annualized figure, recognizing that in reality such expenditures are lumpy and not distributed evenly through time -- but as a way of giving perspective to what some will view with the sticker shock. (For example, the first financing slide had no indication of the period of time or duration over which the costs would be incurred.)		The presentation will be updated as noted. No changes to the Draft TSP.
109	8-Jul-09	Email from Eric Porter	Mark Radabaugh told Eric that we should put something in the TSP draft indicating that we will be amending our Development Code and Standards and Specs to mirror the TSP update. This probably should be a policy and/or task added to the text of the TSP . . . in a second email, Eric mentioned that we should time the two processes (i.e., amend our Dev Code concurrently with the Comp Plan during the TSP update process) to work closely together, but that there was no actual requirement for concurrent adoption.		Create Implentation Chapter - note to be completed by City staff in a parallel code development process.

Sisters-Camp Sherman Rural Fire Protection District

"Protecting Life and Property through Quality Service"

December16, 2008

To Sisters TSP Committee,

The Sisters-Camp Sherman Fire District supports the overall direction and content of the Transportation Safety Plan, but does not support the language in the plan specifying narrower road widths. The Oregon Fire Code states in OFC 2007 503.2 that fire apparatus access roads shall have an unobstructed width of 20 feet. The 20 foot width is specific to driving area and does not include parking.

The question of narrow streets, while accomplishing many worthy goals, is not conducive to emergency access and can result in delayed response, and the inability to deploy lifesaving equipment (hoses, pumps, medical equipment, and personnel). Around the country there are many examples of emergencies gone bad due to lack of access and egress caused by narrow streets and parking. The Sisters area requires adequate access for emergency response in all seasons. In summer, the wildfire potential requires access for fire apparatus responding to the emergency as well as ensuring safe egress for civilians to evacuate. The issue of road access is a consistent problem in any wildfire evacuation. In the winter, roads become narrow due to the snowplows inability to access city streets that already have vehicles parked along the sides of the road. The fire district has noted this problem particularly in two subdivisions in town with roads that are 28 feet in width with parking on both sides of the street. Our access is significantly impaired now in these areas and we oppose expanding this problem.

Finally, medical calls and structure fires happen throughout the year, and without sufficient street widths, our ability to save lives and property is in jeopardy due to potential access issues that would be created by the new street width standard.

Please do not hesitate to call if you have questions or concerns.

Taylor Robertson, Fire Chief

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Phone 541-549-0771 Fax 541-549-1343

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Joseph A. Slack, A.I.A.
Russ Dodge, PLS
Stephen R. Cox

February 20, 2009

City of Sisters
P.O. Box 39
Sisters, OR 97759

Attn: Brad Grimm
Public Works Director

Re: Review of Draft Report
Transportation System Plan
Project # 07.20

Dear Brad:

We have reviewed the preliminary draft of the TSP, and have some general comments for your review. Our noted concerns are provided as follows:

1. The expressed goals are good, and the plan addresses the existing transportation system well.
2. There is considerable duplication in the text.
3. One concern is that the report appears to be largely generic rather than specific. Much of the verbage could apply to any community, and is not specific to Sisters.
4. The financial plan will be difficult to implement. Overall costs of 37 million dollars by 2030 are enormous for Sisters.
5. The suggested reduction in single occupant vehicle trips will be difficult to achieve. Sisters is a rural community, and multiple occupants per vehicle is likely not realistic.
6. The proposed back-in diagonal parking will have significant financial challenges and potential legal concerns to be addressed in Sisters.
7. Estimates for bike paths in Table 6-3 do not take into account conversion of the existing parking situation, and additional curbing that would be required for Main and Washington Streets.
8. Bike path costs for new paths in Chapter 7 appear to be extremely low.
9. Drainage issues and costs in Sisters are much greater than in other areas of the State where underground drainage can be installed.
10. To take advantage of existing improvements that have been constructed in the downtown core, it may be preferable to provide back in diagonal parking on one side, and parallel parking on the other side of existing streets.
11. It would appear that back-in parking would be much easier to achieve on the side streets rather than on Main and Washington Streets.
12. If bike paths could be installed on Adams and Jefferson Streets, utilizing side streets as access corridors to the downtown core, implementation could be achieved with tremendous cost savings.
13. The cost of roadway improvements in Table 7-5 need additional detail, and a breakdown of how the estimates were derived. Note also that the project 10 reference to Canyon Creek should be modified to Creekside.

14. Since signalization of intersections is a significant concern, additional detail (layout) should be provided to illustrate recommendations, particularly for the Hwy 20/Barclay Drive and Hwy 20/Locust Street intersections.

Please contact me if you have any questions or concerns with our review of the TSP, or in any other regard. If additional information is desired, we would be happy to review the plan in much greater detail.

We appreciate the opportunity to be of assistance to the City of Sisters.

Very truly yours,

HGE INC., Architects, Engineers,
Surveyors & Planners

Richard D. Nored, P.E.
President

c. Paul Bertagna

SCHWABE, WILLIAMSON & WYATT
ATTORNEYS AT LAW

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March 20, 2009

Eric Porter
Community Development Director
City of Sisters
PO Box 39
Sisters, OR 97759

Re: TSP Update

Dear Eric:

As you know, our office represents several property owners within the City of Sisters. We are interested in participating in the TSP Update process and appreciate you including us on the list of persons wishing to receive any notices associated with the process.

As the City moves forward with its transportation planning, and particularly with the selection of the Alternative Route, it will be important to establish guidelines and policies for right of way acquisition decisions. We suggest those guidelines and policies be included in the TSP Update process. Enclosed herewith is our suggested language to include in the draft TSP amendment being prepared by DKS. We have drafted it to be included in Chapter 8 as it seemed the most logical place. However, the language could also be revised to go into Chapter 9 or any other Chapter where it makes sense.

Please include this in the record for the TSP Update and in the draft amendments to be considered by the Planning Commission and City Council. Please let me know if you have any questions or concerns. Thank you.

Sincerely,

Tia M. Lewis

TML:bacl
Enclosure

CHAPTER 8: FINANCIAL PLAN

STREET ACQUISITION:

Consistent with the powers and purposes of City government, the City Charter and ORS Chapter 35, the City shall acquire rights-of-way, easements and fee property for transportation facilities which are necessary for the continued growth, safety and welfare of the community. Acquisition shall include negotiation and agreement, purchase, or, if necessary, by commencement of eminent domain proceedings. Recognizing that pressure from continued growth has created circumstances where many planned improvements are not funded, the City must work with public agencies and private parties to find ways to acquire and build necessary transportation infrastructure. Consideration shall be given to right of way, easement or fee property acquisitions involving opportunities for public/private partnerships where private property owners can contribute costs of acquisition and/or public infrastructure improvement costs for the acquisition and development of public transportation facilities.

The following policies shall guide acquisition decisions.

Acquisition Policies:

*Facilitates development of efficient transportation infrastructure
*Promotes police and fire safety
*Facilitates orderly and compact development consistent with land use designations
*Necessary to serve anticipated growth
*Necessary to meet existing or future employment or job growth

Appendix C: Background Document Review

DKS Associates
TRANSPORTATION SOLUTIONS

Memorandum

TO:	Eileen Stein, City of Sisters	
FROM:	Carl Springer, P.E., Brad Coy, DKS Associates	
DATE:	January 18, 2008	
SUBJECT:	**Sisters TSP – Background Document Review**	P/A No. 07288-000-002

This memorandum summarizes prior studies and plans that have findings or guidelines relevant to the Sisters Transportation System Plan. This background review will be useful throughout the project and initially identifies conflicts and discrepancies between previous planning documents. Furthermore, it explains how local plans fit into the larger regional context.

Summary

Key rules and policies found during the Plan and Document Review include the following:

- Use 2001 Oregon Transportation System Planning Guidelines for overall transportation system planning assistance.
- Address new TPR requirements (OAR 660-12-0050 and -0055) that direct the amendment of local TSPs when land use plan amendments are proposed.
- Comply with State access management standards for Statewide and District Highways—which include Santiam Highway (US 20/OR 126), McKenzie Highway (OR 242 and OR 126), and McKenzie-Bend Highway (US 20)—as they travel through the City of Sisters. Access spacing standards range from 400 feet to 1320 feet depending on the type of highway and posted speed.
- Follow the guidance of OHP policies related to:
    - Land use and transportation planning coordination between the City, County, and State;
    - Volume-to-capacity mobility standards for intersections located along state highways based on posted speed limit and location relative to the Urban Growth Boundary (UGB); and
    - Off-system improvements, where the State may financially assist local jurisdictions in local road projects that are cost-effective improving conditions on state facilities.
- Adopt mobility standards (e.g. LOS or v/c standards) for City facilities.

DKS 25 YEARS

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Background Plan and Document Review

The documents reviewed are listed below, along with their page number within this document.

City of Sisters Transportation System Plan (TSP) 2
Sisters Couplet Refinement Plan 4
Oregon Transportation Planning Rule (TPR) (OAR 660-012) 5
Oregon Access Management Rule (OAR 734-051) 6
Salem to Bend Corridor (OR 22, OR 126, US 20) Interim Corridor Strategy 7
Deschutes County Transportation System Plan (TSP) 8
Oregon Highway Plan (OHP) 8
State Transportation Improvement Program (STIP) 9
Deschutes County ITS Plan 10
City of Sisters Comprehensive Plan 10
City of Sisters Development Code 11
Oregon Bicycle and Pedestrian Plan 13
Oregon Historic Preservation Plan 13
Sustainability and Quality Development Executive Order 14

Other reports addressing specific area master plans or feasibility studies will be considered throughout the process as appropriate, but the land development and travel forecasts done in conjunction with the TSP will generally supersede these studies.

City of Sisters Transportation System Plan (TSP)

David Evans and Associates, June 2001

The 2001 Sisters TSP was developed to provide a review of the transportation system, evaluate deficiencies in the system, and plan for future improvements for the City through the year 2020. A key objective of this plan was to achieve a safe, convenient, and economic transportation system for all users. The TSP outlines the City's goals for developing its transportation facilities to meet short and long term needs.

Functional classification, cross-section standards, and access management standards (reproduced in Table 1 below) are included in the plan.

TABLE 1: Access Spacing Standards for City Streets

Roadway	Spacing Between Intersections of Public Streets[a]	Spacing Between Private Driveways and Alleys[a]
Collector	300 feet	100 feet
Local	300 feet	Access to each lot

[a] Spacing distance is measured from center to center on the same side of roadway.

Source: Table 7-1, City of Sisters TSP, 2001.

Existing conditions were assessed and future needs through 2020 were determined based on growth assumptions. The operational analysis for future conditions identified intersection deficiencies for those intersections along State highways that exceed ODOT volume-to-capacity (V/C) ratio standards and those along other City streets that exceed level-of-service "D" for the minor side street approaches. Although

LOS "D" was used for non-highway intersections, no specific standard was adopted as part of the TSP. The following roadway system evaluation criteria were used to select roadway improvement alternatives to address the deficiencies:

- Traffic Operations (speed, delay, collision records, and congestion)
- Safety
- Livability
- Cost

Transportation projects were identified and prioritized for inclusion in the Oregon Department of Transportation's (ODOT's) Statewide Transportation Improvement Program (STIP) and the City of Sisters' Capital Improvement Program (CIP). Cost estimates for each project, a transportation financing plan, and transportation and land use policy recommendations were also presented and the resulting CIP is summarized in Table 2 below.

TABLE 2: Capital Improvement Program Summary

Priority	City of Sisters Costs	ODOT Costs	Developer Costs	Total Costs (Year 2001 $)
High	$0.50 million	$2.55 million	$0.80 million	$3.85 million
Medium	$0.07 million	$0	$0.74 million	$0.81 million
Local	$0.07 million	$1.98 million	$0.54 million	$2.59 million
TOTAL	**$0.64 million**	**$4.53 million**	**$2.08 million**	**$7.25 million**

Source: Table 7-6, City of Sisters TSP, 2001.

The following are some key recommendations included in the Sisters TSP:

- Recommends improvements along Cascade Avenue in order to relieve current and future congestion, including:
  - Continued temporary rerouting of US 20/OR 126 traffic during peak periods with the best route specified as Locust Street to Barclay Drive to a new collector
  - The conversion of two parallel streets (Hood/Main, Hood/Cascade, or Cascade/Main) into a couplet
- Proposes treatments along Cascade Avenue in order to maintain livability, including:
  - Special Transportation Area (STA) designation from Locust Street to Pine Street
  - Designation of access management areas
  - Narrowing the travel lanes and widening the sidewalks
  - Curb extensions at the intersections of Spruce Street, Fir Street, Elm Street, Ash Street, and Oak Street
- Recommends the following street system expansion projects:
  - Barclay Drive extension (*since completed)*

  - Jefferson Avenue extension
  - Cowboy Street extension
  - Black Butte Avenue extension
  - Fir Street extension
  - New Timber Creek roads
  - New Coyote Springs Road
  - New road (connection between Rope Lane and Tamarack Street)
- Proposes a traffic signal at the intersection of US 20 and Locust Street.
- Recommends adding 4-ft. shoulders to both sides of City streets, including:
  - Larch Street from Main Avenue to the northern City limits
  - Locust Street from Main Avenue to the northern City limits
  - Three Creeks Road from St. Helens Avenue to the southern city limits
  - Jefferson Avenue from Pine Street to US 20/OR 126
  - Pine Street from Barclay Drive to the northern City limits
- Recommends a new section of sidewalk between Larch Street and Locust Street
- Recommends the City continue requiring walkway improvements as infill development projects arise and bike lanes or separated paths as part of new developments
- Proposes that directional signage for bicycles is appropriate for the City of Sisters

The TSP update will consider and incorporate all findings and projects from the adopted TSP that are still relevant in addition to incorporating new projects.

Sisters Couplet Refinement Plan

Cogan Owens Cogan, CTS Engineers, and Robert Yakas, November 2004

The Sisters Couplet Refinement Plan was prepared to develop a couplet alternative that addresses current and future congestion on US 20/OR 126 (Cascade Avenue), which is the main highway running through Sisters. While the couplet was not identified in the Sisters TSP as a top priority project, it was preferred over other long-term options for addressing congestion.

The couplet design that was analyzed in the study is non-traditional and would use two parallel one-way streets (Hood and Main Avenues), with a parallel two-way street between them (Cascade Avenue). The couplet is intended to act as a “pressure relief valve” providing alternatives to Cascade Avenue for travelers during peak traffic periods. At other times, Cascade Avenue would likely be used as the most direct route through town. Specific objectives of the study include the following:

- Refine couplet design and operational elements to identify a preferred conceptual design for a Hood/Main couplet, particularly how it connects to two-way traffic on Cascade Avenue
- Consider environmental concerns, impacts on businesses, traffic engineering and highway mobility standards

- Meet the goals of the City's Comprehensive Plan, TSP, Urban Renewal Plan, Oregon Highway Plan, and state Transportation Planning Rule
- Preserve the City's livability, small town character and economy, while accommodating increased local and through traffic
- Maintain interconnectivity within the local street grid

The preferred alternative resulting from the study, consisted of intersection designs at the intersection of US 20/OR 126 and Hood Avenue (west end of couplet) and the intersection of US 20/OR 126 and Locust Street (east end of couplet). In addition, diagonal parking along both sides of Hood and Main Avenues would be preserved, though a city-wide parking study was recommended to identify the potential need to develop off-street parking areas. The two intersection designs are as follows:

- **West Intersection Design:** Extends Main Street to Hwy 20 at the west end of the couplet, retains two-way traffic along Highway 20 as it approaches Sisters from the west, and allows for two-way traffic along Hood Avenue between Highway 242 and Pine Street to facilitate north/south and east/west access for residents north of Hood
- **East Intersection Design:** Creates a channelized intersection and future traffic signal, adjusts intersection geometry to accommodate couplet movements, and accommodates two-way traffic on Locust Avenue between Highway 20 and Main Street even though it is part of the couplet.

No analysis results for the preferred alternative were provided in the study. In response, the Oregon Department of Transportation (ODOT) performed analysis and determined that the east intersection would not meet operation performance standards. Therefore, the alternative was not implemented.

Sisters Community Trails Plan (2003)

Construction and development of the shared use path system is directed by the Sisters Community Trails Plan (2003). This plan calls for three miles of paved trails designed for pedestrian or bicycle travel. The Tollgate High School trail, the first bicycle/pedestrian project completed from this plan, accommodates two-way traffic on a ten foot wide paved path. These paths will primarily serve to increase connectivity throughout Sisters and improve connections to the surrounding Deschutes County Trail System.

Oregon Transportation Planning Rule (TPR) (OAR 660-012)

The State of Oregon adopted 19 statewide planning goals that must be implemented in a comprehensive plan for each city (with a population over 2,500 individuals) and county in the state. In addition to identifying how land, air and water resources of each specific jurisdiction will be utilized, a review and needs analysis must be completed for improving public facilities.

One of the 19 goals is the Transportation Planning Rule (Goal 12). To comply with this rule, Sisters must adopt a Transportation System Plan (TSP) that complies with the State TSP. The overarching goals to be accomplished by the TPR are to:

- Reduce dependence on the automobile and the number of people driving alone.
- Establish a stronger connection between land use and transportation planning.

Local TSPs are expected to examine possible land use solutions to transportation problems and identify multi-modal, system management and demand management strategies to address transportation needs. This entails the development of modal plans, including pedestrian, bicycle, motor vehicle and transit.

These plans must strive to provide an integrated transportation network and include an inventory of current infrastructure, provide a gap analysis and identify how these gaps are going to be filled. The areas of analysis addressed in the TPR for a transportation system plan include:

- Roadway capacity and level-of-service
- Transit capacity and capacity utilization
- Bicycle and pedestrian system capacity
- Adjustment of turning movement volumes produced by travel demand forecasting models
- Estimation of future transportation needs (person travel), reflecting:
- Population and employment forecasts consistent with comprehensive plans
- Measures to reduce reliance on the automobile
- Increased residential, commercial and retail development densities
- Location of neighborhood shopping centers near residential areas
- Better balance between jobs and housing
- Maximum parking limits for office and institutional developments
- Appropriate levels of transportation facilities to serve land uses identified in transportation plans
- Increases in average automobile occupancy
- Increases in modal shares of non-automobile modes
- TDM programs
- Land use and subdivision regulation
- Estimation of future goods movement
- Access management

Those strategies that were previously incorporated into the adopted TSP will be carried forward in the update. In addition, the Oregon Land Conservation and Development Commission adopted amendments to sections of the TPR – OAR 660-12-0050 and -0055 – in 2005. The amendments clarify planning requirements for amending local TSPs when land use plan amendments are proposed. The TSP update should reflect this new rule requirement.

Oregon Access Management Rule (OAR 734-051)

The purpose of Oregon's Access Management Rule is to control the issuing of permits for access to state highways, state highway rights of way and other properties under the State's jurisdiction. In addition, the ability to close existing approaches, set spacing standards and establish a formal appeals process in relation to access issues is also identified.

These rules enable the State to set policy and direct location and spacing of intersections and approaches on state highways, ensuring the relevance of the functional classification system and preserving the efficient operation of state routes. Regulating access can:

- Protect resource lands
- Preserve highway capacity

- Ensure safety for segments of state routes with sharp curves, steep grades or obstructed sight distance.

The access management standards adopted by ODOT and applicable to the City of Sisters are summarized in Table 3 below.

TABLE 3: Applicable ODOT Access Management Standards

Facility	Spacing Standard[a] per Posted Speed			
	≥55 mph	*40,45 mph*	*30,35 mph*	*≤25 mph*
Statewide Highway[b]	1320 feet	990 feet	770 feet	550 feet
District Highway[c]	700 feet	500 feet	400 feet	400 feet

[a] Measurement of the approach road spacing is from center to center on the same side of the roadway.
[b] The Santiam and McKenzie-Bend Highways are Statewide Highways, as is the segment of the McKenzie Highway east of Sisters.
[c] The segment of the McKenzie Highway west of Sisters is a District Highway.

Source: 1999 Oregon Highway Plan.

These standards will be used in the TSP to establish a connectivity plan, verify access spacing for any proposed highway interchanges, and analyze current access conditions on congested state highways. These standards will be applied to all rights-of-way under the State's jurisdiction in the City of Sisters.

Salem to Bend Corridor (OR 22, OR 126, US 20) Interim Corridor Strategy

Oregon Department of Transportation (ODOT), September 1998

The Salem to Bend Corridor (OR 22, OR 126, US 20) Interim Corridor Strategy addresses the operation, preservation, and improvement of transportation facilities in the Highway 22/US 20 corridor over a 20-year planning period. This corridor passes through the City of Sisters and is main roadway providing accessibility between neighboring communities for purposes of freight movement, tourism, commuting, and recreational travel. Highway 20 is also the City's principal thoroughfare.

The following points were made concerning the City of Sisters

- The City of Sisters is referred to as a "corridor community".
- Dial-a-ride service is the only public transit service provided within Sisters.
- The Sisters airport is public use but does not provide scheduled commercial air service.
- High traffic congestion occurs in Sisters on summer weekends and during special event weekends such as the rodeo and quilt show.
- Participants in the public involvement program mentioned problems of too much congestion, inadequate safety, lack of commute alternatives, the need for a Sisters bypass route, difficulties of access, and uncertainty of funding for improvements.
- The highway is both a major arterial route for commuters, tourists, local users, and freight movement and the focus of commercial activity, which results in conflicts between through movement and local access functions.
- The purchase of right-of-way in the City of Sisters is very expensive.

- The strategy discusses a series of actions for the Highway 22/US 20 corridor
  - Pursue transportation demand and system management strategies as a first course in addressing future needs
  - Develop support facilities for transit, carpooling, and the use of non-motorized modes
  - Develop and implement access management plans to manage future access to the highway
  - Continue study of traffic route alternatives in Sisters to enhance connectivity
  - Pursue improvements that enhance truck mobility and safety
  - Implement a program of transportation system management measures to improve the efficiency of traffic flow
  - Provide capacity improvements in balance with transportation system

Deschutes County Transportation System Plan (TSP)

Deschutes County, adopted August 1998

The Deschutes County Transportation System Plan addresses transportation needs throughout the County over the next twenty years (1996-2016). The County transportation system provides connections between Deschutes County and adjacent counties, as well as between the urban and rural areas within the County. The transportation network involves many different modes, including auto, bike, pedestrian, rail and transit. The Plan provides an overview of the existing transportation system in the County and addresses both short and long-term transportation needs. In the short-term, the study identifies and provides recommended solutions to immediate safety and congestion problems. For the future, the study looks at the next 20 years in Deschutes County, and identifies through goals and policies, how best to move people and goods efficiently throughout the County. Long-term projects are identified and prioritized.

The following projects relevant to the City of Sisters were identified:

- Camp Polk Road – widen and overlay from the Sisters Urban Growth Boundary (UGB) to Wilt Road; this is specified as a High Priority Road Project and is located outside the Sisters UGB.

Oregon Highway Plan (OHP)

The basic framework for the Oregon Highway Plan (OHP) is a refinement and application of the goals and policies stated in the Oregon Transportation Plan applied to the state highway system. The OHP gives policy and investment direction to large scale facility plans and TSPs, but is not intended to direct specific projects and modal alternatives.

Specific OHP policies with bearing on transportation planning and the current Sisters TSP update include the following.

- Policy 1A – State Highway Classification System

  - The two state highways in Sisters are OR 214 and OR 213 are classified as district highways.
- Policy 1B: Land Use and Transportation
  - Land use and transportation planning and development needs to be coordinated between state, regional, county, and city agencies.
- Policy 1F: Highway Mobility Standards
  - For District Highways inside UGBs where speed limits are at least 45 mph, mobility standards are 0.80 v/c. Where the speed limit between 35 and 45 mph, the standards are 0.85 v/c. Where speed limits are 35 mph or less, the standard is 0.90 v/c. Outside of the UGB, 0.75 is the standard for all approaches except for minor approaches at unsignalized intersections where a standard of 0.80 is specified.
- Policy 1G: Major Improvements
  - Efficiency and other management measures must be instituted before adding capacity.
- Policy 2A: Partnerships
  - The limited resources available for transportation planning and development should be efficiently and effectively used by coordinating the efforts of ODOT and other agencies, in this case the City of Sisters.
- Policy 2B: Off-System Improvements
  - The State is to provide financial assistance for local road projects when the projects are cost-effective in improving state facility conditions.
- Policy 2D: Public Involvement
  - Offer opportunities for effective public involvement in transportation planning and project development.
- Policy 2F: Traffic safety
  - Increase the safety of the state transportation system through engineering, education, enforcement, and emergency services.

Goal 3 (Access Management) is critical in transportation planning efforts that involve state transportation facilities. This goal is implemented through OAR 734-051, which is reviewed later in this chapter. Goal 4 (Travel Alternatives) and Goal 5 (Environmental and Scenic Resources) also apply to the TSP update, if in limited ways. Goal 5, with an aim to go beyond what is required by other state and federal regulations, calls for natural resources to be maintained and even improved by transportation planning and projects involving state facilities.

State Transportation Improvement Program (STIP)

The current adopted (2006-2009) Statewide Transportation Improvement Program (STIP) serves as ODOT's short term capital improvement program and provides funding and scheduling information for transportation projects for both ODOT and the metropolitan planning organizations in the state. Projects funded in the STIP reflect and advance the Oregon Transportation Plan for highways, public transportation, freight and passenger rail and bicycle and pedestrian facilities. Additionally, monies obtained from the sale of state bonds authorized in the 2003 Oregon Transportation Investment Act

(OTIA III) and placed in the STIP have been dedicated to modernization, bridge and pavement preservation projects. Therefore, many of the projects in the 2004-2007 STIP are preservation oriented.

No projects have been identified within the STIP that are within the City of Sisters' boundaries.

Deschutes County ITS Plan

DKS Associates, IBI Group, et. al., March 2005

The *Deschutes County Intelligent Transportation System (ITS) Plan* provides a framework of policies, procedures, and strategies for the integration of the region's resources to effectively meet future regional transportation needs and expectations. As part of the *Deschutes County ITS Plan*, a 20-year deployment plan of ITS projects is provided and includes advanced technologies and management techniques aimed to improve the safety and efficiency of the Deschutes County transportation system. These ITS applications will help improve transportation system operations by increasing the mobility of people and goods on the given roadway infrastructure.

The following projects relevant to the City of Sisters were identified:

- Proposed deployment of the following ITS Equipment on US 20 near the southeast edge of the Sisters UGB:
    - CCTV camera (in 6 to 10 years)
    - Variable message sign (in 6 to 10 years)
    - Two count stations (in 6 to 10 years)
    - Automatic traffic recorder (in 11 to 20 years)

These ITS devices and their corresponding communication infrastructure should be installed on corridors concurrently with traditional transportation construction and maintenance projects.

City of Sisters Comprehensive Plan

City of Sisters, July 2005

The City of Sisters Comprehensive Plan provides a framework for future development in the area by presenting goals and policies that are consistent with the physical characteristics, attitudes, and resources of the Sisters community and that organize and coordinate complex interrelationships between people, land, resources and facilities in a manner which will protect the health, safety, welfare and convenience of its citizens.

With respect to its transportation component, the plan summarizes the Sisters Transportation System Plan (TSP) and identifies the roadway classifications and roadway, transit, bicycle, and pedestrian improvement plans outlined in the City of Sisters TSP. The key implementation goals and policies for the transportation component of the plan are listed below:

- Establish a Special Transportation Area (STA) in the downtown core along the highway corridor
- Re-designate Main, Jefferson, Barclay Drive, and Hood Avenues as collectors
- Obtain all elements of a well functioning multi-modal transportation system, which include:
    - Development and maintenance of additional parking spaces and/or facilities

  - Preservation of right-of-way for planned transportation facilities, access ways, paths, or trails
  - Integration of new developments into the existing transportation system to facilitate local traffic flows, access to developments, and safe access to state highways
  - Construction of all streets to City Public Works Construction standards
- Cooperate with neighboring Cities and with Deschutes County in the development of an inter-city transportation plan
- Participate in the Central Oregon Commute Options Program by assisting in implementing measures outlined in their programming.
- Develop and utilize telecommuting strategies to facilitate the movement of information and data rather than people.
- Obtain funding from the City of Sisters Tax Increment Financing District (Urban Renewal District) for the development of improvements along and adjacent to the commercial core.
- Design residential street lighting to be consistent with the 1880s Western Design Theme, Dark Skies ordinance, and Development Code
- Lower speed limits along highways within the entire Urban Growth Boundary

City of Sisters Development Code

The development code provides city standards for public improvements related to the development process. Many relevant codes outlined throughout Chapters 3 and 4 of the code will be applicable to the TSP update process.

Chapter 3.1 – Access and Circulation- The purpose of this chapter is to help insure that developments provide safe and efficient access and circulation, for pedestrians and vehicles.

- **3.1.2 - Vehicular Access and Circulation** manages vehicle access to development through a connected street system, while preserving the flow of traffic in terms of safety, roadway capacity, and efficiency. Access shall be managed to maintain an adequate "performance standards" and to maintain the "functional classification" of roadways as required by the City's Transportation System Plan.
- **3.1.3 - Pedestrian Access and Circulation**

Chapter 3.2 – Landscaping, Street Trees, Fences and Walls- The purpose of this chapter is to promote community health, safety and welfare by protecting natural vegetation, and setting development standards for landscaping, street trees, fences and walls.

- **3.2.2 - Landscape Conservation** prevents the indiscriminate removal of significant trees and other vegetation, including vegetation associated with streams, wetlands and other protected natural resource areas.
- **3.2.3 - New Landscaping** sets standards for and requires landscaping of all development sites that require Site Design Review. This section also requires buffering for parking and maneuvering areas, and between different land use districts.
- **3.2.4 - Street Trees** sets standards for and requires planting of trees along all streets for shading, comfort and aesthetic purposes.

Chapter 3.3 – Parking- The purpose of this chapter is to provide basic and flexible standards for development of vehicle and bicycle parking.

- **3.3.3 - Vehicle Parking Standards**
- **3.3.4 - Bicycle Parking Standards**

Chapter 3.4 – Public Work Standards- A primary purpose of this Chapter is to provide standards for attractive and safe streets that can accommodate vehicle traffic from planned growth, and provide a range of transportation options, including options for driving, walking and bicycling

- **3.4.1 - Standards and Specifications** specifies right-of-way and roadway width standards per roadway classification
- **3.4.2 - Transportation Improvements and Public Use Areas** specifies key standards related to block dimensions, traffic signals, traffic calming features, future street plans, street extensions, and other general street guidelines.

Chapter 4.2 – Development Review and Site Design Review- The purpose of this Chapter is to:

- Provide rules, regulations, and standards for efficient and effective administration of site development review.
- Carry out the development pattern and plan of the City and its comprehensive plan policies;
- Promote the public health, safety and general welfare;
- Lessen or avoid congestion in the streets, and secure safety from fire, flood, pollution and other dangers;
- Provide adequate light and air, prevent overcrowding of land, and facilitate adequate provision for transportation, water supply, sewage and drainage;
- Encourage the conservation of energy resources; and
- Encourage efficient use of land resources, full utilization of urban services, mixed uses, transportation options, and detailed, human-scaled design.

Chapter 4.5 – Master Planned Developments- The purpose of this Chapter is to:

- Provide rules, regulations, and standards for efficient and effective administration of site development review.
- Implement the Development standards of Chapter 2, Section 2.1.200 I by providing a means for master planning large development sites;
- Encourage innovative planning that results in more mixed use development, improved protection of open spaces, and transportation options and site phasing of development;
- Encourage developments that recognize the relationship between buildings, their use, open space, and transportation options, providing varied opportunities for innovative and diversified employment environments;
- Facilitate the efficient use of land;
- Promote an economic arrangement of land use, buildings, circulation systems, open space, and utilities;

- Preserve to the greatest extent possible the existing landscape features and amenities, that may not otherwise be protected through conventional development;
- Encourage energy conservation and improved air and water quality and;
- Assist the City in planning infrastructure improvements.

Chapter 4.10 – Traffic Impact Study- This Chapter establishes the standards for when a proposal must be reviewed for potential traffic impacts; when a Traffic Impact Study must be submitted with a development application in order to determine whether conditions are needed to minimize impacts to and protect transportation facilities; what must be in a Traffic Impact Study; and who is qualified to prepare the Study.

- **4.10.2 - When Required**
- **4.10.3 - Traffic Impact Study Requirements**
- **4.10.4 - Approval Criteria**

Oregon Bicycle and Pedestrian Plan

The provision of safe and accessible bicycling and walking facilities in an effort to encourage increased levels of bicycling and walking is the goal of the Oregon Bicycle and Pedestrian Plan. The Plan provides actions that will assist local jurisdictions understand the principals and policies that ODOT follows in providing bike and walkways along state highways. In order to reach the plan's objectives, the strategies for system design are outlined, including:

- Providing bikeway and walkway systems that are integrated with other transportation systems.
- Providing a safe and accessible biking and walking environment.
- Development of education programs that improve bicycle and pedestrian safety.

The document includes two sections, including the Policy & Action Plan and the Bikeway & Walkway Planning Design, Maintenance & Safety. The first section contains background information, legal mandates and current conditions, goals, actions and implementation strategies ODOT proposes to improve bicycle and pedestrian transportation. The second section assists ODOT, cities and counties in designing, constructing and maintaining pedestrian and bicycle facilities. Design standards are recommended and information on safety is provided.

The Sisters TSP will implement the design standards for all bicycling and pedestrian facilities located in the City of Sisters in accordance with the Oregon Bicycle and Pedestrian Plan. Additionally, needs assessment and possible alignment alternatives will be based on the goals outlined in the Policy and Action section of the Oregon Bicycle and Pedestrian Plan.

Oregon Historic Preservation Plan

State Historic Preservation Office, 2005

The Oregon State Historic Preservation Office (SHPO) is the state office that deals with historic building and archaeological site issues. The Oregon SHPO oversees nominations of Oregon's significant historic properties to the National Register of Historic Places, which is the nation's official list of buildings, structures, districts, sites, and objects significant in American history, architecture, archaeology and culture. For the City of Sisters, the William T.E. Wilson Homestead (70300 Camp Polk Road) and Sisters

High School (115 N Locust Street) are identified on the National Register list. Consideration will be given to these historical locations in the Sisters TSP update.

Sustainability and Quality Development Executive Order

Executive Order No. EO 03-03, 2003

The executive order was created to support and drive the goals for the Oregon Sustainability Act adopted by the Legislature in 2001. The order outlines the role of the Oregon State government to define sustainability, produce goals to achieve sustainability, identify challenges to achieving sustainability and measuring performance. This order does not include any standards or recommendations that will directly impact the Sisters TSP update.

Appendix D: HCM Delay and Level of Service Information

TRAFFIC LEVELS OF SERVICE

Analysis of traffic volumes is useful in understanding the general nature of traffic in an area, but by itself indicates neither the ability of the street network to carry additional traffic nor the quality of service afforded by the street facilities. For this, the concept of *level of service* has been developed to subjectively describe traffic performance. Level of service can be measured at intersections and along key roadway segments.

Level of service categories are similar to report card ratings for traffic performance. Intersections are typically the controlling bottlenecks of traffic flow and the ability of a roadway system to carry traffic efficiently is generally diminished in their vicinities. Levels of Service A, B and C indicate conditions where traffic moves without significant delays over periods of peak travel demand. Level of service D and E are progressively worse peak hour operating conditions and F conditions represent where demand exceeds the capacity of an intersection. Most urban communities set level of service D as the minimum acceptable level of service for peak hour operation and plan for level of service C or better for all other times of the day. The *Highway Capacity Manual* provides level of service calculation methodology for both intersections and arterials.[1] The following two sections provide interpretations of the analysis approaches.

---

[1] *2000 Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2000, Chapters 16 and 17.

UNSIGNALIZED INTERSECTIONS (Two-Way Stop Controlled)

Unsignalized intersection level of service is reported for the major street and minor street (generally, left turn movements). The method assesses available and critical gaps in the traffic stream which make it possible for side street traffic to enter the main street flow. The *2000 Highway Capacity Manual* describes the detailed methodology. It is not unusual for an intersection to experience level of service E or F conditions for the minor street left turn movement. It should be understood that, often, a poor level of service is experienced by only a few vehicles and the intersection as a whole operates acceptably.

Unsignalized intersection levels of service are described in the following table.

Level of Service	Expected Delay	(Sec/Veh)
A	Little or no delay	0-10.0
B	Short traffic delay	>10.1-15.0
C	Average traffic delays	>15.1-25.0
D	Long traffic delays	>25.1-35.0
E	Very long traffic delays	>35.1-50.0
F	Extreme delays potentially affecting other traffic movements in the intersection	> 50

Source: 2000 *Highway Capacity Manual*, Transportation Research Board Washington, D.C.

SIGNALIZED INTERSECTIONS

For signalized intersections, level of service is evaluated based upon average vehicle delay experienced by vehicles entering an intersection. Control delay (or signal delay) includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. In previous versions of this chapter of the HCM (1994 and earlier), delay included only stopped delay. As delay increases, the level of service decreases. Calculations for signalized and unsignalized intersections are different due to the variation in traffic control. The *2000 Highway Capacity Manual* provides the basis for these calculations.

Level of Service	Delay (secs.)	Description
A	≤10.00	**Free Flow/Insignificant Delays:** No approach phase is fully utilized by traffic and no vehicle waits longer than one red indication. Most vehicles do not stop at all. Progression is extremely favorable and most vehicles arrive during the green phase.
B	10.1-20.0	**Stable Operation/Minimal Delays:** An occasional approach phase is fully utilized. Many drivers begin to feel somewhat restricted within platoons of vehicles. This level generally occurs with good progression, short cycle lengths, or both.
C	20.1-35.0	**Stable Operation/Acceptable Delays:** Major approach phases fully utilized. Most drivers feel somewhat restricted. Higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level, and the number of vehicles stopping is significant.
D	35.1-55.0	**Approaching Unstable/Tolerable Delays:** The influence of congestion becomes more noticeable. Drivers may have to wait through more than one red signal indication. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. The proportion of vehicles not stopping declines, and individual cycle failures are noticeable.
E	55.1-80.0	**Unstable Operation/Significant Delays:** Volumes at or near capacity. Vehicles may wait though several signal cycles. Long queues form upstream from intersection. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are a frequent occurrence.
F	≥80.0	**Forced Flow/Excessive Delays:** Represents jammed conditions. Queues may block upstream intersections. This level occurs when arrival flow rates exceed intersection capacity, and is considered to be unacceptable to most drivers. Poor progression, long cycle lengths, and v/c ratios approaching 1.0 may contribute to these high delay levels.

Source: *2000 Highway Capacity Manual*, Transportation Research Board, Washington D.C.

MAXIMUM VOLUME TO CAPACITY RATIOS OUTSIDE METRO [A, B, C, 14]							
Highway Category	**Inside Urban Growth Boundary**					**Outside Urban Growth Boundary**	
	STA[D]	**MPO**	**Non-MPO Outside of STAs where non-freeway posted speed <= 35 mph, or a Designated UBA**	**Non-MPO outside of STAs where non-freeway speed > 35 mph**	**Non-MPO where non-freeway speed limit >= 45 mph**	**Unincorporated Communities**	**Rural Lands**
Interstate Highways [E]	N/A	0.80	N/A	0.70	0.70	0.70	0.70
Statewide Expressways	N/A	0.80	0.70	0.70	0.70	0.70	0.70
Freight Route on a Statewide Highway	0.85	0.80	0.80	0.75	0.70	0.70	0.70
Statewide (not a Freight Route)	0.90	0.85	0.85	0.80	0.75	0.75	0.70
Freight Route on a Regional or District Highway	0.90	0.85	0.85	0.80	0.75	0.75	0.70
Expressway on a Regional or District Highway	N/A	0.85	N/A	0.80	0.75	0.75	0.70
Regional Highways	0.95	0.85	0.85	0.80	0.75	0.75	0.70
District / Local Interest Roads	0.95	0.90	0.90	0.85	0.80	0.80	0.75

Table 6: Maximum volume to capacity ratios for peak hour operating conditions

Notes for Table 6

[A] OHP Amendment 00-04 established alternative mobility standards for Portland Metro and the Rogue Valley MPO (RVMPO). For Metro, see Table 7, below. For RVMPO see note B, below and the OHP amendment establishing the RVMPO alternative standards located on the web at: *http://www.oregon.gov/ODOT/TD/TP/docs/orhwyplan/registry/0004.pdf* . Where there is a conflict between the Table 6 standards and the established alternative mobility standards, the more tolerant standard (higher v/c ratio) applies.

[B] The maximum volume to capacity ratio at the Northbound and Southbound off-ramps of the South Medford Interchange is >1.0 for four hours daily until the new South Medford Interchange is constructed. The maximum v/c ratio at Highway 99 at Stewart Avenue is >1.0 for two hours daily. When the new interchange is completed, the mobility standards for the ramps will be those in Table 6.

[C] For the purposes of this policy, the peak hour shall be the 30th highest annual hour. This approximates weekday peak hour traffic in larger urban areas.

[D] Interstates and Expressways shall not be identified as Special Transportation Areas.

[E] National Highway System (NHS) highway design requirements are addressed in the Highway Design Manual (HDM).

[14] Table 6 was replaced in August 2005, part of OHP Amendment 05-16.

Appendix E: Traffic Counts

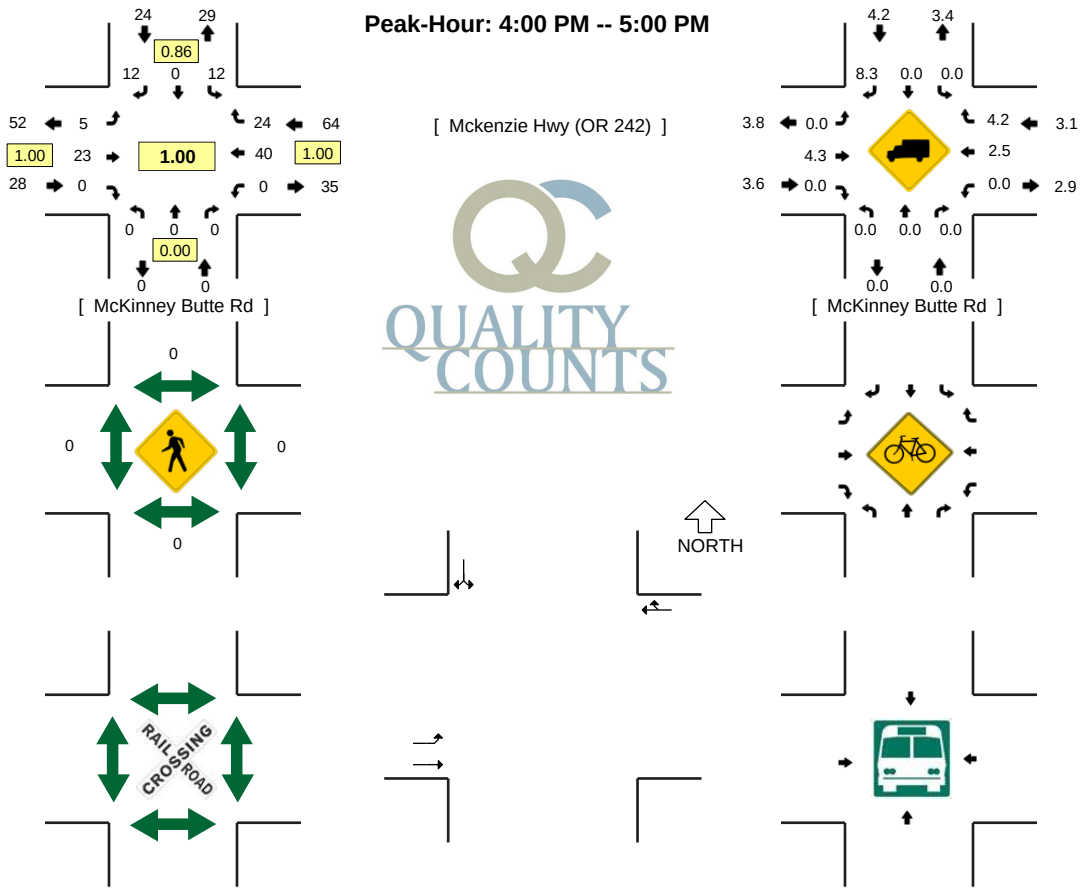
Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

INTERSECTION: McKinney Butte Rd--Mckenzie Hwy (OR 242)
WEATHER:

QC JOB #: 10326501
DATE: 2/12/2008

Peak-Hour: 4:00 PM -- 5:00 PM



*SEE LEGEND SHEET

5-MIN COUNT PERIOD BEGINNING AT	McKinney Butte Rd (Northbound)				McKinney Butte Rd (Southbound)				Mckenzie Hwy [OR ... (Eastbound)				Mckenzie Hwy [OR ... (Westbound)				TOTAL	HOURLY TOTALS
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	2	0	1	0	0	1	0	0	0	1	1	0	6	
4:05 PM	0	0	0	0	2	0	0	0	2	2	0	0	0	4	3	0	13	
4:10 PM	0	0	0	0	1	0	1	0	0	1	0	0	0	4	1	0	8	
4:15 PM	0	0	0	0	0	0	3	0	1	1	0	0	0	3	7	0	15	
4:20 PM	0	0	0	0	1	0	0	0	0	3	0	0	0	3	3	0	10	
4:25 PM	0	0	0	0	1	0	0	0	1	1	0	0	0	5	2	0	10	
4:30 PM	0	0	0	0	1	0	2	0	0	3	0	0	0	5	1	0	12	
4:35 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	4	1	0	8	
4:40 PM	0	0	0	0	0	0	1	0	0	3	0	0	0	3	2	0	9	
4:45 PM	0	0	0	0	1	0	1	0	0	0	0	0	0	2	0	0	4	
4:50 PM	0	0	0	0	1	0	1	0	1	3	0	0	0	5	1	0	12	
4:55 PM	0	0	0	0	1	0	2	0	0	3	0	0	0	1	2	0	9	116
5:00 PM	0	0	0	0	4	0	1	0	0	1	0	0	0	2	7	0	15	125
5:05 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	6	1	0	9	121
5:10 PM	0	0	0	0	5	0	2	0	0	2	0	0	0	3	1	0	13	126
5:15 PM	0	0	0	0	0	0	1	0	0	1	0	0	0	3	2	0	7	118
5:20 PM	0	0	0	0	4	0	1	0	0	2	0	0	0	3	2	0	12	120
5:25 PM	0	0	0	0	1	0	0	0	1	3	0	0	0	3	2	0	10	120
5:30 PM	0	0	0	0	2	0	2	0	0	1	0	0	0	2	4	0	11	119
5:35 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	2	1	0	4	115
5:40 PM	0	0	0	0	2	0	1	0	0	2	0	0	0	5	4	0	14	120
5:45 PM	0	0	0	0	1	0	0	0	0	1	0	0	0	3	0	0	5	121
5:50 PM	0	0	0	0	2	0	1	0	0	3	0	0	0	2	1	0	9	118
5:55 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	3	112

PEAK 15-MIN FLOW RATES	Northbound				Southbound				Eastbound				Westbound				TOTAL
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	20	0	8	0	8	16	0	0	0	36	20	0	108
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Counter Comments:

Report generated on 2/15/2008

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

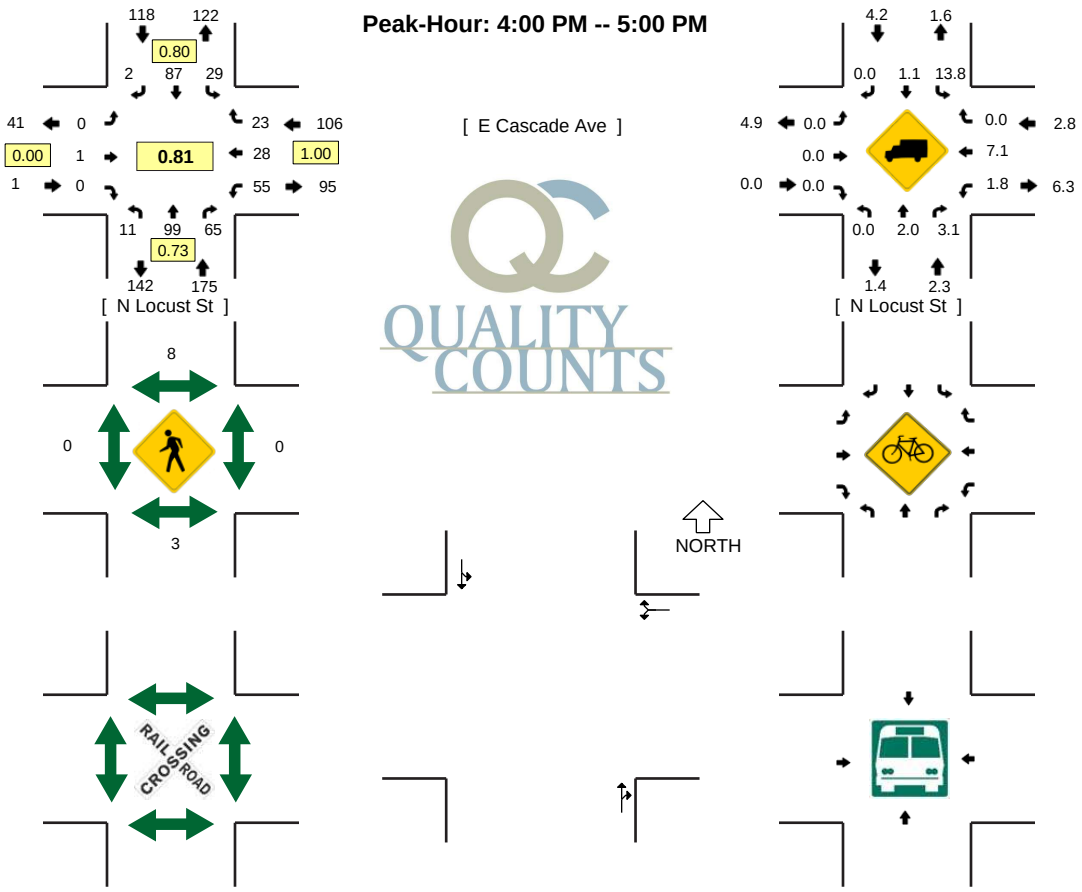
Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

INTERSECTION: N Locust St--E Cascade Ave
WEATHER:

QC JOB #: 10326502
DATE: 2/12/2008

Peak-Hour: 4:00 PM -- 5:00 PM



*SEE LEGEND SHEET

5-MIN COUNT PERIOD BEGINNING AT	N Locust St (Northbound)				N Locust St (Southbound)				E Cascade Ave (Eastbound)				E Cascade Ave (Westbound)				TOTAL	HOURLY TOTALS
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	6	8	0	2	5	0	0	0	0	0	0	4	1	3	0	29	
4:05 PM	2	8	6	0	2	7	0	0	0	0	0	0	3	2	1	0	31	
4:10 PM	3	17	10	0	5	16	0	0	0	0	0	0	4	5	3	0	63	
4:15 PM	1	8	6	0	1	8	1	0	0	0	0	0	9	2	4	0	40	
4:20 PM	2	9	2	0	2	4	0	0	0	0	0	0	8	1	2	0	30	
4:25 PM	1	9	2	0	3	6	0	0	0	0	0	0	5	2	3	0	31	
4:30 PM	1	10	6	0	1	7	0	0	0	0	0	0	4	3	0	0	32	
4:35 PM	0	7	4	0	1	8	0	0	0	0	0	0	4	2	0	0	26	
4:40 PM	0	9	2	0	0	3	0	0	0	0	0	0	0	1	2	0	17	
4:45 PM	0	5	6	0	3	4	0	0	0	0	0	0	3	2	1	0	24	
4:50 PM	1	6	8	0	6	7	0	0	0	1	0	0	3	2	3	0	37	
4:55 PM	0	5	5	0	3	12	1	0	0	0	0	0	8	5	1	0	40	400
5:00 PM	0	10	9	0	1	9	1	0	0	0	0	0	3	1	3	0	37	408
5:05 PM	0	5	2	0	2	7	0	0	0	0	0	0	3	5	2	0	26	403
5:10 PM	0	11	7	0	6	8	0	0	0	0	0	0	4	1	2	0	39	379
5:15 PM	0	9	5	0	2	8	1	0	0	0	0	0	1	1	2	0	29	368
5:20 PM	1	4	7	0	1	5	0	0	0	0	0	0	7	3	2	0	30	368
5:25 PM	0	7	5	0	1	6	0	0	0	0	0	0	2	1	0	0	22	359
5:30 PM	0	6	5	0	2	1	1	0	0	0	0	0	2	1	0	0	18	345
5:35 PM	1	8	6	0	0	7	0	0	0	0	1	0	1	1	2	0	27	346
5:40 PM	1	6	5	0	1	7	0	0	0	0	0	0	4	0	0	0	24	353
5:45 PM	0	3	7	0	3	6	0	0	0	0	0	0	1	1	0	0	21	350
5:50 PM	0	5	5	0	0	6	0	0	0	0	0	0	4	0	2	0	22	335
5:55 PM	0	8	11	0	3	3	0	0	0	0	0	0	3	0	0	0	28	323

PEAK 15-MIN FLOW RATES	Northbound				Southbound				Eastbound				Westbound				TOTAL
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	124	96	0	36	112	0	0	0	0	0	0	44	32	28	0	492
Heavy Trucks	0	4	4		12	0	0		0	0	0		0	0	0		20
Pedestrians		0				20				0				0			20
Bicycles																	
Railroad																	
Stopped Buses																	

Counter Comments:

Report generated on 2/15/2008

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

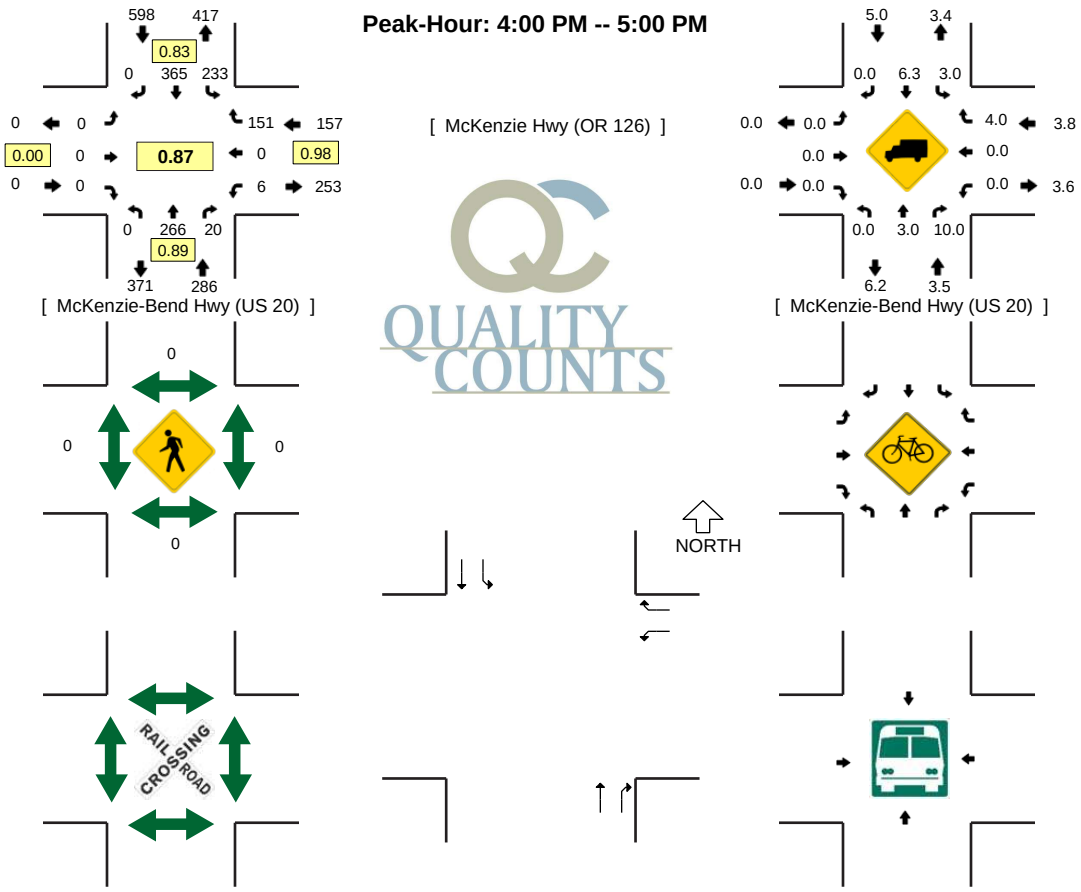
Type of peak hour being reported: System Peak

Method for determining peak hour: Total Entering Volume

INTERSECTION: McKenzie-Bend Hwy (US 20)--McKenzie Hwy (OR 126)
WEATHER:

QC JOB #: 10326503
DATE: 2/12/2008

Peak-Hour: 4:00 PM -- 5:00 PM



*SEE LEGEND SHEET

5-MIN COUNT PERIOD BEGINNING AT	McKenzie-Bend Hwy... (Northbound)				McKenzie-Bend Hwy... (Southbound)				McKenzie Hwy [OR ... (Eastbound)				McKenzie Hwy [OR ... (Westbound)				TOTAL	HOURLY TOTALS
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	20	4	0	25	37	0	0	0	0	0	0	2	0	15	0	103	
4:05 PM	0	21	4	0	29	29	0	0	0	0	0	0	0	0	11	0	94	
4:10 PM	0	29	2	0	25	35	0	0	0	0	0	0	0	0	12	0	103	
4:15 PM	0	29	0	0	17	22	0	0	0	0	0	0	0	0	12	0	80	
4:20 PM	0	30	0	0	18	32	0	0	0	0	0	0	2	0	6	0	88	
4:25 PM	0	18	0	0	16	30	0	0	0	0	0	0	0	0	16	0	80	
4:30 PM	0	18	2	0	21	32	0	0	0	0	0	0	0	0	19	0	92	
4:35 PM	0	25	2	0	17	28	0	0	0	0	0	0	0	0	8	0	80	
4:40 PM	0	16	0	0	13	27	0	0	0	0	0	0	1	0	10	0	67	
4:45 PM	0	19	1	0	15	25	0	0	0	0	0	0	0	0	15	0	75	
4:50 PM	0	20	1	0	20	27	0	0	0	0	0	0	1	0	16	0	85	
4:55 PM	0	21	4	0	17	41	0	0	0	0	0	0	0	0	11	0	94	1041
5:00 PM	0	20	0	0	19	37	0	0	0	0	0	0	1	0	4	0	81	1019
5:05 PM	0	21	0	0	21	24	0	0	0	0	0	0	0	0	9	0	75	1000
5:10 PM	0	21	3	0	14	25	0	0	0	0	0	0	2	0	8	0	73	970
5:15 PM	0	21	3	0	22	14	0	0	0	0	0	0	1	0	8	0	69	959
5:20 PM	0	29	0	0	13	25	0	0	0	0	0	0	2	0	18	0	87	958
5:25 PM	0	21	1	0	17	31	0	0	0	0	0	0	1	0	12	0	83	961
5:30 PM	0	27	1	0	19	21	0	0	0	0	0	0	0	0	9	0	77	946
5:35 PM	0	27	1	0	14	25	0	0	0	0	0	0	0	0	14	0	81	947
5:40 PM	0	12	0	0	10	15	0	0	0	0	0	0	0	0	6	0	43	923
5:45 PM	0	17	0	0	6	31	0	0	0	0	0	0	0	0	9	0	63	911
5:50 PM	0	21	0	0	7	26	0	0	0	0	0	0	0	0	10	0	64	890
5:55 PM	0	16	1	0	13	13	0	0	0	0	0	0	0	0	10	0	53	849

PEAK 15-MIN FLOW RATES	Northbound				Southbound				Eastbound				Westbound				TOTAL
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	280	40	0	316	404	0	0	0	0	0	0	8	0	152	0	1200
Heavy Trucks	0	4	4		12	16	0		0	0	0		0	0	4		40
Pedestrians		0				0				0				0			0
Bicycles																	
Railroad																	
Stopped Buses																	

Counter Comments:

Report generated on 2/15/2008

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net)

2005

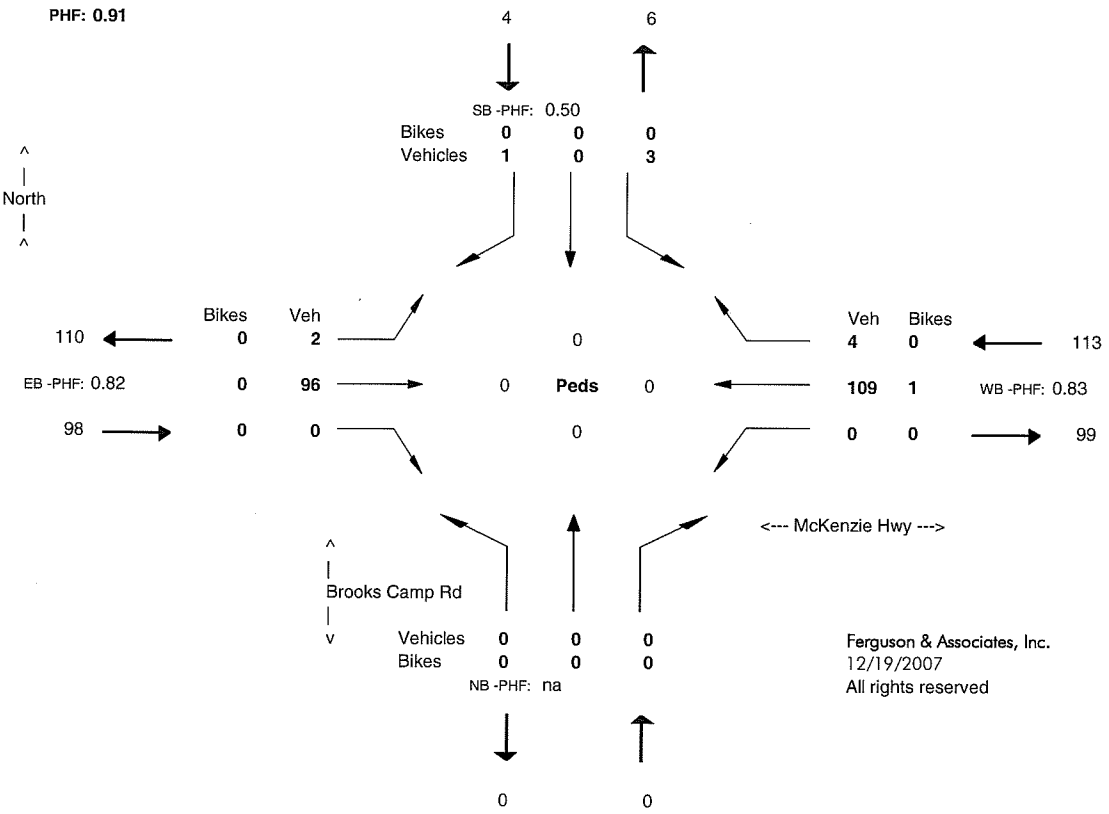
Location: Sisters	**East-West Street Name:** McKenzie Hwy	**Project #:** 623
Date: July 21, 2005	**North-South Street Name:** Brooks Camp Rd	
Day of week: Thursday	**Peak:**	

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	0	0	0	0	34	0	2	0	4	0	24	0	64	
4:15	4:30	0	0	0	0	17	1	1	0	1	5	15	0	40	
4:30	4:45	0	0	0	0	22	2	0	0	1	1	23	0	49	<------
4:45	5:00	0	0	0	0	30	0	1	0	1	1	21	0	54	
5:00	5:15	0	0	0	0	19	0	0	0	1	0	33	0	53	
5:15	5:30	0	0	0	0	25	0	0	0	0	2	32	0	59	
5:30	5:45	0	0	0	0	22	0	0	0	0	3	16	0	41	
5:45	6:00	0	0	0	0	15	0	0	0	0	0	18	0	33	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		0	0	0	0	184	3	4	0	8	12	182	0	393	
Peak Hour		**0**	**0**	**0**	**0**	**96**	**2**	**1**	**0**	**3**	**4**	**109**	**0**	**215**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**na**	**0.82**	**0.50**	**0.83**	**0.91**

Time of peak: **4:30 -- to -- 5:30**

PHF: 0.91



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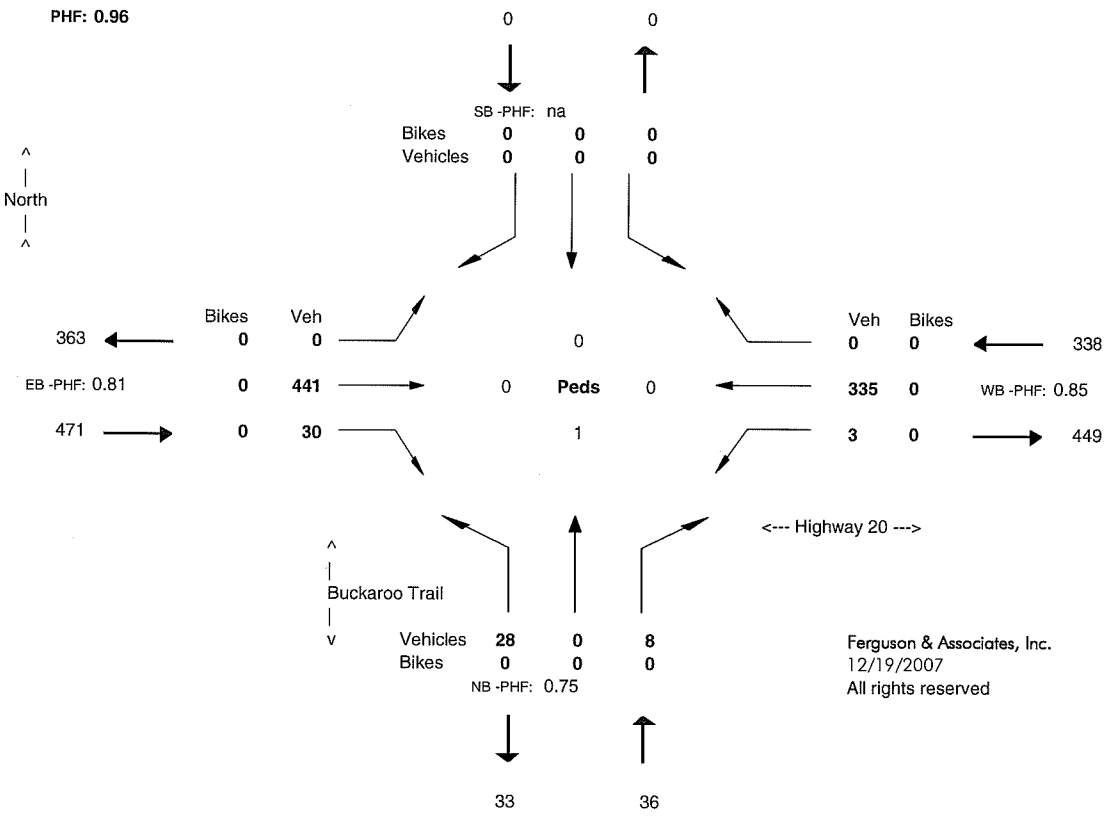
Location:	Sisters	**East-West Street Name:**	Highway 20	**Project #:** 00622B
Date:	October 19, 2005	**North-South Street Name:**	Buckaroo Trail	
Day of week:	Wednesday	**Peak:**		

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	7	0	6	7	98	0	0	0	0	0	91	2	211	
4:15	4:30	1	0	5	10	97	0	0	0	0	0	69	2	184	
4:30	4:45	3	0	9	8	101	0	0	0	0	0	79	0	200	<------
4:45	5:00	5	0	7	5	98	0	0	0	0	0	91	2	208	
5:00	5:15	0	0	7	10	135	0	0	0	0	0	66	0	218	
5:15	5:30	0	0	5	7	107	0	0	0	0	0	99	1	219	
5:30	5:45	0	0	8	5	73	0	0	0	0	0	70	1	157	
5:45	6:00	0	0	3	6	81	0	0	0	0	0	83	1	174	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		16	0	50	58	790	0	0	0	0	0	648	9	1571	
Peak Hour		**8**	**0**	**28**	**30**	**441**	**0**	**0**	**0**	**0**	**0**	**335**	**3**	**845**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**0.75**	**0.81**	**na**	**0.85**	**0.96**

Time of peak: **4:30 -- to -- 5:30**



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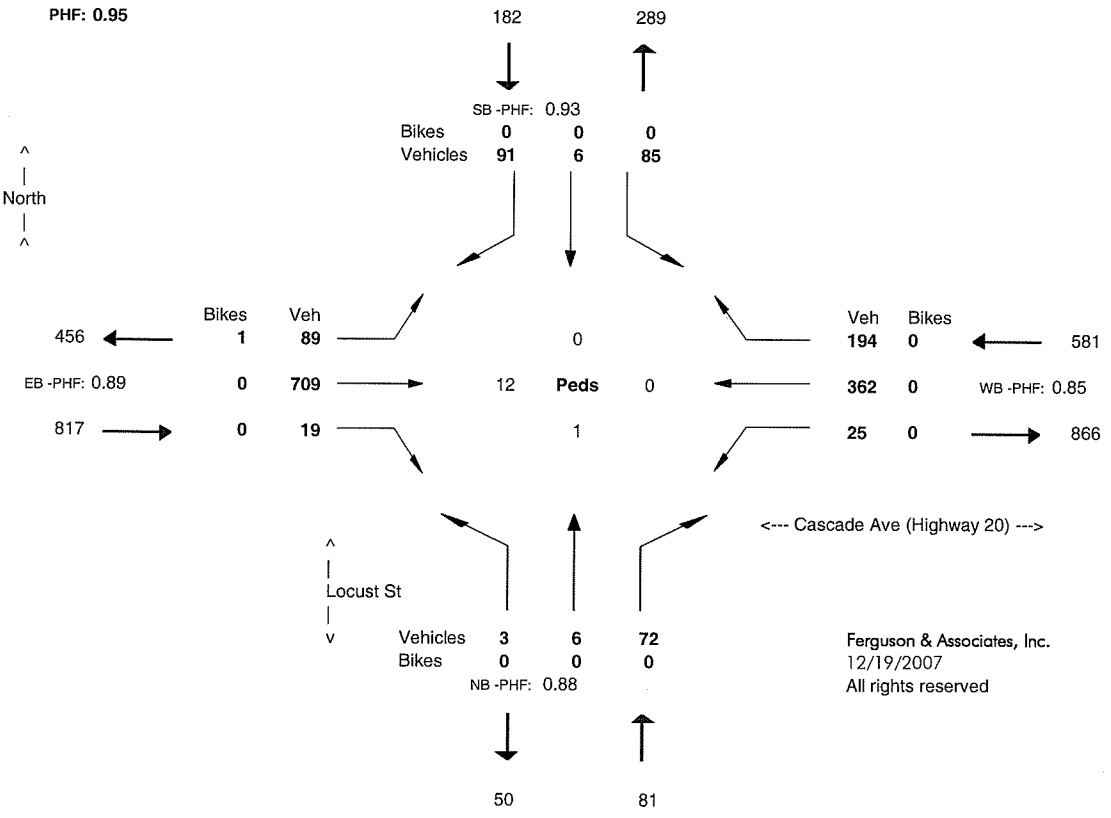
Location: Sisters	**East-West Street Name:** Cascade Ave (Highway 20)	**Project #:**	566
Date: July 6, 2005	**North-South Street Name:** Locust St		
Day of week: Wednesday	**Peak:**		

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	11	1	2	0	146	20	19	0	9	12	111	6	337	
4:15	4:30	16	1	0	2	146	21	21	2	19	17	104	7	356	
4:30	4:45	22	1	0	3	212	15	20	0	22	135	8	0	438	<------
4:45	5:00	16	2	0	6	168	22	23	3	18	27	136	7	428	
5:00	5:15	19	0	0	6	167	20	24	1	24	14	120	13	408	
5:15	5:30	15	3	3	4	162	32	24	2	21	18	98	5	387	
5:30	5:45	5	4	6	8	147	21	21	1	13	20	128	6	380	
5:45	6:00	7	6	7	1	113	22	23	0	13	27	105	9	333	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		111	18	18	30	1261	173	175	9	139	270	810	53	3067	
Peak Hour		**72**	**6**	**3**	**19**	**709**	**89**	**91**	**6**	**85**	**194**	**362**	**25**	**1661**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**0.88**	**0.89**	**0.93**	**0.85**	**0.95**

Time of peak: **4:30 -- to -- 5:30**



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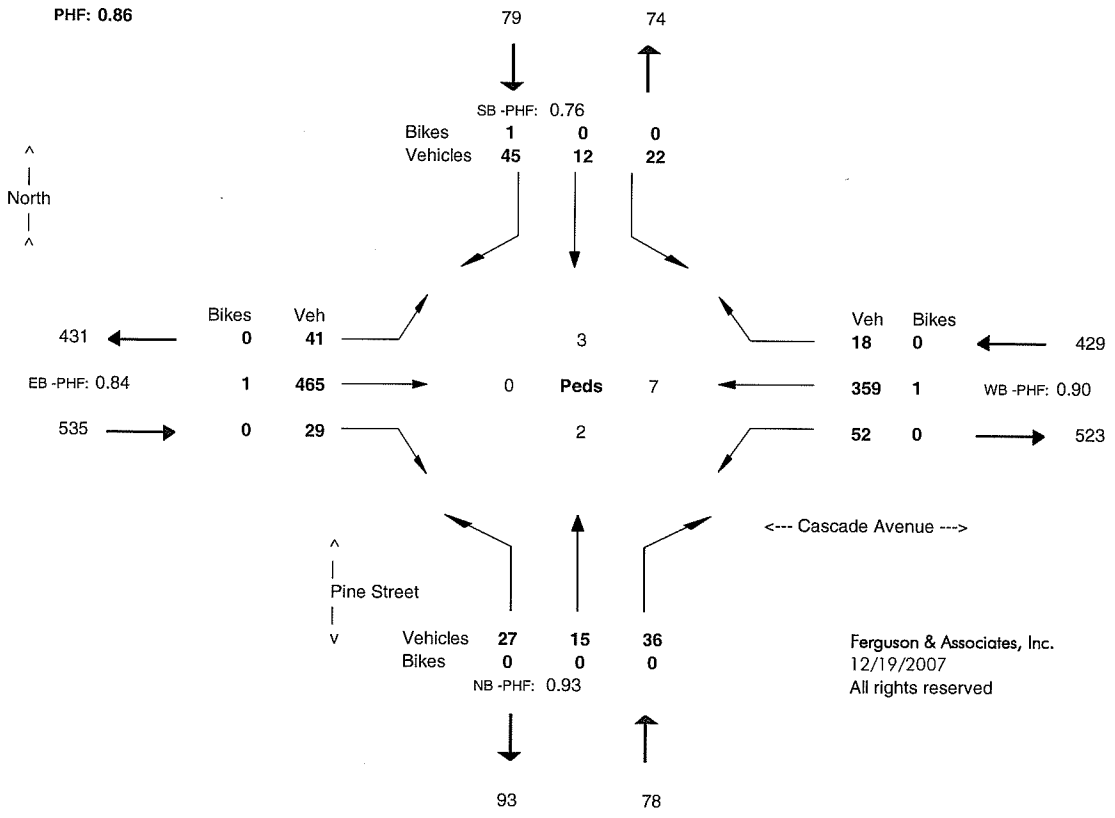
Location: Sisters, Oregon	**East-West Street Name:**	Cascade Avenue	**Project #:** 566
Date: June 9, 2005	**North-South Street Name:**	Pine Street	
Day of week: Thursday	**Peak:**	PM Peak Hour	

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	8	1	12	10	137	13	16	3	5	5	97	17	324	<------
4:15	4:30	11	4	6	8	109	9	15	3	8	5	87	12	277	
4:30	4:45	10	6	5	6	105	11	9	4	7	5	89	10	267	
4:45	5:00	7	4	4	5	114	8	5	2	2	3	86	13	253	
5:00	5:15	7	1	4	5	139	7	14	2	7	2	94	5	287	
5:15	5:30	9	0	8	5	104	6	10	9	4	2	102	10	269	
5:30	5:45	5	3	5	3	109	4	7	3	4	1	89	9	242	
5:45	6:00	4	2	4	3	114	5	6	0	3	2	68	7	218	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		61	21	48	45	931	63	82	26	40	25	712	83	2137	
Peak Hour		**36**	**15**	**27**	**29**	**465**	**41**	**45**	**12**	**22**	**18**	**359**	**52**	**1121**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**0.93**	**0.84**	**0.76**	**0.90**	**0.86**

Time of peak: **4:00 -- to -- 5:00**



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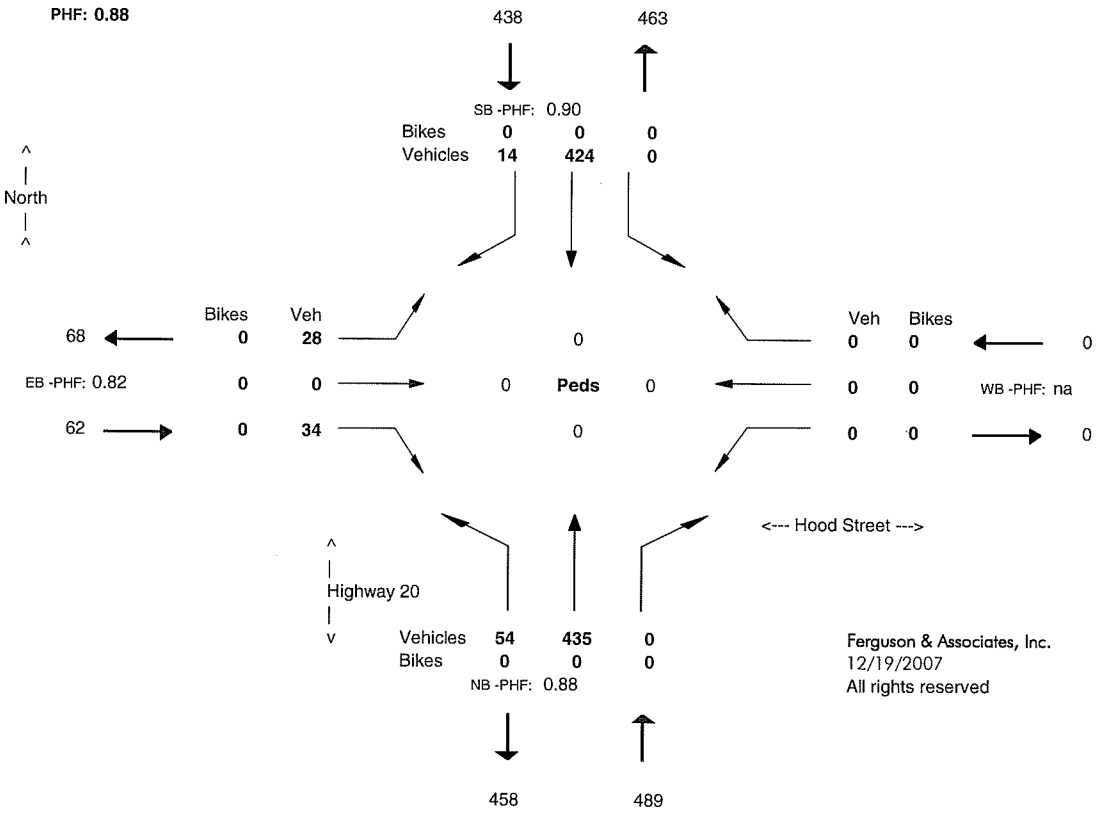
Location: Sisters, OR	**East-West Street Name:** Hood Street	**Project #:**	566
Date: June 15, 2005	**North-South Street Name:** Highway 20		
Day of week: Wednesday	**Peak:**		

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	0	88	12	3	0	5	4	128	0	0	0	0	240	
4:15	4:30	0	92	10	8	0	3	4	117	0	0	0	0	234	
4:30	4:45	0	102	8	3	0	6	1	117	0	0	0	0	237	<------
4:45	5:00	0	108	8	11	0	8	4	93	0	0	0	0	232	
5:00	5:15	0	124	15	10	0	9	6	116	0	0	0	0	280	
5:15	5:30	0	101	23	10	0	5	3	98	0	0	0	0	240	
5:30	5:45	0	77	5	12	0	3	4	93	0	0	0	0	194	
5:45	6:00	0	83	11	6	0	2	4	86	0	0	0	0	192	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		0	775	92	63	0	41	30	848	0	0	0	0	1849	
Peak Hour		**0**	**435**	**54**	**34**	**0**	**28**	**14**	**424**	**0**	**0**	**0**	**0**	**989**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**0.88**	**0.82**	**0.90**	**na**	**0.88**

Time of peak: **4:30 -- to -- 5:30**



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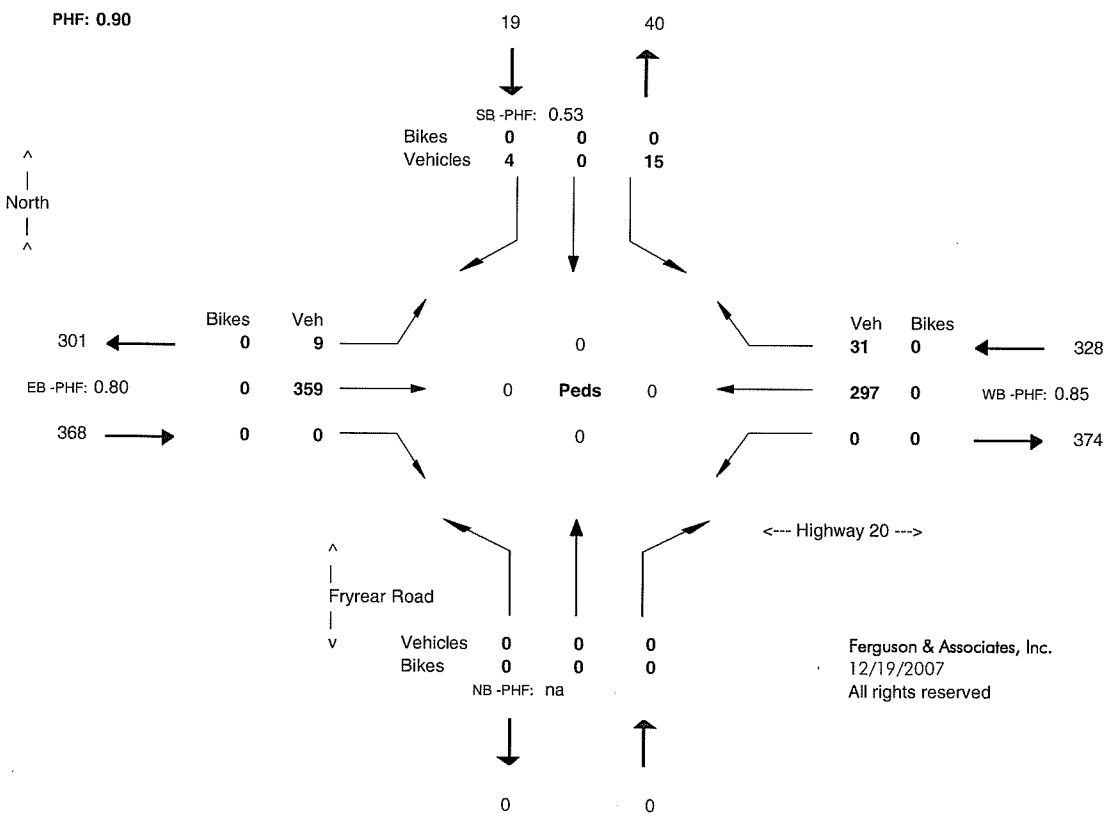
Location: Deschutes County	**East-West Street Name:**	Highway 20	**Project #:**	564
Date: April 13, 2005	**North-South Street Name:**	Fryrear Road		
Day of week: Wednesday	**Peak:**			

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	0	0	0	0	87	4	0	0	6	7	97	0	201	
4:15	4:30	0	0	0	0	80	1	4	0	6	12	74	0	177	
4:30	4:45	0	0	0	0	111	4	1	0	2	5	55	0	178	<------
4:45	5:00	0	0	0	0	66	3	2	0	2	2	76	0	151	
5:00	5:15	0	0	0	0	89	2	0	0	3	8	86	0	188	
5:15	5:30	0	0	0	0	93	0	1	0	8	16	80	0	198	
5:30	5:45	0	0	0	0	65	4	1	0	3	7	79	0	159	
5:45	6:00	0	0	0	0	62	0	1	0	2	13	76	0	154	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		0	0	0	0	653	18	10	0	32	70	623	0	1406	
Peak Hour		**0**	**0**	**0**	**0**	**359**	**9**	**4**	**0**	**15**	**31**	**297**	**0**	**715**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**na**	**0.80**	**0.53**	**0.85**	**0.90**

Time of peak: **4:30 -- to -- 5:30**



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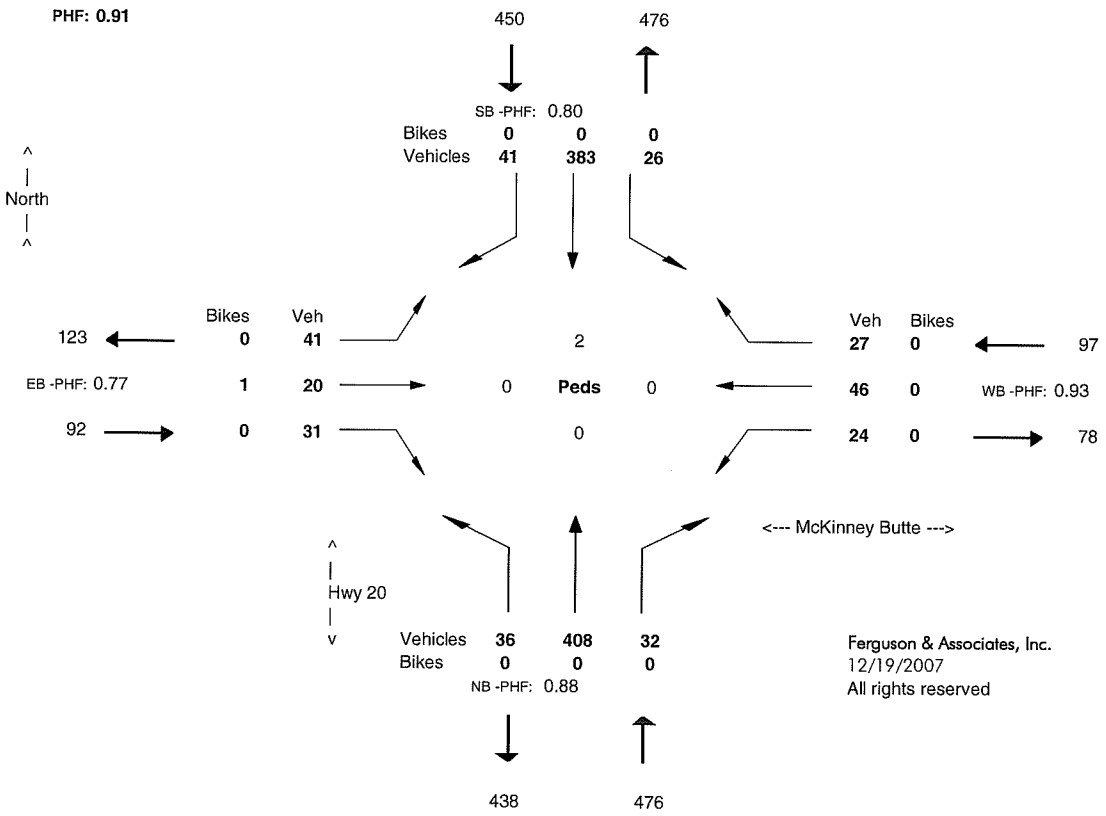
Location: Sisters, OR	**East-West Street Name:** McKinney Butte	**Project #:** 566
Date: June 16, 2005	**North-South Street Name:** Hwy 20	
Day of week: Thursday	**Peak:**	

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	8	67	10	5	3	3	1	68	5	7	7	3	187	
4:15	4:30	7	80	8	6	8	8	12	85	11	4	13	5	247	
4:30	4:45	8	110	7	7	3	10	7	87	6	10	9	7	271	<------
4:45	5:00	10	101	4	6	7	15	13	117	11	7	11	5	307	
5:00	5:15	7	80	14	11	8	11	7	99	2	8	14	4	265	
5:15	5:30	7	117	11	7	2	5	14	80	7	2	12	8	272	
5:30	5:45	11	80	6	6	4	5	5	81	6	7	6	5	222	
5:45	6:00	5	93	6	10	5	2	4	84	5	8	5	7	234	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		63	728	66	58	40	59	63	701	53	53	77	44	2005	
Peak Hour		**32**	**408**	**36**	**31**	**20**	**41**	**41**	**383**	**26**	**27**	**46**	**24**	**1115**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**0.88**	**0.77**	**0.80**	**0.93**	**0.91**

Time of peak: **4:30 -- to -- 5:30**



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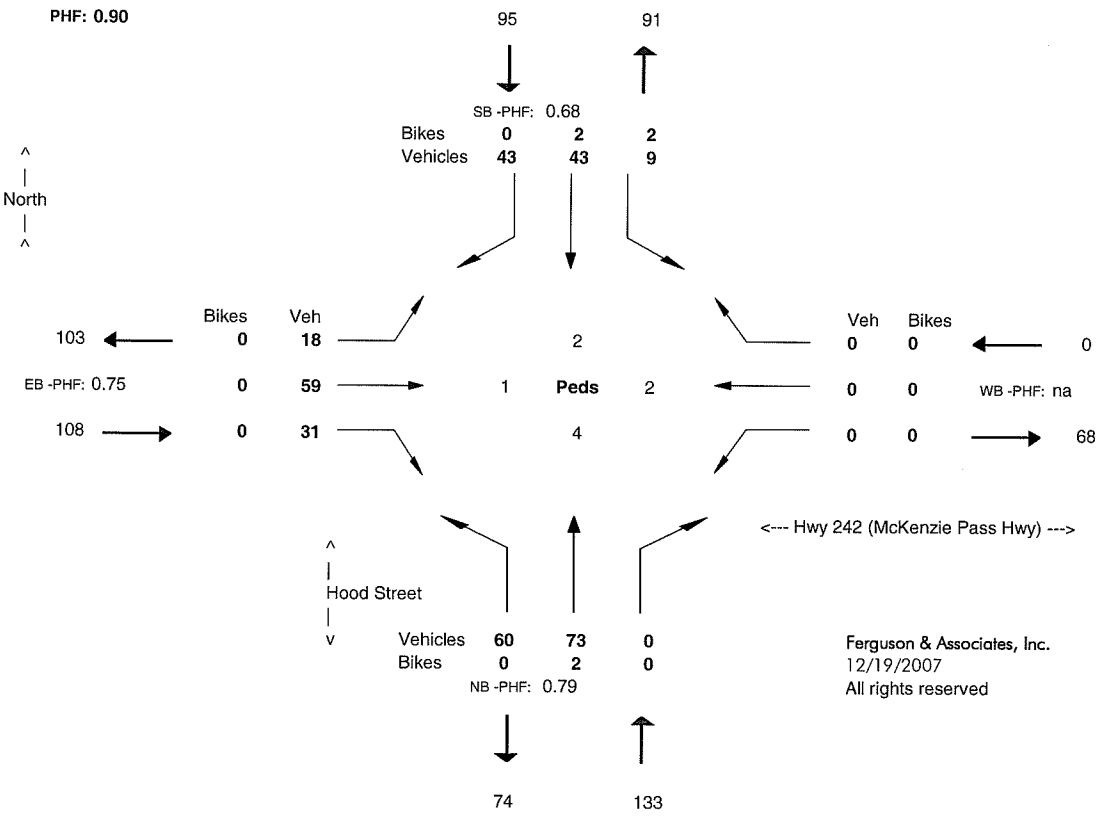
Location: Sisters, Oregon	**East-West Street Name:**	Hwy 242 (McKenzie Pass Hwy)	**Project #:** 566
Date: June 15, 2005	**North-South Street Name:**	Hood Street	
Day of week: Wednesday	**Peak:**	PM Peak Hour	

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	0	17	15	13	15	4	14	11	1	0	0	0	90	
4:15	4:30	0	18	6	9	17	0	10	3	1	0	0	0	64	
4:30	4:45	0	20	11	7	12	1	8	5	3	1	0	2	70	
4:45	5:00	0	16	13	13	15	8	4	8	2	0	0	0	79	<------
5:00	5:15	0	28	14	9	14	3	11	8	1	0	0	0	88	
5:15	5:30	0	15	18	7	15	3	18	13	4	0	0	0	93	
5:30	5:45	0	14	15	2	15	4	10	14	2	0	0	0	76	
5:45	6:00	1	13	18	5	8	3	9	6	2	0	1	0	66	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		1	141	110	65	111	26	84	68	16	1	1	2	626	
Peak Hour		**0**	**73**	**60**	**31**	**59**	**18**	**43**	**43**	**9**	**0**	**0**	**0**	**336**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**0.79**	**0.75**	**0.68**	**na**	**0.90**

Time of peak: **4:45 -- to -- 5:45**



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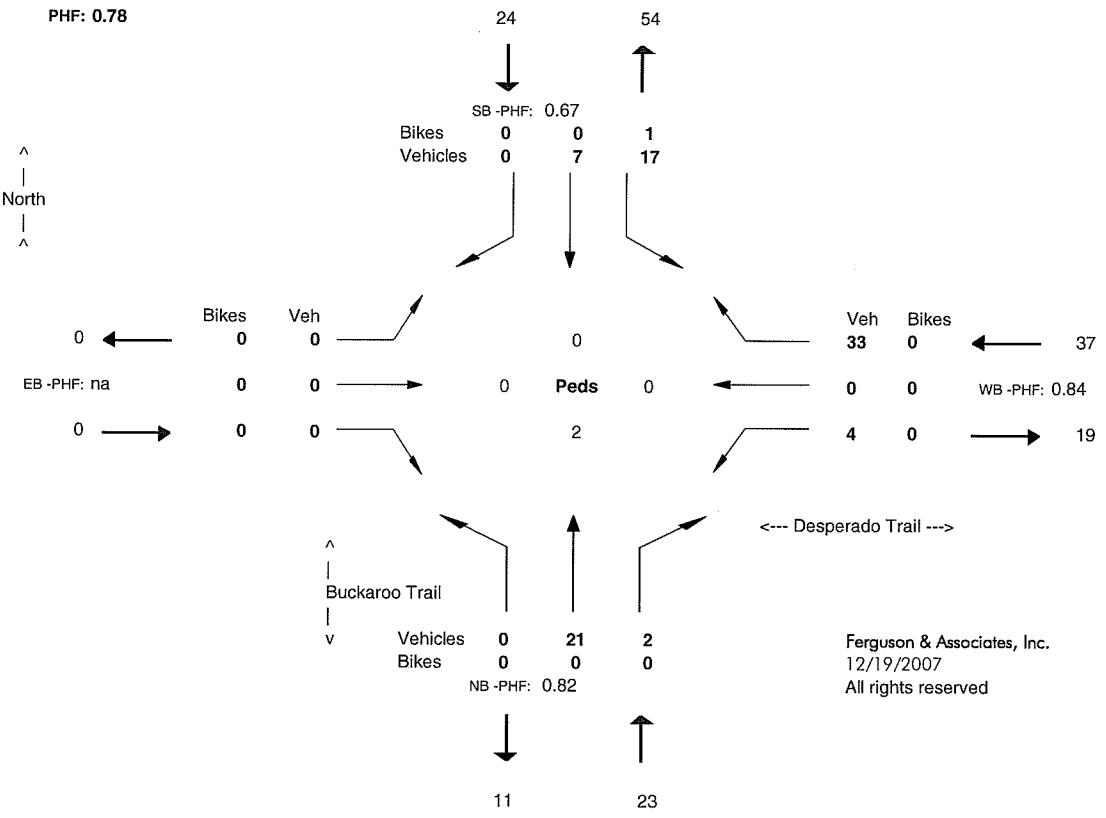
2006

Location: Sisters, Oregon	**East-West Street Name:**	Desperado Trail	**Project #:**	00828
Date: August 16, 2006	**North-South Street Name:**	Buckaroo Trail		
Day of week: Tuesday	**Peak:**	PM Peak Hour		

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	1	5	0	0	0	0	0	1	12	4	0	0	23	
4:15	4:30	0	3	0	0	0	0	0	1	5	2	0	1	12	
4:30	4:45	0	7	0	0	0	0	0	3	1	7	0	1	19	<------
4:45	5:00	1	5	0	0	0	0	0	2	3	7	0	1	19	
5:00	5:15	1	6	0	0	0	0	0	1	8	9	0	2	27	
5:15	5:30	0	3	0	0	0	0	0	1	5	10	0	0	19	
5:30	5:45	0	5	0	0	0	0	0	3	6	1	0	1	16	
5:45	6:00	3	3	0	0	0	0	0	2	3	4	0	1	16	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		6	37	0	0	0	0	0	14	43	44	0	7	151	
Peak Hour		**2**	**21**	**0**	**0**	**0**	**0**	**0**	**7**	**17**	**33**	**0**	**4**	**84**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**0.82**	**na**	**0.67**	**0.84**	**0.78**

Time of peak: **4:30 -- to -- 5:30**



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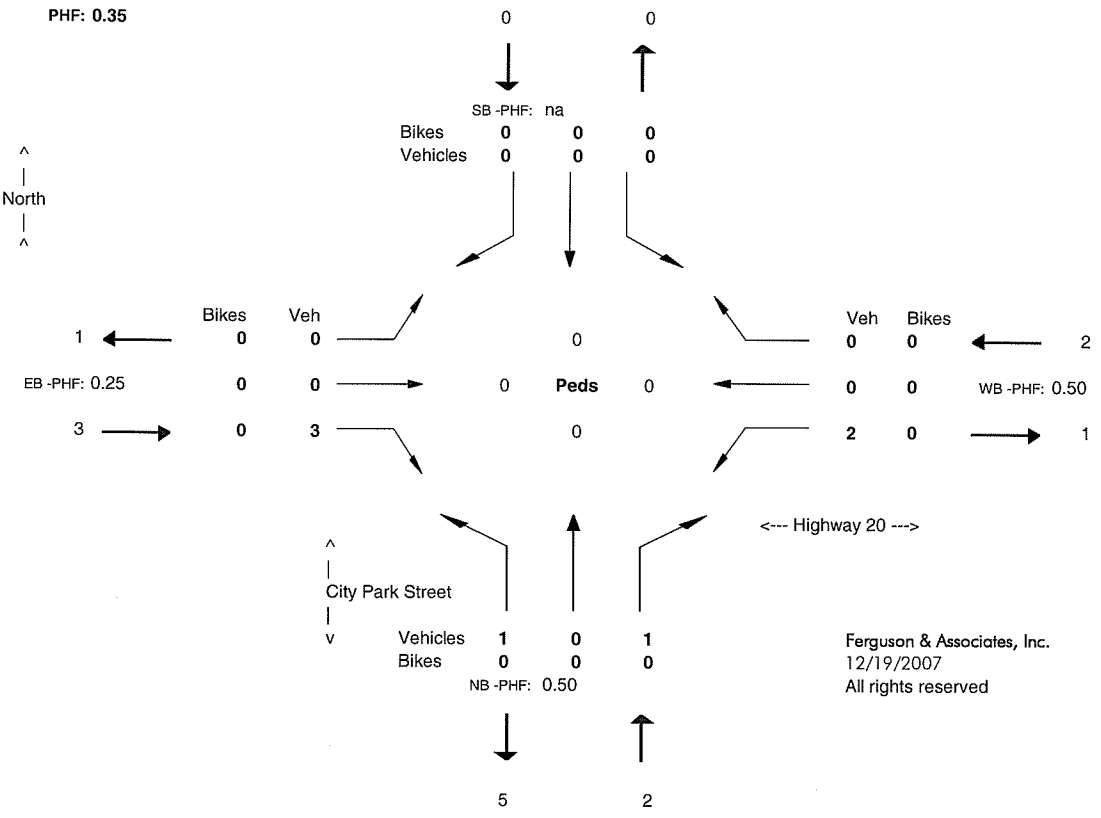
Location: Sisters, Oregon	**East-West Street Name:**	Highway 20	**Project #:**	00828
Date: August 29, 2006	**North-South Street Name:**	City Park Street		
Day of week: Tuesday	**Peak:**	PM Peak		

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	0	0	1	3	0	0	0	0	0	0	0	1	5	<------
4:15	4:30	1	0	0	0	0	0	0	0	0	0	0	0	1	
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	1	1	
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:15	5:30	0	0	0	1	0	0	0	0	0	0	0	0	1	
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		1	0	1	4	0	0	0	0	0	0	0	2	8	
Peak Hour		**1**	**0**	**1**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**7**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**0.50**	**0.25**	**na**	**0.50**	**0.35**

Time of peak: **4:00 -- to -- 5:00**



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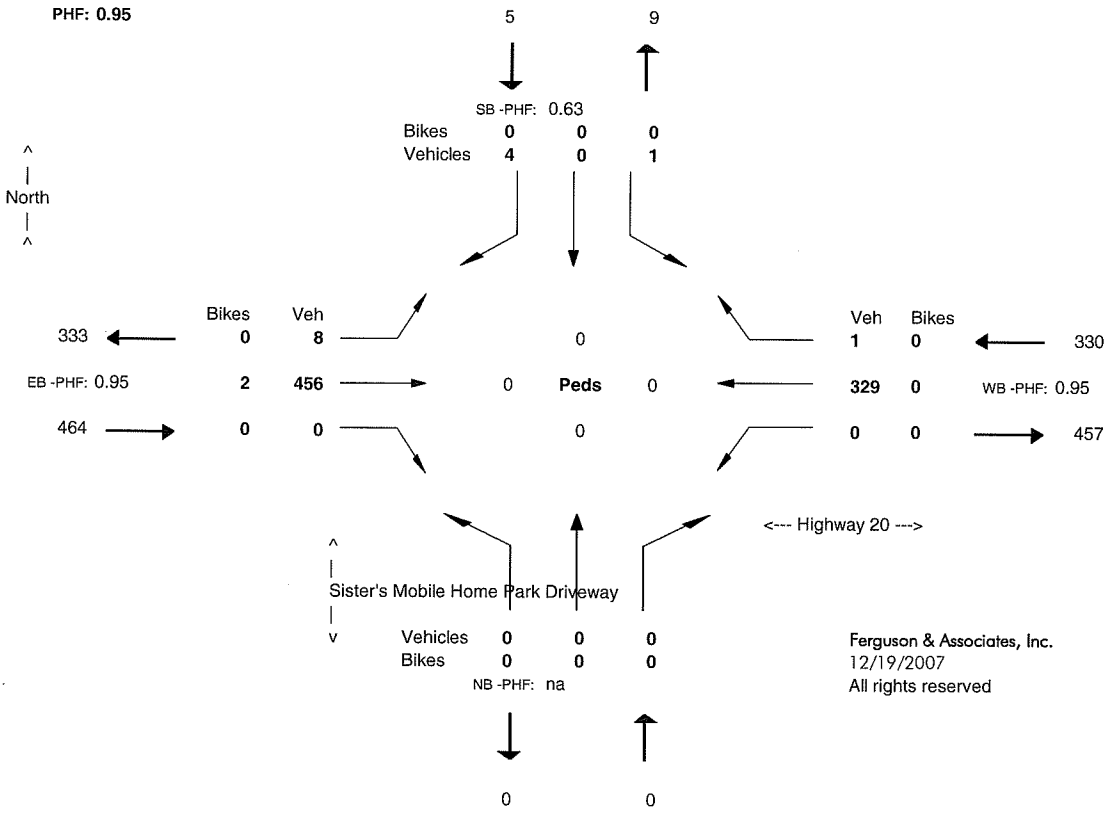
Location: Sisters	**East-West Street Name:**	Highway 20	**Project #:**	00850
Date: August 22, 2006	**North-South Street Name:**	Sister's Mobile Home Park Driveway		
Day of week: Tuesday	**Peak:**	PM Peak		

TIME STARTING	TIME ENDING	NB-RT	NB-T	NB-LT	EB-RT	EB-T	EB-LT	SB-RT	SB-T	SB-LT	WB-RT	WB-T	WB-LT	TOTAL	1-HOUR PEAK STARTING AT:
3:00	3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:15	3:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:30	3:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
3:45	4:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
4:00	4:15	0	0	0	0	115	3	1	0	0	0	80	0	199	<------
4:15	4:30	0	0	0	0	109	1	1	0	0	0	79	0	190	
4:30	4:45	0	0	0	0	110	4	1	0	0	1	83	0	199	
4:45	5:00	0	0	0	0	122	0	1	0	1	0	87	0	211	
5:00	5:15	0	0	0	0	102	0	1	0	0	1	81	0	185	
5:15	5:30	0	0	0	0	101	0	1	0	0	0	79	0	181	
5:30	5:45	0	0	0	0	103	1	1	0	0	0	102	0	207	
5:45	6:00	0	0	0	0	98	1	0	0	1	0	91	0	191	
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0	
TOTAL		0	0	0	0	860	10	7	0	2	2	682	0	1563	
Peak Hour		**0**	**0**	**0**	**0**	**456**	**8**	**4**	**0**	**1**	**1**	**329**	**0**	**799**	

Approach	**NB**	**EB**	**SB**	**WB**	**TOTAL**
Peak Hour Factor (PHF)	**na**	**0.95**	**0.63**	**0.95**	**0.95**

Time of peak: **4:00 -- to -- 5:00**



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2007

PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

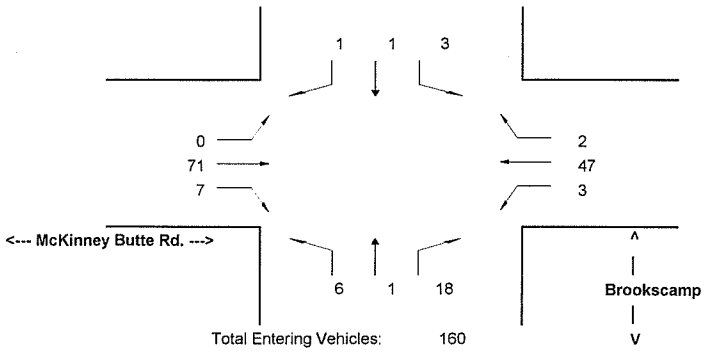
Count Date(s): Thursday, June 28, 2007

East-West Street Name: McKinney Butte Rd.

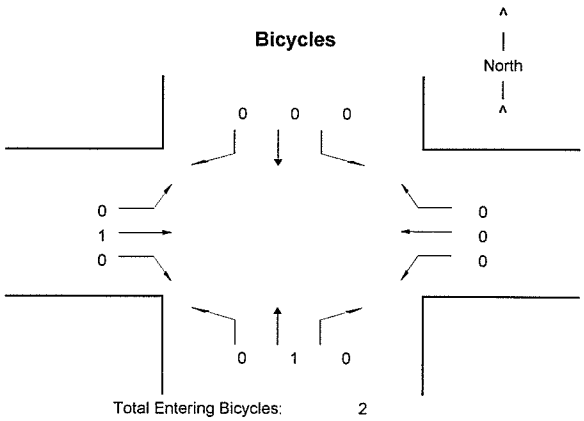
North-South Street Name: Brookscamp

Peak Hour: 4:00 to 5:00 p.m.

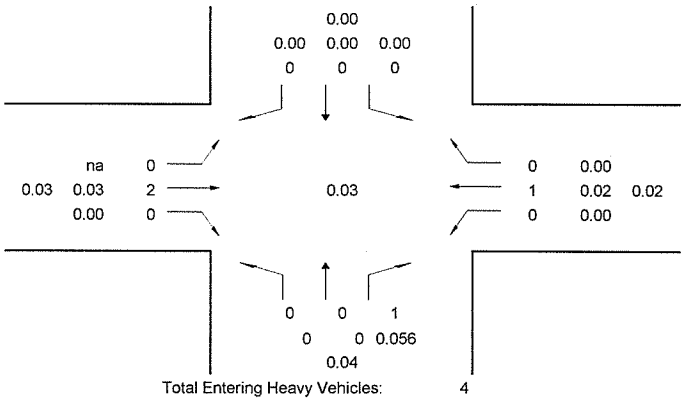
Vehicles per Hour (all vehicles)



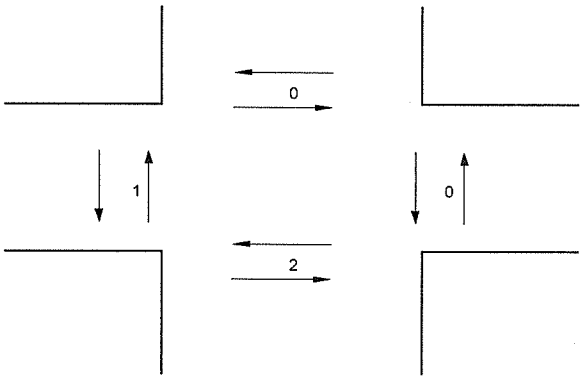
Bicycles



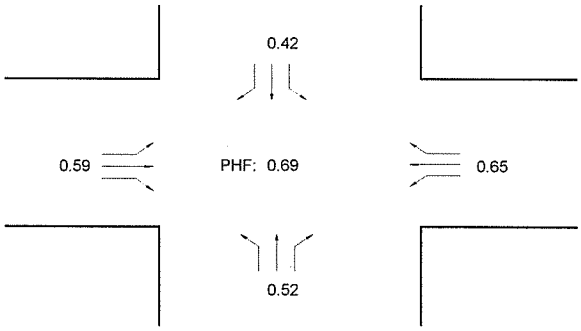
Heavy Vehicles (trucks per hour)



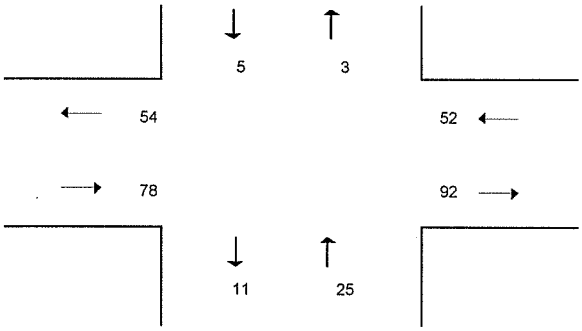
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



Matchless Data, Inc.	1045 NW Bond Street, Suite 11 PO Box 1557 Bend, OR 97709	Phone: 541-389-2785 Fax: 541-610-1926 info@matchlessdata.com	Matchless Data, Inc. Project #:

PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Thursday, June 28, 2007

East-West Street Name: McKinney Butte Rd.

North-South Street Name: Brookscamp

Peak Hour: 4:00 to 5:00 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	2	1	1	2	31	0	0	1	0	0	18	2	58
4:15	4:30	2	0	0	2	13	0	1	0	2	2	9	0	31
4:30	4:45	10	0	2	3	15	0	0	0	1	0	9	0	40
4:45	5:00	4	0	3	0	12	0	0	0	0	0	11	1	31
5:00	5:15	3	1	1	4	19	0	0	0	1	0	15	1	45
5:15	5:30	3	0	2	4	16	0	0	0	0	0	17	0	42
5:30	5:45	2	0	2	0	15	0	0	0	1	1	18	1	40
5:45	6:00	1	0	0	0	8	0	1	0	0	0	10	0	20
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		27	2	11	15	129	0	2	1	5	3	107	5	307
Peak Hour		**18**	**1**	**6**	**7**	**71**	**0**	**1**	**1**	**3**	**2**	**47**	**3**	**160**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	2	0	0	0	0	0	0	0	2
4:15	4:30	0	0	0	0	0	0	0	0	0	0	1	0	1
4:30	4:45	1	0	0	0	0	0	0	0	0	0	0	0	1
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	5:15	0	0	0	0	0	0	0	0	0	0	1	0	1
5:15	5:30	0	0	0	1	0	0	0	0	0	0	0	0	1
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		1	0	0	1	2	0	0	0	0	0	2	0	6
Peak Hour		**1**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**4**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	1	0	0	0	0	0	0	0	1
4:15	4:30	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45	5:00	0	1	0	0	0	0	0	0	0	0	0	0	1
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	1	0	0	1	0	0	0	0	0	0	0	2
Peak Hour		**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	0	0	0	0
4:15	4:30	2	0	0	0
4:30	4:45	0	1	0	0
4:45	5:00	0	0	0	0
5:00	5:15	0	0	0	0
5:15	5:30	0	0	0	0
5:30	5:45	0	0	0	0
5:45	6:00	0	0	2	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		2	1	2	0
Peak Hour		2	1	0	0

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info@matchlessdata.com

Matchless Data, Inc.
Project #:

PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

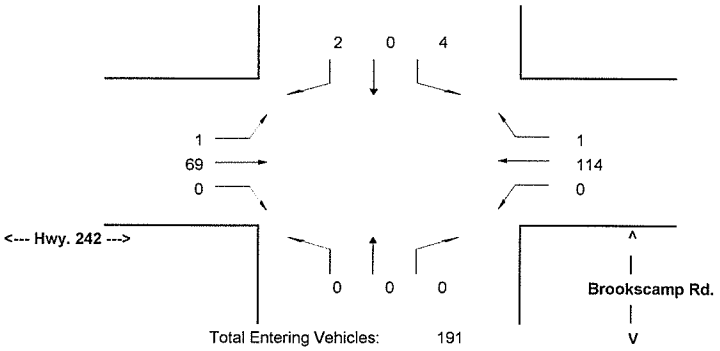
Count Date(s): Wednesday, June 13, 2007

East-West Street Name: Hwy. 242

North-South Street Name: Brookscamp Rd.

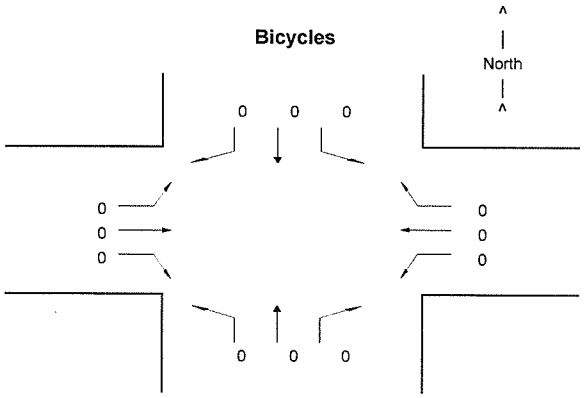
Peak Hour: 5:00 to 6:00 p.m.

Vehicles per Hour (all vehicles)



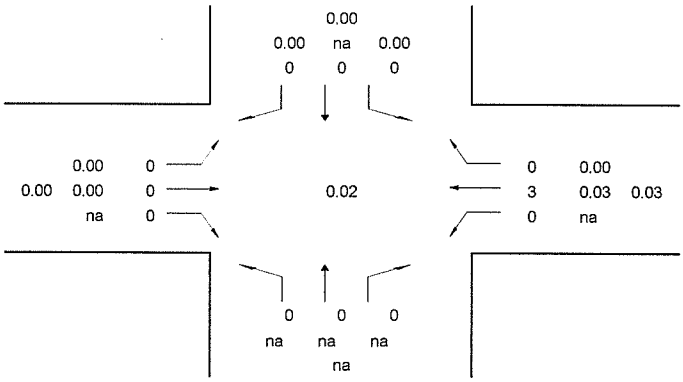
Total Entering Vehicles: 191

Bicycles



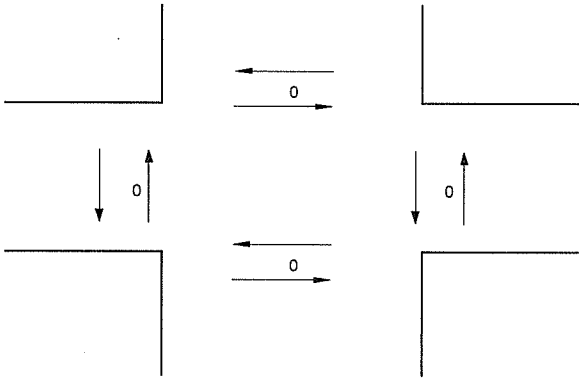
Total Entering Bicycles: 0

Heavy Vehicles (trucks per hour)

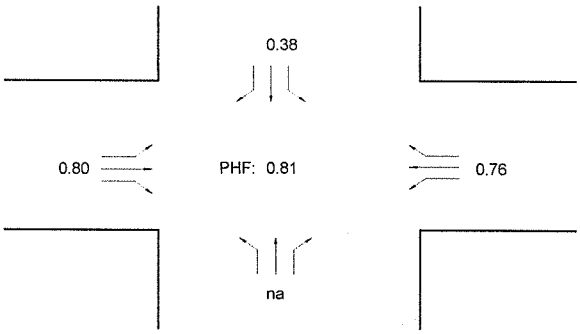


Total Entering Heavy Vehicles: 3

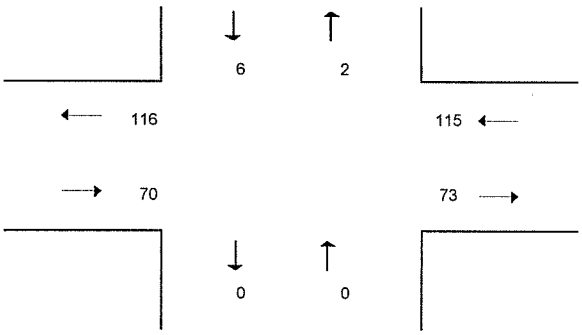
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



Matchless Data, Inc.	1045 NW Bond Street, Suite 11 PO Box 1557 Bend, OR 97709	Phone: 541-389-2785 Fax: 541-610-1926 info@matchlessdata.com	Matchless Data, Inc. Project #:

PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Wednesday, June 13, 2007

East-West Street Name: Hwy. 242

North-South Street Name: Brookscamp Rd.

Peak Hour: 5:00 to 6:00 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	23	0	2	0	0	2	16	0	43
4:15	4:30	0	0	0	0	19	0	0	0	2	1	25	0	47
4:30	4:45	0	0	0	0	17	0	2	0	2	3	22	0	46
4:45	5:00	0	0	0	0	17	2	0	0	0	3	21	0	43
5:00	5:15	0	0	0	0	11	0	1	0	0	0	20	0	32
5:15	5:30	0	0	0	0	19	1	0	0	1	1	37	0	59
5:30	5:45	0	0	0	0	22	0	0	0	0	0	33	0	55
5:45	6:00	0	0	0	0	17	0	1	0	3	0	24	0	45
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	0	145	3	6	0	8	10	198	0	370
Peak Hour		**0**	**0**	**0**	**0**	**69**	**1**	**2**	**0**	**4**	**1**	**114**	**0**	**191**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	3	0	0	0	0	0	0	0	3
4:15	4:30	0	0	0	0	0	0	0	0	0	0	1	0	1
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	5:15	0	0	0	0	0	0	0	0	0	0	1	0	1
5:15	5:30	0	0	0	0	0	0	0	0	0	0	2	0	2
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	0	3	0	0	0	0	0	4	0	7
Peak Hour		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**3**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15	4:30	0	0	0	0	0	0	0	0	1	0	0	0	1
4:30	4:45	0	0	0	0	0	0	0	0	0	4	0	0	4
4:45	5:00	0	0	0	0	1	0	0	0	0	0	0	0	1
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	0	1	0	0	0	1	4	0	0	6
Peak Hour		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	0	0	0	0
4:15	4:30	0	0	0	0
4:30	4:45	0	0	0	0
4:45	5:00	0	0	0	0
5:00	5:15	0	0	0	0
5:15	5:30	0	0	0	0
5:30	5:45	0	0	0	0
5:45	6:00	0	0	0	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		0	0	0	0
Peak Hour		0	0	0	0

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Matchless Data, Inc.
Project #:

PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

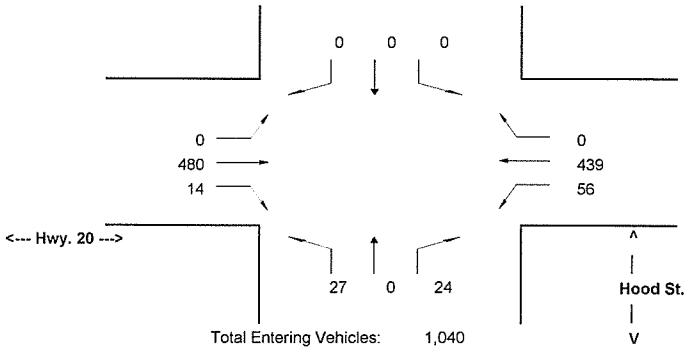
Count Date(s): Thursday, June 14, 2007

East-West Street Name: Hwy. 20

North-South Street Name: Hood St.

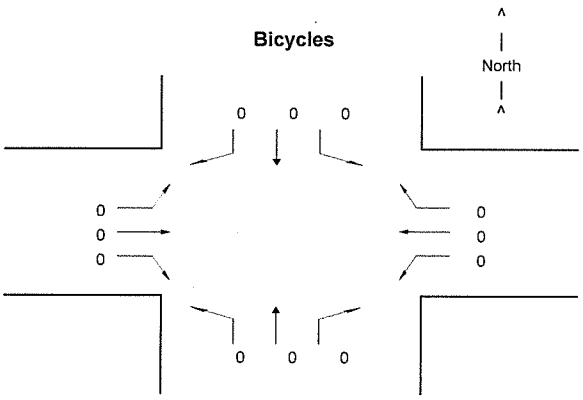
Peak Hour: 4:30 to 5:30 p.m.

Vehicles per Hour (all vehicles)



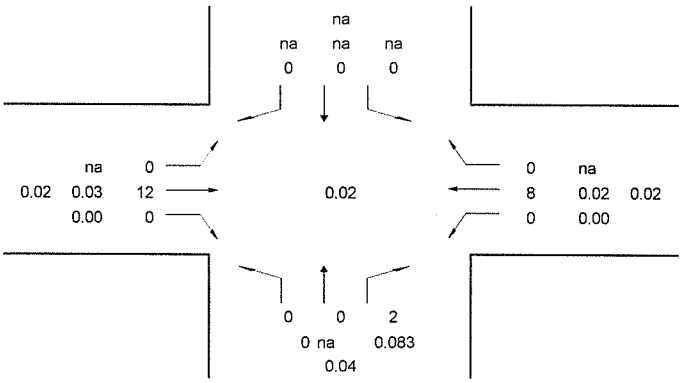
Total Entering Vehicles: 1,040

Bicycles



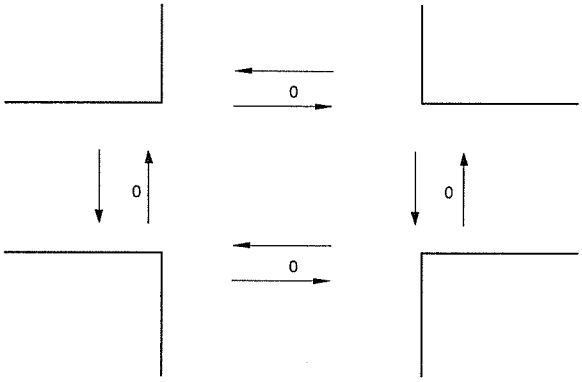
Total Entering Bicycles: 0

Heavy Vehicles (trucks per hour)

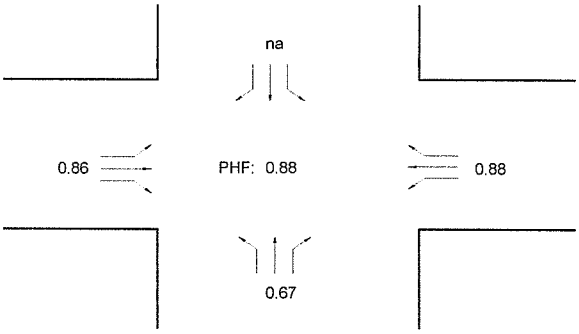


Total Entering Heavy Vehicles: 22

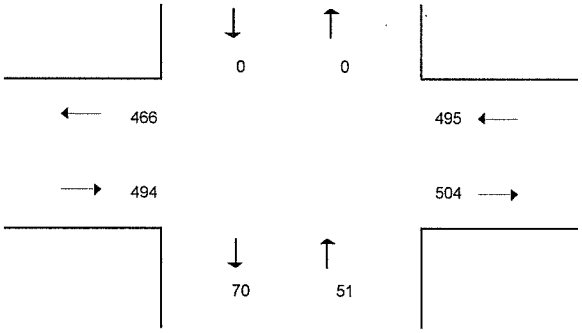
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



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PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Thursday, June 14, 2007

East-West Street Name: Hwy. 20

North-South Street Name: Hood St.

Peak Hour: 4:30 to 5:30 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	3	0	5	2	103	0	0	0	0	0	102	11	226
4:15	4:30	2	0	8	2	119	0	0	0	0	0	94	8	233
4:30	4:45	12	0	7	3	130	0	0	0	0	0	95	16	263
4:45	5:00	0	0	9	2	142	0	0	0	0	0	130	11	294
5:00	5:15	5	0	4	2	101	0	0	0	0	0	99	14	225
5:15	5:30	7	0	7	7	107	0	0	0	0	0	115	15	258
5:30	5:45	5	0	4	2	113	0	0	0	0	0	89	15	228
5:45	6:00	4	0	8	3	99	0	0	0	0	0	86	3	203
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		38	0	52	23	914	0	0	0	0	0	810	93	1,930
Peak Hour		**24**	**0**	**27**	**14**	**480**	**0**	**0**	**0**	**0**	**0**	**439**	**56**	**1,040**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	1	0	0	0	5	0	0	0	0	0	4	0	10
4:15	4:30	0	0	0	0	2	0	0	0	0	0	0	0	2
4:30	4:45	2	0	0	0	0	0	0	0	0	0	1	0	3
4:45	5:00	0	0	0	0	1	0	0	0	0	0	1	0	2
5:00	5:15	0	0	0	0	5	0	0	0	0	0	3	0	8
5:15	5:30	0	0	0	0	6	0	0	0	0	0	3	0	9
5:30	5:45	0	0	0	0	8	0	0	0	0	0	4	0	12
5:45	6:00	0	0	0	0	3	0	0	0	0	0	0	0	3
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		3	0	0	0	30	0	0	0	0	0	16	0	49
Peak Hour		**2**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**8**	**0**	**22**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15	4:30	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	1	0	0	0	0	0	0	0	1
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	0	1	0	0	0	0	0	0	0	1
Peak Hour		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	0	0	0	0
4:15	4:30	0	0	0	0
4:30	4:45	0	0	0	0
4:45	5:00	0	0	0	0
5:00	5:15	0	0	0	0
5:15	5:30	0	0	0	0
5:30	5:45	0	0	0	0
5:45	6:00	0	0	0	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		0	0	0	0
Peak Hour		0	0	0	0

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Matchless Data, Inc.
Project #:

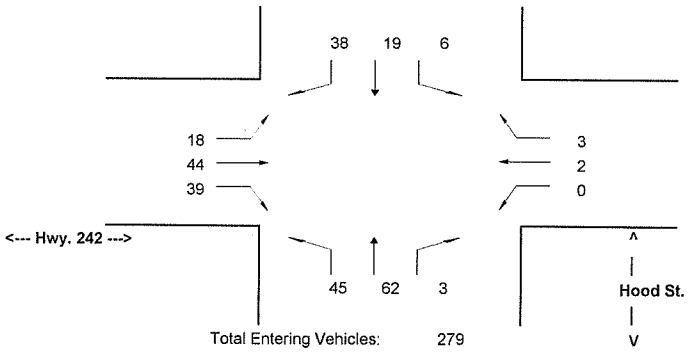
PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

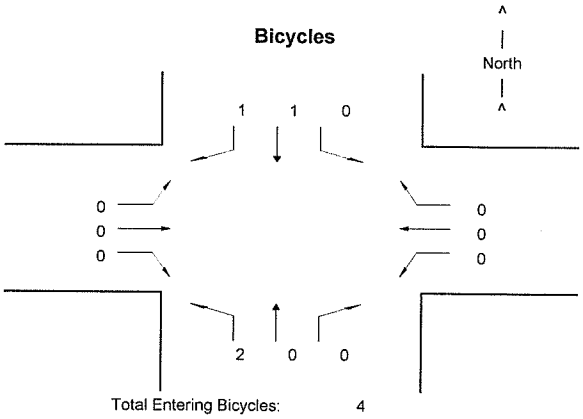
Count Date(s): Tuesday, June 12, 2007

East-West Street Name: Hwy. 242
North-South Street Name: Hood St.
Peak Hour: 4:15 to 5:15 p.m.

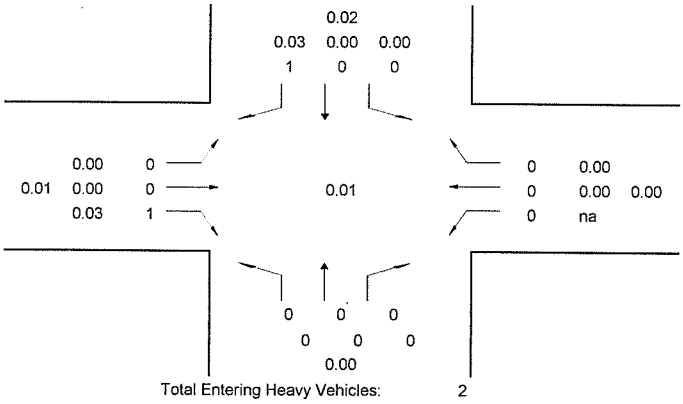
Vehicles per Hour (all vehicles)



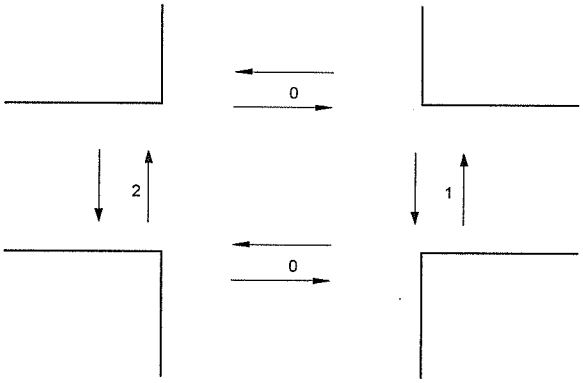
Bicycles



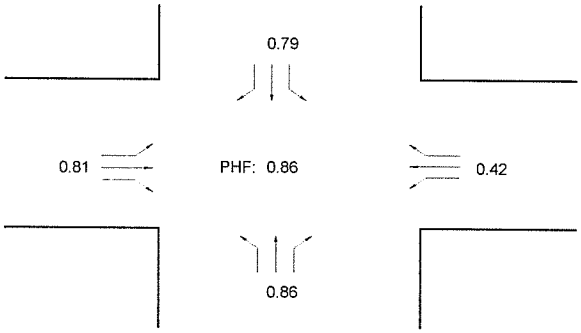
Heavy Vehicles (trucks per hour)



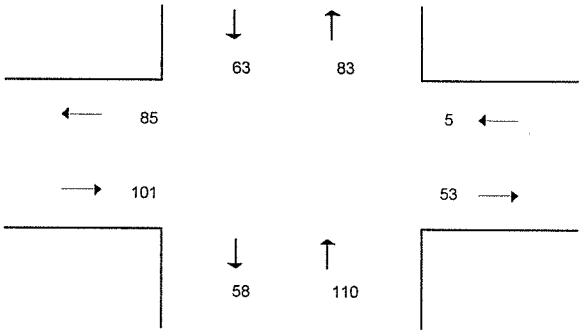
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



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PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Tuesday, June 12, 2007

East-West Street Name: Hwy. 242

North-South Street Name: Hood St.

Peak Hour: 4:15 to 5:15 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	14	19	7	11	3	11	8	2	0	0	0	75
4:15	4:30	2	17	10	11	6	6	13	2	0	0	1	0	68
4:30	4:45	1	14	12	14	15	2	11	6	3	2	1	0	81
4:45	5:00	0	14	8	6	6	5	4	6	1	1	0	0	51
5:00	5:15	0	17	15	8	17	5	10	5	2	0	0	0	79
5:15	5:30	0	15	5	6	6	7	10	9	0	0	1	0	59
5:30	5:45	1	11	17	3	12	2	8	6	1	0	0	0	61
5:45	6:00	0	15	12	6	4	1	12	8	0	0	1	0	59
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		4	117	98	61	77	31	79	50	9	3	4	0	533
Peak Hour		**3**	**62**	**45**	**39**	**44**	**18**	**38**	**19**	**6**	**3**	**2**	**0**	**279**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	1	0	1	0	0	0	0	0	2
4:15	4:30	0	0	0	1	0	0	0	0	0	0	0	0	1
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45	5:00	0	0	0	0	0	0	1	0	0	0	0	0	1
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	1	0	0	0	0	0	1
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	1	1	0	3	0	0	0	0	0	5
Peak Hour		**0**	**0**	**0**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**2**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	3	0	0	0	0	0	0	0	0	0	0	3
4:15	4:30	0	0	0	0	0	0	1	0	0	0	0	0	1
4:30	4:45	0	0	0	0	0	0	0	1	0	0	0	0	1
4:45	5:00	0	0	1	0	0	0	0	0	0	0	0	0	1
5:00	5:15	0	0	1	0	0	0	0	0	0	0	0	0	1
5:15	5:30	0	0	0	0	1	2	0	0	0	0	0	0	3
5:30	5:45	0	0	0	1	0	0	0	0	0	0	1	0	2
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	3	2	1	1	2	1	1	0	0	1	0	12
Peak Hour		**0**	**0**	**2**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**	**4**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	0	0	0	2
4:15	4:30	0	0	0	0
4:30	4:45	0	0	0	0
4:45	5:00	0	2	0	1
5:00	5:15	0	0	0	0
5:15	5:30	0	0	0	0
5:30	5:45	0	0	0	0
5:45	6:00	0	0	0	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		0	2	0	3
Peak Hour		0	2	0	1

Matchless Data, Inc.	1045 NW Bond Street, Suite 11 PO Box 1557 Bend, OR 97709	Phone: 541-389-2785 Fax: 541-610-1926 info@matchlessdata.com	Matchless Data, Inc. Project #:

PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

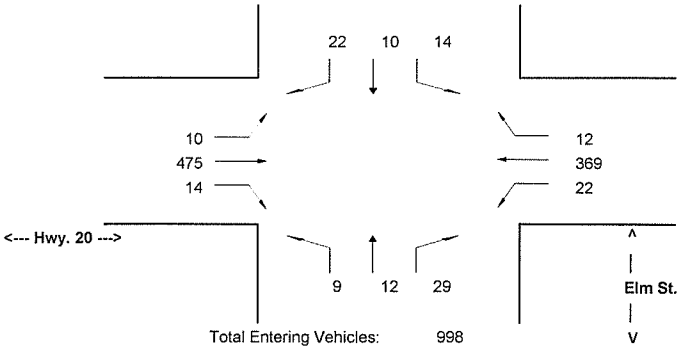
Count Date(s): Wednesday, October 17, 2007

East-West Street Name: Hwy. 20

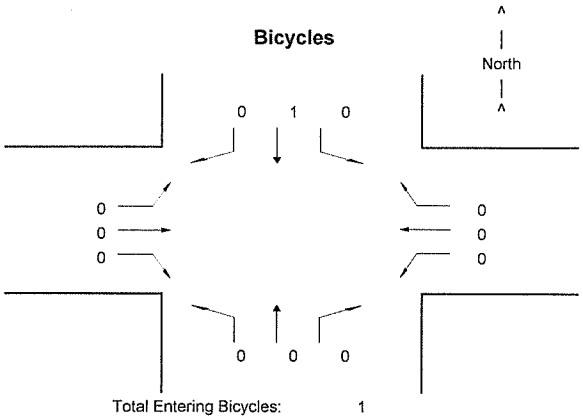
North-South Street Name: Elm St.

Peak Hour: 4:15 to 5:15 p.m.

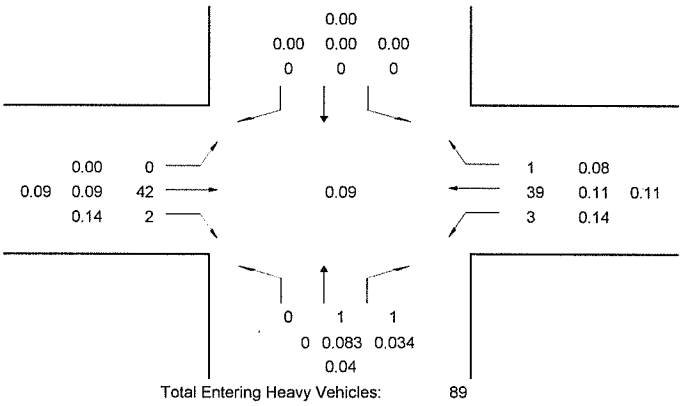
Vehicles per Hour (all vehicles)



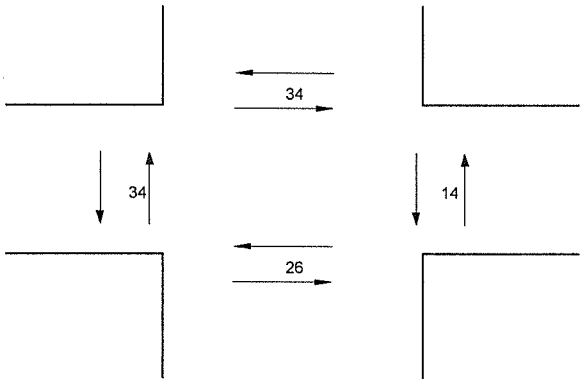
Bicycles



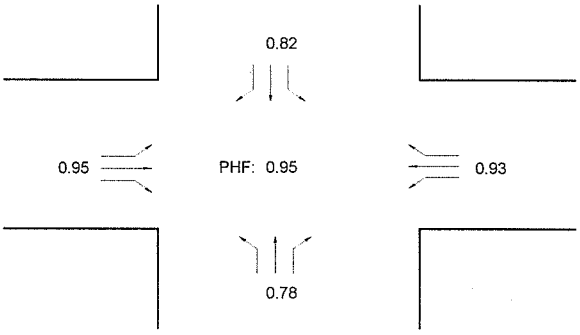
Heavy Vehicles (trucks per hour)



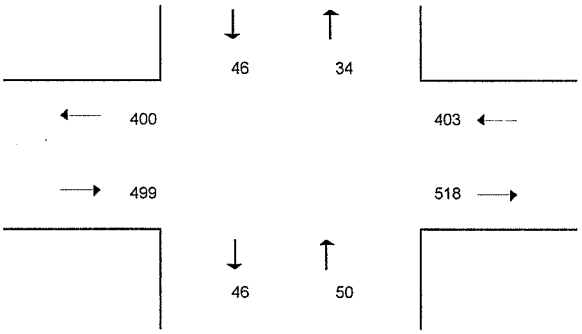
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



Matchless Data, Inc.	1045 NW Bond Street, Suite 11 PO Box 1557 Bend, OR 97709	Phone: 541-389-2785 Fax: 541-610-1926 info@matchlessdata.com	Matchless Data, Inc. Project #: 942

PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Wednesday, October 17, 2007

East-West Street Name: Hwy. 20
North-South Street Name: Elm St.
Peak Hour: 4:15 to 5:15 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	4	2	3	4	102	4	9	3	4	2	99	5	241
4:15	4:30	4	4	1	6	124	1	4	3	4	3	87	7	248
4:30	4:45	10	4	2	3	110	2	4	2	5	2	85	8	237
4:45	5:00	7	2	4	4	120	1	5	3	2	2	98	3	251
5:00	5:15	8	2	2	1	121	6	9	2	3	5	99	4	262
5:15	5:30	11	2	3	1	104	6	5	1	5	4	61	1	204
5:30	5:45	1	2	1	2	106	4	5	4	2	4	72	5	208
5:45	6:00	3	2	1	3	106	4	4	3	3	3	76	3	211
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		48	20	17	24	893	28	45	21	28	25	677	36	1,862
Peak Hour		**29**	**12**	**9**	**14**	**475**	**10**	**22**	**10**	**14**	**12**	**369**	**22**	**998**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	1	0	0	14	0	0	0	0	0	11	0	26
4:15	4:30	0	1	0	0	10	0	0	0	0	0	14	2	27
4:30	4:45	1	0	0	1	7	0	0	0	0	1	10	1	21
4:45	5:00	0	0	0	0	9	0	0	0	0	0	9	0	18
5:00	5:15	0	0	0	1	16	0	0	0	0	0	6	0	23
5:15	5:30	0	0	1	0	9	0	0	0	0	0	1	0	11
5:30	5:45	0	1	0	1	20	0	0	0	0	0	2	0	24
5:45	6:00	0	0	0	1	7	0	0	0	0	0	6	0	14
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		1	3	1	4	92	0	0	0	0	1	59	3	164
Peak Hour		**1**	**1**	**0**	**2**	**42**	**0**	**0**	**0**	**0**	**1**	**39**	**3**	**89**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15	4:30	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	4:45	0	0	0	0	0	0	0	1	0	0	0	0	1
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	1	0	0	0	0	0	0	0	1
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	0	1	0	0	1	0	0	0	0	2
Peak Hour		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**1**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	15	8	4	0
4:15	4:30	1	2	8	1
4:30	4:45	9	9	5	4
4:45	5:00	9	15	10	6
5:00	5:15	7	8	11	3
5:15	5:30	5	6	8	0
5:30	5:45	8	2	7	6
5:45	6:00	2	5	4	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		56	55	57	20
Peak Hour		26	34	34	14

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Fax: 541-610-1926
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Matchless Data, Inc.
Project #: 942

PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

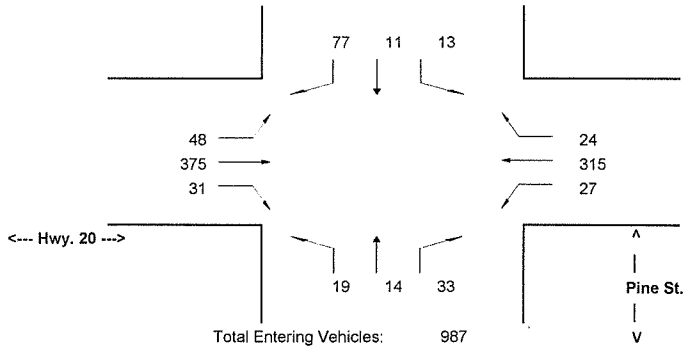
Count Date(s): Tuesday, October 16, 2007

East-West Street Name: Hwy. 20

North-South Street Name: Pine St.

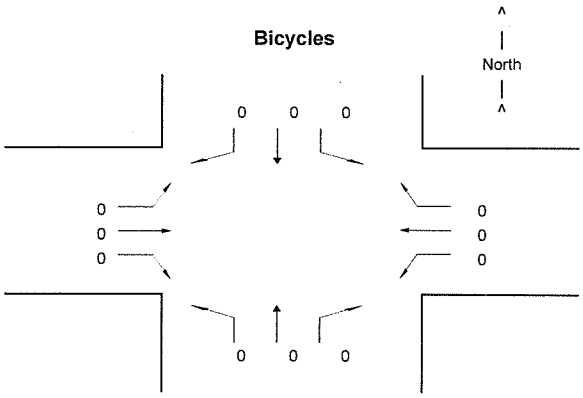
Peak Hour: 4:00 to 5:00 p.m.

Vehicles per Hour (all vehicles)



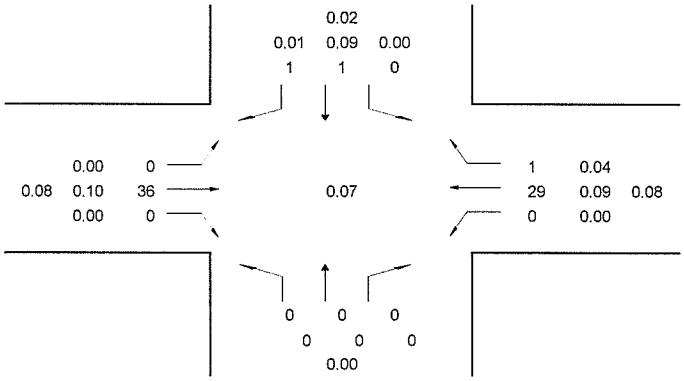
Total Entering Vehicles: 987

Bicycles



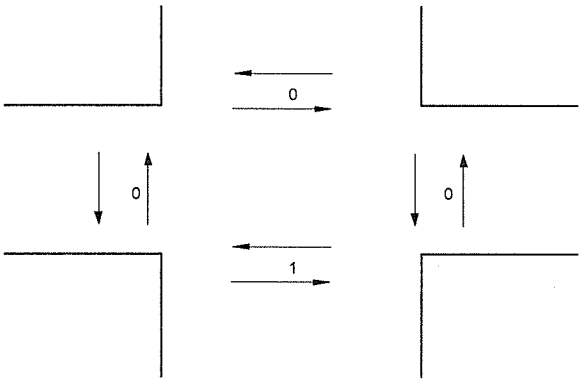
Total Entering Bicycles: 0

Heavy Vehicles (trucks per hour)

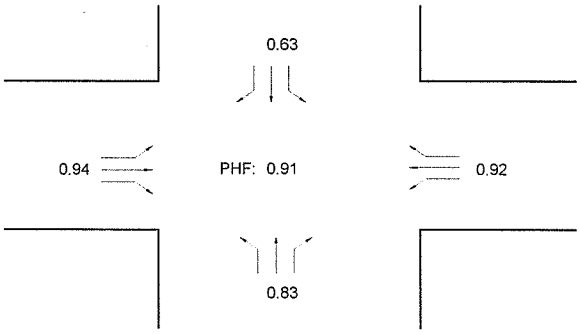


Total Entering Heavy Vehicles: 68

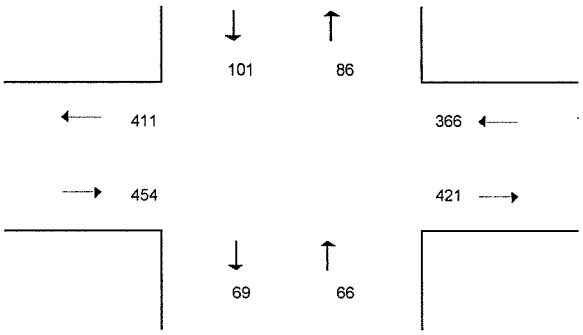
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



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PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Tuesday, October 16, 2007

East-West Street Name: Hwy. 20

North-South Street Name: Pine St.

Peak Hour: 4:00 to 5:00 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	10	4	5	8	85	18	29	5	6	5	83	12	270
4:15	4:30	8	6	6	11	88	8	15	1	3	5	67	4	222
4:30	4:45	7	3	5	9	95	11	16	2	1	11	75	8	243
4:45	5:00	8	1	3	3	107	11	17	3	3	3	90	3	252
5:00	5:15	10	1	9	4	102	5	9	4	4	3	72	13	236
5:15	5:30	5	3	4	5	94	3	14	1	4	5	67	3	208
5:30	5:45	5	7	3	2	88	2	10	3	3	2	80	7	212
5:45	6:00	6	5	2	4	68	4	11	2	1	2	55	4	164
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		59	30	37	46	727	62	121	21	25	36	589	54	1,807
Peak Hour		**33**	**14**	**19**	**31**	**375**	**48**	**77**	**11**	**13**	**24**	**315**	**27**	**987**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	8	0	0	0	0	0	9	0	17
4:15	4:30	0	0	0	0	8	0	1	0	0	0	5	0	14
4:30	4:45	0	0	0	0	12	0	0	0	0	1	7	0	20
4:45	5:00	0	0	0	0	8	0	0	1	0	0	8	0	17
5:00	5:15	0	0	0	0	5	0	0	0	0	1	4	0	10
5:15	5:30	0	0	0	0	6	0	0	0	0	0	4	0	10
5:30	5:45	0	0	0	0	6	0	2	0	0	0	5	0	13
5:45	6:00	0	0	0	1	0	0	0	0	0	0	2	0	3
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	1	53	0	3	1	0	2	44	0	104
Peak Hour		**0**	**0**	**0**	**0**	**36**	**0**	**1**	**1**	**0**	**1**	**29**	**0**	**68**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15	4:30	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	5:15	0	0	0	0	0	0	1	0	0	0	0	0	1
5:15	5:30	0	0	0	0	1	0	0	0	0	0	0	0	1
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	0	1	0	1	0	0	0	0	0	2
Peak Hour		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	0	0	0	0
4:15	4:30	1	0	0	0
4:30	4:45	0	0	0	0
4:45	5:00	0	0	0	0
5:00	5:15	1	0	0	0
5:15	5:30	0	0	0	0
5:30	5:45	0	0	0	0
5:45	6:00	1	0	0	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		3	0	0	0
Peak Hour		1	0	0	0

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Matchless Data, Inc.
Project #: 942

PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

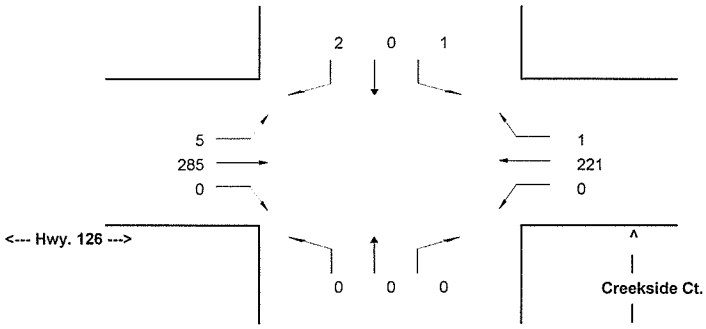
Count Date(s): Tuesday, August 28, 2007

East-West Street Name: Hwy. 126

North-South Street Name: Creekside Ct.

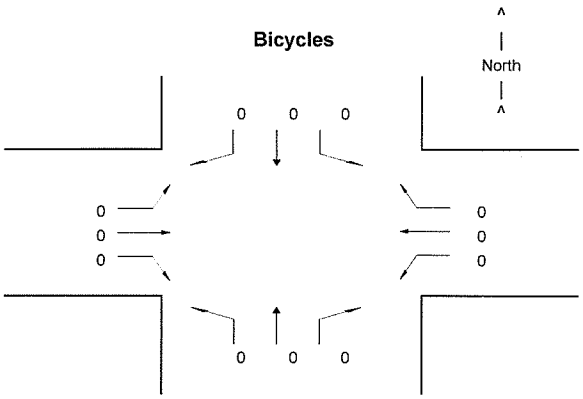
Peak Hour: 4:30 to 5:30 p.m.

Vehicles per Hour (all vehicles)



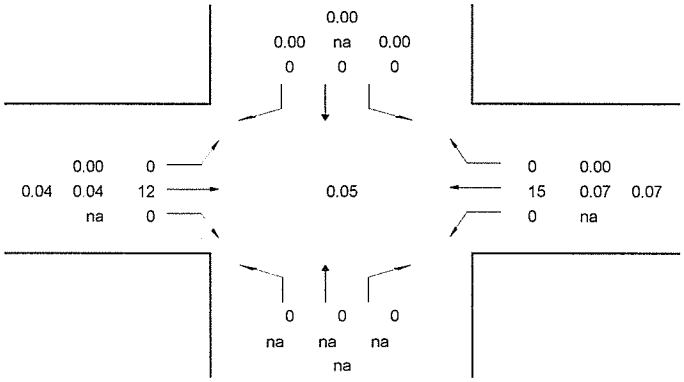
Total Entering Vehicles: 515

Bicycles



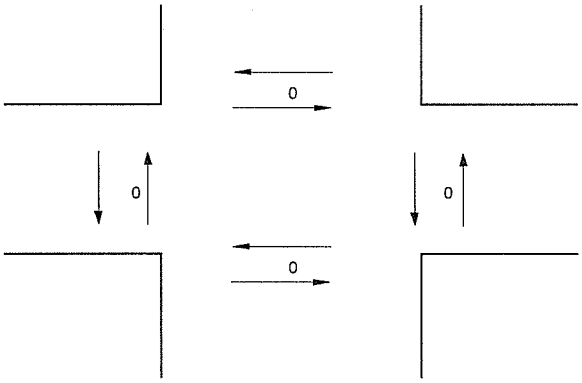
Total Entering Bicycles: 0

Heavy Vehicles (trucks per hour)

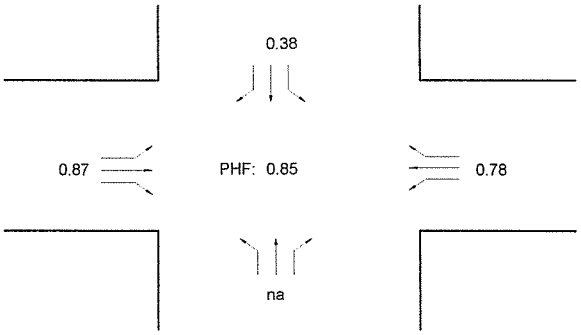


Total Entering Heavy Vehicles: 27

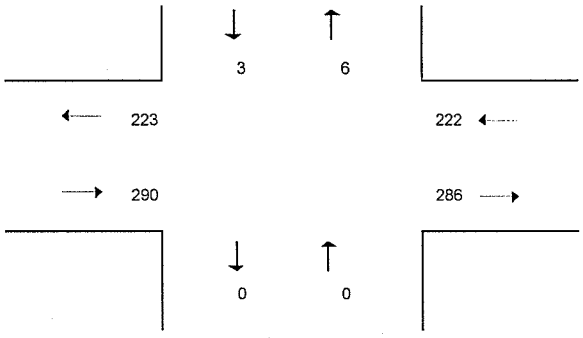
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



Matchless Data, Inc.	1045 NW Bond Street, Suite 11 PO Box 1557 Bend, OR 97709	Phone: 541-389-2785 Fax: 541-610-1926 info@matchlessdata.com	Matchless Data, Inc. Project #:

PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Tuesday, August 28, 2007

East-West Street Name: Hwy. 126

North-South Street Name: Creekside Ct.

Peak Hour: 4:30 to 5:30 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	79	2	2	0	0	1	46	0	130
4:15	4:30	0	0	0	0	60	0	3	0	0	0	53	0	116
4:30	4:45	0	0	0	0	80	3	0	0	0	0	51	0	134
4:45	5:00	0	0	0	0	60	1	0	0	0	1	49	0	111
5:00	5:15	0	0	0	0	80	0	1	0	0	0	71	0	152
5:15	5:30	0	0	0	0	65	1	1	0	1	0	50	0	118
5:30	5:45	0	0	0	0	60	2	1	0	0	2	47	0	112
5:45	6:00	0	0	0	0	61	2	0	0	1	0	38	0	102
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	0	545	11	8	0	2	4	405	0	975
Peak Hour		**0**	**0**	**0**	**0**	**285**	**5**	**2**	**0**	**1**	**1**	**221**	**0**	**515**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	6	0	0	0	0	1	5	0	12
4:15	4:30	0	0	0	0	9	0	0	0	0	0	7	0	16
4:30	4:45	0	0	0	0	5	0	0	0	0	0	5	0	10
4:45	5:00	0	0	0	0	2	0	0	0	0	0	1	0	3
5:00	5:15	0	0	0	0	0	0	0	0	0	0	7	0	7
5:15	5:30	0	0	0	0	5	0	0	0	0	0	2	0	7
5:30	5:45	0	0	0	0	6	0	0	0	0	0	3	0	9
5:45	6:00	0	0	0	0	1	0	0	0	0	0	2	0	3
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	0	34	0	0	0	0	1	32	0	67
Peak Hour		**0**	**0**	**0**	**0**	**12**	**0**	**0**	**0**	**0**	**0**	**15**	**0**	**27**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15	4:30	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	0	0	0	0
4:15	4:30	0	0	0	0
4:30	4:45	0	0	0	0
4:45	5:00	0	0	0	0
5:00	5:15	0	0	0	0
5:15	5:30	0	0	0	0
5:30	5:45	0	0	0	0
5:45	6:00	0	0	0	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		0	0	0	0
Peak Hour		0	0	0	0

Matchless Data, Inc.	1045 NW Bond Street, Suite 11 PO Box 1557 Bend, OR 97709	Phone: 541-389-2785 Fax: 541-610-1926 info@matchlessdata.com	Matchless Data, Inc. Project #:

PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

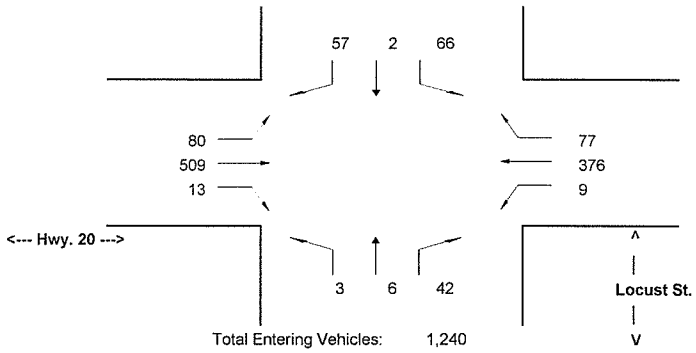
Count Date(s): Tuesday, October 16, 2007

East-West Street Name: Hwy. 20

North-South Street Name: Locust St.

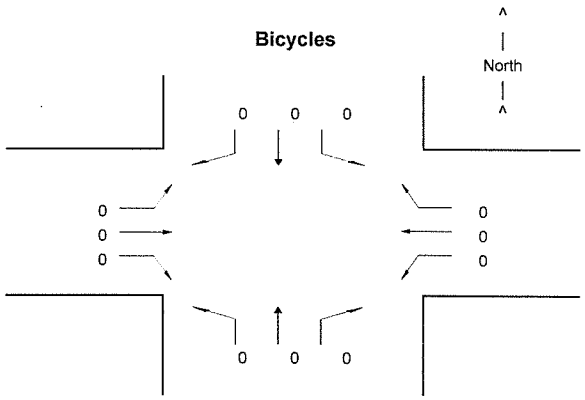
Peak Hour: 4:00 to 5:00 p.m.

Vehicles per Hour (all vehicles)



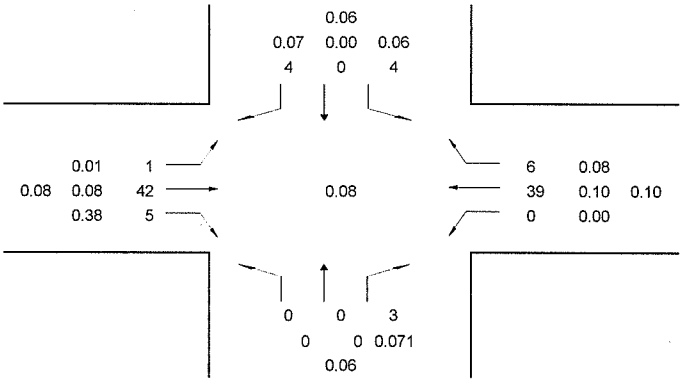
Total Entering Vehicles: 1,240

Bicycles



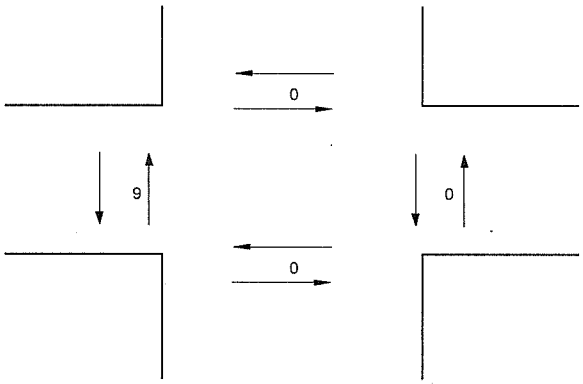
Total Entering Bicycles: 0

Heavy Vehicles (trucks per hour)

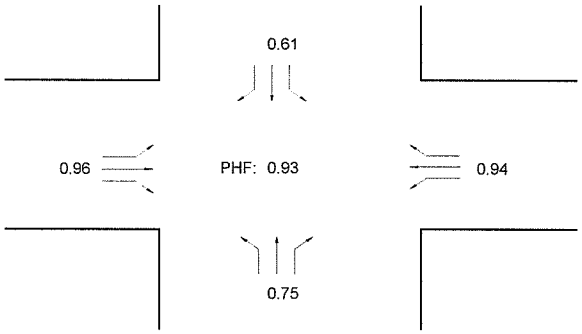


Total Entering Heavy Vehicles: 104

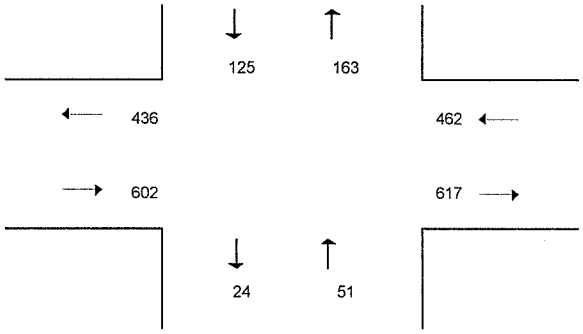
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



Matchless Data, Inc.	1045 NW Bond Street, Suite 11 PO Box 1557 Bend, OR 97709	Phone: 541-389-2785 Fax: 541-610-1926 info@matchlessdata.com	Matchless Data, Inc. Project #: 942

PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Tuesday, October 16, 2007

East-West Street Name: Hwy. 20

North-South Street Name: Locust St.

Peak Hour: 4:00 to 5:00 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	16	1	0	4	128	20	21	0	30	14	97	2	333
4:15	4:30	6	2	2	1	125	16	9	1	9	24	92	3	290
4:30	4:45	10	2	1	4	128	24	8	0	13	14	91	2	297
4:45	5:00	10	1	0	4	128	20	19	1	14	25	96	2	320
5:00	5:15	16	1	2	5	138	24	13	1	9	16	74	3	302
5:15	5:30	8	1	0	4	90	15	13	1	20	26	82	8	268
5:30	5:45	10	0	2	0	124	17	9	2	7	30	83	5	289
5:45	6:00	7	3	0	1	90	11	9	4	20	18	80	4	247
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		83	11	7	23	951	147	101	10	122	167	695	29	2,346
Peak Hour		**42**	**6**	**3**	**13**	**509**	**80**	**57**	**2**	**66**	**77**	**376**	**9**	**1,240**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	1	0	0	2	10	0	2	0	1	4	9	0	29
4:15	4:30	0	0	0	0	12	1	1	0	2	1	7	0	24
4:30	4:45	2	0	0	2	7	0	1	0	1	1	14	0	28
4:45	5:00	0	0	0	1	13	0	0	0	0	0	9	0	23
5:00	5:15	1	0	0	0	7	1	0	0	1	0	7	0	17
5:15	5:30	2	0	0	0	7	0	2	0	0	2	4	0	17
5:30	5:45	1	0	0	0	11	0	0	0	2	2	7	0	23
5:45	6:00	0	0	0	0	5	0	0	0	2	0	6	0	13
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		7	0	0	5	72	2	6	0	9	10	63	0	174
Peak Hour		**3**	**0**	**0**	**5**	**42**	**1**	**4**	**0**	**4**	**6**	**39**	**0**	**104**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15	4:30	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	0	0	0	0
4:15	4:30	0	3	0	0
4:30	4:45	0	4	0	0
4:45	5:00	0	2	0	0
5:00	5:15	0	2	0	0
5:15	5:30	0	5	0	0
5:30	5:45	3	0	0	0
5:45	6:00	0	2	0	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		3	18	0	0
Peak Hour		0	9	0	0

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Project #: 942

PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

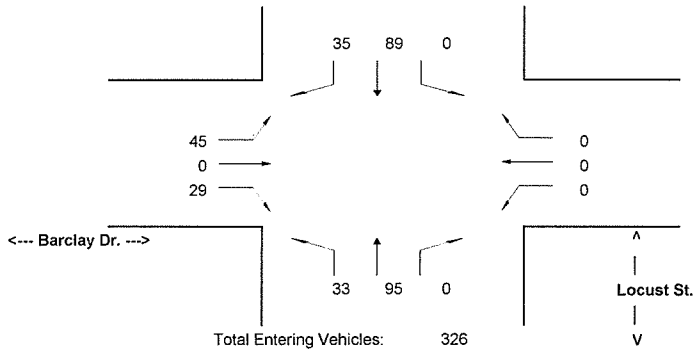
Count Date(s): Thursday, June 14, 2007

East-West Street Name: Barclay Dr.

North-South Street Name: Locust St.

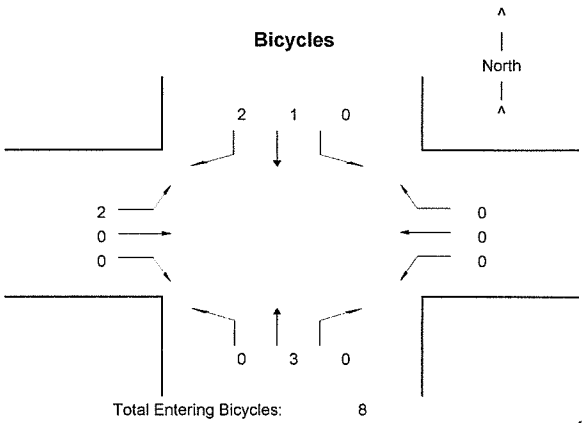
Peak Hour: 4:00 to 5:00 p.m.

Vehicles per Hour (all vehicles)



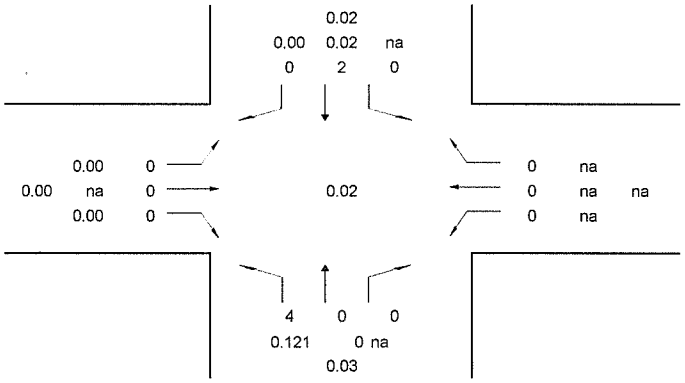
Total Entering Vehicles: 326

Bicycles



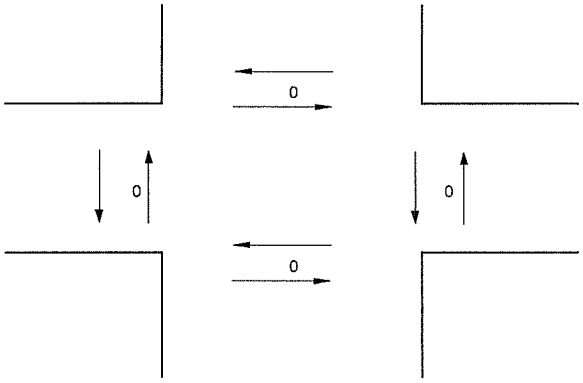
Total Entering Bicycles: 8

Heavy Vehicles (trucks per hour)

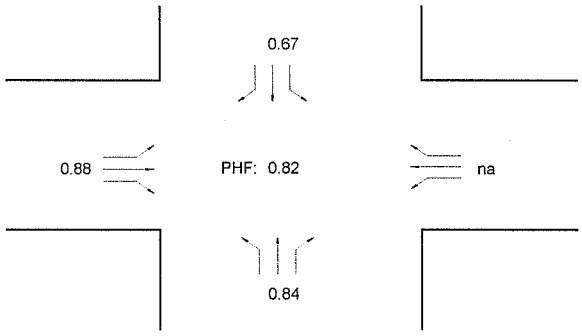


Total Entering Heavy Vehicles: 6

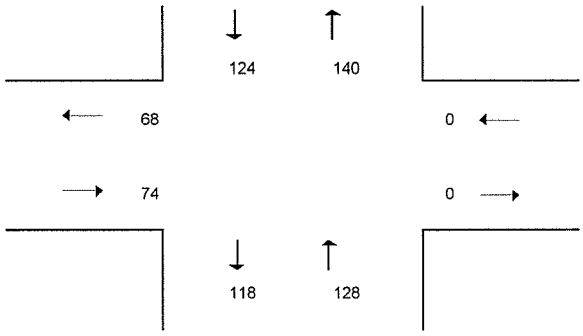
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



Matchless Data, Inc.	1045 NW Bond Street, Suite 11 PO Box 1557 Bend, OR 97709	Phone: 541-389-2785 Fax: 541-610-1926 info@matchlessdata.com	Matchless Data, Inc. Project #:

PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Thursday, June 14, 2007

East-West Street Name: Barclay Dr.

North-South Street Name: Locust St.

Peak Hour: 4:00 to 5:00 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	26	12	8	0	8	15	31	0	0	0	0	100
4:15	4:30	0	21	6	10	0	11	9	26	0	0	0	0	83
4:30	4:45	0	22	8	6	0	15	5	17	0	0	0	0	73
4:45	5:00	0	26	7	5	0	11	6	15	0	0	0	0	70
5:00	5:15	0	38	6	6	0	15	10	14	0	0	0	0	89
5:15	5:30	0	28	2	8	0	14	11	20	0	0	0	0	83
5:30	5:45	0	42	1	2	0	11	6	21	0	0	0	0	83
5:45	6:00	0	31	4	4	0	11	5	12	0	0	0	0	67
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	234	46	49	0	96	67	156	0	0	0	0	648
Peak Hour		**0**	**95**	**33**	**29**	**0**	**45**	**35**	**89**	**0**	**0**	**0**	**0**	**326**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	1	0	0	0	0	2	0	0	0	0	3
4:15	4:30	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	4:45	0	0	1	0	0	0	0	0	0	0	0	0	1
4:45	5:00	0	0	2	0	0	0	0	0	0	0	0	0	2
5:00	5:15	0	1	0	0	0	0	0	0	0	0	0	0	1
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	1	0	0	0	0	0	0	0	0	0	0	1
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	2	4	0	0	0	0	2	0	0	0	0	8
Peak Hour		**0**	**0**	**4**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**6**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	2	0	0	0	1	0	0	0	0	0	0	3
4:15	4:30	0	0	0	0	0	1	2	1	0	0	0	0	4
4:30	4:45	0	1	0	0	0	0	0	0	0	0	0	0	1
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	1	0	0	0	0	0	0	1
5:45	6:00	0	0	1	0	0	0	1	0	0	0	0	0	2
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	3	1	0	0	3	3	1	0	0	0	0	11
Peak Hour		**0**	**3**	**0**	**0**	**0**	**2**	**2**	**1**	**0**	**0**	**0**	**0**	**8**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	0	0	0	0
4:15	4:30	0	0	0	0
4:30	4:45	0	0	0	0
4:45	5:00	0	0	0	0
5:00	5:15	0	0	0	0
5:15	5:30	0	0	0	0
5:30	5:45	0	0	0	0
5:45	6:00	0	0	0	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		0	0	0	0
Peak Hour		0	0	0	0

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Project #:

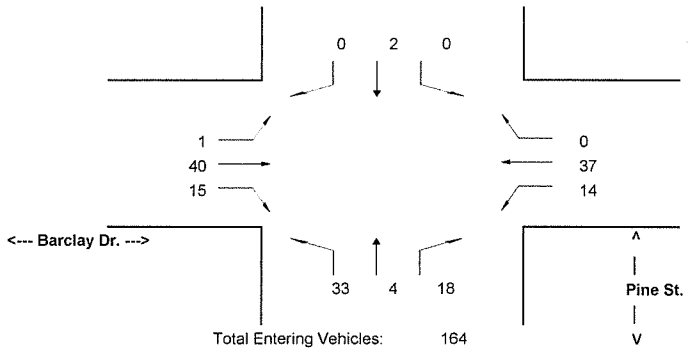
PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

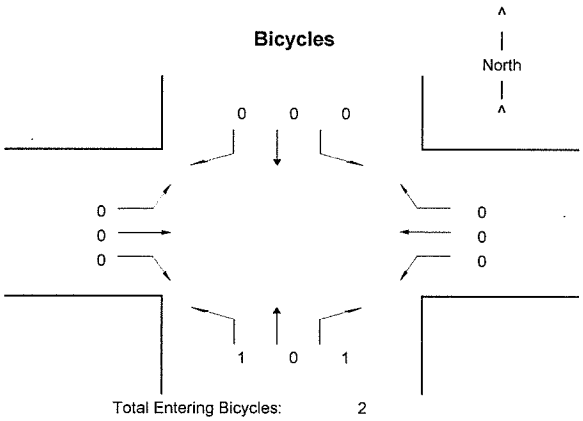
Count Date(s): Tuesday, June 12, 2007

East-West Street Name: Barclay Dr.
North-South Street Name: Pine St.
Peak Hour: 4:15 to 5:15 p.m.

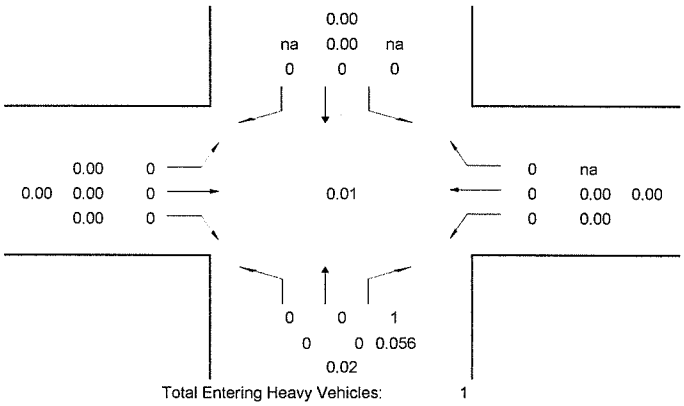
Vehicles per Hour (all vehicles)



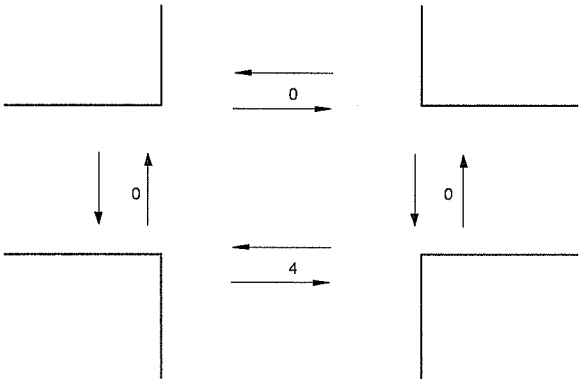
Bicycles



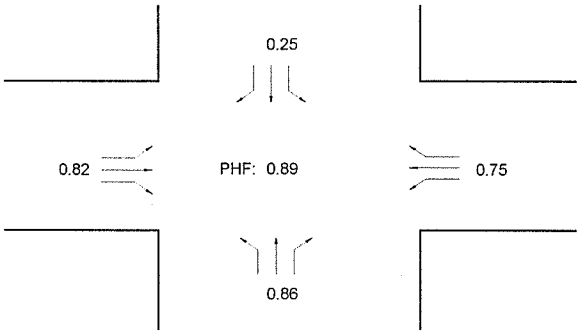
Heavy Vehicles (trucks per hour)



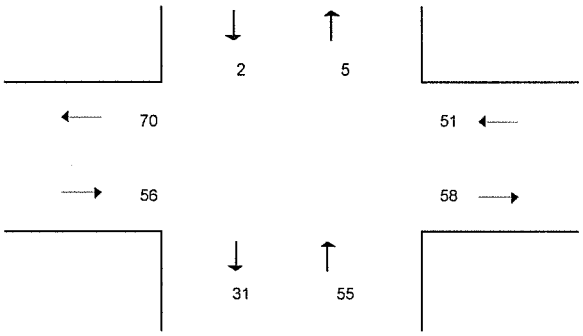
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



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PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Tuesday, June 12, 2007

East-West Street Name: Barclay Dr.

North-South Street Name: Pine St.

Peak Hour: 4:15 to 5:15 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	2	0	3	1	5	0	0	3	1	0	8	3	26
4:15	4:30	5	0	7	5	9	0	0	0	0	0	8	7	41
4:30	4:45	8	3	4	4	10	0	0	0	0	0	13	4	46
4:45	5:00	2	0	10	4	6	1	0	0	0	0	9	1	33
5:00	5:15	3	1	12	2	15	0	0	2	0	0	7	2	44
5:15	5:30	1	1	3	2	15	0	0	0	0	0	7	2	31
5:30	5:45	4	1	5	3	13	0	0	1	0	0	10	4	41
5:45	6:00	1	1	4	1	7	0	0	0	0	0	9	1	24
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		26	7	48	22	80	1	0	6	1	0	71	24	286
Peak Hour		**18**	**4**	**33**	**15**	**40**	**1**	**0**	**2**	**0**	**0**	**37**	**14**	**164**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15	4:30	1	0	0	0	0	0	0	0	0	0	0	0	1
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	5:15	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15	5:30	0	0	0	0	1	0	0	0	0	0	0	0	1
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		1	0	0	0	1	0	0	0	0	0	0	0	2
Peak Hour		**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15	4:30	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45	5:00	0	0	1	0	0	0	0	0	0	0	0	0	1
5:00	5:15	1	0	0	0	0	0	0	0	0	0	0	0	1
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	1	0	0	0	0	0	0	0	0	0	1
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		1	0	2	0	0	0	0	0	0	0	0	0	3
Peak Hour		**1**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	0	0	0	0
4:15	4:30	0	0	0	0
4:30	4:45	0	0	0	0
4:45	5:00	4	0	0	0
5:00	5:15	0	0	0	0
5:15	5:30	0	0	0	0
5:30	5:45	0	0	0	0
5:45	6:00	0	0	0	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		4	0	0	0
Peak Hour		4	0	0	0

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Matchless Data, Inc.
Project #:

PEAK HOUR TRAFFIC COUNT SUMMARY

Count Location: Sisters OR

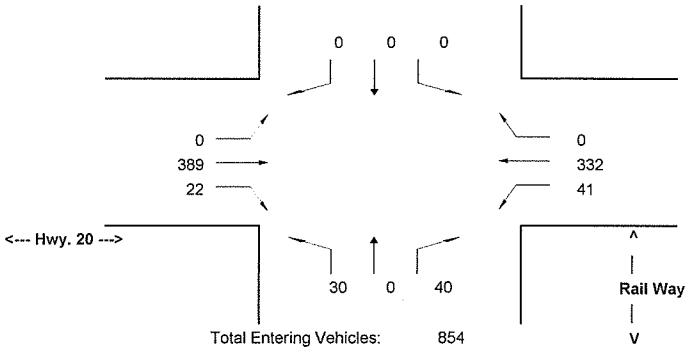
Count Date(s): Wednesday, June 13, 2007

East-West Street Name: Hwy. 20

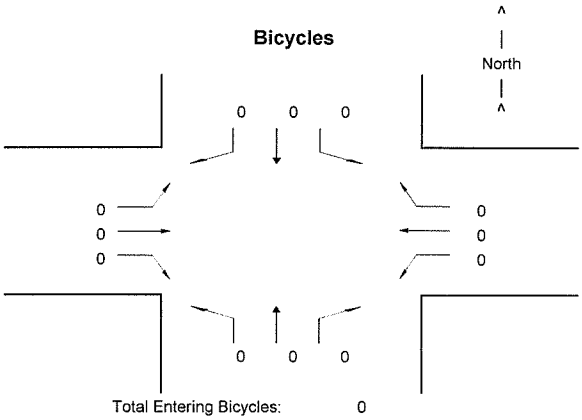
North-South Street Name: Rail Way

Peak Hour: 4:00 to 5:00 p.m.

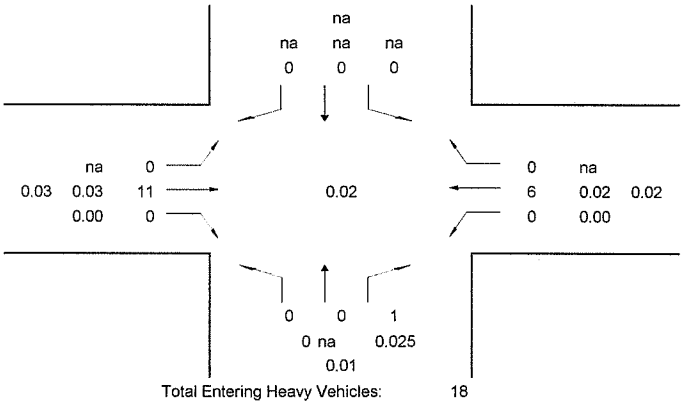
Vehicles per Hour (all vehicles)



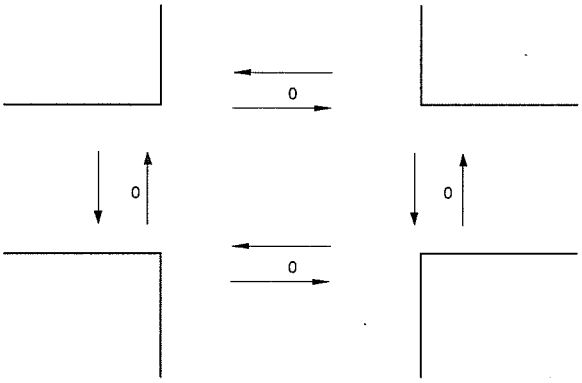
Bicycles



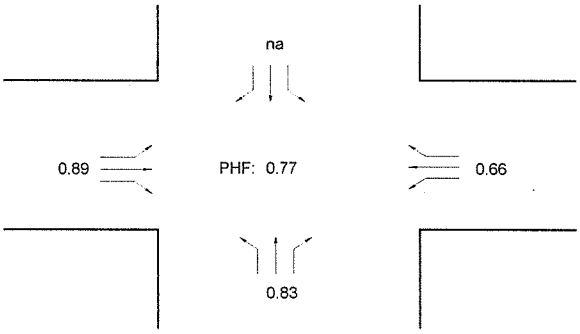
Heavy Vehicles (trucks per hour)



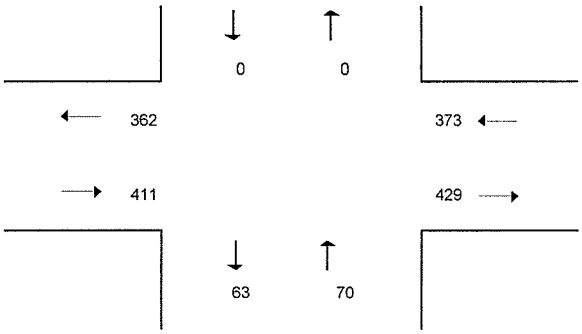
Pedestrians (crossings per hour)



Peak Hour Factor by Approach



Approach & Departure Volumes (vehicles per hour)



Matchless Data, Inc.	1045 NW Bond Street, Suite 11 PO Box 1557 Bend, OR 97709	Phone: 541-389-2785 Fax: 541-610-1926 info@matchlessdata.com	Matchless Data, Inc. Project #:

PEAK PERIOD TRAFFIC COUNT -- DETAILED COUNT DATA

Count Location: Sisters OR

Count Date(s): Wednesday, June 13, 2007

East-West Street Name: Hwy. 20

North-South Street Name: Rail Way

Peak Hour: 4:00 to 5:00 p.m.

ALL VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	10	0	11	7	108	0	0	0	0	0	130	11	277
4:15	4:30	11	0	4	5	100	0	0	0	0	0	60	12	192
4:30	4:45	8	0	8	4	89	0	0	0	0	0	79	8	196
4:45	5:00	11	0	7	6	92	0	0	0	0	0	63	10	189
5:00	5:15	5	0	5	4	101	0	0	0	0	0	86	0	201
5:15	5:30	9	0	7	3	81	0	0	0	0	0	87	11	198
5:30	5:45	9	0	4	7	83	0	0	0	0	0	70	10	183
5:45	6:00	6	0	11	2	89	0	0	0	0	0	62	10	180
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		69	0	57	38	743	0	0	0	0	0	637	72	1,616
Peak Hour		**40**	**0**	**30**	**22**	**389**	**0**	**0**	**0**	**0**	**0**	**332**	**41**	**854**

HEAVY VEHICLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	3	0	0	0	0	0	2	0	5
4:15	4:30	1	0	0	0	1	0	0	0	0	0	1	0	3
4:30	4:45	0	0	0	0	3	0	0	0	0	0	1	0	4
4:45	5:00	0	0	0	0	4	0	0	0	0	0	2	0	6
5:00	5:15	0	0	0	0	5	0	0	0	0	0	1	0	6
5:15	5:30	0	0	0	0	4	0	0	0	0	0	0	0	4
5:30	5:45	0	0	0	0	5	0	0	0	0	0	0	0	5
5:45	6:00	0	0	0	0	2	0	0	0	0	0	0	0	2
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		1	0	0	0	27	0	0	0	0	0	7	0	35
Peak Hour		**1**	**0**	**0**	**0**	**11**	**0**	**0**	**0**	**0**	**0**	**6**	**0**	**18**

BICYCLES

TIME		NORTHBOUND			EASTBOUND			SOUTHBOUND			WESTBOUND			
STARTING	ENDING	Right	Through	Left	Right	Through	Left	Right	Through	Left	Right	Through	Left	TOTAL
4:00	4:15	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15	4:30	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30	4:45	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45	5:00	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00	5:15	0	0	2	0	0	0	0	0	0	0	0	0	2
5:15	5:30	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30	5:45	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45	6:00	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00	6:15	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15	6:30	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30	6:45	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45	7:00	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00	7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15	7:30	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	7:45	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	8:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL		0	0	2	0	0	0	0	0	0	0	0	0	2
Peak Hour		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

PEDESTRIANS

TIME		CROSSINGS			
STARTING	ENDING	South Leg	West Leg	North Leg	East Leg
4:00	4:15	0	0	0	0
4:15	4:30	0	0	0	0
4:30	4:45	0	0	0	0
4:45	5:00	0	0	0	0
5:00	5:15	0	0	0	0
5:15	5:30	0	0	0	0
5:30	5:45	0	0	0	0
5:45	6:00	0	0	0	0
6:00	6:15	0	0	0	0
6:15	6:30	0	0	0	0
6:30	6:45	0	0	0	0
6:45	7:00	0	0	0	0
7:00	7:15	0	0	0	0
7:15	7:30	0	0	0	0
7:30	7:45	0	0	0	0
7:45	8:00	0	0	0	0
TOTAL		0	0	0	0
Peak Hour		0	0	0	0

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Project #:

Appendix F: Existing Year HCM Output

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 OR 242/McKinney Butte Rd

Average Delay (sec/veh): 1.3 Worst Case Level Of Service: A[9.6]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Uncontrolled				Uncontrolled			
Rights:	Include				Include				Include				Include			
Lanes:	0	0	0	0 0	0	0	1!	0 0	0	1	0	0 0	0	0	1	0 1
Volume Module:	2006 - 30th HV															
Base Vol:	0	0	0		19	0	19		8	137	0		0	94	38	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	0	0	0		19	0	19		8	137	0		0	94	38	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92	
PHF Volume:	0	0	0		21	0	21		9	149	0		0	102	41	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
FinalVolume:	0	0	0		21	0	21		9	149	0		0	102	41	
Critical Gap Module:																
Critical Gp:	xxxxx	xxxx	xxxxx		6.4	6.5	6.2		4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx		
FollowUpTim:	xxxxx	xxxx	xxxxx		3.5	4.0	3.3		2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx		
Capacity Module:																
Cnflict Vol:	xxxx	xxxx	xxxxx		268	268	102		143	xxxx	xxxxx	xxxx	xxxx	xxxxx		
Potent Cap.:	xxxx	xxxx	xxxxx		725	641	958		1451	xxxx	xxxxx	xxxx	xxxx	xxxxx		
Move Cap.:	xxxx	xxxx	xxxxx		722	637	958		1451	xxxx	xxxxx	xxxx	xxxx	xxxxx		
Volume/Cap:	xxxx	xxxx	xxxx		0.03	0.00	0.02		0.01	xxxx	xxxx	xxxx	xxxx	xxxx		
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx		
Control Del:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		7.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx		
LOS by Move:	*	*	*		*	*	*		A	*	*	*	*	*		
Movement:	LT - LTR - RT				LT - LTR - RT				LT - LTR - RT				LT - LTR - RT			
Shared Cap.:	xxxx	xxxx	xxxxx		xxxx	823	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx	xxxx	xxxxx		xxxxx	0.2	xxxxx		0.0	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shrd ConDel:	xxxxx	xxxx	xxxxx		xxxxx	9.6	xxxxx		7.5	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shared LOS:	*	*	*		*	A	*		A	*	*		*	*	*	
ApproachDel:	xxxxxx					9.6			xxxxxx				xxxxxx			
ApproachLOS:	*					A			*				*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 OR 242/Hood St (OR 242)

Cycle (sec): 100 Critical Vol./Cap.(X): 0.228
Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 8.6
Optimal Cycle: 0 Level Of Service: A

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	1	0	0	1 0	1	0	0	1 0	0	0	1!	0 0	0	0	0	1 0
Volume Module:	2006 - 30th HV															
Base Vol:	72	99	5		10	30	61		29	70	62		0	3	5	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	72	99	5		10	30	61		29	70	62		0	3	5	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92	
PHF Volume:	78	108	5		11	33	66		32	76	67		0	3	5	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	78	108	5		11	33	66		32	76	67		0	3	5	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	78	108	5		11	33	66		32	76	67		0	3	5	
Saturation Flow Module:																
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	0.95	0.05		1.00	0.33	0.67		0.18	0.43	0.39		0.00	0.38	0.62	
Final Sat.:	630	662	33		617	244	497		138	334	296		0	280	467	
Capacity Analysis Module:																
Vol/Sat:	0.12	0.16	0.16		0.02	0.13	0.13		0.23	0.23	0.23		xxxx	0.01	0.01	
Crit Moves:		****					****		****						****	
Delay/Veh:	9.0	8.7	8.7		8.5	8.1	8.1		8.7	8.7	8.7		0.0	7.6	7.6	
Delay Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	9.0	8.7	8.7		8.5	8.1	8.1		8.7	8.7	8.7		0.0	7.6	7.6	
LOS by Move:	A	A	A		A	A	A		A	A	A		*	A	A	
ApproachDel:	8.8					8.1			8.7				7.6			
Delay Adj:	1.00					1.00			1.00				1.00			
ApprAdjDel:	8.8					8.1			8.7				7.6			
LOS by Appr:	A					A			A				A			
AllWayAvgQ:	0.1	0.2	0.2		0.0	0.1	0.1		0.3	0.3	0.3		0.0	0.0	0.0	

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #3 US 20/Rail Way

Average Delay (sec/veh): 2.9 Worst Case Level Of Service: D[29.3]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	1	0	1	0	0		0	0	1	0	1		1	0	0	0	1		0	0	0	0	0	
Volume Module:	2006 - 30th HV																							
Base Vol:	68	548		0		0	642		36		50	0		66		0		0		0		0		0
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00		1.00		1.00		1.00
Initial Bse:	68	548		0		0	642		36		50	0		66		0		0		0		0		0
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00		1.00		1.00		1.00
PHF Adj:	0.92	0.92		0.92		0.92	0.92		0.92		0.92	0.92		0.92		0.92		0.92		0.92		0.92		0.92
PHF Volume:	74	596		0		0	698		39		54	0		72		0		0		0		0		0
Reduct Vol:	0	0		0		0	0		0		0	0		0		0		0		0		0		0
FinalVolume:	74	596		0		0	698		39		54	0		72		0		0		0		0		0
Critical Gap Module:																								
Critical Gp:	4.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx						6.4	xxxx			6.2	xxxxx	xxxx	xxxxx					
FollowUpTim:	2.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx						3.5	xxxx			3.3	xxxxx	xxxx	xxxxx					
Capacity Module:																								
Cnflict Vol:	737	xxxx	xxxxx	xxxx	xxxx	xxxxx						1441	xxxx			698	xxxx	xxxx	xxxxx					
Potent Cap.:	833	xxxx	xxxxx	xxxx	xxxx	xxxxx						145	xxxx			439	xxxx	xxxx	xxxxx					
Move Cap.:	833	xxxx	xxxxx	xxxx	xxxx	xxxxx						135	xxxx			439	xxxx	xxxx	xxxxx					
Volume/Cap:	0.09	xxxx	xxxx	xxxx	xxxx	xxxx						0.40	xxxx			0.16	xxxx	xxxx	xxxx					
Level Of Service Module:																								
2Way95thQ:	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx						1.7	xxxx			0.6	xxxx	xxxx	xxxxx					
Control Del:	9.7	xxxx	xxxxx	xxxxx	xxxx	xxxxx						48.4	xxxx			14.8	xxxxx	xxxx	xxxxx					
LOS by Move:	A	*	*	*	*	*						E	*			B	*	*	*					
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx						xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx						
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx						xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx						
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx						xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx						
Shared LOS:	*	*	*	*	*	*						*	*	*		*	*	*						
ApproachDel:	xxxxxx			xxxxxx								29.3				xxxxxx								
ApproachLOS:	*			*								D				*								

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #4 US 20/Barclay Dr (McKinney Butte)

Average Delay (sec/veh): 59.4 Worst Case Level Of Service: F[364.0]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	1	0	0	1	0		1	0	1	0	1		1	0	0	1	0		0	1	0	0	1	
Volume Module:	2006 - 30th HV																							
Base Vol:	39	596		46		48	580		61		37	59		71		36		71		73				
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00		1.00				
Initial Bse:	39	596		46		48	580		61		37	59		71		36		71		73				
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00		1.00				
PHF Adj:	0.92	0.92		0.92		0.92	0.92		0.92		0.92	0.92		0.92		0.92		0.92		0.92				
PHF Volume:	42	648		50		52	630		66		40	64		77		39		77		79				
Reduct Vol:	0	0		0		0	0		0		0	0		0		0		0		0				
FinalVolume:	42	648		50		52	630		66		40	64		77		39		77		79				
Critical Gap Module:																								
Critical Gp:	4.2	xxxx	xxxxx			4.2	xxxx	xxxxx			7.2	6.6		6.3		7.1	6.5		6.2					
FollowUpTim:	2.3	xxxx	xxxxx			2.3	xxxx	xxxxx			3.6	4.1		3.4		3.5	4.0		3.3					
Capacity Module:																								
Cnflict Vol:	697	xxxx	xxxxx			698	xxxx	xxxxx			1574	1517		630		1596	1559		676					
Potent Cap.:	863	xxxx	xxxxx			862	xxxx	xxxxx			85	114		467		85	111		450					
Move Cap.:	863	xxxx	xxxxx			862	xxxx	xxxxx			24	102		467		33	99		449					
Volume/Cap:	0.05	xxxx	xxxx			0.06	xxxx	xxxx			1.71	0.63		0.17		1.19	0.78		0.18					
Level Of Service Module:																								
2Way95thQ:	0.2	xxxx	xxxxx			0.2	xxxx	xxxxx			5.1	xxxx	xxxxx			xxxx	xxxx		0.6					
Control Del:	9.4	xxxx	xxxxx			9.4	xxxx	xxxxx			696.9	xxxx	xxxxx			xxxxx	xxxx		14.7					
LOS by Move:	A	*	*			A	*	*			F	*	*			*	*		B					
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx						xxxx	xxxx	xxxxx		178		59	xxxx	xxxxx				
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx						xxxxx	xxxx	xxxxx		5.3		11.1	xxxx	xxxxx				
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx						xxxxx	xxxx	xxxxx		75.5		602.4	xxxx	xxxxx				
Shared LOS:	*	*	*	*	*	*						*	*	*		F		F	*	*				
ApproachDel:	xxxxxx			xxxxxx								213.1				364.0								
ApproachLOS:	*			*								F				F								

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #5 Cascade Ave (US 20)/Hood St (OR 242)

Average Delay (sec/veh): 2.5 Worst Case Level Of Service: E[40.4]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Uncontrolled				Uncontrolled				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Lanes:	1 0	1	0	0	0 0	1	0	1	1 0	0	0	1	0 0	0	0	0
Volume Module:2006 - 30th HV																
Base Vol:	81	637		0	0	696		20	39		0	35	0		0	0
Growth Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	1.00
Initial Bse:	81	637		0	0	696		20	39		0	35	0		0	0
User Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	1.00
PHF Adj:	0.92	0.92		0.92	0.92	0.92		0.92	0.92		0.92	0.92	0.92		0.92	0.92
PHF Volume:	88	692		0	0	757		22	42		0	38	0		0	0
Reduct Vol:	0	0		0	0	0		0	0		0	0	0		0	0
FinalVolume:	88	692		0	0	757		22	42		0	38	0		0	0
Critical Gap Module:																
Critical Gp:	4.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx		6.4	xxxx		6.2	xxxxx	xxxx	xxxxx		
FollowUpTim:	2.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx		3.5	xxxx		3.3	xxxxx	xxxx	xxxxx		
Capacity Module:																
Cnflict Vol:	778	xxxx	xxxxx	xxxx	xxxx	xxxxx		1625	xxxx		757	xxxx	xxxx	xxxxx		
Potent Cap.:	804	xxxx	xxxxx	xxxx	xxxx	xxxxx		111	xxxx		405	xxxx	xxxx	xxxxx		
Move Cap.:	804	xxxx	xxxxx	xxxx	xxxx	xxxxx		102	xxxx		405	xxxx	xxxx	xxxxx		
Volume/Cap:	0.11	xxxx	xxxx	xxxx	xxxx	xxxx		0.42	xxxx		0.09	xxxx	xxxx	xxxx		
Level Of Service Module:																
2Way95thQ:	0.4	xxxx	xxxxx	xxxx	xxxx	xxxxx		1.7	xxxx		0.3	xxxx	xxxx	xxxxx		
Control Del:	10.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx		63.3	xxxx		14.8	xxxxx	xxxx	xxxxx		
LOS by Move:	B	*	*	*	*	*		F	*		B	*	*	*		
Movement:	LT -	LTR -	RT	LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		
Shared LOS:	*	*	*	*	*	*		*	*	*		*	*	*		
ApproachDel:	xxxxxx			xxxxxx				40.4				xxxxxx				
ApproachLOS:	*			*				E				*				

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #6 Cascade Ave (US 20)/Pine St

Average Delay (sec/veh): 34.0 Worst Case Level Of Service: F[398.2]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Uncontrolled				Uncontrolled			
Rights:	Include				Include				Include				Include			
Lanes:	0 0	1!	0	0	0 1	0	0	1	0 0	1!	0	0	0 0	1!	0	0
Volume Module:2006 - 30th HV																
Base Vol:	33	25		58	23	19		135	84	656		54	47	551		42
Growth Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
Initial Bse:	33	25		58	23	19		135	84	656		54	47	551		42
User Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00
PHF Adj:	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92
PHF Volume:	36	27		63	25	21		147	91	713		59	51	599		46
Reduct Vol:	0	0		0	0	0		0	0	0		0	0	0		0
FinalVolume:	36	27		63	25	21		147	91	713		59	51	599		46
Critical Gap Module:																
Critical Gp:	7.1	6.5		6.2	7.1	6.5		6.2	4.2	xxxx	xxxxx		4.2	xxxx	xxxxx	
FollowUpTim:	3.5	4.0		3.3	3.5	4.0		3.3	2.3	xxxx	xxxxx		2.3	xxxx	xxxxx	
Capacity Module:																
Cnflict Vol:	1735	1674		744	1694	1680		622	645	xxxx	xxxxx		774	xxxx	xxxxx	
Potent Cap.:	68	95		413	73	94		485	903	xxxx	xxxxx		807	xxxx	xxxxx	
Move Cap.:	33	79		412	40	78		485	903	xxxx	xxxxx		806	xxxx	xxxxx	
Volume/Cap:	1.08	0.34		0.15	0.63	0.26		0.30	0.10	xxxx	xxxx		0.06	xxxx	xxxx	
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	xxxxx		xxxx	xxxx		1.3	0.3	xxxx	xxxxx		0.2	xxxx	xxxxx	
Control Del:	xxxxx	xxxx	xxxxx		xxxxx	xxxx		15.6	9.4	xxxx	xxxxx		9.8	xxxx	xxxxx	
LOS by Move:	*	*	*		*	*		C	A	*	*		A	*	*	
Movement:	LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT	
Shared Cap.:	xxxx	80	xxxxx		51	xxxx	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx	10.3	xxxxx		3.8	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shrd ConDel:	xxxxx	398	xxxxx		219.2	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shared LOS:	*	F	*		F	*	*		*	*	*		*	*	*	
ApproachDel:	398.2				63.9				xxxxxx				xxxxxx			
ApproachLOS:	F				F				*				*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #7 Cascade Ave (US 20)/Elm St

Average Delay (sec/veh): 12.5 Worst Case Level Of Service: F[153.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module:2006 - 30th HV												
Base Vol:	14	19	46	22	16	35	16	760	22	35	590	19
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	14	19	46	22	16	35	16	760	22	35	590	19
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	15	21	50	24	17	38	17	826	24	38	641	21
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	15	21	50	24	17	38	17	826	24	38	641	21
Critical Gap Module:												
Critical Gp:	7.1	6.5	6.2	7.1	6.5	6.2	4.2	xxxx	xxxxx	4.2	xxxx	xxxxx
FollowUpTim:	3.5	4.0	3.3	3.5	4.0	3.3	2.3	xxxx	xxxxx	2.3	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1724	1707	902	1712	1709	760	716	xxxx	xxxxx	892	xxxx	xxxxx
Potent Cap.:	69	90	333	71	90	404	849	xxxx	xxxxx	728	xxxx	xxxxx
Move Cap.:	45	77	316	42	77	369	811	xxxx	xxxxx	702	xxxx	xxxxx
Volume/Cap:	0.34	0.27	0.16	0.57	0.23	0.10	0.02	xxxx	xxxx	0.05	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	0.1	xxxx	xxxxx	0.2	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	9.5	xxxx	xxxxx	10.4	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	*	A	*	*	B	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	112	xxxxx	xxxx	88	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	4.3	xxxxx	xxxxx	4.9	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	103	xxxxx	xxxxx	154	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	F	*	*	F	*	*	*	*	*	*	*
ApproachDel:	102.9			153.8			xxxxxx			xxxxxx		
ApproachLOS:	F			F			*			*		

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #8 US 20/Locust St

Average Delay (sec/veh): 110.6 Worst Case Level Of Service: F[1060.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Stop Sign			Stop Sign			Uncontrolled			Uncontrolled		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 1	0 0	1	1 0	0 1	0	0 0	1! 0	0
Volume Module:2006 - 30th HV												
Base Vol:	5	10	67	106	3	91	128	814	21	14	602	123
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	5	10	67	106	3	91	128	814	21	14	602	123
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	5	11	73	115	3	99	139	885	23	15	654	134
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	5	11	73	115	3	99	139	885	23	15	654	134
Critical Gap Module:												
Critical Gp:	7.2	6.6	6.3	7.2	6.6	6.3	4.2	xxxx	xxxxx	4.2	xxxx	xxxxx
FollowUpTim:	3.6	4.1	3.4	3.6	4.1	3.4	2.3	xxxx	xxxxx	2.3	xxxx	xxxxx
Capacity Module:												
Cnflict Vol:	1990	1993	896	1968	1938	734	788	xxxx	xxxxx	908	xxxx	xxxxx
Potent Cap.:	44	59	333	46	64	413	797	xxxx	xxxxx	718	xxxx	xxxxx
Move Cap.:	27	48	333	25	52	409	797	xxxx	xxxxx	718	xxxx	xxxxx
Volume/Cap:	0.20	0.23	0.22	4.55	0.06	0.24	0.17	xxxx	xxxx	0.02	xxxx	xxxx
Level Of Service Module:												
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	0.9	0.6	xxxx	xxxxx	0.1	xxxx	xxxxx
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	16.6	10.5	xxxx	xxxxx	10.1	xxxx	xxxxx
LOS by Move:	*	*	*	*	*	C	B	*	*	B	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	137	xxxxx	26	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
SharedQueue:	xxxxx	3.5	xxxxx	14.6	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shrd ConDel:	xxxxx	70.0	xxxxx	1933	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
Shared LOS:	*	F	*	F	*	*	*	*	*	*	*	*
ApproachDel:	70.0			1060.8			xxxxxx			xxxxxx		
ApproachLOS:	F			F			*			*		

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #9 OR 126/Creekside Ct

Average Delay (sec/veh): 0.1 Worst Case Level Of Service: B[11.1]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	0	0	0		0	0	1!	0	0		0	1	0	0	0		0	0	0	1	0	
Volume Module:	2006 - 30th HV																							
Base Vol:	0		0		0		1		0		3		7		371		0		0		287		1	
Growth Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
Initial Bse:	0		0		0		1		0		3		7		371		0		0		287		1	
User Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Adj:	0.92	0.92		0.92		0.92	0.92	0.92		0.92		0.92	0.92	0.92		0.92		0.92	0.92	0.92		0.92		0.92
PHF Volume:	0		0		0		1		0		3		8		403		0		0		312		1	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
FinalVolume:	0		0		0		1		0		3		8		403		0		0		312		1	
Critical Gap Module:																								
Critical Gp:	xxxxx	xxxx	xxxxx				6.4	6.5		6.2			4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx						
FollowUpTim:	xxxxx	xxxx	xxxxx				3.5	4.0		3.3			2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx						
Capacity Module:																								
Cnflict Vol:	xxxx	xxxx	xxxxx				731	731		313			313	xxxx	xxxxx	xxxx	xxxx	xxxxx						
Potent Cap.:	xxxx	xxxx	xxxxx				387	348		725			1236	xxxx	xxxxx	xxxx	xxxx	xxxxx						
Move Cap.:	xxxx	xxxx	xxxxx				386	345		725			1236	xxxx	xxxxx	xxxx	xxxx	xxxxx						
Volume/Cap:	xxxx	xxxx	xxxx				0.00	0.00		0.00			0.01	xxxx	xxxx	xxxx	xxxx	xxxx						
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx						
Control Del:	xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				7.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx						
LOS by Move:	*		*		*		*		*		*		A		*		*		*		*		*	
Movement:	LT -	LTR -	RT				LT -	LTR -	RT				LT -	LTR -	RT				LT -	LTR -	RT			
Shared Cap.:	xxxx	xxxx	xxxxx				xxxx	594	xxxxx				xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx						
SharedQueue:	xxxxx	xxxx	xxxxx				xxxxx	0.0	xxxxx				0.0	xxxx	xxxxx	xxxxx	xxxx	xxxxx						
Shrd ConDel:	xxxxx	xxxx	xxxxx				xxxxx	11.1	xxxxx				7.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx						
Shared LOS:	*		*		*		*		B		*		A		*		*		*		*		*	
ApproachDel:	xxxxxx						11.1						xxxxxx						xxxxxx					
ApproachLOS:			*						B						*						*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #10 Barclay Dr/Pine St

Average Delay (sec/veh): 4.2 Worst Case Level Of Service: B[10.5]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	0	1	0	0		0	0	1!	0	0		0	1	0	0	0	
Volume Module:	2006 - 30th HV																							
Base Vol:	53		6		29		0		3		0		2		64		24		22		59		0	
Growth Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
Initial Bse:	53		6		29		0		3		0		2		64		24		22		59		0	
User Adj:	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00		1.00
PHF Adj:	0.92	0.92		0.92		0.92	0.92	0.92		0.92		0.92	0.92	0.92		0.92		0.92	0.92	0.92		0.92		0.92
PHF Volume:	58		7		32		0		3		0		2		70		26		24		64		0	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
FinalVolume:	58		7		32		0		3		0		2		70		26		24		64		0	
Critical Gap Module:																								
Critical Gp:	7.1		6.5		6.2	xxxxx		6.5	xxxxx				4.1	xxxx	xxxxx				4.1	xxxx	xxxxx			
FollowUpTim:	3.5		4.0		3.3	xxxxx		4.0	xxxxx				2.2	xxxx	xxxxx				2.2	xxxx	xxxxx			
Capacity Module:																								
Cnflict Vol:	207		205		89	xxxx		218	xxxxx				64	xxxx	xxxxx				102	xxxx	xxxxx			
Potent Cap.:	749		690		967	xxxx		678	xxxxx				1532	xxxx	xxxxx				1484	xxxx	xxxxx			
Move Cap.:	732		674		962	xxxx		663	xxxxx				1532	xxxx	xxxxx				1477	xxxx	xxxxx			
Volume/Cap:	0.08		0.01		0.03	xxxx		0.00	xxxx				0.00	xxxx	xxxx				0.02	xxxx	xxxx			
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx	xxxxx			xxxx		0.0	xxxxx				0.0	xxxx	xxxxx				0.0	xxxx	xxxxx			
Control Del:	xxxxx	xxxx	xxxxx			xxxxx		10.5	xxxxx				7.4	xxxx	xxxxx				7.5	xxxx	xxxxx			
LOS by Move:	*		*		*	*		B	*				A		*		*		A		*		*	
Movement:	LT -	LTR -	RT			LT -	LTR -	RT				LT -	LTR -	RT				LT -	LTR -	RT				
Shared Cap.:	xxxx	790	xxxxx			xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				xxxx	xxxx	xxxxx				
SharedQueue:	xxxxx	0.4	xxxxx			xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				0.0	xxxx	xxxxx				
Shrd ConDel:	xxxxx	10.2	xxxxx			xxxxx	xxxx	xxxxx				xxxxx	xxxx	xxxxx				7.5	xxxx	xxxxx				
Shared LOS:	*		B		*	*		*	*			*	*		*			A		*		*		
ApproachDel:		10.2					10.5					xxxxxx						xxxxxx						
ApproachLOS:		B					B						*						*					

Note: Queue reported is the number of cars per lane.

Sisters TSP
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Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #11 Barclay Dt/Locust St (Camp Polk Rd)

Average Delay (sec/veh): 3.6 Worst Case Level Of Service: B[12.2]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Uncontrolled				Uncontrolled				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Lanes:	0	1	0	0 0	0	0	0	1 0	0	0	1!	0 0	0	0	0	0 0
Volume Module:2006 - 30th HV																
Base Vol:	53	152		0	0	142		56	72		0	46	0		0	0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	53	152		0	0	142		56	72		0	46	0		0	0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	58	165		0	0	154		61	78		0	50	0		0	0
Reduct Vol:	0	0		0	0	0		0	0		0	0	0		0	0
FinalVolume:	58	165		0	0	154		61	78		0	50	0		0	0
Critical Gap Module:																
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx			6.4		6.5	6.2	xxxxx	xxxx	xxxxx	
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx			3.5		4.0	3.3	xxxxx	xxxx	xxxxx	
Capacity Module:																
Cnflict Vol:	215	xxxx	xxxxx	xxxx	xxxx	xxxxx			465		465	185	xxxx	xxxx	xxxxx	
Potent Cap.:	1349	xxxx	xxxxx	xxxx	xxxx	xxxxx			554		493	855	xxxx	xxxx	xxxxx	
Move Cap.:	1349	xxxx	xxxxx	xxxx	xxxx	xxxxx			535		471	855	xxxx	xxxx	xxxxx	
Volume/Cap:	0.04	xxxx	xxxx	xxxx	xxxx	xxxx			0.15		0.00	0.06	xxxx	xxxx	xxxx	
Level Of Service Module:																
2Way95thQ:	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				
Control Del:	7.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*				
Movement:	LT - LTR - RT				LT - LTR - RT				LT - LTR - RT				LT - LTR - RT			
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	626	xxxxx	xxxx	xxxx	xxxxx				
SharedQueue:	0.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	0.8	xxxxx	xxxxx	xxxx	xxxxx				
Shrd ConDel:	7.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	12.2	xxxxx	xxxxx	xxxx	xxxxx				
Shared LOS:	A	*	*	*	*	*	*	B	*	*	*	*				
ApproachDel:	xxxxxx			xxxxxx				12.2			xxxxxx					
ApproachLOS:	*			*				B			*					

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #12 Main Ave/Elm St

Average Delay (sec/veh): 3.5 Worst Case Level Of Service: B[12.4]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Uncontrolled				Uncontrolled			
Rights:	Include				Include				Include				Include			
Lanes:	0	0	1!	0 0	0	0	1!	0 0	0	0	1!	0 0	0	0	1!	0 0
Volume Module:2006 - 30th HV																
Base Vol:	22	16		30	6	24		2	5	139		35	42	106		13
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	22	16		30	6	24		2	5	139		35	42	106		13
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	24	17		33	7	26		2	5	151		38	46	115		14
Reduct Vol:	0	0		0	0	0		0	0	0		0	0	0		0
FinalVolume:	24	17		33	7	26		2	5	151		38	46	115		14
Critical Gap Module:																
Critical Gp:	7.1	6.5		6.2	7.1	6.5		6.2	4.1	xxxx	xxxxx		4.1	xxxx	xxxxx	
FollowUpTim:	3.5	4.0		3.3	3.5	4.0		3.3	2.2	xxxx	xxxxx		2.2	xxxx	xxxxx	
Capacity Module:																
Cnflict Vol:	409	402		170	420	414		122	129	xxxx	xxxxx		189	xxxx	xxxxx	
Potent Cap.:	557	540		879	548	532		934	1469	xxxx	xxxxx		1397	xxxx	xxxxx	
Move Cap.:	519	520		879	499	512		934	1469	xxxx	xxxxx		1397	xxxx	xxxxx	
Volume/Cap:	0.05	0.03		0.04	0.01	0.05		0.00	0.00	xxxx	xxxx		0.03	xxxx	xxxx	
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx			0.0	xxxx	xxxxx		0.1	xxxx	xxxxx	
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx			7.5	xxxx	xxxxx		7.7	xxxx	xxxxx	
LOS by Move:	*	*	*	*	*	*			A	*	*		A	*	*	
Movement:	LT - LTR - RT				LT - LTR - RT				LT - LTR - RT				LT - LTR - RT			
Shared Cap.:	xxxx	634	xxxxx	xxxx	525	xxxxx			xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx	0.4	xxxxx	xxxxx	0.2	xxxxx			xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shrd ConDel:	xxxxx	11.4	xxxxx	xxxxx	12.4	xxxxx			xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shared LOS:	*	B		*	*	B			*	*	*		*	*	*	
ApproachDel:	11.4				12.4				xxxxxx				xxxxxx			
ApproachLOS:	B				B				*				*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #13 Hood Ave/Elm St

Average Delay (sec/veh): 10.6 Worst Case Level Of Service: B[13.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0			0 0 1! 0 0		
Volume Module:2006 - 30th HV												
Base Vol:	14	40	26	22	38	26	19	208	13	24	181	29
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	14	40	26	22	38	26	19	208	13	24	181	29
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	15	43	28	24	41	28	21	226	14	26	197	32
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	15	43	28	24	41	28	21	226	14	26	197	32
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	70	xxxx	xxxxx	72	xxxx	xxxxx	305	205	55	311	205	58
Potent Cap.:	1544	xxxx	xxxxx	1541	xxxx	xxxxx	651	695	1017	645	695	1014
Move Cap.:	1544	xxxx	xxxxx	1541	xxxx	xxxxx	480	677	1017	463	677	1014
Volume/Cap:	0.01	xxxx	xxxx	0.02	xxxx	xxxx	0.04	0.33	0.01	0.06	0.29	0.03
Level Of Service Module:												
2Way95thQ:	0.0	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.4	xxxx	xxxxx	7.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	667	xxxxx	xxxx	673	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	1.9	xxxxx	xxxxx	1.8	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	13.8	xxxxx	xxxxx	13.6	xxxxx
Shared LOS:	*	*	*	*	*	*	*	B	*	*	B	*
ApproachDel:	xxxxxx			xxxxxx			13.8			13.6		
ApproachLOS:	*			*			B			B		

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #14 E Cascade Ave/Locust St

Average Delay (sec/veh): 4.6 Worst Case Level Of Service: B[14.5]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L - T - R			L - T - R			L - T - R			L - T - R		
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0 1! 0 0			0 0 1! 0 0			0 0 0 0 0			0 1 0 0 1		
Volume Module:2006 - 30th HV												
Base Vol:	18	158	104	46	139	3	0	0	0	88	45	37
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	18	158	104	46	139	3	0	0	0	88	45	37
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	20	172	113	50	151	3	0	0	0	96	49	40
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	20	172	113	50	151	3	0	0	0	96	49	40
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	154	xxxx	xxxxx	285	xxxx	xxxxx	xxxx	xxxx	xxxxx	520	522	228
Potent Cap.:	1438	xxxx	xxxxx	1289	xxxx	xxxxx	xxxx	xxxx	xxxxx	520	462	816
Move Cap.:	1438	xxxx	xxxxx	1289	xxxx	xxxxx	xxxx	xxxx	xxxxx	499	438	816
Volume/Cap:	0.01	xxxx	xxxx	0.04	xxxx	xxxx	xxxx	xxxx	xxxx	0.19	0.11	0.05
Level Of Service Module:												
2Way95thQ:	0.0	xxxx	xxxxx	0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	0.2
Control Del:	7.5	xxxx	xxxxx	7.9	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	9.6
LOS by Move:	A	*	*	A	*	*	*	*	*	*	*	A
Movement:	LT - LTR - RT			LT - LTR - RT			LT - LTR - RT			LT - LTR - RT		
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	476	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	1.3	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	15.8	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	C	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			14.5		
ApproachLOS:	*			*			*			B		

Note: Queue reported is the number of cars per lane.

Sisters TSP
2006 - 30th HV
Factored Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #15 US 20/Buckaroo Trail

Average Delay (sec/veh): 1.0 Worst Case Level Of Service: C[22.2]

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Stop Sign					Stop Sign					Uncontrolled					Uncontrolled				
Rights:	Include					Include					Include					Include				
Lanes:	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	0	1	0	0
Volume Module:2006 30th HV																				
Base Vol:	38		0		11	0		0		0	0		595		41	4		452		0
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	38		0		11	0		0		0	0		595		41	4		452		0
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	41		0		12	0		0		0	0		647		45	4		491		0
Reduct Vol:	0		0		0	0		0		0	0		0		0	0		0		0
FinalVolume:	41		0		12	0		0		0	0		647		45	4		491		0
Critical Gap Module:																				
Critical Gp:	6.4	xxxx			6.2	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				4.1	xxxx	xxxxx			
FollowUpTim:	3.5	xxxx			3.3	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				2.2	xxxx	xxxxx			
Capacity Module:																				
Cnflict Vol:	1147	xxxx			647	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				691	xxxx	xxxxx			
Potent Cap.:	222	xxxx			475	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				913	xxxx	xxxxx			
Move Cap.:	221	xxxx			475	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				913	xxxx	xxxxx			
Volume/Cap:	0.19	xxxx			0.03	xxxx	xxxx	xxxx	xxxx	xxxx	xxxx				0.00	xxxx	xxxx			
Level Of Service Module:																				
2Way95thQ:	0.7	xxxx			0.1	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				0.0	xxxx	xxxxx			
Control Del:	25.0	xxxx			12.8	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				9.0	xxxx	xxxxx			
LOS by Move:	C	*			B	*	*	*	*	*	*				A	*	*			
Movement:	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT	LT	-	LTR	-	RT
Shared Cap.:	xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxxx	xxxx	xxxxx				
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxxx	xxxx	xxxxx				
Shared LOS:	*	*		*	*	*	*	*	*	*	*	*	*	*	*	*				
ApproachDel:	22.2					xxxxxx					xxxxxx					xxxxxx				
ApproachLOS:	C					*					*					*				

Note: Queue reported is the number of cars per lane.

Appendix G: Future Year HCM Output

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #1 OR 242/McKinney Butte Rd

Average Delay (sec/veh): 1.5 Worst Case Level Of Service: B[10.9]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Uncontrolled				Uncontrolled			
Rights:	Include				Include				Include				Include			
Lanes:	0	0	0	0 0	0	0	1!	0 0	0	1	0	0 0	0	0	1	0 1
Volume Module:2030 - 30th HV																
Base Vol:	0	0	0		31	0	30		20	211	0		0	166	72	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	0	0	0		31	0	30		20	211	0		0	166	72	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92	
PHF Volume:	0	0	0		34	0	33		22	229	0		0	180	78	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
FinalVolume:	0	0	0		34	0	33		22	229	0		0	180	78	
Critical Gap Module:																
Critical Gp:	xxxxx	xxxx	xxxxx		6.4	6.5	6.2		4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx		
FollowUpTim:	xxxxx	xxxx	xxxxx		3.5	4.0	3.3		2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx		
Capacity Module:																
Cnflict Vol:	xxxx	xxxx	xxxxx		453	453	180		259	xxxx	xxxxx	xxxx	xxxx	xxxxx		
Potent Cap.:	xxxx	xxxx	xxxxx		568	505	867		1318	xxxx	xxxxx	xxxx	xxxx	xxxxx		
Move Cap.:	xxxx	xxxx	xxxxx		561	497	867		1318	xxxx	xxxxx	xxxx	xxxx	xxxxx		
Volume/Cap:	xxxx	xxxx	xxxx		0.06	0.00	0.04		0.02	xxxx	xxxx	xxxx	xxxx	xxxx		
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		0.1	xxxx	xxxxx	xxxx	xxxx	xxxxx		
Control Del:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		7.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx		
LOS by Move:	*	*	*		*	*	*		A	*	*	*	*	*		
Movement:	LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT	
Shared Cap.:	xxxx	xxxx	xxxxx		xxxx	679	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx	xxxx	xxxxx		xxxxx	0.3	xxxxx		0.1	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shrd ConDel:	xxxxx	xxxx	xxxxx		xxxxx	10.9	xxxxx		7.8	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shared LOS:	*	*	*		*	B	*		A	*	*		*	*	*	
ApproachDel:	xxxxxx				10.9				xxxxxx				xxxxxx			
ApproachLOS:	*				B				*				*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 OR 242/Hood St (OR 242)

Cycle (sec): 100 Critical Vol./Cap.(X): 0.558
Loss Time (sec): 0 (Y+R=4.0 sec) Average Delay (sec/veh): 13.4
Optimal Cycle: 0 Level Of Service: B

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	1	0	0	1 0	1	0	0	1 0	0	0	1!	0 0	0	0	1!	0 0
Volume Module:2030 - 30th HV																
Base Vol:	284	104	26		9	57	147		110	14	183		6	16	6	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	284	104	26		9	57	147		110	14	183		6	16	6	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92	
PHF Volume:	309	113	28		10	62	160		120	15	199		7	17	7	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	309	113	28		10	62	160		120	15	199		7	17	7	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	309	113	28		10	62	160		120	15	199		7	17	7	
Saturation Flow Module:																
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	0.80	0.20		1.00	0.28	0.72		0.36	0.04	0.60		0.21	0.58	0.21	
Final Sat.:	553	489	122		514	169	435		227	29	378		110	293	110	
Capacity Analysis Module:																
Vol/Sat:	0.56	0.23	0.23		0.02	0.37	0.37		0.53	0.53	0.53		0.06	0.06	0.06	
Crit Moves:	****					****			****					****		
Delay/Veh:	16.4	10.1	10.1		9.5	11.4	11.4		13.8	13.8	13.8		9.6	9.6	9.6	
Delay Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	16.4	10.1	10.1		9.5	11.4	11.4		13.8	13.8	13.8		9.6	9.6	9.6	
LOS by Move:	C	B	B		A	B	B		B	B	B		A	A	A	
ApproachDel:	14.4					11.3			13.8					9.6		
Delay Adj:	1.00					1.00			1.00					1.00		
ApprAdjDel:	14.4					11.3			13.8					9.6		
LOS by Appr:	B					B			B					A		
AllWayAvgQ:	1.1	0.3	0.3		0.0	0.5	0.5		0.9	0.9	0.9		0.0	0.0	0.0	

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #3 US 20/Rail Way

Average Delay (sec/veh): 49.5 Worst Case Level Of Service: F[407.5]

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Rights:	Include					Include					Include					Include				
Lanes:	1	0	1	0	0	0	0	1	0	1	1	0	0	0	1	0	0	0	0	0
Volume Module: 2030 - 30th HV																				
Base Vol:	248	1023		0		0	905		93		61		0		242		0		0	
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
Initial Bse:	248	1023		0		0	905		93		61		0		242		0		0	
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00		1.00		1.00		1.00	
PHF Adj:	0.92	0.92		0.92		0.92	0.92		0.92		0.92		0.92		0.92		0.92		0.92	
PHF Volume:	270	1112		0		0	984		101		66		0		263		0		0	
Reduct Vol:	0	0		0		0	0		0		0		0		0		0		0	
FinalVolume:	270	1112		0		0	984		101		66		0		263		0		0	
Critical Gap Module:																				
Critical Gp:	4.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx					6.4	xxxx			6.2	xxxxx	xxxx	xxxxx		
FollowUpTim:	2.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx					3.5	xxxx			3.3	xxxxx	xxxx	xxxxx		
Capacity Module:																				
Cnflict Vol:	1085	xxxx	xxxxx	xxxx	xxxx	xxxxx					2635	xxxx			984	xxxx	xxxx	xxxxx		
Potent Cap.:	614	xxxx	xxxxx	xxxx	xxxx	xxxxx					26	xxxx			300	xxxx	xxxx	xxxxx		
Move Cap.:	614	xxxx	xxxxx	xxxx	xxxx	xxxxx					17	xxxx			300	xxxx	xxxx	xxxxx		
Volume/Cap:	0.44	xxxx	xxxx	xxxx	xxxx	xxxx					3.92	xxxx			0.88	xxxx	xxxx	xxxx		
Level Of Service Module:																				
2Way95thQ:	2.2	xxxx	xxxxx	xxxx	xxxx	xxxxx					9.0	xxxx			7.9	xxxx	xxxx	xxxxx		
Control Del:	15.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx					1773	xxxx			63.3	xxxxx	xxxx	xxxxx		
LOS by Move:	C		*		*		*		*		F		*		F		*		*	
Movement:	LT - LTR - RT					LT - LTR - RT					LT - LTR - RT					LT - LTR - RT				
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx					xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx					xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx					xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx		
Shared LOS:	*		*		*		*		*		*		*		*		*		*	
ApproachDel:	xxxxxx					xxxxxx					407.5					xxxxxx				
ApproachLOS:		*					*				F						*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #4 US 20/Barclay Dr (McKinney Butte)

Average Delay (sec/veh): OVERFLOW Worst Case Level Of Service: F[xxxxx]

Approach:	North Bound					South Bound					East Bound					West Bound				
Movement:	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R	L	-	T	-	R
Control:	Uncontrolled					Uncontrolled					Stop Sign					Stop Sign				
Rights:	Include					Include					Include					Include				
Lanes:	1	0	0	1	0	1	0	1	0	1	1	0	0	1	0	0	1	0	0	1
Volume Module: 2030 - 30th HV																				
Base Vol:	111	876		101		126	940		62		241		36		90	166		108		243
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00		1.00	1.00		1.00		1.00
Initial Bse:	111	876		101		126	940		62		241		36		90	166		108		243
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00		1.00	1.00		1.00		1.00
PHF Adj:	0.92	0.92		0.92		0.92	0.92		0.92		0.92		0.92		0.92	0.92		0.92		0.92
PHF Volume:	121	952		110		137	1022		67		262		39		98	180		117		264
Reduct Vol:	0	0		0		0	0		0		0		0		0	0		0		0
FinalVolume:	121	952		110		137	1022		67		262		39		98	180		117		264
Critical Gap Module:																				
Critical Gp:	4.2	xxxx	xxxxx			4.2	xxxx	xxxxx			7.2		6.6		6.3	7.1		6.5		6.2
FollowUpTim:	2.3	xxxx	xxxxx			2.3	xxxx	xxxxx			3.6		4.1		3.4	3.5		4.0		3.3
Capacity Module:																				
Cnflict Vol:	1089	xxxx	xxxxx	1062	xxxx	xxxxx					2738		2599		1022	2646		2611		1010
Potent Cap.:	612	xxxx	xxxxx	626	xxxx	xxxxx					12		23		277	15		24		289
Move Cap.:	612	xxxx	xxxxx	626	xxxx	xxxxx					0		15		277	0		15		288
Volume/Cap:	0.20	xxxx	xxxx	0.22	xxxx	xxxx					xxxx		2.67		0.35	xxxx		7.79		0.92
Level Of Service Module:																				
2Way95thQ:	0.7	xxxx	xxxxx	0.8	xxxx	xxxxx					xxxx	xxxx	xxxxx			xxxx	xxxx	8.6		
Control Del:	12.3	xxxx	xxxxx	12.3	xxxx	xxxxx					xxxxx	xxxx	xxxxx			xxxxx	xxxx	73.2		
LOS by Move:	B		*	B		*		*		*		*		*		*		F		
Movement:	LT - LTR - RT					LT - LTR - RT					LT - LTR - RT					LT - LTR - RT				
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx					xxxx	xxxx	45			0	xxxx	xxxxx		
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx					xxxxx	xxxx	14.9			xxxxx	xxxx	xxxxx		
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx					xxxxx	xxxx	1101			xxxxx	xxxx	xxxxx		
Shared LOS:	*		*		*		*		*		*		*		F		*		*	
ApproachDel:	xxxxxx					xxxxxx					xxxxxx					xxxxxx				
ApproachLOS:		*					*				F						F			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #5 Cascade Ave (US 20)/Hood St (OR 242)

Average Delay (sec/veh): 11.0 Worst Case Level Of Service: F[145.6]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Uncontrolled						Uncontrolled						Stop Sign						Stop Sign					
Rights:	Include						Include						Include						Include					
Lanes:	1	0	1	0	0		0	0	1	0	1		1	0	0	0	1		0	0	0	0	0	
Volume Module:	2030 - 30th HV																							
Base Vol:	125	1059		0		0	1124		106		26	0		157		0		0		0		0		
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00	1.00		1.00		1.00	
Initial Bse:	125	1059		0		0	1124		106		26	0		157		0		0		0		0		
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00	1.00		1.00		1.00	
PHF Adj:	0.92	0.92		0.92		0.92	0.92		0.92		0.92	0.92		0.92		0.92		0.92	0.92		0.92		0.92	
PHF Volume:	136	1151		0		0	1222		115		28	0		171		0		0		0		0		
Reduct Vol:	0	0		0		0	0		0		0	0		0		0		0		0		0		
FinalVolume:	136	1151		0		0	1222		115		28	0		171		0		0		0		0		
Critical Gap Module:																								
Critical Gp:	4.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx						6.4	xxxx			6.2	xxxxx	xxxx	xxxxx					
FollowUpTim:	2.3	xxxx	xxxxx	xxxxx	xxxx	xxxxx						3.5	xxxx			3.3	xxxxx	xxxx	xxxxx					
Capacity Module:																								
Cnflict Vol:	1337	xxxx	xxxxx		xxxx	xxxx	xxxxx		2645	xxxx		1222		xxxx	xxxx	xxxxx								
Potent Cap.:	491	xxxx	xxxxx		xxxx	xxxx	xxxxx		25	xxxx		217		xxxx	xxxx	xxxxx								
Move Cap.:	491	xxxx	xxxxx		xxxx	xxxx	xxxxx		20	xxxx		217		xxxx	xxxx	xxxxx								
Volume/Cap:	0.28	xxxx	xxxx		xxxx	xxxx	xxxx		1.43	xxxx		0.79		xxxx	xxxx	xxxx								
Level Of Service Module:																								
2Way95thQ:	1.1	xxxx	xxxxx		xxxx	xxxx	xxxxx		3.8	xxxx		5.6		xxxx	xxxx	xxxxx								
Control Del:	15.1	xxxx	xxxxx		xxxxx	xxxx	xxxxx		637.7	xxxx		64.1		xxxxx	xxxx	xxxxx								
LOS by Move:	C		*		*		*		*			F		*		F			*		*			
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx									
SharedQueue:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx									
Shrd ConDel:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx									
Shared LOS:	*		*		*		*		*		*		*		*		*		*		*		*	
ApproachDel:	xxxxxx						xxxxxx						145.6						xxxxxx					
ApproachLOS:			*						*						F						*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #6 Cascade Ave (US 20)/Pine St

Average Delay (sec/veh): OVERFLOW Worst Case Level Of Service: F[xxxxx]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	1	0	0	1		0	0	1!	0	0		0	0	1!	0	0	
Volume Module:	2030 - 30th HV																							
Base Vol:	106		55		58		193		13		172		213		891		179		47		907		46	
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00	1.00		1.00		1.00	
Initial Bse:	106		55		58		193		13		172		213		891		179		47		907		46	
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00		1.00	1.00		1.00		1.00	
PHF Adj:	0.92	0.92		0.92		0.92	0.92		0.92		0.92	0.92		0.92		0.92		0.92	0.92		0.92		0.92	
PHF Volume:	115		60		63		210		14		187		232		968		195		51		986		50	
Reduct Vol:	0		0		0		0		0		0		0		0		0		0		0		0	
FinalVolume:	115		60		63		210		14		187		232		968		195		51		986		50	
Critical Gap Module:																								
Critical Gp:	7.1		6.5		6.2		7.1		6.5		6.2		4.2	xxxx	xxxxx		4.2	xxxx	xxxxx					
FollowUpTim:	3.5		4.0		3.3		3.5		4.0		3.3		2.3	xxxx	xxxxx		2.3	xxxx	xxxxx					
Capacity Module:																								
Cnflict Vol:	2744	2669		1068		2703	2741		1011		1036	xxxx	xxxxx		1165	xxxx	xxxxx							
Potent Cap.:	13		22		268		14		20		290		641	xxxx	xxxxx		572	xxxx	xxxxx					
Move Cap.:	0		12		268		0		11		290		641	xxxx	xxxxx		571	xxxx	xxxxx					
Volume/Cap:	xxxx	5.07		0.24		xxxx	1.34		0.65		0.36	xxxx	xxxx		0.09	xxxx	xxxx							
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx	xxxxx		xxxx	xxxx		4.1		1.6	xxxx	xxxxx		0.3	xxxx	xxxxx								
Control Del:	xxxxx	xxxx	xxxxx		xxxxx	xxxx		37.6		13.8	xxxx	xxxxx		11.9	xxxx	xxxxx								
LOS by Move:	*		*		*		*		E		B		*		B		*							
Movement:	LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT		LT	-	LTR	-	RT	
Shared Cap.:	xxxx		0	xxxxx			0	xxxx	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx							
SharedQueue:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx					
Shrd ConDel:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx					
Shared LOS:	*		*		*		*		*		*		*		*		*		*		*		*	
ApproachDel:	xxxxxx						xxxxxx						xxxxxx						xxxxxx					
ApproachLOS:			F						F						*						*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #7 Cascade Ave (US 20)/Elm St

Average Delay (sec/veh): 23.6 Worst Case Level Of Service: F[564.8]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0		0	0	1!	0	0	
Volume Module:	2030 - 30th HV																							
Base Vol:	5	22		46		13	6		32		10	1001		13		36	812		20					
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00					
Initial Bse:	5	22		46		13	6		32		10	1001		13		36	812		20					
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00					
PHF Adj:	0.92	0.92		0.92		0.92	0.92		0.92		0.92	0.92		0.92		0.92	0.92		0.92					
PHF Volume:	5	24		50		14	7		35		11	1088		14		39	883		22					
Reduct Vol:	0	0		0		0	0		0		0	0		0		0	0		0					
FinalVolume:	5	24		50		14	7		35		11	1088		14		39	883		22					
Critical Gap Module:																								
Critical Gp:	7.1	6.5		6.2		7.1	6.5		6.2		4.2	xxxx	xxxxx			4.2	xxxx	xxxxx						
FollowUpTim:	3.5	4.0		3.3		3.5	4.0		3.3		2.3	xxxx	xxxxx			2.3	xxxx	xxxxx						
Capacity Module:																								
Cnflict Vol:	2205	2195		1159		2202	2192		1001		958	xxxx	xxxxx			1144	xxxx	xxxxx						
Potent Cap.:	31	44		236		32	45		293		686	xxxx	xxxxx			582	xxxx	xxxxx						
Move Cap.:	20	37		224		11	38		267		655	xxxx	xxxxx			562	xxxx	xxxxx						
Volume/Cap:	0.27	0.64		0.22		1.33	0.17		0.13		0.02	xxxx	xxxx			0.07	xxxx	xxxx						
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx		xxxxx		xxxx	xxxx		xxxxx		0.1	xxxx	xxxxx			0.2	xxxx	xxxxx						
Control Del:	xxxxx	xxxx		xxxxx		xxxxx	xxxx		xxxxx		10.6	xxxx	xxxxx			11.9	xxxx	xxxxx						
LOS by Move:	*	*		*		*	*		*		B	*	*			B	*	*						
Movement:	LT -	LTR -		RT		LT -	LTR -		RT		LT -	LTR -		RT		LT -	LTR -		RT					
Shared Cap.:	xxxx	70		xxxxx		xxxx	34		xxxxx		xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx						
SharedQueue:	xxxxx	6.0		xxxxx		xxxxx	6.1		xxxxx		xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx						
Shrd ConDel:	xxxxx	249		xxxxx		xxxxx	565		xxxxx		xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx						
Shared LOS:	*	F		*		*	F		*		*	*		*		*	*		*						
ApproachDel:	248.8					564.8					xxxxxx					xxxxxx								
ApproachLOS:	F					F					*					*								

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #8 US 20/Locust St

Average Delay (sec/veh): OVERFLOW Worst Case Level Of Service: F[xxxxx]

Approach:	North Bound						South Bound						East Bound						West Bound					
Movement:	L	-	T	-	R		L	-	T	-	R		L	-	T	-	R		L	-	T	-	R	
Control:	Stop Sign						Stop Sign						Uncontrolled						Uncontrolled					
Rights:	Include						Include						Include						Include					
Lanes:	0	0	1!	0	0		0	1	0	0	1		1	0	0	1	0		0	0	1!	0	0	
Volume Module:	2030 - 30th HV																							
Base Vol:	35	47		72		577	3		57		201	992		7		41	916		317					
Growth Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00					
Initial Bse:	35	47		72		577	3		57		201	992		7		41	916		317					
User Adj:	1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00		1.00	1.00		1.00					
PHF Adj:	0.92	0.92		0.92		0.92	0.92		0.92		0.92	0.92		0.92		0.92	0.92		0.92					
PHF Volume:	38	51		78		627	3		62		218	1078		8		45	996		345					
Reduct Vol:	0	0		0		0	0		0		0	0		0		0	0		0					
FinalVolume:	38	51		78		627	3		62		218	1078		8		45	996		345					
Critical Gap Module:																								
Critical Gp:	7.2	6.6		6.3		7.2	6.6		6.3		4.2	xxxx	xxxxx			4.2	xxxx	xxxxx						
FollowUpTim:	3.6	4.1		3.4		3.6	4.1		3.4		2.3	xxxx	xxxxx			2.3	xxxx	xxxxx						
Capacity Module:																								
Cnflict Vol:	2822	2948		1082		2841	2780		1181		1340	xxxx	xxxxx			1086	xxxx	xxxxx						
Potent Cap.:	11	14		260		11	18		227		489	xxxx	xxxxx			613	xxxx	xxxxx						
Move Cap.:	4	7		260		0	9		225		489	xxxx	xxxxx			613	xxxx	xxxxx						
Volume/Cap:	10.42	7.02		0.30		xxxx	0.35		0.28		0.45	xxxx	xxxx			0.07	xxxx	xxxx						
Level Of Service Module:																								
2Way95thQ:	xxxx	xxxx		xxxxx		xxxx	xxxx		1.1		2.3	xxxx	xxxxx			0.2	xxxx	xxxxx						
Control Del:	xxxxx	xxxx		xxxxx		xxxxx	xxxx		27.0		18.2	xxxx	xxxxx			11.3	xxxx	xxxxx						
LOS by Move:	*	*		*		*	*		D		C	*	*			B	*	*						
Movement:	LT -	LTR -		RT		LT -	LTR -		RT		LT -	LTR -		RT		LT -	LTR -		RT					
Shared Cap.:	xxxx	9		xxxxx		0	xxxx		xxxxx		xxxx	xxxx	xxxxx			xxxx	xxxx	xxxxx						
SharedQueue:	xxxxx	22.5		xxxxx		xxxxx	xxxx		xxxxx		xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx						
Shrd ConDel:	xxxxx	8306		xxxxx		xxxxx	xxxx		xxxxx		xxxxx	xxxx	xxxxx			xxxxx	xxxx	xxxxx						
Shared LOS:	*	F		*		*	*		*		*	*		*		*	*		*						
ApproachDel:	8306.2					xxxxxx					xxxxxx					xxxxxx								
ApproachLOS:	F					F					*					*								

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #9 OR 126/Creekside Ct

Average Delay (sec/veh): 1.0 Worst Case Level Of Service: C[16.0]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Uncontrolled				Uncontrolled			
Rights:	Include				Include				Include				Include			
Lanes:	0	0	0	0 0	0	0	1!	0 0	0	1	0	0 0	0	0	0	1 0
Volume Module:2030 - 30th HV																
Base Vol:	0	0	0		13	0	46		29	557	0		0	482	22	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	0	0	0		13	0	46		29	557	0		0	482	22	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92	
PHF Volume:	0	0	0		14	0	50		32	605	0		0	524	24	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
FinalVolume:	0	0	0		14	0	50		32	605	0		0	524	24	
Critical Gap Module:																
Critical Gp:	xxxxx	xxxx	xxxxx		6.4	6.5	6.2		4.1	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
FollowUpTim:	xxxxx	xxxx	xxxxx		3.5	4.0	3.3		2.2	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Capacity Module:																
Cnflict Vol:	xxxx	xxxx	xxxxx		1204	1204	536		548	xxxx	xxxxx		xxxx	xxxx	xxxxx	
Potent Cap.:	xxxx	xxxx	xxxxx		202	183	543		1012	xxxx	xxxxx		xxxx	xxxx	xxxxx	
Move Cap.:	xxxx	xxxx	xxxxx		197	177	543		1012	xxxx	xxxxx		xxxx	xxxx	xxxxx	
Volume/Cap:	xxxx	xxxx	xxxx		0.07	0.00	0.09		0.03	xxxx	xxxx		xxxx	xxxx	xxxx	
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		0.1	xxxx	xxxxx		xxxx	xxxx	xxxxx	
Control Del:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		8.7	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
LOS by Move:	*	*	*		*	*	*		A	*	*		*	*	*	
Movement:	LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT	
Shared Cap.:	xxxx	xxxx	xxxxx		xxxx	392	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx	xxxx	xxxxx		xxxxx	0.6	xxxxx		0.1	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shrd ConDel:	xxxxx	xxxx	xxxxx		xxxxx	16.0	xxxxx		8.7	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shared LOS:	*	*	*		*	C	*		A	*	*		*	*	*	
ApproachDel:	xxxxxx				16.0				xxxxxx				xxxxxx			
ApproachLOS:	*				C				*				*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #10 Barclay Dr/Pine St

Average Delay (sec/veh): 7.8 Worst Case Level Of Service: C[19.8]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Uncontrolled				Uncontrolled			
Rights:	Include				Include				Include				Include			
Lanes:	0	0	1!	0 0	0	0	1!	0 0	0	0	1!	0 0	0	1	0	0 0
Volume Module:2030 - 30th HV																
Base Vol:	90	28	90		4	51	97		9	138	47		19	240	0	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	90	28	90		4	51	97		9	138	47		19	240	0	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92	
PHF Volume:	98	30	98		4	55	105		10	150	51		21	261	0	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
FinalVolume:	98	30	98		4	55	105		10	150	51		21	261	0	
Critical Gap Module:																
Critical Gp:	7.1	6.5	6.2		7.1	6.5	6.2		4.1	xxxx	xxxxx		4.1	xxxx	xxxxx	
FollowUpTim:	3.5	4.0	3.3		3.5	4.0	3.3		2.2	xxxx	xxxxx		2.2	xxxx	xxxxx	
Capacity Module:																
Cnflict Vol:	584	503	182		561	529	261		261	xxxx	xxxxx		207	xxxx	xxxxx	
Potent Cap.:	422	469	858		436	454	775		1298	xxxx	xxxxx		1358	xxxx	xxxxx	
Move Cap.:	322	456	854		360	441	775		1298	xxxx	xxxxx		1351	xxxx	xxxxx	
Volume/Cap:	0.30	0.07	0.11		0.01	0.13	0.14		0.01	xxxx	xxxx		0.02	xxxx	xxxx	
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx		0.0	xxxx	xxxxx		0.0	xxxx	xxxxx	
Control Del:	xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx		7.8	xxxx	xxxxx		7.7	xxxx	xxxxx	
LOS by Move:	*	*	*		*	*	*		A	*	*		A	*	*	
Movement:	LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT		LT -	LTR -	RT	
Shared Cap.:	xxxx	466	xxxxx		xxxx	604	xxxxx		xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx	2.6	xxxxx		xxxxx	1.1	xxxxx		xxxxx	xxxx	xxxxx		0.0	xxxx	xxxxx	
Shrd ConDel:	xxxxx	19.8	xxxxx		xxxxx	13.2	xxxxx		xxxxx	xxxx	xxxxx		7.7	xxxx	xxxxx	
Shared LOS:	*	C	*		*	B	*		*	*	*		A	*	*	
ApproachDel:	19.8				13.2				xxxxxx				xxxxxx			
ApproachLOS:	C				B				*				*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #11 Barclay Dt/Locust St (Camp Polk Rd)

Average Delay (sec/veh): 7.2 Worst Case Level Of Service: E[36.6]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Uncontrolled				Uncontrolled				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Lanes:	0	1	0	0 0	0	0	0	1 0	0	0	1!	0 0	0	0	0	0 0
Volume Module:2030 - 30th HV																
Base Vol:	127	350		0	0	379		196	69		0	149	0		0	0
Growth Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	1.00
Initial Bse:	127	350		0	0	379		196	69		0	149	0		0	0
User Adj:	1.00	1.00		1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	1.00
PHF Adj:	0.92	0.92		0.92	0.92	0.92		0.92	0.92		0.92	0.92	0.92		0.92	0.92
PHF Volume:	138	380		0	0	412		213	75		0	162	0		0	0
Reduct Vol:	0	0		0	0	0		0	0		0	0	0		0	0
FinalVolume:	138	380		0	0	412		213	75		0	162	0		0	0
Critical Gap Module:																
Critical Gp:	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx			6.4		6.5	6.2	xxxxx	xxxx	xxxxx	
FollowUpTim:	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx			3.5		4.0	3.3	xxxxx	xxxx	xxxxx	
Capacity Module:																
Cnflict Vol:	625	xxxx	xxxxx	xxxx	xxxx	xxxxx			1175		1175	518	xxxx	xxxx	xxxxx	
Potent Cap.:	952	xxxx	xxxxx	xxxx	xxxx	xxxxx			211		191	555	xxxx	xxxx	xxxxx	
Move Cap.:	952	xxxx	xxxxx	xxxx	xxxx	xxxxx			185		161	555	xxxx	xxxx	xxxxx	
Volume/Cap:	0.15	xxxx	xxxx	xxxx	xxxx	xxxx			0.40		0.00	0.29	xxxx	xxxx	xxxx	
Level Of Service Module:																
2Way95thQ:	0.5	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx				
Control Del:	9.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx				
LOS by Move:	A	*	*	*	*	*	*	*	*	*	*	*				
Movement:	LT - LTR - RT				LT - LTR - RT				LT - LTR - RT				LT - LTR - RT			
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	340	xxxxx	xxxx	xxxx	xxxxx				
SharedQueue:	0.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	5.0	xxxxx	xxxxx	xxxx	xxxxx				
Shrd ConDel:	9.4	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	36.6	xxxxx	xxxxx	xxxx	xxxxx				
Shared LOS:	A	*	*	*	*	*	*	E	*	*	*	*				
ApproachDel:	xxxxxx			xxxxxx				36.6			xxxxxx					
ApproachLOS:	*			*				E			*					

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #12 Main Ave/Elm St

Average Delay (sec/veh): 3.1 Worst Case Level Of Service: B[12.8]

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	-	T	- R	L	-	T	- R	L	-	T	- R	L	-	T	- R
Control:	Stop Sign				Stop Sign				Uncontrolled				Uncontrolled			
Rights:	Include				Include				Include				Include			
Lanes:	0	0	1!	0 0	0	0	1!	0 0	0	0	1!	0 0	0	0	1!	0 0
Volume Module:2030 - 30th HV																
Base Vol:	19		36	34	2		21	1	8		132	37	27		162	57
Growth Adj:	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Initial Bse:	19		36	34	2		21	1	8		132	37	27		162	57
User Adj:	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
PHF Adj:	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92
PHF Volume:	21		39	37	2		23	1	9		143	40	29		176	62
Reduct Vol:	0		0	0	0		0	0	0		0	0	0		0	0
FinalVolume:	21		39	37	2		23	1	9		143	40	29		176	62
Critical Gap Module:																
Critical Gp:	7.1		6.5	6.2	7.1		6.5	6.2	4.1	xxxx	xxxxx		4.1	xxxx	xxxxx	
FollowUpTim:	3.5		4.0	3.3	3.5		4.0	3.3	2.2	xxxx	xxxxx		2.2	xxxx	xxxxx	
Capacity Module:																
Cnflict Vol:	459		478	164	485		467	207	238	xxxx	xxxxx		184	xxxx	xxxxx	
Potent Cap.:	516		490	886	496		497	838	1341	xxxx	xxxxx		1403	xxxx	xxxxx	
Move Cap.:	486		476	886	436		483	838	1341	xxxx	xxxxx		1403	xxxx	xxxxx	
Volume/Cap:	0.04		0.08	0.04	0.00		0.05	0.00	0.01	xxxx	xxxx		0.02	xxxx	xxxx	
Level Of Service Module:																
2Way95thQ:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx			0.0	xxxx	xxxxx		0.1	xxxx	xxxxx	
Control Del:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx			7.7	xxxx	xxxxx		7.6	xxxx	xxxxx	
LOS by Move:	*	*	*	*	*	*			A	*	*		A	*	*	
Movement:	LT - LTR - RT				LT - LTR - RT				LT - LTR - RT				LT - LTR - RT			
Shared Cap.:	xxxx	581	xxxxx	xxxx	487	xxxxx			xxxx	xxxx	xxxxx		xxxx	xxxx	xxxxx	
SharedQueue:	xxxxx	0.6	xxxxx	xxxxx	0.2	xxxxx			xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shrd ConDel:	xxxxx	12.4	xxxxx	xxxxx	12.8	xxxxx			xxxxx	xxxx	xxxxx		xxxxx	xxxx	xxxxx	
Shared LOS:	*	B	*	*	B	*			*	*	*		*	*	*	
ApproachDel:	12.4			12.8					xxxxxx				xxxxxx			
ApproachLOS:	B			B					*				*			

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #13 Hood Ave/Elm St

Average Delay (sec/veh): 15.7 Worst Case Level Of Service: C[20.8]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0	0 0	1! 0	0
Volume Module:2006 - 30th HV												
Base Vol:	33	37	80	11	21	24	20	321	34	28	269	28
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	33	37	80	11	21	24	20	321	34	28	269	28
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	36	40	87	12	23	26	22	349	37	30	292	30
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	36	40	87	12	23	26	22	349	37	30	292	30
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	7.1	6.5	6.2	7.1	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	3.5	4.0	3.3	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	49	xxxx	xxxxx	127	xxxx	xxxxx	377	259	36	408	228	84
Potent Cap.:	1571	xxxx	xxxxx	1471	xxxx	xxxxx	584	649	1043	557	675	981
Move Cap.:	1571	xxxx	xxxxx	1471	xxxx	xxxxx	360	629	1043	295	654	981
Volume/Cap:	0.02	xxxx	xxxx	0.01	xxxx	xxxx	0.06	0.55	0.04	0.10	0.45	0.03
Level Of Service Module:												
2Way95thQ:	0.1	xxxx	xxxxx	0.0	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx
Control Del:	7.3	xxxx	xxxxx	7.5	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx
LOS by Move:	A	*	*	A	*	*	*	*	*	*	*	*
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	626	xxxxx	xxxx	607	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	4.8	xxxxx	xxxxx	3.7	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	20.8	xxxxx	xxxxx	18.8	xxxxx
Shared LOS:	*	*	*	*	*	*	*	C	*	*	C	*
ApproachDel:	xxxxxx			xxxxxx			20.8			18.8		
ApproachLOS:	*			*			C			C		

Note: Queue reported is the number of cars per lane.

Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM Unsignalized Method (Base Volume Alternative)

Intersection #14 E Cascade Ave/Locust St

Average Delay (sec/veh): 14.6 Worst Case Level Of Service: F[113.6]

Approach:	North Bound			South Bound			East Bound			West Bound		
Movement:	L -	T -	R	L -	T -	R	L -	T -	R	L -	T -	R
Control:	Uncontrolled			Uncontrolled			Stop Sign			Stop Sign		
Rights:	Include			Include			Include			Include		
Lanes:	0 0	1! 0	0	0 0	1! 0	0	0 0	0 0	0	0 1	0 0	1
Volume Module:2030 - 30th HV												
Base Vol:	73	374	137	81	588	6	0	0	0	74	40	58
Growth Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Initial Bse:	73	374	137	81	588	6	0	0	0	74	40	58
User Adj:	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PHF Adj:	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
PHF Volume:	79	407	149	88	639	7	0	0	0	80	43	63
Reduct Vol:	0	0	0	0	0	0	0	0	0	0	0	0
FinalVolume:	79	407	149	88	639	7	0	0	0	80	43	63
Critical Gap Module:												
Critical Gp:	4.1	xxxx	xxxxx	4.1	xxxx	xxxxx	xxxxx	xxxx	xxxxx	6.4	6.5	6.2
FollowUpTim:	2.2	xxxx	xxxxx	2.2	xxxx	xxxxx	xxxxx	xxxx	xxxxx	3.5	4.0	3.3
Capacity Module:												
Cnflict Vol:	646	xxxx	xxxxx	555	xxxx	xxxxx	xxxx	xxxx	xxxxx	1458	1461	481
Potent Cap.:	949	xxxx	xxxxx	1025	xxxx	xxxxx	xxxx	xxxx	xxxxx	144	130	589
Move Cap.:	949	xxxx	xxxxx	1025	xxxx	xxxxx	xxxx	xxxx	xxxxx	125	108	589
Volume/Cap:	0.08	xxxx	xxxx	0.09	xxxx	xxxx	xxxx	xxxx	xxxx	0.64	0.40	0.11
Level Of Service Module:												
2Way95thQ:	0.3	xxxx	xxxxx	0.3	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	0.4
Control Del:	9.1	xxxx	xxxxx	8.8	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	11.8
LOS by Move:	A	*	*	A	*	*	*	*	*	*	*	B
Movement:	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT	LT -	LTR -	RT
Shared Cap.:	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	xxxx	xxxx	xxxxx	119	xxxx	xxxxx
SharedQueue:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	7.2	xxxx	xxxxx
Shrd ConDel:	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	xxxxx	xxxx	xxxxx	165.3	xxxx	xxxxx
Shared LOS:	*	*	*	*	*	*	*	*	*	F	*	*
ApproachDel:	xxxxxx			xxxxxx			xxxxxx			113.6		
ApproachLOS:	*			*			*			F		

Note: Queue reported is the number of cars per lane.

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	26	425	477	27	146	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	28	462	518	29	159	16
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	548				1052	533
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	548				1052	533
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				35	97
cM capacity (veh/h)	1022				244	547

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	490	548	175
Volume Left	28	0	159
Volume Right	0	29	16
cSH	1022	1700	257
Volume to Capacity	0.03	0.32	0.68
Queue Length 95th (ft)	2	0	111
Control Delay (s)	0.8	0.0	44.3
Lane LOS	A		E
Approach Delay (s)	0.8	0.0	44.3
Approach LOS			E

Intersection Summary			
Average Delay		6.7	
Intersection Capacity Utilization		62.2%	ICU Level of Service B
Analysis Period (min)		15	

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	18	212	166	84	31	30
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	230	180	91	34	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	272				450	180
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	272				450	180
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				94	96
cM capacity (veh/h)	1292				558	862

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	250	180	91	66
Volume Left	20	0	0	34
Volume Right	0	0	91	33
cSH	1292	1700	1700	675
Volume to Capacity	0.02	0.11	0.05	0.10
Queue Length 95th (ft)	1	0	0	8
Control Delay (s)	0.7	0.0	0.0	10.9
Lane LOS	A			B
Approach Delay (s)	0.7	0.0		10.9
Approach LOS				B

Intersection Summary			
Average Delay		1.5	
Intersection Capacity Utilization		35.8%	ICU Level of Service A
Analysis Period (min)		15	

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	936	92	185	652	53	31
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1017	100	201	709	58	34
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type					TWLTL	
Median storage veh)					1	
Upstream signal (ft)	563					
pX, platoon unblocked			0.92		0.92	0.92
vC, conflicting volume			1117		1774	509
vC1, stage 1 conf vol					1017	
vC2, stage 2 conf vol					757	
vCu, unblocked vol			1037		1753	373
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.3
p0 queue free %			67		64	94
cM capacity (veh/h)			610		158	572

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1
Volume Total	509	509	100	201	354	354	91
Volume Left	0	0	0	201	0	0	58
Volume Right	0	0	100	0	0	0	34
cSH	1700	1700	1700	610	1700	1700	251
Volume to Capacity	0.30	0.30	0.06	0.33	0.21	0.21	0.36
Queue Length 95th (ft)	0	0	0	36	0	0	40
Control Delay (s)	0.0	0.0	0.0	13.8	0.0	0.0	29.7
Lane LOS				B			D
Approach Delay (s)	0.0			3.0			29.7
Approach LOS							D

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	138	0	1072	900	123
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	150	0	1165	978	134
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)				1136		
pX, platoon unblocked	0.80					
vC, conflicting volume	2143	978	1112			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2423	978	1112			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	51	100			
cM capacity (veh/h)	29	304	628			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	150	1165	978	134
Volume Left	0	0	0	0
Volume Right	150	0	0	134
cSH	304	1700	1700	1700
Volume to Capacity	0.49	0.69	0.58	0.08
Queue Length 95th (ft)	65	0	0	0
Control Delay (s)	27.9	0.0	0.0	0.0
Lane LOS	D			
Approach Delay (s)	27.9	0.0	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	65.7%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	12	74	378	411	783	51
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	13	80	411	447	851	55
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL					
Median storage veh)	1					
Upstream signal (ft)					874	
pX, platoon unblocked	0.85	0.85	0.85			
vC, conflicting volume	2147	453	851			
vC1, stage 1 conf vol	879					
vC2, stage 2 conf vol	1268					
vCu, unblocked vol	2173	181	649			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	89	48			
cM capacity (veh/h)	83	706	793			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	13	80	411	447	567	339
Volume Left	13	0	411	0	0	0
Volume Right	0	80	0	0	0	55
cSH	83	706	793	1700	1700	1700
Volume to Capacity	0.16	0.11	0.52	0.26	0.33	0.20
Queue Length 95th (ft)	13	10	76	0	0	0
Control Delay (s)	56.0	10.8	14.3	0.0	0.0	0.0
Lane LOS	F	B	B			
Approach Delay (s)	17.1		6.9		0.0	
Approach LOS	C					

Intersection Summary				
Average Delay		4.0		
Intersection Capacity Utilization		60.0%	ICU Level of Service	B
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	*0.80	*0.80	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1676	1765	1500	1676	1765	1354	1676	1765	1500	2400	2803	
Flt Permitted	0.32	1.00	1.00	0.59	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	564	1765	1500	1035	1765	1354	1676	1765	1500	2400	2803	
Volume (vph)	197	225	156	41	232	575	102	300	30	397	610	31
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	214	245	170	45	252	625	111	326	33	432	663	34
RTOR Reduction (vph)	0	0	123	0	0	0	0	0	25	0	4	0
Lane Group Flow (vph)	214	245	47	45	252	625	111	326	8	432	693	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	13%	2%	2%	2%	14%	2%	2%
Turn Type	pm+pt		Perm	pm+pt		Free	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		Free			2			
Actuated Green, G (s)	29.2	21.3	21.3	20.9	17.0	77.6	7.1	19.2	19.2	17.2	29.3	
Effective Green, g (s)	29.2	21.3	21.3	20.9	17.0	77.6	7.1	19.2	19.2	17.2	29.3	
Actuated g/C Ratio	0.38	0.27	0.27	0.27	0.22	1.00	0.09	0.25	0.25	0.22	0.38	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	330	484	412	311	387	1354	153	437	371	532	1058	
v/s Ratio Prot	c0.07	0.14		0.01	0.14		0.07	c0.18		c0.18	0.25	
v/s Ratio Perm	c0.18		0.03	0.03		c0.46			0.01			
v/c Ratio	0.65	0.51	0.11	0.14	0.65	0.46	0.73	0.75	0.02	0.81	0.66	
Uniform Delay, d1	18.1	23.7	21.1	21.3	27.6	0.0	34.3	26.9	22.1	28.7	20.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.3	0.8	0.1	0.2	3.9	1.1	15.7	6.8	0.0	9.2	1.5	
Delay (s)	22.4	24.6	21.2	21.5	31.5	1.1	50.0	33.8	22.1	37.8	21.4	
Level of Service	C	C	C	C	C	A	D	C	C	D	C	
Approach Delay (s)		22.9			10.4			36.8			27.7	
Approach LOS		C			B			D			C	

Intersection Summary				
HCM Average Control Delay		23.1	HCM Level of Service	C
HCM Volume to Capacity ratio		0.67		
Actuated Cycle Length (s)		77.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization		66.4%	ICU Level of Service	C
Analysis Period (min)		15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	138	708	96	121	475	67	0	0	182	0	0	297
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	150	770	104	132	516	73	0	0	198	0	0	323
Pedestrians		50			50							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		4			4							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	589			874			2274	1974	872	2133	1990	603
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	589			874			2274	1974	872	2133	1990	603
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	85			83			100	100	41	100	100	33
cM capacity (veh/h)	986			772			7	44	335	11	43	478

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	150	874	132	589	198	323
Volume Left	150	0	132	0	0	0
Volume Right	0	104	0	73	198	323
cSH	986	1700	772	1700	335	478
Volume to Capacity	0.15	0.51	0.17	0.35	0.59	0.67
Queue Length 95th (ft)	13	0	15	0	89	124
Control Delay (s)	9.3	0.0	10.6	0.0	30.0	26.8
Lane LOS	A		B		D	D
Approach Delay (s)	1.4		1.9		30.0	26.8
Approach LOS					D	D

Intersection Summary				
Average Delay		7.7		
Intersection Capacity Utilization		68.0%	ICU Level of Service	C
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	761	69	88	545	10	8	9	41	11	15	43
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	23	827	75	96	592	11	9	10	45	12	16	47
Pedestrians		50			50							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		4			4							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	603			902			1804	1705	915	1799	1737	648
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	603			902			1804	1705	915	1799	1737	648
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			87			78	87	86	71	78	90
cM capacity (veh/h)	974			753			39	78	317	41	74	451

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	925	699	63	75
Volume Left	23	96	9	12
Volume Right	75	11	45	47
cSH	974	753	129	122
Volume to Capacity	0.02	0.13	0.49	0.61
Queue Length 95th (ft)	2	11	56	78
Control Delay (s)	0.6	3.2	57.1	72.9
Lane LOS	A	A	F	F
Approach Delay (s)	0.6	3.2	57.1	72.9
Approach LOS			F	F

Intersection Summary				
Average Delay		6.8		
Intersection Capacity Utilization		97.8%	ICU Level of Service	F
Analysis Period (min)		15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.97	
Frpb, ped/bikes	1.00	1.00	1.00	0.96	0.94	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.96	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1676	3353	1765	1329	2815	
Flt Permitted	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	1676	3353	1765	1329	2815	
Volume (vph)	204	856	320	757	390	160
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	222	930	348	823	424	174
RTOR Reduction (vph)	0	0	0	67	55	0
Lane Group Flow (vph)	222	930	348	756	543	0
Confl. Peds. (#/hr)				50		100
Heavy Vehicles (%)	2%	2%	2%	10%	10%	2%
Turn Type	Prot			pm+ov		
Protected Phases	7	4	8	2	2	
Permitted Phases				8		
Actuated Green, G (s)	14.1	37.7	19.6	50.2	30.6	
Effective Green, g (s)	14.1	37.7	19.6	50.2	30.6	
Actuated g/C Ratio	0.18	0.49	0.26	0.66	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	310	1657	453	944	1129	
v/s Ratio Prot	c0.13	0.28	0.20	c0.32	0.19	
v/s Ratio Perm				0.25		
v/c Ratio	0.72	0.56	0.77	0.80	0.48	
Uniform Delay, d1	29.2	13.5	26.2	9.4	17.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.7	0.4	7.7	4.9	0.3	
Delay (s)	36.9	13.9	33.9	14.4	17.3	
Level of Service	D	B	C	B	B	
Approach Delay (s)		18.4	20.2		17.3	
Approach LOS		B	C		B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	76.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	5	149	47	31	100	19	9	20	34	5	26	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	162	51	34	109	21	10	22	37	5	28	3
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	129			213			402	395	188	433	410	119
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	129			213			402	395	188	433	410	119
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			98	96	96	99	95	100
cM capacity (veh/h)	1456			1357			522	526	855	483	516	933

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	218	163	68	37
Volume Left	5	34	10	5
Volume Right	51	21	37	3
cSH	1456	1357	663	532
Volume to Capacity	0.00	0.02	0.10	0.07
Queue Length 95th (ft)	0	2	9	6
Control Delay (s)	0.2	1.8	11.1	12.3
Lane LOS	A	A	B	B
Approach Delay (s)	0.2	1.8	11.1	12.3
Approach LOS			B	B

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	15	188	37	90	134	14	17	36	63	23	129	34
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	204	40	98	146	15	18	39	68	25	140	37
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	407	353	159	461	338	73	177			108		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	407	353	159	461	338	73	177			108		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	96	63	95	71	74	98	99			98		
cM capacity (veh/h)	428	555	887	340	566	988	1399			1483		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	261	259	126	202
Volume Left	16	98	18	25
Volume Right	40	15	68	37
cSH	577	462	1399	1483
Volume to Capacity	0.45	0.56	0.01	0.02
Queue Length 95th (ft)	58	84	1	1
Control Delay (s)	16.3	22.3	1.2	1.0
Lane LOS	C	C	A	A
Approach Delay (s)	16.3	22.3	1.2	1.0
Approach LOS	C	C		

Intersection Summary				
Average Delay		12.2		
Intersection Capacity Utilization	50.9%	ICU Level of Service	A	
Analysis Period (min)		15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	2	2	12	5	5	142	0	887	74	247	533	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	2	2	13	5	5	154	0	964	80	268	579	11
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)						4						
Median type		None			None							
Median storage veh)												
Upstream signal (ft)								420				
pX, platoon unblocked												
vC, conflicting volume	2206	2166	585	2135	2132	1004	590			1045		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2206	2166	585	2135	2132	1004	590			1045		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	76	92	97	76	82	47	100			60		
cM capacity (veh/h)	9	28	511	23	30	293	985			666		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	17	165	1045	268	590
Volume Left	2	5	0	268	0
Volume Right	13	154	80	0	11
cSH	50	314	1700	666	1700
Volume to Capacity	0.35	0.53	0.61	0.40	0.35
Queue Length 95th (ft)	31	72	0	49	0
Control Delay (s)	110.3	42.6	0.0	14.0	0.0
Lane LOS	F	E		B	
Approach Delay (s)	110.3	42.6	0.0	4.4	
Approach LOS	F	E			

Intersection Summary				
Average Delay		6.1		
Intersection Capacity Utilization	81.8%	ICU Level of Service	D	
Analysis Period (min)		15		

HCM Unsignalized Intersection Capacity Analysis
Intersection #8264: Barclay Dr & Pine St

Sisters TSP Update
2030 30HV Barclay-Locust Alternate Route

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	33	550	58	105	752	6	6	11	6	4	33	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	36	598	63	114	817	7	7	12	7	4	36	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	824			661			1785	1753	629	1731	1782	821
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	824			661			1785	1753	629	1731	1782	821
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			88			79	83	99	92	48	94
cM capacity (veh/h)	806			927			31	71	482	52	69	375

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	36	661	114	824	7	18	4	57
Volume Left	36	0	114	0	7	0	4	0
Volume Right	0	63	0	7	0	7	0	21
cSH	806	1700	927	1700	31	102	52	98
Volume to Capacity	0.04	0.39	0.12	0.48	0.21	0.18	0.08	0.58
Queue Length 95th (ft)	3	0	10	0	16	16	7	67
Control Delay (s)	9.7	0.0	9.4	0.0	148.4	47.8	80.0	83.1
Lane LOS	A		A		F	E	F	F
Approach Delay (s)	0.5		1.1		74.1		82.9	
Approach LOS					F		F	

Intersection Summary				
Average Delay		4.8		
Intersection Capacity Utilization		60.8%	ICU Level of Service	B
Analysis Period (min)		15		


```
Sisters TSP - Alt 6 Locust Barclay Alt Route
Locust/Barclay
Intersection ID:

aaTraffic SIDRA US Highway Capacity Manual (2000) Version


Table S.15 - CAPACITY AND LEVEL OF SERVICE
-------------------------------------------------------------------
 Mov     Mov    Total  Total    Deg.   Aver.   LOS  Longest Queue
 No.     Typ    Flow    Cap.     of    Delay          95% Back
                (veh   (veh     Satn                 (vehs)  (ft)
                  /h)    /h)    (v/c)  (sec)
-------------------------------------------------------------------
West:  West Approach
  12 L            239    384   0.622     1.9    A      6.1    162
  13 R            533    857   0.622     1.9    A      6.1    162
                -----------------------------------------------------
                  772          0.622     1.9    A      6.1    162
-------------------------------------------------------------------
South:  South Approach
  32 LT           989   1394   0.709*    1.3    A      7.3    195
                -----------------------------------------------------
                  989          0.709     1.3    A      7.3    195
-------------------------------------------------------------------
North:  North Approach
  42 TR           587   1012   0.580     4.6    A      6.3    161
                -----------------------------------------------------
                  587          0.580     4.6    A      6.3    161
-------------------------------------------------------------------
 ALL VEHICLES:   2348          0.709     2.3    A      7.3    195
-------------------------------------------------------------------
     Level of Service calculations are based on
     average control delay including geometric delay (HCM criteria),
     independent of the current delay definition used.
     For the criteria, refer to the "Level of Service" topic in the
     aaSIDRA Output Guide or the Output section of the on-line help.
  *  Maximum v/c ratio, or critical green periods

_____________________________________________________________________
_____

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Sisters TSP
2030 - 30th HV
Model Volumes

Level Of Service Computation Report
2000 HCM 4-Way Stop Method (Base Volume Alternative)

Intersection #2 OR 242/Hood St (OR 242)

Cycle (sec):	100	Critical Vol./Cap.(X):	0.644
Loss Time (sec):	0 (Y+R=4.0 sec)	Average Delay (sec/veh):	14.3
Optimal Cycle:	0	Level Of Service:	B

Approach:	North Bound				South Bound				East Bound				West Bound			
Movement:	L	- T	- R		L	- T	- R		L	- T	- R		L	- T	- R	
Control:	Stop Sign				Stop Sign				Stop Sign				Stop Sign			
Rights:	Include				Include				Include				Include			
Min. Green:	0	0	0		0	0	0		0	0	0		0	0	0	
Lanes:	1	0 0	1	0	1	0 0	1	0	0	0 1!	0	0	0	0 1	0	
Volume Module:317																
Base Vol:	247	90	31		17	70	317		20	78	163		0	16	4	
Growth Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Initial Bse:	247	90	31		17	70	317		20	78	163		0	16	4	
User Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
PHF Adj:	0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92		0.92	0.92	0.92	
PHF Volume:	268	98	34		18	76	345		22	85	177		0	17	4	
Reduct Vol:	0	0	0		0	0	0		0	0	0		0	0	0	
Reduced Vol:	268	98	34		18	76	345		22	85	177		0	17	4	
PCE Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
MLF Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
FinalVolume:	268	98	34		18	76	345		22	85	177		0	17	4	
Saturation Flow Module:																
Adjustment:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
Lanes:	1.00	0.74	0.26		1.00	0.18	0.82		0.08	0.30	0.62		0.00	0.80	0.20	
Final Sat.:	545	450	155		543	118	535		46	180	375		0	378	95	
Capacity Analysis Module:																
Vol/Sat:	0.49	0.22	0.22		0.03	0.64	0.64		0.47	0.47	0.47		xxxx	0.05	0.05	
Crit Moves:	****						****				****				****	
Delay/Veh:	14.9	10.0	10.0		9.4	16.7	16.7		13.0	13.0	13.0		0.0	9.7	9.7	
Delay Adj:	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	
AdjDel/Veh:	14.9	10.0	10.0		9.4	16.7	16.7		13.0	13.0	13.0		0.0	9.7	9.7	
LOS by Move:	B	A	A		A	C	C		B	B	B		*	A	A	
ApproachDel:		13.3				16.4				13.0				9.7		
Delay Adj:		1.00				1.00				1.00				1.00		
ApprAdjDel:		13.3				16.4				13.0				9.7		
LOS by Appr:		B				C				B				A		
AllWayAvgQ:	0.9	0.3	0.3		0.0	1.6	1.6		0.7	0.7	0.7		0.0	0.0	0.0	

Note: Queue reported is the number of cars per lane.

Appendix H: Pedestrian and Bicycle Existing and Future Needs Memo

Memorandum

To: Brad Coy and Chris Maciejewski

CC:

From: Kim Voros, Rory Renfro and Steve Durrant

Date: March 11, 2008

Re: Sisters TSP Bicycle and Pedestrian Element – Existing Conditions and Future Needs

---

INTRODUCTION

This memorandum discusses Sisters' existing pedestrian and bicycle system, and serves as the Existing Conditions element of the Transportation System Plan. The memo defines various pedestrian and bicycle facility types, and reviews the overall state of these facilities in Sisters. The text summarizes bicycle and pedestrian volume data collected for this project, identifies major pedestrian and bicyclist destinations, and discusses other critical bicycle/pedestrian elements such as bicycle parking, transit connections, and end-of-trip facilities. The memo includes a detailed discussion of the walking and bicycling environment near Sisters' schools and also describes existing needs with respect to Sisters' walking and bicycling network. The needs assessment largely reflects existing and anticipated system deficiencies, with the sections below highlighting major issues complicating bicycle and pedestrian travel. These issues will serve as a basis for identifying site-specific and system-wide pedestrian and bicycle improvements in Sisters.

PEDESTRIAN FACILITIES – AN OVERVIEW

Pedestrian travel is accommodated and enhanced by sidewalks, shared use paths, crosswalks, curb ramps and other infrastructure. Sisters has several types of pedestrian facilities, the most basic of which are described below.

- Sidewalks: The most common type of walkway, sidewalks, generally parallel roadways. Sidewalks have a hard, smooth surface (e.g., concrete), with separation from the roadway typically consisting of a curb and/or planter strip.
- Shared Use Paths: Shared use paths are used by various non-motorized users, including pedestrians, bicyclists, in-line skaters and runners. Shared use paths are typically paved but my also consist of an unpaved surface as long as it meets Americans with Disabilities Act Standards. The Oregon Bicycle and Pedestrian Plan suggests a minimum 10-foot width for shared use facilities to reduce conflicting movements of two-way, multi-modal traffic.
- Pedestrian Paths: Generally 6-feet wide, these concrete or asphalt paths share the same function as sidewalks. Unlike a sidewalk, they generally lack a curb and gutter and are physically separated from the street through setbacks. These pedestrian facilities are referred to in the 2001 Transportation System Plan (TSP) as "shared use paths" or "multi use paths." Although intended specifically for pedestrians, bicyclists and other non-motorized transportation users also take advantage of these facilities.

- Roadway Shoulders: Paved roadway shoulders often serve as pedestrian routes in rural areas. On roadways with low traffic volumes (e.g., less than 3,000 Average Daily Traffic (ADT) volumes), roadway shoulders are often adequate for pedestrian travel. These roadways should have shoulders wide enough to accommodate both pedestrians and bicyclists. This designation generally denotes a 6-foot paved shoulder with a white 6-inch stripe.

Existing Pedestrian Facilities

Sisters' current pedestrian network is depicted in the memorandum, *Sisters TSP Update – Existing Conditions, DKS, March 2008***.** The inventory and assessment largely focused on the arterial and collector street system, as citywide Transportation System Plans do not typically address site-specific conditions on local streets. However, the Project Team recorded general observations on local streets to gain an understanding of pedestrian issues on these corridors. The following sections describe the pedestrian network in greater detail.

SIDEWALKS

The presence and condition of sidewalks in Sisters varies by location. Where they exist, sidewalk conditions are generally adequate, but show cracking and signs of aging in some places. A fairly complete sidewalk system (with sidewalks on both sides of streets) exists downtown in the area bounded by Hood Avenue, Main Street, Larch Street and Pine Street as well in several residential areas such as the Pine Meadow development (Figure 1). The downtown core's sidewalk environment includes a variety of complementary pedestrian facilities such as ADA-compliant curb ramps at some intersections, sidewalk curb extensions, pedestrian-scale lighting, and amenities like benches and trash receptacles. Along Hood Street and Main Street, diagonal parking creates a spatial buffer between pedestrians and motorists (Figure 2). Sidewalk widths throughout the city measure 4 to 6 feet. Planter strips also separate sidewalks and curbs in some areas, with widths ranging between 3.5 feet and 16 feet in some areas. Planter strips do not exist on downtown sidewalks.

Figure 1. Sidewalks in the Pine Meadow development.

A 1999 city ordinance requires provision of adequate pedestrian facilities along all newly built and reconstructed roadways. Further, this ordinance requires sidewalk facilities within areas zoned as High or Standard Density Residential and General Commercial.

Figure 2. Sidewalks and parking along Hood Street.

SHARED USE PATHS

Shared use paths exist throughout Sisters, although they vary in width, length and overall condition. Construction and development of the shared use path system is directed by the Sisters Community Trails Plan (2003). This Plan calls for three miles of paved trails designed for pedestrian or bicycle travel. The Tollgate High School Trail, the first bicycle/pedestrian

project completed from this Plan, accommodates two-way traffic on a 10-foot wide paved path. These paths primarily serve to increase connectivity throughout Sisters and with the surrounding Deschutes County Trail System. Trails are also planned to connect the Crossoads subdivision with the Sisters High School and the Five Pines Fitness Center to the Deschutes National Forest.

PEDESTRIAN PATHS

In some residential areas and along collectors outside the downtown area, pedestrian paths take the place of sidewalk facilities. These paths exist along portions of Barclay Drive and within residential areas such as The Village. Pedestrian paths also extend through the Village Green Park and Sisters City Park. In cases where adequate infrastructure does not exist to serve other non-motorized travel in the corridor comfortably, these pedestrian paths may serve as defacto bicycle facilities. (Figure 3)

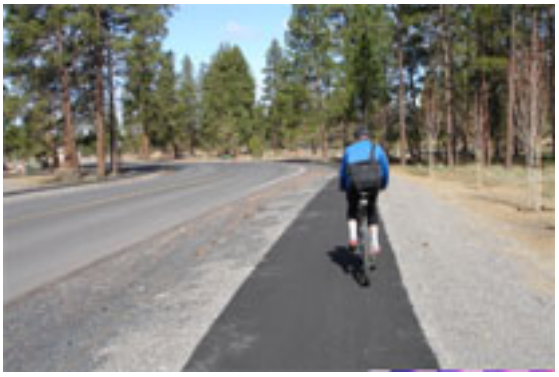

Figure 3. Asphalt paths serve many users but width constrains multiple simultaneous use.

ROADWAY SHOULDERS

Roadway shoulders accommodate pedestrian travel in Sisters where sidewalks or pedestrian paths do not exist. Such streets include portions of Highway 242 near Sisters Middle and High Schools, portions of Highway 20 (though not on Cascade Avenue) within the city limits, Highway 126 and portions Barclay Drive. Roadway shoulders sometimes lack paving and fog striping; unpaved shoulders are not considered pedestrian facilities according to the Oregon State Highway Design Manual (Figure 4).

Although roadway shoulders may appropriately accommodate pedestrians in rural areas, the gradual outward expansion of Sisters' urban development will likely result in higher traffic volumes on these roads, creating a need to provide additional pedestrian facilities in order to separate pedestrians and motorists.

Figure 4. Shoulders serve as pedestrian facilities throughout Sisters. Unpaved shoulders are not officially part of the pedestrian network.

INTERSECTIONS

The quality of intersections pedestrian crossings vary by location. Marked crosswalks and curb ramps exist at many intersections within downtown Sisters and in areas outside the downtown that were constructed or rebuilt after 1999. Crosswalk markings generally appear worn due to weathering and wear from studded tires (e.g. on Cascade Avenue and Fir Street, shown in Figure 5). The markings at intersections along lower-order streets also vary by location. Crosswalks vary in design and exist at some intersections near schools and other pedestrian trip generators. Outside of downtown Sisters, most intersections either lack curb ramps or have existing ramps that are in poor condition.

As described in the Urban Renewal Plan, Sisters Comprehensive Plan and the 2001 TSP, the area between Oak Street and Elm Street serves as the central point of the Sisters downtown area and possesses enhanced crossing features including a marked mid-block crossing with curb extensions abutting an open plaza.

Pedestrian Destinations

Major pedestrian destinations include schools, employment areas, shopping areas, neighborhood commercial areas, and parks. Within Sisters, popular pedestrian destinations include:

- Downtown (Figure 5)
- Sisters Elementary School
- Sisters Middle School
- Sisters High School
- Recreational Trails including Buckrun, Three Creeks, and others
- Community facilities (e.g., post office)
- parks and recreation areas (e.g., The Village Green, Triangle Park and Sisters City Park)

Figure 5. Downtown Sisters contains many pedestrian destinations.

Connections to Transit

Ensuring a strong pedestrian link to transit is an important part of making non-motorized transportation a part of daily life in Sisters. There are several main components of pedestrian-transit integration:

- Improving connections between walkways transit
- Encouraging use of transit programs

Cascades East Transit provides dial-a-ride service to all residents of the Sisters area. Residents must schedule a ride 24 hours in advance but can ride anywhere in the service area. The service area extends from the city center. Rides cost $1.25 for residents less than sixty years old, and $1.00 for residents over sixty. Twice a month, the service runs shuttle trips to Bend.

Connections to Schools

SISTERS ELEMENTARY SCHOOL

Sisters Elementary School is located at the corner of Cascade Avenue and Locust Street on the east side of town. Highway 20 runs along the south west edge of the property with bus and car access on Cascade Avenue (Figure 6). Sidewalks exist on both sides of Cascade Avenue east of the School and along Locust near the public library. The McKenzie Highway (US 20/OR 126) runs along the southwest edge of the property and is barrier for pedestrian access. High traffic volumes and vehicle speeds create safety concerns for pedestrians at the existing crosswalk near the McKenzie Highway (US 20/OR 126) and Locust Street intersection.

Figure 6. Crossing guard aids students crossing Cascade at Sisters Elementary School.

Streets farther away from the School have varying conditions including sidewalks on both sides (e.g., downtown on Hood Street, Main Street and Cascade Avenue), sidewalks only on one side, or none altogether (e.g., Locust Lane, Maple Street and Cascade Avenue across from the School). On streets

lacking sidewalks, students have created demand paths through front yards on roadway shoulders or in adjacent ditches. Students were also observed walking in the roadway. Several marked crosswalks and accompanying warning signs exist in the vicinity of the School, primarily at intersections.

SISTERS MIDDLE AND HIGH SCHOOLS

Sisters Middle School (Figure 7) and High School are located in adjoining facilities on the west side of town, near the intersection of the McKenzie Highway (OR 242) and McKinney Butte Road. Several pedestrian paths, including one on McKinney Butte Road, serve the schools. A 10-foot wide shared use path connects the Tollgate Housing development to the High School. One marked crosswalk exists on McKinley Butte Road in front of the High School, but there are no facilities on the McKenzie Highway (OR 242) near the Middle School entrance. A winter site visit revealed travel paths worn into icy and snowy road shoulders.

Figure 7. Winter conditions at Sisters Middle School.

Pedestrian Volumes

Pedestrian volumes vary by season and are particularly high during special events. As documented in the 2001 TSP, during the Sisters Quilt Show pedestrian crossing volumes on Cascade Avenue (US 20/OR 126) can range from 700-1,600 people per hour, which has the effect of reducing vehicle capacity on Highway 20 to approximately 350 vehicles per hour per lane.

During the typical weekday PM peak hour, pedestrian counts were much lower but were still noteworthy, especially in downtown Sisters. The source of pedestrian count data was traffic counts performed at study intersections between 2005 and 2007. These counts were taken between April and October and document conditions during the weekday PM peak hour (between 4:00 PM and 6:00 PM).

EXISTING PEDESTRIAN ISSUES

Climate

Sisters receives between 10 and 30 inches of snow in an average year. Freezing temperatures and snow accumulation can create difficult walking conditions. Snow accumulation requires maintenance - including reapplication of pavement markings worn away by cinder deployment (to increase traction on pavement) and studded tires (Figure 8). Sustained ice and snow also requires snow storage space, plowing and de-icing to allow pedestrians to travel safely. As the pedestrian system expands, the city should work to ensure they have sufficient resources to meet increased maintenance needs.

Figure 8. Weather contributes to rapid of fading of pavement markings throughout the city.

Barriers

Man-made barriers limit direct pedestrian travel between certain parts of the city. Sisters is relatively flat and travel is only minimally impacted by the single stream running through the city limits. Man-made barriers include Highway 20, which runs down Cascade Avenue; Highway 242, on the western side of the city; and Highway 126, on the eastern side of the city. The Highways have high volumes and motor vehicle speeds. Cascade Avenue, Sisters' main thoroughfare, experiences seasonally high motorist and pedestrian volumes during the summer tourist season and special events, such as the Quilt Show. During these times, the number of pedestrian and motorist conflicts increases substantially. High speeds on collectors, such as Camp Polk Road, create additional barriers. Locust Street also serves as a barrier between Sisters Elementary School and the downtown due to high traffic volumes and a lack of signalized crossings.

Some streets have narrow, paved or un-paved shoulders, but ditches constrain available roadway shoulder width, preventing pedestrians from using the facility and forcing them to walk on the road (such as Cascade Avenue across from the Elementary School).

Limited Street Connectivity

Although a well-connected street grid exists in downtown and the surrounding neighborhoods, discontinuous streets in other areas impede direct travel between pedestrian destinations. Specifically, circuitous streets characterize neighborhoods in northern Sisters and western Sisters around the Middle and High Schools.

Figure 9. Example of a paved accessway in Forest Grove, Oregon.

Lack of Accessways

Accessways are short shared use path segments providing direct pedestrian connections to destinations that would otherwise require out-of-direction travel on the surrounding street system. Accessways commonly connect cul-de-sac streets with nearby streets or paths to minimize pedestrian/bicycle travel time in areas with limited street system connectivity (Figure 9). For example, north-south streets in the Pine Meadows neighborhood are about 800 feet long, with limited east-west access provided by meandering paved paths. Mid-block accessways provide additional pedestrian connectivity in this area.

Lack of Wayfinding Tools

Sisters' pedestrian system would benefit from signage and other wayfinding tools to orient users and direct them to and through major destinations like downtown, schools, community locations such as the library, connections to recreational trails and various surrounding neighborhoods. The design of these tools should tie into the existing recreational trail signage and map program maintained by the Community Action Team of Sisters (Figure 10).

Figure 10. Signage at the Village Green.

Poor Street Lighting in Some Places

Some areas (e.g., along Highway 242) have minimal or no street lighting. Lighting, when present, is generally restricted to the automobile scale and may only minimally improve pedestrian and cyclist comfort. The absence of lighting may decrease pedestrian comfort and safety.

Maintenance Issues

Most existing sidewalks, pedestrian paths and curb ramps are in adequate condition. Regular repair on these facilities should continue to be a priority. As mentioned earlier in the "climate" section, pavement markings wear quickly due to the application of cinder in winter and wear caused by studded tires. Public Works repaints facilities twice a year, but the faded appearance of the markings may decrease their visibility to all road users. Heavy application of cinder to bike lanes along Highway 242 and Highway 20 was observed to completely obscure many bike lane markings during one Project Team visit. On Highway 242, near Sisters Middle School, the bike lane was plowed while pedestrians walked in the snow next to the lane. While pedestrians could use the bike lane, this could result in bicycle / pedestrian conflicts (Figure 11).

Figure 11. Lack of cleared pedestrian facility near Sisters Middle School.

Melting snow and rain can also create large puddles, like the one shown in Figure 12 at the intersection of Cascade Avenue and Cowboy Street. These conditions can create challenging pedestrian crossing conditions or promote behaviors such as diagonal intersection crossings, or mid-block crossings where visibility is reduced. Additionally the puddles can freeze up, creating safety concerns.

Figure 12. Water pooling at Cascade Avenue and Cowboy Street.

Intrusion Into the Pedestrian Realm

Diagonal parking along streets downtown (e.g., Hood Street and Oak Street) lack wheel stops. This allows cars to intrude on the sidewalk (Figure 13).

Figure 13. Parking without wheel stops results in auto intrusion.

Fragmented Sidewalk Network

Discussed earlier, some parts of Sisters have a fairly complete sidewalk network while the system is fragmented in other areas. A relatively complete system exists in downtown and nearby residential neighborhoods, though gaps are especially prevalent along Main Street and Hood Street. Complete sidewalk networks exist in new housing developments such as Pine Meadow. Near the Elementary, Middle

and High School sidewalks are uncommon; where they do exist the facilities only extend for several blocks.

Narrow Sidewalks and Pathways

In the downtown area (Figure 14), sidewalk widths range from 4 to 6 feet. The Oregon Highway Design Manual recommends six feet as the minimum sidewalk width ad at least five feet of clear space. Ten foot wide sidewalks are recommended in downtown core areas. While the 6-foot wide sidewalks meet design standards, the width contributes to congestion during seasonal events. The pedestrian realm also presents obstacles that include newspaper racks, store signs and signposts that sometimes encroach on pedestrian clear space. Existing development along streets (e.g. Cascade Avenue and Main Street) constrains the options and opportunities for sidewalk widening.

Figure 14. Narrow Sidewalks in downtown Sisters.

Pedestrian paths in other parts of Sisters (Figure 15) create similar congestion-related challenges for pedestrians. These conflicts may increase in cases where cyclists use pedestrian pathways to avoid motorist traffic on streets with high volumes or speeds. These pathways are sometimes referred to as "shared use" pathways or "multi use" pathways but lack the width to receive this designation as described in the Oregon Bicycle and Pedestrian Plan. In cases where infrastructure does not exist to comfortably serve other non-motorized travel in the corridor, these pedestrian paths may serve as defacto bicycle facilities.

Seasonal and Event Generated Congestion

As mentioned in the existing conditions section, Sisters experiences substantial seasonal variation of pedestrian traffic. On a givenday in the summer, about 80% of motor vehicle traffic traveling Highway 20 stops in Sisters, creating many temporary, non-resident pedestrians. Pedestrian volumes during summer events that require a temporary prohibition against parking on Cascade Avnue, so the extra space can be used to accommodate pedestrians on narrow sidewalks in the downtown area. This seasonal congestion contributes to a negative perception that traveling through Sisters during the summer creates unnecessarily stressful conditions for travelers using all modes.

Figure 15. Narrow pathways present challenges for cyclists and pedestrians sharing a single facility.

Lack of a Comprehensive Shared Use Path Network

Although shared use paths exist in several parks and other areas in Sisters, the community lacks a comprehensive and connected pathway system. The Trails Plan suggests several multi use trails, which would help address system connectivity needs and more closely connect the Sisters

community to the County Trail network. In some areas of Sisters, shared use paths may take the place of sidewalk development to help retain the rural look of the community. Shared use paths should be designed to comfortably accommodate a range of users simultaneously. Existing alleys running east and west along Cascade Avenue could serve as a central spine for a city-wide network.

Higher Speeds on Pedestrian Oriented Streets

Higher vehicle speeds on streets serving pedestrians can create an uncomfortable and challenging walking environment, especially on streets near major pedestrian trip generators such as schools and downtown areas. The city could implement a wide variety of traffic calming measures to improve safety and comfort for all transportation users. Streets that could benefit from traffic calming include Locust Street near Sisters Elementary School and Highways 126, 20 and 242 as motorists approach the town boundaries. Modifications to state highways requires approval by the Oregon Department of Transportation. Some of these modifications may occur through a Special Transportation Area designation.

Difficult Street Crossings

Pedestrians face a variety of difficult street crossing conditions:

Figure 16. Wide crossings on Cascade Avenue at Oak Street.

HIGH-VOLUME STREETS

Crossings on Cascade Avenue (Highway 20) were mentioned in many stakeholder interviews as the most challenging in the City. Cascade Avenue (Figure 16) bisects the City from east to west and creates crossing challenges for pedestrians traveling between residential neighborhoods and commercial businesses on opposite sides of the road. Seasonal traffic is especially challenging due to the large numbers of visitors who are unfamiliar with the crossing situations and don't pay attention to the presence of pedestrians or try to travel above the speed limit. The street's 48-foot width increases the length of time required to cross. This can be especially problematic for seniors and mobility impaired pedestrians unwilling or unable to walk extra distances to reach a marked crosswalk. In some cases, pedestrians choose to dart across the roadway to reach their desired destinations.

DIFFICULT INTERSECTION CONFIGURATIONS

Difficult roadway crossings exist in several locations, particularly along Cascade Avenue, on Locust Street at Highway 20 (Figure 17), Jefferson Street at Highway 20, and the intersection of Pine Street/Highway 20/Highway 242. Pedestrians approaching these crossings encounter excessively long conflict zones with vehicles due to the broad turning radii constructed for motorists entering and leaving asymmetrical intersection legs. Several of these roadway crossings also lack marked crosswalks, sidewalks and warning signage to alert motorists of pedestrian traffic crossing at the intersection.

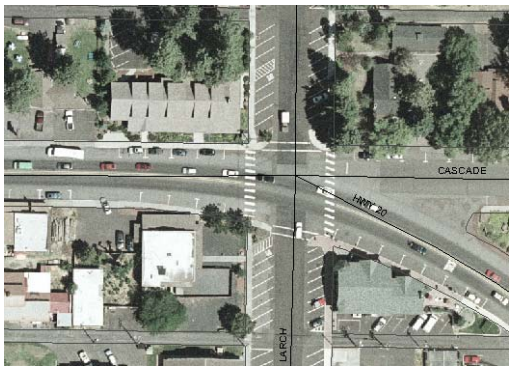

Figure 17. Difficult intersection of Larch Street, Highway 20 and Cascade Avenue.

Crossings along Locust Street are particularly challenging for children due to the proximity of Sisters Elementary School. During the school year, elementary students crossing west, toward the downtown core, must contend with high traffic volumes. The posted speed limit drops from 50 miles per hour outside the City limits to 20 miles per hour ¼ mile later near the school. Motorists do not always allow sufficient time to slow down prior to entering the school zone. Existing crosswalks have signage, but lack other attention grabbing devices. These marked crosswalks may contribute to a false sense of security for elementary school aged children.

Difficulties for Disabled Pedestrians

Pedestrians with disabilities experience crossing difficulties in some parts of Sisters. Curb ramps at some intersections are in poor condition or disrepair, while other intersections lack curb ramps altogether or at least one side of the intersection (e.g., Cascade Avenue and Oak Street). In some cases, marked crosswalks lead to sidewalks with no curb ramps or to a roadway shoulder with no sidewalk (e.g., Larch Street at Main Street, Cascade Avenue at Maple Street). This can make traveling by wheelchair or other motorized mobility device challenging, if not impossible (Figure 18). Visually- and mobility-impaired pedestrians also experience difficulty navigating through intersections with curb ramps oriented diagonally toward the intersection's center rather than toward a crosswalk.

Figure 18. Unpaved shoulders present problems for disabled pedestrians.

Demonstrated Demand for More Pedestrian Facilities

In many locations, demand for pedestrian facilities exists, as demonstrated by numerous "demand paths." Pedestrians often create demand paths in areas lacking formalized facilities, and/or in areas where existing facilities follow circuitous travel routes. In areas near schools where sidewalks do not exist, students on foot have created informal paths (e.g., along Cascade Avenue near Sisters Elementary School, and along Highway 242 near Sisters Middle and High school, see Figure 17). Seasonal demand trails are also influenced by winter weather; during one winter visit the Project Team noticed demand trails traveling through snow drifts on icy shoulders and sidewalk facilities on Locust Street, Highway 20 and on Cascade Avenue near Sisters Elementary.

PEDESTRIAN CRASH HISTORY

The Oregon Department of Transportation provided crash data covering the January 2004 through December 2006 period. Within this period, five reported crashes involving pedestrians occurred in Sisters.

- Cascade and Pine: A pedestrian was struck by a car while crossing Cascade Avenue when the driver failed to yield. The pedestrian was injured.
- Cascade and Fir: A motorist struck a car from behind, while following too closely. A pedestrian was involved in the crash, though no injuries were reported.

- Cascade and Spruce: A motorist struck a car from behind, while following too closely. A pedestrian was involved in the crash, though no injuries were reported.
- Locust and McKenzie: A motorist struck a car from behind, while following too closely. A pedestrian was involved in the crash, though no injuries were reported.
- Cascade and Elm: A motorist struck a car from behind, while following too closely. A pedestrian was involved in the crash, though no injuries were reported.

Of the five collisions that were reported; only one involved a pedestrian directly. The other four collisions resulted in the rear-ending of vehicles, but cited the involvement of pedestrians. Based on the crash type and locations (i.e. at various intersections along Cascade Avenue), it is likely that the front vehicles had slowed down to allow pedestrians to cross the road while the following motorist did not allow enough space between the vehicles or was inattentive to the traffic flow.

BICYCLE FACILITIES – AN OVERVIEW

Several types of bikeways exist in Sisters. Bikeways, as defined by Federal and State bicycle planning and design guides and manuals, are distinguished as preferential roadways accommodating bicycle travel, with accommodation taking the form of bicycle route designation or bicycle lane striping. Shared use paths are separated from a roadway for use by cyclists, pedestrians, in-line skaters, runners, and others.

Sisters' existing bicycle network includes the following bikeway types:

- Bike Lanes: Designated exclusively for bicycle travel, bike lanes are separated from vehicle travel lanes with striping and also include pavement stencils. Bike lanes are most appropriate on arterial and major collector streets where higher traffic volumes and speeds warrant greater separation.
- Shoulder Bikeways: Typically found in rural areas, shoulder bikeways are paved roadways with striped shoulders wide enough for bicycle travel. Shoulder bikeways often include signage alerting motorists to expect bicycle travel along the roadway.
- Shared Roadways: The most common type of bikeway, shared roadways accommodate vehicles and bicycles in the same travel lane. The most suitable roadways for shared vehicle/bicycle use are those with low posted speeds (25 MPH or less) and low traffic volumes (3,000 ADT or less). These facilities may include traffic-calming devices to reduce vehicle speeds while limiting conflicts between motorists and bicyclists. A common practice includes signing shared roadways with bicycle route signs, directional arrows and other wayfinding information. Most minor collector and local streets in Sisters can be categorized as shared roadways given their relatively low vehicle volumes.
- Shared Use Paths: Shared use paths (also referred to as "trails" and "multi use paths") are used by various non-motorized users, including pedestrians, bicyclists, in-line skaters, and runners. Shared use paths are typically paved (asphalt or concrete) but may also consist of an unpaved smooth surface as long as it meets ADA standards.

Existing Bikeways

Sisters' current bikeway network is shown depicted in the memorandum, *Sisters TSP Update – Existing Conditions, DKS, March 2008***.** The inventory and assessment largely focused on the arterial and collector street system, as citywide Transportation System Plans do not typically address site-specific conditions on local streets. However, the Project Team recorded general observations on

local streets to gain an understanding of bicycle issues on these corridors. The following sections describe the bikeway network in greater detail.

BIKE LANES

State highways and arterial streets comprise the majority of Sisters bike lane network. Bike lanes are generally 5-feet wide and exist on:

- Highway 242 from Highway 20 to Sisters High School;
- Pine Street between Lundgren Mill Road and Barclay Drive;
- Highway 20 from Cascade Avenue to the City Boundary;
- Lundgren Mill Road from Pine Street to Sun Ranch Road;
- Locust Street south of Jefferson Avenue;
- The Buck Run subdivision;
- Highway 242 (Figure 19);
- Camp Polk Road;
- Pine Street from Highway 20 to Barclay.

Figure 19. Existing bike lane on Highway 242

SHOULDER BIKEWAYS

Shoulder bikeways accommodate bicyclists on rural roadways connecting Sisters with outlying communities. Sisters has shoulder bikeways on Highway 126 and Highway 20 east of Locust Street (Figure 20). Sisters is gradually expanding its urban area, resulting in higher traffic volumes on outlying roads; therefore, there is a need to provide additional designated facilities for cyclists.

Figure 20. Shoulder bikeway with parallel sidewalk.

As noted previously, the Sisters Trails Plan recommends construction of multi use, non-motorized facilities. The projects listed below are designed to primarily serve cyclists. They may carry pedestrians and other forms of non-motorized travel if the corridor lacks adequate facilities for other types of non-motorized traffic within the corridor.

- Camp Polk Loop to Redmond Highway: A shoulder bikeway along Camp Polk Road designed to connect Sisters to Panoramic View Estates.
- Cloverdale Road: A shoulder bikeway along Cloverdale Road designed to connect Highway 126 to Highway 20.
- Indian Ford Road: A shoulder bikeway designed to connect the Indian Ford subdivision and form a loop route with highway 20 and Camp Polk Road.
- Three Creek Road: A shoulder bikeway designed to provide access to the National Forest.

- Highway 20, Sisters to Indian Ford: This route exists as a 4-foot shoulder bikeway targeted for improvements due to high traffic volumes which impact cyclist comfort.
- Highway 20, Sisters to Jordan Road: This paved shoulder bikeway would connect Sisters to Jordan Road.
- Gist Road – Plainview Road: This horse path with a shoulder bikeway would connect along Cascade Estates Drive.
- Highway 126 – Holmes Road: A shoulder bikeway would link Camp Polk Road to Homes Road.
- McKenzie Highway 242: This shoulder bikeway would connect Sisters to recreational access in the National Forest.

Figure 21. Shared roadway near downtown core.

SHARED ROADWAYS

Most local streets in Sisters are low speed/low volume roadways that could be classified as shared roadways (Figure 21). These streets can accommodate bicyclists of all ages and currently have little need for dedicated bicycle facilities (e.g., bicycle lanes). They generally have low vehicle volumes (3,000 ADT or less) and low posted speeds (25 MPH or less). Curb-to-curb widths range between 25 and 40 feet with typical street cross-sections including two vehicle travel lanes (with or without striping) and on-street parking.

SHARED USE PATHS

Shared use paths exist throughout Sisters, although they vary in width, length and overall condition. Construction and development of the shared use path system is directed by the Sisters Community Trails Plan (2003). This Plan calls for three miles of paved trails designed for pedestrian and bicycle travel. The Tollgate High School trail, the first bicycle / pedestrian project completed from this Plan accommodates two-way traffic on a 10-foot wide paved path. These paths primarily serve to increase connectivity throughout Sisters and improve connections to the surrounding Deschutes County Trail System. This project is the only completed shared use path in Sisters.

Figure 22. This rack is unusable due to snowy conditions and does not allow a cyclist to secure their bike's frame and wheel.

BICYCLE PARKING

Bicycle parking is a critical component of a community's bikeway network, and can strongly influence one's decision whether to complete a trip via bicycle. The Sisters Comprehensive Plan notes that new development should have bike parking; the Sisters Development Code contains specific guidelines.

In Sisters, the quantity of bike parking facilities varies by location. Bike racks exist at several commercial locations, schools and government buildings downtown core. Most parking facilities

consist of a rack located in a parking lot or near a building entrance. The Project Team located parking at City Hall, the Chamber of Commerce, the Public Library, the Sisters Market, and Sisters Elementary, Middle and High Schools.

The quality of existing bicycle parking also varies by location, primarily due to the style of rack chosen and/or placement of the rack. Racks situated immediately adjacent to walls or shrubbery have reduced capacity by limiting user access to one side of the rack only. Some existing racks are also considered substandard because they do not allow a bicycle frame and at least one wheel to be locked to the rack without the use of a long bicycle cable or unless the bicycle hangs over the rack (Figure 22). The shortage of quality bicycle racks in high-demand locations typically generates informal bicycle parking activities with cyclists securing their bikes to hand rails, street signs, light poles and other objects. Weather can also impact the quality of bicycle parking. During the winter site visits all racks with the exception of covered the parking near City Hall (Figure 23) were partially covered by snow, which rendered them useless.

Figure 23. Covered bike parking outside city Hall.

Bicyclist Destinations

Major bicyclist destinations include schools, employment areas, shopping areas, neighborhood commercial areas, and parks. Within Sisters, popular pedestrian/bicycle destinations include:

- Downtown
- Sisters Elementary School
- Sisters Middle School
- Sisters High School
- Recreational Trails, including Buckrun, Three Creeks, and others
- Community facilities (e.g., post office)
- Parks and recreation areas (e.g., The Village Green, Triangle Park and Sisters City Park)

Connections to Transit

Ensuring a strong bicycle link to transit is an important part of making non-motorized transportation a part of daily life in Sisters. There are several main components of bicycle-transit integration:

- Allowing bicycles on transit
- Improving connections between bikeways and transit
- Encouraging use of bicycle and transit programs

Cascades East Transit provides dial-a-ride service to all residents of the Sisters' area. Resident's must schedule a ride 24 hours in advance, but can ride anywhere in the service area, five-miles from the city center for $1.25 for residents less than sixty years old and $1.00 for residents over sixty. Twice a month the service runs shuttle trips to Bend. Currently, bicycles are not allowed on dial-a-ride vehicles.

Connections to Schools

SISTERS ELEMENTARY SCHOOL

Sisters Elementary School is located at the corner of Locust Street and Cascade Avenue on the east side of town. Few facilities exist that serve bicyclists traveling to and from the School. In order to access the School, bicyclists must share the road with motorists, which may lead to cyclist discomfort on higher volume, higher speed streets. Some students were also observed riding on sidewalks and other facilities intended for pedestrians. The main exception is that bicyclists traveling along North Locust Street (Camp Polk Road) do have the option of using the bike lanes.

SISTERS MIDDLE AND HIGH SCHOOLS

Sisters Middle and High Schools are located in adjoining facilities on the west side of town near the intersection of the McKenzie Highway (OR 242) and McKinney Butte Road. In this area, cyclists are accommodated by a shared use path connecting the Tollgate Housing development to the High School. In addition, the McKenzie Highway (OR 242) has marked bike lanes but no shared use path or sidewalks. A winter site visit revealed pedestrian travel paths worn into icy and snowy road shoulders; it is unlikely that such paths would be suitable for bicycle use.

BICYCLE VOLUMES

The Project Team analyzed traffic count data taken at intersections between 2005 and 2007. These counts were taken between April and October. The counts, which took place between 4 and 6 PM, also included bicycle volumes. Generally, most intersections experienced two or fewer bicyclist crossing movements per hour. Some intersections, including several along existing bicyclist facilities and one near Sisters Elementary School, served higher volumes. These intersections include Cascade Avenue at Locust Street, Pine Street at Cascade Avenue, Highway 20 at Cascade Avenue and Hood Street at Highway 242. The intersection of Locust Street and Camp Polk Road served the highest number of cyclists of all count intersections.

EXISTING ISSUES

Climate

Sisters receives between 10 and 30 inches of snow in an average year. Freezing temperatures and snow accumulation can create difficult cycling conditions. Snow accumulation requires maintenance - including reapplication of pavement markings worn away by cinder deployment (to increase traction on pavement) and studded tires. Sustained ice and snow also requires snow storage space, plowing and de-icing to allow bicycles to travel safely. As the Sisters bicycle system of the city expands, the city should work to ensure they have sufficient resources to meet the expanding maintenance needs.

Barriers

Man-made barriers limit direct bicycle travel between certain parts of the city. Sisters is relatively flat and travel is only minimally impacted by the single stream running through the city limits. Man-made barriers include Highway 20, which runs down Cascade Avenue; Highway 242, on the western side of the city; and Highway 126, on the eastern side of the city. The Highways have minimal pedestrian crossing treatments and high vehicle speeds. Cascade Avenue, Sisters' main thoroughfare,

experiences seasonally high motorist and pedestrian volumes during the summer tourist season and special events, such as the Quilt Show. During these times, the number bicycle and motorist conflicts increases substantially. High vehicle speeds on collectors, such as Camp Polk Road create additional barriers. Locust Street also serves as a barrier between the Elementary School and the Sisters downtown due to high traffic volumes and a lack of signalized crossings.

Limited Street Connectivity

Although a well-connected street grid exists in downtown and the immediately surrounding neighborhoods, discontinuous streets in other areas impede direct travel between bicyclist destinations. Specifically, circuitous streets characterize neighborhoods in northern Sisters and western Sisters around the Middle and High Schools.

Lack of Accessways

Accessways are short shared use path segments providing direct bicycle connections to destinations that would otherwise require out-of-direction travel on the surrounding street system (pictured in the pedestrian chapter). Accessways commonly connect cul-de-sac streets with nearby streets or paths to minimize bicycle travel time in areas with limited street system connectivity. For example, north-south streets in the Pine Meadows neighborhood are about 800 feet long, with limited east-west access provided by meandering paved paths. Mid-block accessways could provide additional pedestrian and bicycle connectivity in this area.

Lack of Wayfinding Tools

Sisters' bicycle system would benefit from signage and other wayfinding tools to orient users and direct them to and through major destinations like downtown, schools, community locations such as the library, connections to recreational trails and various surrounding neighborhoods. The design of these tools should tie into the existing recreational trail signage and map program maintained by the Community Action Team of Sisters (pictured in the pedestrian chapter). In some places (e.g., on Locust Street) the long distance between bike lane pavement markings creates the feeling of a facility discontinuity.

Maintenance Issues

Most existing sidewalks, asphalt paths and curb ramps are in adequate condition. Regular repair on these facilities should continue to be a priority. As mentioned earlier in the "climate" section, pavement markings wear quickly due to the application of cinder in winter and wear caused by studded tires. Public Works repaints facilities twice a year, but the faded appearance of the markings decreases their visibility to all road users. Heavy application of cinder to bike lanes along Highway 242 and Highway 20 was observed to completely obscure many bike lane markings during one Project Team visit. On Highway 242, near Sisters Middle School, the bike lane was plowed while pedestrians walked in the snow next to the lane. While pedestrians could use the bike lane, this could result in bicycle / pedestrian conflicts

No Bicycle Access on Transit Facilities

Currently, bicycles are not permitted on Dail-A-Ride transit service provided by Cascades East Transit.

Lack of a Comprehensive Shared Use Path Network

Although shared use paths exist in several parks and other areas in Sisters, the community lacks a comprehensive and connected system. The Trails Plan suggests several multi use trails, which would help address system connectivity needs and more closely connect the Sisters community to the County Trail network. In some areas of Sisters, shared use paths may take the place of sidewalks to help retain the rural look of the community. Shared use paths should be designed to comfortably accommodate a range of users simultaneously. Existing alleys running east and west along Cascade Avenue may serve as a central spine for a city-wide network.

Diagonal Head in Parking Causes Cyclist Conflicts

In the downtown area, diagonal parking along Hood Street, Main Street, Cedar Street, Larch Street, Spruce Street, Elm Street, Ash Street, Oak Street and Adams Street creates conflict points for cyclists. Drivers backing out may experience poor visibility and parked cars can decrease the chance of a driver seeing an oncoming cyclist. These conditions require cyclists to ride close to the center of the lane to avoid potential collisions, which may discomfort inexperienced riders.

Higher Vehicle Speeds on Some Streets

Higher vehicle speeds on streets serving cyclists can create an uncomfortable and challenging bicycling environment, especially on streets near major bicycle trip generators such as schools and downtown areas. The city could implement a wide variety of traffic calming measures to improve safety and comfort for all transportation users. Streets that could benefit from traffic calming include Locust Street near Sisters Elementary School and Highways 126, 20 and 242 as motorists approach the town boundaries. Modifications to state highways would require approval by the Oregon Department of Transportation. Some of these modifications may occur through a Special Transportation Area designation.

Difficult Street Crossings

Non-motorized users face a variety of difficult street crossing conditions:

HIGH-VOLUME STREETS

Crossings on Cascade Avenue (Highway 20) were mentioned in many stakeholder interviews as the most challenging in the City. Cascade Avenue bisects the City from east to west and creates crossing challenges for cyclists traveling between residential neighborhoods and commercial businesses on opposite sides of the road. Seasonal traffic is especially challenging due to the large numbers of pedestrian and motorist visitors who are unfamiliar with the crossing situations and may contribute to excessively long wait times.

DIFFICULT INTERSECTION CONFIGURATIONS

Difficult roadway crossings exist in several locations, particularly along Cascade Avenue, on Locust at Highway 20, Jefferson, at Highway 20 and the intersection of Pine Street/Highway 20/Highway 242. Cyclists approaching these crossings encounter excessively long conflict zones with vehicles due to the broad turning radii constructed for motorists entering and leaving asymmetrical intersection legs.

Gaps in the Bicycle Network

The existing bicycle facilities should be connected to form a complete network. This may include bicycle boulevard style east-west connections, shoulder bicycle facilities and bike lanes on streets such as Camp Polk and Locust to connect to Deschutes County Trailhead facilities.

Inadequate Bicycle Parking in Some Places

The quantity and quality of bike parking in Sisters varies by location. While covered parking exists at City Hall, Sisters Elementary School has only a single rack. These racks are also considered substandard because they do not allow a bicycle frame and at least one wheel to be locked to the rack without the use of a long bicycle cable or unless the bicycle is mounted over the rack.

Despite the good quality of parking provided at City Hall, this location only provides two racks.

Minimal Bicycle Facility Width Recommendations in Previous Planning Efforts

The 2001 Transportation System Plan recommends 4-foot shoulder additions on several streets including Larch, Locust, and Jefferson as part of the bicycle network. Many of these roads do not have dedicated pedestrian facilities; in many cases bicyclists and pedestrians share the shoulder space. Four feet is the minimum width recommended under constrained conditions in the Oregon Bicycle and Pedestrian Plan, and six feet is standard. Greater width could increase the safety and comfort of cyclists using these facilities.

Figure 24. Newly constructed sidewalk facilities near Triangle Park.

BICYCLE CRASH ANALYSIS

The Oregon Department of Transportation provided crash data covering the January 2004 through December 2006 period. Within this period, no collisions involving cyclists were reported

POSITIVE QUALITIES OF SISTERS' BICYCLING AND WALKING ENVIRONMENT

Summarized below, various characteristics contribute to a positive bicycling and walking environment in many parts of Sisters.

Sisters benefits from a positive bicycle and pedestrian environment in several parts of the community:

- Newly-constructed sidewalks within subdivisions and other development contribute to a more complete pedestrian network (Figure 24).
- Land use characteristics contribute to a pedestrian-friendly environment. For instance, buildings fronting the sidewalk edge in downtown create a sense of tight urban form,

Figure 25. Sidewalks with open, plaza type areas downtown help create a pedestrian friendly atmosphere.

and an inviting pedestrian atmosphere. Walking as a means for running errands is also encouraged through the grouping of diverse land uses in downtown (Figure 25).

- A relatively well-connected street grid in downtown and surrounding neighborhoods facilitates convenient and direct bicycle and pedestrian travel.
- Wide planter strips between sidewalks and curbs in residential areas (e.g., on Redwood Street and Birchwood Street) provide a buffer between pedestrians and motor vehicle traffic.

Bicycle/Pedestrian Enhancements with Street Improvement Projects

By mandating that new and reconstructed roads include pedestrian and bicycle facilities, Sisters has already taken an active role in demonstrating their desire to increase the attractiveness of walking and bicycling. Strong community support can increase the scope and innovation of projects required by the City Code.

Presence of Shared Use Paths and Connections to Existing Facilities

Shared use paths enable bicyclists and pedestrians of all ages and skills to use the non-motorized system. Paths within parks (e.g., Village Green and Sisters City Park) offer recreational bicycling and walking opportunities. The City is also taking measures to extend the community path system, as exhibited by the Community Trails Plan. This existing Plan can help the City to strategically utilize opportunities to expend the system as they arise. By connecting the city to the County Trail system, Sisters visitors and residents have more opportunities to experience non-motorized travel for recreation, health and transportation purposes.

Figure 26. Curb extensions at Main and Spruce reduce pedestrian crossing distances and create a visual 'pinch' point for motorists.

Presence of Intersection Treatments for Pedestrian Crossings

CURB EXTENSIONS

Curb extensions slow vehicle traffic by creating a visual "pinch point" for approaching motorists. Typically constructed within the on-street parking lane (e.g., Hood Street and the Pine Meadow Housing Development), these devices can calm traffic passing through or turning at an intersection (Figure 26). Curb extensions reduce pedestrian crossing distances and also increase motorists' visibility of pedestrians waiting to cross the street.

MID-BLOCK CROSSINGS WITH CURB EXTENSIONS

Mid-block crossings meet pedestrian crossing needs where traditional street intersections do not exist (Figure 27). These crossings include marked crosswalks (e.g., Cascade Avenue between Elm Street

Figure 27. Mid-block crossing on Cascade between Elm and Oak.

and Oak Street), and/or other treatments. These crossings can increase pedestrian visibility, create a visual-pinch point, reduce sidewalk congestion and reduce crossing distance and required crossing time while creating a unique pedestrian plaza or open-space.

EXISTING DEVELOPMENT PATTERNS

Sisters has a relatively compact layout, which puts most bicycle and pedestrian destinations within close proximity. The Comprehensive Plan mentions a continued desire to maintain this development pattern.

Appendix I: Future Forecasting Methodology Memorandum

DKS *Associates*

TRANSPORTATION SOLUTIONS

MEMORANDUM

TO: Peter Schuytema, ODOT Transportation Planning Analysis Unit

FROM: Chris Maciejewski, P.E.
Mat Dolata
Garth Appanaitis
Brad Coy

DATE: March 28, 2008

SUBJECT: **Sisters TSP Update – Future Forecasting Methodology** P/A No. 07288-000-003

This memorandum summarizes the future forecasting methodology relating to the 2008 update of the City of Sisters Transportation System Plan (TSP). The methodology expands upon a Level 2 Cumulative Analysis approach (as defined in Transportation Planning Analysis Unit's (TPAU's) Analysis Procedure Manual) by including total base year and future year trip tables, as well as utilizing VISUM to complete an equilibrium trip assignment. The resulting forecasting tool allows for improved evaluation of changes in traffic volumes between various project alternatives.

Approach Summary

Based on the size of Sisters, the amount of highway traffic, and the alternatives that will be evaluated in this TSP update, a simple trend line (Level 1) was determined to be inadequate. As TPAU has not completed the Deschutes County Travel Demand Model, a cumulative analysis (Level 2) approach was selected. While the chosen forecasting methodology utilizes the Level 2 Cumulative Analysis (as defined in TPAU's Analysis Procedure Manual) as a foundation for developing forecasts, additional elements were included in the model.

In the context of the traditional 4-step travel demand model approach, the Level 2 Analysis is used for trip generation and trip distribution purposes only. The result is a trip table (for growth increment) that is used as an input into traffic assignment where analysis is completed by manually assigning trips to a network to estimate future traffic volumes.

The Cumulative Analysis method described in the Analysis Procedure Manual (APM) divides traffic growth into three distinct segments: External-External, Internal-Internal, and Internal-External/External-Internal. This format is retained in this analysis. Trip growth estimates are based on forecasted growth on external roadways and forecasted land use changes within the Sisters TSP Update study area. Land uses changes based on the City's Comprehensive Plan are allocated across 14 transportation analysis zones (TAZs), which are shown in Figure 1.

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City of Sisters
Transportation System Plan

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TRANSPORTATION SOLUTIONS

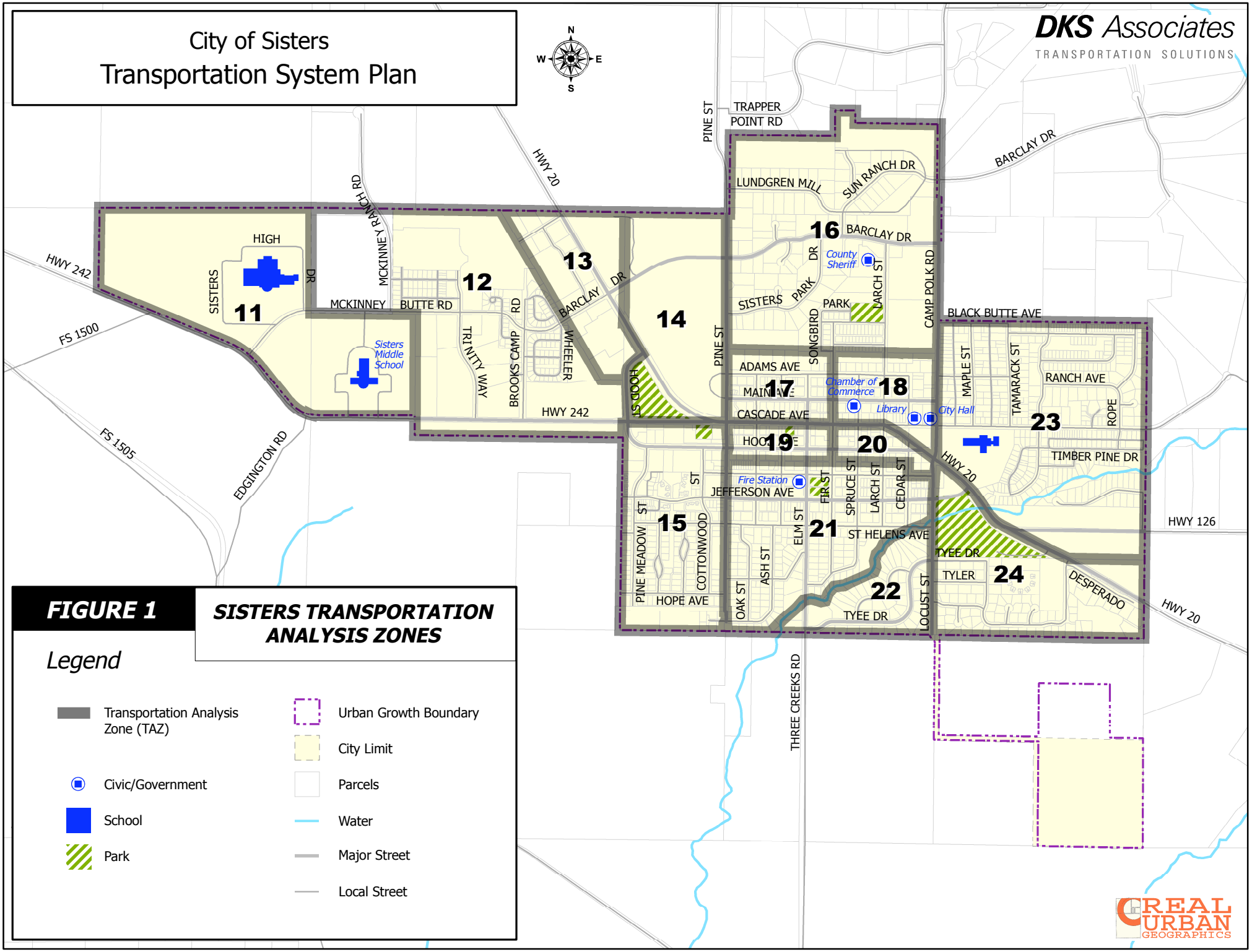


FIGURE 1

SISTERS TRANSPORTATION ANALYSIS ZONES

Legend

- Transportation Analysis Zone (TAZ)
- Civic/Government
- School
- Park
- Urban Growth Boundary
- City Limit
- Parcels
- Water
- Major Street
- Local Street

REAL URBAN GEOGRAPHICS

The City of Sisters Level 2 model was developed as an enhanced cumulative analysis tool to better analyze alternative future scenarios identified in TSP. Primarily, the enhancement to the model includes estimation of base year and future year total trips, instead of only modeling the growth increment. In addition, the travel demand model utilizes an equilibrium assignment procedure that represents routing choice more accurately than manual assignment. The model assigns motor vehicle trips to the City roadway network and utilizes equilibrium assignment based on node delay to estimate routing adjustments in response to varying levels of congestion and delay as traffic patterns change. This creates a more responsive and accurate traffic assignment across the city network (compared to manual traffic assignment). As a result, a more comprehensive analysis of TSP alternatives can be performed.

The following sections detail each component of the travel forecast methodology: land use, roadway network, trip generation, trip distribution, trip assignment, and validation.

LAND USE

Land use is a key factor affecting demands placed on a City's transportation system. The location, density, type, and mixture of land uses have a direct impact on traffic levels and patterns. Land uses are converted into motor vehicle trips using methodology described in the Trip Generation section of this memorandum. Table 1 summarizes the existing and future land use within the Sisters UGB, with the land use data grouped into four main categories: households, retail employment, service employment, and other employment.

Existing land use within the Sisters Urban Growth Boundary (UGB) corresponds to a population of approximately 1,800 residents. The land use inventory was completed through a parcel level GIS analysis based on GIS Data, aerial photography, and State of Oregon ES-202 data. In addition, land use inventories were compared and controlled to the data published by the City's Comprehensive Plan[1].

Projected land use corresponds to a year 2030 population projection of approximately 4,700 residents and were estimated for the future 2030 horizon year by extrapolating growth trends identified in the City's Comprehensive Plan. The land use growth was allocated to vacant lands in the City's urban and urban reserve areas based on zoning designations in the City's Comprehensive Plan.[2]

TABLE 1. Sisters UGB Land Use Summary

Land Use	Existing 2006 Land Use	Projected Growth from 2006 to 2030	Projected 2030 Land Use
Households			
Total Households	**920**	**1,215**	**2,135**
Employees			
Retail Employees	695	550	1,244
Service Employees	375	230	605
Other Employees	755	530	1,285
Total Employees	**1,824**	**1,310**	**3,134**

[1] *Sisters Urban Area Comprehensive Plan*; Sisters, Oregon; Deschutes County; July, 2005.
[2] Because vacant lands exist mostly on the northern and western edges of the Sisters UGB, the majority of growth is estimated to occur in the corresponding TAZs (i.e. TAZs 12 and 16).

The land use projections identified in Table 1 were allocated between the transportation analysis zones (TAZs), which represent the sources of vehicle trip generation. The Sisters network includes 14 internal and six external TAZs. A detailed description of the existing 2006 and forecasted 2030 land uses for each TAZ is attached.

ROADWAY NETWORK

The Sisters model consists of all local, collector, and arterial streets within the Sisters UGB. The existing roadway network (built off of NAVTEQ files) was used for configuring the current model. Planned roads were added for the future year model. Key locations of planned roadways include the following:

- New mixed-use developments near Sun Ranch Business Park at north edge of City
- New bridge connecting Creekside Court to Cascade Avenue at eastern edge of City
- New connection between Rail Way and Trinity Way in western portion of City

TRIP GENERATION

Trip Types

Travel demand projections involve the determination of three distinct types of trips, which are categorized based on whether their origin and/or destination (i.e. trip ends) are internal or external to the study area. The trip types are as follows:

- **External-External (E-E) Trips** do not have an origin or destination in Sisters (i.e. through traffic) and do not stop for more than 10 minutes while passing through the Sisters UGB;
- **Internal-External (I-E) Trips** originate in Sisters and are traveling to a location outside of the Sisters UGB and **External-Internal (E-I) Trips** originate outside of the Sisters UGB and are traveling to a location within the Sisters UGB; and
- **Internal-Internal Trips** travel from one location within the Sisters UGB to another location within the UGB.

Trip generation for both the base year (2006) and future (2030) year travel demand model was developed based on the methods specified in the ODOT Analysis Procedures Manual (APM)[3]. One notable deviation from the Level 2 Analysis described in the APM is including all trips in the forecast rather than just the growth component. This is done in order to develop volumes for the base year travel demand model, but also provides a more reasonable distribution of trips. Whereas, an approach using only new growth for distribution would only allocate trips between areas of new growth, this method allows for new trips to be allocated to already built-out areas (such as downtowns).

Internal Trip Ends

The number of internal trip ends was determined using land use trip generation methodology, which translates land use quantities (i.e. number of dwelling units or number of employees) into vehicle trip ends (number of vehicles entering or leaving a TAZ) using land use specific trip generation rates. The average PM peak hour trip generation rates provided in the Institute of Transportation Engineers (ITE) Trip Generation, 7th Edition[4] for housing units, retail employees, service employees, educational employees, and other employees were used to estimate the number of trips generated in each TAZ. The

[3] *Analysis Procedures Manual*, ODOT: Transportation Development Division, April 2006, p. 4-21
[4] *Trip Generation Manual*, 7th Edition, Institute of Transportation Engineers, 2003.

average values used are provided in Table 2.[5] In addition, Table 3 lists in detailed the existing 2006 and forecasted 2030 in and out trips generated for each TAZ.

TABLE 2. PM Peak Hour Trip Generation Rates by Land Use

Land Use	ITE Trip Generation Rates		
	Trips In	*Trips Out*	*Total Trip Ends*
Households (per dwelling unit)	0.64	0.37	1.01
Retail (per employee)	2.06	2.32	4.38
Service (per employee)	0.83	1.06	1.89
Other—Education (per employee)	0.84	0.71	1.55
Other—Non-Education (per employee)	0.06	0.33	0.39

TABLE 3. PM Peak Hour Trip Generation Rates by Land Use

Zone	Existing Trips Generated			2030 Trips Generated		
	Trips In	*Trips Out*	***Total Trip Ends***	*Trips In*	*Trips Out*	***Total Trip Ends***
11	84	71	**155**	167	143	**310**
12	79	77	**156**	471	338	**809**
13	285	329	**614**	512	591	**1103**
14	0	0	**0**	145	167	**312**
15	140	126	**266**	456	416	**872**
16	273	359	**632**	759	939	**1698**
17	394	476	**870**	450	542	**992**
18	114	136	**250**	190	226	**416**
19	454	537	**990**	464	548	**1012**
20	204	245	**449**	225	270	**495**
21	144	87	**231**	211	142	**353**
22	29	17	**45**	116	111	**227**
23	219	139	**358**	402	278	**680**
24	67	59	**126**	177	158	**335**

[5] Based on the results of model calibration, there was no indication that further trip rate adjustments were needed to improve model accuracy.

External Trip Ends

In preparation for the distribution of external trips, three steps were followed. First, the number of external trip ends was estimated based on design hour volumes at external nodes. Second, these external trip ends were separated into external-external (E-E), external-internal (E-I), and internal-external (I-E) trips. Third, projected future growth rates were applied (to determine trips levels for the 2030 model).

Design Hour Volumes at External Nodes

The number of 2006 external trip ends for the City of Sisters was based on 30th HV design volumes at key gateways to the City, which include the Santiam Highway (US 20/OR 126) on the northwest, the McKenzie Highway on the east (OR 126) and west (OR 242), the McKenzie-Bend Highway (US 20) on the southeast, and Pine Street and Camp Polk Road on the north. The 2006 gateway design volumes are listed in Table 4 and are based on 30th HV intersection volumes for the study intersection closest to each gateway (i.e., the entering and exiting volumes of the intersection's appropriate approach leg).

TABLE 4. 2006 External Trip End Summary

External Gateway	Direction of Travel	2006 Gateway Volume	E-E Trip Probability	2006 E-E Trip Ends	2006 E-I and I-E Trip Ends
Santiam HWY (US 20/OR 126)	SE	660	0.45	297	363
	NW	615	0.45	277	338
McKenzie-Bend HWY (US 20)	SE	600	0.45	270	330
	NW	540	0.45	243	297
McKenzie HWY (OR 126)	E	375	0.45	169	206
	W	290	0.45	131	160
McKenzie HWY (OR 242)	E	150	0.45	68	83
	W	120	0.45	54	66
Pine St	N	10	0.30	3	7
	S	5	0.30	2	4
Camp Polk Rd	N	225	0.30	68	158
	S	200	0.30	60	140

External-External (E-E), External-Internal (E-I), and Internal-External (I-E) Trips

To separate external-external (E-E) traffic (i.e., through trips) from external-internal (E-I) and internal-external (I-E) traffic (i.e., trips with either a trip origin or destination in Sisters), the existing probability of being an E-E trip was applied to highway traffic (the highways are the first four external gateways). This methodology utilizes data from the origin-destination (O-D) license plate survey described in the 2001 Sisters Transportation System Plan[6] rather than determining the E-E trip probability via turn movements. According to the O-D survey, 45% of 30th HV highway traffic was through-traffic (i.e., E-E trips).

[6] *2001 Sisters Transportation System Plan*, David Evans and Associates, June 2001, pg 4-2.

Because the O-D survey did not include Pine Street and Camp Polk Road, another method was utilized to estimate E-E trips using these external gateways: entering and exiting vehicles were traced through the system by estimating turn percentages and/or subtracting away turn movements along the Camp Polk Road, Locust Street, Barclay Road, and Highway 20 corridors (using 30th HV turn movements at the key corridor intersections). Based on this methodology, E-E trips at these gateways were approximately 30% of total gateway volumes.

After calculating E-E trips, the remaining trips were designated as E-I or I-E trips based on whether the vehicles were entering or exiting the study area, respectively.

Future Growth Rates

Future external trip ends were estimated based on forecasted growth at each of the six external gateways. ODOT models for the neighboring cities of Redmond and Bend and ODOT highway volume table projections were utilized to estimate compounding growth rates along the four highways: the Santiam (US 20/OR 126), McKenzie (OR 242 on the west), McKenzie (OR 126 on the east), and McKenzie-Bend (US 20) Highways. In general, the growth rates are 2.0% and 2.5% per year (compound rates). Along Pine Street and Camp Polk Road (Locust Street), a 3.5% compounding growth rate was estimated based on the roadways' average daily traffic (ADT) volume growth. Deschutes County verified the potential for these growth rates to continue by reviewing land use data. The growth rates are included in Table 5 along with the 2030 projected future 30th HV gateway design volumes broken down by trip type.

TABLE 5. 2030 External Trip End Summary

External Gateway	Direction of Travel	Yearly Growth Rate[a]	2030 Gateway Volume	2030 E-E Trip Ends	2030 E-I and I-E Trip Ends
Santiam HWY (US 20/OR 126)	SE	2.1%	1087	489	598
	NW	2.1%	1013	456	557
McKenzie-Bend HWY (US 20)	SE	2.0%	965	434	531
	NW	2.0%	869	391	478
McKenzie HWY (OR 126)	E	2.5%	678	305	373
	W	2.5%	525	236	289
McKenzie HWY (OR 242)	E	2.2%	253	114	139
	W	2.2%	202	91	111
Pine St	N	2.0%	16	5	11
	S	2.0%	8	2	6
Camp Polk Rd	N	3.5%	514	154	360
	S	3.5%	457	137	320

[a] Yearly growth rate is compounding.

TRIP DISTRIBUTION

Trip distribution is the estimation of the percentage of trips that travel from one zone in the model to any other zone. In this analysis, trip distribution was performed in conjunction with trip generation to define the vehicle trip tables that were incorporated into the existing and 2030 models.

Distribution was generally based on the number of trip ends generated in each zone as either trips coming out from the zone (productions) or trips going into the zone (attractions). The productions and attractions for each internal zone were used to determine an attraction probability and production probability, relative to other zones in the transportation network.

Trips were distributed between TAZs using two trip tables:

1. Production Trip Table - The number of outbound trips generated (productions) by each TAZ was multiplied by each zone's attraction probability (based on the relative number of inbound trips for each other TAZ), resulting in a set of trips from each TAZ to every other TAZ.

2. Attraction Trip Table - The number of inbound trips generated (attractions) by each TAZ was multiplied by each zone's production probability (based on the relative number of outbound trips for each other TAZ), resulting in a different set of trips from each TAZ to every other TAZ.

External-Internal & Internal-External Trip Distribution

The external-internal (E-I) and internal-external (I-E) trips identified in Tables 3 & 4 were distributed across TAZs based on the attraction and production probabilities. E-I trips were distributed based on attraction probabilities and I-E trips were distributed based on production probabilities.

An additional level of detail was introduced into the City Sisters travel demand model to address the high concentration of households north of the Sisters UGB. In order to distribute the E-I and I-E trips associated with the two northern external zones (i.e. Pine Street and Camp Polk Road) to and from employment or errand locations within the City of Sisters, the relative attractiveness of the internal zones was determined using only the trip ends generated by the employment land uses. This is done to represent more realistic travel behavior by avoiding a problem of having an unrealistically large number of trips assigned between households. As a result, more trips were distributed between households and other (non-household) land uses.

A detailed listing of the existing 2006 and forecasted 2030 attraction and production probabilities for each TAZ is attached.

Internal-Internal Trip Distribution

So as not to double-count the external-internal and internal-external trips, these trips were subtracted from the total internal trip growth. I-E trips were subtracted from productions and E-I trips were subtracted from attractions. The remaining trips represented internal-internal (I-I) trips.

Production and attraction probabilities were used to distribute trips to and from the appropriate TAZs. This resulted in a productions trip table and an attractions trip table. To balance the trip productions and attractions and avoid double counting (since the trip generation process identifies trip ends, and every trip has two trip ends), the production and attraction trip tables were averaged to result in a final I-I trip table.

These steps were performed twice (once for trips generated by household land uses and once for trips generated by employment land uses.) Household-based trips used only employment land uses to calculate attraction and production probabilities. Doing so, as with the northern external zones, again reduced the number of trips assigned between households.

Final Trip Table

Internal trip productions and attractions were balanced to result in a trip table that specified the number of trips from each internal zone to each other internal zone in the network. The I-I trip table was combined with the I-E and I-E trip tables to address all identified internal growth. The E-E trips were added to complete the trip table including both internal and external growth. The resulting trip table was used as the basis for the Sisters Model.

This procedure was followed for both the base year and future models. The full zone to zone trip tables for existing 2006 and forecasted 2030 models are attached.

TRAFFIC ASSIGNMENT

Traffic assignment involves the determination of a specific travel route taken by each trip within the transportation network. This step was performed using VISUM modeling software, which determined path choice based on minimal travel times between locations. The travel times were based on both link (street) and node (intersection) components, with the second incorporating Highway Capacity Manual (HCM) turn delay at intersections. Including the concept of intersection turn delay allows for a greater level of detail than standard manual Level 2 analysis, and provides a means for comparing future network alternatives.

Several steps were followed to utilize the VISUM model. First, model inputs such as the transportation network data and trip table were determined. The second step was to perform the traffic assignment algorithm in the model and analyze the resulting traffic volumes. The final step was to calibrate the base model network to represent existing traffic conditions and verify that the traffic volumes resulting from the assignment algorithm were similar to the existing volumes. Details for each step of the VISUM traffic assignment process follow.

VISUM MODEL INPUTs

The general VISUM model input included the transportation network (i.e. road locations and traffic control) and the trip table (based on trip generation and trip distribution as described previously). However, the transportation network was coded into the model at a greater level of detail than typical travel demand models in order to utilize intersection-level HCM delay. Elements of the transportation network that were provided in the model include:

Street Detail

- Location – All public roads in Sisters (ranging from local streets to highways) were included to provide flexibility in assignment routes. Streets contained geographic location so that the distance attribute remains valid for travel time calculations.

- Speed – The free flow speed of streets was initially based on posted speed limits in the City. Some modifications were made during the calibration process as described later.

- Lanes – The number of lanes for each roadways segment were based on field conditions. This input affects the number of fully developed approach lanes at intersections and is utilized for intersection geometry and delay.

Intersection Detail

- Control – Intersection traffic control was collected during field inventories and specified in the model to allow for intersection delay calculations following HCM methodology. Several locations in Sisters with uncontrolled or yield intersections were modeled with stop control in order to approximate field conditions and allow nominal HCM delay calculations.

- Lane Configuration – Lane configuration was collected and specified at intersections to complete HCM delay calculations.

Zone Detail

- Connectors – Centroid connectors are used to load traffic from the TAZ to the transportation network in the model. Connectors were distributed throughout the TAZ to load traffic to the public street network based on the location of driveway access and parking.

VISUM Model Assignment

The assignment algorithm in VISUM utilized the transportation network features to assign traffic to paths that required the least travel time. The travel time of each path was based on the summation of the link components (the distance of a link divided by the link speed) and the node components (intersection turn delay based on HCM methodology using the internal TRAFFIX component in VISUM), summed across all links and nodes traversed on a path. The travel time methodology does not use link based volume-delay functions where speed varies with volume based on link capacity limitations[7] and congestion.

As the model algorithm runs, successive iterations update travel times for each path and reassign traffic. While the link component of a path's travel time is unchanged between successive iterations, the turn delay at each intersection is revised based on the volumes from the previous iteration. This process continues until the model converges to an equilibrium state (i.e. little to no change in traffic assignment results). Based on the sensitivity of this type of equilibrium assignment (node delays via HCM) a Lohse algorithm was utilized.

VISUM Model Calibration

The model output provided traffic volumes on roadway segments and at intersections. Calibration was performed on the model using base year 30th Highest Hourly Volumes (30th HV) at the Sisters TSP study intersections. Calibration procedures for the model included the following:

- Pedestrian Conflicts – The presence of pedestrians crossing Highway 20 in the downtown area influences the capacity and travel time of the corridor. To account for the additional delay attributed to vehicles stopping for pedestrians, seven "dummy traffic signals" were placed at midblock locations to emulate the pedestrian crossing activity in the model.
- Street Speeds - The speeds of some links were adjusted to influence use in the model to account for driver behavior. Primary adjustments include increasing Hwy 20 through downtown from 20 to 30 miles per hour (in order for this to remain the primary route for

[7] Care was taken to model the vehicle capacity limitations in the downtown area due to pedestrian crossing, as described in the VISUM Model Calibration section.

through traffic), and increasing Hood Avenue from 20 to 25 miles per hour. The speeds for Adams Avenue, the north-south streets located north of Hood Avenue and east of Larch Street, and the Jefferson Avenue connection to Hwy 20 were all decreased from 25 to 20 miles per hour. Lastly, the portions of Barclay Drive and Sisters Park Drive that are posted as 20 miles per hour were increased to 25 miles per hour.

Each of these calibration measures were utilized to reflect actual traffic circulation and flow through the model network. Model calibrations were performed in an iterative process to determine the relative effect of each calibration measure.

A plot comparing 30HV turn movement counts to the base model counts was analyzed to evaluate the accuracy of the model (shown in Figure 1). The slope of the fitted curve is 1.031, indicating that the model volumes are generally only 3% higher than the 30HV volumes and that the trip generation is appropriate and does not require further refinement. Furthermore, the R^2 value of 0.975 indicates that the model volumes are consistent with the target 30HV volumes. A link volume analysis was also completed and found similar calibration results (R^2 = 0.97, slope = 1.02).

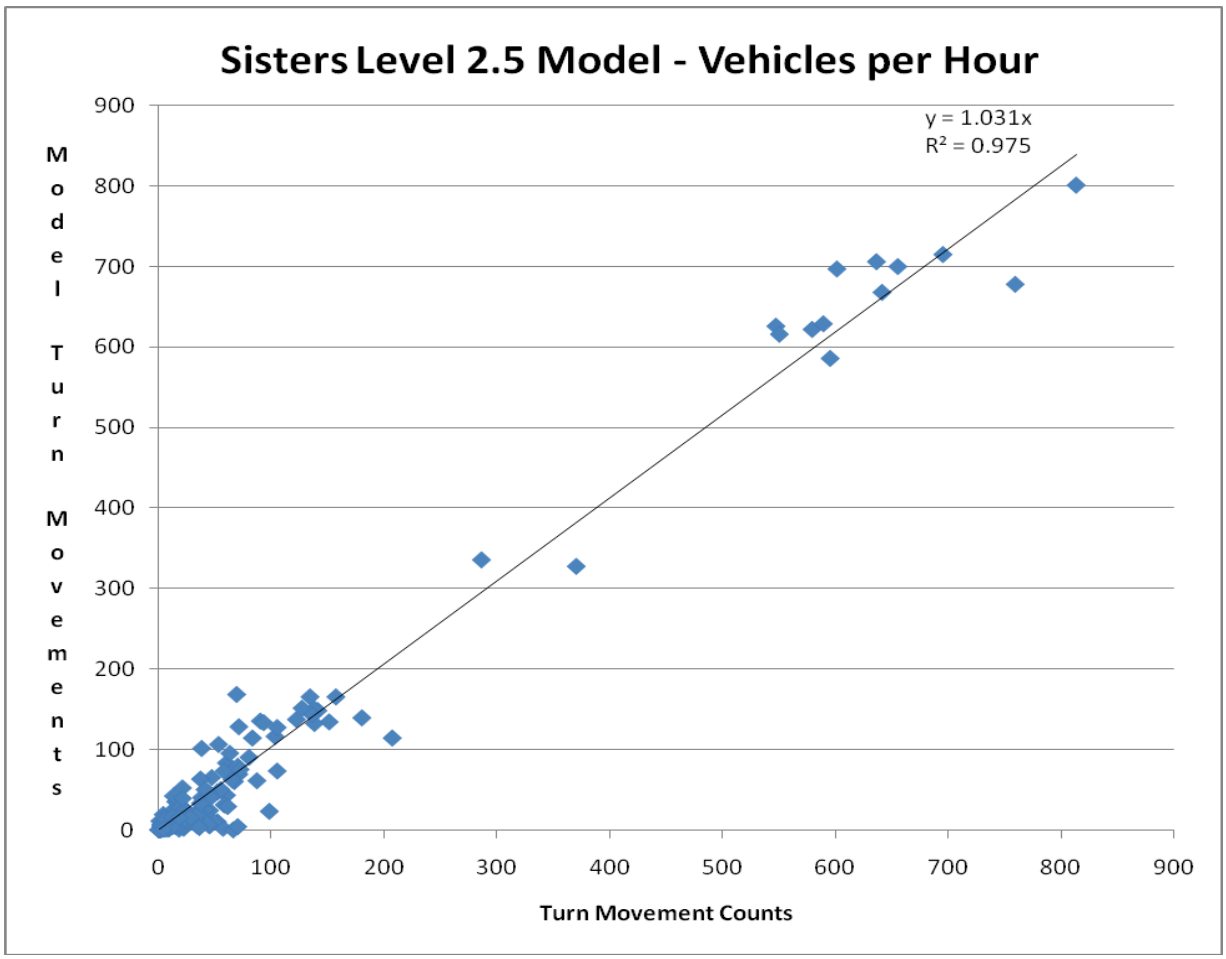


Figure 2: 2006 Model vs. 2006 30th HV Turn Movements

MODEL VOLUMES

Model output volume plots are shown in Figure 3 for the 2006 base year and in Figure 4 for the 2030 future year. Design hour volumes were extracted from the model for both the base year 2006 and forecast year 2030 scenarios. A "post processing" technique following NCHRP 255 methodology[8] was utilized to refine model travel forecasts to the volume forecasts utilized for 2030 intersection analysis.

[8] *Highway Traffic Data for Urbanized Area Project Planning and Design - National Cooperative Highway Research Program Report 255*, Transportation Research Board, Washington D.C., 1982.

City of Sisters

Transportation System Plan

DKS Associates
TRANSPORTATION SOLUTIONS

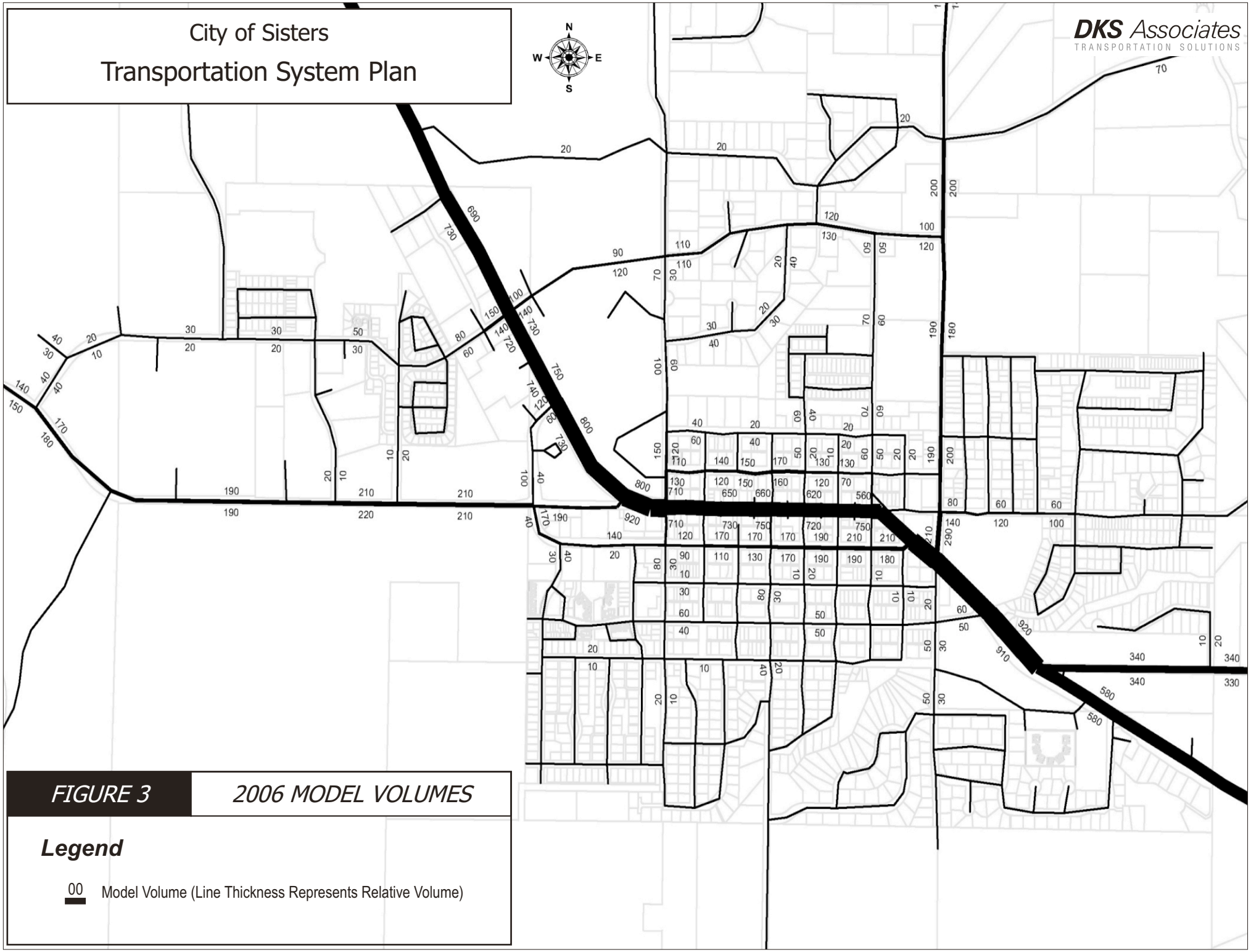


FIGURE 3 | 2006 MODEL VOLUMES

Legend

00 Model Volume (Line Thickness Represents Relative Volume)

City of Sisters

Transportation System Plan

DKS Associates
TRANSPORTATION SOLUTIONS

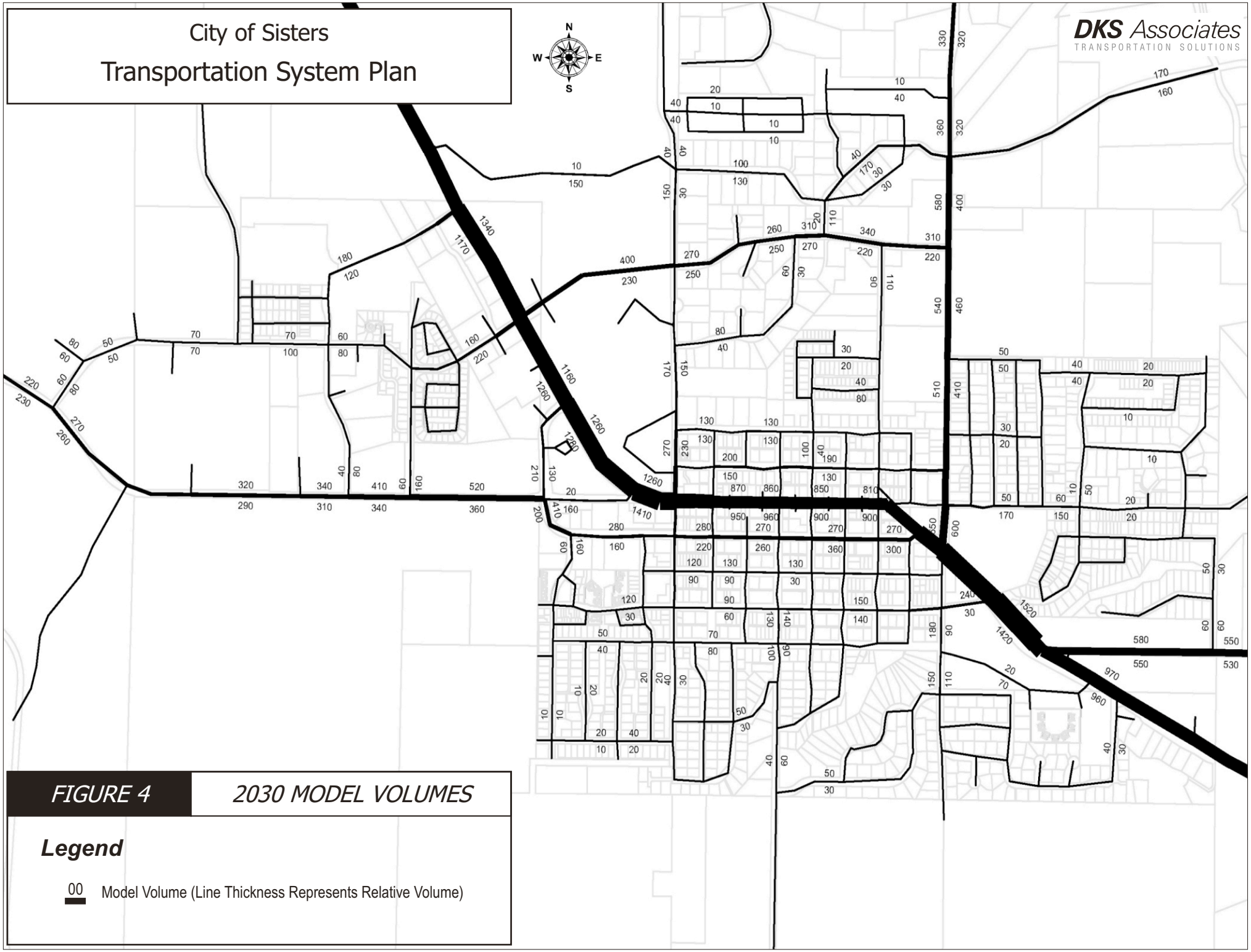


FIGURE 4 | 2030 MODEL VOLUMES

Legend

00 Model Volume (Line Thickness Represents Relative Volume)

Sisters TSP Update

DRAFT Future Land Use Forecasts

2/21/2008

DKS Associates
TRANSPORTATION SOLUTIONS

	Existing (2007)				Estimated UGB Buildout Growth				Future Year (2030) Total			
TAZ	HH	RET	SERV	OTH	HH	RET	SERV	OTH	HH	RET	SERV	OTH
11	0	0	0	100	0	0	0	100	0	0	0	200
12	70	0	40	25	565	10	10	50	635	10	50	75
13	0	110	70	0	0	100	25	10	0	210	95	10
14	0	0	0	0	0	60	25	5	0	60	25	5
15	120	15	40	15	215	80	15	25	335	95	55	40
16	50	55	140	195	120	150	105	230	170	205	245	425
17	15	175	20	130	0	25	5	10	15	200	25	140
18	30	40	10	65	0	35	5	10	30	75	15	75
19	5	210	15	95	0	5	0	0	5	215	15	95
20	5	90	15	55	0	10	0	5	5	100	15	60
21	225	0	0	10	65	10	5	5	290	10	5	15
22	45	0	0	0	20	30	15	5	65	30	15	5
23	285	0	0	45	150	10	10	70	435	10	10	115
24	70	0	25	20	80	25	10	5	150	25	35	25
Total	**920**	**695**	**375**	**755**	**1215**	**550**	**230**	**530**	**2135**	**1244**	**605**	**1285**

Pop. 1831 (Assumes 1.99 people per home)

Pop. 4697 (Assumes 2.2 people per home)

HH = Households
RET = Retail Employees
SERV = Service Employees
OTH = Other Employees

Existing Productions and Attractions
Level 2.5 (TPAU-Level 2 plus DKS Refinement)

All Production/Attractions for Internal TAZ's

Zone	*Trip Ends* IN	Attraction Probability	*Trip Ends* OUT	Production Probability
11	83.7	3%	71.3	3%
12	79.3	3%	76.8	3%
13	284.7	11%	329.4	12%
14	0.0	0%	0.0	0%
15	140.5	6%	126.0	5%
16	272.8	11%	359.0	14%
17	394.0	16%	476.1	18%
18	113.6	5%	136.2	5%
19	453.6	18%	536.9	20%
20	204.1	8%	244.9	9%
21	143.8	6%	87.4	3%
22	28.6	1%	16.8	1%
23	219.0	9%	138.6	5%
24	66.5	3%	59.2	2%
Total	**2484**	**100%**	**2659**	**100%**

Household Productions/Attractions for Internal TAZ's

Zone	*Trip Ends* IN	Attraction Probability	*Trip Ends* OUT	Production Probability
11	0.0	0%	0.0	0%
12	44.5	8%	26.2	8%
13	0.0	0%	0.0	0%
14	0.0	0%	0.0	0%
15	76.4	13%	44.8	13%
16	31.8	5%	18.7	5%
17	9.5	2%	5.6	2%
18	19.1	3%	11.2	3%
19	3.2	1%	1.9	1%
20	3.2	1%	1.9	1%
21	143.2	24%	84.1	24%
22	28.6	5%	16.8	5%
23	181.3	31%	106.5	31%
24	44.5	8%	26.2	8%
Total	**585**	**100%**	**344**	**100%**

Non-Household Productions/Attractions for Internal TAZ's

Zone	*Trip Ends* IN	Attraction Probability	*Trip Ends* OUT	Production Probability
11	83.7	4%	71.3	3%
12	34.7	2%	50.6	2%
13	284.7	15%	329.4	14%
14	0.0	0%	0.0	0%
15	64.1	3%	81.1	4%
16	241.0	13%	340.3	15%
17	384.5	20%	470.5	20%
18	94.5	5%	125.0	5%
19	450.4	24%	535.0	23%
20	201.0	11%	243.0	10%
21	0.6	0%	3.3	0%
22	0.0	0%	0.0	0%
23	37.7	2%	32.1	1%
24	22.0	1%	33.1	1%
Total	**1899**	**100%**	**2315**	**100%**

2030 Future Productions and Attractions
Level 2.5 (TPAU-Level 2 plus DKS Refinement)

All Production/Attractions for Internal TAZ's

Zone	*Trip Ends* IN	Attraction Probability	*Trip Ends* OUT	Production Probability
11	167.4	4%	142.6	3%
12	470.6	10%	338.3	7%
13	511.9	11%	591.4	12%
14	144.6	3%	167.4	3%
15	455.9	10%	416.2	9%
16	758.8	16%	939.4	19%
17	449.8	9%	542.2	11%
18	190.3	4%	226.1	5%
19	463.9	10%	548.5	11%
20	225.0	5%	269.8	6%
21	210.5	4%	142.3	3%
22	115.9	2%	111.5	2%
23	401.9	8%	278.4	6%
24	176.6	4%	158.5	3%
Total	**4743**	**100%**	**4872**	**100%**

Household Productions/Attractions for Internal TAZ's

Zone	*Trip Ends* IN	Attraction Probability	*Trip Ends* OUT	Production Probability
11	0.0	0%	0.0	0%
12	404.1	30%	237.3	30%
13	0.0	0%	0.0	0%
14	0.0	0%	0.0	0%
15	213.2	16%	125.2	16%
16	108.2	8%	63.5	8%
17	9.5	1%	5.6	1%
18	19.1	1%	11.2	1%
19	3.2	0%	1.9	0%
20	3.2	0%	1.9	0%
21	184.5	14%	108.4	14%
22	41.4	3%	24.3	3%
23	276.8	20%	162.6	20%
24	95.4	7%	56.1	7%
Total	**1359**	**100%**	**798**	**100%**

Non-Household Productions/Attractions for Internal TAZ's

Zone	*Trip Ends* IN	Attraction Probability	*Trip Ends* OUT	Production Probability
11	167.4	5%	142.6	3%
12	66.6	2%	101.0	2%
13	511.9	15%	591.4	15%
14	144.6	4%	167.4	4%
15	242.7	7%	291.0	7%
16	650.6	19%	875.9	21%
17	440.3	13%	536.6	13%
18	171.3	5%	214.8	5%
19	460.7	14%	546.6	13%
20	221.8	7%	267.9	7%
21	26.0	1%	33.9	1%
22	74.5	2%	87.2	2%
23	125.2	4%	115.8	3%
24	81.2	2%	102.4	3%
Total	**3385**	**100%**	**4075**	**100%**

Existing Model Trip Table
Level 2.5 (TPAU-Level 2 plus DKS Refinement)

from TAZ \ to TAZ	1	2	3	4	5	6	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
1	0	190	121	0	0	11	11	11	39	0	19	37	54	15	62	28	20	4	30	9	661
2	173	0	0	34	2	35	11	11	38	0	19	36	52	15	60	27	19	4	29	9	574
3	93	0	0	18	1	19	7	7	24	0	12	23	33	9	38	17	12	2	18	6	337
4	0	48	30	0	0	3	2	2	8	0	4	7	10	3	12	5	4	1	6	2	147
5	0	1	0	0	0	0	0	0	1	0	0	1	1	0	2	1	0	0	0	0	9
6	10	31	17	2	0	0	7	3	24	0	5	20	32	8	37	17	0	0	3	2	218
11	10	8	4	2	0	4	1	1	4	0	2	4	6	2	7	3	3	1	4	1	69
12	10	9	5	2	0	3	2	1	5	0	2	5	7	2	8	4	2	0	3	1	72
13	45	37	20	10	0	20	6	6	21	0	11	20	29	8	33	15	12	2	18	5	320
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	17	14	8	4	0	5	3	2	9	0	4	8	12	3	14	6	3	1	5	2	117
16	49	40	22	11	1	21	7	7	23	0	12	22	32	9	36	16	12	2	19	6	346
17	65	53	29	15	1	28	9	9	30	0	16	29	42	12	48	22	17	3	26	8	461
18	19	15	8	4	0	8	3	2	9	0	4	8	12	4	14	6	5	1	7	2	131
19	73	60	32	17	1	32	10	10	34	0	18	33	47	14	54	24	20	4	29	9	521
20	33	27	15	8	0	15	5	5	15	0	8	15	21	6	25	11	9	2	13	4	237
21	12	10	5	3	0	0	2	1	7	0	2	6	9	2	11	5	0	0	1	1	76
22	2	2	1	1	0	0	0	0	1	0	0	1	2	0	2	1	0	0	0	0	14
23	19	15	8	4	0	2	3	2	10	0	3	9	14	4	16	7	1	0	3	1	123
24	8	7	4	2	0	2	1	1	4	0	2	4	6	2	7	3	1	0	2	1	55
Total	640	567	328	137	7	208	90	80	305	0	143	289	421	120	486	218	139	28	216	67	**4487**

2030 Future Model Trip Table
Level 2.5 (TPAU-Level 2 plus DKS Refinement)

from TAZ \ to TAZ	1	2	3	4	5	6	11	12	13	14	15	16	17	18	19	20	21	22	23	24	Total
1	0	289	213	0	1	25	20	55	60	17	54	89	53	22	54	26	25	14	47	21	1085
2	282	0	0	55	2	80	19	53	57	16	51	85	50	21	52	25	24	13	45	20	951
3	152	0	0	30	1	43	13	37	40	11	36	60	35	15	36	18	17	9	32	14	599
4	0	72	53	0	0	6	4	11	12	3	11	18	11	4	11	5	5	3	9	4	243
5	0	1	1	0	0	0	1	0	2	0	1	2	1	1	2	1	0	0	0	0	14
6	22	71	38	5	0	0	18	7	54	15	26	69	47	18	49	24	3	8	13	9	497
11	17	14	8	4	0	11	3	10	9	3	9	14	8	3	8	4	4	2	8	3	143
12	42	33	20	10	0	8	8	9	26	7	15	34	22	9	23	11	4	4	10	5	302
13	73	58	35	17	1	46	12	40	37	10	36	56	33	14	33	16	18	9	33	14	591
14	21	16	10	5	0	13	3	11	10	3	10	16	9	4	9	5	5	3	9	4	167
15	51	41	25	12	0	23	9	21	28	8	23	41	25	10	26	12	9	6	19	9	397
16	115	92	56	27	1	69	20	60	60	17	56	90	53	22	54	26	27	14	50	22	930
17	67	53	32	15	1	42	11	36	34	10	33	52	30	13	31	15	16	8	30	13	541
18	28	22	13	6	0	17	5	15	14	4	13	22	13	5	13	6	7	3	12	5	224
19	67	54	33	16	1	43	11	37	34	10	33	52	30	13	31	15	17	8	31	13	548
20	33	26	16	8	0	21	6	18	17	5	16	26	15	6	15	7	8	4	15	6	269
21	17	14	8	4	0	3	4	3	11	3	6	14	9	4	10	5	1	2	4	2	126
22	14	11	7	3	0	7	2	6	7	2	6	11	7	3	7	3	3	2	5	2	108
23	34	27	16	8	0	9	7	10	20	6	13	28	18	7	18	9	4	4	10	5	254
24	19	16	9	5	0	8	4	7	11	3	8	16	10	4	10	5	3	2	7	3	150
Total	1054	912	594	230	10	474	178	446	545	154	456	793	478	200	493	239	199	118	390	175	**8139**

Updated 3/28/2008

Appendix J: Safe Routes to School Plan

Memorandum

To: Sisters TSP Technical Advisory Committee

CC:

From: Steve Durrant, Kim Voros and Rory Renfro

Date: June 5, 2008

Re: Sisters TSP – DRAFT Safe Routes to School Toolkit

INTRODUCTION

This Safe Routes to School (SR2S) Toolkit represents a critical component of the Sisters pedestrian and bicycle network. The Toolkit's purpose is to provide an overview of tools and strategies for improving safety and accessibility for bicyclists and pedestrians around school areas. The Toolkit was developed to assist Sisters Elementary School and Sisters Middle School as they work to improve walking and bicycling conditions for their students.

This report is organized according to the Five E's (Engineering, Education, Encouragement, Enforcement, and Evaluation), with Education and Encouragement grouped together since many educational programs are intended to be fun and motivating, and many encouragement programs include an educational component. The fifth "E" – Evaluation – refers to the periodic review of projects and programs to measure their performance. This toolkit also includes a section discussing operational tools that can improve safety for children walking and bicycling to school. Two Project Description Sheets, located at the end of this report, highlight potential route-to-school improvements for the elementary and middle schools.

WHAT IS SAFE ROUTES TO SCHOOL?

Safe Routes to School refers to a variety of multi-disciplinary programs aimed at promoting walking and bicycling to school, and improving traffic safety around school areas through education, incentives, law enforcement, and engineering measures. Walking and bicycling to school are healthy alternatives to being driven, and can provide a sense of independence for children who may otherwise be restricted by school buses or parents' schedules. Safe Routes to School programs typically involve partnerships among municipalities, school districts, community and parent volunteers, and law enforcement agencies. Among the goals of SR2S programs is improved safety for children, establishing good health and fitness habits in children, and decreased traffic and air pollution. SR2S programs help integrate physical activity into the everyday routine of school children. These programs also address the safety concerns of parents by encouraging greater enforcement of traffic laws, educating the public, and exploring ways to create safer streets.

Benefits of a SR2S Program

The primary benefit of implementing and continuing a SR2S program is the resulting increase in safety for children walking and bicycling to school. A comprehensive strategy based on a cooperative effort between school officials, parents, residents, and city staff will ensure that specific traffic, pedestrian, and bicycle improvements will become priority projects eligible for State, Federal or other grant funding. Involvement of various stakeholders throughout the Safe Routes process increases the likelihood for implementation of needed safety improvements. While the primary focus of a SR2S program is improving safety for children walking and riding to school, the safety benefits from infrastructure improvements often extend to all bicyclists and pedestrians in vicinity of schools.

In addition to safety enhancements, a SR2S program helps integrate physical activity into the everyday routine of school children. Health concerns related to sedentary lifestyles have become the focus of statewide and national efforts to reduce health risks associated with being overweight. Identifying and improving routes for children to safely walk and bicycle to school is also one of the most cost-effective means of reducing weekday morning traffic congestion, and can help reduce auto-related pollution.

Safe Routes to School improvements are often discussed in terms of the Five E's: Engineering, Education, Encouragement, Enforcement, and Evaluation.

Engineering — Signing, striping, and infrastructure improvements are implemented along school commute routes.

Education — Students are taught bicycle, pedestrian and traffic safety skills, and educational campaigns aimed at drivers are developed.

Encouragement — Events and contests such as walk-to-school days are used to encourage more walking, bicycling, or carpooling through fun and incentives.

Enforcement — Various techniques are used by law enforcement to ensure that traffic laws are obeyed, such as traffic stings targeted at pedestrian safety and speed feedback trailers.

Evaluation — SR2S projects and programs are periodically reviewed to measure improvements in the walking/bicycling environment, and to determine whether more children are walking/riding to school.

Numerous other excellent SR2S toolkits and guidebooks exist, several of which are listed at the end of this chapter in the Resources section. This toolkit is not intended to supplant the information in those other guidebooks, but should instead be viewed as focused guidebook for describing tools and programs that may be appropriate to implement as part of SR2S efforts in Sisters.

THE SCHOOL SITE AUDIT

One primary purpose of this Plan is to provide a resource for local groups to conduct a "school site audit" of their school. A school site audit, sometimes called a walking audit or walkabout, is an assessment of pedestrian and bicycling conditions around the school area. Typically school site

audits are conducted by a local school group or task force on foot, by following common routes used by students. A site audit could also be conducted on bicycle to better evaluate bicycling conditions. The Sisters TSP Project Team, along with various school representatives and other interested parties, conducted brief school site audits for Sisters Elementary and Middle schools in April 2008.

The site audit's primary goal is to document conditions that may discourage walking and bicycling to school, and to identify solutions to improve those conditions. Such audits typically involve identification of the built environment around a school (e.g., streets, sidewalks, paths, crosswalks and intersections, bike routes, traffic controls), the drop-off and pick-up operations (e.g., presence of designated loading areas), as well as behaviors of students, parents, and motorists that could create unsafe and unattractive conditions for bicyclists or pedestrians (e.g., speeding, jaywalking, failure to yield to pedestrians). Such conditions are typically recorded on a detailed checklist.

Along with the checklist, an aerial map of the school area is an essential part of the site audit. Each school group would be provided with an aerial map of their school area that should be marked up with identified issues and suggested improvements. The marked-up aerials, along with the information from the checklist form, would then be forwarded to a designated Community Task Force and used to pinpoint and prioritize improvements in the school area.

This toolkit describes common measures for improving school area safety. The most successful SR2S programs involve multi-faceted improvements including both infrastructure and programmatic measures. Many problems can be solved through relatively low-cost educational and enforcement activities. However, some problems do require more expensive engineering or design solutions.

It is important to note that not all tools in this toolkit will be applicable or appropriate for a given school. Many of the engineering tools have specific warrants for their installation and will require evaluation by a local traffic engineer to determine if they are feasible for a particular location.

ENGINEERING TOOLS: IMPROVEMENTS FOR THE PHYSICAL ENVIRONMENT

Engineering tools focus on the design of transportation facilities that provide safe and functional accommodation for bicyclists, pedestrians, and motorists. Engineering measures can improve pedestrian and bicyclist safety and access, reduce traffic volumes, and decrease vehicle speeds. These measures may include signage, markings, signals, paths, and other traffic calming improvements. Although some engineering solutions are higher-cost infrastructure improvements, many engineering tools can be implemented without large expenditures, such as posting signs, painting crosswalks, or striping bike lanes.

The School Zone

In Oregon, school zones can be designated on roadways contiguous to a school, and any crosswalks near school grounds. Regardless of a roadway's posted speed, the speed limit is 20 miles per hour in designated school zones between 7 AM and 5 PM. With School Zones signed and delineated, focused traffic enforcement can occur to target speeding and other moving violations.

School Area Signage

The 2003 Manual on Uniform Traffic Control Devices (MUTCD) and the 2005 Oregon MUTCD Supplement (OMUTCD) provide guidance on the use of school area signs and markings. Key signs include the School Crosswalk Warning, School Speed Limit, and School Advance Warning. The use of other signs is described in the MUTCD and the OMUTCD.

Pavement Markings

Pavement markings have definite and important functions in a proper scheme of school area traffic control. In some cases, they are used to supplement the regulations or warnings provided by devices such as traffic signs or signals. In other instances, they are used alone and produce results that cannot be obtained by use of any other device. Pavement markings can also serve as an effective means of conveying certain regulations, guidance, and warnings that could not otherwise be made clearly understandable. Pavement markings have limitations – they might not be clearly visible when wet or covered in snow, and might not be durable when subjected to heavy traffic. The "SLOW SCHOOL XING" marking, used in advance of uncontrolled crosswalks, is the most important school-specific pavement marking. The MUTCD and OMUTCD also provide guidance on the use of stop lines, yield lines, curb markings, and other symbol markings.

High-Visibility Signage

One way of increasing visibility of school area signage is through the use of Fluorescent Yellow-Green signs. When the fluorescent yellow-green background is used for school signing, a systematic approach should be used, so that the mixing of standard yellow and fluorescent yellow-green is avoided.

Sidewalks

Sidewalks represent the most fundamental element of the walking network, as they provide an area for pedestrian travel physically separated from vehicle traffic. Sidewalks are typically concrete and separated from the roadway by a curb and gutter. Sidewalks are a common application in urban and suburban environments, but are less common in rural areas and environments where objections to the "urban" aesthetic of sidewalks often arise. In rural areas such as Sisters, pedestrian travel commonly occurs along the shoulder of the roadway, or on sidewalks or asphalt paths adjacent to the roadway.

One of the first elements to observe when evaluating the walking environment around the school zone is the sidewalk network. Is a continuous network of sidewalks or pathways provided to access the school site from surrounding neighborhoods? Are there any gaps? What is the condition of the walkways?

Installing new sidewalks can be costly, particularly if drainage improvements (e.g., undergrounding of roadside culverts and installation of curb/gutter) is part of the design. However, fixing short gaps in an existing sidewalk network is important to ensure system continuity of the system and can be a relatively low-cost fix. Alternatives to sidewalks in rural areas include asphalt pedestrian paths separated from the roadway by a bioswale (to serve drainage purposes), or traffic-calming measures on lower-volume streets where pedestrians must share the road with motorists. These design alternatives exist throughout several neighborhoods in Sisters.

Shared Use Paths

Shared use paths (also referred to as "trails" and "multi-use paths") are often viewed as recreational facilities, but can also serve an important function as a walking and bicycling corridor to school. Shared use paths serve both bicyclists and pedestrians, and provide additional width over a standard sidewalk or pedestrian path. These facilities may be constructed adjacent to roads, through parks or open space areas, along creeks, or along linear corridors such as abandoned railroad lines. Mentioned earlier, shared use paths can serve as an alternative to formal curb, gutter and sidewalks in rural areas. If an asphalt hardscape is not desired, paths can be constructed with decomposed granite or another aggregate material to better fit in with the rural environment (as long as the surface type meets Americans with Disabilities Act (ADA) standards). Regardless of type, paths constructed adjacent to roadways must have some type of vertical (e.g., curb or barrier) or horizontal (e.g., landscaped strip) buffer separating the path area from adjacent travel lanes.

Crossings

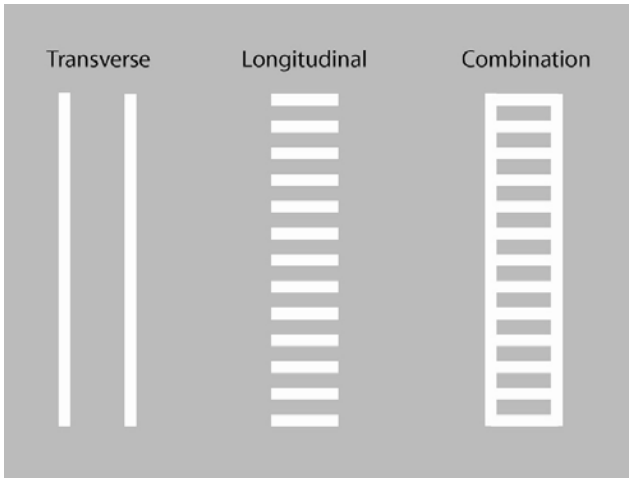
School crosswalks denote the preferred location for children to cross the street. Crosswalks should be marked at all intersections on established routes to school where there is substantial conflict between motorists, bicyclists, and pedestrian movements, where students are encouraged to cross between intersections, or where students would not otherwise recognize the proper place to cross. The SLOW SCHOOL XING marking is commonly used in advance of uncontrolled school

crosswalks. The MUTCD and OMUTCD provide guidance on the use of crosswalks as well as stop lines, yield lines, curb markings, and other symbol markings. The Oregon Department of Transportation (ODOT) Traffic Manual also provides guidance on the placement of crosswalks and other pavement markings on State highways. It should be noted that in most cases, an engineering study must be conducted prior to crosswalk installation.

Increasing Visibility of Pedestrians at Crossings

Described below, various treatments can be used to increase the visibility of pedestrians at crossing locations.

High-Visibility Crosswalk Striping



Various crosswalk striping patterns can be used – the most common types are shown in the diagram below. The basic crosswalk striping pattern consists of two parallel lines, called the "transverse" pattern. Other higher-visibility patterns include longitudinal and combination markings, which add bars for increased visibility.

Application of these high-visibility patterns varies widely from jurisdiction to jurisdiction; in some cities they are not used at all, while in other cities high-visibility crosswalks are used regularly. High-visibility markings should be considered for higher-volume crossings near schools, and where conditions demonstrate a need for an increased visibility marking (e.g., a mid-block location).

Even within a jurisdiction, there may not be consistent application of high-visibility patterns, with a mix of transverse or longitudinal patterns applied throughout a community. Should the City of Sisters choose to install high-visibility crosswalks, the City should adopt a single pattern and apply it consistently. Standardizing crosswalk markings helps both motorists and pedestrians recognize designated crossings. The MUTCD, OMUTCD, and ODOT Traffic Manual provide guidance for the use and placement of various crosswalk marking types.

Other Crosswalk Surface Treatments

Aside from the striping pattern, other crosswalk surface treatments can include textured surfaces or colored pavement. Although providing aesthetic benefits, this treatment can be expensive to implement and often require additional maintenance. In particular, textured surfaces such as

concrete or brick pavers are generally not recommended due to accessibility issues (e.g., potential difficulties for wheelchair users), long-term maintenance issues, and low visibility to motorists.

In-Street Yield-to-Pedestrian Signs

In-Street Yield-to-Pedestrian Signs are flexible plastic signs installed in the median (or street centerline) to enhance a crosswalk at uncontrolled crossing locations. These signs communicate variations of the basic message 'State Law: Yield to Pedestrians.' At school crosswalks, these signs are sometimes installed on a portable base and brought out in the morning and back in at the end of each day by school staff, which may reduce the chance that the sign will become "invisible" to motorists by being left out for longer time periods. Permanently-installed signs can create maintenance issues as they incur damage if struck by passing vehicles. Installing the signs in a raised median can help extend their lifetime.

Overhead Flashing Lights

Overhead flashing lights can be used at uncontrolled crossing locations with higher vehicle volumes or speeds, or where other conditions demonstrate a need for a more intense treatment than a high-visibility crosswalk. Several overhead flashing warning light types exist, including both standard yellow, fluorescent yellow-green, and LED displays. These hang from a mast arm extending over the street. Some applications use flashing red or yellow beacons to enhance overhead signs, while at others, it is the pedestrian crossing sign itself that flashes. These devices utilize passive or active actuation. Drawbacks of overhead flashing lights include higher cost and the fact that they may not be immediately understood by motorists.

In-Pavement Crosswalk Lights

In-pavement crosswalk lighting includes flashing lights mounted in the street pavement adjacent to the outer edge of crosswalk markings, positioned so as to be seen by oncoming traffic. The lights are actuated (either through a push-button or a motion sensor) to flash while the pedestrian crossing is in use. Several studies conclude that flashing lights embedded in the pavement at uncontrolled crosswalks have a positive effect in enhancing driver awareness of crosswalks and modifying driver habits to be more favorable to pedestrians.

Mid-Block Crossings

Because pedestrians tend to follow the most direct route to their destination, substantial demand for mid-block crossings exists when the nearest crosswalk is too far to expect pedestrians to walk (generally more than 500 feet between intersections). By channeling pedestrians to a preferred crossing location, mid-block crosswalks can enhance pedestrian safety where blocks are too long to expect all crossings to occur at intersections, and in places where large numbers of people are crossing mid-block.

Selection of appropriate locations should be undertaken carefully, especially on multi-lane (four or more lanes) roads with heavy traffic volumes (generally greater than 12,000 ADT). As part of the review process for crosswalk installation, an engineering study should be used to evaluate factors including (but not limited to) gaps in traffic, approaching vehicle speeds, sight distances, illumination, the needs of special populations, and the distance to the nearest traffic signal (if a signal exists). Uncontrolled crosswalks should not be installed near traffic signals, since pedestrians should be encouraged to cross at the signal in most situations. Mid-block crossings may be coupled with medians or pedestrian refuges to shorten crossing distances, especially in multi-lane locations with higher vehicle speeds and volumes.

Advance Stop Lines

Stop lines consist of solid white lines extending across approach lanes to indicate the point at which the stop is intended or required to be made, in compliance with a STOP sign or traffic signal. The MUTCD requires stop lines be placed a minimum of four feet in advance of the crosswalk line at controlled intersections. However, studies have shown that moving the stop line farther back from the crosswalk can increase pedestrian visibility. Some communities place stop lines 15 to 30 feet upstream from the crosswalk.

Traffic Signals and Pedestrians

Although roadway intersections in Sisters currently lack traffic signals, the following sections provide guidance for enhancing pedestrian comfort and safety should signals be used for intersection traffic control in the future. Traffic signals generally operate in one of three modes: fixed-time signals, which have a regular cycle of phases; fully-actuated signals, which use detection of vehicles and pedestrians to actuate all movements through the intersection; and semi-actuated signals which have vehicle and pedestrian detection on one or more roadway approaches. In both actuated signal situations, pedestrian detection typically consists of a push button. According to the MUTCD, pedestrian clearance time should be sufficient to allow a pedestrian who leaves the curb or shoulder (during the WALK signal indication) to travel at a walking speed of four feet per second to reach the far side of the street. The four feet per second "normal" walking rate has been greatly debated by transportation professionals, as many feel that it does not adequately take into account users who may walk slower, such as children or

senior citizens. Many transportation engineers working on pedestrian issues recommend using a walking speed of three or 3.5 feet per second in areas with higher concentrations of schoolchildren or senior citizens.

Leading Pedestrian Interval

The leading pedestrian interval (LPI) gives pedestrians an advance WALK signal before motorists in the adjacent travel lane(s) receive a green light. LPIs can reduce conflicts between pedestrians and right-turning vehicles, while also making pedestrians in crosswalks more visible to motorists.

Pedestrian Countdown Signals

Pedestrian countdown signals include a pedestrian signal with standard shapes and color and an added display showing a countdown of the remaining crossing time. The countdown timer starts either at the beginning of the pedestrian phase or at the onset of the pedestrian clearance interval. The timer continues counting down through the pedestrian clearance interval. At the end of the pedestrian clearance interval, the countdown device displays a zero and a solid DON'T WALK indication appears.

Curb Extensions

Curb extensions (sometimes called curb bulbs or bulb-outs) provide many benefits for pedestrians. They shorten the street crossing distance, provide additional space at corners, allow pedestrians to see and be seen before entering the crosswalk, and simplify the placement of elements such as curb ramps. Curb extensions may be used at any corner or mid-block location where an on-street parking lane can absorb the extension of the curb. Curb extensions are often effective at locations with crossing distances wider than 40 feet; locations adjacent to high-intensity pick-up/drop-off activity; or at locations with sight distance or visibility issues.

If not designed properly, curb extension could pose difficulties for bicyclists. Curb extensions should never extend into a bike lane, and should generally align with the edge of the on-street parking lane. Additionally, curb extensions can create drainage issues or trash accumulation, and may be expensive to install due to utility and drainage relocation.

Grade-Separated Crossings

Occasionally, it may be necessary to raise or lower a pedestrian crossing above or below the existing grade, using a pedestrian/bicycle overcrossing or undercrossing. Due to their relatively high cost, grade-separated crossings should only be considered when there are no safe and convenient alternative routes. Even in these cases, grade-separated crossings should be built only after careful consideration. Those that require significant elevation change (e.g., to cross over a major roadway) can be infrequently used by pedestrians. Grade-separated crossings can present safety and security issues by isolating bicyclists/pedestrians from other transportation users. For these reasons,

pedestrian treatments should be incorporated into existing and new vehicle crossings where feasible. The design of grade-separated crossings should be consistent with ODOT guidelines for shared use paths, in terms of width, grade, lighting, surfaces, and other characteristics.

Traffic Calming

Traffic calming is a traffic engineering technique prioritizing people over motor vehicles in the design of neighborhood streets. Traffic calming measures can enhance pedestrian safety and encourage safe driving by slowing motorists and reducing cut-through traffic on local streets. Potential traffic calming tools include raised crosswalks, curb extensions, chicanes, choker entrances, pedestrian refuge islands, medians, traffic circles and roundabouts, and speed humps.

Each traffic calming tool presents benefits and drawbacks. For instance, speed humps may slow vehicle speeds in a specific location, but may induce higher vehicle speeds between humps. Chicanes and chokers may slow traffic and provide reduced crossing distances for pedestrians, but may present obstacles to cyclists if not properly designed.

Lighting

Safe sidewalks and paths are primary ingredients of a good pedestrian environment, and well-lit environments convey a feeling of comfort and safety, particularly at night. Lighting should be located in the sidewalk's furnishings and/or frontage zones, and at all roadway crossings to increase pedestrian visibility. Lighting is also an important element for shared use paths, grade-separated crossings and other isolated locations.

On-Street Bicycle Facilities

Although some children may prefer to bicycle on the sidewalk, designated on-street bicycle facilities can provide a space for older or more-experienced children to bicycle on-street. Particularly for older grade levels (as children become more confident in their cycling skills and ride at faster speeds), designated on-street facilities may help to reduce bicycle/pedestrian conflicts on congested walkways near schools. Use of on-street facilities is more appropriate for children with better bike handling skills, as they need to be aware to stay within the bike lane (if striped) or to the right of traffic (on shared roadways), obey stop signs and other traffic signals, and watch for traffic pulling out of side streets or driveways. Bike lanes provide a striped and

stenciled lane for one-way travel on the roadway. Shared roadways provide for shared use of the roadway lane with motor vehicle traffic and are identified by signage.

Bicycle Parking

Providing secure and convenient bicycle parking is one way to help encourage more bicycling to school among children. Attributes of good bike parking include:

- Protection from vandalism/theft
- Protection from damage to the bicycle
- Protection from weather
- Convenient to destination

Described below, several factors should be considered when determining bicycle parking needs:

Amount: A sufficient amount of parking must be made available so that bicycles are not crowded. The Oregon Bicycle and Pedestrian Plan recommends four parking spaces per classroom for elementary and middle schools.

Location: The location must be convenient to the end destination. An appropriate location for the parking site needs to be identified.

Type of device: Many schools use "wheel holder" type racks which only support the bicycle by the wheel and can damage the bicycle, and also do not allow the bike to be locked up by the frame with a U-lock. The preferred bike rack design should keep the bike upright by supporting the frame, allow the bike to be locked by the frame, and allow one or both wheels to be secured.

Monitoring: A monitor could provide an additional level of security at the bike parking area, while another option includes placing bike parking in a visible location near school administrative offices or another location where a school staff member is present. Constructing a bike cage (where bike racks are placed inside a locked corral-type facility) can provide for electronic monitoring as only students with a key card or code can enter the cage.

Operational Tools: Improving the School Commute and Drop-Off/Pick-Up Areas

Operational tools focus on methods to ensure that vehicle traffic, busing, walking, and bicycling to school is conducted in the safest and most efficient way possible. The operational tools described below generally focus on vehicle pick-up and drop-off activities, ensuring adherence to established procedures, developing specific systems to move vehicles through the loading zone, and use of monitors to expedite the process. Other operational tools focus on strategies for incorporating walking and bicycling into the school commute, while ensuring that children are kept safe along the way. Operational tools can be very cost-effective and easy to implement, although they may involve a greater outlay of staff resources, and new operational methods may take some time to gain acceptance.

Crossing Guards

Adult crossing guards are used to help create gaps in traffic at uncontrolled intersections, and to "platoon" children across the street at controlled intersections, as currently practiced at Sisters Elementary School. The presence of a crossing guard in the roadway serves as an easily recognized indication to motorists that pedestrians are about to use the crosswalk and that all traffic must stop. When all traffic has stopped, the adult guard can allow children to cross.

Adult crossing guards are normally assigned where official supervision of elementary school pedestrians is desirable while they cross a street on the suggested route to school. The Oregon Department of Education provides recommendations regarding typology of flags, vests, and hats used by adult and child crossing guards.

School Safety Patrol

School Safety Patrols are comprised of students trained to guide school pedestrians and assist existing traffic control devices, police officers, or adult crossing guards. School Safety Patrols may be used to direct and control children at crossings near schools where there is no need to create adequate gaps in traffic.

School Safety Patrols control children, not vehicles. Safety Patrols stop children behind the curb or edge of the roadway and allow them to cross only when an adequate gap in traffic exists. Safety Patrols should be established only by agreement between the governing board of the school district and local traffic law enforcement agencies.

Drop-Off/Pick-Up Instruction Flyer

At the beginning of the school year, individual schools should send home a flyer clearly identifying the "do's" and "don'ts" of the drop-off and pick-up procedure. The flyer should include a map of the school site and surrounding streets, identifying the direction of travel, loading zones, parking locations, and parking restrictions to inform parents of proper procedures. These flyers should be re-sent to parents occasionally throughout the school year to remind them of these procedures.

Dedicated Bus Zones

Establishing separate areas for vehicular and bus traffic can help improve traffic flows in the pick-up/drop-off area. Conflicts often occur when private vehicles and buses arrive at the same time and in the same location. Separating traffic often necessitates establishing an off-street bus zone, dedicated solely to buses. Private vehicles should not be allowed to load/unload in the bus zone. Bus zones need to be large enough to accommodate all buses that might be parking there at one time. Sometimes it is possible to stagger bus arrival times, thus requiring less space. The zones must be clearly marked and there should be adequate sidewalk space for students to wait for the bus. Dedicated bus zones currently exist at Sisters Middle School.

Parent Drop-Off/Pick-Up Operations

Creation of a parent drop-off/pick-up "loop" can help maximize capacity and safety and minimize delay in drop-off and pick-up operations. The loop can include either a dedicated lane for pick-up/drop-off activities, or a portion of the larger parking lot that has been marked with cones to serve as the pick-up/drop-off loop. Regardless of the design, having staff or volunteers available to supervise drop-off/pick-up activities will often play a large part in making the procedures successful. Having supervisors present can help to ensure that loading/unloading moves forward smoothly and efficiently, maximizing the space available with no bottlenecks. Sisters Elementary School and Middle School each have varying forms of drop-off/pick-up loops.

Valet Drop-Off

Valet drop-off is a technique to improve traffic flow within the drop-off and pick-up loop by assisting students into and out of vehicles. A "valet" is present at the pick-up/drop-off area to open car doors and assist students into and out of arriving vehicles, improving the overall traffic flow. The valet system eliminates the need for parents to step out of the vehicle to open the door for a child and remove bags or other items. The valet system is typically staffed by school staff or parent volunteers, who can quickly and efficiently move children into and out of vehicles and hold onto backpacks, umbrellas and other items. Some schools use older grade students as valets (for example 5th or 6th graders help younger students). However, student volunteers must get out of class early to prepare for pick-up.

A supplement to the valet system is a nameplate in the vehicle window identifying which student needs to be picked up. This allows the valet to find an inattentive student and bring them to the arriving vehicle.

Platooning Drop-Off/Pick-Up System

In a platooning system, all vehicles are unloaded/loaded simultaneously before proceeding to the exit. If a vehicle unloads or loads more efficiently than the vehicle in front of it, the rear vehicle must wait for the lead vehicle to finish unloading/loading before following it out of the loop. This tool is best used to control the parent inclination to always drop-off and pick-up a student directly in front of the school. Available curb loading downstream of the school is often severely underutilized, creating excess congestion and delay near the lot entrance. At least two monitors are needed to effectively operate the vehicle platoon – one at the loop entrance to direct the maximum number of vehicles into the lot for a single cycle, and a second to ensure that the lead vehicle proceeds to the front-most loading stall.

Walking School Bus/Bike Train

If parents are uncomfortable allowing their children to walk or bicycle alone to or from school, parent or neighborhood volunteers can escort a group of children walking or bicycling to school together in a "Walking School Bus" or "Bike Train." Children can be picked up at home along the route, or at designated staging areas. The parents offer a level of supervision and protection and the larger numbers allow children to be more visible to traffic. Usually, one parent acts as the organizer, recruiting other parents, neighbors, seniors or community volunteers to walk or bicycle with the children. As in a carpool, participants need to work out schedules and meeting places. Adults and children can wear safety vests or use other means to enhance visibility.

Park-and-Walk

In a Park-and-Walk system, parents are encouraged to park their vehicles and walk the remaining distance to school with their children (or drop-off and pick-up their children who then walk by themselves or with other children to and from school). Park-and-Walk locations are typically established two to four blocks from the school site. This approach helps alleviate some traffic congestion in the immediate school zone, and also allows children to get a bit of exercise on their way to school. As a first step, an appropriate location for the parking site needs to be identified.

School Busing

School busing has been used for generations to safely and reliably deliver students to school who are outside of a reasonable walking distance. School busing can be very effective in reducing single-child vehicle trips and decreasing traffic around school sites. The benefits of longer-distance school busing should not be confused with short-distance "hazard" busing, where students who live very close to school (in some cases less than one-half mile) are bused because walking routes are considered unsafe.

Alternate Traffic Patterns

In some cases, implementing "alternate" traffic patterns near schools can improve traffic flow and pedestrian/bicycle circulation by maximizing the use of existing roadway capacity. Potential solutions for improving off-site traffic circulation may include establishing permanent or temporary one-way circulation on streets adjacent to the school, or using temporary cones to separate travel lanes or delineate on-street loading zones. Implementation of these tools should be undertaken only after review by a local traffic engineer.

Staggered Bell Times

Staggered bell times can help disperse traffic at schools with larger student populations or when two or more schools are in close proximity to one another. Staggering school bell times creates a "spreading of the traffic peak" by breaking up the start and/or release time of students into groups of two or more. For a single school application, students' start and end time should be grouped by grade levels. The start times of these groups should be at least 15 minutes apart. This allows vehicles from the first group to leave the school or be completely out of the area by the time the second group arrives. With multiple schools, staggered bell times can be coordinated among two or more schools to ensure that significant volumes of traffic do not use competing transportation facilities simultaneously.

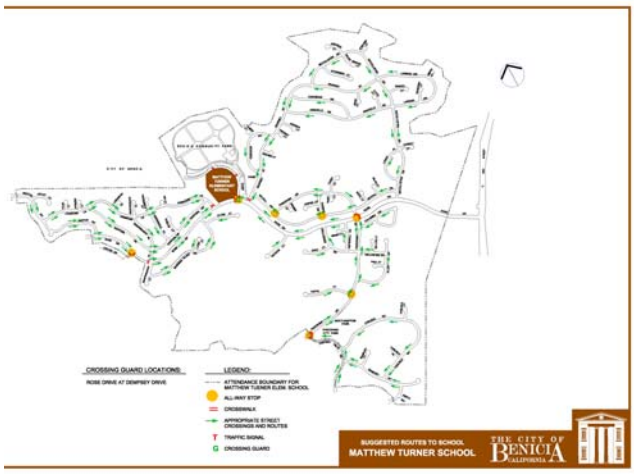
EDUCATION AND ENCOURAGEMENT TOOLS: TEACHING SAFETY AND PROMOTING AWARENESS

Education and encouragement tools focus on teaching traffic, pedestrian and bicycle safety to parents and students, increasing public awareness of Safe Routes to School goals and benefits, and promoting behavioral changes to increase walking and bicycling. Educational activities teach children age-appropriate skills related to bicycling and walking, familiarize students with the benefits of bicycling and walking, and foster greater commuter attention regarding safe operation of motor vehicles. Encouragement activities include a variety of special events and contests, outreach campaigns, presentations to school and community groups, and surveys of current practices and attitudes related to the school commute. A major objective of educational and encouragement tools

is to increase the understanding of parents, school personnel, students, and the community of the health and safety concerns that can be addressed by successful SR2S programs.

Suggested Route to School Maps

Suggested route to school maps are one of the most cost-effective and tangible means available for encouraging children to walk or bike to school. The purpose of the maps is to provide school officials, parents, and students with a tool to help plan the best walking and bicycling routes to and from school. The maps help illustrate the safest walking, bicycling, and crossing locations by identifying traffic controls, crossing guard locations, and the presence of sidewalks, paths, or bicycle facilities along routes leading to a given school. In addition to being used as a resource for parents and school staff, suggested route to school maps can serve as a tool for city staff to identify the location of needed transportation infrastructure improvements in school areas.



Local jurisdictions should consider assisting their school districts in developing and distributing suggested route to school maps to local schools. Maps can be handed out to parents at the beginning of each school year, posted prominently at each school in a location, and made available on the school's website. Other locations for posting or distributing maps might include local libraries and neighborhood community centers.

As a starting point for developing a map, city staff should conduct field visits to inventory traffic controls, signage, crosswalks, and other physical conditions on streets surrounding the school. Factors that contribute to designating the "best" routes to a school include the presence of traffic controls, crosswalks, and or crossing guards at key crossing locations, and presence of sidewalks or bike lanes along street segments. In some cases, pedestrian paths or known off-street cut-throughs (such as a path leading to the back of a school) are noted as suggested routes. The suggested routes usually extend about one-half mile for elementary schools, and about one mile for junior high and high schools.

Cities or school districts occasionally cite liability concerns as reasons for not publishing walking and/or bicycling route maps. While no route will ever be completely free of pedestrian/bicycle safety concerns, a well-defined route should provide the greatest physical separation between

walking children and traffic, expose children to the lowest traffic speeds, and have the fewest roadway crossings. Local jurisdictions should follow these basic guidelines when identifying routes, should regularly review walking routes to ensure that traffic conditions have not changed, and should make engineering improvements as appropriate to improve safety along routes. These steps should ensure that local jurisdictions or schools do not have increased liability as a result of publishing walking routes.

Two maps at the end of this report highlight existing bicycle/pedestrian facilities and recommended improvements for Sisters Elementary and Middle schools. The City and school district could use these maps as a starting point for identifying the most suitable existing walking/bicycling routes, as well as potential measures for improving conditions for non-motorized users.

Walk and Bike to School Days

Walk and Bike to School Days are special events encouraging children to try walking or bicycling to school. The most well-known of these is International Walk to School Day, a major annual event attracting millions of participants in over 30 countries in October. Additional walk and bike to school days can be held yearly, monthly, or even weekly, depending on the level of support and participation among children, parents, and school and local officials. Some schools organize more frequent days – such as weekly Walking/Wheeling Wednesdays or Walk and Roll Fridays – providing opportunities to enjoy the event on a regular basis. Parents and other volunteers accompany the children, and often there are designated staging areas along the route where several groups can gather and walk or bike together. The events should be promoted through press releases, articles in school newsletters, and posters and flyers for children to take home.

Classroom Lessons and Activities

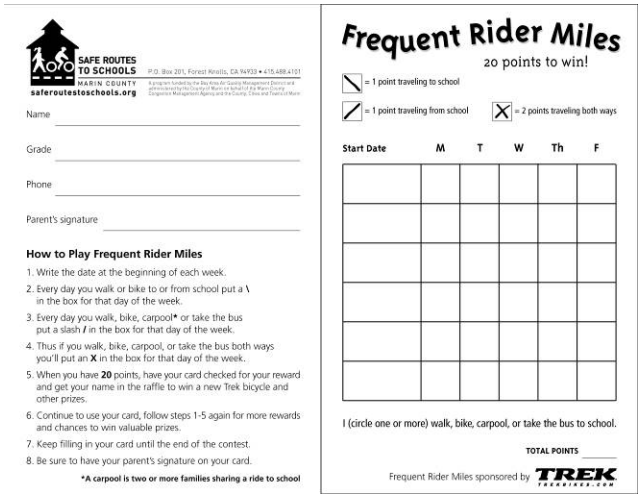
A variety of curricula and classroom activities are available to help teach children about walking, bicycling, health and traffic safety. These may include lessons given by a law enforcement officer or other trained professional, or simply as a lesson plan developed by teachers. Example topics might include: Safe Street Crossing; Helmet Safety; Rules of the Road for Bicycles; Health and Environmental Benefits of Walking and Biking; and Stranger Safety. A growing movement exists to develop SR2S curricula that can be incorporated into regular math and problem solving lesson plans so that these activities do not take away from regular teaching time.

The "Walk and Bike Across America" project represents an example lesson plan, in which students track the number of miles they each travel (walking or bicycling) to and from school

on a daily basis, and add the class miles together to travel across a map of the United States. The students can conduct the activity as a class, or gather miles from the entire school (thus increasing the number of miles that they can travel). Along the way, students "visit" locations such as national parks and historical monuments, learning lessons on history, culture and geography as they go.

Contests

Contests are activities that reward children by keeping track of the number of times they walk, bike, or carpool to school. Contests can include individual, classroom, or interschool competitions. Local businesses often provide incentives and prizes. Two context examples are described below.


SAFE ROUTES TO SCHOOLS
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A program funded by the Bay Area Air Quality Management District and administered by the County of Marin on behalf of the Marin County Congestion Management Agency and the County, Cities and Towns of Marin

Name _____

Grade _____

Phone _____

Parent's signature _____

How to Play Frequent Rider Miles

1. Write the date at the beginning of each week.
2. Every day you walk or bike to or from school put a \ in the box for that day of the week.
3. Every day you walk, bike, carpool* or take the bus put a slash / in the box for that day of the week.
4. Thus if you walk, bike, carpool, or take the bus both ways you'll put an **X** in the box for that day of the week.
5. When you have **20** points, have your card checked for your reward and get your name in the raffle to win a new Trek bicycle and other prizes.
6. Continue to use your card, follow steps 1-5 again for more rewards and chances to win valuable prizes.
7. Keep filling in your card until the end of the contest.
8. Be sure to have your parent's signature on your card.

***A carpool is two or more families sharing a ride to school**

Frequent Rider Miles

20 points to win!

\ = 1 point traveling to school

/ = 1 point traveling from school

X = 2 points traveling both ways

Start Date	M	T	W	Th	F

I (circle one or more) walk, bike, carpool, or take the bus to school.

TOTAL POINTS _____

Frequent Rider Miles sponsored by TREK

Frequent Rider Miles – Children are issued tally cards to keep track of "points" for each time they walk, bike, bus, or carpool to or from school. After accruing a specified number of points, they earn a small prize and are entered in a raffle for a larger prize. At the end of the school year, there is a drawing for major prizes.

Golden Sneaker Award – Each class keeps track of the number of times students walk, bike, bus, or carpool to school, and compiles these figures monthly. The class with the most participation earns the Golden Sneaker Award (the award is created by taking a sneaker and spray painting it gold). The winning class usually earns an added treat like a pizza or ice cream party.

Safety Education

Pedestrian and bicycle safety education helps ensure that children become knowledgeable of basic traffic safety rules. Pedestrian training is typically recommended for first- and second-graders, and teaches basic lessons such as "look left, right, and left again."

Bicycle safety training is normally appropriate beginning in the third grade, and helps children understand that they have the same responsibilities as motorists to obey traffic laws. Child bicycle safety education is often conducted in the "bicycle rodeo" format, using various stations to teach children traffic safety and bicycle control. Most rodeos include a stop sign course, teaching children how to stop and look for oncoming traffic. Other stations teach balance, stopping, turning, and control. Rodeos also provide an opportunity to check children's bikes and instruct them on proper helmet use.

Although not a substitute for safety lessons conducted by trained instructors, many agencies including the American Automobile

Association, the National Highway Traffic Safety Administration, and private companies produce informational brochures, flyers and activity books designed to teach students, parents, and motorists about safe walking, bicycling and traffic behavior. These books can be distributed with the weekly "backpack mail," or be handed out as part of a safety lesson. Schools or Parent Teacher Associations can also create original flyers unique to the school.

Banners and Signs

Banners and signs can be effective tools to remind motorists about traffic safety in school zones. Large banners can be hung over or along roadways near schools with readable letters cautioning motorists to slow down, stop at stop signs, or watch for children in crosswalks, using catchy phrases such as:

- Drive 25, Keep Kids Alive
- Give Our Kids a Brake

If there are active local residents, lawn signs can be placed on private property near schools and along routes with similar messages. Signs and banners should be rotated or moved frequently so that they do not risk becoming "invisible" to motorists.

ENFORCEMENT TOOLS: ENSURING COMPLIANCE WITH TRAFFIC LAWS

Enforcement tools are aimed at ensuring compliance with traffic and parking laws in school zones. Through a variety of active and passive methods, enforcement activities help address safety issues including speeding, failing to yield to pedestrians, illegal turns, illegal parking, and other violations. Enforcement strategies, in conjunction with education efforts, clearly demonstrate what is expected of motor vehicle operators and make them accountable for the consequences of their actions. While enforcement tools logically center on police and other law enforcement, they also entail working with school officials, crossing guards, parents and volunteers. In addition to motor vehicle enforcement, these activities also focus on ensuring that students walking and bicycling to school comply with traffic laws.

Targeted Enforcement

Law enforcement agencies can increase the presence of police near schools or high-conflict areas to curb unlawful behavior. People tend to slow down and improve their driving behavior if they expect law enforcement to be present. These targeted enforcement activities can be effective but are labor intensive in that they require dedication of police officer resources in a single location. In addition, once the targeted enforcement period has ended and motorists realize that the police presence is gone, they may revert to speeding or driving unsafely.

Crosswalk Stings

In a crosswalk sting operation, the local police department targets motorists failing to yield to pedestrians in a crosswalk. A plain-clothes "decoy" police officer ventures into a crosswalk or crossing guard-monitored location, and motorists who do not yield are given a citation by a second officer stationed nearby. Typically a motorcycle officer issues the citations, hidden between nearby parked vehicles. The police department or school district may alert the media to crosswalk stings to increase public awareness of the issue of crosswalk safety, and news cameras may accompany the police officers to report on the sting.

School Parking Lot "Citations"

If on-site parking problems exist at a school (e.g., parents leaving vehicles unattended in loading zones), school staff may issue parking lot "citations." These citations are actually warnings designed to look like police tickets, intended to educate parents about how parking in improper zones can create safety hazards or disrupt traffic flow for other parents during the pick-up/drop-off period.

Neighborhood Speed Watch

In areas where potential speeding problems have been identified by residents, a Neighborhood Speed Watch can be used to warn motorists that they are exceeding the speed limit. A radar unit is loaned to a designated neighborhood representative to record speed information about vehicles. The person operating the radar unit must record information, such as make, model, and license number of offending vehicles. This information is sent to the local law enforcement agency having jurisdiction at the location of violations. The department then sends a letter to the registered vehicle owner, informing them that the vehicle was observed exceeding the posted speed limit on a specific street. Letters are typically sent out to those driving at least five miles per hour over the speed limit. Although not a formal citation, the letter explains that local residents are concerned about safety.

Radar Trailers

Speed Radar Trailers can be used to reduce speeds and enforce speed limit violations in known problem areas. In areas with speeding problems, police set up an unmanned trailer displaying the speed of approaching motorists along with a speed limit sign.

Radar trailers can be used as both an educational and enforcement tool. By itself, the unmanned trailer serves as effective education to motorists about their current speed in relation to the speed limit. As an alternative enforcement measure, the police department may choose to station an officer

near the trailer to issue citations to motorists exceeding the speed limit. Because they can be easily moved, radar trailers are often brought to streets where local residents have complained about speeding problems. If frequently left in the same location without officer presence, motorists may learn that speeding in that location will not result in a citation.

Speed Feedback Signs

A permanent speed radar sign can be used to display approaching vehicle speeds and speed limits on roadways near the school site. The unit is a fixed speed limit sign with a built-in radar display unit operating similar to a Radar Trailer. In order to maximize effectiveness for school settings, the radar display unit should be set to only activate during school commute hours.

Roadways approaching the school site are the most appropriate location to display speeds, as opposed to streets along the school frontage that will likely have lower speeds due to pick-up/drop-off traffic.

EVALUATION TOOLS: MEASURING SR2S PROGRESS AND SUCCESS

SR2S evaluation tools are equally important to infrastructure projects and programmatic efforts. Measuring the effectiveness of SR2S projects and programs, evaluation tools enable communities to allocate and/or re-allocate limited financial resources as necessary. Typical measures of effectiveness include:

- Improvements to the pedestrian/bicycle system (e.g., proportion of streets with complete sidewalks, intersections with safe and convenient crossing treatments, adequate bike parking facilities, etc.)

- Number and/or proportion of children walking and bicycling to school

The following sections briefly describe common SR2S evaluation tools.

Hand Raising Surveys

In-class hand raising surveys gauge walking/bicycling participation among students. These surveys typically include simple questions (e.g., "How did you get to school today?") administered by a class teacher or other school official. Surveys should be conducted in each classroom at the same time each year. This tool enables City and school leaders to measure student bicycling and walking trends

over time (e.g., before and after project/program implementation). ODOT provides guidance on survey structure and methods.

Parent Take-Home Surveys

Parent take-home surveys provide another means for gauging walking/bicycling participation among students. These surveys can also glean additional parent information (e.g., reasons for not allowing their child to walk or ride to school). School officials can sort completed surveys based on the distance between the school and respondents' homes (e.g., at one-half mile intervals) to evaluate a program's effect on students living within reasonable walking and bicycling distance of the school. Incentives (e.g., entering the names of survey respondents into a raffle) represent strategies for increasing survey response rates.

RESOURCES: LINKS TO OTHER SR2S TOOLKITS AND GUIDEBOOKS

National Center for Safe Routes to School

The National Center for Safe Routes to School assists communities in enabling and encouraging children to safely walk and bike to school. The Center strives to equip Safe Routes to School programs with the knowledge and technical information to implement safe and successful strategies. The website includes links to an academy of National SR2S Instructors who lead trainings and provide assistance to local jurisdictions wishing to develop a SR2S program.

www.saferoutesinfo.org

KidsWalk-to-School: A Guide to Promote Walking to School

This guide by the Centers for Disease Control and Prevention is a tool to help develop a walk-to-school program appropriate for your neighborhood. It includes a checklist and step-by-step guidelines for creating a KidsWalk-to-School program such as a "walking school bus." Sample letters, surveys, forms, and an extensive list of resources are included.

www.cdc.gov/nccdphp/dnpa/kidswalk.htm

Pedestrian Safety Toolkit

This toolkit includes resource materials that states and communities can use to implement pedestrian safety programs. The toolkit contains a compilation of Federal agency pedestrian safety videos; an interactive CD-ROM of pedestrian resources with subject-to-subject cross referencing; a user manual explaining how to create effective pedestrian safety programs; a resource manual that references NHTSA, Federal Highway Administration and Federal Railroad Administration materials; and sample materials and information covering the basics for all who want to promote pedestrian safety and advocacy.

www.nhtsa.dot.gov

Safe Routes to Schools Toolkit

This toolkit, developed by the Marin County Safe Routes to Schools project in California — in partnership with NHTSA and the California Department of Health Services — is designed to be used in initiating and implementing a Safe Routes to Schools program. It includes examples of classroom activities, ideas for promotions, information on safe streets, resources, and forms to assist you along the way.

http://www.nhtsa.dot.gov/people/injury/pedbimot/bike/Safe-Routes-2002/toc.html

Safe Ways to School Toolkit

This toolkit details systematically how to create a Safe Ways to School program for your community. It provides an overview of the implementation process, and includes sample tools such as a student travel survey, parent survey, neighborhood site assessment, and implementation ideas. The toolkit also contains a video and sample materials, including handouts for students, parents, and schools.

http://www.dcp.ufl.edu/centers/trafficsafetyed/safeways.htm

Way to Go! Manual and Resource Kit

The "Way to Go! Manual and Resource Kit" can help parents, teachers, and student groups design and implement school-based, traffic-reduction programs in their communities. The kit includes strategies, information, and educational and curriculum resources. Other manuals available include: "Bike Smarts: A Handbook;" "RoadSenseKids: Passport to Safety (Teaching Guide for K-3);" and "Walking/Wheeling Challenge Map."

www.waytogo.icbc.bc.ca

National Strategies for Advancing Child Pedestrian Safety and National Strategies for Advancing Bicycle Safety

"National Strategies for Advancing Child Pedestrian Safety" details six strategies and action steps readily implemented by anyone interested in reducing pedestrian injuries among children, all while encouraging them to become more active and explore their environment on foot. "National Strategies for Advancing Bicycle Safety" is designed to be a roadmap for policy makers, safety specialists, educators, and the bicycling community to follow as they promote national, state and local efforts to increase safe bicycling. It includes goals, strategies, short- and long-term actions that can reduce injuries associated with bicycling.

http://www.nhtsa.dot.gov/people/injury/pedbimot/bike/bicycle_safety/

SISTERS SAFE ROUTES TO SCHOOL ACTION PLAN

The Sisters Safe Routes to School Action Plan provides a starting point for improving walking and bicycling among Sisters children. Specifically, the Action Plan presents a diverse set of strategies to enhance and promote bicycling and walking among Sisters Elementary and Middle School students. The Plan begins with a review of existing conditions, followed by a discussion of current

walking/bicycling challenges. The Action Plan concludes with specific recommendations, intended to build upon the tremendous work completed to date.

Existing Conditions

The following sections describe existing conditions relevant to Safe Routes to School in Sisters. The sections describe the existing walking/bicycling environment in vicinity of Sisters Elementary and Middle schools, and also review current programmatic efforts. Also included is a discussion of current issues challenging walkers and bicyclists at each school.

Sisters Elementary School

INFRASTRUCTURE OVERVIEW

Sisters Elementary School is located on Cascade Avenue east of Locust Street and north of U.S. 20. Most vehicle and bus traffic access the school via Cascade Avenue, Locust Street, and other streets immediately west of campus. Immediately before and after school hours, the school's parking lot serves as a one-way drop-off/pick-up loop, with loading/unloading activities occurring near the school's main entrance. Bus loading and unloading occurs in a dedicated zone adjacent to Cascade Avenue near the main building entrance.

The availability of sidewalks and other pedestrian infrastructure in vicinity of Sisters Elementary School varies by location. A fragmented sidewalk system exists on streets immediately north and east of the school campus, with some streets having sidewalks or pedestrian paths on one side only (e.g., portions of Cascade Avenue), or no pedestrian facilities altogether (e.g., Timber Creek Drive). A more-complete sidewalk system exists west of Locust Street. On streets lacking sidewalks, students have created demand paths through front yards or in adjacent ditches. With the exception of striped bike lanes on Locust Street north of U.S. 20, shared roadways comprise the vast majority of bicycle facilities in the school's immediate vicinity. The Elementary School's bike parking consists of a single uncovered bike rack near the main building entrance.

Marked crosswalks (some with accompanying warning signs) exist at some intersections and mid-block locations immediately adjacent to the school. Specific locations include Cascade Avenue at Maple Street, Cascade Avenue at Locus Street, U.S. 20 at Locust Street, and Locust Street between U.S. 20 and Cascade Avenue.

Most streets in the school's vicinity have a 25 MPH posted speed limit, while several local streets west of the campus (e.g., Hood and Main avenues) have 20 MPH posted speeds. The segment of U.S. 20 immediately south of the school has a 30 MPH posted speed limit, while segments of U.S. 20 and OR 126 farther east have posted speeds of 40 MPH.

PROGRAMS OVERVIEW

Sisters Elementary School currently benefits from a variety of operational and programmatic efforts aimed at improving the walking and bicycling environment:

- Sisters Elementary School teachers serve as crossing guards to increase visibility of students crossing Cascade Avenue
- Conversion of the school's parking lot into a one-way pick-up/drop-off loop facilitates relatively-efficient vehicle circulation

- "No Idling" signs posted in the school parking lot contribute to cleaner air by encouraging motorists to turn off car engines while parked
- The school's newsletter regularly publishes information about Safe Routes to School events
- The school occasionally hosts brownbag events focused on safety education
- Oregon's Bicycle Transportation Alliance occasionally provides teacher education sessions

- The Sisters Police Department recently received grant funding to purchase a radar gun for speed enforcement purposes
- Teachers conduct hand raising surveys to measure student walking/bicycling participation
- School officials regularly measure vehicle volumes during drop-off/pick-up periods

CURRENT ISSUES

The Project Team, school officials, and city staff conducted a brief walking audit in April 2008 to identify issues challenging the Elementary School's current walking and bicycling environment. This exercise also included observations of drop-off/pick-up activities. The April Community Forum also provided residents opportunities to voice issues and concerns. Major issues complicating pedestrian and bicycle travel to/from the school include the following:

- Discontinuous sidewalks force pedestrians to walk in the road or in adjacent yards
- Inattentive motorists occasionally do not see pedestrians attempting to cross major streets
- Westbound motorists entering Sisters on U.S. 20 occasionally do not reduce speeds despite the presence of lower posted speeds
- Parked vehicles regularly block the pedestrian travelway on Cascade Avenue east of the school
- Markings at several nearby crosswalks have faded
- Despite the presence of a crosswalk, higher vehicle speeds and volumes on U.S. 20 create challenging bicycle/pedestrian crossing conditions
- Sidewalks lack curb ramps in some locations (e.g., the mid-block crossing on Locust Street immediately west of the school)
- Students bicycling on sidewalks create conflicts with pedestrians
- Bicyclists and pedestrians conflict on the relatively narrow path near the school's administration building

- The absence of a northbound bike lane on Locust Street near Cascade Avenue forces cyclists to mix with higher volumes of vehicle traffic
- Demand often exceeds capacity at the school's single bike rack; the rack is also considered substandard because it does not allow a bicycle frame and at least one wheel to be locked simultaneously
- Periodic vehicle queuing occurs on the pick-up/drop-off loop
- Some parents drive their children relatively short distances to school in response to perceived pedestrian/bicycle safety issues

Sisters Middle School

INFRASTRUCTURE OVERVIEW

Sisters Middle School is located on OR 242 on the far west side of town. Most vehicle and bus traffic access the school via OR 242, although some motorists utilize a rear entrance on McKinney Butte Road. The vehicle pick-up/drop-off loop is situated between the campus entrance and east parking lot, while a dedicated bus loop (with a separate entrance) lies immediately west of the vehicle pick-up/drop-off loop.

Limited pedestrian facilities exist within the school's immediate vicinity, partly due to the school's location on Sisters' outer fringe. Sidewalks and/or pedestrian paths exist on both sides of streets in most residential areas and on major streets (e.g., McKinney Butte Road). Striped bike lanes exist on OR 242 west of Hood Avenue, while lower volume streets serve bicyclists in other areas near the school. A shared use path currently extends north from McKinney Butte Road to the Tollgate subdivision, while a network of unpaved trails provide short cuts where formalized pedestrian/bicycle facilities do not exist. The City of Sisters plans to construct a shared use path on the north side of OR 242 between Hood Avenue and the Middle School entrance, with a potential future extension to McKinney Butte Road. This facility will greatly enhance non-motorized system connectivity.

Marked crosswalks exist in limited locations in vicinity of Sisters Middle School. Most marked crossings exist along McKinney Butte Road (including a crosswalk at the school's rear entrance). The school's bike parking consists of a single uncovered bike rack located behind the main building. With the exception of OR 242 (which has a posted speed of 40 MPH), most streets in the school's vicinity have a 25 MPH posted speed limit.

PROGRAMS OVERVIEW

Although Sisters Middle School does not have any active SR2S programs in place, several elements benefit the school's walking and bicycling environment:

- The school's separate vehicle and bus drop-off/pick-up loops contribute to more efficient loading/unloading activities
- The planned OR 242 shared use path will greatly enhance connections between the school an areas to the east
- Oregon's Bicycle Transportation Alliance occasionally provides teacher education sessions

- The Sisters Police Department recently received grant funding to purchase a radar gun for speed enforcement purposes

CURRENT ISSUES

The Project Team, school officials, and city staff conducted a brief walking audit in April 2008 to identify issues challenging the Middle School's current walking and bicycling environment. This exercise also included observations of drop-off/pick-up activities. The April Community Forum also provided residents opportunities to voice issues and concerns. Major issues complicating pedestrian and bicycle travel to/from the school include the following:

- The school's bike parking is located in an inconspicuous location and appears to be damaged; the bike rack is also considered substandard because it does not allow a bicycle frame and at least one wheel to be locked simultaneously
- Portions of the vehicle pick-up/drop-off loop are occasionally underutilized, with vehicle queuing occurring in some locations while available capacity exists in other locations; motorists were also observed disobeying "No Parking" signs in some locations
- The lack of marked crosswalks at some intersections along McKinney Butte Road creates challenging pedestrian crossing conditions
- Discontinuous sidewalks on McKinney Road and other streets forces pedestrians to walk in the roadway or on adjacent gravel shoulders (if they exist)
- Direct connections between the school and Tollgate Trail currently do not exist

Recommended Improvements

The following sections describe recommended infrastructure and programmatic improvements for Sisters Elementary and Middle schools. The recommendations were based on observations from the April 2008 walking audits, input from school officials and City staff, as well as comments received at the April 2008 Safe Routes to School community forum. The sections first describe recommended infrastructure improvements for each school, followed by a general discussion of programmatic measures.

Infrastructure Improvements

SISTERS ELEMENTARY SCHOOL

The attached Project Description Sheet depicts recommended infrastructure improvements in vicinity of Sisters Elementary School. The recommended improvements largely focus on completing the sidewalk/pedestrian path network, thereby enhancing pedestrian system connectivity. These sidewalk/pedestrian path infill projects would generally occur on streets northeast and southwest of the school where numerous gaps currently exist. A sidewalk is also proposed in the school parking lot to provide a formalized, more direct route between Locust Street and the school entrance. Alternatives to sidewalks (where physical or other severe constraints exist) include traffic calming measures to reduce vehicle speeds).

The map also depicts several intersection improvement locations, particularly along U.S. 20, Cascade Avenue, and Locust Street. Most intersection improvement projects consist of upgrading existing crosswalks with high-visibility markings, as well as new crosswalks at additional locations. Other

potential intersection improvements include reconfiguring the U.S. 20 intersection at Larch Street near downtown Sisters.

Bicycle system improvements include shared roadway treatments (e.g., signage and/or pavement markings) on Cascade Avenue to improve driver awareness of bicyclists. The map also depicts bike lanes on nearby roadways including Locust Street and portions of Hood and Main avenues. The proposed intersection improvements described above will also benefit bicyclists.

Other proposed improvements include replacing the existing school bike rack with a covered facility with greater capacity, and evaluating strategies to further improve traffic flow in the drop-off/pick-up loop.

SISTERS MIDDLE SCHOOL

A second Project Description Sheet at the end of this report depicts recommended infrastructure improvements in vicinity of Sisters Middle School. Most recommended projects include sidewalks and/or pedestrian paths on surrounding roads such as McKinney Butte Road, Trinity Way, and Brooks Camp Road. Mentioned earlier, traffic calming measures could serve as sidewalk alternatives where physical or other severe constraints exist). The map also depicts the planned OR 242 shared use path, as well as other short but critical path segments to enhance system connectivity. Existing informal paths, particularly north and west of the school, should be upgraded to provide additional connectivity.

The recommended intersection improvements largely exist along the McKinney Butte Road and OR 242 corridors, with the McKinney Butte Road projects including high-visibility crosswalk markings, and the OR 242 projects including signage and markings at trail/roadway crossings.

Bicycle system improvements include the planned OR 242 shared use path, an extension of the Tollgate Trail, as well as internal campus path segments. Bike lanes on McKinney Butte Road and Hood Avenue would enhance connectivity between the Middle School and destinations to the east.

Other proposed improvements include relocating the school's bicycle parking to a covered area near the main building entrance, and addressing vehicle queuing in the drop-off/pick-up area with higher-visibility signage and/or encouraging motorists to utilize the adjacent parking lot.

Programmatic Measures

This toolkit provides a diverse menu of SR2S programmatic measures, some of which are currently practiced in Sisters. The City, school district, and other relevant parties should continue these programs to further enhance walking and bicycling among children. These parties should also consider implementing the measures listed below, many of which were proposed by City and school officials as well as Sisters residents.

- Provide incentives for walking and bicycling (e.g., contests, raffles, distribute free bike lights, etc.); consider conducting focus groups with children to identify the best incentives

- Encourage carpooling among students who live farther distances from school, but within close proximity to one another

- Establish a weekly or monthly Walking School Bus or Bike Train (to be hosted by parents or high school students)

- Create an in-class education campaign about proper bicycling techniques and rules of the road

- Create an event (e.g., grand opening party) to publicize completion of the OR 242 path and other community trails) with an emphasis on child participation

- Promote and encourage families to participate in International Walk-to-School Day in October; establish additional Walk-to-School days during other times of the year

- Create a bicycle safety team to teach in-class bike safety courses

- Develop annual surveys to gauge student walking/bicycling participation

These measures represent a starting point for enhancing Sisters' SR2S Program, and the City, school district, residents, and other interested parties are encouraged to develop and implement additional strategies as appropriate.

Project/Program Implementation

Responsibility for project implementation largely depends on the project under focus. The Sisters School District would likely lead on-site campus infrastructure improvements (e.g., bike parking and drop-off/pick-up loop circulation enhancements), though coordination with the City and ODOT may be necessary. Depending on the roadway under focus, street improvement projects fall under the jurisdiction of ODOT, Deschutes County, or the City. Specific roadway design elements (e.g., crosswalk marking location and type) are also subject to agency standards.

Responsibility for program implementation also depends on the program under focus, and can involve numerous agencies. For instance, crosswalk stings may involve both the school district and police department. Oregon's Bicycle Transportation Alliance, the Community Cycling Center, and other advocacy groups can also provide assistance in program development and implementation.

Sisters Elementary School - Proposed Safe Route to School Improvements

alta PLANNING + DESIGN

DKS Associates TRANSPORTATION SOLUTIONS

Sisters Middle School - Proposed Safe Routes to School Improvements

Appendix K: Pedestrian and Bicycle Design Standards

DESIGN GUIDELINES AND STANDARDS

INTRODUCTION

This section discusses recommended design guidelines for Sisters' pedestrian and bicycle system. Design recommendations are proposed for each of the non-motorized facility types proposed in this Plan including bikeways, intersections, shared-use paths and walkways. This chapter also discusses other important issues that should be considered as the City improves existing facilities and expands the pedestrian and bicycle network.

The design standards use the *Manual on Uniform Traffic Control Devices* (MUTCD) guidelines as the preferred approach, with options identified that the City can implement at their discretion. ODOT will only follow the MUTCD guidelines for their facilities. The following terms are defined by the MUTCD:

- **Standard:** A statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device.
- **Guidance:** A statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation to be appropriate.
- **Option**: A statement of practice that is a permissive condition and carries no requirement or recommendation. Options may contain allowable modifications to a Standard or Guidance.
- **Support:** An informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition or enforceable condition.

The inclusion of design guidelines and standards not included in the MUTCD does not constitute tacit approval of the recommendations by the City or State.

SIDEWALKS

Several considerations are important in sidewalk design. Providing adequate and accessible facilities should lead to increased numbers of people walking, improved safety, and the creation of social space. Attributes of well-designed sidewalks include:

- **Accessibility**: A network of sidewalks should be accessible to all users and meet ADA requirements.
- **Adequate width:** Two people should be able to walk side-by-side and pass a third person comfortably, and different walking speeds should be possible. In areas of intense pedestrian use, sidewalks should be wider to accommodate the greater volume of walkers.
- **Safety:** Design features of the sidewalk should allow pedestrians to have a sense of security and predictability. Sidewalk users should not feel they are at risk due to the presence of adjacent traffic.

- **Continuity**: Walking routes should be obvious and should not require pedestrians to travel out of their way unnecessarily.
- **Landscaping**: Plantings and street trees within the roadside area should contribute to the overall psychological and visual comfort of sidewalk users, without providing hiding places for attackers.
- **Social space:** Sidewalks should be more than areas to travel; they should provide places for people to interact. There should be places for standing, visiting, and sitting. The sidewalk area should be a place where adults and children can safely participate in public life.
- **Quality of place:** Sidewalks should contribute to the character of neighborhoods and business districts and strengthen their identity.

Width

Required sidewalk widths in Sisters vary based a street's ownership and functional classification. According the *Highway Design Manual* (HDM), ODOT requires six-foot sidewalks with four-foot planter strips on Highway 20, Highway 126 and Highway 242, although this requirement is not often met. Currently, Sisters requires five-foot or six-foot sidewalks on all streets falling within CG and CI zones.

Generally, sidewalks should be at least six feet wide, exclusive of the curb and other obstructions. This width enables two pedestrians (including wheelchair users) to walk side by side, or to pass each other comfortably. It also allows two pedestrians to pass a third pedestrian without leaving the sidewalk. This Plan recommends that the City of Sisters increase its current minimum sidewalk (or other pedestrian facility) width standard to six feet to address these issues.

Surface

Sidewalk surfaces should be smooth and continuous. It is also desirable that the sidewalk surface be stable, firm and slip resistant. Preferred materials include Portland Cement Concrete (PCC) and Asphalt Concrete (AC). PCC provides a smooth, long-lasting and durable finish that is easy to grade and repair. AC has a shorter life expectancy but may be more appropriate in less urbanized areas and in park settings. Crushed aggregate may also be used as an all-weather walkway surface in park areas, but this material generally requires a higher level of maintenance to maintain accessibility.

Brick pavers (or other decorative treatments) may be used on some sidewalks and crosswalks if they are constructed to avoid settling or removal of bricks, which can create tripping hazards. This treatment should also be constructed to provide a high level of smoothness to accommodate wheelchairs and other mobility devices. Alternatives to brick pavers include "stamping" molds to create the visual appearance of bricks.

The Americans with Disabilities Act allows a maximum two percent cross-slope on sidewalks and other walkways. Where sidewalks meet driveways, curb cuts or intersections, a three-foot-wide area should be maintained with a two percent cross-slope.

Addressing Obstructions

Typical obstructions to pedestrian travel in the sidewalk corridor include sign posts, utility and signal poles, mailboxes, fire hydrants and street furniture. Obstructions should be placed between the sidewalk and the roadway to create a buffer for increased pedestrian comfort while maintaining six feet of lateral clearance. When sidewalks abut perpendicular or diagonal on-street parking, wheelstops should be placed in the parking area to prevent parked vehicles from overhanging in the sidewalk. When sidewalks abut hedges, fences, guard rails, or buildings, an additional two feet of lateral clearance should be added to provide appropriate shy distance.

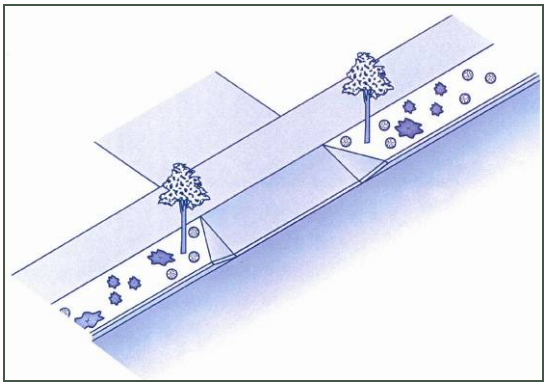

Figure 1 Driveway apron utilizing a planter strip

Driveways represent another sidewalk obstruction, especially for wheelchair users. Figures 1-3 show several design solutions that can minimize sidewalk/driveway conflicts. The following techniques can be used to accommodate wheelchair users at driveway crossings:

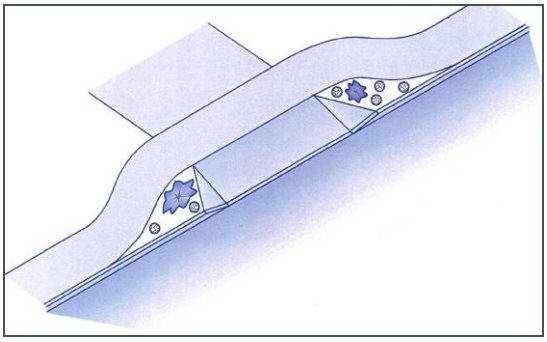

Figure 2 Sidewalk wrapped around driveway

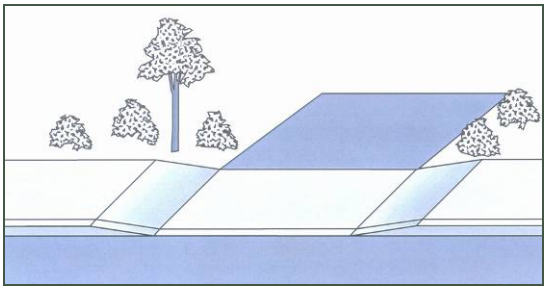

Figure 3 Entire sidewalk dips at driveway

- Reducing the number of accesses reduces the need for special provisions. This strategy should be pursued first.
- Construction of wide sidewalks avoids excessively steep driveway slopes. The overall width must be sufficient to avoid an abrupt driveway slope.
- Planter strips allow sidewalks to remain level, with the driveway grade change occurring within the planter strip.
- Where constraints rule out a planter strip, wrapping the sidewalk around the driveway has a similar effect. However, this method may have disadvantages for visually-impaired pedestrians who follow the curb line for guidance.
- When constraints only allow curb-tight sidewalks, dipping the entire sidewalk at the driveway approaches keeps the cross-slope at a constant grade. However, this may be uncomfortable for pedestrians and could create drainage problems behind the sidewalk.

Alternatives to Sidewalks

Although Sisters has a goal of providing sidewalks on both sides of all streets in the downtown area and with new development areas, environmental or other constraints (especially in older neighborhoods) could mean that sidewalks are not always the best answer. In these cases alternative sidewalk treatments may provide a more satisfactory solution.

Soft Paths

In areas where paved sidewalks are not feasible or appropriate due to site conditions such as existing trees, walls, or other obstacles, a soft path alternative should be explored. A soft path is a pedestrian path constructed of a pervious material such as decomposed granite or other universally accessible material. Another option is rubberized sidewalks, which use one recycled automobile tire per square foot of sidewalk. Rubberized sidewalks cost approximately one-third more than the cost of typical concrete sidewalks, but require significantly less maintenance than concrete sidewalks that are located near trees, since they can be lifted out of the ground for periodic tree root trimming. Rubberized sidewalks are less likely than concrete to be broken up by tree roots, further reducing long-term costs. Soft paths should be at least five feet wide. Constricted areas may have a reduced width consistent with the ADA guidelines.

Colored Shoulders

Colored shoulders visually narrow the roadway and slow traffic, making it more pedestrian- and bicycle-friendly. They are optional treatments for neighborhoods with no room for traditional sidewalks. Drivers see only travel lanes as available road space, so the roadway appears narrower than it is when the shoulders are a different color. Painting the road surface requires frequent maintenance; lower-maintenance methods include:

- Paving travel lanes with concrete, and bicycle/pedestrian facilities with asphalt, or the reverse
- Slurry-sealing or chip-sealing the roadway, but not the pedestrian path
- Incorporating dyes into concrete or asphalt
- Installing colored unit pavers that resemble brick

BICYCLE LANES

This Plan proposes bicycle lanes on several existing streets in Sisters. The City does not have a standard bike lane width, while ODOT requires six-foot bicycle lanes on State highways. Cyclists need at least four feet of lateral clearance while operating in a bicycle lane. A lane's usable width is normally measured from the curb face to the center of the lane stripe, although adjustments should be made for drainage grates and longitudinal joints between the street pavement and the curb gutter pan. As discussed earlier, this Plan recommends that the City increase its current bicycle lane width standard to six feet to address these issues. If parking is permitted on a street, bicycle lanes should be placed between the parking lane and the travel lane, and vehicle parking should be parallel parking or diagonal back-in parking.

Oregon's Administrative Rules requires bicycle lanes to be striped with an eight-inch solid white line to increase the visual separation between the vehicle lane and bicycle lane. A four-inch solid white line may also be striped between the bicycle lane and adjacent on-street parking to encourage parking closer to the curb and to provide additional separation from motor vehicles.

Manual on Uniform Traffic Control Devices (MUTCD) Guidelines

Part 3 of the MUTCD covers roadway markings, while Part 9 of the MUTCD covers signs, pavement markings, and highway traffic signals specifically related to bicycle operation on both roadways and shared-use paths.

Section 3B.24 - Preferential Lane Words and Symbol Marking, depicted in Figure 4 and discussed in Section 9C.04 - Markings for Bike Lanes and Section 9B.04 - Bicycle Lane Signs (R3-17, R3-17a, R3-17b) provide the baseline standard for striping, marking and signing bike lanes in Sisters.

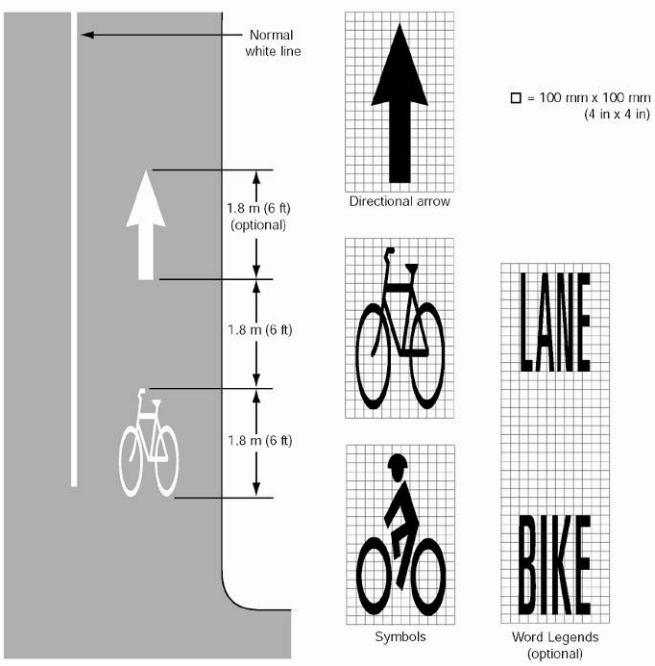

Figure 4 MUTCD Markings for Bike Lanes

Section 3B.24 Preferential Lane Word and Symbol Markings

The Standard states,

> "When a lane is assigned full or part time to a particular class or classes of vehicles, preferential lane markings shall be used. Signs or signals may be used with preferential lane word or symbol markings. All preferential lane word and symbol markings shall be white. All preferential lane word and symbol markings shall be positioned laterally in the center of the preferred-use lane."

Figure 5 MUTCD Bike Lane Sign R3-17

The standard continues by noting that, "Where a preferential lane use is established, the preferential lane shall be marked with one or more of the following symbol or word markings for the preferential lane use specified: …Bicycle lane – the preferential lane use marking for a bicycle lane shall consist of a bicycle symbol or the work marking BIKE LANE… If two or more preferential lane uses are permitted in a single lane, the symbol or word marking for each preferential lane use shall be installed"

Section 9C. 04 Markings for Bike Lanes

The Guidance notes that, "If used, the bicycle lane symbol marking should be placed at the beginning of a bicycle lane and at periodic intervals along the bicycle lane." The standard states that, "Longitudinal pavement markings shall be used to define bicycle lanes. The bicycle lane symbol marking shall be white. If the bicycle lane symbol marking is used in conjunction with another word or symbol message, it shall precede them. A through bicycle lane shall not be positioned to the right of a right turn only lane."

Section 9B.04 Bicycle Lane Signs

The standard for Bicycle Lane Signs states, "The BIKE LANE (R3-17) sign (Figure 5), if used, shall be used only in conjunction with marked bicycle lanes as described in Section 9C.04, and shall be placed at periodic intervals along the bicycle lanes."

The *Oregon Bicycle and Pedestrian Plan* recommends placing stencils after most intersections to alert motorists and cyclists of the exclusive nature of bicycle lanes. For long street segments with few intersections, the appropriate frequency of stencils is calculated by multiplying the street's design speed by 40. For instance, stencils should be placed every 1,400 feet on streets with a 35 MPH designated speed.

OTHER BICYCLE LANE TREATMENTS

Bicycle Detector Symbol of Actuated Signals

The guidance states that, "a symbol may be placed on the pavement indicating the optimum position for a bicyclist to actuate the signal." It further states that, "[an] R10-22 sign may be installed to supplement the pavement marking." Figure 6 shows MUTCD signage and pavement markings.

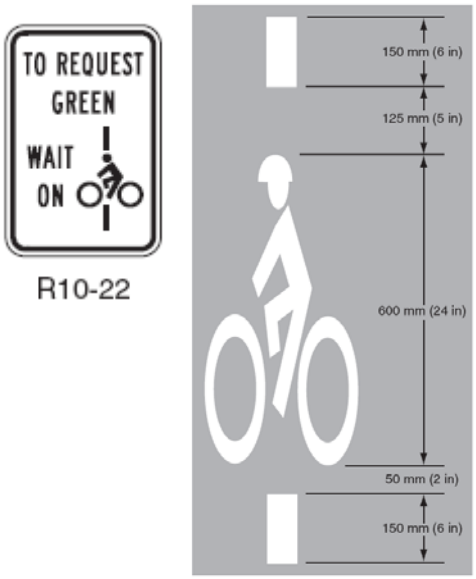

Figure 6 Bike Detector symbols and signage

Addressing Drainage Grates and Other Obstacles

Bicycle lanes should be provided with adequate drainage to prevent ponding, washouts, debris accumulation and other potentially hazardous situations for cyclists. Drainage grates should be bicycle-safe (See Figure 7). When an immediate replacement of an incompatible grate is not possible, a temporary correction of welding thin metal straps across the grates perpendicular to the drainage slots (four to six inches apart, center-to-center spacing) should be considered. Bicycle lanes should also include a smooth riding surface, and utility covers should be adjusted flush with the street surface. Furthermore, raised pavement markings (e.g., reflectors and truncated domes) can cause steering difficulties for bicyclists, and should not be used to delineate bicycle lanes.

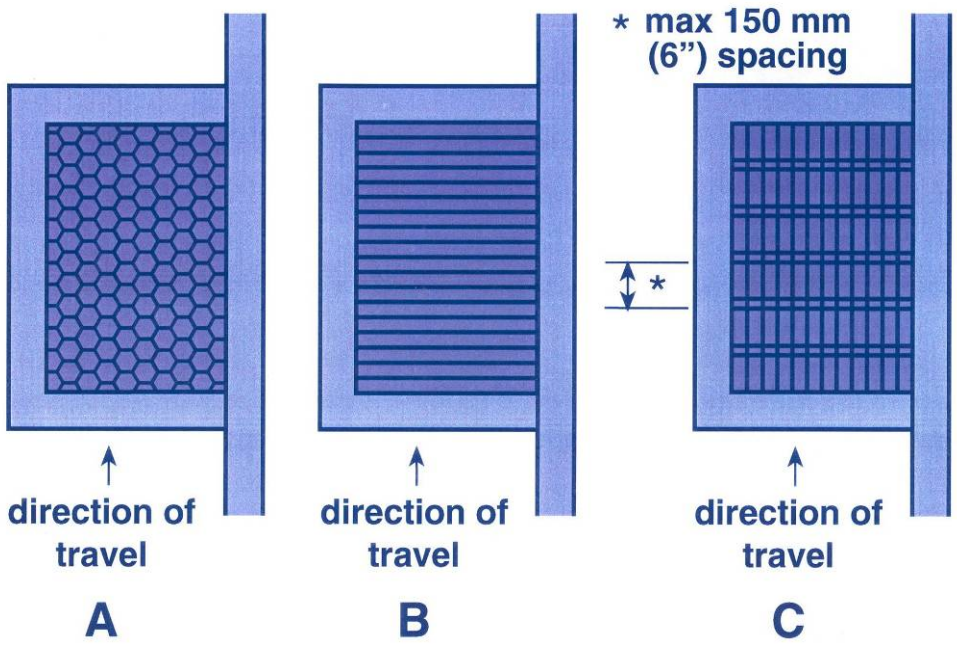

Figure 7 Example grate configurations for use with bike facilities

ADDRESSING DIAGONAL HEAD-IN PARKING

Sisters utilizes diagonal head-in parking as a design standard on many streets in the downtown area (e.g., Hood Avenue and Main Avenue). This practice has several advantages over traditional parallel parking, including:

- More parking spaces per block
- Creation of curb extensions on many corners
- Natural traffic calming due to reduced travel lane width and slower average motor vehicle speeds

Despite these benefits, head-in diagonal parking is dangerous for roadway users, including cyclists and can increase the discomfort and willingness of cyclists to travel on streets with this type of parking facility. Both AASHTO's *Guide for the Development of Bicycle Facilities* and the *Oregon Bicycle and Pedestrian Plan* recommend against this practice, citing reduced sight distance for drivers of backing motor vehicles and a reduced ability of cyclists to see cars in motion because of already parked cars. Additionally, the *Oregon Bicycle and Pedestrian Plan* states that, "these factors require cyclists to ride close to the center of a travel lane, which is intimidating to inexperienced riders."

"Back-in/Head-Out Parking Angle Parking" (2005), a report by Nelson\Nygaard Consulting Associates, cited benefits of back-in diagonal parking over parallel or head-in parking including:

- Decreased incidence of parking-related crashes
- Increased visibility for motor vehicle drivers
- Increased quantity of spaces over parallel parking
- Automatic curbing of motor vehicle wheels
- Improved access to curb ramps and loading/unloading out of the path of oncoming traffic

Many cities currently utilize back-in angled parking, including Seattle, WA; Olympia, WA; Vancouver, WA; Portland, OR; Tucson, AZ; Austin, TX; Salt Lake City, UT; Indianapolis, IN; and Wilmington DE. Several cities have documented benefits of diagonal back-in parking; Pottstown, PA, for example, found a 25% reduction in the number of accidents as a result of back-in angled parking, and a 43% reduction in accidents resulting in injury.

This Plan recommends that head-in diagonal parking throughout Sisters be replaced with back-in angled parking or parallel parking.

SHARED ROADWAYS/BICYCLE BOULEVARDS

Shared roadways, typically the most common type of bikeway, are streets with relatively low traffic volumes and low posted speeds that enable cyclists and motorists to share the same travel lanes. These streets usually have two travel lanes with or without adjacent on-street parking. Additional treatments, described below, vary by street.

Bicycle Routes

The MUTCD defines a designated bicycle route as, "a system of bikeways designated by the jurisdiction having authority with appropriate directional and informational route signs, with or without specific bicycle route numbers. Bicycle routes, which might be a combination of various types of bikeways, should establish a continuous routing."

Bicycle Boulevards

Bicycle routes that incorporate treatments to accommodate cyclists are often called "bicycle boulevards." Bicycle boulevards are developed through a combination of traffic calming measures

and other streetscape treatments, and are intended to slow vehicle traffic while facilitating safe and convenient bicycle travel. Appropriate treatments depend on several factors, including traffic volumes, vehicle and bicycle circulation patterns, street connectivity, street width, physical constraints, and other parameters. Many residential streets could be improved through relatively inexpensive treatments like new signage, pavement markings, and striping and signal improvements to facilitate bicyclists' mobility and safety. Other potential treatments include curb extensions, medians, on-street parking delineation and other features that can be implemented at reasonable cost and are compatible with snow plowing and emergency vehicle accessibility. It should be noted that many bicycle boulevard treatments can also benefit pedestrians. Curb extensions, for instance, can reduce vehicle speeds on a street by creating a visual "pinch point" for motorists. They also improve the pedestrian environment by shortening the pedestrian crossing distance.

Bicycle Boulevard Applications

The following section describes recommended applications for Sisters' proposed shared roadway/bicycle boulevard system. The treatments have been divided into five main categories based on their level of intensity, with Level 1 representing the least intensive treatments that could be implemented at relatively low cost. It should be noted that each successive application level would also include (where necessary) treatments identified for the previous levels. Furthermore, several treatments could fall within multiple categories as they achieve multiple goals.

Figure 8 MUTCD Bike Route Guide D11-1 Sign

Level 1: SIGNAGE

Bikeway signage is a relatively cost-effective treatment that can improve the bicycling environment along Sisters' bicycle boulevard system. Described below, signage can serve both wayfinding and safety purposes.

Figure 9 MUTCD Destination Sign D1-1b

Wayfinding Signs

Bicycle wayfinding signs should be installed along Sisters' bicycle boulevards and other cycling routes.

MUTCD Guidelines

Several sections of the MUTCD provide standards used for wayfinding or guide signs in the MUTCD.

Section 9B.20 Bicycle Route Guide Signs provides the following guidance, "If used, Bicycle Route Guide (D11-1, Figure 8) signs should be provided at decision points along designated bicycle routes, including signs to inform bicyclists of bicycle route direction changes and confirmation for route direction, distance, and destination.

Figure 10 MUTCD Directional Arrow Signs M7-1/7

If used, Bicycle Route Guide signs should be repeated at regular intervals so that bicyclists entering from side streets will have an opportunity to know that they are on a bicycle route.

Alternative Bike Route Guide (D11-1c) signs may be used to provide information on route direction, destination and/or route name in place of the "BIKE ROUTE" wording on the D11-1 sign.

Section 9B.21 Bicycle Route Signs provides the option of establishing a unique identification (route designation) signs for a State or local bicycle route. *Destination Arrow and Supplemental Plaque Signs for Bicycle Route Signs* allow for the mounting of Destination (D1-1b and D1-1c, Figure 9) signs, or directional arrow signs (M7-1 through M7-7, Figure 10) to furnish additional information. The Standard states that, "An arrow pointing to the right, if used, shall be at the extreme right-hand side of the sign. An arrow pointing left or up, if used, shall be at the extreme left-hand side of the sign. The distance numerals, if used, shall be placed to the right of the destination names. On Bicycle Destination signs, a bicycle symbol shall be placed next to each destination or group of destinations. If an arrow is at the extreme left, the bicycle symbol shall be placed to the right of the respective arrow."

Optional Signage Design

The City of Portland has had success in using a slightly different bicycle route sign than the one identified in the MUTCD. The City of Portland sign differs in three primary ways:

- It incorporates the Bicycle Route Guide Sign, the Destination Arrow, and the Directional Arrow signs all on one sign
- It provides for the inclusion of multiple destinations on one sign
- It includes time to destination as well as distance

This Plan proposes a unique signage program to complement Sisters' western themed Streetscape. Proposed conceptual sign designs are shown in Figure 11.

Figure 11 Proposed signage for Sisters, Oregon

WARNING SIGNS

On bicycle boulevards with higher vehicle and bicycle volumes (e.g., Cascade Avenue and Camp Polk Road), the City should also consider installing additional warning signs alerting motorists to the presence of cyclists.

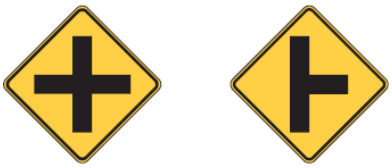

Figure 12 Example W2 Series Signs

MUTCD Guidelines

Section 9b.14 Other Regulatory Signs gives the option to include other regulator signs, described in chapter 2B on bicycle facilities, where appropriate.

Section 9b.15 Turn or Curve Warning Signs (W1 Series) notes that turn or curve signs may be installed to alert cyclists of unexpected changes in direction along cycling facilities. Signs should be installed at least 50 feet in advance of the alignment change.

Section 9b.16 Intersection Warning Signs (W2 Series) gives the option to install W2-1 – W2-5 signs, shown in Figure 12, on roadways streets or shared-use paths. Guidance notes that when intersection

Figure 13 W11Series Signs

visibility of a shared use path approach is limited, intersection warning signs should be used.

Section 9B.18 Bicycle Warning and Combined Bicycle/Pedestrian Signs notes that a Bicycle Warning sign (W11-1) alerts the road user to unexpected entries into the roadway by bicyclists and other crossing activities that might cause conflicts. The combined Bicycle/Pedestrian sign (W11-15), shown in Figure 13 may be used in areas where both bicyclists and pedestrians may cross a street. As an option, a supplemental plaque with the legend AHEAD or XXX FEET may be used with the Bicycle Warning sign. The Standard states that if either sign is used at a specific crossing location, "the sign shall be supplemented with a diagonal downward point arrow plaque to show the location of the crossing."

Section 9B.19 Other Bicycle Warning Signs provides the Option to install additional warning signs such as BIKEWAY NARROWS on bicycle facilities to warn bicyclists of conditions not readily apparent. In addition, in situations where there is a need to warn motorists to watch for bicyclists traveling along the highway, the SHARE THE ROAD (W16-1) plaque, shown in Figure 14 may be used in conjunction with the W11-1.

Figure 14 MUTCD Bicycle Warning Sign (W11-1) with supplemental plaque (W16-1)

Level 2: Pavement Markings

A variety of pavement marking techniques can effectively improve bicycling conditions along bicycle boulevards.

On-Street Parking Delineation

MUTCD Guidelines

Section 3B.19 Parking Space Markings in the MUTCD provides support for the marking of on-street parking (Figure 15).

Delineating on-street parking through paint or other materials clearly indicates where a vehicle should be parked, and can discourage motorists from parking their vehicles too far into the adjacent travel lane. This helps cyclists by maintaining a wide enough space to safely share a travel lane with moving vehicles while minimizing the need to swerve farther into the travel lane to maneuver around parked cars. In addition to benefiting cyclists, delineated parking spaces also promote the

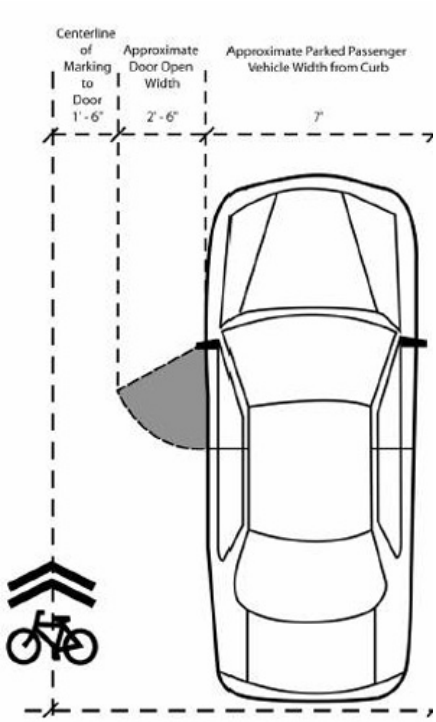

Figure 15 Sharrow placement on a local street

efficient use of on-street parking by maximizing the number of spaces in high-demand areas, such as along Cascade Avenue.

Directional Pavement Markings

MUTCD Guidelines

The MUTCD currently provides no guidance on the use of directional pavement markings for bicyclists, although *Section 9C.01 Function of Markings* provides this general support, "Markings indicate the separation of the lanes for road users, assist the bicyclist by indicating assigned travel paths, indicate correct position for traffic control signal actuation, and provide advance information for turning and crossing maneuvers."

Figure 16 Directional Pavement Marking – Portland (OR)

Directional pavement markings (Figure 16) effectively lead cyclists along a bicycle boulevard (and reinforce cyclists that they are on a designated route). The markings take the form of small bicycle symbols (about one foot in diameter) placed every 600-800 feet along a linear corridor. When a bicycle boulevard travels along several streets (with multiple turns at intersections), additional markings accompanied by directional arrows are provided to guide cyclists through turns and other complex routing areas. Directional pavement markings also visually queue motorists that they are traveling along a bicycle route and should exercise caution.

Shared Lane Marking (Sharrow)

MUTCD Guidelines

Section 9C.07C discusses shared lane markings (Figure 17). Shared Lane Markings can:

- Help cyclists with lateral positioning in streets with on-street parallel parking to reduce chances of impacting a vehicle's open door.
- Help cyclists with positioning in lanes too narrow to travel side by side with a motor vehicle.
- Alert road users of a cyclist's probable location in the roadway.
- Encourage safe passing distances between cyclists and motorists .
- Help reduce the incidence of wrong-way bicycling.

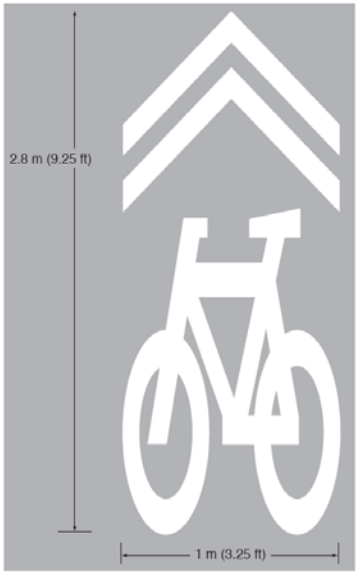

Figure 17 Shared lane markings configuration.

The Standard states that "Shared Lane Markings shall not be used on shoulders or in designated bicycle Lanes. If used in a shared lane with on-street parallel parking, Shared Lane Markings shall be placed so that the centers of the markings are at least 3.4m (11 ft)

from the face of the curb, or from the edge of the pavement where there is no curb." Guidance suggests Shared Lane Marking should not be used on roads with a posted speed limit greater than 35 mph and symbols should be placed immediately after an intersection and spaced at intervals not greater than 250 ft.

Level 3: Intersection Treatments

Described below, a variety of intersection treatments can be used to safely and conveniently facilitate bicycle travel on bicycle boulevards.

Curb Extensions

Curb extensions slow vehicle traffic by creating a visual "pinch point" for approaching motorists. Typically constructed within the on-street parking lane, these devices can calm vehicle traffic passing through or turning at an intersection. Curb extensions also benefit cyclists and pedestrians on cross-streets by reducing the crossing distance within the roadway. Curb extensions, such as those shown in Figure 18, should be designed with sufficient radii to accommodate the turning movements of snowplows, school buses and emergency vehicles.

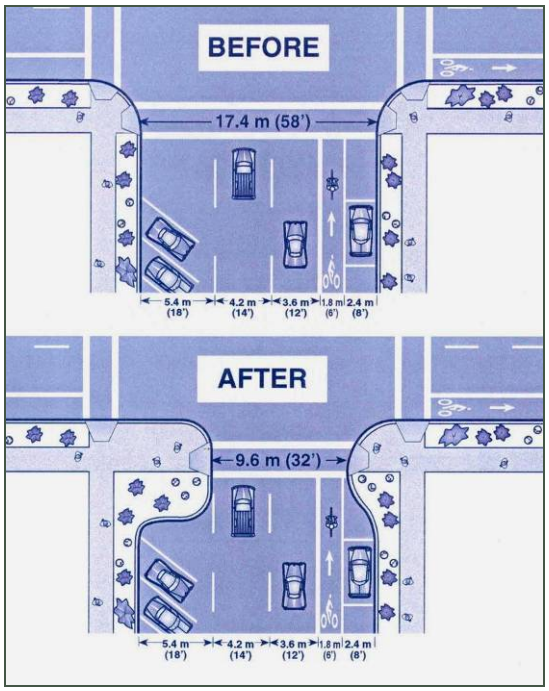

Figure 18 Intersection with curb extensions installed

Medians/Refuge Islands

Medians are elevated or delineated islands that break up non-motorized street crossings into multiple segments. Where shared roadways intersect major streets at unsignalized intersections (Figure 19), medians can be used to simplify bicyclist and pedestrian crossings on the major street. Appropriate signage should be installed on the major street to warn motorists of bicyclist/pedestrian crossings. Additionally, vegetation within the median should be low to maintain adequate sight distances for both motorists and bicyclists/pedestrians. Medians can also be used along the bicycle boulevard to create a visual pinch point for motorists as well as to accommodate mid-block bicycle/pedestrian crossings.

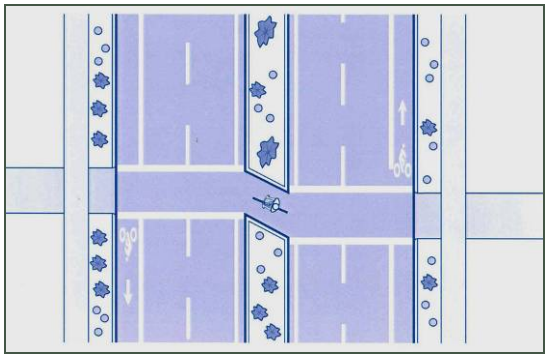

Figure 19 Crossing with a median/refuge island

Stop Sign Placement

Placing stop signs on cross-streets approaching a bicycle boulevard can facilitate convenient through bicycle travel. A reduced number of stop signs on a designated bicycle route enables riders to maintain their momentum and exert less energy with fewer "stops and starts". This treatment should be

used judiciously to minimize the potential for increasing vehicle speeds on the bicycle boulevard. Additionally, appropriate traffic control measures should be used where bicycle boulevards intersect major streets.

Bicycle Detection at Signalized Intersections

Several treatments can be used to streamline bicycle travel where bicycle boulevards approach intersections with actuated signals. In-pavement bicycle loop detectors can sense a bicyclist's presence (just as vehicle loop detectors sense automobiles) and trigger the signal to provide a green signal phase for the cyclist. Bicycle loop detectors should be placed within the bicyclist's expected path, (including left turn lanes and shoulders), and should be accompanied with a pavement marking indicating the optimal location for detection. Vehicle loop detectors can also be used for bicycle detection, provided they are located within the bicycle travel path and their sensitivity levels are adjusted for cyclists.

Similar to pedestrian activation buttons, bicyclist activation buttons can also be used at signalized intersections as long as they do not require cyclists to dismount or make unsafe leaning movements. These devices should be placed as close to the street as possible in a location that is unobstructed by parked vehicles or motorists making right-hand turns.

Half Signals

Because bicycle boulevards generally travel along lower-volume minor streets, they typically have minimal treatments to accommodate bicycle/pedestrian crossings when they approach major streets. In situations where there are few "crossable" gaps and where vehicles on the major street do not stop for pedestrians and cyclists waiting to cross, "half signals" could be installed to improve the crossing environment. Half signals include pedestrian and bicycle activation buttons and may also include bicycle loop detectors on the bicycle boulevard. Many of these models have been used successfully for years overseas, and their use in the United States has increased dramatically over the last decade. Discussed in the "Signals" section (later in this chapter), a variety of half signal applications could be used on Sisters' bicycle boulevard network.

Level 4: Traffic Calming

Traffic calming treatments on bicycle boulevards improve the bicycling environment by reducing vehicle speeds to the point where they generally match cyclists' operating speeds, enabling motorists and cyclists to safely co-exist on the same facility. Specific traffic calming treatments are described below.

Chicanes

Chicanes (Figure 20) are a series of raised or delineated curb extensions on alternating sides of a street forming an S-shaped curb, which reduce vehicle speeds through narrowed travel lanes. Chicanes can also be achieved by establishing on-street parking on alternate sides of the street. These treatments are most effective on streets with narrower cross-sections.

Figure 20 Chicane

Mini Traffic Circles

Mini traffic circles (Figure 21) are raised or delineated islands placed at intersections, reducing vehicle speeds through tighter turning radii and narrowed vehicle travel lanes. These devices can effectively slow vehicle traffic while facilitating all turning movements at an intersection. Mini traffic circles can also include a paved apron to accommodate the turning radii of larger vehicles like fire trucks or school buses.

Figure 21 Traffic circle

Speed Humps

Speed humps (Figure 22) are rounded raised areas of the pavement requiring approaching motor vehicles to reduce speed. These devices also discourage through vehicle travel on a street when a parallel through route exists.

Level 5: Traffic Diversion

Traffic diversion treatments maintain through bicycle travel on a street while physically restricting through vehicle traffic. These treatments direct through vehicle traffic onto parallel higher-order streets while accommodating bicyclists and local vehicle traffic on the bicycle boulevard. Traffic diversion is most effective when the higher-order streets can sufficiently accommodate the diverted traffic associated with these treatments.

Choker Entrances

Choker entrances (Figure 23) are intersection curb extensions or raised islands allowing full bicycle

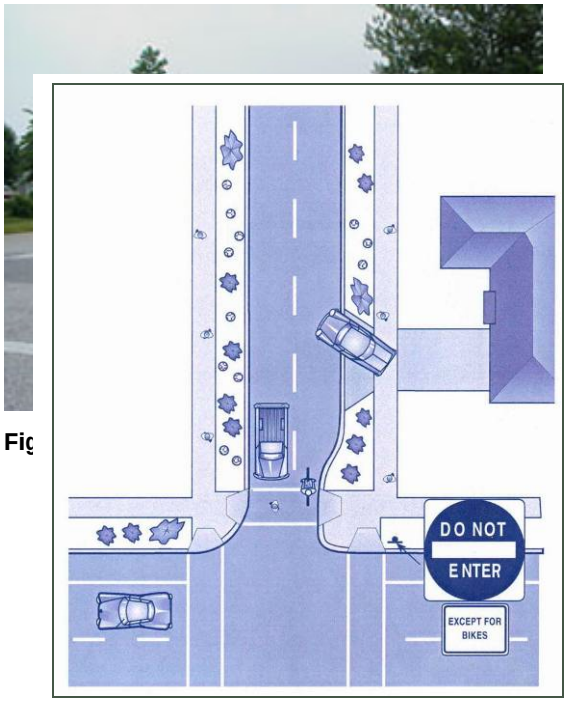

Figure 23 Choker at entrance of 2-way local street

passage while restricting vehicle access to and from a bicycle boulevard. When they approach a choker entrance at a cross-street, motorists on the bicycle boulevard must turn onto the cross-street while cyclists may continue forward. These devices can be designed to permit some vehicle turning movements from a cross-street onto the bicycle boulevard while restricting other movements.

Traffic Diverters

Similar to choker entrances, traffic diverters (Figure 24) are raised features directing vehicle traffic off the bicycle boulevard while permitting through bicycle travel.

Figure 24 Traffic diverters: median island (left) and bike/pedestrian only refuge on NE 16th and Tillamook in Portland (right)

Figure25 illustrates an example of bicycle boulevard applications on a hypothetical street.

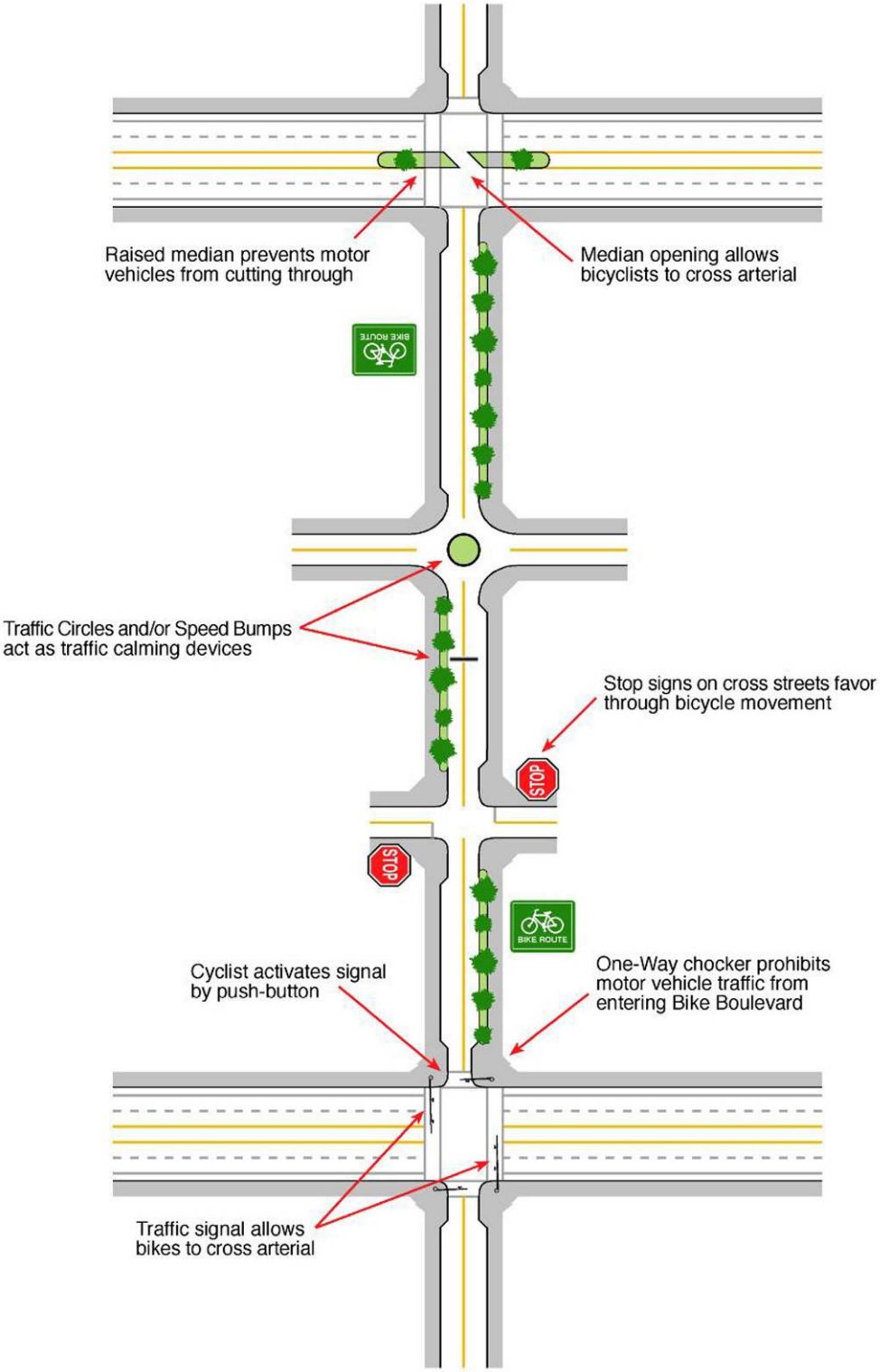

Figure 25 Sample Bicycle Boulevard Treatments

RECOMMENDED STREET STANDARDS

This section discusses recommended changes to street design standards pertaining to walking and bicycling fatalities. Depending on the corridor under focus, standards are either dictated by the City of Sisters or ODOT.

ODOT Street Design Standards

Within Sisters, Highway 20 and Highway 126 are state highways and are therefore subject to ODOT design standards and final review for approval for any non-standard roadway treatments. Approved standards are laid out in the agency's Highway Design Manual (HDM), updated in 2003. The HDM standards are based on several parameters, including a highway's functional classification and posted speed. Within the Sisters' city limits, both Highway 20 and Highway 126 are classified as "Urban Principal Arterial-Other" by the HDM. This classification dictates the type and width of bicycle and pedestrian facilities on these highways. In addition, there is a state permitting process for establishing new pedestrian crossings of state facilities.

The standard width for bike lanes is six feet, with a minimum width of five feet. Sidewalks separated with a buffer, with a standard width of six feet, are the preferred facility for pedestrians. However, several conditions require greater widths:

- In the absence of a buffer, an additional two feet is encouraged and should be added to the width of a curbside sidewalk.
- Curbside sidewalks should not be placed directly adjacent to a high-speed (design speed of 45 mph and above) travel lane.
- Curbside sidewalks on bridges shall be at least seven feet wide.

City of Sisters Street Design Standards

Sisters' Standard Detail documents (1999) and Public Works Standards for City-owned streets as described in Title 12 of the Municipal Code. As mentioned in Chapters 5 and 6 of this Plan, the standards are difficult to follow because they do not clearly lay out facility standards. The following, Table 1, proposes standard cross sections for bicycle and pedestrian designs for use with street functional classifications. These basic designs can function well with a range of functional classifications and will provide the City enough flexibility to select appropriate bicycle and pedestrian facilities for a variety of conditions.

The proposed designs take into consideration several basic assumptions:

- The City's standards should be amended to require bicycle lanes or other separated facilities on all new arterials and collectors.

- Bicycle lanes or other separated facilities should be also be constructed on local or neighborhood routes with high traffic volumes (3,000 ADT or above) or where conditions warrant the separation of bicyclists and motor vehicles.

- A shared-use path in the street ROW will take the place of a sidewalk on one side of the street

- A standard bicycle lane width of six feet on arterials and collectors will conform to the Highway standards required by ODOT and

- Pedestrian facilities should have a standard minimum width of six feet with a minimum width of five feet in constrained conditions. This width enables two pedestrians (including wheelchair users) to walk side by side, or to pass each other comfortably. It also allows two pedestrians to pass a third pedestrian without leaving the sidewalk.

Table 1 Recommended Bicycle and Pedestrian Facility Design Standards[1]

Bicycle and Pedestrian Facility Type	Used with Roadway Functional Class	Sidewalk	Swale, Planting or Street Furnishing Zone	On-Street Parking	Bike Lane	Shared-use pathway
Shared-use path/ cycle track[2]	Highway, Arterial, Collector, Local or Neighborhood Route	6' standard, 5' constrained (one side only)	6' standard, 5' constrained	Parallel, if present on highway. Otherwise parallel or back-in diagonal (one side only)	Bikes accommodated on shoulder or shared-use pathway	10' minimum
Wide sidewalks and bike lanes[3]	Highway, Arterial, Collector	10' +	6' standard, 0' constrained	Parallel, if present on highway. Otherwise parallel or back-in diagonal	6' standard, 5' constrained	N/A
Standard sidewalks and bike lanes[4]	Highway, Arterial, Collector	6' – 8' standard, 5' constrained	6' standard, 4' constrained[5]	Parallel, if present on highway. Otherwise parallel or back-in diagonal	6' standard, 5' constrained	N/A
Sidewalks and shared street (Bicycle Boulevard)[6]	Local or Neighborhood Route	6' – 8' standard, 5' constrained	4' - 14'	Parallel or back-in diagonal	N/A	N/A
Woonerf	Local or Neighborhood Route	N/A	N/A	N/A	N/A	N/A

Figures 26 – 30 show the typical cross sections of bicycle and pedestrian facilities proposed in Table 1.

[1] Numbers in parenthesis represent recommend minimum widths under constrained conditions.
[2] Shared-use path replaces one sidewalk, removes parking on one side and accommodates bicycles on roadway shoulders or a shared use pathway. Recommended uses include wide ROWs, heavily used pedestrian corridors or high-speed, high-volume roadways.
[3] Potential uses include heavily used pedestrian corridors, or downtown streets.
[4] Potential uses include streets outside of the downtown area, or streets with constrained ROW's.
[5] A bike lane may take precedence over a swale under constrained conditions.
[6] Uses include Local or Neighborhood Routes. Bike lanes should be considered if motor vehicle traffic exceeds 3,000 VPD.

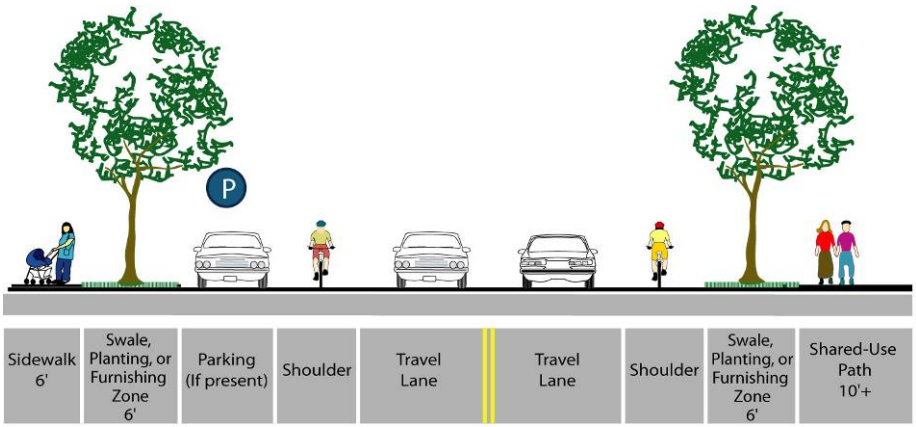

Figure 26 Shared-use path, sidewalks and shoulders

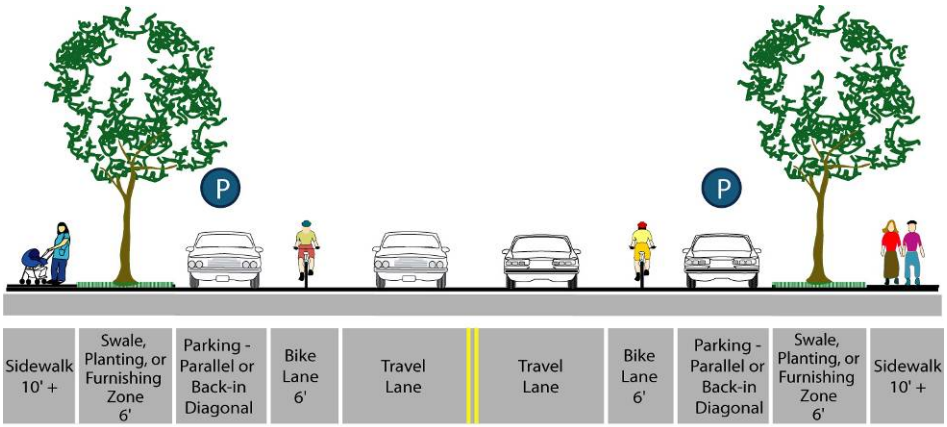

Figure 27 Wide sidewalks and bike lanes

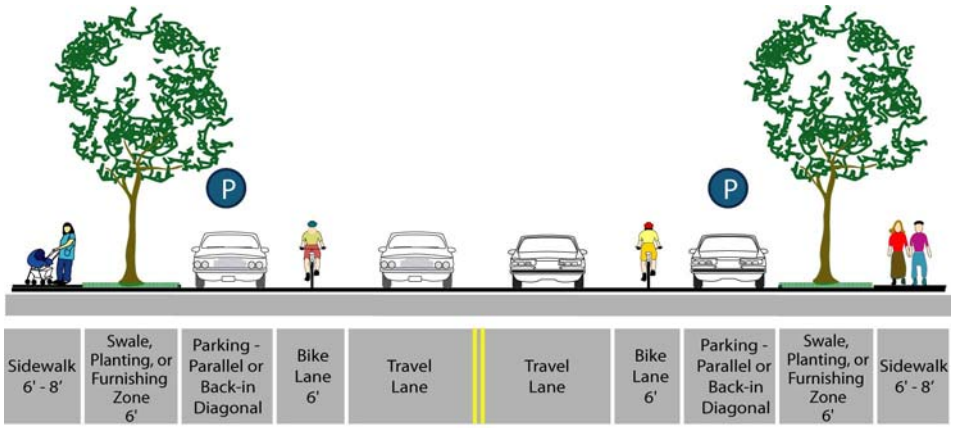

Figure 28 Standard sidewalks and bike lanes

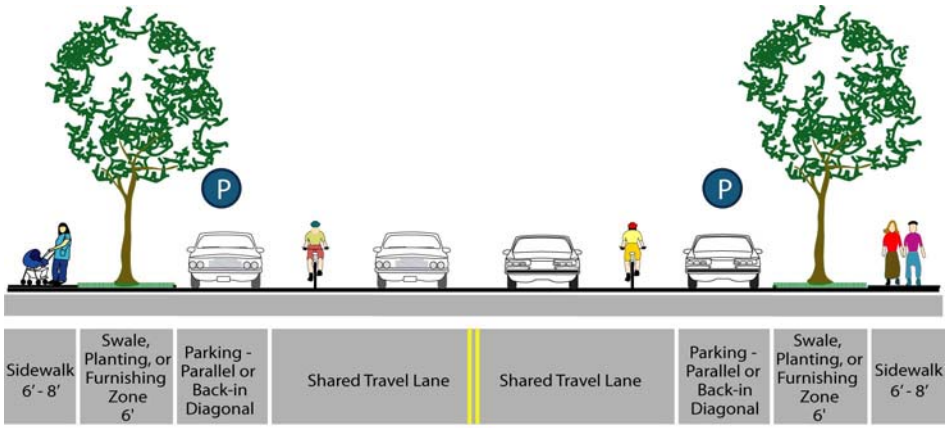

Figure 29 Shared travel lanes and sidewalks

Figure 30 "Woonerf"

"Woonerf " Shared Street

A "Woonerf" ("Street for living") is a Dutch term for a common space created to be shared by pedestrians, bicyclists, and low-speed motor vehicles. Woonerfs are typically narrow streets without curbs and sidewalks, and vehicles are slowed by placing trees, planters, parking areas, and other obstacles in the street. Motorists become the intruders and must travel at very low speeds. This makes a street available for public use that is essentially only intended for local residents. A woonerf identification sign is placed at each street entrance. Consideration must be given to provide access by fire trucks, sanitation vehicles and other service vehicles (school buses and street sweepers), if needed. A woonerf design also provides the opportunity to apply "green street" treatments such as permeable pavers and bioswales to reduce or eliminate the need for expensive sewer connections while improving the surrounding environment.

A woonerf is generally not appropriate where nonresident motorists will access services along the street or travel through to reach other areas. The design needs to keep vehicle speeds very low in order to make the streets safe for children.

TRANSITION ZONES

ODOT's (HDM) discusses the importance of accommodating pedestrians and cyclists in "transition zones." These transitions often occur when high-speed rural highways (e.g., Highway 20 and Highway 126) enter urbanized areas. The HDM indicates that visual queues and other design elements are critical to informing motorists that they are entering a changing environment that is urbanized, requires slower speeds, and requires greater attention to pedestrians, cyclists and transit vehicles. The HDM recommends various treatments on rural State highways where they enter urbanized areas, including bicycle lanes, sidewalks with planter strips, marked crosswalks, and landscape features. A variety of treatments are proposed to visually cue motorists that they are entering the city, including colored bicycle lanes/shoulders on Highway 20 and other state Highways. Pavement markings and signage, intersection treatments, completion of sidewalk gaps, and installation of gateway features will also address urban/rural transitions on other roads entering Sisters.

INTERSECTION TREATMENTS

Several design and operational treatments could be implemented to improve the pedestrian environment at intersections. Attributes associated with good intersection design include the following:

- **Clarity**: It should be obvious to motorists that there will be pedestrians present; it should be obvious to pedestrians where to cross.
- **Predictability:** The placement of crosswalks should be predictable. Additionally, the frequency of crossings should increase where pedestrian volumes are greater.
- **Visibility:** The location and illumination of the crosswalk allows pedestrians to see and be seen by approaching traffic while crossing.

- **Short wait**: The pedestrian does not have to wait unreasonably long for an opportunity to cross.
- **Limited exposure:** Conflict points with traffic are few, and the distance to cross is short or is divided into shorter segments with crossing islands.
- **Clear crossing:** The crosswalk is free of barriers, obstacles, and hazards and is accessible to all users. Pedestrian crossing information is available in accessible locations.

Signal Timing Evaluation and Modification

Providing adequate pedestrian crossing time is a critical element of the walking environment at signalized intersections. The Manual on Uniform Traffic Control Devices (MUTCD) recommends traffic signal timing to assume a pedestrian walking speed of three and a half feet per second, meaning that the length of a signal phase with parallel pedestrian movements should provide sufficient time for a pedestrian to safely cross the adjacent street. It should be noted however that the three and a half feet per second walking speed does not reflect the walking rates of all users. At crossings where older pedestrians or pedestrians with disabilities are expected, crossing speeds as low as three feet per second may be assumed. As Sisters and ODOT begin to install traffic signals, both parties should periodically evaluate signal timing plans to ensure adequate pedestrian crossing times are provided.

Innovative Pedestrian Signal Features

Pedestrian Countdown Signals

According to the MUTCD, "Pedestrian Signal Heads provide special types of traffic signal indications exclusively intended for controlling pedestrian traffic. These signal indications consist of the illuminated symbols of a WALKING PERSON (symbolizing WALK) and an UPRAISED HAND (symbolizing DONT WALK)." An advanced type of pedestrian signal head contains a countdown signal, in addition to the WALK/DON'T WALK symbol. The countdown signal (Figure 31) displays the number of seconds remaining for the individual to complete their crossing. These applications could be effective throughout Sisters, particularly along Highway 20 (which has less-frequent traffic gaps) and along Locust Street near the elementary school.

Figure 31 Pedestrian crossing countdown signal

Leading Pedestrian Interval (LPI)

Including LPIs at signalized crossings provides pedestrians with a three- to four-second head start into the intersection before parallel traffic is released by the green light. LPIs ensure that pedestrians are well into the intersection and visible to turning vehicles prior to vehicles entering the crosswalk.

Crosswalks

Sisters currently uses a variety of crosswalk treatments, including "transverse" (also called "parallel bar") markings consisting of two bars crossing an intersection; "longitudinal" (also called "ladder style") markings; and combinations of these marking styles (Figure 32). Crosswalks with pavement texturing and color also exist along Cascade Avenue at Ash Street. The MUTCD indicates that transverse crosswalks should include solid white lines six to 24 inches wide (extending across the full pavement width), with a minimum of six feet between the lines. Longitudinal crosswalk bars should be 12 to 24 inches wide, at least six feet long, with 1- to 5-foot spacing between each bar (the space between bars should not exceed 2.5 times the bar width). To minimize maintenance costs, the bars should not be placed directly within vehicle wheel paths (where possible).

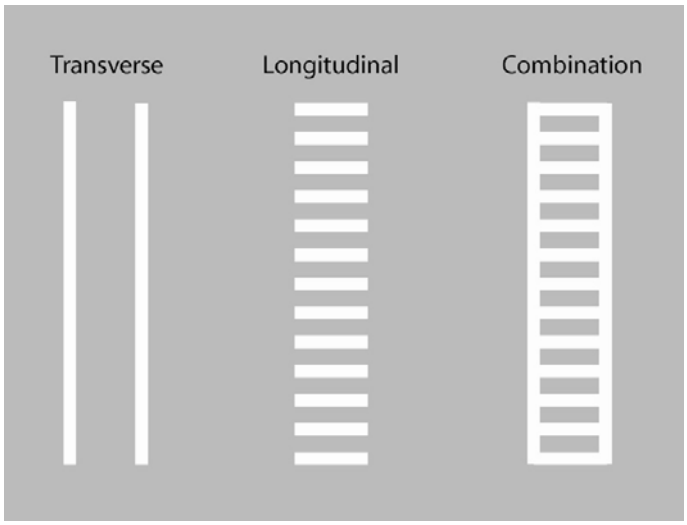

Figure 32 Crosswalk configurations

Where crosswalks are located at unsignalized crossings of Highways, Arterials or Collectors, they should be accompanied by advance stop bars striped 30 feet back from the crosswalk within the vehicle travel lanes. Advance stop bars provide additional protection to pedestrians while improving communication between pedestrians and drivers.

High-Visibility Crosswalks

Various crosswalk striping patterns can be used. The most common types are shown in the diagram below. The basic crosswalk striping pattern consists of two parallel lines, called the "transverse" pattern. Other higher-visibility patterns include longitudinal and combination markings, which add bars for increased visibility.

Figure 33 High visibility crosswalks can help increase pedestrian visibility near schools.

Application of these high-visibility patterns varies widely from jurisdiction to jurisdiction; in some cities they are not used at all, while in other cities high-visibility crosswalks are used regularly. High-visibility markings should be considered for higher-volume crossings near schools (Figure 33), and where conditions demonstrate a need for an increased visibility marking (e.g., a mid-block location).

Even within a jurisdiction, there may not be consistent application of high-visibility patterns, with a mix of transverse or longitudinal patterns applied throughout a community. Should the City of

Sisters choose to install high-visibility crosswalks, the City should adopt a single pattern and apply it consistently. Standardizing crosswalk markings helps both motorists and pedestrians recognize designated crossings. The MUTCD, Oregon MUTCD Supplement, and ODOT Traffic Manual provide guidance for the use and placement of various crosswalk marking types.

Overhead Flashing Lights

Overhead flashing lights can be used at uncontrolled crossing locations with higher vehicle volumes or speeds, or where other conditions demonstrate a need for a more intense treatment than a high-visibility crosswalk. Several overhead flashing warning light types exist, including both standard yellow, fluorescent yellow-green, and LED displays. These hang from a mast arm extending over the street. Some applications use flashing red or yellow beacons to enhance overhead signs, while at others, it is the pedestrian crossing sign itself that flashes. These devices utilize passive or active actuation. Drawbacks of overhead flashing lights include higher cost and the fact that they may not be immediately understood by motorists.

In-Pavement Crosswalk Lights

In-pavement crosswalk lighting includes flashing lights mounted in the street pavement adjacent to the outer edge of crosswalk markings, positioned so as to be seen by oncoming traffic. The lights are actuated (either through a push-button or a motion sensor) to flash while the pedestrian crossing is in use. Several studies conclude that flashing lights embedded in the pavement at uncontrolled crosswalks have a positive effect in enhancing driver awareness of crosswalks and modifying driver habits to be more favorable to pedestrians. These may pose maintenance issues, especially with snow plows.

High-Visibility Signage

One way of increasing visibility of crosswalks is through the use of fluorescent yellow-green signs. When the fluorescent yellow-green background is used for crosswalk signing, a systematic approach should be used, so that the mixing of standard yellow and fluorescent yellow-green is avoided.

Other Intersection Treatments

Curb Extension and Median/Refuge Islands are two intersection treatments that can benefit pedestrians. Please see the 'Bicycle Boulevard Treatments: Level 3 Intersection Treatments' section for details and example facilities.

Curb Ramps

Curb ramps are a fundamental element of an accessible public realm. A sidewalk without a curb ramp can be useless to someone in a wheelchair, forcing them back to a driveway and out into the street for access. Likewise, street crossings must be aligned and properly designed to accommodate the needs and desires of all people. Many of the access ramps built in previous decades direct users diagonally into the street intersection (rather than straight into the crosswalk area). This can be problematic for visually impaired pedestrians, as they could experience difficulty orienting themselves toward the crosswalk. Where possible, all intersection corners should provide dual curb ramps oriented directly across the street. Curb ramps should also have detectable warning strips to

accommodate the visually impaired. AASHTO's (Guide for the Planning, Design, and Operation of Pedestrian Facilities) and the ODOT HDM provide further guidance on curb ramp design.

SIGNALS

Full Signalized Crossings

The Federal government has provided guidance to determine where traffic control signals should be considered for installation. The Pedestrian Volume signal warrant is intended for the application where traffic volumes on a major street are high enough that pedestrians on an approaching side street or path experience excessive delay in crossing the major street (see Section 4C.05 of the MUTCD details Warrant 4, Pedestrian Volume). For signal warrant analysis, a location with a wide median, even if the median width is greater than nine meters (30 feet), should be considered as one intersection.

Half-Signalized Crossings

In situations where there are few "crossable" gaps and where vehicles do not stop for pedestrians waiting to cross (or because of multiple lanes, it is unsafe to cross in front of a stopped vehicle), there are a number of innovative pedestrian traffic signals that do not operate as full signals that could be installed. Many of these models have been used successfully for years overseas, and their use in the United States has increased dramatically over the last decade. However, these types of signals are not yet included in the MUTCD, and are not available for use on state facilities.

Pelican Signals

A Pelican (**Pe**destrian **Li**ght **C**ontrol **A**ctivated crossi**n**g) signal (Figure 34) incorporates a standard red-yellow-green signal light that rests in green for vehicular traffic until a pedestrian wishes to cross and presses the button. The signal then changes to yellow, then red, while WALK is shown to the pedestrian. The signal can be installed as either a one-stage or two-stage signal, depending on the street's characteristics. In a two-stage crossing, the pedestrian crosses first to a median island and is then channelized along the median to a second signalized crossing point. At that point, the pedestrian then activates a second crossing button and another crossing signal changes to red for the traffic while the pedestrian is given a WALK signal. The two crossings only delay the pedestrian minimally and allow the signal operation to fit into the arterial synchronization, thus reducing the potential for stops, delays, accidents, and air quality issues. A Pelican crossing is quite effective in providing a pedestrian crossing at mid-block locations when the technique can be integrated into the roadway design.

Puffin Signals

A Puffin (**P**edestrian **U**ser **F**riendly **In**telligent) crossing signal (Figure 35) is an updated version of a Pelican crossing. The signal consists of traffic and pedestrian signals with push-button signals and infrared or pressure mat detectors. After a pedestrian pushes the button, a detector verifies the presence of the pedestrian at the curbside. This helps eliminate false signal calls associated with people who push the button and then decide not to cross. When the pedestrian is given the WALK signal, a separate motion detector extends the WALK interval (if needed) to ensure that slower pedestrians have time to cross safely. Conversely, the signal can also detect when the intersection is clear of pedestrians and return the green signal to vehicles, reducing vehicle delay at the light. Puffin signals are designed to be crossed in a single movement by the pedestrian, unlike the Pelican signal, which can be designed to cross in either one or two stages.

Figure 34 Pelican signal in Tucson, AZ

Figure 35 Puffin signal

Hawk Signals

A Hawk (**H**igh-Intensity **A**ctivated Cross**w**al**k**) signal (Figure 36) is a combination of a beacon flasher and traffic control signaling technique for marked crossings. The beacon signal consists of a traffic signal head with a red-yellow-red lens. The unit is normally off until activated by a pedestrian. When pedestrians wish to cross the street, they press a button and the signal begins with a flashing yellow indication to warn approaching drivers. A solid yellow, advising the drivers to prepare to stop, then follows the flashing yellow. The signal is then changed to a solid red, at which time the pedestrian is shown a WALK indicator. The beacon signal then converts to an alternating flashing red, allowing the drivers to proceed after stopping at the crosswalk, while the pedestrian is shown the flashing DON'T WALK signal.

Figure 36 Hawk signal

INTERSECTION CROSSINGS BY TYPE

Like most bicycle and pedestrian systems in built urban areas, non-motorized users in Sisters must cross roadways at certain points. While at-grade crossings create a potentially high level of conflict between bicyclists and pedestrians and motorists, well-designed crossings have not historically posed a safety problem. In most cases, intersection crossings can be properly designed at-grade to a reasonable degree of safety and meet existing traffic and safety standards.

Evaluation of intersections involves analysis of vehicular and anticipated path user traffic patterns, including vehicle speeds, traffic volumes (average daily traffic and peak hour traffic), street width,

and sight distance and user profile (age distribution, destinations served). Crossing features for all roadways include warning signs both for vehicles and path users. The type, location, and other criteria are identified in AASHTO's Guide for the Development of Bicycle Facilities and the MUTCD. Consideration must be given for adequate warning distance based on vehicle speeds and line of sight, with visibility of any signing absolutely critical. Catching the attention of motorists jaded to roadway signs may require additional alerting devices such as a flashing light, roadway striping or changes in pavement texture. Care must be taken not to place too many signs at crossings lest they begin to lose their impact.

The following section identifies several roadway crossing treatments that should be considered for Sisters' bicycle and pedestrian system.

Roadway Crossing Prototypes

- The proposed intersection approach that follows is based on established standards, published technical reports,[7] and experiences from cities around the country.[8] Intersection crossings generally will fit into one of four basic categories:
- Type 1: Marked/Unsignalized; Type 1+: Marked/Enhanced
- Type 2: Route Users to Existing Signalized Intersection
- Type 3: Signalized/Controlled
- Type 4: Grade-separated crossing

Type 1: Marked/Unsignalized Crossings

A marked/unsignalized crossing (Type 1, Figure 37) consists of a crosswalk, signage, and often no other devices to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, route traffic, use patterns, vehicle speed, road type and width, and other safety issues such as proximity to schools. The following thresholds recommend where unsignalized crossings may be acceptable:

Maximum traffic volumes:

- ≤9,000-12,000 Average Daily Traffic (ADT) volumes
- Up to 15,000 ADT on two-lane roads, preferably with a median.
- Up to 12,000 ADT on four-lane roads with median.

Figure 37 Type 1 Crossing

[7] Federal Highway Administration (FHWA) Report, "Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations."
[8] In particular, the recommendations in this report are based in part on experiences in cities like Portland (OR), Seattle (WA), Tucson (AZ), and Sacramento (CA), among others

Maximum travel speed:

- 35 MPH

Minimum line of sight:

- 25 MPH zone: 155 feet
- 35 MPH zone: 250 feet
- 45 MPH zone: 360 feet

On two-lane residential and collector roads below 15,000 ADT with average vehicle speeds of 35 MPH or less, crosswalks and warning signs ("Path Xing") should be provided to warn motorists, with engineering judgment used to determine the appropriate level of traffic control and design.

Type1 Enhanced (Type 1+)

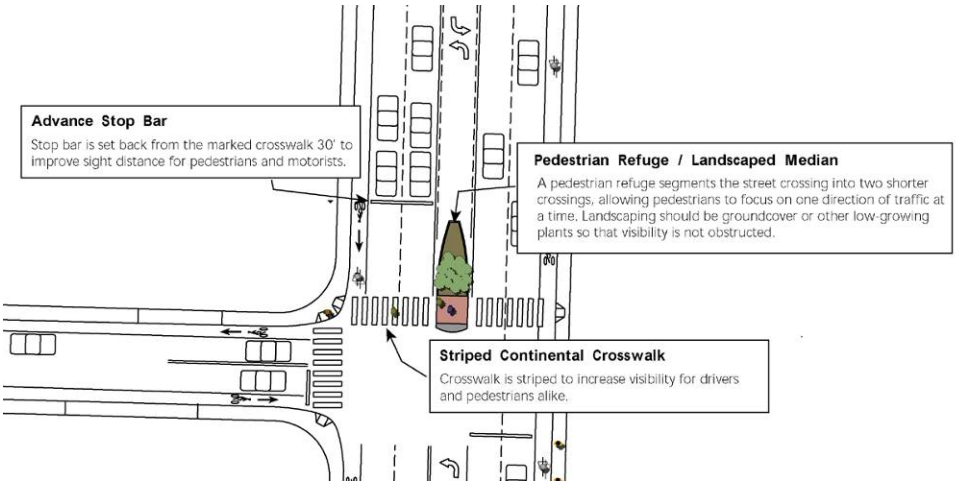

Figure 38 Type 1+ Crossing with Median

If well-designed, crossings of multi-lane higher-volume arterials over 15,000 ADT may be unsignalized with features such as a combination of some or all of the following: excellent sight distance, sufficient crossing gaps (more than 60 per hour), median refuges, and/or active warning devices like flashing beacons or in-pavement flashers. These are referred to as "Type 1 Enhanced" (Type 1+, Figure 38). Such crossings would not be appropriate; however, if a significant number of schoolchildren used the identified route. Furthermore, both existing and potential future non-motorized traffic volume should be taken into consideration.

On roadways with low to moderate traffic volumes (<12,000 ADT) and a need to control traffic speeds, a raised crosswalk may be the most appropriate crossing design to improve pedestrian visibility and safety. These crosswalks are raised 75 millimeters above the roadway pavement (similar to speed humps) to an elevation that matches the adjacent sidewalk. The top of the crosswalk is flat and typically made of asphalt, patterned concrete, or brick pavers. Brick or unit

pavers should be discouraged because of potential problems related to pedestrians, bicycles, and ADA requirements for a continuous, smooth, vibration-free surface. Detectable warning strips are needed at the sidewalk/street boundary so that visually impaired pedestrians can identify the edge of the street.

Type 2: Route Users to Existing Signalized Intersection

Crossings within 250 feet of an existing signalized intersection with pedestrian crosswalks are typically diverted to the signalized intersection for safety purposes (Figure 39). For this option to be effective, barriers and signing may be needed to direct trail users to the signalized crossings. In most cases, signal modifications would be made to add pedestrian detection and to comply with the Americans with Disabilities Act.

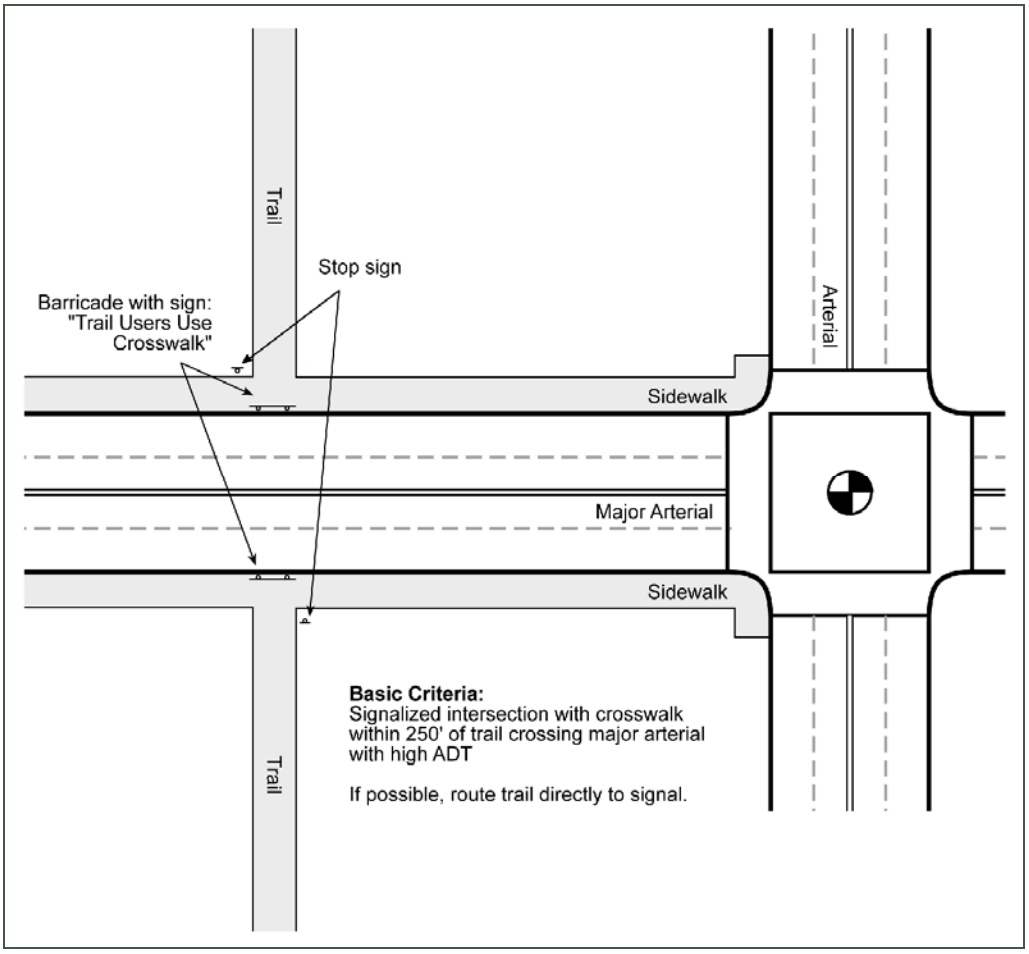

Figure 39 Type 2 Crossing Treatment

Type 3: Signalized/Controlled Crossings

New signalized crossings (Figure 40) may be recommended for crossings that meet pedestrian, school, or modified warrants, are located more than 250 feet from an existing signalized intersection and where 85th percentile travel speeds are 40 MPH and above and/or ADT exceeds 15,000 vehicles. Each crossing, regardless of traffic speed or volume, requires additional review by a registered engineer to identify sight lines, potential impacts on traffic progression, timing with adjacent signals, capacity, and safety.

Figure 40 Type 3 Crossing

The maximum delay for activation of the signal should be two minutes, with minimum crossing times determined by the width of the street. The signals may rest on flashing yellow or green for motorists when not activated, and should be supplemented by standard advanced warning signs. As described in the "Half-Signalized Crossings" section earlier in this chapter, various types of pedestrian signals exist and can be used at Type 3 crossings.

Type 4: Grade-separated Crossings

Grade-separated crossings (Figures 41 and 42) may be needed where existing bicycle/pedestrian crossings do not exist, where ADT exceeds 25,000 vehicles, and where 85th percentile speeds exceed 45 MPH. Real and perceived personal safety is a major concern with both overcrossings and undercrossings. In both cases, users may be temporarily out of sight from public view and may have poor visibility themselves. Undercrossings, like parking garages, have the reputation of being places where crimes occur. Most crime on trails, however, appears to have more in common with the general crime rate of the community and the overall usage of the trail than any specific design feature.

Figure 41 Type 4 Grade-Separated Undercrossing

Design and operation measures are available which can address trail user concerns. For example, an undercrossing can be designed to be spacious, well-lit, equipped with emergency cell phones at each end and completely visible for its entire length prior to entering. Other potential problems with undercrossings include conflicts with utilities, drainage, flood control, and maintenance requirements. Overcrossings pose potential concerns about visual impact and functional appeal, as well as space requirements necessary to meet ADA guidelines for slope.

Figure 42 Type 4 Grade-Separated Overcrossing

Summary of At-Grade Crossing Recommendations

Table 2 provides guidance on how to implement at-grade path/roadway crossings in Sisters.

Table 2. Summary of At-Grade Crossing Recommendations[9]

Roadway Type (Number of Travel Lanes and Median Type)	Vehicle ADT ≤ 9,000			Vehicle ADT > 9,000 to 12,000			Vehicle ADT > 12,000 to 15,000			Vehicle ADT > 15,000		
	Speed Limit **											
	30 mi/h	35 mi/h	40 mi/h	30 mi/h	35 mi/h	40 mi/h	30 mi/h	35 mi/h	40 mi/h	30 mi/h	35 mi/h	40 mi/h
2 Lanes	1	1	1/1+	1	1	1/1+	1	1	1+/3	1	1/1+	1+/3
3 Lanes	1	1	1/1+	1	1/1+	1/1+	1/1+	1/1+	1+/3	1/1+	1+/3	1+/3
Multi-Lane (4 or more lanes) with raised median ***	1	1	1/1+	1	1/1+	1+/3	1/1+	1/1+	1+/3	1+/3	1+/3	1+/3
Multi-Lane (4 or more lanes) without raised median	1	1/1+	1+/3	1/1+	1/1+	1+/3	1+/3	1+/3	1+/3	1+/3	1+/3	1+/3

*General Notes: Crosswalks should not be installed at locations that could present an increased risk to pedestrians, such as where there is poor sight distance, complex or confusing designs, a substantial volume of heavy trucks, or other dangers, without first providing adequate design features and/or traffic control devices. Adding crosswalks alone will not make crossings safer, nor will they necessarily result in more vehicles stopping for pedestrians. Whether or not marked crosswalks are installed, it is important to consider other pedestrian facility enhancements (e.g., raised median, traffic signal, roadway narrowing, enhanced overhead lighting, traffic-calming measures, curb extensions), as needed, to improve the safety of the crossing. These are general recommendations; good engineering judgment should be used in individual cases for deciding which treatment to use.

For each pathway-roadway crossing, an engineering study is needed to determine the proper location. For each engineering study, a site review may be sufficient at some locations, while a more in-depth study of pedestrian volume, vehicle speed, sight distance, vehicle mix, etc. may be needed at other sites.

** Where the speed limit exceeds 40 mi/h (64.4 km/h), marked crosswalks alone should not be used at unsignalized locations.

*** The raised median or crossing island must be at least four ft (1.2 m) wide and six ft (1.8 m) long to adequately serve as a refuge area for pedestrians in accordance with MUTCD and AASHTO guidelines. A two-way center turn lane is not considered a median.

1= Type 1 Crossings. Ladder-style crosswalks with appropriate signage should be used.

1/1+ = With the higher volumes and speeds, enhanced treatments should be used, including marked ladder style crosswalks, median refuge, flashing beacons, and/or in-pavement flashers. Ensure there are sufficient gaps through signal timing, as well as sight distance.

1+/3 = Carefully analyze signal warrants using a combination of Warrant 2 or 5 (depending on school presence) and EAU factoring. Make sure to project pathway usage based on future potential demand. Consider Pelican, Puffin, or Hawk signals in lieu of full signals. For those intersections not meeting warrants or where engineering judgment or cost recommends against signalization, implement Type 1 enhanced crosswalk markings with marked ladder style crosswalks, median refuge, flashing beacons, and/or in-pavement flashers. Ensure there are sufficient gaps through signal timing, as well as sight distance.

[9] This table is based on information contained in the U.S. Department of Transportation Federal Highway Administration Study, " Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations," February 2002.

ACCESSWAYS

Pedestrian-ways (also known as "accessways"), shown in Figure 43, provide direct connections to schools, parks, community centers, retail areas, neighborhoods, and other paths. They are intended to be short, direct connections to reduce unnecessary out-of-direction travel for bicyclists and pedestrians. Pedestrian-ways should be at least 10 feet wide, and "be of such design and location as reasonably required to pedestrian travel, and shall be dedicated to the public."

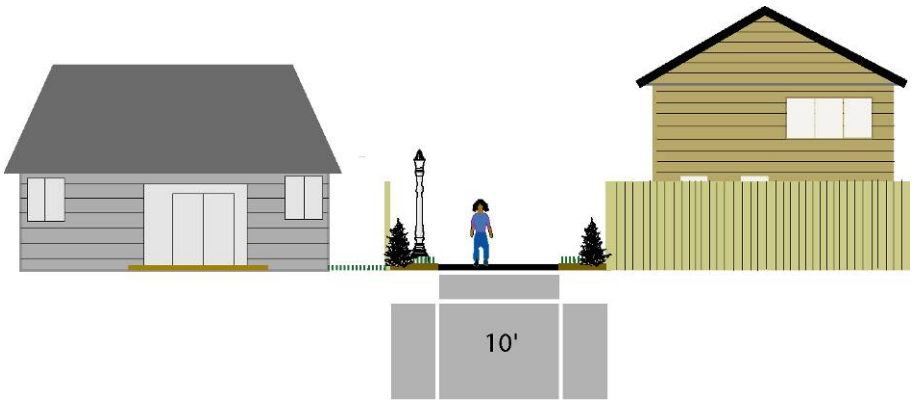

Figure 43 Accessways

SHARED-USE PATHS

As the City of Sisters develops its shared-use path network, several design issues should be taken into consideration. Shared-use paths should be designed to accommodate two-way bicycle and pedestrian traffic, and typically should have their own rights-of-way (for a minimum of 75 percent of their length to reinforce the experience of traveling on a path). Because most of the proposed paths will be also serve maintenance vehicles, the paved surface should be asphalt or concrete (or a durable unpaved surface that is smooth and meets ADA requirements).

Figure 44 depicts the recommended cross-section for shared-use paths in Sisters. A narrower path width may be allowed (8 feet minimum) in physically constrained areas. Wider path widths are recommended in areas where user volumes are expected to be high. Soft shoulders (at least two feet wide) should be provided on both sides of the path, and a wider shoulder should be provided to accommodate runners and joggers where space permits. Soft shoulders may consist of bark or wood chips.

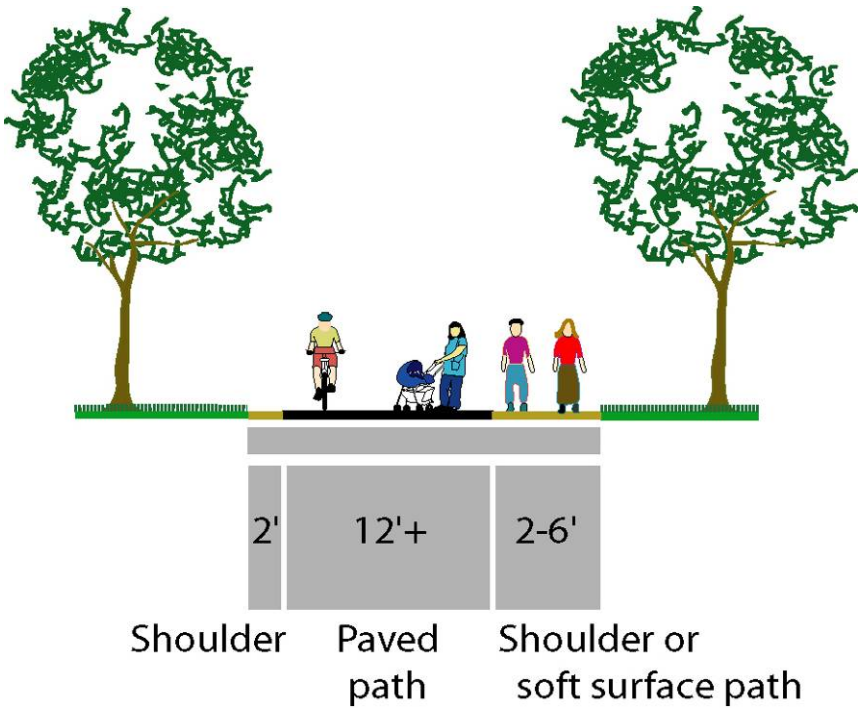

Figure 44 Shared-Use Paths

Shared-use paths should also be designed to restrict access from unauthorized vehicles. Bollards can be placed at path/roadway crossings to permit bicycle/pedestrian access while restricting vehicle access. Removable bollards also maintain path access for maintenance and emergency vehicles.

Table 3 highlights additional design recommendations for the Sisters' shared-use path network. The recommendations are based on experience in other communities, as well as guidelines prescribed by AASHTO and the *Oregon Bicycle and Pedestrian Plan*.

Table 3 Shared-Use Path Design Recommendations

Parameter	Recommendation
Paved width	12' (8' in constrained areas)
Soft surface width	6' minimum
Shoulder width[10]	2' minimum
Lateral clearance between path and adjacent signs	3'-6'
Overhead clearance	8' minimum
Separation from parallel roadway	5' minimum
Grade/running slope	5% maximum
Cross-slope	2% maximum
Fence height	54 inches
Bollards	5' minimum between bollards

Source: AASHTO Guide for the Development of Bicycle Facilities; ODOT Oregon Bicycle and Pedestrian Plan.

Shared-Use Paths along Roadways

Shared-use paths should not be placed directly adjacent to roadways (e.g., with minimal or no separation) without careful consideration and planning for variety of reasons:

- Half of bicycle traffic would ride against the normal flow of vehicle traffic, contrary to the rules of the road.
- When the path ends, cyclists riding against traffic tend to continue to travel on the wrong side of the street, as do cyclists making their way to the path. Wrong-way bicycle travel is a major cause of vehicle/bicycle crashes.
- At intersections, motorists crossing the path often do not notice bicyclists approaching from certain directions, especially where sight distances are poor.
- Bicyclists on the path are required to stop or yield at cross-streets and driveways, unless otherwise posted.
- Stopped vehicles on a cross-street or driveway may block the path.
- Because of the closeness of vehicle traffic to opposing bicycle traffic, barriers are often necessary to separate motorists from cyclists. These barriers serve as obstructions, complicate facility maintenance and waste available right-of-way.
- Paths directly adjacent to high-volume roadways diminish users' experience by placing them in an uncomfortable environment. This could lead to a path's underutilization.

Shared-use paths can successfully be placed along roadways, provided several design considerations are met:

[10] A soft surface path paralleling the paved path can take the place of a shoulder on one side.

- A minimum 5-foot buffer should be provided between the path and roadway to address potential conflicts between motorists and path users.
- There are few vehicle/path user conflict points (e.g., cross-streets and driveways).
- There is a commitment to provide path continuity along the corridor.
- The path can be terminated at each end onto streets with good bicycle and pedestrian facilities or onto another safe, well-designed path though appropriate street crossing treatments.
- The path should not take the place of bicycle/pedestrian facilities (e.g., sidewalks and bicycle lanes) on the parallel street.

Sidewalks as Shared-Use Paths

Utilizing or providing a sidewalk as a shared-use path is unsatisfactory for several reasons. Sidewalks are typically designed for pedestrian speeds and maneuverability and are not safe for higher bicycle speeds. Conflicts are common between pedestrians traveling at low speeds (e.g., exiting stores, parked cars, etc.) and bicyclists, as are conflicts with fixed objects (e.g., utility poles, mailboxes, parked cars extending into the sidewalk from a driveway). Walkers, joggers, skateboarders and in-line skaters can (and often do) change their speed and direction almost instantaneously, leaving bicyclists insufficient reaction time to avoid collisions.

Similarly, pedestrians often have difficulty predicting the direction an oncoming cyclist will take. At intersections, motorists are often not looking for bicyclists who are traveling at higher speeds than pedestrians entering a crosswalk area, particularly when motorists are making a turn. Sight distance is often impaired by buildings, walls, fences and shrubs along sidewalks, especially at driveways. In addition, bicyclists and pedestrians often prefer to ride or walk side-by-side when traveling in pairs. Sidewalks are typically too narrow to enable this to occur without serious conflict between users.

It should also be noted that developing extremely wide sidewalks does not necessarily add to the safety of sidewalk bicycle travel. Wide sidewalks might encourage higher speed bicycle use and can increase the potential for conflicts with motorists at intersections, as well as pedestrians with fixed objects.

Path Amenities

A variety of amenities can make a path inviting to the user. The following table highlights some common items that make path systems work well for users. Costs vary depending on the design and materials selected for each amenity.

Interpretive Installations

Interpretive installations and signs can enhance the users experience by providing information about the history of Sisters' and the surrounding area. Installations can also discuss local ecology, environmental concerns, and other educational information.

Water Fountains and Bicycle Parking

Water fountains provide water for people (and pets, in some cases) and bicycle racks allow recreational users to safely park their bikes if they wish to stop along the way, particularly at parks and other desirable destinations.

Pedestrian-Scale Lighting and Furniture

Pedestrian-scale lighting improves safety and enables the facility to be used year-round. It also enhances the aesthetic of the pathway. Lighting fixtures should be consistent with other light fixtures in the city, possibly emulating a historic theme.

Providing benches at key rest areas and viewpoints encourages people of all ages to use the pathway by ensuring that they have a place to rest along the way. Benches can be simple (e.g., wood slates) or more ornate (e.g., stone, wrought iron, concrete).

Maps and Signage

A comprehensive signing system makes a bicycle and pedestrian system stand out. Informational kiosks with maps at trailheads and other pedestrian generators can provide enough information for someone to use the network with little introduction – perfect for areas with high out-of-area visitation rates as well as the local citizens.

Art Installations

Local artists can be commissioned to provide art for the pathway system, making it uniquely distinct. Many pathway art installations are functional as well as aesthetic, as they may provide places to sit and play on.

Landscaping

Landscape features, including street trees or trees along paths, can enhance the visual environment and improve the path user experience. Trees can also provide shade from heat and also provide protection from rain.

Restrooms

Restrooms benefit path users, especially in more remote areas where other facilities do not exist. Restrooms can be sited at major trailheads or at other strategic locations along the path system.

Path Safety and Security

Various design and programmatic measures can be taken to address safety issues on a shared-use path. Table 4 summarizes key safety issues and strategies for minimizing impacts.

Table 4 Safety Recommendations

Safety Issue	Recommended Improvements
Unwanted vehicle access on the path	• Utilize landscaping to define the corridor edge and path, including earth berms and large boulders. • Use bollards at intersections • Pass a motorized vehicle prohibited ordinance and sign the path. • Create a Path Watch Program and encourage citizens to photograph report illegal vehicle use of the corridor. • Lay the trail out with curves that allow bike/ped passage, but are uncomfortably tight for automobile passage.
Privacy of adjacent property owners	• Encourage the use of neighborhood friendly fencing and also planting of landscape buffers. • Clearly mark path access points. • Post path rules that encourage respect for private property. • Strategically placed lighting.

Safety Issue	Recommended Improvements
Litter and dumping	• Post path rules encouraging pack-it-in/pack-it-out etiquette. • Place garbage receptacles at trailheads. • Strategically-placed lighting, utilizing light shields to minimize unwanted light in adjacent homes. • Manage vegetation within the right-of-way to allow good visual surveillance of the path from adjacent properties and from roadway/path intersections. • Encourage local residents to report incidents as soon as they occur. • Remove dumpsites as soon as possible.
Trespassing	• Clearly distinguish public path right-of-way from private property through the use of vegetative buffers and the use of good neighbor type fencing. • Post path rules that encourage respect for private property.
Crime	• Manage vegetation so that corridor can be visually surveyed from adjacent streets and residences. • Select shrubs that grow below 3' in height and trees that branch out greater than 6' in height. • Place lights strategically and as necessary. • Place benches and other path amenities at locations with good visual surveillance and high activity. • Provide mileage markers at quarter-mile increments and clear directional signage for orientation. • Create a "Path Watch Program" involving local residents. • Proactive law enforcement. Utilize the corridor for mounted patrol training.
Private use of corridor	• Attempt to negotiate win/win solutions with property owners. • Eliminate where detrimental impact to path cannot be reasonably ameliorated.
Local on-street parking	• Post local residential streets as parking for local residents only to discourage path user parking. Place "no outlet" and "no parking" signs prior to path access points.
Trailhead safety	• Clearly identify trailhead access areas.
Vandalism	• Select benches, bollards, signage and other site amenities that are durable, low maintenance and vandal resistant. • Respond through removal or replacement in rapid manner. • Keep a photo record of all vandalism and turn over to local law enforcement. • Encourage local residents to report vandalism. • Create a Trail Watch Program; maintain good surveillance of the corridor. • Involve neighbors in path projects to build a sense of ownership. • Place amenities (benches, etc.) in well used and highly visible areas.

Community Involvement with Safety on the Path

Creating a safe path environment goes beyond design and law enforcement and should involve the entire community. The most effective and most visible deterrent to illegal activity on Sisters' path system will be the presence of legitimate path users. Getting as many "eyes on the corridor" as possible is a key deterrent to undesirable activity. There are several components to accomplishing this as outlined below.

Provide good access to the path

Access ranges from providing conveniently located trailheads along the path, to encouraging the construction of sidewalks to accommodate access from private developments adjacent to the path. Access points should be inviting and signed so as to welcome the public onto the path.

Good visibility from adjacent neighbors

Neighbors adjacent to the path can potentially provide 24-hour surveillance of the path and can become Sisters' biggest ally. Though some screening and setback of the path is needed for privacy of adjacent neighbors, complete blocking out of the path from neighborhood view should be discouraged. This eliminates the potential of neighbors' "eyes on the path," and could result in a "tunnel effect" on the path.

High level of maintenance

A well-maintained path sends a message that the community cares about the public space. This message alone will discourage undesirable activity along the path.

Programmed events

Community events along the path will help increase public awareness and thereby attract more people to use the path. Neighbors and residents can help organize numerous public events along the path which will increase support for the path. Events might include a day-long path clean up or a series of short interpretive walks led by long time residents or a park naturalist.

Community projects

The support generated by community groups could be further capitalized by involving neighbors and friends of the path in a community project. Ideas for community projects include volunteer planting events, art projects, interpretive research projects, or even bridge building events. These community projects are the strongest means of creating a sense of ownership along the path that is perhaps the strongest single deterrent to undesirable activity along the path.

Adopt-a-Path Program

Nearby businesses, community institutions, and residential neighbors often see the benefit of their involvement in the path development and maintenance. Businesses and developers may view the path as an integral piece of their site planning and be willing to take on some level of responsibility for the path. Creation of an adopt-a-path program should be explored to capitalize on this opportunity and build civic pride.

Path Watch Program

Partnering with local and county law enforcement, a path watch program would provide an opportunity for local residents to become actively involved in crime prevention along Sisters' path system. Similar to Neighborhood Watch programs, residents are brought together to get to know their neighbors, and are educated on how to recognize and report suspicious activity.

INTERNAL CIRCULATION STANDARDS

Pedestrian circulation in larger residential and commercial developments is influenced by the infrastructure provided for the pedestrian as well as the infrastructure and design of auto circulation and parking.

Automobile Infrastructure

Parking lots should be located in such a manner as to encourage pedestrian access to the development, connect uses to the street and decrease the distance between adjacent developments. To accomplish this, parking should be located behind and to the side of buildings wherever possible. Landscaping should be provided between the pedestrian circulation system and automobile areas to provide protection, security and accessibility for the pedestrian while providing sufficient sight distance. Parallel parking can also be used to buffer pedestrian routes from moving vehicles.

Pedestrian Infrastructure

An internal pedestrian circulation system should:

- Be barrier-free and designed for safety and security
- Ensure continuous sidewalks and safe crossing points
- Connect all uses within a development (buildings, parking areas, etc.)
- Clearly link public sidewalks with all internal walkways
- Clearly link the individual sites within a development to each other and to surrounding off-site uses (mixed-use and residential areas)
- Be defined with landscaping, paving, and pedestrian-scale lighting
- Meet ADA guidelines
- Provide adequate sight distance

Pedestrian circulation routes could be composed of treated surfaces such as scored or brushed concrete in order to differentiate the pedestrian system from the auto system. Where pedestrian routes cross an auto circulation route, striping should be provided.

To provide greater opportunity for pedestrian connectivity and to prevent autos from having to use the public street system to travel between adjacent developments, parking and pedestrian circulation should be designed to accommodate connections between developments.

Pedestrian circulation plans should be required with each large lot development. These plans must emphasize connectivity through sidewalk design, traffic circulation, landscaping, and lighting.

Bicycle Infrastructure

Internal circulation for bicyclists is as important a consideration as for cars and pedestrians. Bicyclists should have a clearly delineated travel path through any development, as well as clear travel paths that link individual sites within the development and provide safe travel. In smaller developments or constrained situations, this can be accomplished through directional signage, lane markings, and signage that clearly show a shared roadway system (such as a shared lane marking), and signage and markings indicating slow speeds (10 MPH) required while in the development.

In larger developments, bicycle lanes should be striped to both indicate the travel route to bicyclists and to constantly inform motorists to expect bicyclists within the development. The bicycle lanes should be supplemented with appropriate directional signage for bicyclists. Signage and markings indicating slow speeds (10 MPH) are also recommended. Bicycle circulation plans should be required with each large lot development.

BICYCLE PARKING

Bicycle parking can be broadly defined as either short-term or long-term parking:

- **Short-term parking**: Bicycle parking meant to accommodate visitors, customers, messengers and others expected to depart within two hours; requires approved standard rack, appropriate location and placement, and weather protection.
- **Long-term parking:** Bicycle parking meant to accommodate employees, students, residents, commuters, and others expected to park more than two hours. This parking is to be provided in a secure, weather-protected manner and location.

Short-Term Bicycle Parking

Short-term bicycle parking facilities are intended to provide short-term bicycle parking, and include racks which permit the locking of the bicycle frame and one wheel to the rack and support the bicycle in a stable position without damage to wheels, frame or components. Short-term bicycle parking (Figures 45 - 46) is currently provided at no charge at most locations. Such facilities should continue to be free, as they provide minimal security, but encourage cycling and promote proper bicycle parking. Additionally, bicycle racks can help enhance the streetscape. By including specially designed, western themed 'art racks' at key locations Sisters can incorporate bicycle parking in a way that does not detract from the existing ambiance. Please see the Programs Section of this Chapter for more detail and examples.

Bicycle rack dimensions requirements should meet or exceed those recommended by the *Oregon Bicycle and Pedestrian Plan*, including the following:

- Bicycle parking spaces should be at least six feet long and 2.5 feet wide, and overhead clearance for covered spaces should be at least seven feet.

- A 5-foot aisle for bicycle maneuvering should be provided and maintained beside or between each row of bicycle parking.
- Bicycle racks or lockers should be securely anchored to the surface or structure.

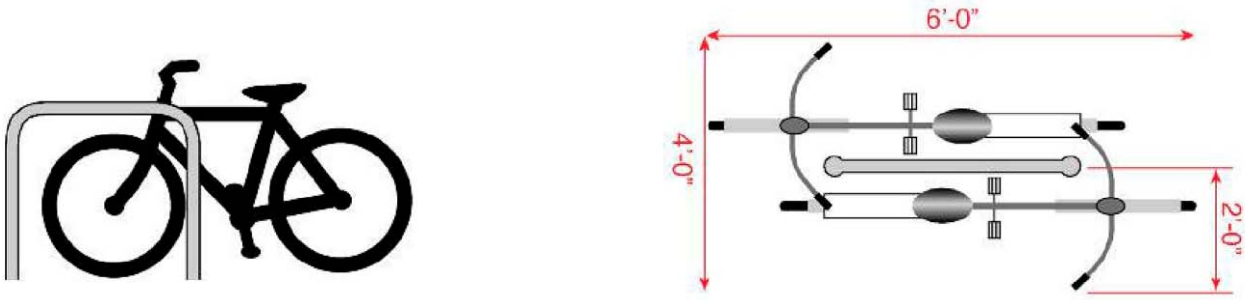

Figure 45 Inverted "U" Rack

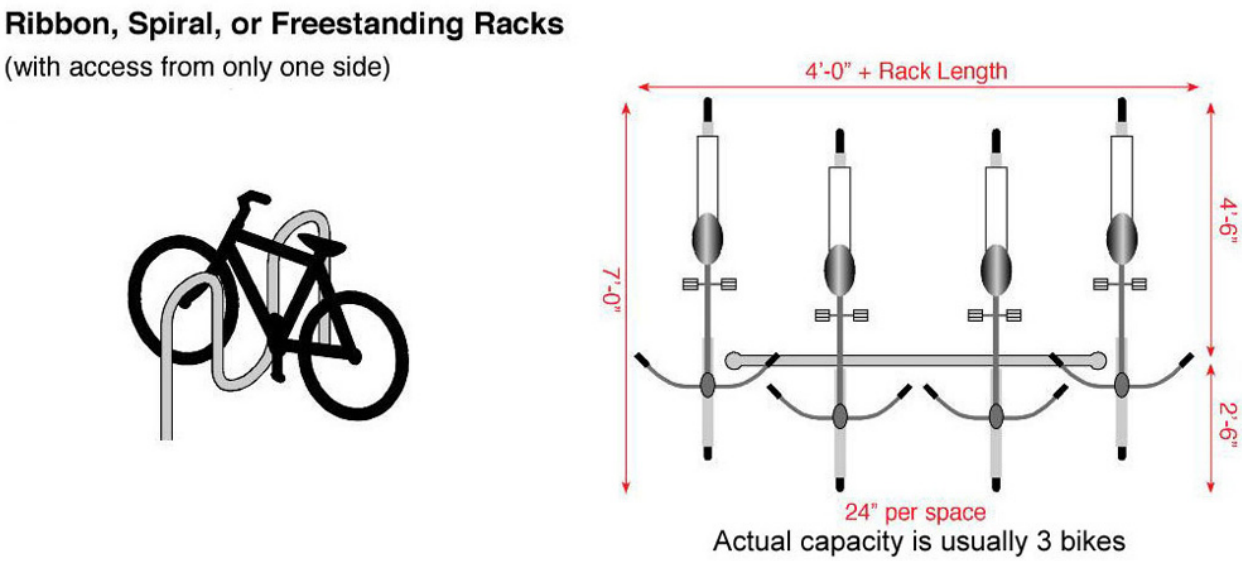

Figure 46 Ribbon, Spiral, and Freestanding Racks

Where racks are not possible on sidewalks (because of narrow sidewalk width, sidewalk obstructions, or other issues), bicycle parking can be created in the street where on-street vehicle parking is allowed. Two possible options for creating parking in the street include clustered racks in a car parking space protected by bollards or curbs, and racks installed on sidewalk curb extensions where adequate sight distance can be provided. Installing bicycle parking directly in a car parking space incurs only the cost of the racks and bollards or other protective devices.

A curb extension is more expensive to install, and can be prohibitively expensive if substantial drainage and/or utility work is necessary. Costs may be less if the curb extension is installed as part of a larger street or pedestrian improvement project. While on-street bicycle parking may take space away from the automobile parking, there are ways to mitigate auto parking loss: Additional auto parking spaces can be created by consolidating driveways, moving fire hydrants, or otherwise finding

places where it may be possible to admit auto parking where it is currently prohibited. Options for combining bicycle and motorcycle parking also exist.

On-street bicycle parking may be installed at intersection corners or at mid-block locations. Mid-block on-street parking may be closer to cyclists' destinations, although it could force cyclists to dismount and walk to the parking site if access from the street is difficult or dangerous. Combining a mid-block pedestrian crossing with mid-block on-street parking facilities could mitigate this situation. Table 5 provides additional guidance on short term bicycle parking design and installation.

Table 5 Bicycle Rack Placement Guidelines

Design Issue	Recommended Guidance
Minimum Rack Height	To increase visibility to pedestrians, racks should have a minimum height of 33 inches or be indicated or cordoned off by visible markers.
Signing	Where bicycle parking areas are not clearly visible to approaching cyclists, signs at least 12 inches square should direct them to the facility. The sign should give the name, phone number, and location of the person in charge of the facility, where applicable.
Lighting	Lighting of not less than one foot-candle illumination at ground level should be provided in all bicycle parking areas.
Frequency of Racks on Streets	In popular retail areas, two or more racks should be installed on each side of each block. This does not eliminate the inclusion of requests from the public which do not fall in these areas. Areas officially designated or used as bicycle routes may warrant the consideration of more racks.
Location and Access	Access to facilities should be convenient; where access is by sidewalk or walkway, curb ramps should be provided where appropriate and ADA compliant. Parking facilities intended for employees should be located near the employee entrance, and those for customers or visitors near the main public entrances. (Convenience should be balanced against the need for security if the employee entrance is not in a well traveled area). Bicycle parking should be clustered in lots not to exceed 16 spaces each. Large expanses of bicycle parking make it easier for thieves to operate undetected.
Locations within Buildings	Provide bike racks within 50 feet of the entrance. Where a security guard is present, provide racks behind or within view of a security guard. The location should be outside the normal flow of pedestrian traffic.
Locations near Transit Stops	To prevent bicyclists from locking bikes to bus stop poles - which can create access problems for transit users, particularly those who are disabled - racks should be placed in close proximity to transit stops where there is a demand for short-term bike parking.
Locations within a Campus-Type Setting	Racks are useful in a campus-type setting at locations where the user is likely to spend less than two hours, such as classroom buildings. Racks should be located near the entrance to each building. Where racks are clustered in a single location, they should be surrounded by a fence and watched by an attendant. The attendant can often share this duty with other duties to reduce or eliminate the cost of labor being applied to the bike parking duties; a cheaper alternative to an attendant may be to site the fenced bicycle compound in a highly visible location on the campus. For the long-term parking needs of employees and students, attendant parking and/or bike lockers are recommended.
Retrofit Program	In established locations, such as schools, employment centers, and shopping centers, the City should conduct bicycle parking audits to assess the bicycle parking availability and access, and add in additional bicycle racks where necessary.

Long-Term Bicycle Parking

Long-term bicycle parking facilities, such as those shown in Figure 47, are intended to provide secure long-term bicycle storage. Long-term facilities protect the entire bicycle, its components and accessories against theft and against inclement weather, including snow and wind-driven rain. Examples include lockers, check-in facilities, monitored parking, restricted access parking, and personal storage.

Long-term parking facilities are more expensive to provide than short-term facilities, but are also significantly more secure. Although many bicycle commuters would be willing to pay a nominal fee to guarantee the safety of their bicycle, long-term bicycle parking should be free wherever automobile parking is free. Potential locations for long-term bicycle parking include large employers and institutions where people use their bikes for commuting, and not consistently throughout the day. An advantage of lockers is that they can be configured to more easily accommodate different styles of bicycles, such as recumbent bicycles.

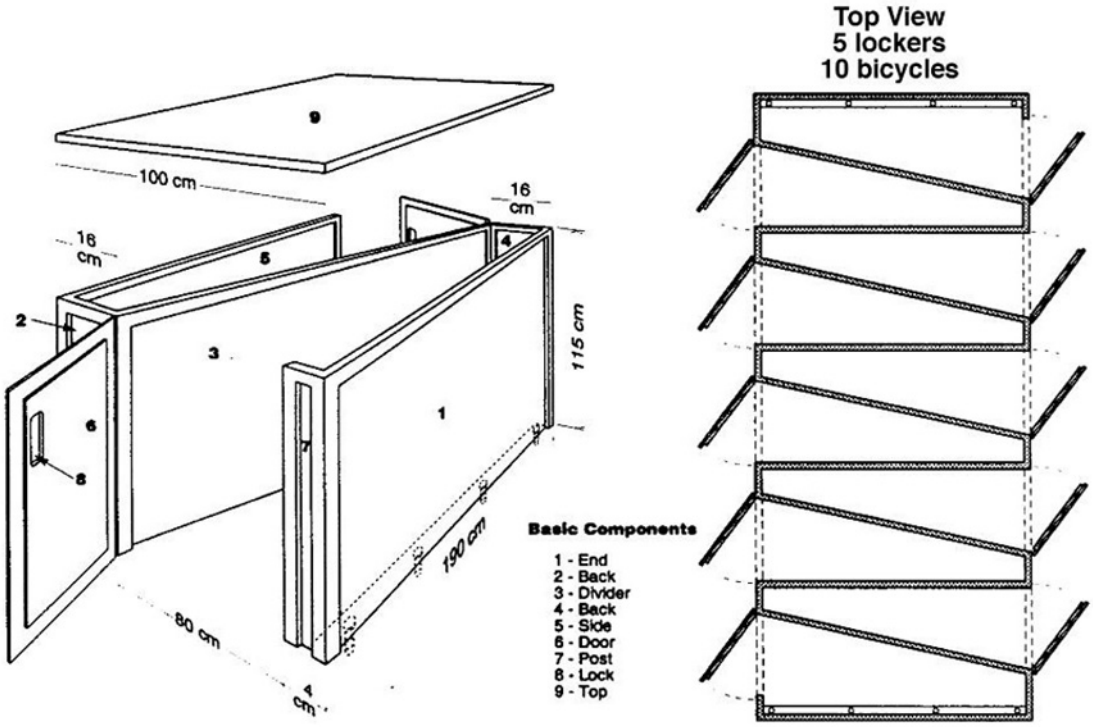

Figure 47 Cycle-Safe Lockers

MAINTENANCE GUIDELINES

Proper maintenance of pedestrian and bicycle facilities is a critical element of providing a safe and user-friendly system. Table 6 summarizes a recommended maintenance schedule for Sisters bicycle/pedestrian system. These guidelines address maintenance of the system's off-street portions. On-street segments should be maintained according to the standards of the responsible jurisdiction (e.g., City, ODOT, etc.).

Table 6 Maintenance Guidelines

Maintenance Task	Frequency
Inspections	Seasonal – at both beginning and end of summer
Signage replacement	1-3 years
Site furnishings; replace damaged components	As needed
Fencing repair	Inspect monthly for holes and damage, repair immediately
Pavement markings replacement	1-3 years
Pavement sweeping/blowing	As needed; before high use season
Pavement sealing; pothole repair	5-15 years
Lighting repair	Annually
Introduced tree and shrub plantings, trimming	1-3 years
Shrub/tree irrigation for introduced planting areas	Weekly during summer months until plants are established
Shoulder plant trimming (weeds, trees, branches)	Twice a year; middle of growing season
Major damage response (fallen trees, washouts, flooding)	Schedule based on priorities
Culvert inspection	Before rainy season; after major storms
Maintaining culvert inlets	Inspect before onset of wet season
Waterbar maintenance (earthen trails)	Annually
Trash disposal	Weekly during high use; twice monthly during low use
Litter pick-up	Weekly during high use; twice monthly during low use
Graffiti removal	Weekly; as needed

Appendix L: Pedestrian and Bicycle Program Recommendations

Memorandum

To: Sisters TSP Technical Advisory Committee

CC:

From: Steve Durrant, Kim Voros and Jessica Roberts

Date: August 5, 2008

Re: Sisters TSP – DRAFT Programs Recommendations

INTRODUCTION

Bicycling and walking programs are an essential and effective complement to infrastructure investments. This memo includes recommendations about programs in the areas of education, marketing, outreach, evaluation and policy, and enforcement.

The goals of these program recommendations are to:

- Disseminate walking and bicycling information widely to residents and visitors
- Increase expertise, knowledge, and acceptance of walking and bicycling
- Raise Sisters' profile as a great place to walk, bicycle, and use trails
- Support a sustainable tourism industry based on active recreation
- Foster a culture of bicycling and walking in Sisters

EDUCATION PROGRAMS

Bicycle Skills Courses

Trained instructors teach adult and teenage cyclists about the rules of the road and bicycle handling techniques. The most common program is the League of American Bicyclists courses (including Road I, Road II, and Commuting), taught by League Certified Instructors. Course cover bicycle safety checks, fixing a flat, on-bike skills, crash avoidance techniques, and traffic negotiation. At the time of writing, there are no League Certified Instructors in Sisters, but there are two in Bend. It is recommended that a local bike shop take the lead in hosting LAB-certified courses, either by inviting instructors from Bend, or by finding a local volunteer to become league-certified.

Lead organization: Local bike shop

Share the Trail Campaign

Conflicts between trail users can be a major issue on Sisters' popular, well-used trail systems. Other communities have launched successful "share the trail" events to help educate users about safety and courtesy. Share the Trail campaigns are most frequently organized by mountain bicycling organizations and clubs, but can also be run by agencies, nonprofits, or any user group (equestrian, hikers, etc.). Share the trail programs educate users about expected behavior and how to limit conflicts. Volunteers often give out brochures and engage with users in a non-confrontational way. Volunteers can also report back to trail agencies about trail damage, erosion, or vandalism. Media outreach should be included as well. It is recommended that the Sisters Community Trails Committee take the lead in organizing a regular team of volunteers to run a Share the Trail Campaign.

Lead organization: Sisters Community Trails Committee

Bike Buddy Programs

Bike Buddy programs pair less-experienced cyclists with a trained mentor who assists them in route selection, training rides, reading bike maps, and gear questions. Experienced cyclists are solicited as volunteer mentors, then provide training about resources, expectations, what they should cover in a training, and what they are and are not responsible for. Residents are then invited to participate in the program, and are matched with the buddy closest to them. Usually the bike buddy is responsible for one information session and one guided commute ride (most commonly during the weekend or other off-peak time). It is recommended that mentors and participants meet in a public place, and that bike buddies bring useful materials with them to the first session. The City of Sisters should seek funding to implement a pilot Bike Buddy Program, possibly in conjunction with National Bike to Work Week. Local bike shops or community volunteers may be able to assist the City in this effort.

Lead organization: City of Sisters

Senior Walking and Bicycling Programs

Seniors often experience limitations in mobility as they age. Senior programs designed to increase walking and bicycling can help seniors maintain independence and mobility, improve health, and provide an opportunity for social interaction. A senior walking and bicycling program may include any of the following components:

- Group walks (aka "Senior Strolls")
- Group bicycle rides
- Tricycles or upright bicycles at seniors centers for checkout
- Trail maps at senior centers

- Senior participation in Safe Routes to Schools (e.g., crossing guard or Walking School Bus volunteer)

The City of Sisters should seek funding to implement a pilot Senior Walking and Bicycling Program. The program may be continued if public support is high and community resources can be found to support its ongoing management.

Lead organizations: City of Sisters, Central Oregon Council on Aging

MARKETING PROGRAMS

Expand Trail Map Distribution

The Sisters Trail Map, created by the Sisters Community Trails Committee, is well-researched and up-to-date. The map should be updated every three to five years, depending on what projects have been completed in the interim. Maps should be distributed to residents and visitors through all available means, including the Chamber of Commerce, City programs and offices, Sisters schools, senior centers, the Deschutes Public Library, the Sisters Oregon Guide, etc.

Lead organization: Sisters Community Trails Committee

Bicycle Benefits Program

In this promotion program, businesses offer discounts or special offers to cyclists. Cyclists purchase a sticker for their helmets (typical cost is $5) and then use it at participating businesses. This national program includes a website to promote businesses. The Sisters Chamber of Commerce is the natural lead agency for this program, since they are already well-connected with area businesses. For more information, see: http://www.bicyclebenefits.org/

Lead organization: Chamber of Commerce

Walking and Bicycling Website

Residents and visitors will benefit from a "one-stop-shopping" location for walking, bicycling, and trail information. The website should be hosted on the City webpage and include:

- A list of all local bicycling and walking groups, including the Sisters Community Trails Committee

- Information about current projects and how to get involved (e.g., public meetings, comment periods)

- Maps and brochures (links to online maps and brochures, where to find in person, and how to request mailed materials)

- Links to laws and statutes relating to bicycling

- Information about cycling events (rides, classes, volunteer opportunities)

- A list of local bike shops, including phone number and address

Lead organization: City of Sisters

Bicycle-Friendly Community Designation

The League of American Bicyclists sponsors an awards program that recognizes cities and counties that actively support bicycling. According to the League, a Bicycle Friendly Community is one that "provides safe accommodation for cycling and encourages its residents to bike for transportation and recreation." The league recognizes four tiers of bicycle friendly communities: bronze, silver, gold and platinum. The City of Sisters should apply for Bicycle-Friendly Community designation after this plan is largely implemented.

Lead organization: City of Sisters

Tourism Marketing Campaign

The City of Sisters already enjoys an outstanding trail network that attracts visitors from near and far. A focused marketing campaign that further raises the profile of Sisters as an outstanding place to walk and bicycle will support a sustainable economy in the region and distinguish Sisters from other eastern Oregon destinations. The campaign should be professionally designed and placed in regional and national publications. Travel Oregon has guidelines for marketing bicycle tourism in Oregon and can advise the local team; Cycle Oregon is also an excellent resource for tourism marketing assistance.

Lead organizations: City of Sisters, Chamber of Commerce

Art Rack Program

An art rack program is an excellent way to raise the profile of bicycling and make bicycling easier in downtown. The City of Sisters should amend their code to clarify what types of racks are permitted[1], and install at least three art racks in prominent locations (such as City Hall). The art rack program may either be fully or partially funded by the City, or the City may prefer instead to partner with the Chamber of Commerce to promote and encourage installation of art racks, funded by private business owners.

Figure 1. Example cowboy bike rack

Lead organizations: City of Sisters, Chamber of Commerce

[1] Sample code langue comes from the City of Portland (http://www.portlandonline.com/auditor/index.cfm?c=31911&a=edccd)

OUTREACH PROGRAMS

Sunday Parkways

Sunday Parkways are periodic street closures (usually on Sundays) that create a temporary park that is open to the public for walking, bicycling, dancing, hula hooping, roller skating, etc. They have been very successful internationally and are just taking hold in the United States. They promote health by creating a safe and attractive space for physical activity and social contact, and are cost-effective compared to the cost of building new parks for the same purpose. These events can be weekly events or one-time events, and are very popular and well-attended. The City of Sisters should lead a community effort to host one pilot Sunday Parkways event in the summer of 2009. Depending on public support and community resources, the program may expand in the future.

Lead organization: City of Sisters

Outreach to visitors and part-time residents

Visitors and part-time residents are important contributors to Sisters' economy, but the impact can be a strain on the community, particularly the impact of thousands of vehicles from other communities. In order to alleviate parking, air pollution, congestion, and traffic collision dangers, the City should lead an effort to reach visitors and part-time residents with information about walking, bicycling, and trail usage. A brochure should be created about walking and bicycling in Sisters, and distributed along with the Trails Map through resorts, vacation rentals, and the Chamber of Commerce.

Lead organization: City of Sisters

Pilot Personal Travel Planning Project

Personal Travel Planning programs (also known as individualized social marketing programs) are encouragement programs based on saturating a geographic area with resources to help residents reduce drive-alone trips and increase biking, walking, transit and carpool trips. PTP programs have demonstrated a lasting reduction in drive-alone trips; for example, in Portland, OR, target areas have experienced a 10% reduction in vehicle traffic.

Programs offer residents maps, brochures and other printed materials, classes, guided rides and walks, and other tools and programs that make bicycling, walking and transit usage a more inviting travel option compared to drive-alone trips.

It is recommended that the City of Sisters seek funding to implement a pilot Personal Travel Planning program in Sisters.

The program may include any of the following:

- Maps and brochures
- Classes, clinics, workshops
- Guided rides and walks

- Fun social events
- Giveaways (coupons, pedometers, etc.)
- Targeted outreach (e.g. Women on Bikes, Senior Strolls)
- Route planning help (bike, walking, or transit)

Lead organization: City of Sisters

Bike to Work Week Promotion

National Bike to Work Week happens every year in May, and is a perfect opportunity for media attention to bicycle commuting. The City should coordinate multiple community partners, including bike shops, the Sisters Community Trails Committee, and citizen volunteers in creating a week-long series of events. Possible events include a celebrity bike/walk/drive commute challenge, a breakfast event for bike commuters, "energizer stations" to give treats to cyclists, Commuter of the Year awards, challenges between workplaces and departments, and informational booths at City buildings and other gathering places. The League of American Bicyclists has created a comprehensive guide to hosting bike-to-work events during May (see http://www.bikeleague.org/programs/bikemonth/).

Lead organization: City of Sisters

Create Municipal Bicycle Fleet

The City of Sisters can encourage and support bicycling among agency staff by having a municipal bike fleet available for employee use during work hours. The bikes should have racks and fenders, and can be checked out from administrative staff. Periodic safety checks and necessary maintenance should either be assigned to a City employee with appropriate skills and interest, or can be contracted with a local bike shop.

Lead organization: City of Sisters

Valet Bike Parking at Events

Major events in Sisters, including the Sisters Outdoor Quilt Show and the Sisters Rodeo, attract many visitors, and parking is a problem. Valet bike parking should be provided at major events, paid for by the event promoters. A local bike shop or volunteer group can provide valet bike parking services. The City can support this effort by requiring major events to provide valet bike parking services in order to receive an event permit.

Lead organization: Event promoters

POLICY AND EVALUATION RECOMMENDATIONS

Pedestrian and Bicycle Advisory Committee

Many cities have a Pedestrian and/or Bicycle Advisory Committee made of citizen volunteers, appointed by City Council, to advise the city on pedestrian and bicycling issues. It is recommended

that the City create a Pedestrian and Bicycle Advisory Committee, and invite members of the current Sisters TSP Technical Advisory Committee to continue their service after the close of the project by serving on the committee. A city staffer, either from Planning or Public Works, should be assigned as the liaison to the PBAC.

Lead organization: City of Sisters

User Counts and Surveys

It is essential to create an evaluation program for non-motorized transportation in order to determine if investments are successful. The City of Sisters should count bicyclists and pedestrians annually at key locations according to national practices (see the National Bicycle and Pedestrian Documentation Project). Resident surveys can further measure changes in knowledge, attitudes, and behaviors; the NBPD has user survey templates as well. It is further recommended that bicycle and pedestrian data collection be included in the before and after data collection efforts on major roadway projects.

Lead organization: City of Sisters

Designate Bicycle/Pedestrian Point Person

Many larger cities have a full-time Bicycle and/or Pedestrian Coordinator. As a smaller city, Sisters instead should designate one staffer as the main point of contact for bicycle and pedestrian issues and publicize his/her contact information widely to the public. Bicycle and pedestrian issues need not take up most of this person's time, but it is helpful to the public to have a knowledgeable staffperson to whom to direct questions. This person would also be the liaison to the Pedestrian and Bicycle Advisory Committee.

In addition to answering inquiries from the public, this point person may also monitor the design and construction of bicycle and pedestrian projects, including those detailed in this plan; ensure that nonmotorized facilities are designed appropriately and constructed expediently; and coordinating the implementation of the recommended projects and programs listed in this Plan, and identifying new projects. This person will also lead the annual User Counts and Surveys program.

Lead organization: City of Sisters

Bike Rack Installation Program

The City of Sisters should create an annual program to purchase and install bike racks in the public right-of-way. The location for racks can be determined by the designated bicycle/pedestrian point person (see above), as well as suggested by the public. A phone number and web form (e.g. http://www.chicagobikes.org/forms/bikerackrequest.php) should be publicized to allow residents to suggest bike rack locations.

Lead organization: City of Sisters

ENFORCEMENT RECOMMENDATIONS

Speeding Countermeasures

Speeding has been identified as a major area of community concern in Sisters. Countermeasures include police ticketing activities; a neighborhood speed watch; radar trailers; and speed feedback signs (see the SR2S Toolkit Appendix XX). These activities should be conducted at problem locations identified by school officials and law enforcement.

Lead organization: Deschutes County Sheriff

Crosswalk Enforcement Actions

Sisters' downtown environment is degraded when motorists routinely fail to stop for pedestrians in crosswalks. It is recommended that the Deschutes County Sheriff's office coordinate with the City of Sisters to conduct a crosswalk enforcement action (sometimes called a "pedestrian sting"). A "decoy" (usually a plain-clothes police officer or a local politician) steps into a crosswalk to exercise his legal right-of-way. Motorists who do not yield are given a citation by a second officer stationed nearby (often a motorcycle officer whose car is hidden between nearby parked vehicles). The Sheriff's Office or the City may include media outreach to increase public awareness of the issue of crosswalk safety, and journalists may observe the enforcement action.

Lead organization: Deschutes County Sheriff

Appendix M: Pedestrian and Bicycle Project Cost Estimate Assumptions

Unit Costs

Facility Type	Unit	Base Cost	Burdened Cost*	
Bicycle Boulevard	Mile	$46,000	$86,238	Assumes base treatments (pavement markings, route identification signs and wayfinding signs) and four level one intersection treatments per mile
Sidewalk	LF	$42	$79	6-7' one side of street
Shared use path	LF	$120	$225	12' concrete trail plus 2' shoulders each side
Bike lane (roadway re-striping)	Mile	$25,000	$46,868	Both sides of street
Bike lane (road widening)	Mile	$300,000	$562,419	Both sides of street
Trail/roadway crossing improvements	Per x/ing	$15,000	$28,121	Markings, signage, integration with signal if appropriate

*** Assumptions**

Survey/Design	14%
Administration	10%
Traffic Control/Mobilization	15%
Contingency	30%
Multiplier:	187.47%

Appendix N: Highway Alternatives Analysis

DKS Associates
TRANSPORTATION SOLUTIONS

DRAFT

MEMORANDUM

TO: Eileen Stein, City of Sisters

FROM: Chris Maciejewski, P.E.
Brad Coy

DATE: July 27, 2009

SUBJECT: **Sisters TSP Update – Alternatives Analysis** P/A No. 07288-000-004

This memorandum documents the alternatives analysis process used to determine the preferred Highway 20 alternative associated with the 2008 Update of the City Sisters Transportation System Plan (TSP). The process included travel forecasting and operational analysis by DKS Associates, direction and decision making by the Project Advisory Committee (PAC), and input/feedback from the general public.

Multiple iterations in decision making were followed, including (1) developing a list of possible alternatives, (2) screening the alternatives to narrow down the list, (3) performing preliminary analysis to determine feasibility, (4) performing refined analysis to determine a preferred alternative, and (5) further refining the preferred alternative. Each of these steps is described as its own section in this memorandum.

POSSIBLE ALTERNATIVES

A list of possible alternatives was determined based on previous work performed, community feedback, and PAC review. Though previous work was performed, no specific recommendations had both received community consensus and been approved by the Oregon Department of Transportation (ODOT). Therefore, analysis began with no pre-determined outcomes and a list of the previously analyzed alternatives was prepared as a starting point.

Previously Analyzed Alternatives

Two previous studies that considered potential alternatives for improving Highway 20 through Sisters were the Sisters Transportation System Plan (2001)[1] and the Sisters Couplet Refinement Plan (2004).[2] These studies considered or identified the following alternatives:

- Cascade Avenue Restriping
- Hood-Main Couplet
- Cascade-Main Couplet
- Cascade-Hood Couplet
- Barclay-Locust Alternate Route
- Northern or Southern Bypass

[1] Sisters Transportation System Plan (2001)
[2] Sisters Couplet Refinement Plan (2004)

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Community Open House #1

In preparation for the project kick-off and first open house (held on December 5, 2007), conceptual figures showing the previously identified alternatives for Highway 20 were prepared. These figures are shown in this document as Figures 1 through 6.

Figure 1: Preliminary Schematic of Hood-Main Couplet

Figure 2: Preliminary Schematic of Cascade-Main Couplet

Figure 3: Preliminary Schematic of Cascade-Hood Couplet

Figure 4: Preliminary Schematic of Barclay-Locust Alternate Route

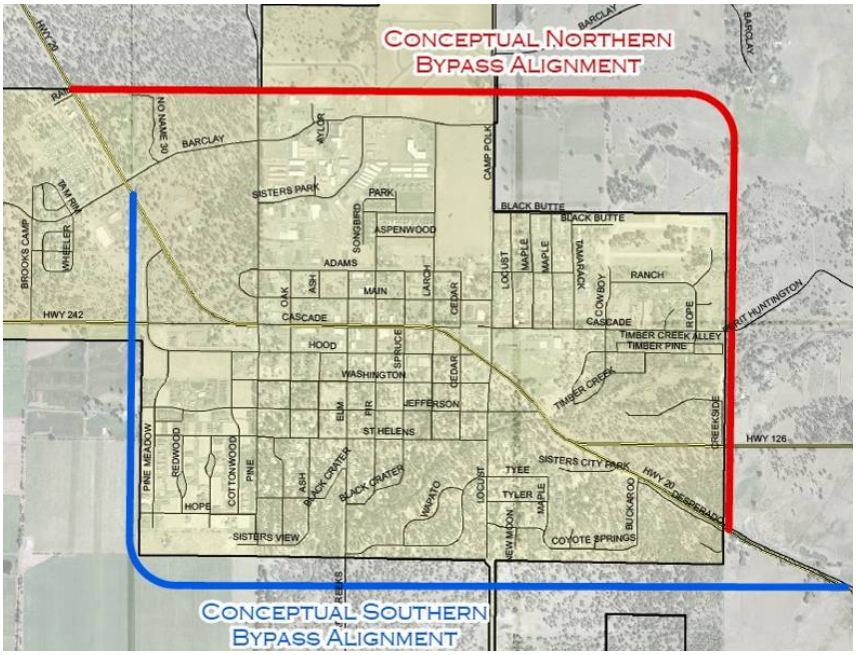

Figure 5: Preliminary Schematic of Northern and Southern Bypasses

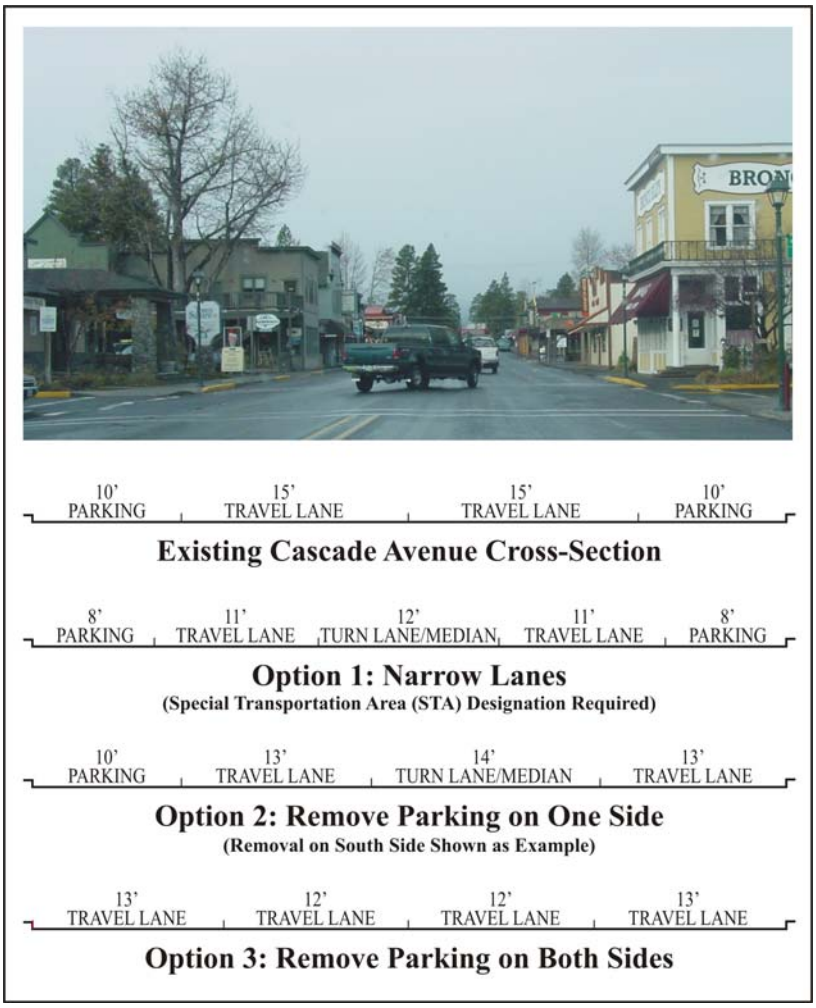

Figure 6: Preliminary Cascade Avenue Cross-Section Restriping Alternatives

The figures of the previously identified alternatives were presented at the open house, and overall community feedback was solicited. Overall goals of the TSP were also presented. Some of the main goals that received support were improving livability, safety, and economic vitality. The desire was expressed that a solution should be found that would both manage long-term traffic demand and be safe for bicyclists and pedestrians while also supporting the City's vision of being a destination instead of a way-point.

There were also various ideas and concerns voiced regarding each of the alternatives. through-trucks on Cascade Avenue, pedestrian safety by the elementary school, pedestrian refuges on Cascade Avenue, roundabouts

Project Advisory Committee Meeting #1

Based on the feedback received at the open house, the PAC worked with DKS to prepare a list of possible alternatives that would receive further consideration. Eleven alternatives were identified and included a mix of improvements that were considered to be either short-term, mid-term, or long-term. The intent was to potentially select a short- or mid-term solution that would increase Highway 20 capacity until the preferred long-term solution could be approved, funded, and constructed.

The 11 alternatives selected for consideration are listed below:

Short-term

- Re-stripe Cascade Avenue to three lanes and provide a continuous two-way left-turn lane
- Re-stripe Cascade Avenue to three lanes and provide a pedestrian refuge and a left-turn lane at each intersection (the left-turn lanes would alternate between an eastbound and a westbound left-turn lane)

Mid-term

- Hood-Main Couplet
- Cascade-Main Couplet
- Cascade-Hood Couplet
- Barclay-Locust Alternate Route
- Barclay + Extension Alternate Route (tying in to Hwy 126 and Hwy 20 along eastern City limits)

Long-term

- Close North Bypass (hugging northern City limits)
- Close South Bypass (hugging southern City limits)
- Far North Bypass (swinging wide around the City)
- Far South Bypass (swinging wide with some sections following the Brooks-Scanlon logging road)

The majority of these alternatives were ones previously identified and are shown in Figures 1 through 6. Figures of the remaining alternatives were also prepared and are shown in Figures 7 through 9.

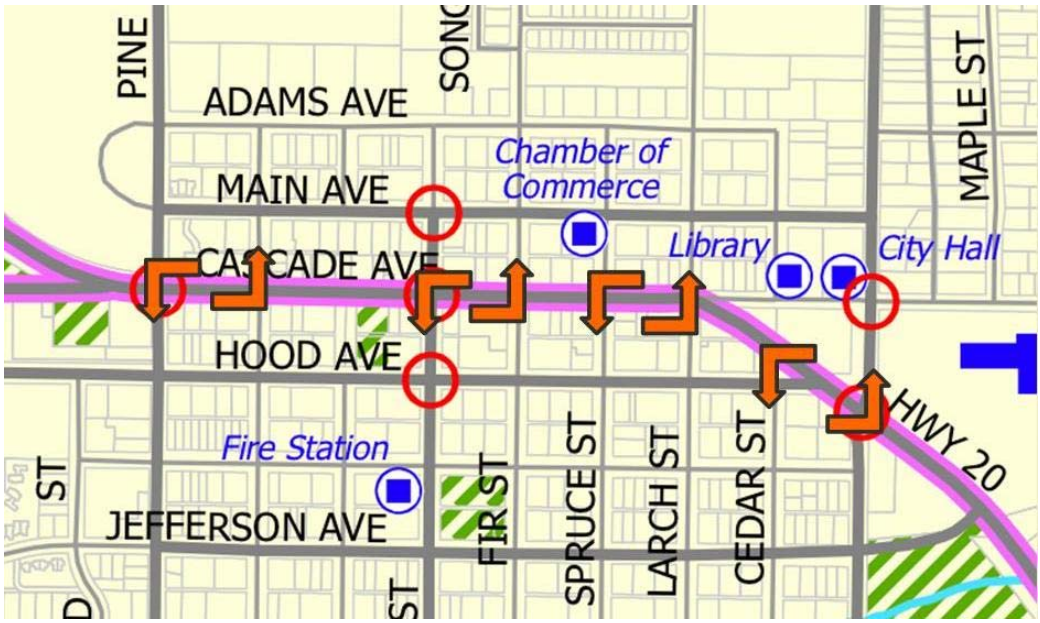

Figure 7: Preliminary Cascade Avenue Restriping with Alternating Left-Turns and Pedestrian Islands

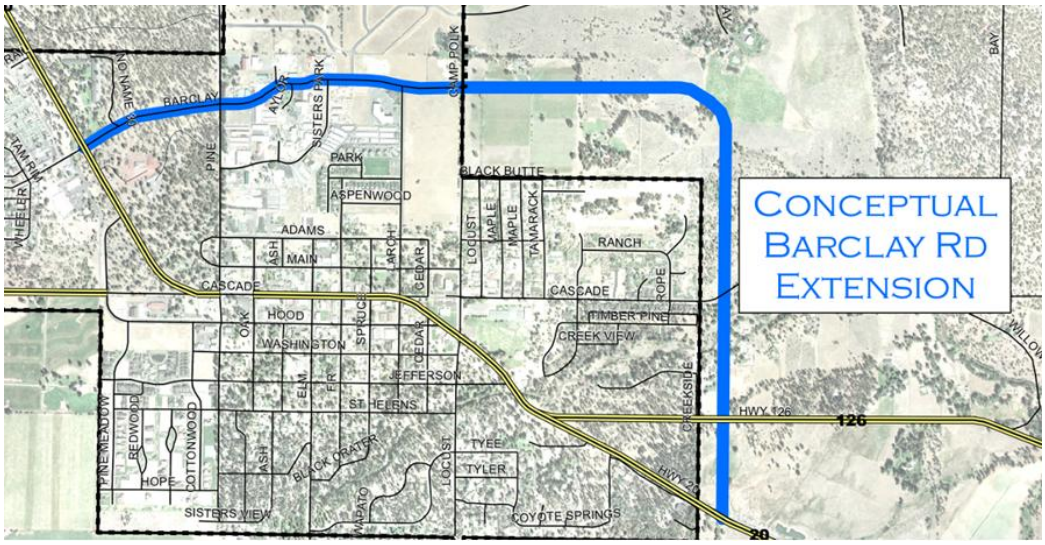

Figure 8: Conceptual Barclay Road with Extension Alternate Route

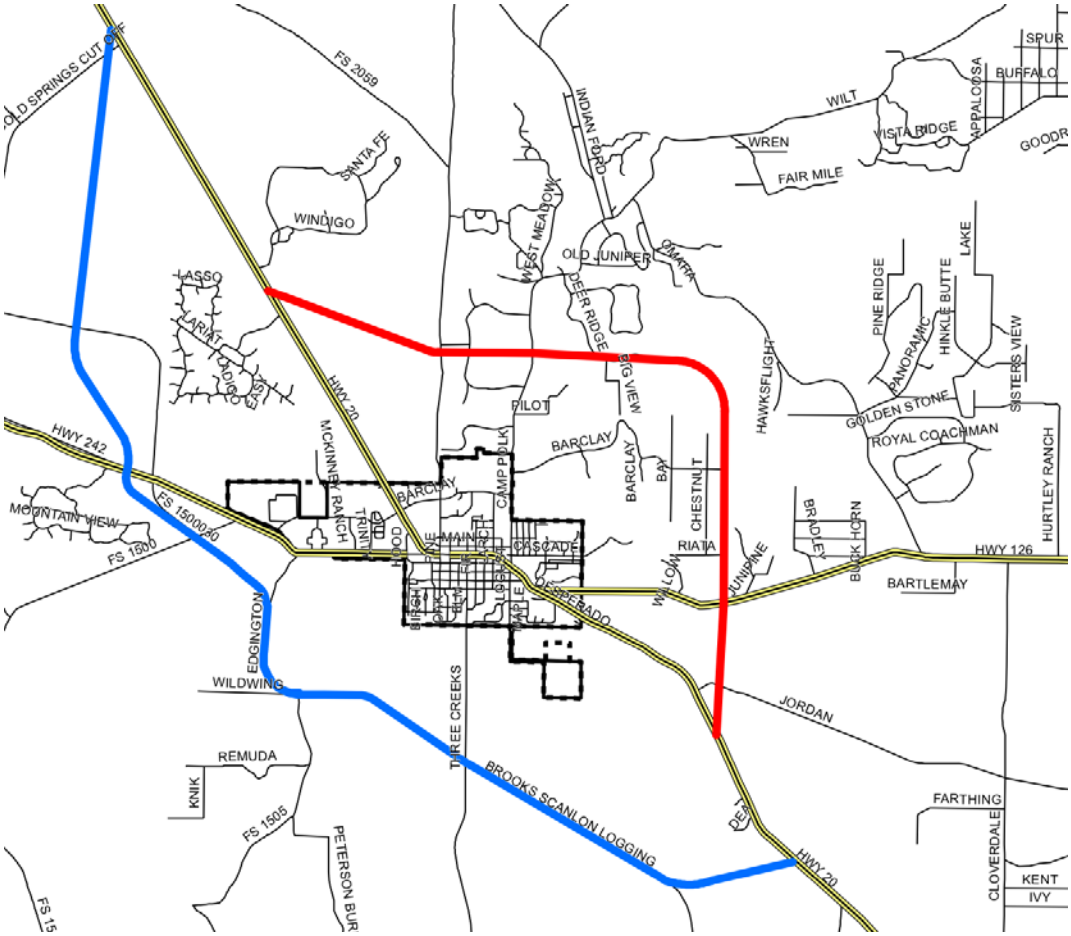

Figure 9: Conceptual Far North and Far South Bypasses

ALTERNATIVES SCREENING

The 11 alternatives underwent an initial screening because there were multiple concepts with similar characteristics and performance. The intent of the screening was to select one or two alternatives from each of the short-, mid-, and long-term categories in order to focus efforts and resources on analyzing the alternatives that appeared to best match community goals. The screening process was performed by the PAC after the Existing Conditions and Future Needs transportation analyses were prepared by DKS Associates in conjunction with Alta Planning and Design.[3,4,5,6] These analyses identified a comprehensive list of transportation issues that the preferred alternative(s) would need to address and documented in separate memorandums that are also included in the TSP Appendix. The PAC screening results are described below.

Project Advisory Committee Meetings #2 and #3

The PAC held two meetings (May 6 and June 10, 2008) during which they selected four alternatives for additional analysis. The selected alternatives for the short-term and long-term were the preferred alternative for their particular groupings. For the mid-term alternatives, both the Hood-Main Couplet and Barclay-Locust Alternate Route were selected to be analyzed through the entire process in order to determine whether either or both were feasible and how the two compare with one another. The four alternatives are listed as bullets below (followed by explanation regarding why each was selected from its particular group):

Short-term

- Re-stripe Cascade Avenue to three lanes and provide a pedestrian refuge and a left-turn lane at each intersection; the left-turn lanes would alternate between an eastbound and a westbound left-turn lane (shown previously in Figure 7)

Mid-term

- Hood-Main Couplet (shown previously in Figure 1)
- Barclay-Locust Alternate Route (shown previously in Figure 4)

Long-term

- Southern Bypass; either near bypass with connections inside the City (shown previously in Figure 5) or far bypass with connections outside the City (shown previously in Figure 9)

Between the two short-term restriping alternatives, the alternating left turns and pedestrian islands was selected while the full two-way left-turn lane (TWLTL) was removed. The main concern for the TWLTL was that it increases the pedestrian crossing distance while not providing pedestrian islands. Therefore, it does not contribute to the community's desire to increase livability by improving the pedestrian environment and reducing the barrier affect caused by difficult pedestrian crossings.

Between the three couplet options, the Hood-Main Couplet was selected as the preferred option based on the PAC's preference on two key issues: (1) keeping Cascade open as a local street and (2) maintaining on-street parking on Hood and Main. The majority of the PAC members preferred keeping Cascade Avenue open as a local street. Because the Hood-Main Couplet met with this preference, it was selected

[3] *Sisters TSP Update – Existing Conditions*, DKS Associates, March 10, 2008.
[4] *Sisters TSP Bicycle and Pedestrian Element – Existing Conditions and Future Needs*, Alta Planning and Design, February 22, 2008
[5] *Sisters TSP Update – 2030 Future Needs*, DKS Associates, March 10, 2008.
[6] *Sisters TSP Bicycle and Pedestrian Element – Future Needs*, Alta Planning and Design, March 11, 2008

for further analysis. This preferred couplet alternative was also consistent with the Couplet Refinement Plan and preliminary information from DKS Associates in preparing future needs and alternatives screening information.[7]

Between the two alternate route options, the Barclay-Locust Alternate Route was selected. Some of the pros of this alternative were that it could be implemented in phases and existing facilities would be improved. One of the drawbacks is that it passes by the elementary school, but this impact could be reduced by using the alternate route only as a relief valve when needed. The other alternate route option (i.e., the Barclay and Extension Alternate Route) also has some key drawbacks, including increased impacts to right-of-way, developed property, and the environmental wetlands east of town.

Between the bypass options, a southern bypass was preferred over a northern bypass. However, whether it would be near the City or outside the City was not initially determined due to the need to have DKS further explore how far south the bypass could go and how it would tie into Highway 20 on the west and east ends. The reason the northern bypass alternatives were removed from consideration were due to costs associated with private property and right-of-way acquisitions, identified wetland impacts, lack of a direct route, and potential conflicts with the airport. It was also mentioned by ODOT staff that a bypass is a long-term solution that will require significant time and money and that the community should keep at least two mid-term alternatives on the table to avoid boxing the City into one or two options that may not be feasible for ODOT to partner on.

Additional Bypass Considerations

Based on the PAC recommendations, DKS further explored southern bypass considerations. The main considerations were how far south the bypass could go and how it would tie into Highway 20 on the west and east ends. It was determined that to meet ODOT spacing standards and provide the likely interchange configuration where the bypass would connect to Highway 20, land impacts and access impacts within the City would be severe with a close-in bypass. Therefore, it was determined that the following bypass alternative may be considered further if it was found to be needed to meet the forecast year mobility needs:

Long-term

- Southern Bypass with connections to Highway 20 outside the City

PRELIMINARY ANALYSIS

Preliminary analysis was performed by DKS Associates and coordinated with the PAC for each of the four selected alternatives. The analysis for these alternatives included travel demand forecasting, graphic simulations, cost estimates, performance results, and traffic simulation. A travel demand forecast tool was developed as a basis for the analysis and was used to estimate the shift in travel patterns associated with each of the Highway 20 alternatives. A detailed explanation of the travel demand forecast tool is provided in the future forecasting methodology memorandum provided as Appendix I.

The intent of the preliminary alternatives analysis was to provide the PAC with more information concerning the general operations and feasibility of the alternatives. The specific findings for each alternative are provided below.

[7] Sisters Couplet Refinement Plan (2004)

Cascade Avenue Alternating Lefts

The preliminary analysis of the Cascade Avenue Alternating Lefts alternative considered the geometric needs of the pedestrian islands and turn lanes that are the key features of this alternative. After estimating potential Cascade Avenue cross-sections and coordinating with ODOT regarding design requirements for the Highway 20 corridor, it was determined that raised pedestrian refuges would allow Highway 20 to meet critical freight clearance requirements only if other desired features were set aside. Namely, a minimum of 18 feet would be needed for oversized vehicle clearance, and this would prohibit wider sidewalks and also require a bike lane to replace the on-street parking (so that oversized vehicles can overhang into the bike lane if needed). Therefore, Cascade Avenue improvements could either include wider sidewalks or a raised median, but not both.

Another concern related to the pedestrian islands was the added difficulty of snow removal, which is a significant issue due to the amount of snowfall during the winter. Snow removal would be further complicated by the removal of the on-street parking required by this scenario because there would be nowhere along Cascade Avenue to store the snow during plowing.

A photograph of Cascade Avenue was altered to show what it might look like with alternating left turns and pedestrian islands. This altered photograph is provided in Figure 10. Considering the tradeoffs relating to this alternative (i.e., removal of parking and inability to widen sidewalks), it was determined that the Cascade Avenue Alternating Lefts alternative was undesirable. Therefore, a continuous center turn lane alternative was briefly reconsidered. While the sidewalks could be widened a few feet under this scenario, this wasn't enough to justify giving up the on-street parking. Altered photographs showing what a continuous center turn lane may look like are provided in Figures 11 and 12.

Figure 10: Altered Cascade Avenue Photograph Showing How Alternating Left-Turn Pockets and Pedestrian Islands May Potentially Look

Figure 11: Altered Cascade Avenue Photograph Showing How a Continuous Center Turn Lane May Potentially Look (Includes Wider Sidewalks but No On-Street Parking)

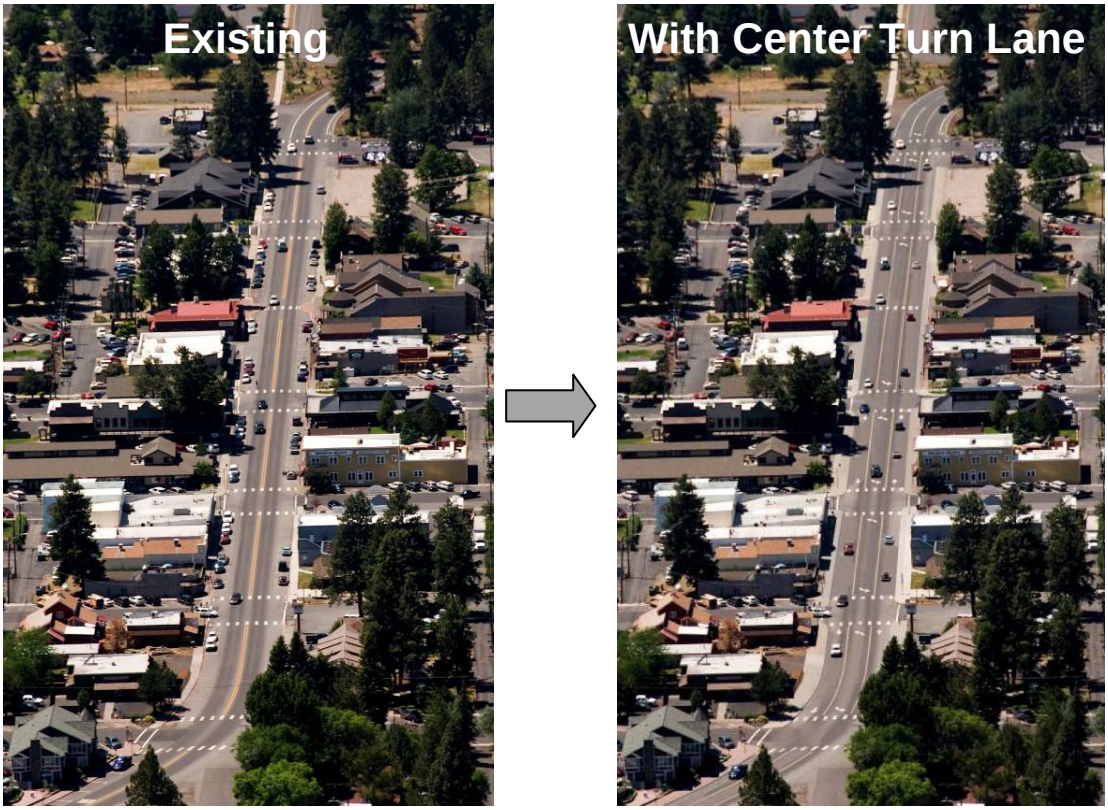

Figure 12: Existing and Altered Cascade Avenue Photographs Showing How a Continuous Center Turn Lane May Potentially Look

Though the Alternating Lefts alternative was found to be infeasible, improvements along Cascade Avenue were still determined to be desirable. Due to the importance of Cascade Avenue as the both the current highway and a key pedestrian destination in Sisters, it was decided that further consideration of Cascade Avenue improvements should be tied to whether the Hood-Main Couplet or Barclay-Locust Alternate Route was selected as the preferred alternative. Specifically, the Hood-Main Couplet would remove the highway designation from Cascade Avenue and allow pedestrian improvements to be made at the City's discretion while the Barclay-Locust Alternate Route would keep Cascade Avenue as the highway and would likely require at least a few capacity improvements at select locations, but the majority of improvements would be pedestrian or bicycle related.

A planning level cost estimate of potential improvements to Cascade Avenue was calculated at $1.4 million. This included sidewalk widening and potential turn lane installation at select locations and was considered applicable regardless of whether the Hood-Main Couplet or Barclay-Locust Alternate Route was selected as the preferred alternative.

Hood-Main Couplet

The travel demand forecast tool developed for this TSP Update was used to estimate the shift in travel patterns that would result from the conversion of Hood and Main Avenues into an east-west couplet for Highway 20. The couplet would consist of one-way streets that were each two lanes. Hood Avenue would service eastbound traffic, and Main Avenue would service westbound traffic. The couplet would span the length of downtown Sisters, and roundabouts would tie the couplet together at the two ends.

Output from the VISUM travel demand forecast tool was post processed and modeled in Synchro™, a traffic software that calculates intersection operating conditions. Synchro™ together with SimTraffic™, which is a traffic simulation software, were used to estimate the resulting traffic operations (e.g., intersection level of service, average delay, queuing, etc.). These models were used to determine some likely improvements that would be needed in conjunction with the Hood-Main Couplet. Two main improvements were the widening of Highway 20 to at least four lanes (two travel lanes in either direction) on the east and west edges of town.

With these improvements incorporated into the Synchro™ and SimTraffic™ models, the preliminary analysis indicated that there was a possibility that the Hood-Main Couplet would be able to meet the long-term transportation needs through the 2030 TPS horizon year (i.e., maintain reasonable traffic flow on the highway without system gridlock). Because these models were still unrefined, additional analysis would be needed to confirm whether this was the case and to determine more detailed improvements that would be needed.

A photograph of downtown Sisters was altered to show what it might look like with the Hood-Main Couplet (including the roundabouts at either end). This altered photograph is provided in Figure 13. In addition, aerials of the two ends of the couplet were overlaid with the potential roundabout footprints and are provided in Figure14.

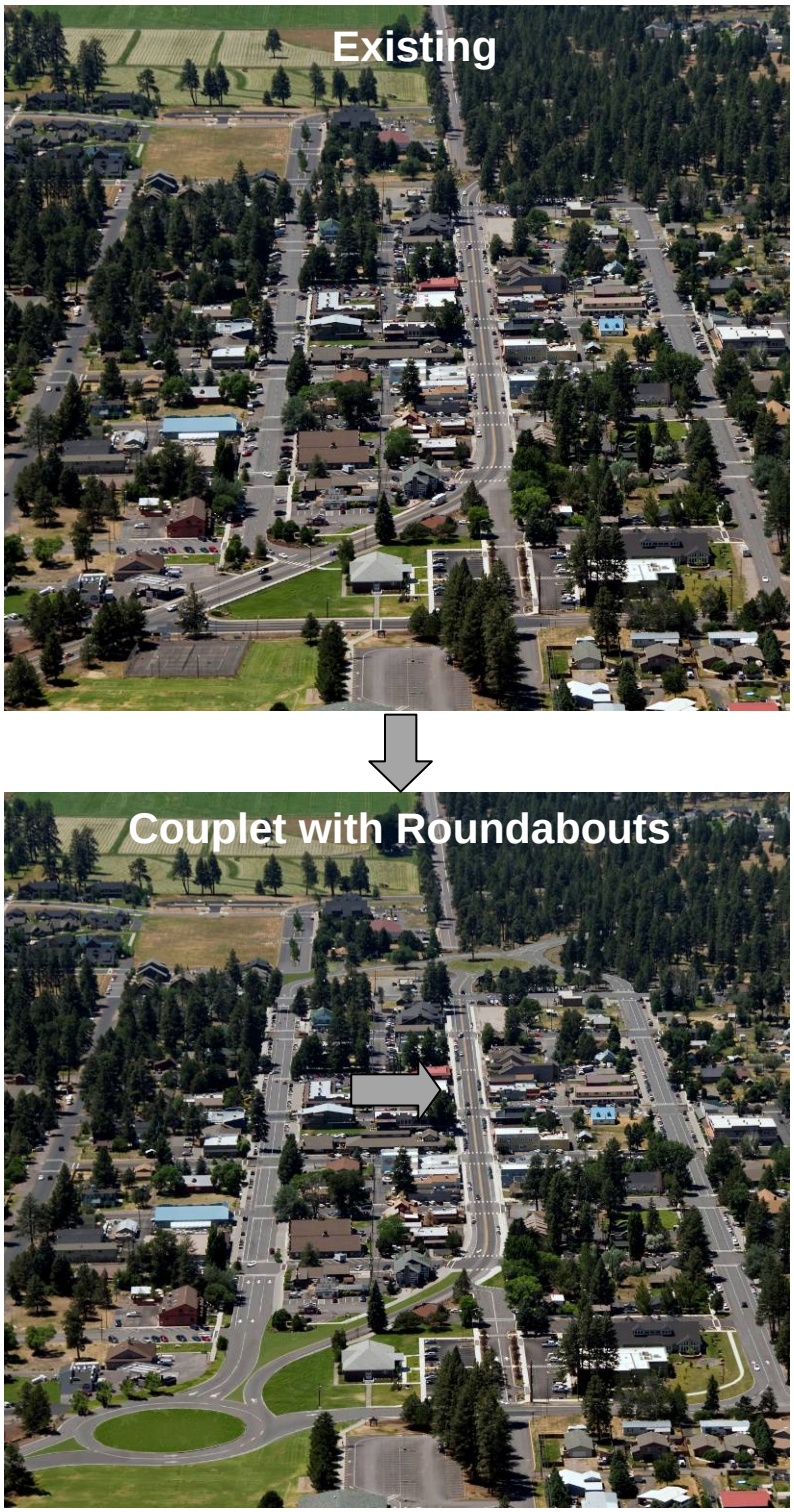

Figure 13: Existing and Altered Downtown Photographs Showing How The Hood-Main Couplet with Roundabouts May Potentially Look

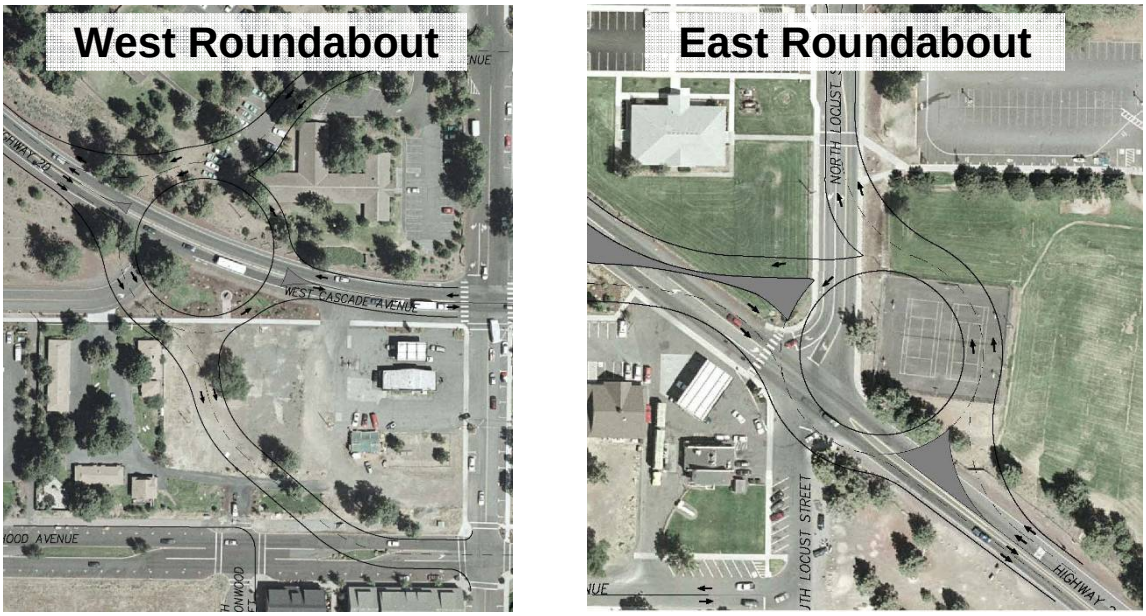

Figure 14: Possible Roundabout Footprints at Either End of the Hood-Main Couplet

A planning level cost estimate of the Hood-Main Couplet and associated Highway 20 widening improvements was calculated at $46.7 million. This also included the $1.4 million cost of the Cascade Avenue improvements. The planning level cost estimate breakdown by roadway section is shown in Figure 15.

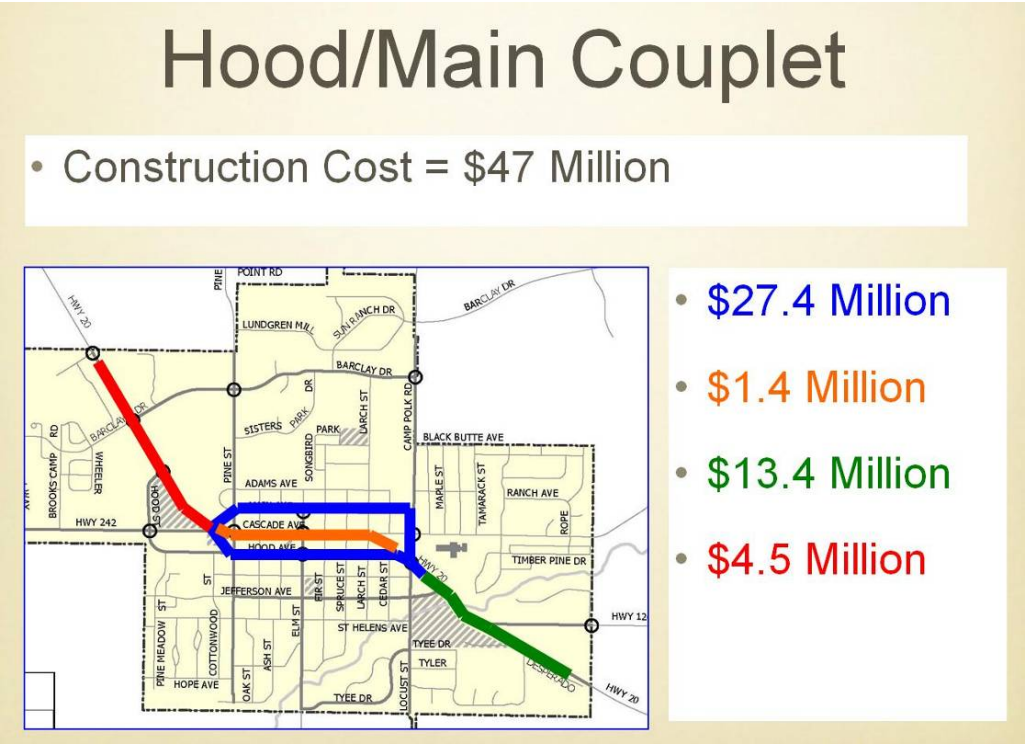

Figure 15: Hood-Main Couplet Planning Level Cost Breakdown

Barclay-Locust Alternate Route

The travel demand forecast tool developed for this TSP Update was also used to estimate the shift in travel patterns that would result from improving Barclay Drive and Locust Street and facilitating their use as an alternate route to Highway 20 through downtown Sisters. Traffic signals or roundabouts would be installed at the Highway 20/Barclay Drive and Highway 20/Locust Street intersections and would be designed to accommodate both the traffic staying on Highway 20 and the traffic using the alternate route. Congestion detection technology and variable message signs that direct motorists to use the alternate route to bypass downtown would be provided for this alternative.

Images were prepared showing what the Barclay-Locust Alternate Route might look like. Figure 16 consists of an existing and an altered aerial of Barclay Drive showing how it might be widened with smoothed curvature and the removal of some accesses. Figure 17 is similar and includes an existing and an altered aerial showing some improvements on Locust Street near Highway 20. Figure 18 then shows how the roundabout at Barclay Drive and Locust Street (Camp Polk Road) might look as well as what the footprint may be for a two-lane roundabout at the Highway 20/Locust Street intersection if one is constructed instead of a traffic signal. Figure 19 is a schematic of a possible variable message sign that could be installed on either end of town to encourage use of the alternate route during peak congestion periods.

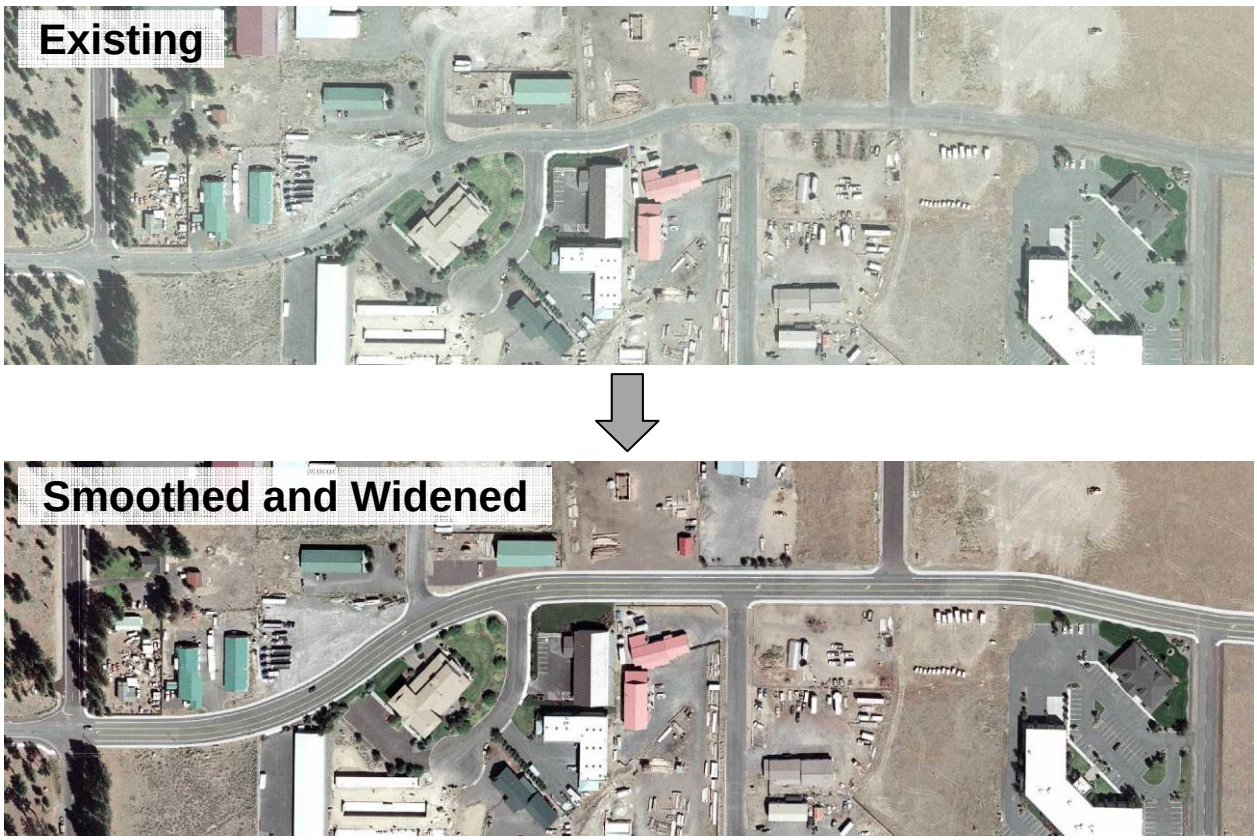

Figure 16: Existing and Altered Barclay Drive Aerial Photographs Showing How It May Potentially Look After Being Smoothed and Widened

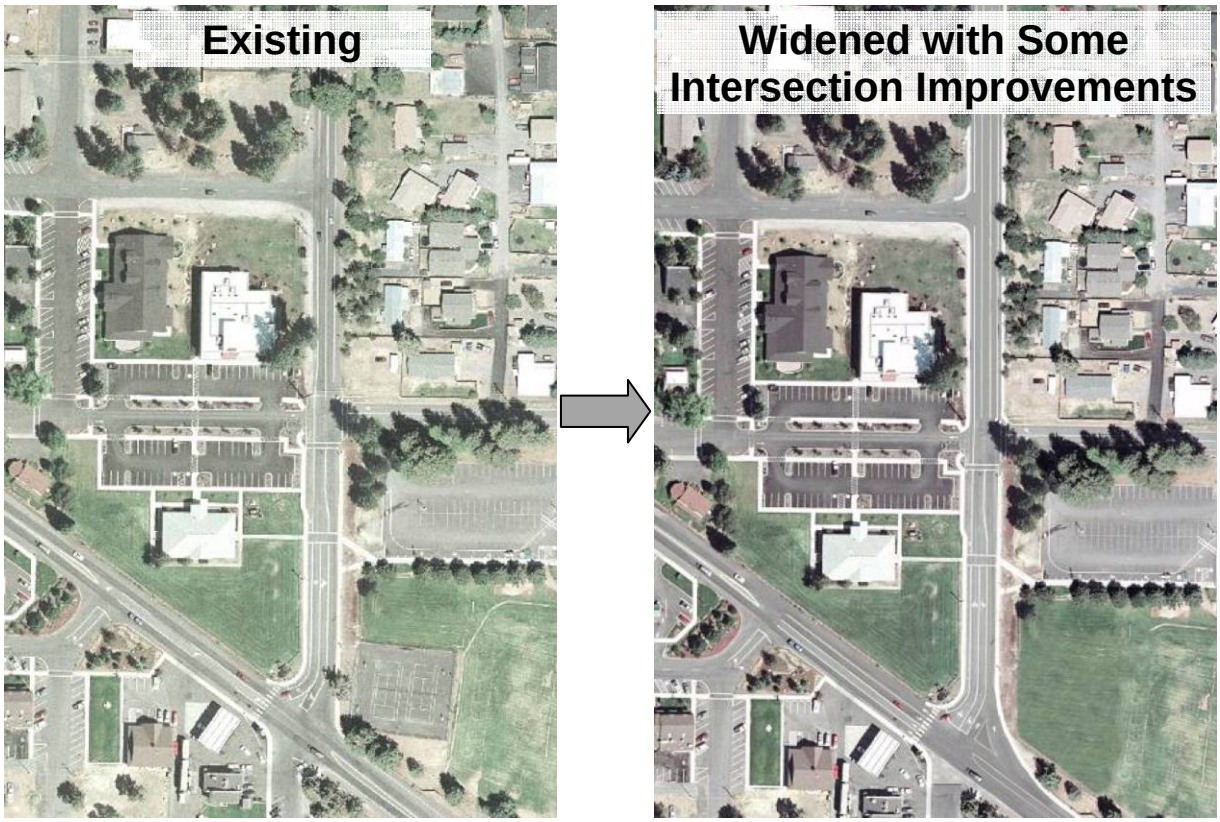

Figure 17: Existing and Altered Locust Street Aerial Photographs Showing How It May Potentially Look After Being Widened with Improvements at Highway 20

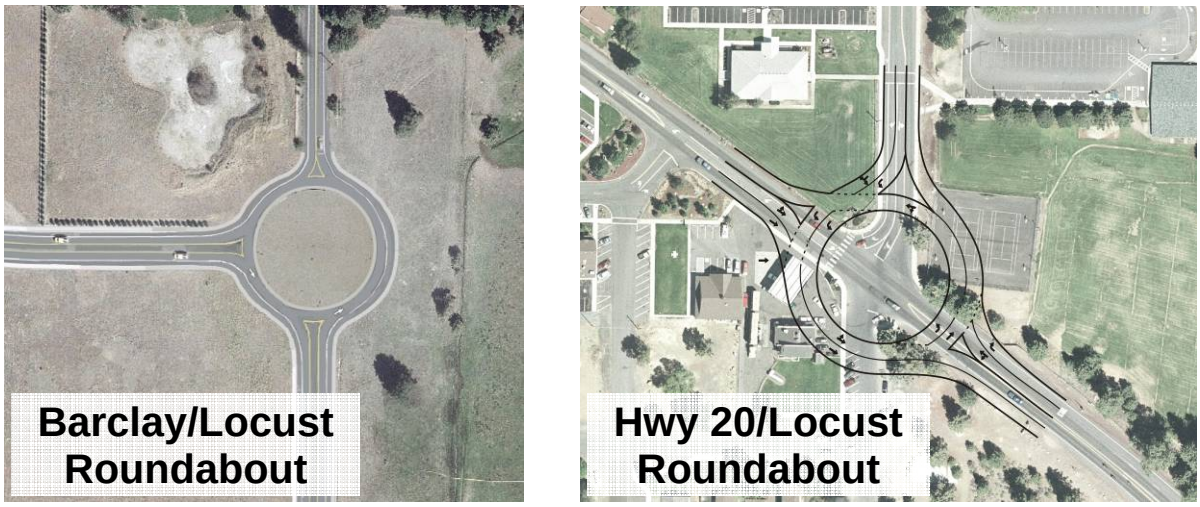

Figure 18: Altered Aerial Photographs Showing Possible Roundabout Footprints at the Barclay/Locust and Highway 20/Locust Intersections

Figure 19: Schematic of a Possible Variable Message Sign for Alternate Route

Output from the VISUM travel demand forecast tool was post processed and modeled in Synchro™, a traffic software that calculates intersection operating conditions. Synchro™ together with SimTraffic™, which is a traffic simulation software, were used to estimate the resulting traffic operations (e.g., intersection level of service, average delay, queuing, etc.). These models were used to determine some likely improvements that would be needed in conjunction with the Barclay-Locust Alternate Route. Similar to the Hood-Main Couplet, portions Highway 20 on the east and west edges of town would need to be widened to at least four lanes (two travel lanes in either direction).

With these improvements incorporated into the Synchro™ and SimTraffic™ models, the preliminary analysis indicated that there was a possibility that the Barclay-Locust Alternate Route would be able to meet the long-term transportation needs through the 2030 TPS horizon year. Because these models were still unrefined, additional analysis would be needed to confirm whether this was the case and to determine more detailed improvements that would be needed.

A planning level cost estimate of the Barclay-Locust Alternate Route and associated Highway 20 widening improvements was calculated at $40.6 million. This also included the $1.4 million cost of the Cascade Avenue improvements. The planning level cost estimate breakdown by roadway section is shown in Figure 20.

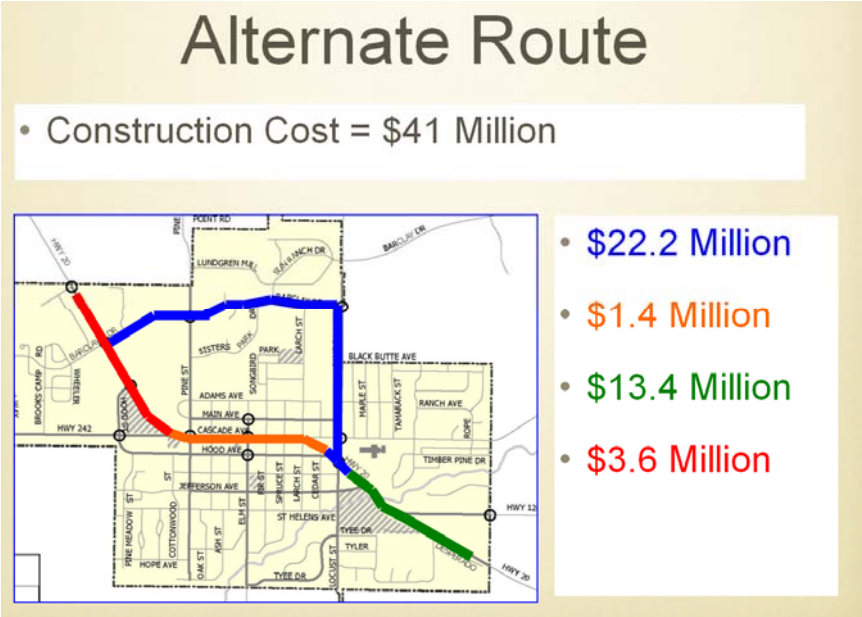

Figure 20: Barclay-Locust Alternate Route Planning Level Cost Breakdown

Southern Bypass

Preliminary analysis of the southern bypass was focused on determining the general alignment. One principal consideration for why the southern bypass was selected by the PAC was due to the potential land and environmental impacts that would result from a northern bypass. In addition, due to the required interchange footprint and bypass access impacts, the west connection between the bypass and Highway 20 should be west of the Tollgate development. Some sections of the bypass may likely follow the Brooks-Scanlon logging road. A planning level cost estimate of the southern bypass was calculated at $125 to $175 million.

Project Advisory Committee Meeting #4

The PAC reviewed the analysis on September 16, 2008, and determined to (1) perform additional analysis for both the Hood-Main Couplet and Barclay-Locust Alternate Route alternatives, (2) explore needs and options for Cascade Avenue and refine as part of Barclay-Locust Alternate Route alternative and not as a short-term alternative, and (3) set aside the southern bypass. The southern bypass was not analyzed further given its substantial cost and because the Hood-Main Couplet and Barclay-Locust Alternate Route would both likely meet long-term capacity needs through the 2030 TSP horizon year. However, should a bypass be considered at a future date, a southern bypass that ties into Highway 20 west of the Tollgate development is recommended as a potential alternative.

REFINED ANALYSIS

Additional alternative development and refined analysis was performed by DKS Associates for the Hood-Main Couplet and Barclay-Locust Alternate Route alternatives to determine if either of these alternatives could meet long-term needs (i.e., mobility standards) through the 2030 TSP horizon year. The results of the analysis were to be presented to the PAC to aid them in selecting a preferred Highway 20 alternative. Discussion of the refined analysis performed for the Hood-Main Couplet and the Barclay-Locust Alternate Route alternatives are described next followed by the preliminary performance results obtained from the analysis.

Hood-Main Couplet

To determine whether the Hood-Main Couplet would meet long-term needs through the 2030 TSP horizon year, more rigorous analysis of the alternative was performed. The Synchro™ and SimTraffic™ models prepared earlier were used to pinpoint specific issues, which were then addressed through network improvements and coordinated with ODOT Region 4 staff. The main improvements identified and their selected solutions include the following:

- To head eastward out of town, vehicles in the north part of Sisters must use Hood Avenue. These vehicles have difficulty accessing Hood Avenue due to the heavy Hood Avenue traffic flows. These vehicles can be accommodated by converting Larch Street between Cascade Avenue and Hood Avenue into one-way southbound with a free left-turn with acceleration lane on Hood Avenue.
- Vehicles entering Sisters from the east would have difficulty accessing the southern section of the city. Many vehicles would be likely turn left from the highway onto Jefferson Street or Buckaroo Trail. Providing left turns, prohibiting the movements, or allowing the status-quo are three options available to the city.
- Vehicles on the south side of Hood Avenue that are destined to head north on Locust Street would have difficulty doing so. This is because they would be required to turn right onto

Hood Avenue and then cross over all lanes of traffic to be able to then follow the roundabout around to the left. Before this origin-destination (O-D) pattern was discovered in the VISUM model, the SimTraffic model appeared to have a high level of U-turns at the roundabout. The U-turn error was fixed by incorporating the O-D patterns at the east roundabout into the SimTraffic model. Even with the correction, the large number of vehicles trying to access Hood Avenue from Cedar and Hood Streets create long queues south of Hood Avenue in the eastern portion of the city.

The operating conditions corresponding with the refined analysis of the Hood-Main Couplet are discussed later in Table 1. It should be noted that while all "study" intersections were shown to meet operating standards, there were queuing and congestion concerns identified in the SimTraffic™ simulation model that were not fully resolved. Specifically, the couplet creates circulation issues, especially near the roundabouts due to the lack of alternate connections. There is particular congestion west of the western roundabout at the Highway 20/Hood Street and Highway 242/Hood Street intersections. With additional refinement, it is expected that any outstanding issues can be resolved; however, no more refinement of this alternative was performed given the position of the PAC and the feedback received from the public and stakeholders (supporting the PAC recommendation) regarding the Barclay-Locust Alternate Route as the preferred alternative.

Barclay-Locust Alternate Route

To determine whether the Barclay-Locust Alternate Route would meet long-term needs through the 2030 TSP horizon year, more rigorous analysis of the alternative was performed. The Synchro™ and SimTraffic™ models prepared earlier were used to pinpoint specific issues, which were then addressed through network improvements and additional modeling. The results were coordinated with ODOT. The main improvements identified and their selected solutions include the following:

- Initially, congestion on Highway 20 through town was expected to exceed the required mobility standards. Given the focus on the pedestrian environment and the willingness to live with a little more congestion, it was recommended that the City seek a Special Transportation Area (STA) designation for downtown Sisters. This would allow more congestion before mobility standards were exceeded. However, more refined analysis determined that the Highway 20 intersections would meet operating standards even without an STA. Therefore, an STA may still be pursued by the City to facilitate Cascade Avenue improvements desired by the City and provide flexibility for longer-term mobility needs, but the TSP adoption process can be completed before downtown Sisters obtains the STA designation.
- Insufficient capacity was available at the Highway 20/Barclay Drive intersection. With the addition of a second southbound left turn lane and a corresponding receiving lane of a few hundred feet, the intersection met standards.
- The Highway 20/Highway 126 intersection did not meet standard. Therefore, a signal is needed, the four lane cross-section on Highway 20 must extend beyond this intersection, and the start of the expressway designation should be moved beyond this intersection.
- Significant congestion occurs on Locust Street near E. Cascade Avenue and Main Avenue (i.e., just north of Highway 20). Side-by-side left turn lanes on Locust Street between Main Avenue and E. Cascade Avenue are needed. In addition, northbound left turns from Locust Street onto E. Cascade Avenue should not be allowed, and a pedestrian island on Locust Street should be installed instead.

- Significant congestion occurs on Highway 20 near the western edge of downtown due to the delay caused by vehicles waiting to turn left. This congestion can be lowered significantly by providing eastbound and westbound left-turn lanes at the Highway 20/Pine Street intersection. The northbound and southbound approaches at the Highway 20/Pine Street intersection should also be restricted to right-turns only. To better accommodate the minor street left turns from the adjacent Highway 20/Oak Street intersection, the northbound and southbound approaches should both have right-turn lanes.
- Vehicles were using Jefferson Avenue and Buckaroo Trail to cut through the southern portion of Sisters. The PAC decided to add a strategy recommendation in the TSP that would require the construction of Highway 20 improvements to consider three alternatives is the following order: (1) provide a left-turn lane and full access if possible, (2) provide a left-turn lane and full access but manage left-turn demand by installing a diverter on Jefferson Avenue to prevent through traffic past Locust and also install traffic calming at the Locust Street/Washington Avenue intersection, and (3) restrict Jefferson Avenue to right-in/right-out and provide improvements or impact mitigation to local streets.
- A large number of southbound vehicles on Locust Street were cutting through the neighborhood near the elementary school in order head east on Highway 126 (and vice-versa). This would impact the local neighborhood and also cause significant congestion at the Locust Street/E. Cascade Avenue intersection. To better manage the cut-through traffic, traffic calming in the neighborhood north of Highway 126 (i.e., E. Cascade to Creekside Court) is recommended. The Highway 126/Creekside Court intersection is also negatively affected by the cut-through traffic, and additional refinement of the model and/or the removal of the expressway designation from Highway 126 in this vicinity were to be considered in the refined analysis.

Performance Results of Refined Analysis

The refined analysis included the calculation of intersection performance measures for the 15 study intersections, including level of service (LOS), volume-to-capacity (V/C) ratios, and average delay. The performance measures were calculated based on the *2000 Highway Capacity Manual* methodology.[8] The study intersection performance results are listed in Table 1 on the following page. For each intersection whose traffic control was analyzed as something other than two-way stop controlled (i.e., all-way stop control, traffic signal, or roundabout), a heading is provided above the performance results. Otherwise, the intersection was analyzed as two-way stop controlled. As indicated in Table 1, all intersections meet or have the potential to meet applicable operating standards. Notice that these results are not the same as those shown for the preferred alternative in the body of the TSP. This is because additional refinement was performed for the Barclay-Locust Alternate Route after the refined analysis.

[8] *2000 Highway Capacity Manual*, Transportation Research Board, Washington DC, 2000.

TABLE 1: Refined Analysis of 30th HV Operations Conditions in 2030 for the Barclay-Locust Alternate Route and Hood-Main Couplet

Intersection (by Jurisdiction)	Mobility Standard	Barclay-Locust Alt. Route			Hood-Main Couplet		
		Delay	*LOS*	*V/C*	*Delay*	*LOS*	*V/C*
ODOT (Varying Control Types)							
Hwy 242 / Hood St	≤ 0.85	14.6	All-way Stop B[a]	0.62	11.7	All-way Stop B[a]	0.56
Hwy 20 / Barclay Dr / McKinney Butte Rd (west end of alternate route)	≤ 0.70	22.9	Traffic Signal C[a]	0.63	2.4 28.9	Roundabout A[a] Traffic Signal C[a]	0.60 0.70
Hwy 20 / Main Ave (west end of couplet)	≤ 0.80	*Non-existent*			2.9	Roundabout A[a]	0.64
Hwy 20 / Locust St (east end of couplet and alt. route)	≤ 0.80	15.8	Traffic Signal B[a]	0.74	1.2	Roundabout A[a]	0.65
ODOT (Two-Way Stop)							
Hwy 242 / McKinney Butte Rd	≤ 0.80	10.7	A/B	0.11	9.3	A/A	0.11
Hwy 20 / Rail Way	≤ 0.70	29.1	D/D	0.68	31.0	A/D	0.67
Hwy 20 / Hwy 242 (Hood St)	≤ 0.80	41.9	B/E	0.49	31.4	E/D	0.77
Cascade Av (Hwy 20) / Pine St	≤ 0.80	28.8	B/D	0.62	*City of Sisters Jurisdiction*		
Main Ave (Hwy 20) / Pine St (westbound couplet)	≤ 0.80	*Not a study intersection*			>50.0	A/F	0.75
Hood Ave (Hwy 20) / Pine St (eastbound couplet)	≤ 0.80	*Not a study intersection*			>50.0	A/F	0.74
Cascade Av (Hwy 20) / Elm St	≤ 0.80	>50.0	A/F	0.66	*City of Sisters Jurisdiction*		
Main Ave (Hwy 20) / Elm St (westbound couplet)	≤ 0.80	*City of Sisters Jurisdiction*			>50.0	A/F	0.61
Hood Ave (Hwy 20) / Elm St (eastbound couplet)	≤ 0.80	*City of Sisters Jurisdiction*			>50.0	A/F	**0.87**[b]
Hwy 20 / Buckaroo Trail	≤ 0.70	24.5	B/C	0.36	24.4	B/C	0.41
Hwy 126 / Creekside Ct	≤ 0.70	>50.0	A/F	**0.85**[b]	28.6	A/D	0.51
City of Sisters							
Barclay Dr / Locust St	LOS D, ≤ 0.85	2.2	Roundabout A[a]	0.70	29.8	A/D	0.52
Barclay Dr / Pine St	≤ 0.90	>50.0	A/F	0.52	29.4	A/D	0.64
Cascade Ave / Pine St	≤ 0.90	*ODOT Jurisdiction*			21.3	A/C	0.27
Cascade Ave / Elm St	≤ 0.90	*ODOT Jurisdiction*			18.7	A/C	0.31
Main Ave / Elm St	≤ 0.90	12.0	A/B	0.09	*ODOT Jurisdiction*		
Hood Ave / Elm St	≤ 0.90	21.0	A/C	0.56	*ODOT Jurisdiction*		
E Cascade Ave / Locust St	≤ 0.90	42.2	B/E	0.55	>50.0	A/F	0.81

Delay = Average Stopped Delay per Vehicle (seconds) of worst approach
LOS = Level of Service (Major Street/Minor Street)
V/C = Volume/Capacity Ratio (of worst movement)
Bold Underlined values exceed standards

[a] LOS for all-way stop, signalized, and roundabout intersections reported for entire intersection
[b] With additional refinement, operating conditions would likely be improved to meet standards.

PAC Feedback and Open House #3

The PAC reviewed the findings and unanimously selected the Barclay-Locust Alternate Route as the locally preferred alternative instead of the Hood-Main Couplet. This selection was made because (1) Cascade Avenue would continue to operate as the principal roadway during the majority of the year, (2) the Barclay-Locust Alternate Route alternative would have better flexibility in construction phasing and staging than the Hood-Main Couplet, (3) the Hood-Main Couplet would have greater circulation impacts, especially in the vicinity of the elementary school, and (4) the Hood-Main Couplet would increase the number of roadways acting as barriers from one to two.

In a community open house on October 29, 2008, the PAC presented their decision to select the Barclay-Locust Alternate Route as the preferred alternative, and 21 (95%) of the attendees completing comment forms indicated that they agreed with the Project Advisory Committee's recommendation for the Alternate Route concept. Two people disagreed with the Committee's recommendation and six did not answer the question on the comment card. Some refinements to the proposed Cascade Avenue improvements were also presented at the open house, but additional refinement and coordination with ODOT was needed.

PREFERRED ALTERNATIVE REFINEMENT

Additional refinement of the preferred alternative was needed following the PAC decision and community open house. The refinement included additional analysis and further coordination with ODOT. The refined analysis and coordination for the Barclay-Locust Alternate Route alternative is described in this section.

Barclay-Locust Alternate Route

There were a few additional issues that received further attention:

- On Highway 20 at the eastern edge of downtown, the spacing between the Hood Avenue and Locust Street intersections will likely not allow sufficient storage distance for the two competing back-to-back left-turn lanes. Due to the high quantity of left-turns at both these intersections, side-by-side left-turn lanes are recommended. This would increase the cross-section to five lanes.
- Deschutes County and ODOT are currently exploring the potential to extend Barclay Road east of Locust Street as a County roadway that may provide a new connection to Highway 126. This project, if adopted by the County, would be beneficial to the City of Sisters by reducing traffic demands on Locust Street, which would be nearing capacity in the forecasted 2030 conditions with the Alternate Route improvements. Therefore, the City should plan for and not preclude this possible County roadway project by designing and constructing the proposed roundabout at Barclay Road/Locust Street to handle additional traffic (i.e. construct the roundabout large enough to be converted to a multi-lane configuration by reducing the inner island if needed in the future).
- The Barclay-Locust Alternate Route would include intelligent transportation system (ITS) elements that detect congestion on Highway 20 through town and then convey the information to drivers so they can decide whether to divert to the alternate route or remain on the main line. Implementation considerations regarding the two intersections at the ends of the Barclay-Locust Alternate Route (i.e., the Hwy 20/Barclay and Hwy 20/Locust intersections) were discussed with ODOT (Galen McGill). It was determined that traffic signals at the two intersections could be integrated with the ITS solution by programming the signals to assign more green time to the alternate route movements when congestion is

detected on Highway 20. It was less clear how or if roundabout operations could be integrated with the ITS solution or whether such integration would be necessary.

- In the Project Advisory Committee Meeting #5, the PAC did not reach a consensus regarding the use of traffic signals or roundabouts at the two ends of the Barclay-Locust Alternate Route (i.e., the Hwy 20/Barclay and Hwy 20/Locust intersections). The PAC liked the look and character of the roundabouts that were considered for the Hood-Main Couplet alternative and decided to add a roundabout feasibility study to the TSP project list to determine whether roundabouts would be a viable intersection improvement option for the Barclay-Locust Alternate Route. While the roundabouts would act as gateway treatments into town and would provide an aesthetic quality and traffic calming effect, there are also additional costs that would need to be addressed in the feasibility study, including: the difficulty of integrating the roundabouts with the dynamic ITS solutions, the increased costs (likely on the order of millions), the additional land use impact issues (particularly on east side of downtown Sisters near the elementary school), and increased difficulty for pedestrian crossings since it would be a multi-lane roundabout and would require circular travel.

After performing the additional refinement of the Barclay-Locust Alternate Route alternative, intersection performance measures for the 15 study intersections were again calculated. The performance results are listed in Table 2 on the following page. For each intersection whose traffic control was analyzed as something other than two-way stop controlled (i.e., all-way stop control, traffic signal, or roundabout), a heading is provided above the performance results. Otherwise, the intersection was analyzed as two-way stop controlled. As indicated in Table 1, all intersections now meet applicable operating standards. Notice that this is the same table shown for the preferred alternative in the body of the TSP.

TABLE 2: Additional Refined Analysis of 30th HV Operations Conditions in 2030 for the Barclay-Locust Alternate Route

Intersection (by Jurisdiction)	Mobility Standard	Intersection Performance		
		Delay	*LOS*	*V/C*
ODOT (Varying Control Types)				
Hwy 20 / Barclay Dr / McKinney Butte Rd (west end of alternate route)	≤ 0.70	23.1	Traffic Signal C[a]	0.67
Hwy 20 / Locust St (east end of alternate route)	≤ 0.80	19.4	Traffic Signal B[a]	0.79
Hwy 242 / Hood St	≤ 0.85	14.2	All-way Stop B[a]	0.64
ODOT (Two-Way Stop)				
Hwy 242 / McKinney Butte Rd	≤ 0.80	10.9	A/B	0.11
Hwy 20 / Rail Way	≤ 0.70	27.9	A/D	0.69
Hwy 20 / Hwy 242 (Hood St)	≤ 0.80	17.1	B/F	0.52
Cascade Av (Hwy 20) / Pine St	≤ 0.80	30.0	B/D	0.67
Cascade Av (Hwy 20) / Elm St	≤ 0.80	>50	A/F	0.61
Hwy 20 / Buckaroo Trail	≤ 0.70	29.7	B/D	0.36
Hwy 126 / Creekside Ct	≤ 0.70	40.6	A/E	0.65
City of Sisters				
Barclay Dr / Locust St	LOS D, ≤ 0.85	2.3	Roundabout A[a]	0.71
Barclay Dr / Pine St	≤ 0.90	>50	A/F	0.58
Main Ave / Elm St	≤ 0.90	12.3	A/B	0.10
Hood Ave / Elm St	≤ 0.90	22.3	A/C	0.56
E Cascade Ave / Locust St	≤ 0.90	>50	B/F	0.61

Delay = Average Stopped Delay per Vehicle (seconds) for worst approach
LOS = Level of Service (Major Street/Minor Street)
V/C = Volume/Capacity Ratio (of worst movement)
Bold Underlined values exceed standards

[a] LOS for all-way stop, signalized, and roundabout intersections reported for entire intersection
[b] With additional refinement, operating conditions would likely be improved to meet standards.

Appendix O: Traffic Calming Toolbox

Residential Traffic Calming Program Toolbox

PHASE I 2
- Do Not Enter Sign 3
- Neighborhood Speed Watch 4
- One-Way Sign 5
- Pavement Markings 6
- Police Enforcement 7
- Speed Monitoring Trailer 8
- Turn Prohibition 9

PHASE II - HORIZONTAL DEFLECTION 10
- Bulb-Outs 11
- Center Island Narrowing 12
- Chicanes 13
- Chokers/Slow Points 14
- Full Closures 15
- Full Diverter 16
- Lane Narrowing 17
- Median Barriers 18
- Semi-Diverters 19
- Traffic Circles 20

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Do Not Enter Sign

Description: Restrict access

Purpose:The purpose of a this sign is to indicate to drivers that they are not permitted to proceed straight ahead. When used as a traffic calming measure, it is intended to discourage through traffic from short-cutting along a street. The sign may be accompanied by a supplementary plate sign indicating the time(s) of the day and the days of the week when the regulation applies.

Advantages
- May result in significant reductions in traffic volumes

Disadvantages
- No significant effect on vehicle speeds.
- Restricts resident access.

Equipment Cost: $100 to $200 per sign, installed.

Neighborhood Speed Watch

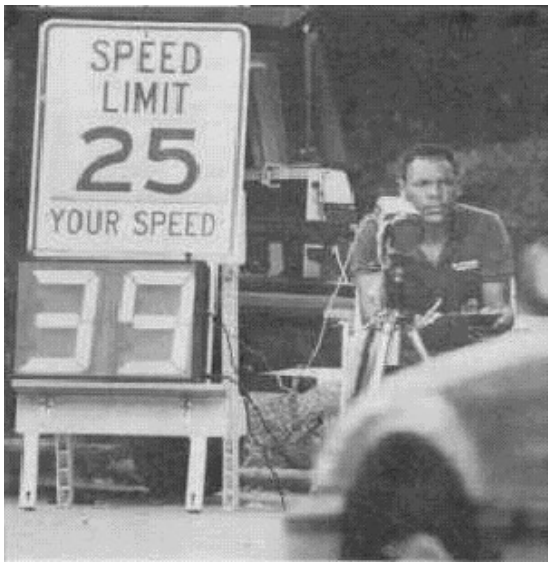
Description: Residents use radar equipment to identify speeding vehicles. The information gathered is matched with the Driver and Motor Vehicle Service (DMV) records. The City then sends a letter to the vehicle's registered owner advising the owner their vehicle was seen speeding. The letter appeals to the owner and/or driver to slow down on neighborhood streets. This program does not issue speeding tickets.

Purpose: To slow vehicle traffic, educate drivers about vehicle speeds, and allow residents to take an active part in the program.

Advantages
- Reduces speed by increasing driver awareness about speeding on residential streets and about safety.
- An effective public relations and educational tool.

Disadvantages
- Not an enforcement tool.
- Not effective in modifying long-term habits.

Cost: $500



One-Way Sign

Description: Directional movement sign.

Purpose: The purpose of a One-Way sign is to indicate to drivers that traffic is allowed to travel only in the direction of the arrow on the street or section of street. When used as a traffic calming measure, the intent of a One-Way sign is to prevent through traffic from short-cutting along a street.

Advantages
- Vehicle-vehicle and vehicle-pedestrian conflicts at intersections are reduced as there are fewer turning movements.
- Reduction in traffic volume.

Disadvantages
- Removal of traffic travelling in the opposing direction can result in an increase in vehicle speeds.
- Reduction in traffic volume may be partially offset by an increase in traffic in the remaining direction.

Cost: $100 to $200 per sign, installed.

Pavement Markings

Description: Stop bars, yield bars, turn arrows, delineators, lane markings, crosswalks, etc.

Purpose: To delineate and to transmit to motorists, bicyclists, and pedestrians important information necessary to safely travel upon the City's street.

Advantages
- Low initial cost.
- Quick application.

Disadvantages
- Maintenance cost.
- May not be visible when covered with snow.

Cost: Varies widely depending on type and amount of material used.

Police Enforcement

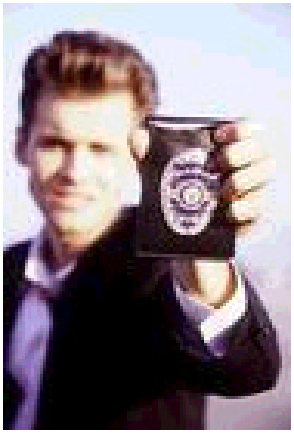
Description: Increased enforcement of speed limits on problem local streets.

Purpose:To reduce traffic speed and increase traffic safety.

Potential Advantages
- Visible enforcement could reduce speed by increasing driver awareness about speeding on residential streets and about safety.
- The approach is flexible and can be tailored to suit needs.
- Response can be quick and effective.

Potential Disadvantages
- Long-term benefits of speed reduction are unsubstantiated without regular periodic enforcement.
- It may be difficult to provide enforcement to the extent and with the frequency that residents desire.

Cost: $90,000 to $100,000 per year for one officer and equipment.



Speed Monitoring Trailer

Description: Portable radar speed meter capable of measuring vehicle speed and displaying the speed of the motorist.

Purpose: To slow vehicle traffic and to educate residents and drivers about vehicle speeds.

Advantages
- Speeds may be reduced during short intervals where the radar trailer is located.
- An effective public relations and educational tool.

Disadvantages
- Not an enforcement tool.
- Not effective in modifying long-term habits.
- Effect on speed limited to the vicinity of the trailer.
- Not effective on multi-lane roadways.

Cost: $8,000 - $13,000 per trailer.

Turn Prohibition

Description: Turn Prohibition sign

Purpose:The purpose of a Right (Left) Turn Prohibition sign is to indicate to drivers that they are not permitted to turn right (left). When used as a traffic calming measure, this sign is intended to prevent traffic from short-cutting along a street. The sign may be accompanied by a supplementary plate indicating the time(s) of the day and the days of the week when the regulation applies.

Advantages
- May result in significant reductions in traffic volumes where supported periodically with police enforcement.

Disadvantages
- No significant effect on vehicle speeds.
- Restricts resident access.

Cost: $100 to $200 per sign, installed.

PHASE II - HORIZONTAL DEFLECTION

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Bulb-Outs

Description: The lane is narrowed at an intersection or mid-block by extending the curbs on one or both sides of the street toward the center of the roadway or by building detached raised islands to allow for drainage and bike lane passage. May be used in conjunction with striped crosswalks.

Purpose: To slow traffic at intersections and to improve pedestrian safety.

Potential Advantages
- May reduce vehicle speed.
- May reduce cut-through traffic.
- Reduces crossing distance for pedestrians.
- Minimal impact to emergency vehicles.
- Does not restrict access for residents.
- Can be designed to restrict truck entry.
- Can be aesthetically pleasing, if landscaped.

Potential Disadvantages
- Some designs can create conflicts for bicyclists (properly designed bulb-outs do not create such conflicts).
- Can impact drainage (depending on design and location).
- Curbside parking must be prohibited at the bulb, thus eliminating at least one space at each bulb location.
- Low impact on mid-block speeding.
- Maintenance responsibility, if landscaped.
- Can impede legitimate truck movements.

Cost: $3,000 -$5,000

Center Island Narrowing

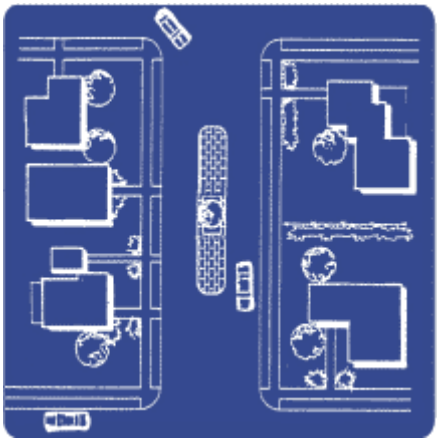
Description: Constructed or painted islands located before an intersection or mid-block along the centerline of a street.

Purpose: To reduce traffic speed by narrowing the roadway with a median, and to increase pedestrian safety by providing a refuge halfway across the street, so that only one direction of traffic need be crossed at a time.

Potential Advantages
- May reduce traffic speed.
- Improves pedestrian safety.
- Does not restrict emergency vehicle access.
- Can be aesthetically pleasing if landscaped.

Potential Disadvantages
- May divert traffic to adjacent streets without traffic calming.
- May impact parking depending on lane width.
- May eliminate the possibility of future bike lane installation on street by narrowing the travel lane.

Cost: $60 per linear foot; $7,000 to $10,000 per device



Chicanes

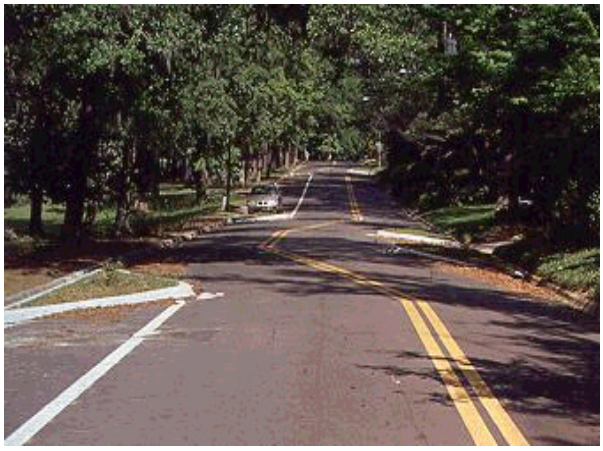
Description: Curb extensions or islands that alternate from one side of the street to the other, forming S-shaped curves.

Purpose: To slow vehicle speed mid-block using horizontal deflection.

Potential Advantages
- May reduce speed.
- Minimal impact to emergency vehicles.
- Does not restrict access to residents.
- Can be aesthetically pleasing if landscaped.

Potential Disadvantages
- May increase conflicts between motor vehicles and bicyclists and pedestrians.
- May create opportunities for head-on collisions on narrow streets.
- May divert traffic to parallel streets.
- Loss of curbside parking.
- Maintenance responsibility if landscaped.

Cost: $1,000 per 250 sq. ft. of offset; $22,500 - $37,000



Chokers/Slow Points

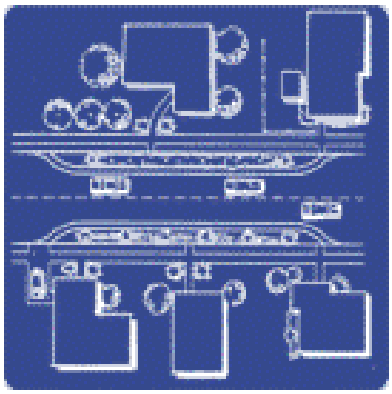
Description: Curb extensions on one or both sides of the street that narrow the street at that location. They may be designed to alter the path of travel or to create single lane, one-way traffic.

Purpose: To reduce vehicle speed mid-block; to increase pedestrian safety.

Potential Advantages
- Reduces vehicle speed (more effective when used in series).
- Can reduce crossing distance for pedestrians.
- Aesthetically pleasing if landscaped; provides visual obstruction.

Potential Disadvantages
- Some choker designs can be hazardous for cyclists; however the device can be designed to be safe and comfortable for cyclists.
- May create conflict between opposing drivers.
- May impact emergency response times.
- May divert traffic to adjacent streets without traffic calming.
- Maintenance responsibility if landscaped.
- Reduces curbside parking.

Cost: $5,000 - $15,000 per pair of offset curb extensions.



Full Closures

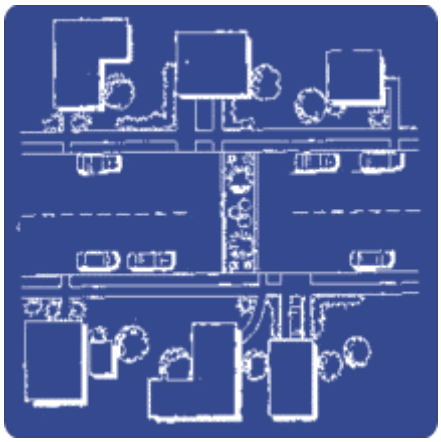
Description: Complete closure of a street either at an intersection or at a mid-block location.

Purpose: To reduce traffic volume and speed.

Potential Advantages
- Effective at reducing traffic speeds and volumes.
- Improves traffic safety.
- Can allow bicycle and pedestrian through-movements.
- Can be designed to allow emergency vehicle access.
- Aesthetically pleasing if landscaped.
- Creates effective dead-ends that may encourage pedestrian activity.

Potential Disadvantages
- May impact emergency response times.
- May divert traffic to adjacent streets.
- May increase trip length.
- May create confusion for users unless signed properly.

Cost: $5,000 - $40,000



Full Diverter

Description: Barriers placed diagonally across an intersection, blocking through movement. May be used in conjunction with stop signs.

Purpose: To reduce traffic volume.

Potential Advantages
- Reduces traffic volume on the protected street.
- Can be designed to preserve emergency vehicle access.
- Can be designed to allow pedestrian and bicycle through-movement.

Potential Disadvantages
- Diverts traffic to other streets.
- Can increase trip length.

Cost: $5,000 - $20,000

Lane Narrowing

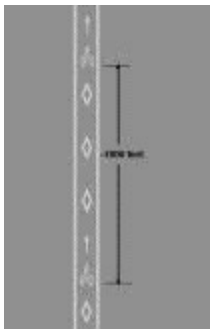
Description: Narrowing travel lanes on streets using striping (lane lines) or changes in parking configuration (angled parking or changes in parking density).

Purpose: To slow traffic speed.

Potential Advantages
- Changes can be implemented quickly.
- Striping can be modified easily if paint is used.
- Requires minimum maintenance.
- Speed may decrease and safety may be improved through the provision of positive guidance to drivers.

Potential Disadvantages
- May increase car/bike conflicts.
- Would increase regular maintenance cost.
- Residents do not always perceive striping as an effective tool for speed reduction.

Cost :The cost of lane striping is variable depending upon the type and amount installed. Crosswalks and other pavement markings are between $200 and $500 per installation. Signs are typically $200 per installation.



Median Barriers

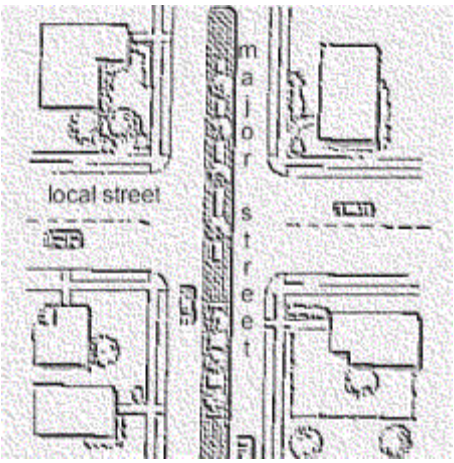
Description: Islands located along the centerline of a street and continuing through an intersection to block through movement across a major street.

Purpose: To reduce traffic speed using roadway narrowing on the street with the median, and to increase pedestrian safety. Traffic volume is reduced on cross streets because through traffic is eliminated.

Potential Advantages
- Makes intersection safer by reducing the number of conflicting turning movements.
- Can be designed to allow through-movement for cyclists traveling on local street.
- Reduces local street volumes.
- Aesthetically pleasing if landscaped.
- Eliminates the need for future traffic signal installation.

Potential Disadvantages
- May shift traffic to other locations where turn opportunities exist.
- May inconvenience local residents.
- May impact parking on the major street depending on lane width.
- Blocks emergency vehicle access and delays emergency response
- Maintenance responsibility if landscaped.

Cost: $10,000 - $20,000



Semi-Diverters

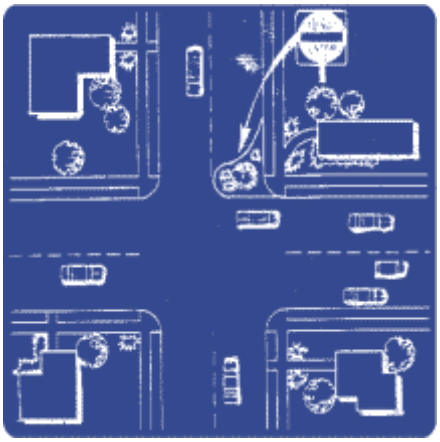
Description: Barriers that block travel in one direction for a short distance on otherwise two-way streets.

Purpose: To reduce traffic volume in the diverted direction.

Potential Advantages
- Restricts movement into a street while maintaining access and movement within the street block for residents.
- Reduces cut-through traffic.
- More self-enforcing and aesthetically pleasing than turn restriction signing.
- Reduces crossing distance for pedestrians.
- Aesthetically pleasing if landscaped.
- Emergency vehicles can travel in restricted direction.
- Can be designed to provide two-way access for bicycles.

Potential Disadvantages
- May divert traffic to parallel streets without traffic calming measures.
- May increase trip length for some residents.
- Curbside parking spaces must be eliminated adjacent to device.
- May increase emergency response times as they maneuver around the barrier.

Cost: $10,000 - $20,000



Traffic Circles

Description: Islands of varying dimensions placed in intersections around which traffic circulates.

Purpose: To slow vehicle speeds at intersections using horizontal deflection and a visual deterrent to higher speeds.

Potential Advantages
- May reduce vehicle speeds.
- Improve safety.
- Visually appealing if landscaped.
- Create a visual obstruction that deters through traffic.
- Do not restrict access for residents.

Potential Disadvantages
- Effect on vehicle speed limited to device's immediate vicinity.
- Loss of curbside parking at each corner (typically 25' to 30' of curb space is restricted at each approach).
- May increase emergency vehicle response time.
- May limit truck and bus access.
- Maintenance responsibility if landscaped.
- Automobile driver's lines of sight may be reduced if landscaped.
- May promote deliberate violation of proper movement.
- May divert traffic to parallel streets.

Cost: $5,000 to $15,000

PHASE II - VERTICAL DEFLECTION

Raised Crosswalks 22
Raised Intersections 23
Speed Humps/Tables 24
Textured Pavement 25

Raised Crosswalks

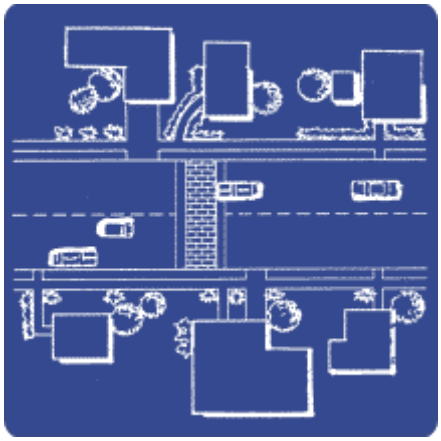
Description: Raised pavement (similar to a speed table) that may be outfitted with crosswalk markings and/or signage to channelize pedestrian crossings, providing pedestrians with a level street crossing. May be used mid-block or at intersections.

Purpose: To reduce vehicle speeds mid-block and to improve pedestrian safety.

Potential Advantages
- May reduce vehicle speeds.
- Less disruptive than speed humps.
- May improve safety for pedestrians by making them more visible.

Potential Disadvantages
- The physical forces exerted by this vertical deflection device upon fragile persons with disability may cause injury.
- Less effective at speed reduction than speed humps.
- May impact emergency vehicle response.
- May disrupt drainage depending on design.
- May divert traffic to other streets.
- May increase noise.
- May give pedestrians a false sense of security.

Cost: $2,000 per location.



Raised Intersections

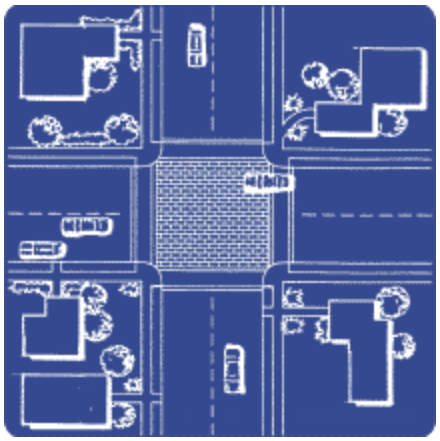
Description: Flat raised areas covering entire intersections with ramps on all approaches and often with brick or other textured materials on the flat section.

Purpose: To slow vehicle traffic at an intersection.

Potential Advantages
- Slows vehicles in intersections and therefore makes conflict avoidance easier.
- Highlights intersection.
- Improves pedestrian safety.
- Aesthetically pleasing if well designed.
- Effective speed reduction at intersection.

Potential Disadvantages
- May increase emergency response time.
- May increase turning difficulty.
- Increases maintenance.
- Impact on speed limited to within approximately 200' of intersection.
- May increase noise due to acceleration and braking.

Cost: $6,000 - $8,000



Speed Humps/Tables

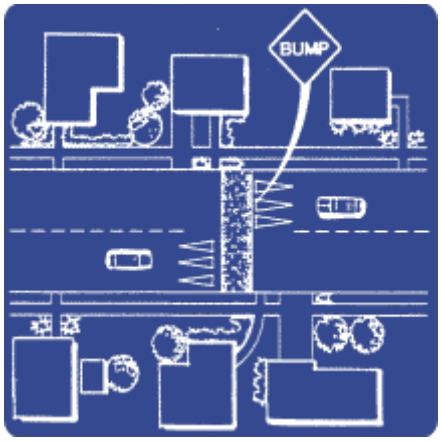
Description: Raised section of pavement across the roadway with curved transitions. Humps are generally 3.5” high and 12’ wide. Elongated speed humps (speed tables) are generally 3"-4" high x 22' wide. Impacts on vehicle speed vary with size of device.

Purpose: To reduce vehicle speed using vertical deflection.

Potential Advantages
- Reduces vehicle speed.
- Can reduce vehicular volumes.
- Does not restrict parking.
- Requires minimum maintenance.

Potential Disadvantages
- May increase emergency response times.
- May divert traffic to parallel streets.

Cost: $2,000 - $6,800



Textured Pavement

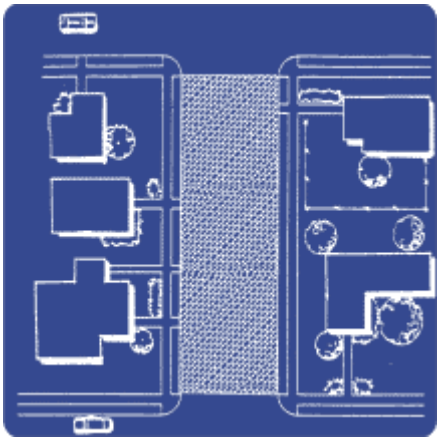
Description: A textured surface used in the roadway or crosswalk that causes drivers to feel a slight vibration over some distance, while improving the aesthetic quality of the street environment. May use brick or stone, but for safety and maintenance reasons, imprinted concrete or pavers that are less slick, less bumpy and easier to maintain are preferable.

Purpose: To reduce vehicle speed.

Potential Advantages
- Reduces vehicle speeds.
- Improves pedestrian safety.
- Can be aesthetically pleasing.

Potential Disadvantages
- Increases vehicle noise.
- Some materials can create hazards for cyclists and pedestrians, particularly when wet.
- Can be high maintenance.
- Materials like cobblestones provide too much texture and can create hazards for the disabled, particularly when the material begins to degrade.

Cost: Varies widely depending on type and amount of material used.



Appendix P: Cost Estimates

City of Sisters TSP
Planning Cost Estimate Summary

Alternative 2 - 3-Lane Cascade Expansion

Project Linear Feet: 3000

2900

Project Description:

Roadway expansion of Cascade to a 3-Lane facility with a continous center turn lane. Remove existing parking. This improvement, approximately 2985 feet in length, includes 12' travel lanes, a 14' center turn lane and increased sidewalks by 6'.

Linear Foot Cost Template	UNITS		UNIT COSTS		ESTIMATED COST	
Remove Pavement		SF	$	0.33	$	-
Clear & Grub		SF	$	0.05	$	-
Remove Curb	6000	LF	$	10.00	$	60,000
Remove Sidewalk	36000	SF	$	1.50	$	54,000
Remove Striping	3000	LF	$	1.00	$	3,000
Grading		SF	$	1.25	$	-
Pavement		SF	$	10.00	$	-
Sidewalk	72000	SF	$	6.00	$	432,000
Curb and gutter	6000	LF	$	14.00	$	84,000
Landscaping		LF	$	15.00	$	-
Wall		LF	$	120.00	$	-
Lighting		LF	$	60.00	$	-
Full Drainage		LF	$	100.00	$	-
Drainage Modifications	3000	LF	$	25.00	$	75,000
Driveway Adjustments	10	Driveways	$	2,000.00	$	20,000
Signing and Striping	3000	LF	$	2.00	$	6,000
SUBTOTAL					$	734,000
Traffic Control				8%	$	58,720
Mobiliization				10%	$	73,400
Design/Administration/Management				20%	$	146,800
Contingency				50%	$	367,000
Project Development				5%	$	36,700
Right of Way	0	SF		$20.00	$	-
Ped Island	0	Unit		$10,000.00	$	-
	PROJECT COST:				**$**	**1,416,620**

Note: High contingencies are due to uncertainty regarding storm drainage/utility needs.

Note: Costs are for constant 2008 dollars; annual adjustments are necessary to address inflation to get to year of construction project estimates (presently 3 to 4 % per year is adequate)

DKS *Associates*

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City of Sisters TSP
Planning Cost Estimate Summary

Barclay - Locust Alternative Route

Project Linear Feet: 7100

Project Description:

Improvement to existing roadway to create an alternative route.
This improvement, approximately 7200 feet in length, includes 2 - 12 foot travel lanes, 6 foot bike lanes and a 14 foot center turn lane.

Linear Foot Cost Template	UNITS		UNIT COSTS		ESTIMATED COST	
Remove Pavement	195300	SF	$	0.33	$	64,449
Clear & Grub		SF	$	0.05	$	-
Remove Curb		LF	$	10.00	$	-
Remove Sidewalk		SF	$	1.50	$	-
Remove Striping		LF	$	1.00	$	-
Grading		SF	$	1.25	$	-
Pavement	355000	SF	$	10.00	$	3,550,000
Sidewalk	85200	SF	$	6.00	$	511,200
Curb and gutter	7100	LF	$	14.00	$	99,400
Landscaping	7100	LF	$	15.00	$	106,500
Wall		LF	$	120.00	$	-
Lighting	7100	LF	$	60.00	$	426,000
Full Drainage		LF	$	100.00	$	-
Drainage Modifications	7100	LF	$	25.00	$	177,500
Driveway Adjustments	14	Driveways	$	2,000.00	$	28,000
Signals	2	Unit	$	250,000.00	$	500,000
Roundabout	1	Unit	$	750,000.00	$	750,000
Variable Message Signs	2	Unit	$	300,000.00	$	600,000
Underground Fiber	5000	LF	$	25.00	$	125,000
Detection System	1	Unit	$	100,000.00	$	100,000
Signing and Striping	7100	LF	$	2.00	$	14,200
SUBTOTAL					$	7,052,249
Traffic Control				8%	$	564,180
Mobiliization				10%	$	705,225
Design/Administration/Management				20%	$	1,410,450
Contingency				50%	$	3,526,125
Project Development				5%	$	352,612
Additional Business Impacts	1	Unit		$5,000,000.00	$	5,000,000
Right of Way	178300	SF		$20.00	$	3,566,000
			PROJECT COST:		**$**	**22,176,841**

Note: High contingencies are due to uncertainty regarding storm drainage/utility needs.

Note: Costs are for constant 2008 dollars; annual adjustments are necessary to address inflation to get to year of construction project estimates (presently 3 to 4 % per year is adequate)

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City of Sisters TSP
Planning Cost Estimate Summary

Alternative 6 - Hwy 20 West expansion

Project Linear Feet: 2800

Project Description:

Roadway expansion of Hwy 20 West. 5 Lane facility between Railway and Barclay. 3 Lane facility 2 in and 1 out from Barclay to Pine.
This improvement, approximately 3600 feet in length, includes 12' travel lanes and 6' shoulders.

Linear Foot Cost Template	UNITS		UNIT COSTS		ESTIMATED COST	
Remove Pavement	126000	SF	$	0.33	$	41,580
Clear & Grub	52000	SF	$	0.05	$	2,600
Remove Curb		LF	$	10.00	$	-
Remove Sidewalk		SF	$	1.50	$	-
Remove Striping		LF	$	1.00	$	-
Grading	52000	SF	$	1.25	$	65,000
Pavement	165600	SF	$	10.00	$	1,656,000
Sidewalk		SF	$	6.00	$	-
Curb and gutter		LF	$	14.00	$	-
Landscaping	2800	LF	$	15.00	$	42,000
Wall		LF	$	120.00	$	-
Lighting		LF	$	60.00	$	-
Full Drainage		LF	$	100.00	$	-
Drainage Modifications	2800	LF	$	25.00	$	70,000
Driveway Adjustments	1	Driveways	$	2,000.00	$	2,000
Signing and Striping	2800	LF	$	2.00	$	5,600
SUBTOTAL					$	1,884,780
Traffic Control				8%	$	150,782
Mobiliization				10%	$	188,478
Design/Administration/Management				20%	$	376,956
Contingency				50%	$	942,390
Project Development				5%	$	94,239
Right of Way		SF		$20.00	$	-
Ped Island	0	Unit		$10,000.00	$	-
	PROJECT COST:				**$**	**3,637,625**

Note: High contingencies are due to uncertainty regarding storm drainage/utility needs.

Note: Costs are for constant 2008 dollars; annual adjustments are necessary to address inflation to get to year of construction project estimates (presently 3 to 4 % per year is adequate)

***DKS** Associates*

7/28/2009 17:01

City of Sisters TSP
Planning Cost Estimate Summary

Hwy 20 East expansion

Project Linear Feet: 3300

Project Description:

Roadway expansion of Hwy 20 East to a 5 lane facility from Locust to just east of Desperado trail.
This improvement, approximately 2985 feet in length, includes 12' travel lanes, a 14' center turn lane.

Linear Foot Cost Template	UNITS		UNIT COSTS		ESTIMATED COST	
Remove Pavement	148500	SF	$	0.33	$	49,005
Clear & Grub	99000	SF	$	0.05	$	4,950
Remove Curb		LF	$	10.00	$	-
Remove Sidewalk		SF	$	1.50	$	-
Remove Striping		LF	$	1.00	$	-
Grading	99000	SF	$	1.25	$	123,750
Pavement	244200	SF	$	10.00	$	2,442,000
Sidewalk		SF	$	6.00	$	-
Curb and gutter		LF	$	14.00	$	-
Landscaping	3300	LF	$	15.00	$	49,500
Wall		LF	$	120.00	$	-
Lighting		LF	$	60.00	$	-
Full Drainage		LF	$	100.00	$	-
Drainage Modifications		LF	$	25.00	$	-
Driveway Adjustments		Driveways	$	2,000.00	$	-
Signals	1	Unit	$	250,000.00	$	250,000
Structured Roadway	16000	SF	$	250.00	$	4,000,000
Signing and Striping	3300	LF	$	2.00	$	6,600
SUBTOTAL					$	6,925,805
Traffic Control				8%	$	554,064
Mobiliization				10%	$	692,581
Design/Administration/Management				20%	$	1,385,161
Contingency				50%	$	3,462,903
Project Development				5%	$	346,290
Right of Way		SF		$20.00	$	-
	PROJECT COST:				**$**	**13,366,804**

Note: High contingencies are due to uncertainty regarding storm drainage/utility needs.

Note: Costs are for constant 2008 dollars; annual adjustments are necessary to address inflation to get to year of construction project estimates (presently 3 to 4 % per year is adequate)

***DKS** Associates*

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Appendix Q: Funding Opportunities

Federal Funding Sources

SAFETEA-LU[1]

There are a number of programs identified within SAFETEA-LU that provide for the funding of bicycle and pedestrian projects.

Highway Safety Improvement Program

This program funds projects designed to achieve significant reductions in traffic fatalities and serious injuries on all public roads, bikeways and walkways. This program includes the Railway-Highway Crossings Program and the High Risk Rural Roads Program. ODOT estimates that they will receive an average of $14 million annually for this program through the lifetime of SAFETEA-LU. This program replaces the Hazard Elimination Program from TEA-21.

Transportation Enhancements

Administered by ODOT, this program is funded by a set-aside of STP funds. Ten percent of STP funds are designated for Transportation Enhancement Activities (TEAs), which include "provision of facilities for pedestrians and bicycles, provision of safety and educational activities for pedestrians and bicyclists," and the "preservation of abandoned railway corridors (including the conversion and use thereof for pedestrian and bicycle trails." *23 USC Section 190 (a)(35).* Projects must serve a transportation need. These funds can be used to build a variety of pedestrian, bicycle, streetscape and other improvements that enhance the cultural, aesthetic, or environmental value of transportation systems. The statewide grant process is competitive.

Congestion Mitigation/Air Quality Program

The Congestion Mitigation/Air Quality Improvement Program (CMAQ) provides funding for projects and programs in air quality non-attainment and maintenance areas for ozone, carbon monoxide, and particulate matter which reduce transportation related emissions.

These federal funds can be used to build bicycle and pedestrian facilities that reduce travel by automobile. Recreational facilities generally are not funded. ODOT estimates that they

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[1] Federal funding is primarily distributed through a number of different programs established by the Federal Transportation Act. The latest act, The Safe, Accountable, Flexible, Efficient Transportation Equity Act – a Legacy for Users (SAFETEA-LU) was enacted in August 2005 as Public Law 109-59. SAFETEA-LU authorizes the Federal surface transportation programs for highways, highway safety, and transit for the 5-year period 2005-2009.

In Oregon, Federal funding is administered through State (ODOT) and regional planning agencies. Most, but not all, of these funding programs are oriented toward transportation versus recreation, with an emphasis on reducing auto trips and providing inter-modal connections. Federal funding is intended for capital improvements and safety and education programs, and projects must relate to the surface transportation system.

will receive an average of $14 million annually for this program through the lifetime of SAFETEA-LU.

Recreational Trails Program

The Recreational Trails Program of the Federal Transportation Bill provides funds to states to develop and maintain recreational trails and trail-related facilities for both non-motorized and motorized recreational trail uses. Examples of trail uses include hiking, bicycling, in-line skating, equestrian use, and other non-motorized and motorized uses. These funds are available for both paved and unpaved trails, but may not be used to improve roads for general passenger vehicle use or to provide shoulders or sidewalks along roads.

Recreational Trails Program funds may be used for:

- Maintenance and restoration of existing trails
- Purchase and lease of trail construction and maintenance equipment
- Construction of new trails, including unpaved trails
- Acquisition or easements of property for trails
- State administrative costs related to this program (limited to seven percent of a State's funds)
- Operation of educational programs to promote safety and environmental protection related to trails (limited to five percent of a State's funds)

Safe Routes to School (SR2S)

Under the SR2S Program, Federal funds are administered by ODOT. Under the Oregon Safe Routes to School Program, approximately $3.7 million will be available for grants between 2006 and 2010. The grants can be used to identify and reduce barriers and hazards to children walking or bicycling to school. ODOT estimates that they will receive an average of $1.37 million annually for this program through the lifetime of SAFETEA-LU.

New Freedom Initiative

SAFETEA-LU creates a new formula grant program that provides capital and operating costs to provide transportation services and facility improvements that exceed those required by the Americans with Disabilities Act.

Community Development Block Grants

The Community Development Block Grants program provides money for streetscape revitalization, which may be largely comprised of pedestrian improvements. Federal Community Development Block Grant grantees may “use Community Development Block Grants funds for activities that include (but are not limited to): acquiring real property; reconstructing or rehabilitating housing and other property; building public facilities and

improvements, such as streets, sidewalks, community and senior citizen centers and recreational facilities; paying for planning and administrative expenses, such as costs related to developing a consolidated plan and managing Community Development Block Grants funds; provide public services for youths, seniors, or the disabled; and initiatives such as neighborhood watch programs."

Land and Water Conservation Fund

The Land and Water Conservation Fund (LWCF) is a Federally-funded program, providing grants for planning and acquiring outdoor recreation areas and facilities, including trails. Funds can be used for right-of-way acquisition and construction. These funds are administered by the Oregon Parks and Recreation Department.

Transportation, Community and System Preservation Program

The Transportation, Community and System Preservation Program provides federal funding for transit-oriented development, traffic calming and other projects that improve the efficiency of the transportation system, reduce the impact on the environment, and provide efficient access to jobs, services and trade centers. The program is intended to provide communities with the resources to explore the integration of their transportation system with community preservation and environmental activities. The Transportation, Community and System Preservation Program funds require a 20 percent match.

State Funding Sources

Oregon Transportation Infrastructure Bank

The Oregon Transportation Infrastructure Bank is a statewide revolving loan fund designed to promote innovative transportation funding solutions. Oregon's program was started in 1996 as part of a ten-state Federal pilot program. Additional legislation passed in 1997 by the Oregon Legislature establishes the program in State law and includes expanded authority. Eligible borrowers include cities, counties, transit districts, other special districts, port authorities, tribal governments, State agencies, and private for-profit and non-profit entities. Eligible projects include:

- Highway projects, such as roads, signals, intersection improvements and bridges
- Transit capital projects, such as buses, equipment, and maintenance or passenger facilities
- Bikeway or pedestrian access projects on highway right-of-way

Eligible project costs include preliminary engineering, environmental studies, right-of-way acquisition, construction (including project management and engineering), inspections, financing costs, and contingencies.

Special Transportation Fund

The State's Special Transportation Fund Program (STF) provides financial support to designated counties, transit districts and Indian tribal governments for special transportation services benefiting seniors and people with disabilities. The majority of the STF money (75 percent) is allocated on a population-based formula. The remaining funds are distributed by the Public Transportation Discretionary Grant Program.

Bicycle and Pedestrian Program Grants

The Pedestrian and Bicycle Grant Program is a competitive grant program providing approximately $5 million every two years to Oregon cities, counties and ODOT regional and district offices for design and construction of pedestrian and bicycle facilities. Proposed facilities must be within public rights-of-way. Grants are awarded by the Oregon Bicycle and Pedestrian Advisory Committee.

Bicyclist Safety Mini-Grant Program

The Community Cycling Center Bicyclist Mini-Grant Program provides funding to public agencies and non-profit 501(c)(3) organizations to promote the safety of bicyclists in Oregon. Funding is available statewide through a grant to the Community Cycling Center from ODOT's Transportation Safety Division. Funding is available for projects targeting youth and/or adults, with a focus on projects that incorporate a strong educational element, especially in communities that do not currently have access to bike safety education resources. For communities that currently do have access to these resources, innovative and creative project proposals are highly encouraged. Applicants may apply for grants between $800 and $5,000.

Pedestrian Safety Mini-Grant Program

Administered by Oregon's Bicycle Transportation Alliance and the Willamette Pedestrian Coalition, the Pedestrian Safety Mini-Grant Program is funded through ODOT's Traffic Safety Division. The program provides funds to police departments around the state to stage crosswalk enforcement actions against motorists who fail to yield to pedestrians. In these operations, a decoy police officer attempts to cross a street at an intersection or marked crosswalk (crosswalk laws apply to unmarked crosswalks as well). If passing motorists fail to stop and yield for the pedestrian, they are issued either a warning or a citation. The operations include a media outreach component, with the purpose of raising awareness around motorists' responsibility toward pedestrians. Grant funds may also be used to offer diversion classes that violators can take in lieu of paying tickets. Applicants may apply for grants up to $5,000.

Business Energy Tax Credits (BETC)

Offered by the Oregon Department of Energy, BETCs reward companies who invest in energy conservation, recycling, renewable energy resources and less-polluting transportation fuels.

Eligible applicants include trade, business or rental property owners with business sites in Oregon or Oregon non-profit organizations, tribes, or public entities partnering with an Oregon business or resident. Non-profit organizations, schools and other public entities can use a transfer option for a cash-sum payment. Investments in alternative fuel infrastructure projects can recoup 50 percent of eligible project costs over five years. Projects with eligible costs under $20,000 can take the tax credit in one year. Employer bicycle purchases may be eligible for a 35% of cost grant. To receive the credit, an application must be submitted prior to the beginning of the project, and again after the project is completed, indicating the resulting reduction in vehicle miles traveled.

Other Funding Sources

American Greenways Program

Administered by The Conservation Fund, the American Greenways Program provides funding for the planning and design of greenways. Applications for funds can be made by local, regional or statewide non-profit organizations and public agencies. The maximum award is $2,500, but most awards range from $500 to $1,500. American Greenways Program monies may be used to fund unpaved trail development.

Bikes Belong Grant Program

The Bikes Belong Coalition of bicycle suppliers and retailers has awarded $1.2 million and leveraged an additional $470 million since its inception in 1999. The program funds corridor improvements, mountain bike trails, BMX parks, trails, and park access. It is funded by the Bikes Belong Employee Pro Purchase Program.

Appendix R: Revenue Stream Forecasts

City of Sisters Revenue Stream Forecasts for Street Fund

REVENUE

Revenue	Yearly Amount	Growth
INTEREST EARNED	$1,000	none assumed
HIGHWAY GAS TAX	$68,000	$20K more in 2010, plus another $20K in 2011 (due to higher state taxes from recent bill) plus 8% per year growth
BIKE/FOOTPATH-GAS TAX	$700	8% per year growth
WATER LINES	$25,000	none assumed
CELL TOWERS	$30,000	5% per year growth
SEWER LINES	$34,000	none assumed
MISCELLANEOUS	$500	none assumed
STREET PERMITS	$8,500	none assumed

Transfers In

Transfer from General Fund	$70,000	except for 2009 (which would have $200K)

EXPENSES

M & S	Yearly Amount	Growth
AUDIT FEES	$610	5% per year growth
COMPUTER SFTWR& UPGRADES	$500	none assumed
OFFICE SUPPLIES	$500	none assumed
CONTRACTED SERVICES	$3,000	none assumed
TELEPHONE	$1,200	none assumed
EDUCATION	$1,500	none assumed
EQUIPMENT	$6,700	none assumed
GAS & OIL	$4,000	$500 more per year
IMPROVEMENTS & REP	$15,000	none assumed
INS: COMP/LIA/UMB	$3,500	5% per year growth
SNOW REMOVAL/STREET CLEANING	$7,000	none assumed
LEGAL FEES	$1,500	none assumed
STREET LIGHTS	$8,000	none assumed
UNIFORMS	$500	none assumed
MISCELLANEOUS	$300	none assumed
SUPPLIES	$5,000	none assumed
VEHICLE MAINTENANCE	$10,000	none assumed

Capital Improvements

ASPHALT MAINTENANCE	$100,000	none assumed

Personal Services

City Staff Labor	$160,000	5% growth per year

City of Sisters Revenue Stream Forecasts

STREET

Revenue	Year 2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
INTEREST EARNED	1,000	1,030	1,061	1,093	1,126	1,159	1,194	1,230	1,267	1,305	1,344	1,384	1,426	1,469	1,513	1,558	1,605	1,653	1,702	1,754	1,806	1,860	
HIGHWAY GAS TAX	68,000	93,440	120,915	130,588	141,035	152,318	164,504	177,664	191,877	207,227	223,806	241,710	261,047	281,931	304,485	328,844	355,151	383,563	414,249	447,388	483,179	521,834	
BIKE/FOOTPATH-GAS TAX	700	756	816	882	952	1,029	1,111	1,200	1,296	1,399	1,511	1,632	1,763	1,904	2,056	2,221	2,398	2,590	2,797	3,021	3,263	3,524	
Street Maintenance Charge	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
WATER LINES	25,000	25,500	26,010	26,530	27,061	27,602	28,154	28,717	29,291	29,877	30,475	31,084	31,706	32,340	32,987	33,647	34,320	35,006	35,706	36,420	37,149	37,892	
CELL TOWERS	30,000	31,500	33,075	34,729	36,465	38,288	40,203	42,213	44,324	46,540	48,867	51,310	53,876	56,569	59,398	62,368	65,486	68,761	72,199	75,809	79,599	83,579	
SEWER LINES	34,000	35,020	36,071	37,153	38,267	39,415	40,598	41,816	43,070	44,362	45,693	47,064	48,476	49,930	51,428	52,971	54,560	56,197	57,883	59,619	61,408	63,250	
MISCELLANEOUS	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	
Local Gas Tax Receipts	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Street Permits	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	8,500	
Grants & Pass Throughs																							
ODOT Sidewalk Grant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Hwy 242 Bike Path Grant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Transfers In																							
Transfer from General Fund	200,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	70,000	
	367,700	**266,246**	**296,948**	**309,975**	**323,907**	**338,812**	**354,763**	**371,840**	**390,125**	**409,711**	**430,696**	**453,185**	**477,293**	**503,143**	**530,867**	**560,608**	**592,520**	**626,770**	**663,536**	**703,011**	**745,404**	**790,938**	10,507,995

STREET

M & S																							
AUDIT FEES	610	641	673	706	741	779	817	858	901	946	994	1,043	1,095	1,150	1,208	1,268	1,332	1,398	1,468	1,541	1,619	1,699	
COMPUTER SFTWR& UPGRADES	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	
OFFICE SUPPLIES	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	
PLANNING CONSULTANT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
CoNTRACTED SERVICES	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	
TELEPHONE	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	
EDUCATION	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	
EQUIPMENT	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700	
GAS & OIL	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500	9,000	9,500	10,000	10,500	11,000	11,500	12,000	12,500	13,000	13,500	14,000	14,500	
IMPROVEMENTS & REP	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	
INS: COMP/LIA/UMB	3,500	3,675	3,859	4,052	4,254	4,467	4,690	4,925	5,171	5,430	5,701	5,986	6,285	6,600	6,930	7,276	7,640	8,022	8,423	8,844	9,287	9,751	
NOW REMOVAL/STREET CLEANING	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	7,000	
LEGAL FEES	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	
STREET LIGHTS	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	
UNIFORMS	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	500	
MISCELLANEOUS	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	
Supplies	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	
VEHICLE MAINTENANCE	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	
	68,810	**69,516**	**70,231**	**70,958**	**71,696**	**72,446**	**73,208**	**73,983**	**74,772**	**75,576**	**76,395**	**77,229**	**78,081**	**78,950**	**79,838**	**80,744**	**81,672**	**82,620**	**83,591**	**84,586**	**85,605**	**86,650**	1,697,156
Capital Improvements																							
ODOT Sidewalk Grant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bike/Footpath	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
ASPHALT MAINTENANCE	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	
Hwy 242 Bikepath Grant	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	100,000	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	2,200,000
Personal Services																							
City Staff Labor	160,000	168,000	176,400	185,220	194,481	204,205	214,415	225,136	236,393	248,213	260,623	273,654	287,337	301,704	316,789	332,629	349,260	366,723	385,059	404,312	424,528	445,754	6,160,834
TRANSFERS																							
To Reserve Fund	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	328,810	**337,516**	**346,631**	**356,178**	**366,177**	**376,651**	**387,623**	**399,119**	**411,165**	**423,788**	**437,018**	**450,884**	**465,418**	**480,654**	**496,627**	**513,373**	**530,932**	**549,343**	**568,650**	**588,898**	**610,133**	**632,404**	10,057,991